CITY OF SANTEE

Planning & Building Department

Aubrey Glen Project

Class 32 CEQA Exemption Analysis

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APPENDICES

I. PROJECT CHARACTERISTICS

1. **Project Title:**
   Aubrey Glen Project Design Review (DR 2024-0005)

2. **Lead Agency Name and Address:**
   City of Santee
   Planning & Building Department
   10601 Magnolia Avenue
   Santee, CA 92071

3. **Contact Person and Phone Number:**
   Sandi Sawa, MPL, AICP
   Director of Planning and Building/City Planner
   10601 Magnolia Avenue
   Santee, CA 92071
   (619) 259-4100 ext. 167; ssawa@cityofsanteeca.gov

4. **Project Location:**
   7737 Mission Gorge Road
   Assessor's Parcel Numbers: 386-701-02

5. **Project Sponsor's Name and Address:**
   Troy Friedeck
   KB Home Coastal, Inc.
   9915 Mira Mesa Boulevard, Suite 100
   San Diego, CA 92131

6. **Property Owner:**
   KB Home Coastal, Inc.
   9915 Mira Mesa Boulevard, Suite 100
   San Diego, CA 92131

7. **Existing General Plan Designation:**
   High-Density Residential

8. **Existing Zoning:**
   R-22 High-Density Residential (22-30 dwelling units per gross acre)

II. EXECUTIVE SUMMARY

The project applicant, KB Home Coastal, Inc., has submitted documents for the proposed Aubrey Glen Project (project) for Design Review. The project site is bordered by Mission Gorge Road to the north, commercial and residential uses to the east, and high-density residential uses to the south and west, and therefore would be considered an “infill” project.

The project was previously approved under the City of Santee’s (City) Essential Housing Ordinance (EMP 2022-1). In conjunction with this Development Review application, the applicant is no longer seeking the designation as Essential Housing.

The California Environmental Quality Act (CEQA) analysis provided herein evaluates the consistency of the project with the exemption requirements for a Class 32 Categorical Exemption for infill development projects as set forth in State CEQA Guidelines Section 15332. Based on the information and conclusions set forth on the following pages, this CEQA analysis demonstrates the project’s consistency with the requirements for a Class 32 Categorical Exemption. No additional environmental documentation or analysis is required.

III. PROJECT DESCRIPTION

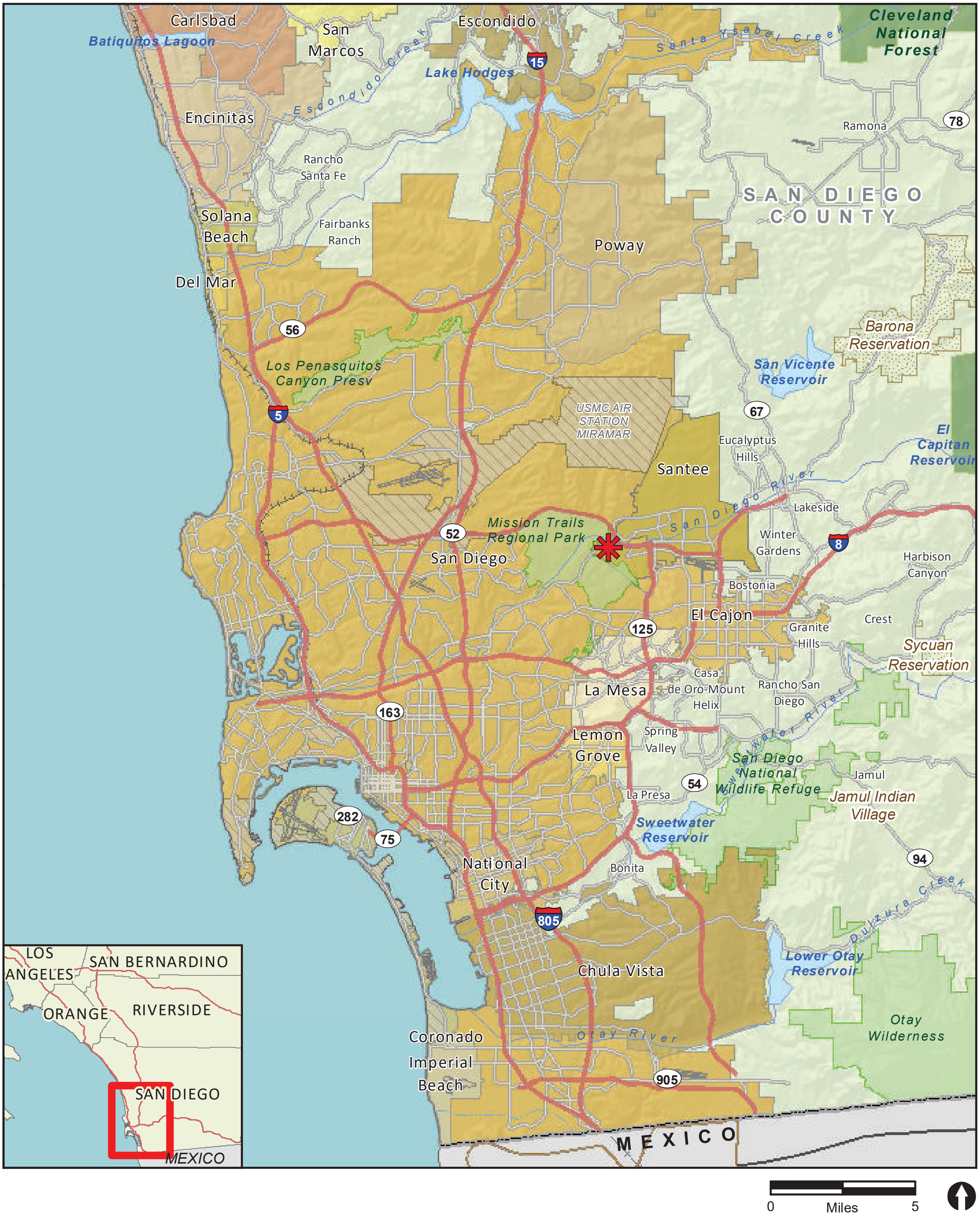
Project Location

The project site is located at 7737 Mission Gorge Road (Assessor’s Parcel Number 386-701-02) in the city of Santee, California. The project site is located east of Aubrey Glen Drive and south of Mission Gorge Road. The 2.63-acre project site is currently developed with 11,700 square feet of vacant retail buildings surrounded by concrete and asphalt parking lots and minimal landscape planters. The project is bordered by Mission Gorge Road to the north, commercial and residential uses to the east, and high-density residential uses to the south and west. Figure 1 shows the regional location of the project. Figure 2 shows an aerial photograph of the project site and vicinity. The site is served by San Diego Metropolitan Transit System (MTS) buses, with the nearest bus stop located at the intersection of Mission Gorge Road and West Hills Parkway, approximately 650 feet east of the project site.

Existing Conditions and Surrounding Land Uses

The existing setting of the project site is developed with vacant buildings surrounded by concrete and asphalt parking lots and minimal landscape planters. The project is bordered by Mission Gorge Road to the north, commercial and residential uses to the east, and high-density residential uses to the south and west.

The project site was previously used as a retail bottled water distribution facility. The site is abandoned and has not been used for the past ten years or more. There are no biological resources, endangered species or endangered species habitat on the site.



Project Location

RECON

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FIGURE 1
Regional Location

Image Source: NearMap (flown May 2024)

FIGURE 2
Project Location on Aerial Photograph

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General Plan and Zoning

The project would be consistent with the existing general plan land use designation and zoning designation of R-22 High-Density Residential (22 to 30 dwelling units per acre; Map ID no. 29; City of Santee 2022). Both the R-22 High-Density Residential land use and zoning designation are intended for residential development characterized by apartment and condominium buildings. It is intended that this category utilize innovative site planning and building design (including three-story buildings) and incorporate on-site recreational amenities and open space. This designation has been applied in areas in close proximity to major community facilities and services, transit facilities, and major streets.

Project

The project would construct 52 residential dwelling units. Fourteen units would consist of attached residential, configured within seven, three-story duplex buildings, and each of the remaining 38 units would consist of three-story detached residential buildings. The residential units would average approximately 1,400 square feet in size, and the project would be consistent with the existing zoning designation of High-Density Residential R-22 (22 to 30 dwelling units per acre). All 52 residential units would be configured with 3 bedrooms and 2.5 bathrooms, and 25 of these residential units would also be configured with a den. All 52 residential units would have private open space by way of patio/entry space and balcony/deck. Vehicular access would be provided via a driveway connecting to Aubrey Glen Drive. All 52 residential units would include a private two-car garage, providing for a total of 104 residential parking spaces. The project would also provide 15 on-site guest parking spaces. Overall, the project would provide a total of 119 parking spaces, which would exceed the City's parking requirement of 2.25 parking spaces per unit. Furthermore, the project would provide 12 off-site parking spaces along Aubrey Glen Drive that would be regulated by City right-of-way with signage. These 12 off-site parking spaces would not be exclusive to the project, and therefore are not included in the parking count. The project would also provide approximately 5,000 square feet of common open space with amenities that would be managed by a private homeowners association. Figure 3 shows the proposed site plan.

There is no natural vegetation that exists on-site, and the project would implement landscaping consistent with the requirements of the City's Municipal Code Title 13, Section No. 13.36 (Landscaping) and Title 8, Section 8.06.070 (Protection of trees). Trash enclosures would be fenced and roofed. The project would include an on-site storm drain that would capture, detain, and treat site runoff prior to discharging to an existing storm drain system.

Project Construction

The project would be constructed over approximately 14 months and is anticipated to start in January 2025. Construction activities would consist of demolition of the existing buildings and parking lot areas, site preparation, grading, building construction, paving, and architectural coatings. Construction grading would be balanced so that no export or import would be required.

Map Source: Summa Architecture

PROJECT SUMMARY

THREE-STORY CONDOMINIUMS

RESIDENCES	52 HOMES
GROSS SITE AREA	2.63 ACRES
NET SITE AREA	2.23 ACRES
NET DENSITY	24.0 DU/AC
PARKING	131 SP (2.5 SP/DU)
ZONING	R-22

PRODUCT MIX

25	PLAN 1	3BD+DEN/2.5 BA	1,440 SF
27	PLAN 2	3BD/2.5 BA	1,470 SF

52 TOTAL UNITS

PARKING SUMMARY

REQUIRED	
52 X 2.00 =	104 SP
52 X 0.25 GUEST =	13 SP
TOTAL	117 SP

PROVIDED - ONSITE / PRIVATE	
GARAGE	104 SP
OPEN PERPENDICULAR	6 SP
OPEN PARALLEL	9 SP
TOTAL	119 SP

PROVIDED - OFFSITE / PUBLIC	
STREET	12 SP
TOTAL	131 SP

ELECTRIC VEHICLE PARKING

15 GUEST X 13% = 2 SP REQUIRED / PROVIDED

EACH GARAGE SHALL BE INSTALLED WITH A MIN. LEVEL 2 EVCS (52 GARAGES = 52 EVCS)

SITE COVERAGE

BUILDINGS	32,292 SF	33%
PAVEMENT	34,776 SF	36%
OPEN SPACE	30,071 SF	31%
TOTAL NET AREA	97,139 SF	100%

OPEN SPACE

PRIVATE OPEN SPACE

REQUIRED	
52 X 60 =	3,120 SF

PROVIDED	
DECK	4,140 SF
PATIO	7,162 SF
TOTAL	11,302 SF

COMMON OPEN SPACE

REQUIRED	
52 X 100 =	5,200 SF
PROVIDED	5,490 SF

KEYNOTES

1	PROPERTY LINE
2	PERPENDICULAR PARKING SPACE (9' X 19')
3	PARALLEL PARKING SPACE (9' X 25')
4	ACCESSIBLE PARKING SPACE (9' X 19')
5	MAILBOX LOCATION
6	4FT MINIMUM WIDE WALKWAY
7	PRIVATE PATIO
8	PRIVATE YARD
9	COMMON REC AREA
10	AC UNIT
11	TRANSFORMER
12	LINE OF FLOOR ABOVE
13	OPEN LAWN AREA
14	SETBACK LINE
15	LIGHTED DIRECTORY MAP

SCALE: 0 20 40 60

RECON

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FIGURE 3

Site Plan

Construction of the project would include the use of excavators, rubber-tired dozers, graders, tractors, loaders, backhoes, paving equipment, rollers, forklifts, cranes, generator sets, and air compressors. The nearest sensitive receptors are the residential uses to the east and high-density residential uses to the south and west.

Project Conditions

The following project conditions would be required. These measures would be incorporated as Conditions of Approval for the entitlement of the site and are typical for urban infill projects built on existing improved land within the city of Santee. Such measures taken to comply with building codes or to address common and typical concerns for new projects do not preclude the use of CEQA exemptions (Berkeley Hillside Preservation v. City of Berkeley (2015) 241 Cal. App.4th 943, 960-961). The following measures are standard conditions for similar development projects entitled in the past by the City:

Standard Project Condition No. 1 – Air Quality:

1. The construction contractor shall use construction equipment powered by California Air Resources Board (CARB) certified Tier 4, or newer, engines and haul trucks that conform to current U.S. Environmental Protection Agency truck standards.

2. During all grading and site preparation activities, the on-site construction superintendent shall ensure implementation of standard best management practices as required by the San Diego Air Pollution Control District (SDAPCD) Rule 55, Fugitive Dust Control.

3. During all grading and site preparation activities, the on-site construction superintendent shall ensure implementation of applicable California Department of Resources Recycling and Recovery (CalRecycle) Sustainable (Green) Building Program Measures, as specified on the CalRecycle website.

4. The project shall utilize high-efficiency equipment and fixtures consistent with the current California Green Building Standards Code and Title 24 of the California Code of Regulations. The project shall include the installation of infrastructure to make the proposed project solar-ready.

5. The project shall include the installation of infrastructure necessary for electric vehicle parking, as well as providing preferential parking for electric vehicles. The project shall provide bike parking on-site.

6. The project shall comply with the Santee Water Efficient Landscape Ordinance. The ordinance promotes water conservation and efficiency by imposing various requirements related to evapotranspiration rates, irrigation efficiency, and plant factors.

7. The project shall comply with Chapters 9.02 and 9.04 of the Santee Municipal Code that pertain to solid waste management and demolition and construction debris recycling.

8. In conformance with SDAPCD Rule 67.0.1, Architectural Coatings, the project shall use low volatile organic compound (VOC) paints.

9. The project shall not include wood burning stoves or fireplaces.

Standard Project Condition No. 2 – Biological Resources:

1. In conformance with CEQA, the Migratory Bird Treaty Act and the California Fish and Game Code, brushing, clearing and/or grading shall not be allowed during bird breeding season (between January 15 and September 15). If vegetation is to be cleared during the breeding season, a qualified biologist shall perform a nesting bird survey within the proposed construction area and appropriately sized buffer no more than 72 hours prior to vegetation disturbance. If the planned vegetation disturbance does not occur within 72 hours of the nesting bird survey, then the area will be resurveyed. If nesting birds are found, then the qualified biologist will establish an adequate buffer zone (on a species-by-species, case-by-case basis) in which construction activities would be prohibited until the nest is no longer active. The size of the buffer zone is determined by the biologist based on the amount, intensity, and duration of construction and can be altered based on site conditions. If appropriate, as determined by the biologist, additional monitoring of the nesting birds may be conducted during construction to ensure that nesting activities are not disrupted.

2. All vehicles, equipment, tools, and supplies shall stay within the limits of the impact area.

3. Best management practices (BMP) features (e.g., silt fencing, straw wattles, and gravel bags) shall be installed where necessary to prevent and/or limit off-site sedimentation runoff in accordance with an approved BMP plan.

4. Any planting stock to be brought onto the project site for landscaping shall be first inspected to ensure that it is free of pest species that could invade natural areas, including, but not limited to, Argentine ants (*Linepithema humile*), non-native fire ants (e.g., *Solenopsis invicta*), and other insect pests.

Standard Project Condition No. 3 – Geology/Soils:

The Construction Contractor shall ensure that construction of the project complies with the recommendations identified in the project-specific geotechnical investigation. Recommendations related to general construction, seismic considerations, earthwork, foundations, building floor foundations, lateral earth pressures, corrosivity, drainage, storm infiltrations, exterior concrete, and masonry flatwork and paved areas shall be adhered to during all project design and construction.

Standard Project Condition No. 4 – Noise:

1. All construction plans shall include the following notes:

    a) Operations shall conform to the City's Municipal Code Section 5.04.090.

    b) All equipment shall be equipped with properly maintained mufflers.

    c) The construction contractor shall place noise-generating construction equipment and locate construction staging areas at the greatest possible distance from sensitive uses whenever feasible during all project construction.

d) The construction contractor shall use on-site electrical sources to power equipment rather than diesel generators where feasible.

2. All residential units located within 500 feet of the construction site shall be sent a notice regarding the construction schedule. A sign legible at a distance of 50 feet shall also be posted at the construction site. All notices and the signs shall indicate the dates and durations of construction activities, as well as provide a telephone number for the "noise disturbance coordinator."

3. A "noise disturbance coordinator" shall be established. The disturbance coordinator shall be responsible for responding to any local complaints about construction noise. The disturbance coordinator shall determine the cause of the noise complaint (e.g., starting too early, bad muffler) and shall be required to implement reasonable measures to reduce noise levels.

4. The following note shall be incorporated into the project construction plan: "Control of Construction Hours. Construction activities occurring as part of the project shall be subject to the limitations and requirements of Section 5.04.090 of the City Municipal Code which states that construction activities may occur between 7:00 a.m. and 7:00 p.m. Mondays through Saturdays. No construction activities shall be permitted outside of these hours or on Sundays and holidays."

5. Interior Noise: For the two units located closest to Mission Gorge Road, windows shall have a sound transmission class (STC) rating of 24 or higher. The STC ratings shall be specified on project building plans and shall be verified by the Director of Planning & Building, or designee, prior to the issuance of building permits.

Standard Project Condition No. 5 – Cultural - Tribal/Archaeological Monitor:

1. Prior to the start of ground-disturbing activities, the applicant shall retain a qualified archaeologist who meets the Secretary of the Interior's Professional Qualifications Standards for Archaeology (U.S. Department of the Interior 1983) to carry out all mitigation related to cultural resources. The applicant shall also retain a Native American Monitor of Kumeyaay decent.

2. Prior to start of ground-disturbing activities, the qualified archaeologist shall conduct cultural resources sensitivity training for all construction personnel. Construction personnel shall be informed of the types of archaeological resources that may be encountered, and of the proper procedures to be enacted in the event of an inadvertent discovery of archaeological resources or human remains. The applicant shall ensure that construction personnel attend the training and sign an attendance acknowledgement form. The applicant shall retain documentation demonstrating attendance.

3. The qualified archaeologist, or an archaeological monitor (working under the direct supervision of the qualified archaeologist), shall observe all initial ground-disturbing activities, including but not limited to brush clearance, vegetation removal, grubbing, grading, and excavation. The qualified archaeologist, in coordination with the applicant and the City, may reduce or discontinue monitoring if it is determined by the qualified archaeologist that the possibility of encountering buried archaeological deposits is low based on observations of soil stratigraphy or other factors. Archaeological monitoring shall be conducted by an archaeologist familiar with the types of archaeological resources that could be encountered within the project site. The archaeological monitor shall be

empowered to halt or redirect ground-disturbing activities away from the vicinity of a discovery until the qualified archaeologist has evaluated the discovery and determined appropriate treatment (as prescribed below). The archaeological monitor shall keep daily logs detailing the types of activities and soils observed, and any discoveries. After monitoring has been completed, the qualified archaeologist shall prepare a monitoring report that details the results of monitoring. The report shall be submitted to the City and any Native American groups who request a copy. A copy of the final report shall be filed at the South Coastal Information Center.

4. The Native American Monitor shall be present for any pre-construction meeting and for all ground disturbing activities associated with the project. Should any cultural or tribal cultural resources be discovered, no further grading shall occur in the area of the discovery until the City Planner, or designee, with concurrence from the Native American Monitor, are satisfied that treatment of the resource has occurred. In the event that a unique archaeological resource or tribal cultural resource is discovered, and in accordance with Public Resources Code (PRC) Section 21083.2(b)(1), (2), and (4), the resource shall be moved and buried in an open space area of the project site, such as slope areas, which will not be subject to further grading activity, erosion, flooding, or any other ground disturbance that has the potential to expose the resource. The on-site area to which the resource is moved shall be protected in perpetuity as permanent open space. No identification of the resource shall be made on-site; however, the applicant shall plot the new location of the resource on a map showing latitudinal and longitudinal coordinates and provide that map to the Native American Heritage Commission (NAHC) for inclusion in the Sacred Lands File. Disposition of the resources shall be at the discretion of the City, but in accordance with the foregoing.

5. In the event of the unanticipated discovery of archaeological materials, all work shall immediately cease in the area (within 100 feet) of the discovery until it can be evaluated by the qualified archaeologist in consultation with the Native American Monitor. Construction shall not resume until the qualified archaeologist has conferred with the applicant and the City on the significance of the resource.

6. If it is determined that the discovered archaeological resource constitutes a historical resource or a unique archaeological resource under CEQA, avoidance and preservation in place is the preferred manner of mitigation. Preservation in place may be accomplished by, but is not limited to, avoidance, incorporating the resource into open space, capping, or deeding the site into a permanent conservation easement. In the event that preservation in place is demonstrated to be infeasible and data recovery through excavation is the only feasible mitigation available, a Cultural Resources Treatment Plan shall be prepared and implemented by the qualified archaeologist in consultation with the applicant and the City that provides for the adequate recovery of the scientifically consequential information contained in the archaeological resource. The qualified archaeologist and the City shall consult with appropriate Native American representatives in determining treatment for prehistoric or Native American resources to ensure cultural values ascribed to the resources, beyond those which are scientifically important, are considered.

7. If human remains are encountered, all work shall halt in the vicinity (within 100 feet) of the discovery and the San Diego County Coroner will be contacted in accordance with PRC Section 5097.98 and Health and Safety Code Section 7050.5. The applicant and the City will also be notified. If the County Coroner determines that the remains are Native American, the NAHC will be notified in accordance with Health and Safety Code Section

7050.5, subdivision (c), and PRC Section 5097.98 (as amended by Assembly Bill 2641). The NAHC will designate a Most Likely Descendant (MLD) for the remains per PRC Section 5097.98. The MLD shall complete the inspection of the site within 48 hours of being granted access and shall provide recommendations for the treatment of the remains. Until the landowner has conferred with the MLD, the applicant will ensure that the immediate vicinity where the discovery occurred is not disturbed by further activity, is adequately protected according to generally accepted cultural or archaeological standards or practices.

IV. CLASS 32 CATEGORICAL EXEMPTION ANALYSIS

The following analysis provides substantial evidence to support a conclusion that the project qualifies for an exemption under State CEQA Guidelines Section 15332 as a Class 32 urban infill development and would not have a significant effect on the environment.

Class 32 Categorical Exemption: Class 32 consists of projects characterized as in-fill development meeting the conditions described below:

(a) The project is consistent with the applicable general plan designation and all applicable general plan policies as well as with applicable zoning designation and regulations.

(b) The proposed development occurs within city limits on a project site of no more than five acres substantially surrounded by urban uses.

(c) The project site has no value as habitat for endangered, rare or threatened species.

(d) Approval of the project would not result in any significant effects relating to traffic, noise, air quality, or water quality.

(e) The site can be adequately served by all required utilities and public services.

Criterion Section 15332(a): General Plan and Zoning Consistency

Yes	No	
☒	☐	The project is consistent with the applicable general plan designation and all applicable general plan policies as well as with applicable zoning designation and regulations.

General Plan

The project would be consistent with the existing General Plan land use designation of R-22 High-Density Residential (22–30 dwelling units per gross acre). The R-22 High-Density Residential zoning designation is intended for residential development characterized by apartment and condominium buildings. It is intended that this category utilize innovative site planning and building design (including three-story buildings) and incorporate on-site recreational amenities and open space. This designation has been applied in areas in close proximity to major community facilities and services, transit facilities and major streets. The project would be consistent with the intent of the R-22 High-Density Residential General Plan land use designation.

Zoning

The project would be consistent with the existing zoning designation of R-22 High-Density Residential (22–30 dwelling units per gross acre). The R-22 High-Density Residential zoning designation is intended for residential development characterized by apartment and condominium buildings. It is intended that this category utilize innovative site planning and building design (including three-story buildings) and incorporate on-site recreational amenities and open space. This designation has been applied in areas in close proximity to major community facilities and services, transit facilities and major streets. The project would be consistent with the intent of the R-22 High-Density Residential Zone.

The project would be consistent with the zoning regulations of the R-22 Zone. The maximum height limit for the R-22 Zone is 56 feet (four stories) and the proposed residential buildings would be three stories and would not exceed the height limit. The project meets all other zoning standards, including setbacks and parking. The setback requirements are 20 feet for the front setback, 10 feet for the side setback, and 10 feet for the rear setback. Each building/duplex setback would be 10 feet throughout, along with the community setback of 25 feet from Mission Gorge Road. The project would provide a total of 129 car parking spaces, which would exceed the City's parking requirement of 2.25 parking spaces per unit. Landscaping would be provided within these setback areas as required by the City's Zoning Ordinance.

Criterion Section 15332(b): Project Location, Size, and Context

Yes	No	
☒	☐	The proposed development occurs within city limits on a project site of no more than 5 acres substantially surrounded by urban uses.

The project site is located on an approximately 2.63-acre site within the city of Santee and is surrounded by parcels developed with urban land uses and paved public streets. Therefore, the project would be consistent with State CEQA Guidelines Section 15332(b).

Criterion Section 15332(c): Endangered, Rare, or Threatened Species

Yes	No	
☒	☐	The project site has no value as habitat for endangered, rare or threatened species.

The project site consists of improved buildings, parking areas and driveways, with no undeveloped vegetation areas. The 2.63-acre project site is currently developed with 11,700 square feet of vacant retail buildings surrounded by concrete and asphalt parking lots and minimal landscape planters. The project is bordered by Mission Gorge Road to the north, commercial and residential uses to the east, and high-density residential uses to the south and west. No natural vegetation exists on the project site. There are no potentially jurisdictional aquatic resources on site. The San Diego River is located approximately 0.4 mile north of the site. The project site is surrounded by urban development and does not possess connectivity to substantial open space or habitat suitable to support endangered, rare, or threatened species.

The City determined that a Biological Resources Report was unnecessary for the subject property because it is fully developed with vacant retail buildings surrounded by concrete and asphalt parking lots, and there is no natural habitat on-site.

Due to its developed nature within an urbanized environment, the project site has no value as a wildlife corridor.

Therefore, the project site has no value as habitat for endangered, rare, or threatened species, and the project would be consistent with State CEQA Guidelines Section 15332(c).

Criterion Section 15332(d): Traffic, Noise, Air Quality, or Water Quality

Yes	No	
☒	☐	Approval of the project would not result in any significant effects relating to traffic, noise, air quality, or water quality.

The analysis below describes the project effects for the resource topics in this criterion, organized as follows: traffic, noise, air quality, and water quality. As demonstrated in the following discussions, the project would not result in significant effects related to traffic, noise, air quality, or water quality and is consistent with Section 15332(d) of the State CEQA Guidelines.

Traffic

The following analysis is based on the Traffic Analysis Intake Form prepared by Linscott, Law & Greenspan, Engineers (Appendix A). Trip generation for the proposed 52 residential units was based on the Institute of Transportation Engineers' (ITE) *Trip General Manual*. The ITE Land Use Code 215 (Single-Family Attached Housing) was used for project trip generation. This is considered the worst-case trip generation for the project. As shown in Table A, the project would generate 374 average daily trips (ADT).

Table A: Project Trip Generation

		Daily Trip Ends (ADTs) [a]		AM Peak Hour					PM Peak Hour				
Land Use Description	Size	Rate[b]	Volume	Rate	In:Out Split	Volume			Rate	In:Out Split	Volume		
						In	Out	Total			In	Out	Total
Multifamily Housing (Mid-Rise - Not Close to Rail Transit	52 DU[c]	7.2/ DU	374	0.48/ DU	31% : 69%	8	17	25	0.57/ DU	57% : 43%	17	13	30
TOTAL			374			8	17	25			17	13	30

[a]ADT = average daily traffic.
[b]Rates are based on ITE Trip Generation Manual, 11th Edition - Land Use 215 (Single-Family Attached Housing)
[c]DU = dwelling unit.

Completion of the Traffic Analysis Intake Form included an evaluation of whether the project would have the potential to result in impacts related to Vehicle Miles Traveled (VMT). The City of Santee Guidelines for Transportation Impact Studies identifies seven types of projects that can be screened out from the requirement for a VMT analysis. Projects consisting of less than 5 acres of land and generating fewer than 500 ADT would be considered small projects that screen out of the requirement for a VMT analysis. As shown in Table A above, the project would generate 374 ADT, which would be less than this screening criteria. Therefore, the project is screened out from a VMT analysis and is presumed to have a less than significant effect relating to traffic pursuant to Section 15332(d) of the State CEQA Guidelines.

Noise

The following analysis is based on the Noise Analysis prepared by RECON Environmental, Inc. (RECON) (Appendix B). The analysis was prepared in accordance with standards established in the City's General Plan Noise Element and the City's Municipal Code. The nearest sensitive receptors include residential uses adjacent to as close as 40 feet from the western project boundary, 40 feet from the southern project boundary, and 135 feet from the eastern project boundary.

Construction Noise. Noise level limits for construction activities are established in Section 5.04.090 of the City's Municipal Code. These limits state that a notice must be provided to all owners and occupants within 300 feet of the project site if the construction equipment has a manufacturer's noise rating of 85 decibels (dB) and operates at a specific location for 10 consecutive workdays. In addition, Section 5.04.090 of the City's Municipal Code states that no construction equipment is permitted before 7:00 a.m. or after 7:00 p.m. on Mondays through Saturdays and at all times on Sundays and holidays. Project construction noise would be generated by diesel engine-driven construction equipment used for site preparation and grading, building construction, loading, unloading, and placing materials and paving. Diesel engine driven trucks also would bring construction materials to the site.

Construction equipment with a diesel engine typically generates maximum noise levels from 70 to 95 A-weighted decibel average one-hour equivalent noise level [dB(A) L_{eq}] at a distance of 50 feet (Federal Highway Administration [FHWA] 2006 and 2008; Federal Transit Authority 2006). During construction, equipment moves to different locations and goes through varying load cycles, and there are breaks for the operators and for non-equipment tasks, such as measurement.

Although maximum noise levels may be 70 to 95 dB(A) at a distance of 50 feet during most construction activities, hourly average noise levels from the grading phase of construction would be 85 dB(A) L_{eq} at 50 feet from the center of construction activity when assessing the loudest pieces of equipment–dozer, excavator, and loader–working simultaneously. Noise associated with the construction of the project was modeled at a series of 15 receivers located at the adjacent properties. The results are summarized in Table B. Construction noise contours are shown in Figure 4. SoundPLAN data is provided as an attachment to Appendix B. Note that the project site has been previously disturbed and developed, and no blasting would be required.

Table B: Construction Noise Levels at Off-Site Receivers [dB(A) L_{eq}]

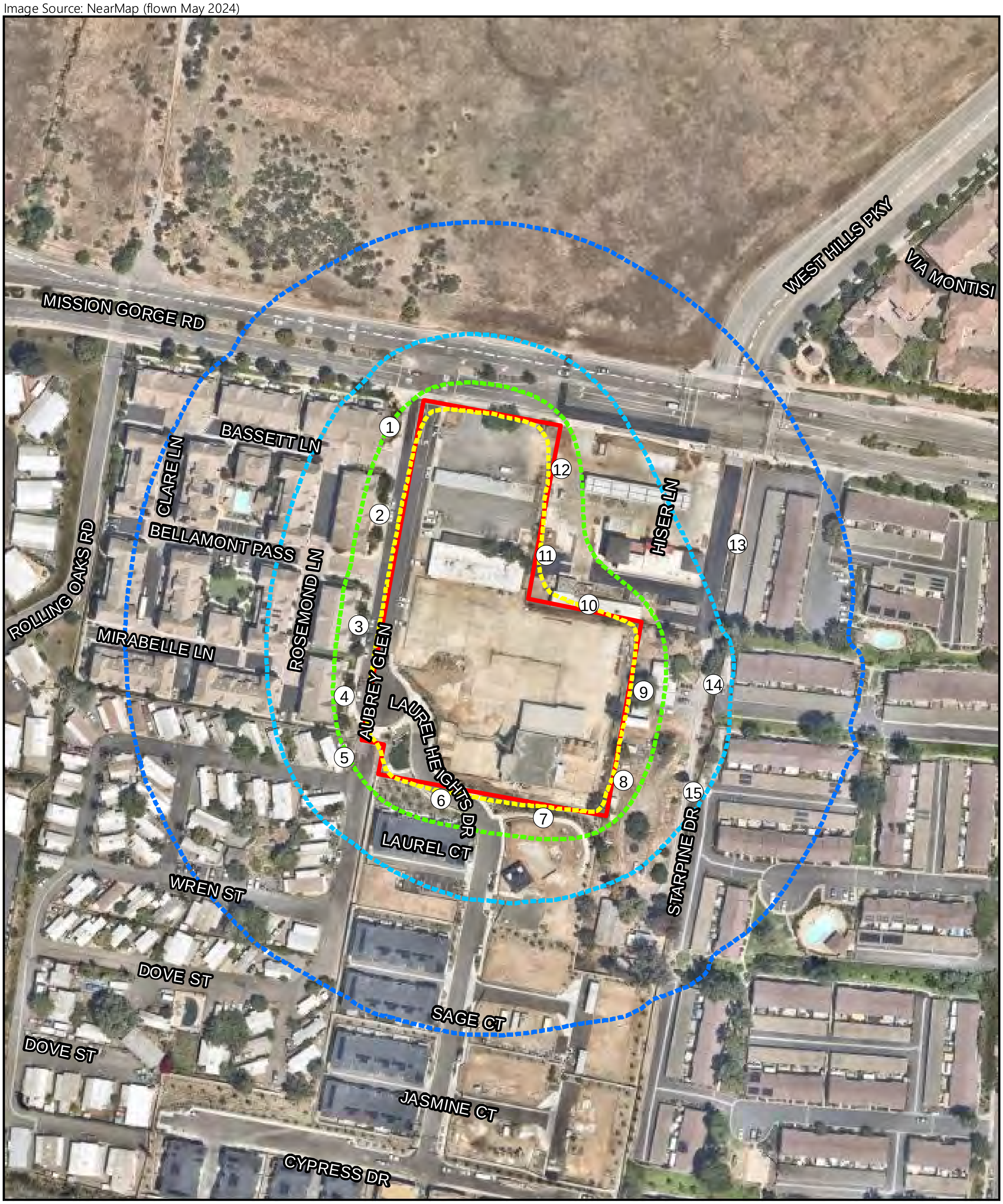
Receiver	Land Use Designation	Construction Noise Level
1	R14 (Medium-High Density Residential)	70
2	R14 (Medium-High Density Residential)	72
3	R14 (Medium-High Density Residential)	72
4	R14 (Medium-High Density Residential)	71
5	R7 (Medium Density Residential)	70
6	R7 (Medium Density Residential)	73
7	R7 (Medium Density Residential)	73
8	R7 (Medium Density Residential)	73
9	GC (General Commercial)	73
10	GC (General Commercial)	74
11	GC (General Commercial)	74
12	GC (General Commercial)	73
13	R7 (Medium Density Residential)	63
14	R7 (Medium Density Residential)	66
15	R7 (Medium Density Residential)	66

Source: Appendix B.
dB(A) L_{eq} = A-weighted decibels equivalent noise level.

As shown in Table B, construction noise levels are anticipated to range from 63 to 74 dB(A) L_{eq} at the adjacent properties. Although the existing adjacent uses would be exposed to construction noise levels that could be heard above ambient conditions, the exposure would be temporary. The project would not require construction equipment that has a manufacturer's noise rating of 85 dB or higher. In accordance with Section 5.04.090 of the City's Municipal Code, construction activities would not occur before 7:00 a.m. or after 7:00 p.m. on Mondays through Saturdays and would not occur at any time on Sundays and holidays. Additionally, the project would be subject to Standard Project Condition No. 4 – Noise, items 1 through 4 (refer to Section III). Compliance with this condition would reduce construction noise impacts to less than significant. As construction activities associated with the project would comply with requirements of the Noise Abatement and Control Ordinance, impacts associated temporary increases in noise levels during construction would be less than significant.

On-Site Noise Compatibility. Noise and land use compatibility are regulated by the Noise Element of the City's General Plan. Residential land uses are normally acceptable with noise levels up to 65 community noise equivalent level (CNEL), conditionally acceptable with noise levels from 65 to 70 CNEL, normally unacceptable with noise levels from 70 to 75 CNEL, and clearly unacceptable with noise levels above 75 CNEL.

Image Source: NearMap (flown May 2024)



Project Boundary

Receivers

Construction Noise

60 dB(A) L_{eq}

65 dB(A) L_{eq}

70 dB(A) L_{eq}

75 dB(A) L_{eq}

0 Feet 200

FIGURE 4

Construction Noise Contours

RECON

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Vehicle traffic noise level contours across the project site were calculated using SoundPLAN. These contours take into account the project area topography and the proposed buildings. Noise levels were also modeled at a series of first- through third-floor receivers located at the proposed buildings. Vehicle traffic noise contours and receiver locations are shown in Figure 5. The results are summarized in Table C below. SoundPLAN data is provided as an attachment to Appendix B.

Table C: Vehicle Traffic Noise Levels (CNEL)

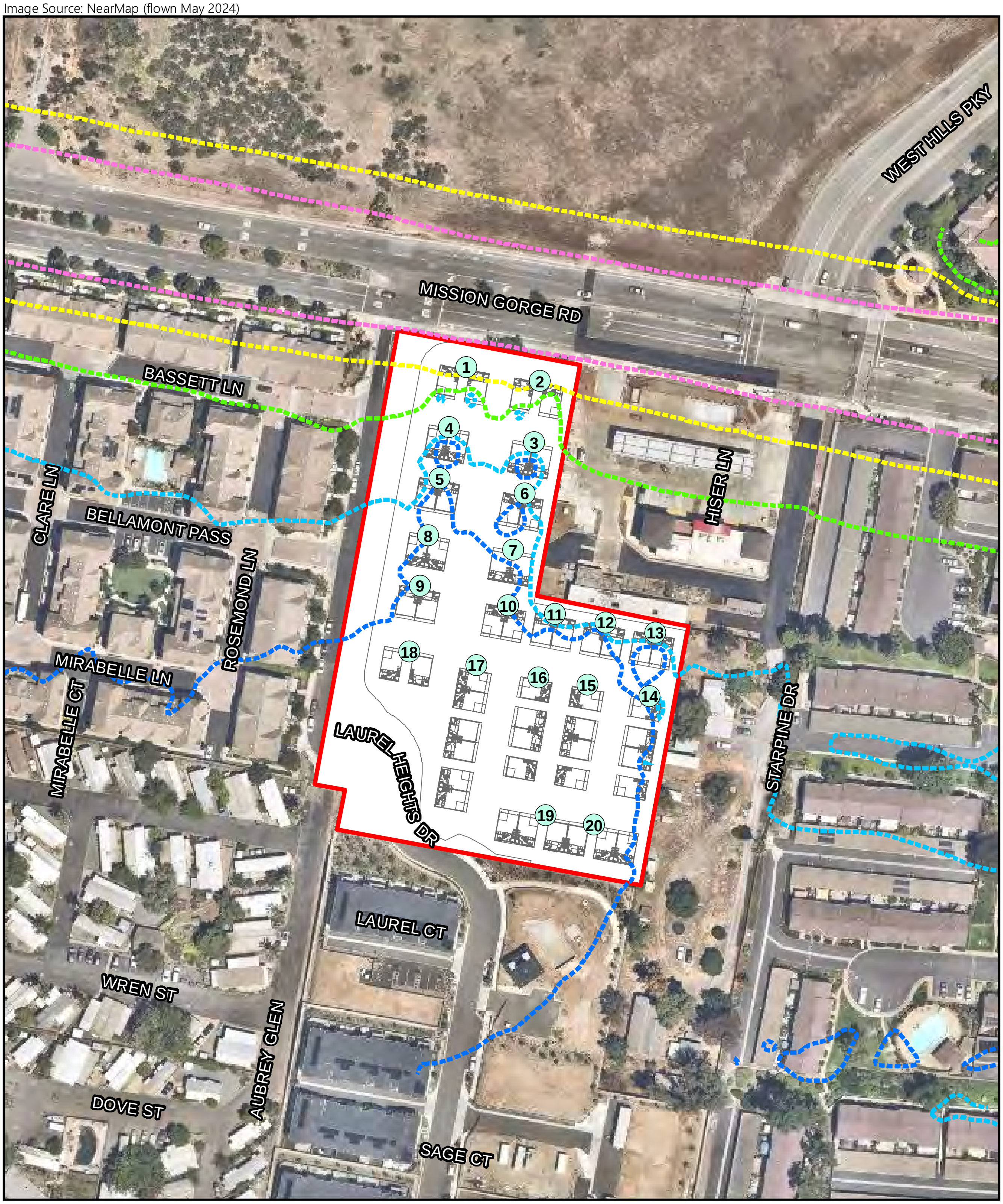
Receiver	1st Floor	2nd Floor	3rd Floor
1	67	69	69
2	66	68	69
3	61	63	65
4	60	63	64
5	52	56	59
6	55	58	61
7	52	56	59
8	50	54	57
9	46	50	53
10	51	55	58
11	58	61	62
12	59	61	63
13	59	62	63
14	53	57	59
15	47	51	53
16	44	48	51
17	43	46	48
18	44	47	50
19	39	44	47
20	47	51	54

Source: Appendix B
CNEL = community noise equivalent level

As shown in Figure 5 and Table C above, exterior noise levels would be 65 CNEL or less at all receivers except at Receivers 1 and 2 on the northern side of the northernmost buildings closest to Mission Gorge Road. However, for Receivers 1 and 2, there are no proposed exterior use areas on the northern sides of those buildings. Patios would be located on the southern side of those buildings shielded from Mission Gorge Road. Exterior noise levels would not exceed the "normally acceptable" noise level limit of 65 CNEL at any proposed exterior use areas. Therefore, the project would not expose receivers to exterior noise levels in excess of standards established in the City's General Plan, and impacts would be less than significant.

Interior noise levels can be reduced through standard construction techniques. When windows are closed, standard construction techniques provide various exterior-to-interior noise level reductions depending on the type of structure and window. According to the FHWA's Highway Traffic Noise Analysis and Abatement Guidance, buildings with masonry façades and double-glazed windows can be estimated to provide a noise level reduction of 35 dB, while light-frame structures with double-glazed windows may provide noise level reductions of 20 to 25 dB (FHWA 2011).

Image Source: NearMap (flown May 2024)



Project Boundary
Receivers
Site Plan

Vehicle Traffic Noise
50 CNEL
55 CNEL
60 CNEL
65 CNEL
70 CNEL

0 Feet 150

FIGURE 5
Vehicle Traffic Noise Contours

RECON

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The interior noise level standard for residential uses is 45 CNEL. As shown in Table C above, with the exception of Receivers 1 and 2, exterior noise levels would range from 39 to 65 CNEL. Standard light-frame construction would reduce exterior to interior noise levels by at least 20 dB. This analysis conservatively assumes that standard construction techniques would achieve 20 dB exterior to interior noise reduction. Using this assumption, interior noise levels would be reduced to 45 CNEL or less.

For the two units located adjacent to Mission Gorge Road (Receivers 1 and 2), a more detailed evaluation of interior noise levels was conducted. The STC rating of windows, walls, and roofs is an integer value that rates how well a building component attenuates noise. The STC rating generally reflects the decibel reduction that a building component can achieve. Noise levels on the northern side of these units would be 69 CNEL. Therefore, because a noise reduction of up to 24 dB(A) is required to achieve interior noise levels of 45 CNEL or less, building components with an STC rating of up to 24 would be required. Standard walls and roofs typically have STC ratings greater than 40, and therefore would achieve the required noise reduction. In order to achieve an interior noise level of 45 CNEL or less in the two units closest to Mission Gorge Road, windows with an STC of 24 or greater would be required. The inclusion of windows with an STC of 24 in the two units closest to Mission Gorge Road shall be a project condition of approval (see Standard Condition No. 4, item 5). Therefore, the project would not expose receivers to interior noise levels in excess of standards established in the General Plan, and impacts would be less than significant.

Off-Site Vehicle Traffic Noise. The project would contribute traffic to the local roadways. However, the project would not substantially alter the vehicle classifications mix on local or regional roadways, nor would the project alter the speed on an existing roadway or create a new roadway. Thus, the primary factor affecting off-site noise levels would be increased traffic volumes. While changes in noise levels would occur along any roadway where project-related traffic occurs, for noise assessment purposes, noise level increases are assumed to be greatest nearest the project site, as this location would represent the greatest concentration of project-related traffic. Noise impacts would be significant if, as a direct result of the project, (1) noise levels for any existing or planned development will exceed the noise levels considered compatible for that use in the General Plan, or (2) noise levels which already exceed the levels considered compatible for that use are increased by 3 dB or more.

Based on the ITE Trip Generation Manual 11th Edition, the project would generate 7.2 ADT per unit. The project proposes 52 units, which would generate a total of 374 ADT (see Appendix A). A 3 dB increase in noise levels would occur when there is a doubling of traffic volumes on a roadway. Typically, a project would have to double the traffic volume on a roadway in order to have a significant direct noise increase of 3 dB or more or to be major contributor to the cumulative traffic volumes. The existing traffic volume on Mission Gorge Road is 12,877 ADT (see Appendix B, Table 3). Adding 374 ADT to Mission Gorge Road would increase noise levels by 0.1 dB, which would not be an audible change in noise levels. Therefore, operational roadway noise would not generate a substantial permanent increase in ambient noise levels for off-site noise sensitive land uses, and impacts would be less than significant.

On-Site Noise. On-site generated noise is regulated by the City's Municipal Code, Title 5 Health and Safety, Chapter 5.04 Noise Abatement and Control. Section 5.04.040 of the City's Municipal Code states that "it is unlawful for any person to make, continue, or cause to be made or continued, within the limits of the City, any disturbing, excessive or offensive noise which causes discomfort or annoyance to reasonable persons of normal sensitivity residing in the area." Section 5.04.040 also provides the following requirements for heating, ventilation, and air conditioning (HVAC) units:

4. Heating and Air Conditioning Equipment and Generators.

    a. It is unlawful for any person to operate or allow the operation of any generator, air conditioning, refrigeration or heating equipment in such manner as to create a noise disturbance on the premises of any other occupied property, or if a condominium, apartment house, duplex, or attached business, within any adjoining unit.

    b. All generators, heating, air conditioning, or refrigeration equipment are subject to the setback and screening requirements in this code.

Additionally, in accordance with the Noise Element of the General Plan, the noise level threshold is 65 dB(A) L_{eq} at the property line. Property line noise levels due to HVAC units were modeled using SoundPLAN. The modeling results are summarized in Table D. HVAC noise contours are shown in Figure 6. SoundPLAN data is provided as an attachment to Appendix B.

Table D: HVAC Noise Levels at Off-Site Receivers [dB(A) L_{eq}]

Receiver	Land Use Designation	HVAC Noise Level
1	R14 (Medium-High Density Residential)	44
2	R14 (Medium-High Density Residential)	46
3	R14 (Medium-High Density Residential)	45
4	R14 (Medium-High Density Residential)	43
5	R7 (Medium Density Residential)	41
6	R7 (Medium Density Residential)	56
7	R7 (Medium Density Residential)	51
8	R7 (Medium Density Residential)	50
9	GC (General Commercial)	51
10	GC (General Commercial)	53
11	GC (General Commercial)	51
12	GC (General Commercial)	48
13	R7 (Medium Density Residential)	39
14	R7 (Medium Density Residential)	42
15	R7 (Medium Density Residential)	42

Source: Appendix B
dB(A) L_{eq} = A-weighted decibels equivalent noise level
HVAC = heating, ventilation, and air conditioning

Image Source: NearMap (flown May 2024)

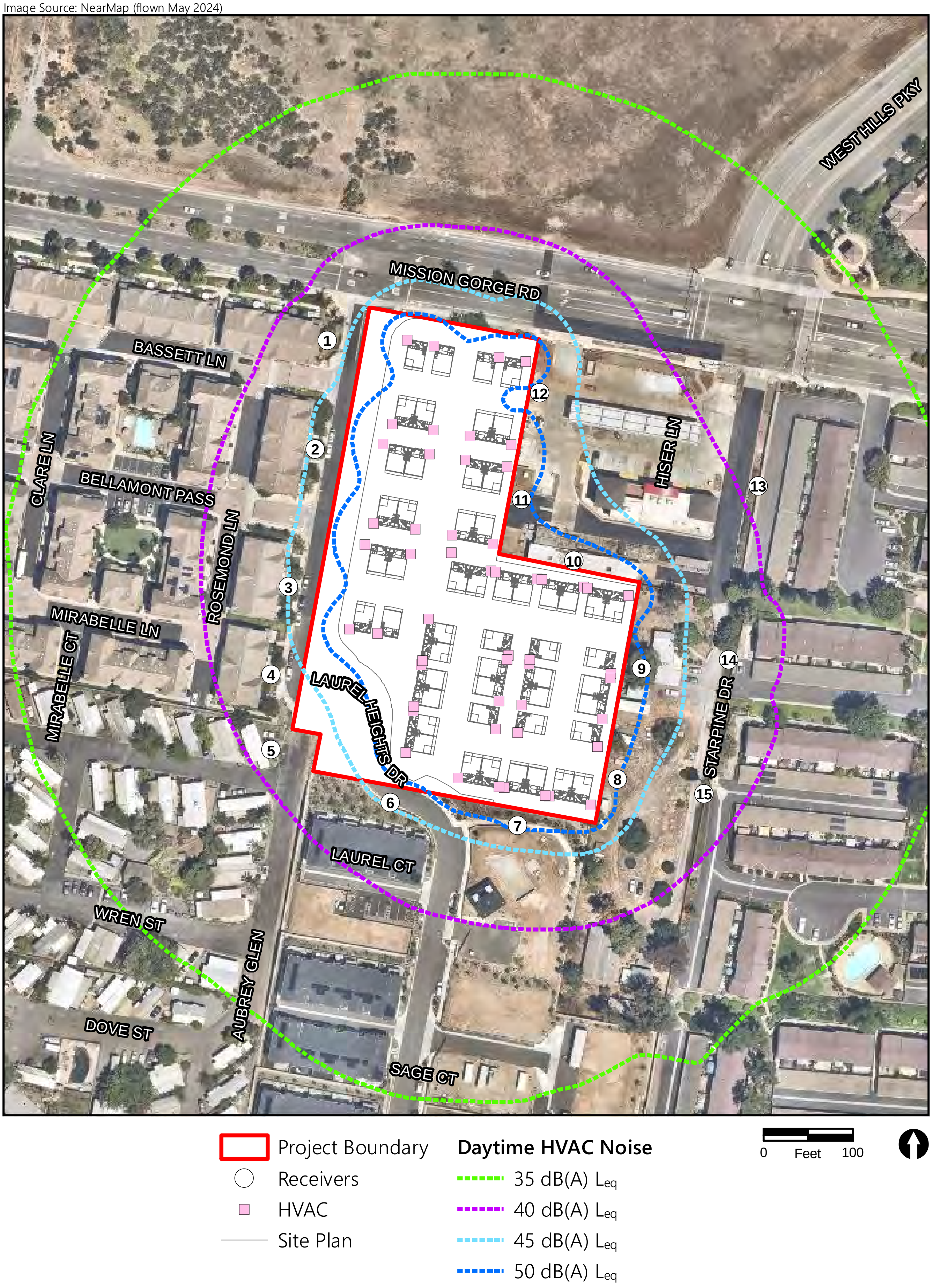

FIGURE 6

HVAC Noise Contours

RECON

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As shown in Table D, property line noise levels would range from 39 to 56 dB(A) L_{eq}. This is a worst-case analysis that assumes all units would operate at 100 percent capacity (i.e., continuously without cycling off) during the daytime and nighttime hours. Noise levels would not exceed 65 dB(A) L_{eq}. Noise at this level would not be considered a noise disturbance. The units would be operated in accordance with the requirements of the City's Municipal Code. Therefore, operational HVAC noise would not generate a substantial permanent increase in ambient noise levels for off-site noise sensitive land uses in excess of standards established in the City's General Plan, and impacts would be less than significant.

A car wash is located adjacent to the project site to the northeast. The requirements of the City's Municipal Code also apply to operations at the car wash. The car wash is temporarily closed but would potentially be reopened after renovations. An Operational Noise Evaluation of the car wash was conducted by Ldn Consulting, Inc. to determine estimated noise levels from existing and proposed car wash operations. The analysis concluded that the existing car wash operational noise levels comply with the noise standards at the property lines and no substantial permanent noise increase is anticipated (Appendix C). Therefore, the car wash would not expose on-site receptors to ambient noise levels in excess of standards established in the City's General Plan, and impacts would be less than significant.

Air Quality

The following analysis is based on the Air Quality Analysis prepared by RECON (Appendix D). The analysis of impacts is based on state and federal Ambient Air Quality Standards (AAQS) and assessed in accordance with the regional guidelines, policies, and standards and the SDAPCD. The SDAPCD prepared the original 1991/1992 Regional Air Quality Strategy (RAQS) in response to requirements set forth in the California Clean Air Act (CAA). The California CAA requires areas that are designated state non-attainment areas for ozone, carbon monoxide (CO), sulfur dioxide (SO_2), and nitrogen dioxide (NO_2) prepare and implement plans to attain the standards by the earliest practicable date. AAQS represent the maximum levels of background pollution considered safe, with an adequate margin of safety, to protect the public health and welfare. Six pollutants of primary concern were designated: ozone, CO, SO_2, NO_2, lead (Pb), particulate matter with a diameter of 10 microns and less (PM_{10}), and particulate matter with a diameter of 2.5 microns and less ($PM_{2.5}$). The project is located within the San Diego Air Basin (SDAB) and approximately 15 miles east of the Pacific Ocean. The SDAB is currently classified as a federal non-attainment area for ozone, and a state non-attainment area for ozone, PM_{10}, and $PM_{2.5}$.

Consistency with Applicable Air Quality Plan. Project consistency is based on whether the project would conflict with or obstruct implementation of the RAQS and/or applicable portions of the State Implementation Plan, which would lead to increases in the frequency or severity of existing air quality violations. The RAQS is the applicable regional air quality plan that sets forth the SDAPCD's strategies for achieving the National AAQS and California AAQS. The SDAB is designated a non-attainment area for the federal and state ozone standard. Accordingly, the RAQS was developed to identify feasible emission control measures and provide expeditious progress toward attaining the standards for ozone. The two pollutants addressed in the RAQS are reactive organic gas (ROG) and oxides of nitrogen (NO_X), which are precursors to the formation of ozone. Projected increases in motor vehicle usage, population, and growth create challenges in controlling emissions and, by extension, to maintaining and improving air quality. The most recent 2022 RAQS and TCM was adopted in 2023 (SDAPCD 2022).

The growth projections used by the SDAPCD to develop the RAQS emissions budgets are based on the population, vehicle trends, and land use plans developed in General Plans and used by the San Diego Association of Governments (SANDAG) in the development of the regional transportation plans and sustainable communities strategy. As such, projects that propose development that is consistent with the growth anticipated by SANDAG's growth projections and/or the General Plan would not conflict with the RAQS. In the event that a project would propose development that is less dense than anticipated by the growth projections, the project would likewise be consistent with the RAQS. In the event a project proposes development that is greater than anticipated in the growth projections, further analysis would be warranted to determine if the project would exceed the growth projections used in the RAQS for the specific subregional area.

The project site was evaluated as a part of the City's Housing Element Rezone Program Implementation Environmental Impact Report (EIR) (City of Santee 2022). The project site was previously designated as General Commercial (GC) and was rezoned to High-Density Residential R-22 (22 to 30 dwelling units per acre). The Housing Element Rezone Program was developed prior to updates to the 2022 RAQS. Therefore, growth forecasting in the 2022 RAQS update utilized the previous General Commercial land use designation. Assuming a typical floor area ratio of 0.2 for commercial development in the City, the 2.63-acre site could have been developed with approximately 29,000 square feet of commercial uses. The SANDAG trip generation rate for a neighborhood shopping center use is 120 trips per 1,000 square feet and the SANDAG trip generation rate for a standard commercial office is 20 trips per 1,000 square feet (SANDAG 2002). Using these rates, a hypothetical retail project would have generated 3,480 ADT and a hypothetical office project would have generated 580 ADT. As discussed in the transportation section above, the project would generate 374 ADT, which would be less than the trips generated by the hypothetical retail and office projects described above. Therefore, the project would generate fewer emissions than what is accounted for in the RAQS and would not exceed the growth assumptions used in the RAQS, and impacts would be less than significant.

Criteria Pollutants. The region is classified as an attainment area for all criterion pollutants except ozone, PM_{10}, and $PM_{2.5}$. The SDAB is a non-attainment area for the 8-hour federal and state ozone standards. Ozone is not emitted directly but is a result of atmospheric activity on precursors. NO_X and ROG are known as the chief "precursors" of ozone. These compounds react in the presence of sunlight to produce ozone. $PM_{2.5}$ includes fine particles that are found in smoke and haze and are emitted from all types of combustion activities (motor vehicles, power plants, wood burning, etc.) and certain industrial processes. PM_{10} includes both fine and coarse dust particles, and sources include crushing or grinding operations and dust from paved or unpaved roads.

The City has not adopted air quality significance thresholds. The SDAPCD also does not provide specific numeric thresholds for determining the significance of air quality impacts under CEQA. However, the SDAPCD does specify Air Quality Impact Analysis trigger levels for new or modified stationary sources (SDAPCD Rules 20.1, 20.2, and 20.3). The SDAPCD does not consider these trigger levels to represent adverse air quality impacts; rather, if these trigger levels are exceeded by a project, the SDAPCD requires an air quality analysis to determine if a significant air quality impact would occur. While these trigger levels do not generally apply to mobile sources or general land development projects, for comparative purposes these levels are used to evaluate the increased emissions that would be discharged to the SDAB if the project were approved.

As shown in Table E, project construction would not exceed the applicable regional emissions thresholds, which are designed to provide limits below which project emissions would not significantly change regional air quality. Additionally, the project would be subject to Standard Project Condition No. 1 – Air Quality, items 1 through 3, 7, and 8 (refer to Section III). Therefore, project construction would not result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard, and impacts would be less than significant.

Table E: Summary of Worst-case Construction Emissions (pounds per day)

Construction	Pollutant					
	ROG	**NO_X**	**CO**	**SO_X**	**PM_{10}**	**$PM_{2.5}$**
Demolition	2	23	21	<1	2	1
Site Preparation	3	32	31	<1	9	5
Grading	2	16	19	<1	4	2
Building Construction	1	11	15	<1	1	<1
Paving	1	6	10	<1	<1	<1
Architectural Coatings	35	1	1	<1	<1	<1
Maximum Daily Emissions	**35**	**32**	**31**	**<1**	**9**	**5**
Significance Threshold	*250*	*250*	*550*	*250*	*100*	*67*

Source: Appendix D.

Long-term emissions of regional air pollutants occur from operational sources. As shown in Table F, the project's daily operational emissions would not exceed the applicable regional emissions thresholds for any pollutant. These thresholds align with attainment of the National Ambient Air Quality Standards (NAAQS) which were developed to protect the public health, specifically the health of "sensitive" populations, including asthmatics, children, and the elderly. Consequently, project operation would not impact any sensitive populations. Additionally, the project would be subject to Standard Project Condition No. 1 – Air Quality, items 4 through 9 (refer to Section III). Therefore, project operation would not result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard, and impacts would be less than significant.

Table F: Summary of Project Operational Emissions (pounds per day)						
	Pollutant					
	ROG	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
Area Sources	1	1	8	<1	2	<1
Energy Sources	3	<1	3	<1	<1	<1
Mobile Sources	<1	<1	<1	<1	<1	<1
Total	**4**	**1**	**11**	**<1**	**2**	**<1**
Significance Threshold	*250*	*250*	*550*	*250*	*100*	*67*

Source: Appendix D.

Sensitive Receptors. Sensitive land uses include schools and schoolyards, parks and playgrounds, day care centers, nursing homes, hospitals, and residential communities. The nearest sensitive receptors include residential uses adjacent to as close as 40 feet from the western project boundary, 40 feet from the southern project boundary, and 135 feet from the eastern project boundary.

Carbon Monoxide Hot Spots

Localized CO concentration is a direct function of motor vehicle activity at signalized intersections (e.g., idling time and traffic flow conditions), particularly during peak commute hours and meteorological conditions. The SDAB is a CO maintenance area under the federal CAA. This means that SDAB was previously a non-attainment area and is currently implementing a 10-year plan for continuing to meet and maintain air quality standards.

Due to increased requirements for cleaner vehicles, equipment, and fuels, CO levels in the state have dropped substantially. All air basins are attainment or maintenance areas for CO. Therefore, more recent screening procedures based on more current methodologies have been developed. The Bay Area Air Quality Management District (BAAQMD) developed a screening threshold in their 2022 CEQA Guidelines (BAAQMD 2022). These screening criteria are considered applicable in the SDAB because the San Francisco Bay Air Basin and the SDAB have the same CO maintenance designations. If the following screening criteria are met, operation of a project would result in less than significant impacts related to CO:

- The project would be consistent with an applicable congestion management program established by the County congestion management agency for designated roads or highways, the regional transportation plan, and local congestion management agency plans.

- Project-generated traffic would not increase traffic volumes at affected intersections to more than 44,000 vehicles per hour.

- Project-generated traffic would not increase traffic volumes at affected intersections to more than 24,000 vehicles per hour where vertical and/or horizontal mixing is substantially limited (e.g., tunnel, parking garage, bridge underpass, natural or urban street canyon, below-grade roadway).

Based on SANDAG daily roadway segment traffic projections (SANDAG 2022) and a peak hour volume equal to approximately 10 percent of the daily roadway segment volume, roadways in the vicinity of the project carry significantly less than both the 44,000 vehicles per hour and 24,000 vehicles per hour screening levels identified above. Therefore, the project's traffic contribution of 374 ADT would not generate a CO hot spot that could expose sensitive receptors to substantial pollutant concentration, and impacts would be less than significant.

Diesel Particulate Matter – Construction

Construction of the project and associated infrastructure would result in short-term diesel exhaust emissions from on-site heavy-duty equipment. Construction of the project would result in the generation of diesel-exhaust diesel particulate matter (DPM) emissions from the use of off-road diesel equipment required for site grading and excavation, paving, and other construction activities and on-road diesel equipment used to bring materials to and from the project site.

Generation of DPM from construction projects typically occurs in a single area for a short period. Construction is anticipated to last for approximately 14 months based on default CalEEMod phase durations. The dose to which the receptors are exposed is the primary factor used to determine health risk. Dose is a function of the concentration of a substance or substances in the environment and the extent of exposure that person has with the substance. Dose is positively correlated with time, meaning that a longer exposure period would result in a higher exposure level for the Maximally Exposed Individual. The risks estimated for a Maximally Exposed Individual are higher if a fixed exposure occurs over a longer period of time. According to the Office of Environmental Health Hazard Assessment (OEHHA), health risk assessments, which determine the exposure of sensitive receptors to toxic emissions, should be based on a 30-year exposure period; however, such assessments should be limited to the period/duration of activities associated with the project (OEHHA 2015). Thus, if the duration of proposed construction activities near any specific sensitive receptor were 14 months, the exposure would be less than 4 percent of the total 30-year exposure period (1.17 years divided by 30 years) used for health risk calculation. Additionally, the project would be subject to Standard Project Condition No. 1 – Air Quality, item 1 which would reduce construction equipment DPM emissions (refer to Section III). Because construction of the project would be short term (14 months) and the amount of heavy equipment required would be minimal, project construction would not expose nearby residents to substantial pollutant concentrations, and impacts would be less than significant.

Diesel Particulate Matter – Operation

The CARB handbook indicates that siting new sensitive land uses within 500 feet of a freeway or urban roads with 100,000 or more vehicles per day should be avoided when possible. The roadways within 500 feet of the project site include Aubrey Glen Drive and Mission Gorge Road. Based on SANDAG daily roadway traffic projections, volumes on these roadways are projected to be well less than 100,000 vehicles per day (SANDAG 2022). Therefore, the project would not expose sensitive receptors to substantial pollutant concentrations associated with diesel particulate matter during operation, and impacts would be less than significant.

Odors. Construction equipment may generate some nuisance odors. Sensitive receptors near the project site include residential uses; however, exposure to odors associated with project construction would be short term and temporary in nature (14 months), and only a minimal amount of construction equipment would be required. The project does not propose any operational uses that are typically associated with odor complaints, nor it does not propose any uses or activities that would result in potentially significant operational-source odor impacts. Therefore, the project would not generate other emissions (such as those leading to odors) adversely affecting a substantial number of people, and impacts would be less than significant.

Water Quality

The following analysis is based on the Storm Water Quality Management Plan (Appendix E) and Drainage Report (Appendix F) prepared by RICK Engineering.

Water Quality Standards. In the existing condition, the project site generally drains in a northerly direction to a single point of comparison (POC-1) located on the northeastern side of the property along Mission Gorge Road. Off-site flows that traverse the project site begin to the south and drain north to a detention vault and then to a water quality basin. Flows are discharged from the basin onto the project site and then are collected by an existing brow ditch and conveyed to Mission Gorge Road. Additional off-site flows begin south of the project site and drain north to a cobble-lined swale, which then discharge through a curb opening onto Aubrey Glen Drive, followed by collection in a v-gutter, which are then conveyed north to an existing curb inlet on Mission Gorge Road (see Appendix E).

Drainage patterns in the post-project condition would be similar to those found in the existing condition. Off-site flows that traverse the project site would be collected by a proposed clean water line storm drain system and conveyed north to the edge of the property boundary. The clean water line would route off-site flows that are already treated via the water quality basin south of the project. To ensure appropriate sizing, the clean water line would be sized and designed for the unmitigated 100-year storm event rather than the mitigated 100-year storm event. Flows from the south would be captured in a proposed type-F catch basin on the southern property boundary and routed to the clean water line that flows north to the property frontage (see Appendix E).

Drainage on-site would be collected by curb inlets and grate inlets and conveyed by a proposed dirty water storm drain system to the northern property boundary. The dirty water line would be treated via proposed modular wetland system (MWS), then confluence with the clean water line prior to discharge from the project site. Additional drainage along the northern portion of the project site would be collected by a grate inlet and treated by a biofiltration basin, then joined with flows discharging the site to Mission Gorge Road. The proposed MWS and biofiltration basin would be designed consistent with the requirements of the City of Santee Best Management Practices Design Manual, which would effectively treat all runoff before being discharged from the site (see Appendix F). Therefore, the project would not violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality, and impacts would be less than significant.

Groundwater Supply and Recharge. The project would obtain its water supply from the Padre Dam Municipal Water District and would not use groundwater supply for any purpose. The project would convert the existing configuration of vacant retail buildings surrounded by concrete and asphalt parking lots to a multi-family residential development with landscaped areas. These changes would decrease the amount of impervious area on-site from 101,930 square-feet in the pre-project condition to 82,677 square feet in the post-project condition, thereby increasing the amount of land available for groundwater recharge. Furthermore, water would continue to infiltrate through undeveloped land further north, south, and east of the project site, and throughout the groundwater basin. Therefore, the project would not substantially decrease groundwater supplies or interfere with groundwater recharge, and impacts would be less than significant.

Drainage. As described in the discussion of water quality standards above, drainage patterns in the post-project condition would be similar to those found in the existing condition. The Drainage Report prepared for the project documented that project would reduce flow rates under the 10-, 50-, and 100-year storm events as follows:

- Reduce the 10-Year flow rate from 30.5 cubic feet per second (cfs) in the existing condition to 23.4 cfs in the post-project condition.
- Reduce the 50-Year flow rate from 42.0 cfs in the existing condition to 32.1 cfs in the post-project condition.
- Reduce the 100-Year flow rate from 44.0 cfs in the existing condition to 33.8 cfs in the post-project condition (see Appendix F).

Therefore, the project would not result in substantial erosion or siltation on- or off-site, substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site, create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or impede or redirect flood flows, and impacts would be less than significant.

Flooding and Hazards. Review of Figure 4.8-2 of the City of Santee Housing Element Rezone Program Environmental Impact Report determined that the project site is not located within the 100-year or 500-year flood hazard area. The project site is located approximately 17 miles inland from the coast. The risk of tsunami is negligible due to the distance from the ocean and high elevation. There would be no risk from a seiche, as the site is not located near a large body of water, such as a lake. Therefore, the project would not risk the release of pollutants due to project inundation associated with flood hazards, tsunami, or seiche zones. No impact would occur.

Water Quality and Groundwater Plans. As described in the discussion of water quality standards above, the project would utilize a MWS and biofiltration basin that would be designed consistent with the requirements of the City of Santee Best Management Practices Design Manual, which would effectively treat all runoff before being discharged from the project site. As described in the discussion of groundwater supply and recharge above, the project would not use groundwater supply for any purpose and would decrease the amount of impervious area on-site, thereby increasing the amount of land available for groundwater recharge. Therefore, the project would not conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan, and impacts would be less than significant.

Criterion Section 15332(e): Utilities and Public Services

Yes	No	
☒	☐	The site can be adequately served by all required utilities and public services.

The project would include connections to utilities such as sewer, water, electrical, gas, and telecommunications within the Aubrey Glen Drive right-of-way. Overhead electrical facilities along the project site frontage would be relocated underground where feasible. The northern portion of the project site proposes a 30-foot easement for road and utility purposes. The south side of the project site includes an existing 20-foot sewer easement and a proposed 5-foot-wide easement to San Diego Gas and Electric (SDG&E).

All on-site utilities would be designed in accordance with applicable codes and current engineering practices. There would be no significant environmental effects specifically related to the installation of utility connections that are not encompassed within the project's construction and operational footprints, and therefore already identified, disclosed, and subject to all applicable local, State, and federal regulations specified above. Therefore, the project site can be adequately served by all required utilities and public services, and the project would be consistent with State CEQA Guidelines Section 15332(e).

V. EXCEPTIONS TO CATEGORICAL EXEMPTIONS

Even if a project is ordinarily exempt under any of the potential categorical exemptions, State CEQA Guidelines Section 15300.2 provides specific instances where exceptions to otherwise applicable exemptions apply. The following section addresses whether any of the exceptions to the CEQA exemption apply to the project, consistent with State CEQA Guidelines Section 15300.2:

Criterion 15300.2(a): Location

Yes	No	
☐	☒	Is there an exception to the exemption for the project due to its location in a particularly sensitive environment, such that the project may impact an environmental resource of hazardous or critical concern where designated, precisely mapped, and officially adopted pursuant to law by federal, state, or local agencies?

This exception applies only to CEQA exemptions under Classes 3, 4, 5, 6, or 11. Since the project would qualify as a Class 32 urban infill exemption, this criterion is not applicable and is provided here for information purposes only. There are no environmental resources of hazardous or critical concern that are designated, precisely mapped, or officially adopted in the vicinity of the project site, or that could be adversely affected by the project. Therefore, exception under State CEQA Guidelines Section 15300.2(a) does not apply to the project.

Criterion 15300.2(b): Cumulative Impact

Yes	No	
☐	☒	Is there an exception to the exemption for the project due to significant cumulative impacts of successive projects of the same type and in the same place, over time?

As demonstrated under Criterion Section 15332(a), General Plan and Zoning Consistency, the project would be consistent with the development density allowed under the General Plan and zoning for the project site. Successive projects of the same type (residential uses) and in the same place are unlikely to occur over time after the proposed residential uses are constructed. Therefore, the exception under State CEQA Guidelines Section 15300.2(b) does not apply to the project.

Criterion 15300.2(c): Significant Effect

Yes	No	
☐	☒	Is there an exception to the exemption for the project because there is a reasonable possibility that the project will have a significant effect on the environment due to unusual circumstances?

There are no known unusual circumstances applicable to the project or its site that may result in a significant effect on the environment. Therefore, an exception to the exemption under State CEQA Guidelines Section 15300.2(c) does not apply to the project.

Criterion 15300.2(d): Scenic Highway

Yes	No	
☐	☒	Is there an exception to the exemption for the project because project may result in damage to scenic resources including but not limited to, trees, historic buildings, rock outcroppings or similar resources, within a highway officially designated as a state scenic highway?

The California Department of Transportation (Caltrans) Scenic Highway Program does not identify any state-designated scenic highways near the project site. The nearest officially designated State Scenic Highway is a portion of State Route 52, which begins where the freeway extends north and west past Mast Boulevard into Mission Trails Regional Park, approximately 3 miles west of the project site.

The project would not degrade views or damage scenic resources including trees, rock outcroppings, or historic buildings within a highway officially designated as a State Scenic Highway. Therefore, an exception to the exemption under State CEQA Guidelines Section 15300.2(d) does not apply to the project.

Criterion 15300.2(e): Hazardous Waste Sites

Yes	No	
☐	☒	Is there an exception to the exemption for the project because the project is located on a site which is included on any list compiled pursuant to Section 65962.5 of the Government Code?

Hazardous materials sites compiled pursuant to Government Code Section 65962.5 are listed on the “Cortese List” (named after the Legislator who authored the legislation that enacted it), which is maintained by the California Department of Toxic Substances Control. The project site is not on any list of hazardous material sites compiled pursuant to Government Code Section 65962.5. Therefore, an exception to the exemption under Section 15300.2(e) does not apply to the project.

Criterion 15300.2(f): Historical Resources

Yes	No	
☐	☒	Is there an exception to the exemption for the project because the project may cause a substantial adverse change in the significance of a historical resource?

A RECON archaeologist conducted a review of existing topographic maps and historic aerial photographs and determined that the project site has been fully disturbed since 1978. A 1947 topographic map represents the alignment of the current Mission Gorge Road adjacent to the project site to the north, as well as the current alignment of Aubrey Glen Drive adjacent to the project site to the west. The first available aerial photograph is from 1953, and it shows the current Mission Gorge Road alignment as a two-lane paved roadway and the current Aubrey Glen Drive alignment as a dirt road. A 1964 aerial photograph exhibits a building near the southwest corner of the project site that was replaced by a larger building by 1966, as seen in a 1966 aerial photograph. No changes were noted in the 1968 aerial photograph. However, a 1978 aerial photograph shows the project site to be fully developed by hardscape with at least two ancillary structures added, one near Mission Gorge Road and one along the southern project boundary. The building near the southwest project corner is represented on a 1969 topographic map along with an additional structure represented to the east of the building along the southern project boundary on a 1978 topographic map. No changes were noted to the project site on subsequent topographic maps. The structure along the southern project boundary was updated or replaced in 1980 and 1981, with no additional changes exhibited on the 1982, 1983, and 1984 aerial photographs. However, an additional structure was added just south of the northern structure near Mission Gorge Road by 1985. In 1986, the southern structure was again expanded at its northeast end, but this expansion had been removed by 1991. No notable changes were exhibited on available aerial photographs between 1987 and 2000, but by 2002 another expansion was noted on the north side of the structure along the southern boundary. No notable changes to the project site were noted in a review of subsequent aerial photographs (Nationwide Environmental Title Research 2024). The ground surface of the project site has been fully disturbed by a combination of hardscape and buildings with associated structure development. The oldest remaining structure on the project site was constructed in 1978, so it does not have any potential significance as an historic resource. Consequently, the potential for historical period resources is considered low. Therefore, an exception to the exemption under State CEQA Guidelines Section 15300.2(f) does not apply to the project.

VI. REFERENCES CITED

Bay Area Air Quality Management District (BAAQMD)
2022 California Environmental Quality Act Air Quality Guidelines. Adopted April 20, 2022.

Federal Highway Administration (FHWA)
2006 Roadway Construction Noise Model User's Guide. FHWA-HEP-05-054, SOT-VNTSC-FHWA-05-01. Final Report. January.

2008 Roadway Construction Noise Mode, V1.1. Washington, DC.

2011 Highway Traffic Noise: Analysis and Abatement Guidance. FHWA-HEP-10-025. December.

Federal Transit Administration (FTA)
2006 Transit Noise and Vibration Impact Assessment. Washington, DC. May.

Office of Environmental Health Hazard Assessment (OEHHA)
2015 Air Toxics Hot Spots Program Guidance Manual for the Preparation of Risk Assessments (Guidance Manual), February.

Nationwide Environmental Title Research, LLC (NETR)
2024 Historic Aerials. Accessed on July 17, 2024. http://www.historicaerials.com.

San Diego Air Pollution Control District (SDAPCD)
2022 2022 Revision of the Regional Air Quality Strategy for San Diego County.

San Diego Association of Governments (SANDAG)
2002 (Not So) Brief Guide of Vehicular Traffic Generation Rates for the San Diego Region. April.

2022 Transportation Forecast Information Center. Years 2025, 2035, and 2050 Series 14 traffic volumes. Accessed at https://tfic.sandag.org/map.html. October 10.

Santee, City of
2022 City of Santee Housing Element Rezone Program Implementation PEIR (SCH# 2021100263). June 17.

United States Department of the Interior
1983 Archeology and Historic Preservation; Secretary of the Interior's Standards and Guidelines.

APPENDICES

Santee CALIFORNIA

DO MORE ▶ DUE EAST

TRAFFIC ANALYSIS INTAKE FORM

The traffic analysis intake form shall be submitted with all new development projects to help determine what traffic analysis will be required. These guidelines apply to most development projects. However, the City reserves the right to request both Vehicle Miles Traveled (VMT) and Level of Service (LOS) analysis depending on the specifics of the project. All questions regarding this intake form should be directed to the City of Santee Traffic Engineering division.

1. Project Information

Applicant Name	KB Home
Project Address or Street/Cross Streets	7734 Mission Gorge Road
APN	386-701-02-00
Project No.	

2. Project Description

This residential project will bring in new home ownership opportunities for both established and growing families, furthering “pride of ownership” throughout the neighborhood. The project is an infill redevelopment located at the Southeastern corner of Mission Gorge Road and Aubrey Glen Drive. The site is centrally located within a strong residential pocket with multi-family, apartments, and single-family homes at every direction. The site was previously the “Pure-Flo water company” commercial site. The proposed residential development will consist of 52 Units (22.6 du/ac). Specifically, 14, 3-story duplex units and 38, 3-story small lot detached units. The units will average approximately 1,400 square feet and will all feature 3 bedrooms, 2.5 bathrooms, plus a Den. Each unit will be EPA energy star certified, featuring fully electric appliances, solar panels, and garage EV chargers. Additionally, each unit is energy star certified along with EPA WaterSense WaterSmart appliance fixtures.

3. Certification

Application Certification: I certify that this intake form has been completed to the best of my ability and accurately reflects the project being proposed. I understand that this intake form is for guidance only and that the City may require additional information or studies.

Date: 10/30/24

Signature of Applicant: Troy Friedeck

Printed Name: Troy Friedeck

4. Trip Generation Information

4A: Total Project Site Trips After Fully Constructed

Fill out the table below to show the total trips for the project site for the completed project. The information in this table should include both existing facilities that will still be in use once the project is complete and new facilities that will be constructed. Use separate rows for each different type of land use.

#	Land Use Description	New or Existing	Size (Number of dwelling units or square feet)	Trip Generation Rate Data Source (Subject to City Staff approval)	Trip Generation Rate	Total Daily Trips
1	Single Family Housing	New	52 DU	☐ SANDAG 2002 Trip Generation Rate ■ Other: ITE, 11th Edition	7.20 / DU	374
2				☐ SANDAG 2002 Trip Generation Rate ☐ Other:________________		
3				☐ SANDAG 2002 Trip Generation Rate ☐ Other:________________		
4				☐ SANDAG 2002 Trip Generation Rate ☐ Other:________________		
5				☐ SANDAG 2002 Trip Generation Rate ☐ Other:________________		

Projected Total Average Daily Trips (ADT) for the site: 374 (see attached trip generation table prepared by LLG Engineers)

4B: Total Existing Trips

Fill out the table below to show the total existing trips for the project site. Use separate rows for each different type of land use.

#	Land Use Description	Size (Number of dwelling units or square feet)	Trip Generation Rate Data Source (Subject to City Staff approval)	Trip Generation Rate	Total Daily Trips
1			☐ SANDAG 2002 Trip Generation Rate ☐ Actual counts collected* ☐ Other:________________		
2			☐ SANDAG 2002 Trip Generation Rate ☐ Actual counts collected* ☐ Other:________________		
3			☐ SANDAG 2002 Trip Generation Rate ☐ Actual counts collected* ☐ Other:________________		
4			☐ SANDAG 2002 Trip Generation Rate ☐ Actual counts collected* ☐ Other:________________		

* Note: If site counts are collected, they should be for a minimum of two full midweek days representing typical days when schools are in session.

Total Existing Average Daily Trips (ADT) for the site:____________________

5. **Vehicle Miles Traveled (VMT) Analysis**
   Projects that are projected to generate more than 500 total Average Daily Trips (ADT) may be required to submit a full VMT analysis. The total trips are all trips from the project site (new and/or existing) from the project site once fully constructed from Table 4A. If a VMT analysis is required, applicant shall refer to the City of Santee VMT Analysis guidelines.

   Total number of project site trips (Section 4A): 374

   Is the proposed project projected to have more than 500 ADT?

   ■ NO VMT analysis is not required for this project

   ☐ YES VMT analysis prepared may be required

6. **Traffic Study Level of Service (LOS) Analysis**
   Projects that are projected to generate more than 1,000 new Average Daily Trips (ADT) may be required to submit a traffic study that evaluates traffic impact and performs a LOS analysis. The new trips are determined by subtracting the existing number of trips (4B) from the total trips for the project site after buildout (4A). If a traffic study with LOS analysis is required, applicant shall refer to the San Diego ITE's Guidelines for Transportation Impact Studies in the San Diego Region, May 2019.

   Total new trips (Section 4A minus Section 4B): 374

   Is the proposed project projected to have more than 1,000 ADT?

   ■ NO A traffic study is not required for this project

   ☐ YES A traffic study LOS analysis may be required

   Is the proposed project projected to have more than 2,500 ADT?

   ■ NO A SANDAG model run is not required.

   ☐ YES A SANDAG model run may be required.

7. **Technical Memorandum**
   If the total ADT is within 10% of any of the limits listed above, at the City's discretion, a technical memorandum prepared by a registered traffic engineer may be required to verify calculations.

   Is the proposed project projected Average Daily Trips over 450 VMT or 900 LOS?

   ■ NO A traffic memorandum is not required.

   ☐ YES A traffic memorandum prepared by a registered traffic engineer detailing if a VMT or Traffic Study LOS analysis may be required.

DEVELOPMENT NOTES:

GROSS AREA: 3.34 AC.
*NET AREA: 2.3 AC.
* - AREA REMAINING WITHIN SETBACK LIMITS
PROPOSED UNITS: 52
DENSITY: 22 DU/AC.
PARKING REQUIRED:
52 (2-CAR GARAGES) - 104 SPACES
52 x 0.25(GUEST) - 13 SPACES
TOTAL REQUIRED: 117 SPACES

PARKING PROVIDED:
52 (2-CAR GARAGES) - 104 SPACES
ONSITE - 13 SPACES
OFFSITE (STREET) - 12 SPACES
TOTAL PROVIDED: 129 SPACES

GRAPHIC SCALE 1" = 20'

RICK
5620 FRIARS ROAD
SAN DIEGO, CA 92110
619-291-0707
rickengineering.com

CONCEPTUAL SITE PLAN
MISSION GORGE
SANTEE, CA

05/08/2024

Project Trip Generation

Land Use Description	Size	Daily Trip Ends (ADTs) [a]		AM Peak Hour					PM Peak Hour				
		Rate [b]	Volume	Rate	In:Out Split	Volume			Rate	In:Out Split	Volume		
						In	Out	Total			In	Out	Total
Single-Family Attached Housing	52 DU	7.2 /DU	374	0.48 /DU	31% : 69%	8	17	25	0.57 /DU	57% : 43%	17	13	30
Total			**374**			**8**	**17**	**25**			**17**	**13**	**30**

Footnotes:

a. ADT = Average Daily Traffic

b. Rates are based on ITE Trip Generation Manual, 11th Edition - Land Use 215 (Single-Family Attached Housing)

General Notes:

1. DU = Dwelling Units

RECON

An Employee-Owned Company

January 20, 2025

Mr. Troy Friedeck
KB Home Coastal, Inc.
9915 Mira Mesa Boulevard, Suite 100
San Diego, CA 92131

Reference: Noise Analysis for the Aubrey Glen Project (RECON Number 10174-1)

Dear Mr. Friedeck:

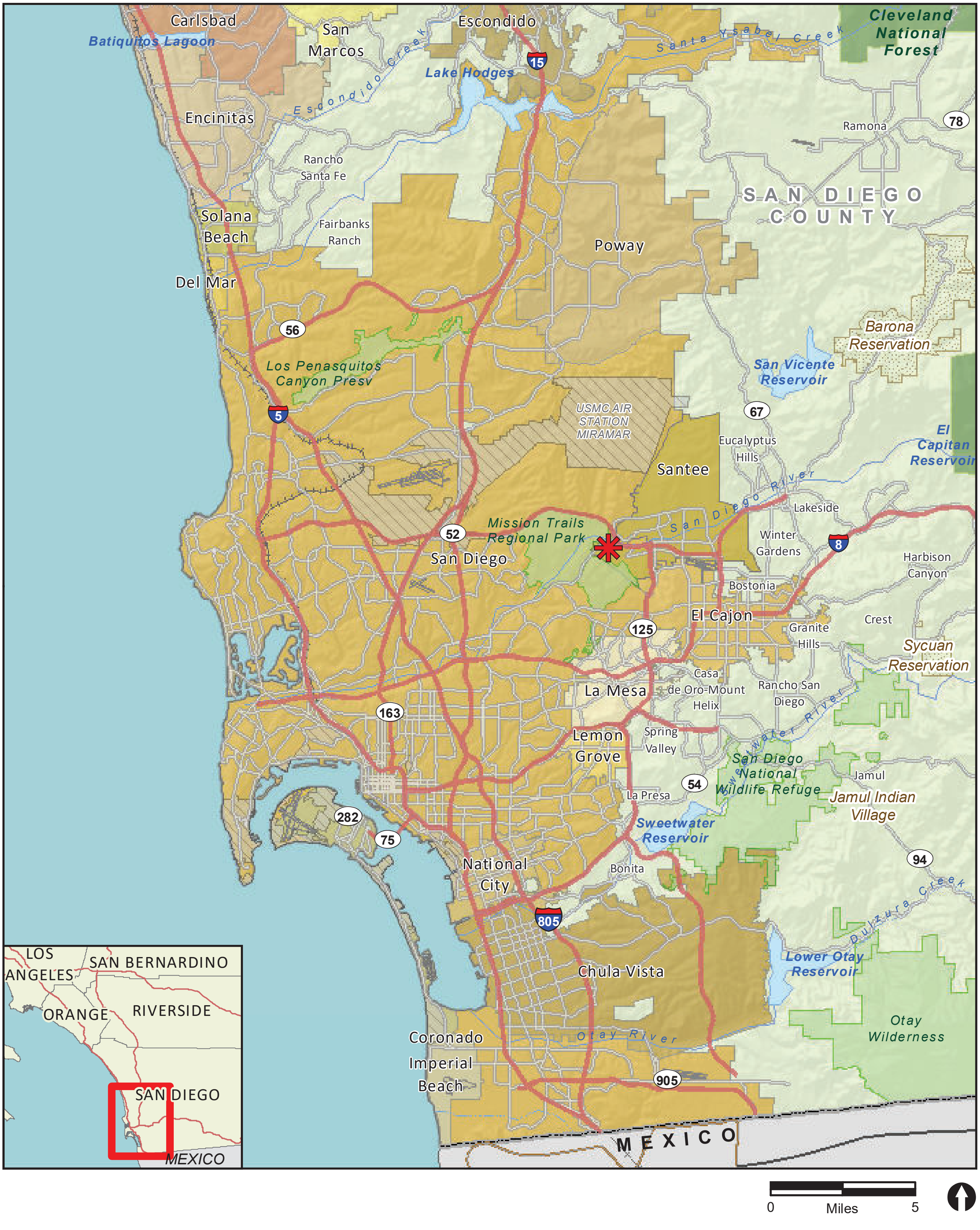
The purpose of this report is to assess potential noise impacts from construction and operation of the Aubrey Glen Project (project). Impacts are assessed in accordance with standards established in the City of Santee's (City) General Plan Noise Element and the City's Municipal Code.

1.0 Introduction

1.1 Project Description

The project site is located at 7737 Mission Gorge Road (Assessor's Parcel Number 386-300-31-00) in the city of Santee, California. The project site is located east of Aubrey Glen Drive and south of Mission Gorge Road. The 2.63-acre project site is currently developed with 11,700 square feet of vacant retail buildings surrounded by concrete and asphalt parking lots and minimal landscape planters. The project is bordered by Mission Gorge Road to the north, commercial and residential uses to the east, and high-density residential uses to the south and west. Figure 1 shows the regional location of the project. Figure 2 shows an aerial photograph of the project site and vicinity.

The project would construct 52 residential dwelling units. Fourteen units would consist of attached residential, configured within seven, three-story duplex buildings, and each of the remaining 38 units would consist of three-story detached residential buildings. The residential units would average approximately 1,400 square feet in size, and the project would be consistent with the existing zoning designation of High-Density Residential R-22 (22 to 30 dwelling units per acre). All 52 residential units would be configured with 3 bedrooms and 2.5 bathrooms, and 25 of these residential units would also be configured with a den. All 52 residential units would have private open space by way of patio/entry space and balcony/deck. Vehicular access would be provided via a driveway connecting to Aubrey Glen Drive. All 52 residential units would include a private two-car garage, providing for a total of 104 residential parking spaces. The project would also provide 15 on-site guest parking spaces. Overall, the project would provide a total of 119 parking spaces, which would exceed the City's parking requirement of 2.25 parking spaces per unit. Furthermore, the project would provide 12 off-site parking spaces along Aubrey Glen Drive that would be regulated by City right-of-way with signage. These 12 off-site parking spaces would not be exclusive to the project, and therefore are not included in the parking count. The project would also provide approximately 5,000 square feet of common open space with amenities that would be managed by a private homeowners association. Figure 3 shows the proposed site plan.



Project Location

FIGURE 1
Regional Location

RECON

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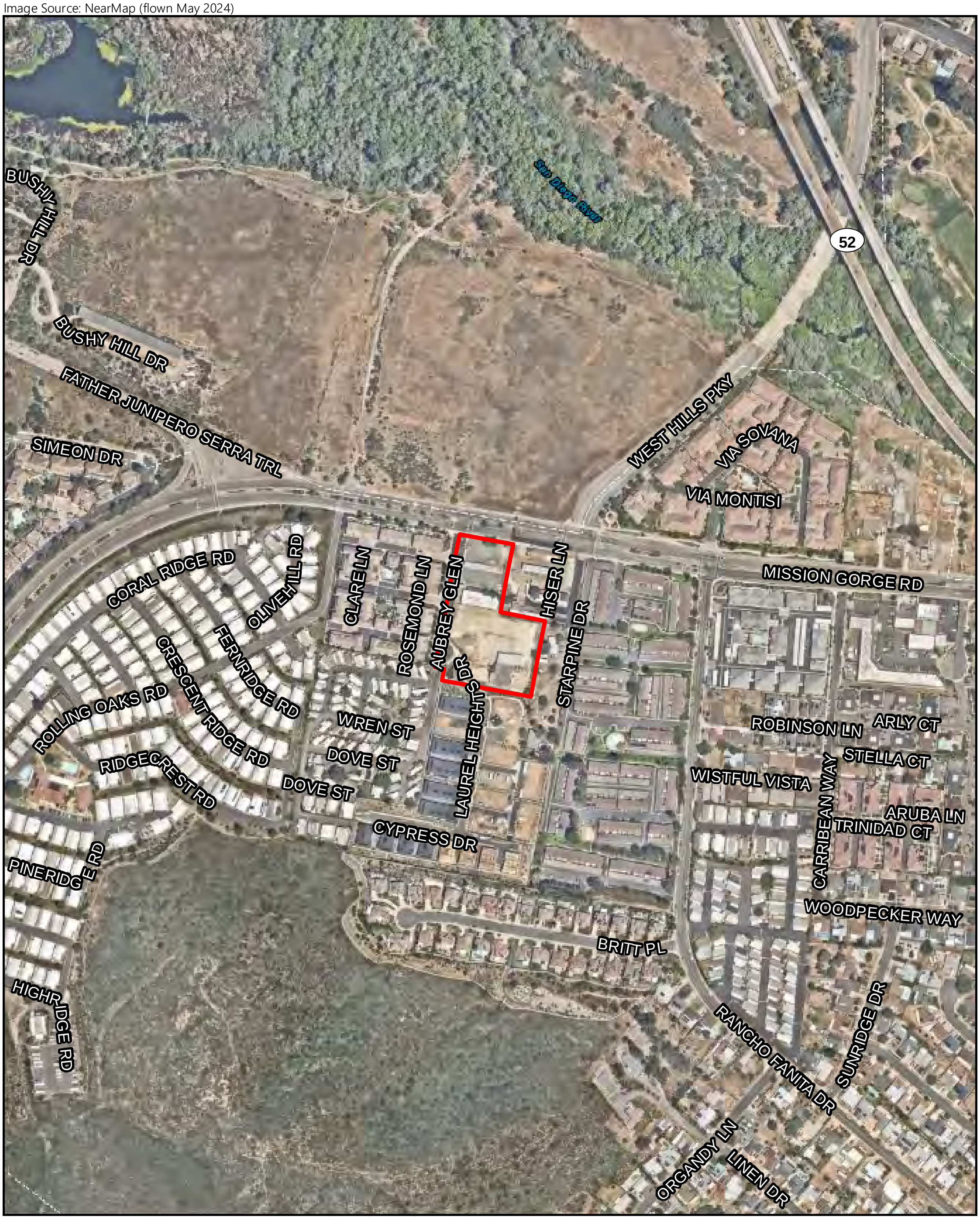
Image Source: NearMap (flown May 2024)



0 Feet 500

Project Boundary

FIGURE 2
Project Location on Aerial Photograph

RECON

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Map Source: Summa Architecture

PROJECT SUMMARY

THREE-STORY CONDOMINIUMS

RESIDENCES	52 HOMES
GROSS SITE AREA	2.63 ACRES
NET SITE AREA	2.23 ACRES
NET DENSITY	24.0 DU/AC
PARKING	131 SP (2.5 SP/DU)
ZONING	R-22

PRODUCT MIX

25	PLAN 1	3BD+DEN/2.5 BA	1,440 SF
27	PLAN 2	3BD/2.5 BA	1,470 SF
52 TOTAL UNITS			

PARKING SUMMARY

REQUIRED	
52 X 2.00 =	104 SP
52 X 0.25 GUEST =	13 SP
TOTAL	117 SP
PROVIDED - ONSITE / PRIVATE	
GARAGE	104 SP
OPEN PERPENDICULAR	6 SP
OPEN PARALLEL	9 SP
TOTAL	119 SP
PROVIDED - OFFSITE / PUBLIC	
STREET	12 SP
TOTAL	131 SP

ELECTRIC VEHICLE PARKING
15 GUEST X 13% = 2 SP REQUIRED / PROVIDED

EACH GARAGE SHALL BE INSTALLED WITH A MIN. LEVEL 2 EVCS (52 GARAGES = 52 EVCS)

SITE COVERAGE

BUILDINGS	32,292 SF	33%
PAVEMENT	34,776 SF	36%
OPEN SPACE	30,071 SF	31%
TOTAL NET AREA	97,139 SF	100%

OPEN SPACE

PRIVATE OPEN SPACE	
REQUIRED	
52 X 60 =	3,120 SF
PROVIDED	
DECK	4,140 SF
PATIO	7,162 SF
TOTAL	11,302 SF
COMMON OPEN SPACE	
REQUIRED	
52 X 100 =	5,200 SF
PROVIDED	5,490 SF

KEYNOTES

1	PROPERTY LINE
2	PERPENDICULAR PARKING SPACE (9' X 19')
3	PARALLEL PARKING SPACE (9' X 25')
4	ACCESSIBLE PARKING SPACE (9' X 19')
5	MAILBOX LOCATION
6	4FT MINIMUM WIDE WALKWAY
7	PRIVATE PATIO
8	PRIVATE YARD
9	COMMON REC AREA
10	AC UNIT
11	TRANSFORMER
12	LINE OF FLOOR ABOVE
13	OPEN LAWN AREA
14	SETBACK LINE
15	LIGHTED DIRECTORY MAP

FIGURE 3
Site Plan

RECON
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The following project conditions related to noise would be required. These measures would be incorporated as Conditions of Approval for the entitlement of the site.

Standard Project Condition No. 4 – Noise:

1. All construction plans shall include the following notes:

    a) Operations shall conform to the City's Municipal Code Section 5.04.090.

    b) All equipment shall be equipped with properly maintained mufflers.

    c) The construction contractor shall place noise-generating construction equipment and locate construction staging areas at the greatest possible distance from sensitive uses whenever feasible during all project construction.

    d) The construction contractor shall use on-site electrical sources to power equipment rather than diesel generators where feasible.

2. All residential units located within 500 feet of the construction site shall be sent a notice regarding the construction schedule. A sign legible at a distance of 50 feet shall also be posted at the construction site. All notices and the signs shall indicate the dates and durations of construction activities, as well as provide a telephone number for the "noise disturbance coordinator."

3. A "noise disturbance coordinator" shall be established. The disturbance coordinator shall be responsible for responding to any local complaints about construction noise. The disturbance coordinator shall determine the cause of the noise complaint (e.g., starting too early, bad muffler) and shall be required to implement reasonable measures to reduce noise levels.

4. The following note shall be incorporated into the project construction plan: "Control of Construction Hours. Construction activities occurring as part of the project shall be subject to the limitations and requirements of Section 5.04.090 of the City Municipal Code which states that construction activities may occur between 7:00 a.m. and 7:00 p.m. Mondays through Saturdays. No construction activities shall be permitted outside of these hours or on Sundays and holidays."

5. Interior Noise: For the two units located closest to Mission Gorge Road, windows shall have a sound transmission class (STC) rating of 24 or higher. The STC ratings shall be specified on project building plans and shall be verified by the Director of Planning & Building, or designee, prior to the issuance of building permits.

1.2 Fundamentals of Noise

Sound levels are described in units called the decibel (dB). Decibels are measured on a logarithmic scale that quantifies sound intensity in a manner similar to the Richter scale used for earthquake magnitudes. Thus, a doubling of the energy of a noise source, such as doubling of traffic volume, would increase the noise level by 3 dB; a halving of the energy would result in a 3 dB decrease.

Additionally, in technical terms, sound levels are described as either a "sound power level" or a "sound pressure level," which while commonly confused are two distinct characteristics of sound. Both share the same unit of measure, the dB. However, sound power, expressed as L_{pw}, is the energy converted into sound by the source. The L_{pw} is used to estimate how far a noise will travel and to predict the sound levels at various distances from the source. As sound energy travels through the air, it creates a sound wave that exerts pressure on receivers such as an eardrum or microphone and is the sound pressure level. Noise measurement instruments only measure sound pressure, and noise level limits used in standards are generally sound pressure levels.

The human ear is not equally sensitive to all frequencies within the sound spectrum. To accommodate this phenomenon, the A-scale, which approximates the frequency response of the average young ear when listening to most ordinary everyday sounds, was devised. When people make relative judgments of the loudness or annoyance of a sound, their judgments correlate well with the A-scale sound levels of those sounds. Therefore, the "A-weighted" noise scale is used for measurements and standards involving the human perception of noise. Noise levels using A-weighted measurements are designated with the notation dB(A). The impact of noise is not a function of loudness alone. The time of day when noise occurs and the duration of the noise are also important. In addition, most noise that lasts for more than a few seconds is variable in its intensity. Consequently, a variety of noise descriptors has been developed. The noise descriptors used for this study are the one-hour equivalent noise level (L_{eq}), the community noise equivalent level (CNEL), and the day night equivalent level (L_{dn}). The CNEL is a 24-hour equivalent sound level. The CNEL calculation applies an additional 5 dB(A) penalty to noise occurring during evening hours, between 7:00 p.m. and 10:00 p.m., and an additional 10 dB(A) penalty is added to noise occurring during the night, between 10:00 p.m. and 7:00 a.m. These increases for certain times are intended to account for the added sensitivity of humans to noise during the evening and night. Similar to the CNEL, the L_{dn} is a 24-hour equivalent level that applies an additional 10 dB(A) penalty to noise occurring during the night.

Sound from a small, localized source (approximating a "point" source) radiates uniformly outward as it travels away from the source in a spherical pattern, known as geometric spreading. The sound level decreases or drops off at a rate of 6 dB(A) for each doubling of the distance.

Traffic noise is not a single, stationary point source of sound. The movement of vehicles makes the source of the sound appear to emanate from a line (line source) rather than a point when viewed over some time interval. The drop-off rate for a line source is 3 dB(A) for each doubling of distance.

The propagation of noise is also affected by the intervening ground, known as ground absorption. A hard site (such as parking lots or smooth bodies of water) receives no additional ground attenuation, and the changes in noise levels with distance (drop-off rate) are simply the geometric spreading of the source. A soft site (such as soft dirt, grass, or scattered bushes and trees) receives an additional ground attenuation value of 1.5 dB(A) per doubling of distance. Thus, a point source over a soft site would attenuate at 7.5 dB(A) per doubling of distance.

Human perception of noise has no simple correlation with acoustical energy. A change in noise levels is generally perceived as follows: 3 dB(A) barely perceptible, 5 dB(A) readily perceptible, and 10 dB(A) perceived as a doubling or halving of noise (California Department of Transportation 2013).

2.0 Applicable Standards

2.1 General Plan

The City's General Plan Noise Element includes various goals, objectives, and policies related to noise standards and protections against excessive noise exposure, including the following:

Objective 1.0. Control noise from sources adjacent to residential, institutional, and other noise-sensitive receptors.

- **Policy 1.1**: The City shall support a coordinated program to protect and improve the acoustical environment of the City including development review for new public and private development and code compliance for existing development.
- **Policy 1.2**: The City shall utilize noise studies and noise contour maps when evaluating development proposals during the discretionary review process.
- **Policy 1.4**: The City shall promote alternative sound attenuation measures rather than traditional wall barrier wherever feasible; these may include glass or polycarbonate walls, berms, landscaping, and the siting of noise-sensitive uses on a parcel away from the roadway or other noise source.
- **Policy 1.5**: The City shall review future projects with particular scrutiny regarding the reduction of unnecessary noise near noise-sensitive areas such as hospitals, schools, parks, etc.

Objective 2.0. Ensure that future developments will be constructed to minimize interior and exterior noise levels.

- **Policy 2.1**: The City shall adhere to planning guidelines and building codes which include noise control for the exterior and interior living space of all new residential developments within noise impacted areas.
- **Policy 2.2**: The City should require new development to mitigate noise impacts to existing uses resulting from new development when: (1) such development adds traffic to existing City streets that necessitates the widening of the street; and (2) the additional traffic generated by new development causes the noise standard or significance thresholds to be exceeded.
- **Policy 2.3**: The City should not require new development to mitigate noise impacts to existing uses when new development only adds traffic already anticipated by the City's General Plan to an existing street but does not necessitate widening of that street.

The Noise Element also provides guidelines for determining acceptable and unacceptable community noise exposure limits for various land use categories (Table 1). Normally acceptable noise levels are defined as satisfactory, based on the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements. Conditionally acceptable noise levels indicate that new construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features have been included in the design. Conventional construction with closed windows and fresh air supply systems or air conditioning will normally suffice. The City's General Plan states that these compatibility guidelines are not prohibitive but should be used as a guide and a resource (City of Santee 2003). As shown in Table 1 below, residential land uses are normally acceptable with noise levels up to 65 CNEL, conditionally acceptable with noise levels from 65 to 70 CNEL, normally unacceptable with noise levels from 70 to 75 CNEL, and clearly unacceptable with noise levels above 75 CNEL.

Table 1 Noise/Land Use Compatibility Guide							
	Community Noise Exposure (CNEL)						
	55	60	65	70	75	80	
Residential – Low Density Single Family, Duplex, Mobile Homes							
Residential – Multiple Family							
Transient Lodging – Motels, Hotels							
Schools, Libraries, Churches, Hospitals, Nursing Homes[1]							
Auditoriums, Concert Halls, Amphitheaters							
Sports Arena, Outdoor Spectator Sports							
Playgrounds, Neighborhood Parks							
Golf Courses, Riding Stables, Water Recreation, Cemeteries							
Office Buildings, Business Commercial and Professional							
Industrial, Manufacturing, Utilities, Agriculture							

Table 1 Noise/Land Use Compatibility Guide	
[1]Applies to noise sensitive areas which serve a significant function for the use which could be adversely affected by noise; such as, outside areas used primarily for instruction, meditation areas, rest and relaxation areas, and other areas where general peace and quiet are important.	
	Normally Acceptable: Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.
	Conditionally Acceptable: New construction or development should be undertaken only after a detailed analysis of the noise reduction requirement is made and needed noise insulation features included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning will normally suffice.
	Normally Unacceptable: New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.
	Clearly Unacceptable: New construction or development should generally not be undertaken.

The Noise Element further states that when new development may result in the exposure of existing or future noise-sensitive uses to noise levels in excess of 65 dB(A) L_{dn}, an acoustical study will be required. If the acoustical study shows that the noise levels at any noise-sensitive area will exceed 65 dB(A) L_{dn}, the development should not be approved unless the following findings are made:

1. Modifications to the development have been, or will be made, which will reduce the exterior noise levels in noise-sensitive areas to 65 dB(A) L_{dn} or less, or

2. If, with current noise abatement technology, it is not feasible to reduce the exterior noise levels to 65 dB(A) L_{dn} or less, then modifications to the development have been, or will be made, which reduce the exterior noise level to the maximum extent feasible and the interior noise level to 45 dB(A) L_{dn} or less. Particular attention shall be given to noise-sensitive spaces such as bedrooms.

3. For rooms in noise-sensitive areas which are occupied only for a part of the day (schools, libraries, or similar), the interior 1-hour average sound level during occupation, due to noise outside, should not exceed 45 dB(A) L_{eq}.

Further, noise impacts shall be considered significant if any of the following occur as a result of the project:

1. If, as a direct result of the project, noise levels for any existing or planned development will exceed the noise levels considered compatible for that use as identified in Table 1.

2. If, as a direct result of the proposed development, noise levels which already exceed the levels considered compatible for that use are increased by 3 dB or more.

Section 8.0, Implementation of the Noise Element lists the following measures that may be incorporated into a proposed project as mitigation measures. The following measures are not always required, and mitigation is not limited to this list:

1. The use of site design techniques, such as the provision of buffers to increase distances between the noise source and receiver, siting of buildings and parking areas, and the careful siting of noise-sensitive outdoor features to minimize noise impacts.

2. Provision of berms, landscaping, and other sound barriers, without the exclusive use of walls (e.g., a combination of a small wall and a berm in concert with the overall streetscape in the area could be appropriate).

3. Insulation of buildings against noise, including thicker-than-standard glazing and mechanical ventilation.

4. Improvement of traffic circulation to “smooth” flow by such measures as interconnecting traffic signals.

5. Consideration of the use of innovative construction technologies and materials in constructing or reconstructing streets.

6. Setting of time limits on certain noisy activities.

7. Purchasing of demonstrably quiet equipment for City use.

2.2 Municipal Code

Title 5 - Health and Safety

Chapter 5.04 Noise Abatement and Control Ordinance

On-site generated noise is regulated by the City’s Municipal Code, Title 5 Health and Safety, Chapter 5.04 Noise Abatement and Control. The sections applicable to the project are as follows:

Section 5.04.040 General Noise Regulations

A. General Prohibitions. It is unlawful for any person to make, continue, or cause to be made or continued, within the limits of the City, any disturbing, excessive or offensive noise which causes discomfort or annoyance to reasonable persons of normal sensitivity residing in the area. The characteristics and conditions which should be considered in determining whether a violation of the provisions of this section exists, include, but are not limited to, the following:

    1. The level of the noise;
    2. Whether the nature of the noise is usual or unusual;

3. Whether the origin of the noise is natural or unnatural;
4. The level of the background noise;
5. The proximity of the noise to sleeping facilities;
6. The nature and zoning of the area within which the noise emanates;
7. The density of the inhabitation of the area within which the noise emanates;
8. The time of day or night the noise occurs;
9. The duration of the noise;
10. Whether the noise is recurrent, intermittent, or constant; and
11. Whether the noise is produced by a commercial or noncommercial activity.

B. Disturbing, Excessive or Offensive Noises. The following acts, among others, are declared to be disturbing, excessive and offensive noises in violation of this section:

   1. Heating and Air Conditioning Equipment and Generators.

      a. It is unlawful for any person to operate or allow the operation of any generator, air conditioning, refrigeration or heating equipment in such manner as to create a noise disturbance on the premises of any other occupied property, or if a condominium, apartment house, duplex, or attached business, within any adjoining unit.

      b. All generators, heating, air conditioning, or refrigeration equipment are subject to the setback and screening requirements in this code.

Section 5.04.070 Motorized Equipment

It is unlawful to operate any lawn mower, backpack blower, lawn edger, leaf blower, riding tractor, or any other machinery, equipment, or other device, or any hand tool which creates a loud, raucous or impulsive sound, within or adjacent to any residential zone between the hours of 10:00 p.m. and 7:00 a.m. of the following day.

Section 5.04.130 Loading and Unloading Operations

A. It is unlawful for any person to engage in loading, unloading, opening, idling of trucks, closing or other handling of boxes, crates, containers, building materials, garbage cans, dumpsters or similar objects between the hours of 10:00 p.m. and 7:00 a.m. in such a manner as to cause a noise disturbance within or adjacent to a residential district.

Section 5.04.160 Limitations on sources of noise not otherwise addressed:

A. Between 10:00 p.m. and 7:00 a.m., it is unlawful for any person to generate any noise on the public way that is louder than average conversational level at a distance of 50 feet or more, vertically or horizontally, from the source.

B. Between 10:00 p.m. and 7:00 a.m., no person is permitted to generate any noise on any private open space that is louder than average conversational level at a distance of 50 feet or more, measured from the property line of the property from which the noise is being generated.

The Noise Abatement and Control Ordinance establishes the City's noise regulation, generally prohibits nuisance noise and states that it is unlawful for any person to make, continue, or cause to be made or continued within the City limits any disturbing, excessive, or offensive noise that causes discomfort or annoyance to reasonable persons of normal sensitivity residing in the area [Municipal Code Section 5.04.040(A)].

Municipal Code Section 5.04.090, which specifically pertains to construction equipment, makes operation of any construction equipment outside the hours of 7:00 a.m. through 7:00 p.m., Monday through Saturday, except holidays, unlawful unless the operation is expressly approved by the Director of Development Services. Construction equipment with a manufacturer's noise rating of 85 dBA L_{max} or greater may only operate at a specific location for 10 consecutive workdays. If work involving such equipment would involve more than 10 consecutive workdays, a notice must be provided to all property owners and residents within 300 feet of the site no later than 10 days before the start of construction. The notice must be approved by the City and describe the proposed project and the expected duration of work and provide a point of contact to resolve noise complaints.

Title 13 - Zoning

Chapter 13.30 General Development and Performance Standards

The intent of this section is to protect properties in all districts and the health and safety of persons from environmental nuisances and hazards and to provide a pleasing environment in keeping with the nature of the district character. Section 13.30.030 applies to operation of land uses and states that no operation or activity is permitted which will create vibration noticeable without instruments at the perimeter of the subject property.

3.0 Existing Conditions

Existing noise contour mapping was developed as part of the City of Santee Housing Element Rezone Program Implementation PEIR (Rezone PEIR; City of Santee 2022). The project site was identified as a redevelopment site in the Rezone PEIR. Noise levels at the project site are dominated by vehicle traffic on Mission Gorge Road and State Route 52 (SR-52). Existing year 2020 vehicle traffic noise contours are shown in Figure 4. Noise level contours do not take into account topography or shielding provided by intervening structures and are therefore conservative. As shown in Figure 4, existing noise levels exceed 60 CNEL across the entire project site and exceed 65 CNEL across the northern 180 feet of the project site.

4.0 Methodology

Noise level predictions and contour mapping were developed using noise modeling software, SoundPlan Essential, version 4.1 (Navcon Engineering 2018). SoundPLAN calculates noise propagation based on the International Organization for Standardization method (ISO 9613-2 – Acoustics, Attenuation of Sound during Propagation Outdoors). The model calculates noise levels at selected receiver locations using input parameter estimates such as total noise generated by each noise source; distances between sources, barriers, and receivers; and shielding provided by intervening terrain, barriers, and structures. The model outputs can be developed as noise level contour maps or noise levels at specific receivers. In all cases, receivers were modeled at 5 feet above ground elevation, which represents the average height of the human ear.

Image Source: NearMap (flown May 2024)

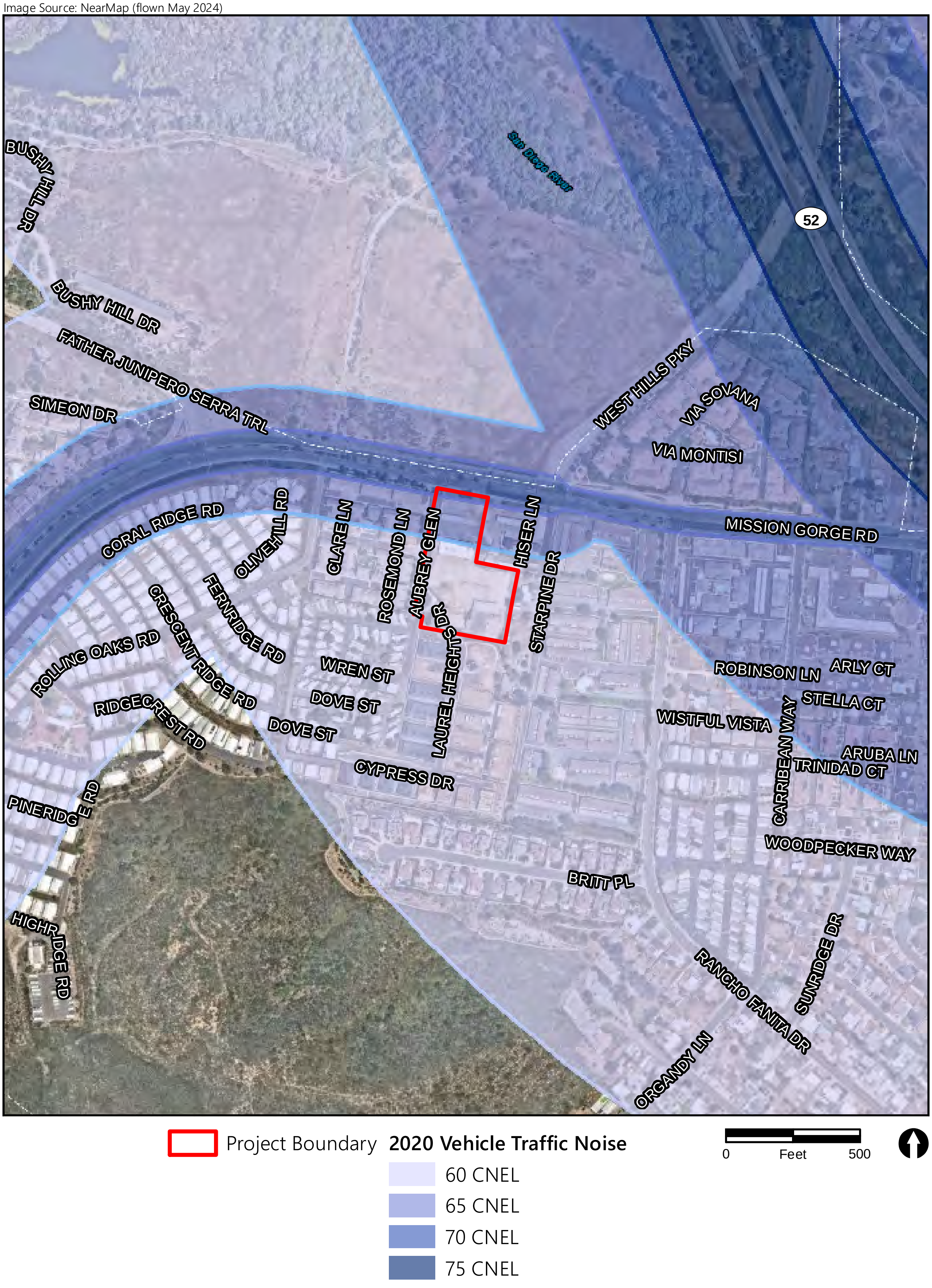

FIGURE 4
Existing Year 2020 Vehicle Traffic Noise Contours

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4.1 Construction Noise Analysis

Project construction noise would be generated by diesel engine-driven construction equipment used for site preparation and grading, building construction, loading, unloading, and placing materials and paving. Diesel engine-driven trucks also would bring construction materials to the site.

Construction equipment with a diesel engine typically generates maximum noise levels from 70 to 95 dB(A) L_{eq} at a distance of 50 feet (Federal Highway Administration [FHWA] 2006 and 2008; Federal Transit Authority 2006). During construction, equipment moves to different locations and goes through varying load cycles, and there are breaks for the operators and for non-equipment tasks, such as measurement. Table 2 summarizes typical construction equipment noise levels and duty cycles.

During excavation, grading, and paving operations, equipment moves to different locations and goes through varying load cycles, and there are breaks for the operators and for non-equipment tasks, such as measurement. Although maximum noise levels may be 70 to 95 dB(A) at a distance of 50 feet during most construction activities, hourly average noise levels from the grading phase of construction would be 85 dB(A) L_{eq} at 50 feet from the center of construction activity when assessing the loudest pieces of equipment–dozer, excavator, and loader–working simultaneously. Noise levels were modeled as an area source over the footprint of the project. Note that the project site has been previously disturbed and developed, and no blasting would be required.

Table 2
Typical Construction Equipment Noise Levels

Equipment	Noise Level at 50 Feet [dB(A) L_{eq}]	Typical Duty Cycle
Auger Drill Rig	85	20%
Backhoe	80	40%
Blasting	94	1%
Chain Saw	85	20%
Clam Shovel	93	20%
Compactor (ground)	80	20%
Compressor (air)	80	40%
Concrete Mixer Truck	85	40%
Concrete Pump	82	20%
Concrete Saw	90	20%
Crane (mobile or stationary)	85	20%
Dozer	85	40%
Dump Truck	84	40%
Excavator	85	40%
Front End Loader	80	40%
Generator (25 kilovolt amps or less)	70	50%
Generator (more than 25 kilovolt amps)	82	50%
Grader	85	40%
Hydra Break Ram	90	10%
Impact Pile Driver (diesel or drop)	95	20%
In situ Soil Sampling Rig	84	20%
Jackhammer	85	20%
Mounted Impact Hammer (hoe ram)	90	20%

Table 2 Typical Construction Equipment Noise Levels		
Equipment	Noise Level at 50 Feet [dB(A) L_{eq}]	Typical Duty Cycle
Paver	85	50%
Pneumatic Tools	85	50%
Pumps	77	50%
Rock Drill	85	20%
Roller	74	40%
Scraper	85	40%
Tractor	84	40%
Vacuum Excavator (vac-truck)	85	40%
Vibratory Concrete Mixer	80	20%
Vibratory Pile Driver	95	20%

dB(A) L_{eq} = A-weighted decibels average noise level
SOURCE: Federal Highway Administration 2006 and 2008; Federal Transit Authority 2006.

4.2 Traffic Noise Analysis

The SoundPLAN program uses the FHWA Traffic Noise Model algorithms and reference levels to calculate traffic noise levels at selected receiver locations. The model uses various input parameters, such as projected hourly average traffic rates; vehicle mix, distribution, and speed; roadway lengths and gradients; distances between sources, barriers, and receivers; and shielding provided by intervening terrain, barriers, and structures. Receivers, roadways, and barriers were input into the model using three-dimensional coordinates.

The main source of traffic noise at the project site is vehicle traffic on Mission Gorge Road and SR-52. Existing and future (year 2050) traffic volumes, speeds, and truck percentages were obtained from the Transportation Impact Study prepared for the Rezone PEIR (CR Associates 2021). The existing vehicle traffic volumes were used to determine if the project would result in a significant increase in ambient noise levels. The future (year 2050) vehicle traffic volumes were used to model future noise levels and determine compatibility with the City's noise standards. A vehicle classification mix of 95.4 percent automobiles, 2.0 percent medium trucks, 0.2 percent heavy trucks, 1.0 percent buses, and 1.0 percent motorcycles was modeled. This classification mix is based on Caltrans' SR-52 truck counts near the project site and is adjusted to account for buses and motorcycles (Caltrans 2021) Table 3 summarizes the modeled future vehicle traffic parameters.

Table 3 Vehicle Traffic Parameters			
Roadway Segment	Existing (Year 2020) ADT	Future (Year 2050) ADT	Speed (mph)
SR-52	116,516	134,367	65
Mission Gorge Road	12,877	16,606	50

ADT = Average Daily Trips; mph = miles per hour
SOURCE: CR Associates 2021

4.3 On-Site Noise Analysis

Operational noise sources on the project site are anticipated to be typical of any residential neighborhood, such as vehicles arriving and leaving, children at play, and landscape maintenance machinery. None of these noise sources associated with residential uses are anticipated to violate the City's Municipal Code or result in a substantial permanent increase in existing noise levels. The project would include heating, ventilation, and air conditioning (HVAC) units. Noise levels due to HVAC units were modeled to determine if they have the potential to produce noise in excess of City limits. In accordance with the Noise Element of the General Plan, the noise level threshold is 65 dB(A) L_{eq} at the property line.

The HVAC equipment would be located on the ground next to each of the residential units. It is not known at this time which manufacturer, brand, or model of unit or units would be selected for use in the project. For the purposes of this analysis, to determine what general noise levels the HVAC units would generate, it was assumed that the HVAC units would be similar to a Carrier unit with a sound power level of 75 dB(A). Noise specifications are presented in Attachment 1. All units were modeled at full capacity during the daytime and nighttime hours.

5.0 Noise Impacts

5.1 Construction Noise Analysis

Noise level limits for construction activities are established in Section 5.04.090 of the City's Municipal Code. These limits state that a notice must be provided to all owners and occupants within 300 feet of the project site if the construction equipment has a manufacturer's noise rating of 85 dB and operates at a specific location for 10 consecutive workdays.

In addition, Section 5.04.090 of the City's Municipal Code states that no construction equipment is permitted before 7:00 a.m. or after 7:00 p.m. on Mondays through Saturdays and all times on Sundays and holidays.

Surrounding land uses include Mission Gorge Road to the north, commercial and residential uses to the east, and high-density residential uses to the south and west. Noise associated with the construction of the project was modeled at a series of 15 receivers located at the adjacent properties. The results are summarized in Table 4. Construction noise contours are shown in Figure 5. SoundPLAN data is contained in Attachment 2.

Image Source: NearMap (flown May 2024)

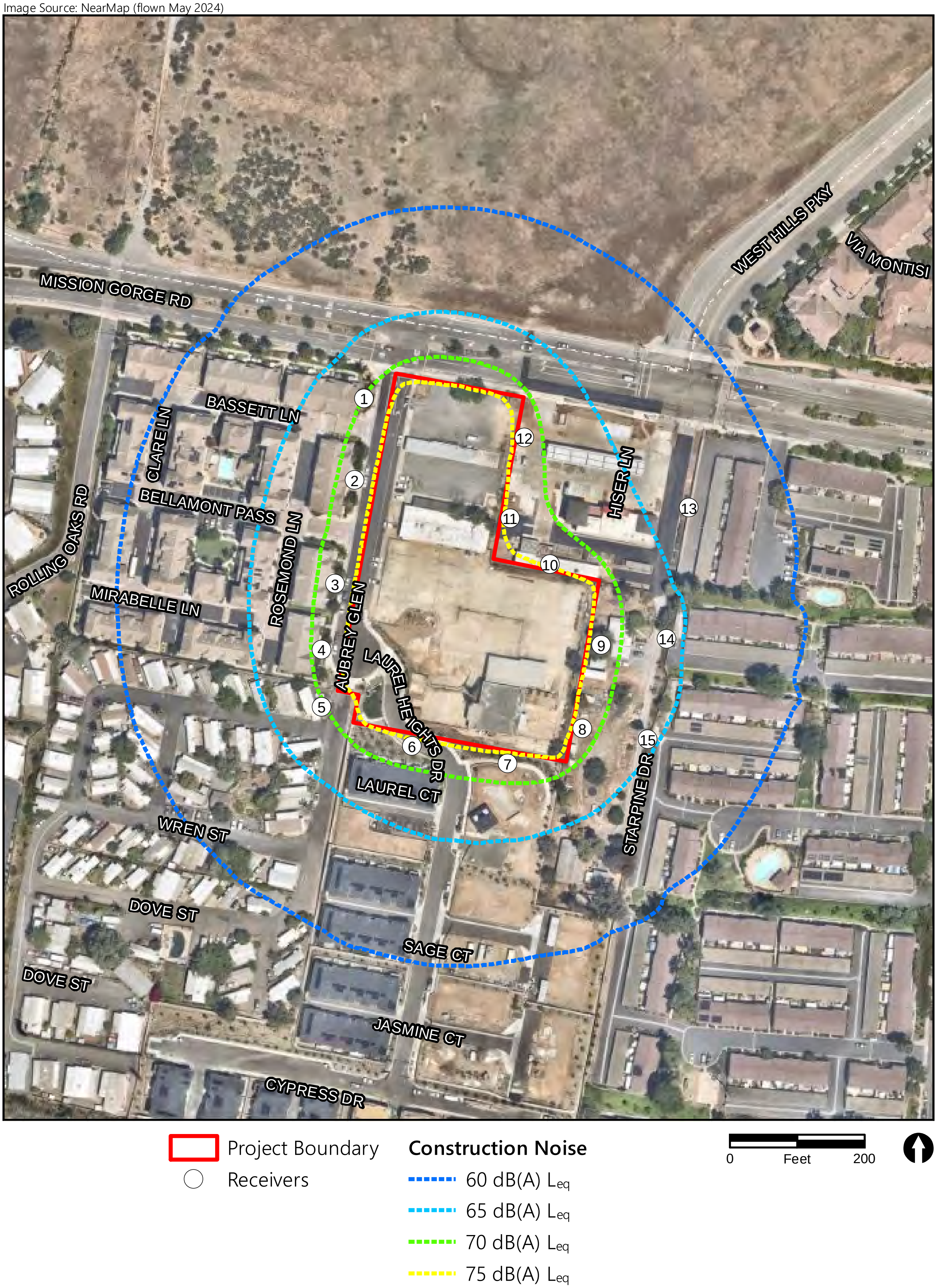

FIGURE 5
Construction Noise Contours

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Table 4 Construction Noise Levels at Off-Site Receivers [dB(A) L_{eq}]		
Receiver	Land Use Designation	Construction Noise Level
1	R14 (Medium-High Density Residential)	70
2	R14 (Medium-High Density Residential)	72
3	R14 (Medium-High Density Residential)	72
4	R14 (Medium-High Density Residential)	71
5	R7 (Medium Density Residential)	70
6	R7 (Medium Density Residential)	73
7	R7 (Medium Density Residential)	73
8	R7 (Medium Density Residential)	73
9	GC (General Commercial)	73
10	GC (General Commercial)	74
11	GC (General Commercial)	74
12	GC (General Commercial)	73
13	R7 (Medium Density Residential)	63
14	R7 (Medium Density Residential)	66
15	R7 (Medium Density Residential)	66
dB(A) L_{eq} = A-weighted decibels equivalent noise level.		

As shown in Table 4, construction noise levels are anticipated to range from 63 to 74 dB(A) L_{eq} at the adjacent properties. Although the existing adjacent uses would be exposed to construction noise levels that could be heard above ambient conditions, the exposure would be temporary. The project would not require construction equipment that has a manufacturer's noise rating of 85 dB or higher. In accordance with Section 5.04.090 of the City's Municipal Code, construction activities would not occur before 7:00 a.m. or after 7:00 p.m. on Mondays through Saturdays and would not occur any time on Sundays and holidays. Additionally, the project would be subject to Standard Project Condition No. 4 – Noise, items 1 through 4 (refer to Section 1.1). Compliance with this condition would reduce construction noise impacts to less than significant. As construction activities associated with the project would comply with requirements of the Noise Abatement and Control Ordinance, impacts associated temporary increases in noise levels during construction would be less than significant.

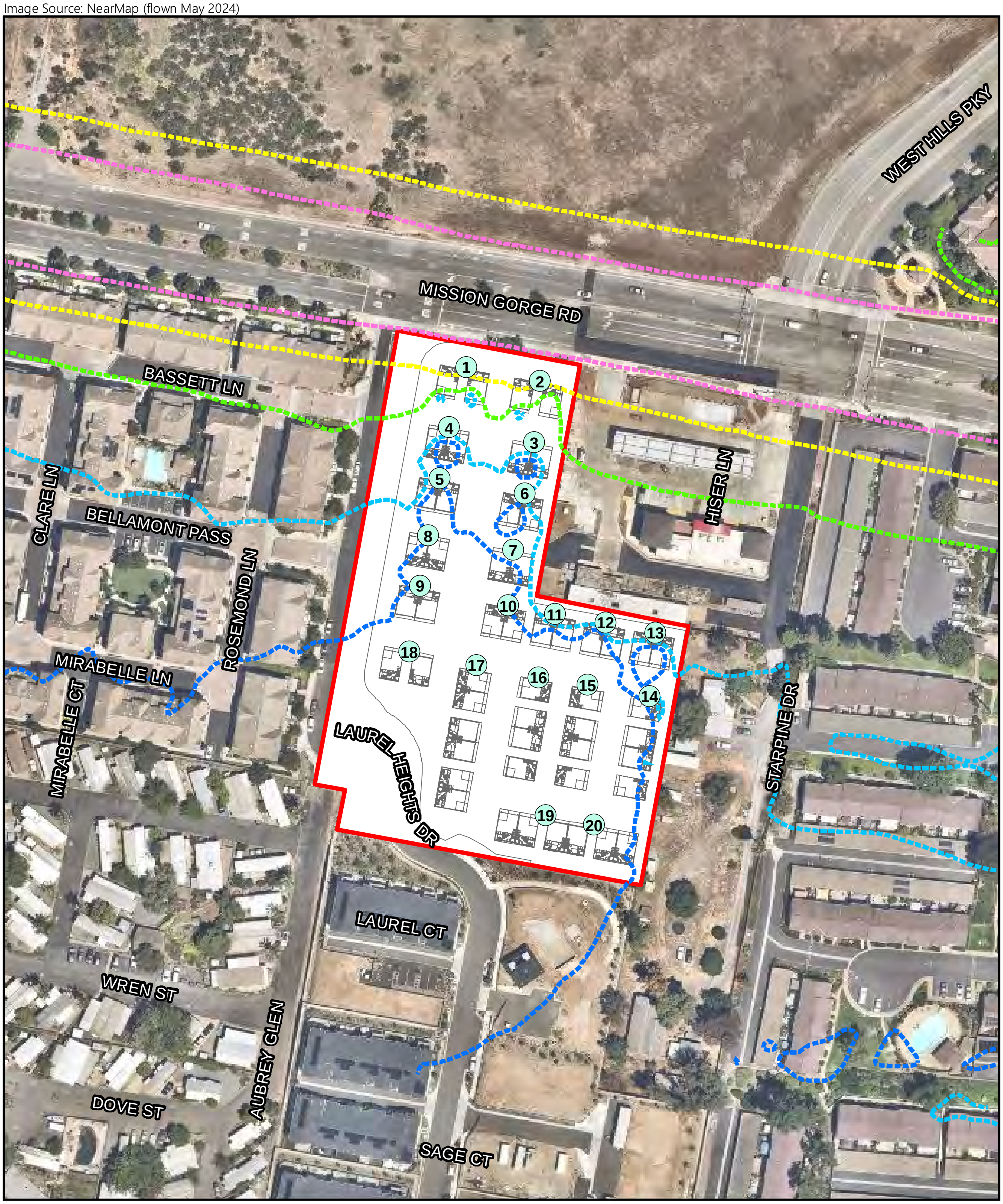
5.2 Traffic Noise Analysis

5.2.1 On-Site Noise Compatibility

Noise and land use compatibility is regulated by the Noise Element of the City's General Plan. As shown in Table 1, residential land uses are normally acceptable with noise levels up to 65 CNEL, conditionally acceptable with noise levels from 65 to 70 CNEL, normally unacceptable with noise levels from 70 to 75 CNEL, and clearly unacceptable with noise levels above 75 CNEL.

Vehicle traffic noise level contours across the project site were calculated using SoundPLAN. These contours take into account the project area topography and the proposed buildings. Noise levels were also modeled at a series of first- through fifth floor receivers located around the proposed buildings. Vehicle traffic noise contours and receiver locations are shown in Figure 6. The results are summarized in Table 5. SoundPLAN data are provided in Attachment 3.

Image Source: NearMap (flown May 2024)



Project Boundary

Receivers

Site Plan

Vehicle Traffic Noise

50 CNEL

55 CNEL

60 CNEL

65 CNEL

70 CNEL

0 Feet 150

FIGURE 6

Vehicle Traffic Noise Contours

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Table 5 Vehicle Traffic Noise Levels (CNEL)			
Receiver	1st Floor	2nd Floor	3rd Floor
1	67	69	69
2	66	68	69
3	61	63	65
4	60	63	64
5	52	56	59
6	55	58	61
7	52	56	59
8	50	54	57
9	46	50	53
10	51	55	58
11	58	61	62
12	59	61	63
13	59	62	63
14	53	57	59
15	47	51	53
16	44	48	51
17	43	46	48
18	44	47	50
19	39	44	47
20	47	51	54
CNEL = community noise equivalent level			

As shown in Figure 6 and Table 5, exterior noise levels would be 65 CNEL or less at all receivers except at Receivers 1 and 2 on the northern side of the northernmost buildings closest to Mission Gorge Road. However, for Receivers 1 and 2, there are no proposed exterior use areas on the northern sides of those buildings. Patios would be located on the southern side of those buildings shielded from Mission Gorge Road. Exterior noise levels would not exceed the "normally acceptable" noise level limit of 65 CNEL at any proposed exterior use areas. Therefore, the project would not expose receivers to exterior noise levels in excess of standards established in the City's General Plan, and impacts would be less than significant.

Interior noise levels can be reduced through standard construction techniques. When windows are closed, standard construction techniques provide various exterior-to-interior noise level reductions depending on the type of structure and window. According to the FHWA's Highway Traffic Noise Analysis and Abatement Guidance, buildings with masonry façades and double-glazed windows can be estimated to provide a noise level reduction of 35 dB, while light-frame structures with double-glazed windows may provide noise level reductions of 20 to 25 dB (FHWA 2011).

The interior noise level standard for residential uses is 45 CNEL. As shown in Table 5, with the exception of Receivers 1 and 2, exterior noise levels would range from 39 to 65 CNEL. Standard light-frame construction would reduce exterior to interior noise levels by at least 20 dB. This analysis conservatively assumes that standard construction techniques would achieve 20 dB exterior to interior noise reduction. Using this assumption, interior noise levels would be reduced to 45 CNEL or less.

For the two units located adjacent to Mission Gorge Road (Receivers 1 and 2), a more detailed evaluation of interior noise levels was conducted. The STC rating of windows, walls, and roofs is an integer value that rates how well a building component attenuates noise. The STC rating general reflects the decibel reduction that a building component can achieve. Noise levels on the northern side of these units would be up to 69 CNEL. Therefore, because a noise reduction of up to 24 dB(A) is required to achieve interior noise levels of 45 CNEL or less, building components with an STC rating of up to 24 would be required. Standard walls and roofs typically have STC ratings greater than 40, and therefore would achieve the required noise reduction. In order to achieve an interior noise level of 45 CNEL or less in the two units closest to Mission Gorge Road, windows with an STC of 24 or greater would be required. The inclusion of windows with an STC of 24 in the two units closest to Mission Gorge Road shall be a project condition of approval (see Standard Condition No. 4, item 5). Therefore, the project would not expose receivers to interior noise levels in excess of standards established in the General Plan, and impacts would be less than significant.

5.2.2 Off-Site Vehicle Traffic Noise

The project would contribute traffic to the local roadways. However, the project would not substantially alter the vehicle classifications mix on local or regional roadways, nor would the project alter the speed on an existing roadway or create a new roadway. Thus, the primary factor affecting off-site noise levels would be increased traffic volumes. While changes in noise levels would occur along any roadway where project-related traffic occurs, for noise assessment purposes, noise level increases are assumed to be greatest nearest the project site, as this location would represent the greatest concentration of project-related traffic. As discussed in Section 2.1, noise impacts would be significance if, as a direct result of the project, (1) noise levels for any existing or planned development will exceed the noise levels considered compatible for that use as identified in Table 1, or (2) noise levels which already exceed the levels considered compatible for that use are increased by 3 dB or more.

Based on the ITE Trip Generation Manual 11th Edition, the project would generate 7.20 trips per unit. The project proposes 52 units which would generate a total of 374 daily trips (Linscott, Law & Greenspan, Engineers 2024). A 3 dB increase in noise levels would occur when there is a doubling of traffic volumes on a roadway. Typically, a project would have to double the traffic volume on a roadway in order to have a significant direct noise increase of 3 dB or more or to be major contributor to the cumulative traffic volumes. As shown in Table 3, the existing traffic volume on Mission Gorge Road is 12,877 ADT. Adding 374 trips to Mission Gorge Road would increase noise levels by 0.1 dB, which would not be an audible change in noise levels. Therefore, operational roadway noise would not generate a substantial permanent increase in ambient noise levels for off-site noise sensitive land uses, and impacts would be less than significant.

5.3 On-Site Noise Analysis

On-site generated noise is regulated by the City's Municipal Code, Title 5 Health and Safety, Chapter 5.04 Noise Abatement and Control. Section 5.04.040 of the City's Municipal Code states that "it is unlawful for any person to make, continue, or cause to be made or continued, within the limits of the City, any disturbing, excessive or offensive noise which causes discomfort or annoyance to reasonable persons of normal sensitivity residing in the area." Section 5.04.040 also provides the following requirements for HVAC units:

4. Heating and Air Conditioning Equipment and Generators.
    a. It is unlawful for any person to operate or allow the operation of any generator, air conditioning, refrigeration or heating equipment in such manner as to create a noise disturbance on the premises of any other occupied property, or if a condominium, apartment house, duplex, or attached business, within any adjoining unit.
    b. All generators, heating, air conditioning, or refrigeration equipment are subject to the setback and screening requirements in this code.

Additionally, in accordance with the Noise Element of the General Plan, the noise level threshold is 65 dB(A) L_{eq} at the property line. Using the parameters discussed in Section 4.3, property line noise levels due to HVAC units were modeled using SoundPLAN. The modeling results are summarized in Table 6. HVAC noise contours are shown in Figure 7. SoundPLAN data is contained in Attachment 4.

As shown in Table 6, property line noise levels would range from 39 to 56 dB(A) L_{eq}. This is a worst-case analysis that assumes all units would operate at 100 percent capacity (i.e., continuously without cycling off) during the daytime and nighttime hours. Noise levels would not exceed 65 dB(A) L_{eq}. Noise at this level would not be considered a noise disturbance. The units would be operated in accordance with the requirements of the City's Municipal Code. Therefore, operational HVAC noise would not generate a substantial permanent increase in ambient noise levels for off-site noise sensitive land uses in excess of standards established in the City's General Plan, and impacts would be less than significant.

Table 6
HVAC Noise Levels at Off-Site Receivers
[dB(A) L_{eq}]

Receiver	Land Use Designation	HVAC Noise Level
1	R14 (Medium-High Density Residential)	44
2	R14 (Medium-High Density Residential)	46
3	R14 (Medium-High Density Residential)	45
4	R14 (Medium-High Density Residential)	43
5	R7 (Medium Density Residential)	41
6	R7 (Medium Density Residential)	56
7	R7 (Medium Density Residential)	51
8	R7 (Medium Density Residential)	50
9	GC (General Commercial)	51
10	GC (General Commercial)	53
11	GC (General Commercial)	51
12	GC (General Commercial)	48
13	R7 (Medium Density Residential)	39
14	R7 (Medium Density Residential)	42
15	R7 (Medium Density Residential)	42

dB(A) L_{eq} = A-weighted decibels equivalent noise level
HVAC = heating, ventilation, and air conditioning

5.4 Off-Site Car Wash Noise

A car wash is located adjacent to the project site to the northeast. The requirements of the City's Municipal Code apply to operations at the car wash. The car wash is temporarily closed but would potentially be reopened after renovations. An Operational Noise Evaluation of the car wash was conducted by Ldn Consulting, Inc. to determine estimated noise levels from existing and proposed car wash operations. The analysis concluded that the existing car wash operational noise levels comply with the noise standards at the property lines and no substantial permanent noise increase is anticipated (Ldn Consulting, Inc. 2024). Therefore, the car wash would not expose on-site receptors to ambient noise levels in excess of standards established in the City's General Plan, and impacts would be less than significant.

Image Source: NearMap (flown May 2024)

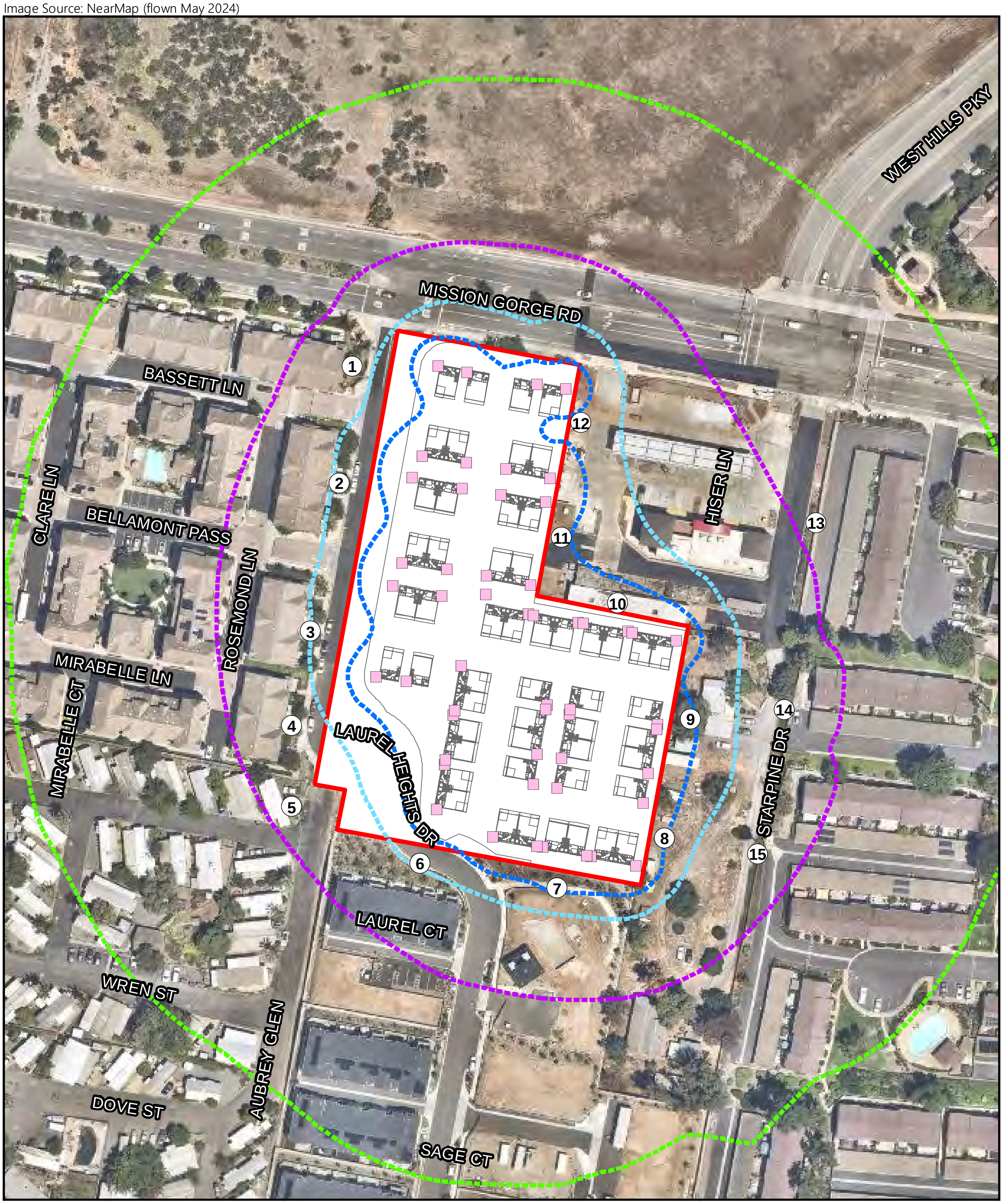

FIGURE 7
HVAC Noise Contours

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6.0 Conclusions

Noise impacts due to construction and operation of the project were assessed in accordance with standards established in the City's General Plan Noise Element and the City's Municipal Code. As discussed in this analysis, construction noise levels are anticipated to range from 63 to 74 dB(A) L_{eq} at the adjacent properties. Although the existing adjacent uses would be exposed to construction noise levels that could be heard above ambient conditions, the exposure would be temporary. Additionally, the project would be subject to Standard Project Condition No. 4 – Noise, items 1 through 4 (refer to Section 1.1). Compliance with this condition would reduce construction noise impacts to less than significant. As construction activities associated with the project would comply with requirements of the Noise Abatement and Control Ordinance, impacts associated with temporary increases in noise levels during construction would be less than significant.

With the exception of Receivers 1 and 2 which are located on the northern side of the northernmost buildings closest to Mission Gorge Road, exterior noise levels would not exceed the "normally acceptable" noise level limit of 65 CNEL. However, for Receivers 1 and 2, there are no proposed exterior use areas on the northern sides of those buildings. Patios would be located on the southern side of those buildings shielded from Mission Gorge Road. Exterior noise levels would not exceed the "normally acceptable" noise level limit of 65 CNEL at any proposed exterior use areas. Therefore, the project would not expose receivers to exterior noise levels in excess of standards established in the City's General Plan, and impacts would be less than significant.

Standard light-frame construction would reduce exterior to interior noise levels by at least 20 dB. For the two units located adjacent to Mission Gorge Road (Receivers 1 and 2), noise levels would be up to 69 CNEL and building components with an STC rating of up to 24 would be required. Standard walls and roofs typically have STC ratings greater than 40, and therefore would achieve the required noise reduction. In order to achieve an interior noise level of 45 CNEL or less in the units closest to Mission Gorge Road, windows with an STC of 24 or greater would be required. The inclusion of windows with an STC of 24 in the two units closest to Mission Gorge Road shall be a project condition of approval (see Standard Condition No. 4, item 5). Therefore, the project would not expose receivers to interior noise levels in excess of standards established in the General Plan, and impacts would be less than significant.

The project would contribute traffic to the local roadways. As calculated in this analysis, an increase of 374 project-generated trips on Mission Gorge Road would result in a noise increase of 0.1 dB or less, which would not be an audible change in noise levels. Therefore, operational roadway noise would not generate a substantial permanent increase in ambient noise levels for off-site noise sensitive land uses, and impacts would be less than significant.

Property line noise levels due to on-site HVAC equipment would range from 39 to 56 dB(A) L_{eq}. Noise at this level would not be considered a noise disturbance. The units would be operated in accordance with the requirements of the City's Municipal Code. Therefore, operational HVAC noise would not generate a substantial permanent increase in ambient noise levels for off-site noise sensitive land uses in excess of standards established in the City's General Plan, and impacts would be less than significant.

If you have any questions about the results of this analysis, please contact me at jfleming@reconenvironmental.com or (619) 308-9333 extension 177.

Sincerely,

Jessica Fleming

Jessica Fleming
Senior Noise Analyst

JLF:sh:jg

Attachments

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Navcon Engineering, Inc.

2018 SoundPLAN Essential version 4.1.

Santee, City of

2003 Santee General Plan.

2022 Draft City of Santee Housing Element Rezone Program Implementation PEIR. SCH #2021100263. June 17.

ATTACHMENTS

ATTACHMENT 1

HVAC Specifications

Source name	Reference	Noise Level dB(A)	Cwall dB(A)	Corrections CI dB(A)	CT dB(A)
HVAC1	Lw/unit	75	-	-	-
HVAC2	Lw/unit	75	-	-	-
HVAC3	Lw/unit	75	-	-	-
HVAC4	Lw/unit	75	-	-	-
HVAC5	Lw/unit	75	-	-	-
HVAC6	Lw/unit	75	-	-	-
HVAC7	Lw/unit	75	-	-	-
HVAC8	Lw/unit	75	-	-	-
HVAC9	Lw/unit	75	-	-	-
HVAC10	Lw/unit	75	-	-	-
HVAC11	Lw/unit	75	-	-	-
HVAC12	Lw/unit	75	-	-	-
HVAC13	Lw/unit	75	-	-	-
HVAC14	Lw/unit	75	-	-	-
HVAC15	Lw/unit	75	-	-	-
HVAC16	Lw/unit	75	-	-	-
HVAC17	Lw/unit	75	-	-	-
HVAC18	Lw/unit	75	-	-	-
HVAC19	Lw/unit	75	-	-	-
HVAC20	Lw/unit	75	-	-	-
HVAC21	Lw/unit	75	-	-	-
HVAC22	Lw/unit	75	-	-	-
HVAC23	Lw/unit	75	-	-	-
HVAC24	Lw/unit	75	-	-	-
HVAC25	Lw/unit	75	-	-	-
HVAC26	Lw/unit	75	-	-	-
HVAC27	Lw/unit	75	-	-	-
HVAC28	Lw/unit	75	-	-	-
HVAC29	Lw/unit	75	-	-	-
HVAC30	Lw/unit	75	-	-	-
HVAC31	Lw/unit	75	-	-	-
HVAC32	Lw/unit	75	-	-	-
HVAC33	Lw/unit	75	-	-	-
HVAC34	Lw/unit	75	-	-	-
HVAC35	Lw/unit	75	-	-	-
HVAC36	Lw/unit	75	-	-	-
HVAC37	Lw/unit	75	-	-	-
HVAC38	Lw/unit	75	-	-	-
HVAC39	Lw/unit	75	-	-	-
HVAC40	Lw/unit	75	-	-	-
HVAC41	Lw/unit	75	-	-	-
HVAC42	Lw/unit	75	-	-	-
HVAC43	Lw/unit	75	-	-	-
HVAC44	Lw/unit	75	-	-	-
HVAC45	Lw/unit	75	-	-	-
HVAC46	Lw/unit	75	-	-	-
HVAC47	Lw/unit	75	-	-	-
HVAC48	Lw/unit	75	-	-	-
HVAC49	Lw/unit	75	-	-	-
HVAC50	Lw/unit	75	-	-	-
HVAC51	Lw/unit	75	-	-	-
HVAC52	Lw/unit	75	-	-	-

10174 Mission Gorge Condos

SoundPLAN Data - HVAC

No.	Coordinates X (meters)	Y	Height m	Noise Level dB(A)
1	497352.13	3633214.73	107.36	30.6
2	497348.10	3633177.67	108.17	33.7
3	497339.51	3633130.66	108.80	33.4
4	497333.78	3633100.86	109.71	37.2
5	497333.96	3633075.08	110.72	35.1
6	497374.75	3633057.52	113.16	40.3
7	497418.12	3633049.90	113.11	48.3
8	497452.06	3633066.01	110.62	50.4
9	497460.05	3633103.76	108.00	46.4
10	497436.64	3633140.29	107.74	46.1
11	497418.64	3633160.98	106.35	42.5
12	497424.66	3633197.39	104.73	37.4
13	497499.27	3633166.19	105.15	32.0
14	497489.78	3633106.95	107.84	38.1
15	497481.51	3633061.26	111.14	37.4

Source name				Noise Level dB(A)
1	1.Fl	30.6	0.0	
HVAC1				16.8
HVAC2				17.6
HVAC3				10.7
HVAC4				11.1
HVAC5				21.2
HVAC6				12.7
HVAC7				20.2
HVAC8				18.1
HVAC9				19.4
HVAC10				15.9
HVAC11				9.3
HVAC12				8.9
HVAC13				23.2
HVAC14				17.4
HVAC15				9.8
HVAC16				8.6
HVAC17				21.3
HVAC18				11.5
HVAC19				14.2
HVAC20				7.5
HVAC21				9.0
HVAC22				7.6
HVAC23				7.8
HVAC24				5.9
HVAC25				6.2
HVAC26				5.7
HVAC27				5.2
HVAC28				3.6
HVAC29				4.9
HVAC30				2.8
HVAC31				3.3
HVAC32				3.1
HVAC33				4.4
HVAC34				4.3
HVAC35				4.3
HVAC36				3.8
HVAC37				6.8
HVAC38				4.0
HVAC39				6.3
HVAC40				3.4
HVAC41				7.0
HVAC42				5.2
HVAC43				5.9
HVAC44				3.3
HVAC45				3.4
HVAC46				0.5
HVAC47				2.3
HVAC48				2.3
HVAC49				3.1
HVAC50				1.5
HVAC51				3.5
HVAC52				-1.1
2	1.Fl	33.7	0.0	
HVAC1				20.8
HVAC2				29.8
HVAC3				9.0
HVAC4				10.2
HVAC5				11.4
HVAC6				12.0
HVAC7				17.3
HVAC8				19.6
HVAC9				17.6
HVAC10				18.4
HVAC11				11.0
HVAC12				11.5
HVAC13				23.3
HVAC14				18.3
HVAC15				15.7
HVAC16				12.2
HVAC17				20.1
HVAC18				16.5
HVAC19				23.8
HVAC20				17.8
HVAC21				10.2
HVAC22				10.0
HVAC23				10.8
HVAC24				10.2
HVAC25				7.6

HVAC26				5.1
HVAC27				5.4
HVAC28				3.0
HVAC29				5.6
HVAC30				4.7
HVAC31				4.5
HVAC32				6.7
HVAC33				6.6
HVAC34				7.6
HVAC35				6.3
HVAC36				7.2
HVAC37				9.3
HVAC38				6.0
HVAC39				7.7
HVAC40				6.1
HVAC41				8.0
HVAC42				8.7
HVAC43				7.8
HVAC44				6.6
HVAC45				6.3
HVAC46				3.1
HVAC47				3.9
HVAC48				3.2
HVAC49				5.8
HVAC50				3.9
HVAC51				4.7
HVAC52				0.2
3	1.Fl	33.4	0.0	
HVAC1				15.0
HVAC2				8.8
HVAC3				5.7
HVAC4				4.3
HVAC5				9.4
HVAC6				7.6
HVAC7				11.3
HVAC8				13.2
HVAC9				20.5
HVAC10				21.5
HVAC11				9.5
HVAC12				10.9
HVAC13				26.5
HVAC14				18.0
HVAC15				9.4
HVAC16				9.4
HVAC17				18.8
HVAC18				20.8
HVAC19				21.5
HVAC20				18.1
HVAC21				13.6
HVAC22				14.7
HVAC23				14.4
HVAC24				13.3
HVAC25				11.4
HVAC26				9.0
HVAC27				7.4
HVAC28				6.6
HVAC29				7.6
HVAC30				4.2
HVAC31				6.0
HVAC32				6.3
HVAC33				8.6
HVAC34				8.2
HVAC35				6.8
HVAC36				10.1
HVAC37				13.0
HVAC38				9.7
HVAC39				12.0
HVAC40				10.4
HVAC41				11.6
HVAC42				16.9
HVAC43				16.6
HVAC44				26.5
HVAC45				16.5
HVAC46				10.5
HVAC47				5.5
HVAC48				5.4
HVAC49				7.3
HVAC50				4.7
HVAC51				5.4
HVAC52				1.8
4	1.Fl	37.2	0.0	
HVAC1				11.9

HVAC2				11.3
HVAC3				4.0
HVAC4				1.5
HVAC5				8.2
HVAC6				6.4
HVAC7				10.2
HVAC8				13.4
HVAC9				11.5
HVAC10				9.6
HVAC11				6.6
HVAC12				7.2
HVAC13				13.4
HVAC14				11.7
HVAC15				9.8
HVAC16				8.8
HVAC17				20.0
HVAC18				28.4
HVAC19				26.8
HVAC20				18.1
HVAC21				8.7
HVAC22				9.8
HVAC23				10.4
HVAC24				7.4
HVAC25				7.6
HVAC26				6.8
HVAC27				5.6
HVAC28				3.0
HVAC29				9.2
HVAC30				10.3
HVAC31				10.1
HVAC32				7.9
HVAC33				7.6
HVAC34				12.0
HVAC35				13.0
HVAC36				12.5
HVAC37				16.1
HVAC38				16.9
HVAC39				16.2
HVAC40				11.3
HVAC41				27.8
HVAC42				31.0
HVAC43				22.0
HVAC44				27.8
HVAC45				28.9
HVAC46				6.5
HVAC47				7.5
HVAC48				7.5
HVAC49				7.7
HVAC50				5.4
HVAC51				6.8
HVAC52				3.5
5	1.Fl	35.1	0.0	
HVAC1				8.8
HVAC2				8.6
HVAC3				5.1
HVAC4				0.8
HVAC5				7.2
HVAC6				3.9
HVAC7				9.4
HVAC8				10.3
HVAC9				11.9
HVAC10				12.2
HVAC11				6.7
HVAC12				5.4
HVAC13				11.7
HVAC14				9.9
HVAC15				9.0
HVAC16				8.3
HVAC17				12.3
HVAC18				9.9
HVAC19				25.2
HVAC20				27.2
HVAC21				14.7
HVAC22				16.7
HVAC23				10.6
HVAC24				9.7
HVAC25				7.0
HVAC26				5.8
HVAC27				4.1
HVAC28				2.5
HVAC29				6.3
HVAC30				6.0

HVAC31				4.1
HVAC32				6.7
HVAC33				8.6
HVAC34				8.7
HVAC35				8.3
HVAC36				7.2
HVAC37				14.3
HVAC38				9.7
HVAC39				7.9
HVAC40				15.3
HVAC41				13.6
HVAC42				17.7
HVAC43				13.9
HVAC44				28.0
HVAC45				26.6
HVAC46				29.0
HVAC47				7.1
HVAC48				7.1
HVAC49				8.5
HVAC50				4.7
HVAC51				7.7
HVAC52				4.5
6	1.Fl	40.3	0.0	
HVAC1				8.6
HVAC2				8.4
HVAC3				5.9
HVAC4				4.6
HVAC5				5.6
HVAC6				4.9
HVAC7				8.7
HVAC8				10.4
HVAC9				6.6
HVAC10				10.5
HVAC11				7.7
HVAC12				6.0
HVAC13				11.2
HVAC14				13.2
HVAC15				8.9
HVAC16				7.8
HVAC17				14.0
HVAC18				17.3
HVAC19				20.2
HVAC20				30.1
HVAC21				11.7
HVAC22				10.8
HVAC23				14.6
HVAC24				10.1
HVAC25				10.0
HVAC26				5.3
HVAC27				6.5
HVAC28				4.6
HVAC29				10.8
HVAC30				9.0
HVAC31				10.1
HVAC32				9.5
HVAC33				14.0
HVAC34				9.8
HVAC35				10.0
HVAC36				9.3
HVAC37				10.1
HVAC38				11.8
HVAC39				11.0
HVAC40				20.1
HVAC41				11.9
HVAC42				14.2
HVAC43				13.4
HVAC44				18.7
HVAC45				18.0
HVAC46				39.1
HVAC47				16.8
HVAC48				18.0
HVAC49				28.0
HVAC50				12.9
HVAC51				12.4
HVAC52				8.6
7	1.Fl	48.3	0.0	
HVAC1				-0.6
HVAC2				1.8
HVAC3				0.6
HVAC4				1.6
HVAC5				3.3
HVAC6				5.1

HVAC7				4.6
HVAC8				2.4
HVAC9				4.2
HVAC10				5.7
HVAC11				3.2
HVAC12				3.3
HVAC13				5.2
HVAC14				5.3
HVAC15				7.0
HVAC16				7.5
HVAC17				6.3
HVAC18				8.5
HVAC19				7.1
HVAC20				7.7
HVAC21				8.8
HVAC22				11.2
HVAC23				8.4
HVAC24				13.1
HVAC25				10.8
HVAC26				12.7
HVAC27				12.5
HVAC28				7.3
HVAC29				11.7
HVAC30				12.2
HVAC31				12.4
HVAC32				13.1
HVAC33				16.4
HVAC34				12.9
HVAC35				12.8
HVAC36				11.5
HVAC37				11.2
HVAC38				12.2
HVAC39				11.3
HVAC40				13.1
HVAC41				9.6
HVAC42				11.0
HVAC43				12.4
HVAC44				11.8
HVAC45				13.1
HVAC46				32.3
HVAC47				41.8
HVAC48				44.5
HVAC49				39.3
HVAC50				40.5
HVAC51				33.5
HVAC52				19.0
8	1.Fl	50.4	0.0	
HVAC1				1.8
HVAC2				3.6
HVAC3				2.8
HVAC4				3.9
HVAC5				3.1
HVAC6				2.9
HVAC7				3.7
HVAC8				2.5
HVAC9				3.4
HVAC10				4.4
HVAC11				4.3
HVAC12				6.1
HVAC13				4.0
HVAC14				4.5
HVAC15				5.4
HVAC16				5.7
HVAC17				4.9
HVAC18				5.6
HVAC19				5.9
HVAC20				6.6
HVAC21				5.6
HVAC22				5.7
HVAC23				8.2
HVAC24				8.2
HVAC25				8.6
HVAC26				13.3
HVAC27				11.3
HVAC28				28.4
HVAC29				16.1
HVAC30				20.5
HVAC31				18.4
HVAC32				22.5
HVAC33				15.2
HVAC34				14.9
HVAC35				14.4

HVAC36				13.6
HVAC37				11.1
HVAC38				13.3
HVAC39				13.7
HVAC40				15.0
HVAC41				9.1
HVAC42				9.2
HVAC43				9.1
HVAC44				26.3
HVAC45				26.7
HVAC46				17.8
HVAC47				16.7
HVAC48				16.1
HVAC49				18.2
HVAC50				22.0
HVAC51				24.1
HVAC52				50.3
9	1.Fl	46.4	0.0	
HVAC1				5.4
HVAC2				5.4
HVAC3				6.4
HVAC4				10.0
HVAC5				6.9
HVAC6				7.5
HVAC7				5.6
HVAC8				5.6
HVAC9				6.3
HVAC10				6.5
HVAC11				8.4
HVAC12				9.1
HVAC13				7.0
HVAC14				5.9
HVAC15				9.6
HVAC16				9.5
HVAC17				6.6
HVAC18				7.2
HVAC19				7.2
HVAC20				7.3
HVAC21				10.4
HVAC22				8.3
HVAC23				12.1
HVAC24				13.0
HVAC25				17.9
HVAC26				34.1
HVAC27				20.0
HVAC28				43.4
HVAC29				41.9
HVAC30				27.7
HVAC31				25.9
HVAC32				20.7
HVAC33				20.4
HVAC34				22.4
HVAC35				17.2
HVAC36				26.1
HVAC37				19.8
HVAC38				16.9
HVAC39				18.9
HVAC40				12.6
HVAC41				17.3
HVAC42				12.0
HVAC43				12.6
HVAC44				9.8
HVAC45				11.3
HVAC46				7.3
HVAC47				10.2
HVAC48				10.1
HVAC49				8.9
HVAC50				12.5
HVAC51				11.6
HVAC52				29.5
10	1.Fl	46.1	0.0	
HVAC1				9.5
HVAC2				11.3
HVAC3				16.7
HVAC4				22.7
HVAC5				15.4
HVAC6				18.6
HVAC7				10.7
HVAC8				9.9
HVAC9				12.2
HVAC10				15.4
HVAC11				16.7

HVAC12				21.9
HVAC13				10.9
HVAC14				11.5
HVAC15				17.0
HVAC16				17.6
HVAC17				11.7
HVAC18				11.8
HVAC19				9.9
HVAC20				9.4
HVAC21				17.3
HVAC22				16.8
HVAC23				18.6
HVAC24				21.8
HVAC25				27.7
HVAC26				41.4
HVAC27				44.0
HVAC28				19.5
HVAC29				13.8
HVAC30				12.8
HVAC31				12.8
HVAC32				10.9
HVAC33				11.8
HVAC34				13.8
HVAC35				13.4
HVAC36				16.7
HVAC37				14.0
HVAC38				13.4
HVAC39				13.3
HVAC40				11.6
HVAC41				12.6
HVAC42				9.4
HVAC43				9.5
HVAC44				7.8
HVAC45				9.1
HVAC46				6.4
HVAC47				8.3
HVAC48				8.2
HVAC49				7.0
HVAC50				11.1
HVAC51				11.7
HVAC52				6.7
11	1.Fl	42.5	0.0	
HVAC1				10.7
HVAC2				11.8
HVAC3				15.6
HVAC4				21.0
HVAC5				22.7
HVAC6				27.5
HVAC7				13.5
HVAC8				13.5
HVAC9				15.5
HVAC10				18.0
HVAC11				25.6
HVAC12				29.3
HVAC13				17.6
HVAC14				15.9
HVAC15				39.2
HVAC16				26.3
HVAC17				12.5
HVAC18				12.2
HVAC19				9.9
HVAC20				11.0
HVAC21				16.6
HVAC22				15.9
HVAC23				28.6
HVAC24				34.4
HVAC25				33.5
HVAC26				17.8
HVAC27				21.1
HVAC28				12.9
HVAC29				11.5
HVAC30				10.4
HVAC31				11.0
HVAC32				11.2
HVAC33				9.1
HVAC34				11.6
HVAC35				11.6
HVAC36				13.2
HVAC37				13.4
HVAC38				11.6
HVAC39				12.4
HVAC40				9.9

HVAC41				12.7
HVAC42				10.3
HVAC43				12.3
HVAC44				9.7
HVAC45				13.0
HVAC46				4.8
HVAC47				18.7
HVAC48				18.6
HVAC49				19.0
HVAC50				7.3
HVAC51				9.7
HVAC52				4.9
12	1.Fl	37.4	0.0	
HVAC1				13.2
HVAC2				18.0
HVAC3				25.6
HVAC4				29.4
HVAC5				29.1
HVAC6				27.2
HVAC7				23.5
HVAC8				15.7
HVAC9				12.1
HVAC10				11.5
HVAC11				16.8
HVAC12				16.5
HVAC13				9.5
HVAC14				10.0
HVAC15				15.2
HVAC16				18.9
HVAC17				8.7
HVAC18				8.8
HVAC19				4.2
HVAC20				6.6
HVAC21				10.2
HVAC22				14.3
HVAC23				26.2
HVAC24				27.4
HVAC25				26.0
HVAC26				24.8
HVAC27				26.2
HVAC28				12.6
HVAC29				6.9
HVAC30				7.3
HVAC31				5.3
HVAC32				5.6
HVAC33				6.7
HVAC34				7.5
HVAC35				7.9
HVAC36				8.5
HVAC37				8.7
HVAC38				7.1
HVAC39				7.8
HVAC40				6.5
HVAC41				7.7
HVAC42				6.4
HVAC43				7.5
HVAC44				4.3
HVAC45				5.9
HVAC46				2.7
HVAC47				15.0
HVAC48				14.9
HVAC49				14.5
HVAC50				3.1
HVAC51				6.1
HVAC52				3.3
13	1.Fl	32.0	0.0	
HVAC1				5.8
HVAC2				9.1
HVAC3				8.6
HVAC4				11.5
HVAC5				8.6
HVAC6				8.5
HVAC7				6.9
HVAC8				5.1
HVAC9				5.4
HVAC10				5.5
HVAC11				8.7
HVAC12				9.1
HVAC13				7.0
HVAC14				5.9
HVAC15				10.0
HVAC16				9.6

HVAC17				4.0
HVAC18				4.6
HVAC19				5.1
HVAC20				3.4
HVAC21				6.6
HVAC22				6.7
HVAC23				9.2
HVAC24				9.2
HVAC25				10.1
HVAC26				22.2
HVAC27				13.5
HVAC28				29.8
HVAC29				9.5
HVAC30				9.4
HVAC31				8.7
HVAC32				7.8
HVAC33				5.9
HVAC34				7.4
HVAC35				6.7
HVAC36				7.3
HVAC37				5.3
HVAC38				4.2
HVAC39				4.1
HVAC40				2.7
HVAC41				4.7
HVAC42				3.7
HVAC43				3.8
HVAC44				1.5
HVAC45				2.1
HVAC46				-1.5
HVAC47				2.5
HVAC48				2.6
HVAC49				-0.4
HVAC50				8.7
HVAC51				5.5
HVAC52				23.2
14	1.Fl	38.1	0.0	
HVAC1				2.2
HVAC2				6.0
HVAC3				7.6
HVAC4				20.6
HVAC5				6.2
HVAC6				8.3
HVAC7				3.9
HVAC8				3.0
HVAC9				3.9
HVAC10				4.0
HVAC11				7.2
HVAC12				11.7
HVAC13				4.2
HVAC14				4.4
HVAC15				4.3
HVAC16				4.4
HVAC17				4.9
HVAC18				8.0
HVAC19				6.8
HVAC20				6.2
HVAC21				6.1
HVAC22				6.3
HVAC23				9.7
HVAC24				10.7
HVAC25				11.8
HVAC26				16.4
HVAC27				12.8
HVAC28				34.8
HVAC29				30.0
HVAC30				29.4
HVAC31				21.5
HVAC32				17.7
HVAC33				13.3
HVAC34				17.1
HVAC35				12.7
HVAC36				17.6
HVAC37				12.6
HVAC38				12.1
HVAC39				13.1
HVAC40				9.6
HVAC41				11.9
HVAC42				8.5
HVAC43				10.0
HVAC44				7.3
HVAC45				8.0

HVAC46				4.8
HVAC47				9.0
HVAC48				7.7
HVAC49				10.1
HVAC50				14.9
HVAC51				15.7
HVAC52				28.2
15	1.Fl	37.4	0.0	
HVAC1				2.2
HVAC2				2.4
HVAC3				6.0
HVAC4				10.0
HVAC5				3.0
HVAC6				2.1
HVAC7				1.8
HVAC8				1.8
HVAC9				2.0
HVAC10				4.0
HVAC11				3.4
HVAC12				5.8
HVAC13				2.4
HVAC14				2.6
HVAC15				3.9
HVAC16				3.9
HVAC17				3.3
HVAC18				5.9
HVAC19				3.6
HVAC20				4.0
HVAC21				3.4
HVAC22				3.5
HVAC23				7.1
HVAC24				7.1
HVAC25				8.6
HVAC26				10.6
HVAC27				12.4
HVAC28				29.4
HVAC29				16.4
HVAC30				29.5
HVAC31				17.4
HVAC32				29.3
HVAC33				14.0
HVAC34				12.5
HVAC35				12.9
HVAC36				13.3
HVAC37				8.6
HVAC38				13.0
HVAC39				11.3
HVAC40				10.4
HVAC41				9.8
HVAC42				9.8
HVAC43				7.3
HVAC44				22.8
HVAC45				23.0
HVAC46				14.0
HVAC47				10.7
HVAC48				10.3
HVAC49				11.8
HVAC50				13.1
HVAC51				14.3
HVAC52				33.1

ATTACHMENT 2

SoundPLAN Data – Construction Noise

10174 Mission Gorge Condos

SoundPLAN Data - Construction

		Noise		Corrections	
Source name	Reference	Level	Cwall	CI	CT
		dB(A)	dB(A)	dB(A)	dB(A)
Construction	Lw/unit	116.3	-	-	-

10174 Mission Gorge Condos

SoundPLAN Data - Construction

No.	Coordinates X (meters)	Coordinates Y (meters)	Height (meters)	Noise Level dB(A)
1	497352.13	3633214.73	107.36	70.2
2	497348.10	3633177.67	108.17	72.3
3	497339.51	3633130.66	108.80	72.2
4	497333.78	3633100.86	109.71	71.3
5	497333.96	3633075.08	110.72	69.6
6	497374.75	3633057.52	113.16	73.4
7	497418.12	3633049.90	113.11	73.0
8	497452.06	3633066.01	110.62	72.5
9	497460.05	3633103.76	108.06	72.7
10	497436.64	3633140.29	106.85	74.4
11	497418.64	3633160.98	106.35	74.0
12	497424.66	3633197.39	105.43	72.6
13	497499.27	3633166.19	105.15	63.2
14	497489.78	3633106.95	107.84	65.9
15	497481.51	3633061.26	111.14	65.6

ATTACHMENT 3

SoundPLAN Data – Vehicle Traffic Noise

Station km	ADT Veh/24h	Traffic values Vehicles type	Vehicle name	day Veh/h	evening Veh/h	night Veh/h	Speed km/h	Control device	Constr. Speed km/h	Affect. veh. %	Road surface	Gradient Min / Max %
Mission Gorge Road		Traffic direction:	In entry direction									
0+000	16614	Total	-	1066	554	240	-	none	-	-	Average (of DGAC and PCC)	-3.75
0+000	16614	Automobiles	-	1017	529	229	80	none	-	-	Average (of DGAC and PCC)	-3.75
0+000	16614	Medium trucks	-	21	11	5	80	none	-	-	Average (of DGAC and PCC)	-3.75
0+000	16614	Heavy trucks	-	6	3	1	80	none	-	-	Average (of DGAC and PCC)	-3.75
0+000	16614	Buses	-	11	6	2	80	none	-	-	Average (of DGAC and PCC)	-3.75
0+000	16614	Motorcycles	-	11	6	2	80	none	-	-	Average (of DGAC and PCC)	-3.75
0+000	16614	Auxiliary vehicle	-	-	-	-	-	none	-	-	Average (of DGAC and PCC)	-3.75
0+872	-	-	-	-	-	-						
SR-52 NW-bound		Traffic direction:	In entry direction									
0+000	67182	Total	-	4311	2240	970	-	none	-	-	Average (of DGAC and PCC)	-1.533333333
0+000	67182	Automobiles	-	4113	2137	925	105	none	-	-	Average (of DGAC and PCC)	-1.533333333
0+000	67182	Medium trucks	-	86	45	19	105	none	-	-	Average (of DGAC and PCC)	-1.533333333
0+000	67182	Heavy trucks	-	26	13	6	105	none	-	-	Average (of DGAC and PCC)	-1.533333333
0+000	67182	Buses	-	43	22	10	105	none	-	-	Average (of DGAC and PCC)	-1.533333333
0+000	67182	Motorcycles	-	43	22	10	105	none	-	-	Average (of DGAC and PCC)	-1.533333333
0+000	67182	Auxiliary vehicle	-	-	-	-	-	none	-	-	Average (of DGAC and PCC)	-1.533333333
1+004	-	-	-	-	-	-						
SR-52 SE-bound		Traffic direction:	In entry direction									
0+000	67182	Total	-	4311	2240	970	-	none	-	-	Average (of DGAC and PCC)	-1.38
0+000	67182	Automobiles	-	4113	2137	925	105	none	-	-	Average (of DGAC and PCC)	-1.38
0+000	67182	Medium trucks	-	86	45	19	105	none	-	-	Average (of DGAC and PCC)	-1.38
0+000	67182	Heavy trucks	-	26	13	6	105	none	-	-	Average (of DGAC and PCC)	-1.38
0+000	67182	Buses	-	43	22	10	105	none	-	-	Average (of DGAC and PCC)	-1.38
0+000	67182	Motorcycles	-	43	22	10	105	none	-	-	Average (of DGAC and PCC)	-1.38
0+000	67182	Auxiliary vehicle	-	-	-	-	-	none	-	-	Average (of DGAC and PCC)	-1.38
1+048	-	-	-	-	-	-						

10174 Mission Gorge Condos
SoundPLAN Data - Traffic

No.	Coordinates X (meters)	Coordinates Y (meters)	Floor	Height (meters)	Noise Level Day dB(A)	Noise Level Evening dB(A)	Noise Level Night dB(A)	Noise Level Lden dB(A)
1	497388.09	3633214.76	1.Fl	105.96	64.8	62.0	58.3	66.7
1	497388.09	3633214.76	2.Fl	109.26	66.9	64.0	60.4	68.8
1	497388.09	3633214.76	3.Fl	112.56	67.1	64.3	60.7	69.0
2	497411.50	3633210.57	1.Fl	105.12	64.4	61.5	57.9	66.3
2	497411.50	3633210.57	2.Fl	108.42	66.5	63.6	60.0	68.4
2	497411.50	3633210.57	3.Fl	111.72	67.1	64.2	60.6	69.0
3	497409.89	3633191.03	1.Fl	106.35	58.6	55.8	52.1	60.5
3	497409.89	3633191.03	2.Fl	109.65	61.0	58.2	54.6	62.9
3	497409.89	3633191.03	3.Fl	112.95	62.7	59.8	56.2	64.6
4	497382.92	3633195.63	1.Fl	106.02	57.6	54.8	51.2	59.5
4	497382.92	3633195.63	2.Fl	109.32	60.8	57.9	54.3	62.7
4	497382.92	3633195.63	3.Fl	112.62	62.3	59.5	55.8	64.2
5	497379.85	3633179.40	1.Fl	106.40	50.1	47.2	43.6	52.0
5	497379.85	3633179.40	2.Fl	109.70	54.5	51.7	48.1	56.4
5	497379.85	3633179.40	3.Fl	113.00	56.9	54.1	50.4	58.8
6	497407.06	3633174.96	1.Fl	106.35	52.9	50.1	46.4	54.8
6	497407.06	3633174.96	2.Fl	109.65	56.3	53.5	49.8	58.2
6	497407.06	3633174.96	3.Fl	112.95	58.6	55.8	52.1	60.5
7	497403.35	3633157.04	1.Fl	106.35	50.4	47.6	43.9	52.3
7	497403.35	3633157.04	2.Fl	109.65	54.3	51.4	47.8	56.2
7	497403.35	3633157.04	3.Fl	112.95	57.0	54.1	50.5	58.9
8	497376.38	3633161.40	1.Fl	106.50	48.0	45.1	41.5	49.9
8	497376.38	3633161.40	2.Fl	109.80	52.5	49.7	46.0	54.4
8	497376.38	3633161.40	3.Fl	113.10	55.0	52.2	48.5	56.9
9	497373.96	3633145.49	1.Fl	106.85	44.1	41.3	37.6	46.0
9	497373.96	3633145.49	2.Fl	110.15	48.1	45.3	41.7	50.0
9	497373.96	3633145.49	3.Fl	113.45	51.0	48.2	44.5	52.9
10	497402.06	3633139.36	1.Fl	106.38	49.1	46.2	42.6	51.0
10	497402.06	3633139.36	2.Fl	109.68	53.0	50.2	46.5	54.9
10	497402.06	3633139.36	3.Fl	112.98	55.9	53.1	49.5	57.8
11	497416.91	3633136.77	1.Fl	107.89	55.8	53.0	49.3	57.7
11	497416.91	3633136.77	2.Fl	111.19	58.9	56.0	52.4	60.8
11	497416.91	3633136.77	3.Fl	114.49	60.4	57.6	54.0	62.3
12	497432.82	3633134.27	1.Fl	107.98	56.6	53.8	50.1	58.5
12	497432.82	3633134.27	2.Fl	111.28	59.4	56.5	52.9	61.3
12	497432.82	3633134.27	3.Fl	114.58	60.8	58.0	54.3	62.7
13	497448.56	3633131.12	1.Fl	108.36	57.1	54.3	50.6	59.0
13	497448.56	3633131.12	2.Fl	111.66	59.7	56.9	53.3	61.6
13	497448.56	3633131.12	3.Fl	114.96	61.1	58.3	54.6	63.0
14	497446.94	3633111.02	1.Fl	108.65	51.0	48.1	44.5	52.9
14	497446.94	3633111.02	2.Fl	111.95	54.9	52.1	48.5	56.8

Receivers

14	497446.94	3633111.02	3.Fl	115.25	57.1	54.3	50.7	59.0
15	497427.33	3633114.41	1.Fl	108.41	45.1	42.3	38.7	47.0
15	497427.33	3633114.41	2.Fl	111.71	48.7	45.8	42.2	50.6
15	497427.33	3633114.41	3.Fl	115.01	50.6	47.8	44.2	52.5
16	497411.82	3633116.67	1.Fl	108.44	41.8	38.9	35.3	43.7
16	497411.82	3633116.67	2.Fl	111.74	45.7	42.9	39.2	47.6
16	497411.82	3633116.67	3.Fl	115.04	48.6	45.8	42.2	50.5
17	497391.96	3633120.47	1.Fl	106.54	40.9	38.0	34.4	42.8
17	497391.96	3633120.47	2.Fl	109.84	44.4	41.5	37.9	46.3
17	497391.96	3633120.47	3.Fl	113.14	45.9	43.1	39.5	47.8
18	497370.81	3633124.58	1.Fl	107.53	41.7	38.9	35.2	43.6
18	497370.81	3633124.58	2.Fl	110.83	45.4	42.5	38.9	47.3
18	497370.81	3633124.58	3.Fl	114.13	48.2	45.4	41.8	50.1
19	497414.25	3633073.07	1.Fl	108.96	37.4	34.5	30.9	39.3
19	497414.25	3633073.07	2.Fl	112.26	41.7	38.8	35.2	43.6
19	497414.25	3633073.07	3.Fl	115.56	44.6	41.7	38.1	46.5
20	497429.75	3633070.09	1.Fl	110.50	45.1	42.2	38.6	47.0
20	497429.75	3633070.09	2.Fl	113.80	49.2	46.3	42.7	51.1
20	497429.75	3633070.09	3.Fl	117.10	51.8	48.9	45.3	53.7

Source name										Level w/o NP Day	Evening	Night	CNEL
										dB(A)			
1	1.Fl	64.8	62.0	58.3	66.7	0.0	0.0	0.0	0.0				
Mission Gorge Road										64.6	61.8	58.2	66.5
SR-52 NW-bound										46.6	43.8	40.1	48.5
SR-52 SE-bound										48.6	45.7	42.1	50.5
1	2.Fl	66.9	64.0	60.4	68.8	0.0	0.0	0.0	0.0				
Mission Gorge Road										66.6	63.8	60.2	68.5
SR-52 NW-bound										49.6	46.7	43.1	51.5
SR-52 SE-bound										52.1	49.2	45.6	54.0
1	3.Fl	67.1	64.3	60.7	69.0	0.0	0.0	0.0	0.0				
Mission Gorge Road										66.8	64.0	60.4	68.7
SR-52 NW-bound										51.1	48.3	44.6	53.0
SR-52 SE-bound										53.5	50.7	47.0	55.4
2	1.Fl	64.4	61.5	57.9	66.3	0.0	0.0	0.0	0.0				
Mission Gorge Road										64.2	61.3	57.7	66.1
SR-52 NW-bound										45.7	42.9	39.3	47.6
SR-52 SE-bound										48.2	45.3	41.7	50.1
2	2.Fl	66.5	63.6	60.0	68.4	0.0	0.0	0.0	0.0				
Mission Gorge Road										66.2	63.4	59.8	68.2
SR-52 NW-bound										49.6	46.8	43.1	51.5
SR-52 SE-bound										51.6	48.8	45.2	53.5
2	3.Fl	67.1	64.2	60.6	69.0	0.0	0.0	0.0	0.0				
Mission Gorge Road										66.7	63.9	60.3	68.6
SR-52 NW-bound										51.0	48.2	44.6	52.9
SR-52 SE-bound										53.7	50.9	47.3	55.6
3	1.Fl	58.6	55.8	52.1	60.5	0.0	0.0	0.0	0.0				
Mission Gorge Road										58.0	55.2	51.5	59.9
SR-52 NW-bound										46.0	43.2	39.5	47.9
SR-52 SE-bound										46.9	44.1	40.5	48.8
3	2.Fl	61.0	58.2	54.6	62.9	0.0	0.0	0.0	0.0				
Mission Gorge Road										60.1	57.3	53.7	62.0
SR-52 NW-bound										50.1	47.2	43.6	52.0
SR-52 SE-bound										51.4	48.6	44.9	53.3
3	3.Fl	62.7	59.8	56.2	64.6	0.0	0.0	0.0	0.0				
Mission Gorge Road										61.7	58.8	55.2	63.6
SR-52 NW-bound										52.0	49.1	45.5	53.9
SR-52 SE-bound										53.7	50.8	47.2	55.6
4	1.Fl	57.6	54.8	51.2	59.5	0.0	0.0	0.0	0.0				
Mission Gorge Road										57.5	54.6	51.0	59.4
SR-52 NW-bound										38.1	35.3	31.6	40.0
SR-52 SE-bound										41.9	39.0	35.4	43.8
4	2.Fl	60.8	57.9	54.3	62.7	0.0	0.0	0.0	0.0				
Mission Gorge Road										60.6	57.8	54.2	62.5
SR-52 NW-bound										39.4	36.6	32.9	41.3
SR-52 SE-bound										44.9	42.0	38.4	46.8
4	3.Fl	62.3	59.5	55.8	64.2	0.0	0.0	0.0	0.0				
Mission Gorge Road										62.1	59.3	55.7	64.0
SR-52 NW-bound										41.8	39.0	35.4	43.7
SR-52 SE-bound										47.3	44.5	40.8	49.2
5	1.Fl	50.1	47.2	43.6	52.0	0.0	0.0	0.0	0.0				
Mission Gorge Road										49.7	46.9	43.2	51.6
SR-52 NW-bound										30.2	27.3	23.7	32.1
SR-52 SE-bound										38.3	35.4	31.8	40.2

5	2.Fl	54.5	51.7	48.1	56.4	0.0	0.0	0.0	0.0				
Mission Gorge Road										54.3	51.5	47.9	56.2
SR-52 NW-bound										33.8	31.0	27.3	35.7
SR-52 SE-bound										40.3	37.5	33.8	42.2
5	3.Fl	56.9	54.1	50.4	58.8	0.0	0.0	0.0	0.0				
Mission Gorge Road										56.6	53.8	50.2	58.5
SR-52 NW-bound										38.4	35.6	31.9	40.3
SR-52 SE-bound										43.4	40.5	36.9	45.3
6	1.Fl	52.9	50.1	46.4	54.8	0.0	0.0	0.0	0.0				
Mission Gorge Road										51.6	48.8	45.2	53.5
SR-52 NW-bound										42.1	39.3	35.6	44.0
SR-52 SE-bound										45.2	42.3	38.7	47.1
6	2.Fl	56.3	53.5	49.8	58.2	0.0	0.0	0.0	0.0				
Mission Gorge Road										55.0	52.2	48.6	56.9
SR-52 NW-bound										46.0	43.2	39.5	47.9
SR-52 SE-bound										48.5	45.7	42.0	50.4
6	3.Fl	58.6	55.8	52.1	60.5	0.0	0.0	0.0	0.0				
Mission Gorge Road										57.3	54.4	50.8	59.2
SR-52 NW-bound										49.0	46.2	42.6	50.9
SR-52 SE-bound										50.5	47.7	44.1	52.4
7	1.Fl	50.4	47.6	43.9	52.3	0.0	0.0	0.0	0.0				
Mission Gorge Road										48.6	45.8	42.1	50.5
SR-52 NW-bound										41.9	39.1	35.4	43.8
SR-52 SE-bound										43.5	40.6	37.0	45.4
7	2.Fl	54.3	51.4	47.8	56.2	0.0	0.0	0.0	0.0				
Mission Gorge Road										52.3	49.5	45.9	54.3
SR-52 NW-bound										46.0	43.2	39.5	47.9
SR-52 SE-bound										47.4	44.6	40.9	49.3
7	3.Fl	57.0	54.1	50.5	58.9	0.0	0.0	0.0	0.0				
Mission Gorge Road										54.6	51.8	48.2	56.5
SR-52 NW-bound										49.5	46.7	43.1	51.5
SR-52 SE-bound										50.6	47.7	44.1	52.5
8	1.Fl	48.0	45.1	41.5	49.9	0.0	0.0	0.0	0.0				
Mission Gorge Road										47.5	44.6	41.0	49.4
SR-52 NW-bound										27.7	24.8	21.2	29.6
SR-52 SE-bound										38.1	35.3	31.7	40.0
8	2.Fl	52.5	49.7	46.0	54.4	0.0	0.0	0.0	0.0				
Mission Gorge Road										52.2	49.3	45.7	54.1
SR-52 NW-bound										30.2	27.4	23.8	32.1
SR-52 SE-bound										40.9	38.0	34.4	42.8
8	3.Fl	55.0	52.2	48.5	56.9	0.0	0.0	0.0	0.0				
Mission Gorge Road										54.6	51.8	48.2	56.5
SR-52 NW-bound										35.9	33.1	29.4	37.8
SR-52 SE-bound										43.6	40.7	37.1	45.5
9	1.Fl	44.1	41.3	37.6	46.0	0.0	0.0	0.0	0.0				
Mission Gorge Road										43.8	40.9	37.3	45.7
SR-52 NW-bound										26.5	23.7	20.0	28.4
SR-52 SE-bound										31.3	28.5	24.9	33.2
9	2.Fl	48.1	45.3	41.7	50.0	0.0	0.0	0.0	0.0				
Mission Gorge Road										47.9	45.0	41.4	49.8
SR-52 NW-bound										29.3	26.5	22.8	31.2
SR-52 SE-bound										34.6	31.8	28.1	36.5
9	3.Fl	51.0	48.2	44.5	52.9	0.0	0.0	0.0	0.0				
Mission Gorge Road										50.5	47.6	44.0	52.4
SR-52 NW-bound										35.5	32.6	29.0	37.4

SR-52 SE-bound										40.3	37.5	33.8	42.2
10	1.Fl	49.1	46.2	42.6	51.0	0.0	0.0	0.0	0.0				
Mission Gorge Road										46.7	43.9	40.3	48.6
SR-52 NW-bound										40.6	37.8	34.1	42.5
SR-52 SE-bound										43.4	40.6	36.9	45.3
10	2.Fl	53.0	50.2	46.5	54.9	0.0	0.0	0.0	0.0				
Mission Gorge Road										50.7	47.9	44.3	52.6
SR-52 NW-bound										45.4	42.5	38.9	47.3
SR-52 SE-bound										46.7	43.8	40.2	48.6
10	3.Fl	55.9	53.1	49.5	57.8	0.0	0.0	0.0	0.0				
Mission Gorge Road										52.9	50.1	46.5	54.8
SR-52 NW-bound										49.7	46.9	43.3	51.6
SR-52 SE-bound										50.1	47.2	43.6	52.0
11	1.Fl	55.8	53.0	49.3	57.7	0.0	0.0	0.0	0.0				
Mission Gorge Road										53.5	50.7	47.1	55.4
SR-52 NW-bound										47.5	44.7	41.0	49.4
SR-52 SE-bound										49.9	47.1	43.4	51.8
11	2.Fl	58.9	56.0	52.4	60.8	0.0	0.0	0.0	0.0				
Mission Gorge Road										56.2	53.3	49.7	58.1
SR-52 NW-bound										51.5	48.7	45.1	53.4
SR-52 SE-bound										53.4	50.5	46.9	55.3
11	3.Fl	60.4	57.6	54.0	62.3	0.0	0.0	0.0	0.0				
Mission Gorge Road										57.3	54.4	50.8	59.2
SR-52 NW-bound										53.6	50.7	47.1	55.5
SR-52 SE-bound										55.3	52.5	48.9	57.2
12	1.Fl	56.6	53.8	50.1	58.5	0.0	0.0	0.0	0.0				
Mission Gorge Road										54.3	51.5	47.8	56.2
SR-52 NW-bound										49.1	46.2	42.6	51.0
SR-52 SE-bound										50.3	47.4	43.8	52.2
12	2.Fl	59.4	56.5	52.9	61.3	0.0	0.0	0.0	0.0				
Mission Gorge Road										56.7	53.9	50.2	58.6
SR-52 NW-bound										52.2	49.4	45.7	54.1
SR-52 SE-bound										53.7	50.8	47.2	55.6
12	3.Fl	60.8	58.0	54.3	62.7	0.0	0.0	0.0	0.0				
Mission Gorge Road										57.8	55.0	51.4	59.7
SR-52 NW-bound										53.8	50.9	47.3	55.7
SR-52 SE-bound										55.5	52.6	49.0	57.4
13	1.Fl	57.1	54.3	50.6	59.0	0.0	0.0	0.0	0.0				
Mission Gorge Road										54.9	52.1	48.4	56.8
SR-52 NW-bound										49.3	46.4	42.8	51.2
SR-52 SE-bound										50.8	48.0	44.3	52.7
13	2.Fl	59.7	56.9	53.3	61.6	0.0	0.0	0.0	0.0				
Mission Gorge Road										57.2	54.3	50.7	59.1
SR-52 NW-bound										52.2	49.4	45.8	54.1
SR-52 SE-bound										54.0	51.2	47.5	55.9
13	3.Fl	61.1	58.3	54.6	63.0	0.0	0.0	0.0	0.0				
Mission Gorge Road										58.3	55.5	51.9	60.2
SR-52 NW-bound										53.9	51.0	47.4	55.8
SR-52 SE-bound										55.6	52.7	49.1	57.5
14	1.Fl	51.0	48.1	44.5	52.9	0.0	0.0	0.0	0.0				
Mission Gorge Road										47.5	44.7	41.0	49.4
SR-52 NW-bound										45.0	42.1	38.5	46.9
SR-52 SE-bound										45.8	43.0	39.3	47.7
14	2.Fl	54.9	52.1	48.5	56.8	0.0	0.0	0.0	0.0				
Mission Gorge Road										50.7	47.9	44.2	52.6

SR-52 NW-bound										49.0	46.1	42.5	50.9
SR-52 SE-bound										50.6	47.8	44.1	52.5
14	3.Fl	57.1	54.3	50.7	59.0	0.0	0.0	0.0	0.0				
Mission Gorge Road										52.6	49.8	46.2	54.5
SR-52 NW-bound										51.1	48.3	44.7	53.0
SR-52 SE-bound										53.1	50.3	46.6	55.0
15	1.Fl	45.1	42.3	38.7	47.0	0.0	0.0	0.0	0.0				
Mission Gorge Road										39.4	36.5	32.9	41.3
SR-52 NW-bound										38.5	35.6	32.0	40.4
SR-52 SE-bound										42.3	39.4	35.8	44.2
15	2.Fl	48.7	45.8	42.2	50.6	0.0	0.0	0.0	0.0				
Mission Gorge Road										42.2	39.3	35.7	44.1
SR-52 NW-bound										41.0	38.2	34.5	42.9
SR-52 SE-bound										46.5	43.6	40.0	48.4
15	3.Fl	50.6	47.8	44.2	52.5	0.0	0.0	0.0	0.0				
Mission Gorge Road										44.8	41.9	38.3	46.7
SR-52 NW-bound										42.9	40.1	36.5	44.8
SR-52 SE-bound										48.2	45.4	41.7	50.1
16	1.Fl	41.8	38.9	35.3	43.7	0.0	0.0	0.0	0.0				
Mission Gorge Road										37.4	34.6	31.0	39.3
SR-52 NW-bound										36.9	34.0	30.4	38.8
SR-52 SE-bound										36.7	33.8	30.2	38.6
16	2.Fl	45.7	42.9	39.2	47.6	0.0	0.0	0.0	0.0				
Mission Gorge Road										40.4	37.5	33.9	42.3
SR-52 NW-bound										41.0	38.1	34.5	42.9
SR-52 SE-bound										41.4	38.5	34.9	43.3
16	3.Fl	48.6	45.8	42.2	50.5	0.0	0.0	0.0	0.0				
Mission Gorge Road										43.3	40.5	36.8	45.2
SR-52 NW-bound										43.2	40.4	36.7	45.1
SR-52 SE-bound										44.8	42.0	38.4	46.7
17	1.Fl	40.9	38.0	34.4	42.8	0.0	0.0	0.0	0.0				
Mission Gorge Road										40.3	37.4	33.8	42.2
SR-52 NW-bound										28.4	25.5	21.9	30.3
SR-52 SE-bound										29.4	26.6	22.9	31.3
17	2.Fl	44.4	41.5	37.9	46.3	0.0	0.0	0.0	0.0				
Mission Gorge Road										43.9	41.1	37.4	45.8
SR-52 NW-bound										30.6	27.8	24.2	32.5
SR-52 SE-bound										32.2	29.4	25.8	34.1
17	3.Fl	45.9	43.1	39.5	47.8	0.0	0.0	0.0	0.0				
Mission Gorge Road										44.8	42.0	38.4	46.7
SR-52 NW-bound										35.8	32.9	29.3	37.7
SR-52 SE-bound										37.0	34.1	30.5	38.9
18	1.Fl	41.7	38.9	35.2	43.6	0.0	0.0	0.0	0.0				
Mission Gorge Road										41.3	38.5	34.8	43.2
SR-52 NW-bound										25.8	23.0	19.4	27.8
SR-52 SE-bound										29.7	26.9	23.2	31.6
18	2.Fl	45.4	42.5	38.9	47.3	0.0	0.0	0.0	0.0				
Mission Gorge Road										45.0	42.2	38.5	46.9
SR-52 NW-bound										28.8	26.0	22.3	30.7
SR-52 SE-bound										32.9	30.0	26.4	34.8
18	3.Fl	48.2	45.4	41.8	50.1	0.0	0.0	0.0	0.0				
Mission Gorge Road										47.5	44.7	41.1	49.5
SR-52 NW-bound										35.3	32.5	28.8	37.2
SR-52 SE-bound										38.1	35.2	31.6	40.0
19	1.Fl	37.4	34.5	30.9	39.3	0.0	0.0	0.0	0.0				

Mission Gorge Road										34.6	31.7	28.1	36.5
SR-52 NW-bound										28.5	25.6	22.0	30.4
SR-52 SE-bound										32.8	30.0	26.4	34.7
19	2.Fl	41.7	38.8	35.2	43.6	0.0	0.0	0.0	0.0				
Mission Gorge Road										39.3	36.5	32.8	41.2
SR-52 NW-bound										30.9	28.0	24.4	32.8
SR-52 SE-bound										36.9	34.0	30.4	38.8
19	3.Fl	44.6	41.7	38.1	46.5	0.0	0.0	0.0	0.0				
Mission Gorge Road										41.0	38.2	34.5	42.9
SR-52 NW-bound										35.7	32.9	29.3	37.6
SR-52 SE-bound										40.9	38.0	34.4	42.8
20	1.Fl	45.1	42.2	38.6	47.0	0.0	0.0	0.0	0.0				
Mission Gorge Road										39.0	36.1	32.5	40.9
SR-52 NW-bound										36.9	34.1	30.4	38.8
SR-52 SE-bound										42.8	40.0	36.4	44.7
20	2.Fl	49.2	46.3	42.7	51.1	0.0	0.0	0.0	0.0				
Mission Gorge Road										43.1	40.2	36.6	45.0
SR-52 NW-bound										40.3	37.5	33.9	42.2
SR-52 SE-bound										47.1	44.3	40.6	49.0
20	3.Fl	51.8	48.9	45.3	53.7	0.0	0.0	0.0	0.0				
Mission Gorge Road										45.1	42.3	38.7	47.0
SR-52 NW-bound										44.2	41.4	37.8	46.1
SR-52 SE-bound										49.6	46.8	43.1	51.5

ATTACHMENT 4

SoundPLAN Data – HVAC Noise

		Noise		Corrections	
Source name	Reference	Level	Cwall	CI	CT
		dB(A)	dB(A)	dB(A)	dB(A)
HVAC1	Lw/unit	75	-	-	-
HVAC2	Lw/unit	75	-	-	-
HVAC3	Lw/unit	75	-	-	-
HVAC4	Lw/unit	75	-	-	-
HVAC5	Lw/unit	75	-	-	-
HVAC6	Lw/unit	75	-	-	-
HVAC7	Lw/unit	75	-	-	-
HVAC8	Lw/unit	75	-	-	-
HVAC9	Lw/unit	75	-	-	-
HVAC10	Lw/unit	75	-	-	-
HVAC11	Lw/unit	75	-	-	-
HVAC12	Lw/unit	75	-	-	-
HVAC13	Lw/unit	75	-	-	-
HVAC14	Lw/unit	75	-	-	-
HVAC15	Lw/unit	75	-	-	-
HVAC16	Lw/unit	75	-	-	-
HVAC17	Lw/unit	75	-	-	-
HVAC18	Lw/unit	75	-	-	-
HVAC19	Lw/unit	75	-	-	-
HVAC20	Lw/unit	75	-	-	-
HVAC21	Lw/unit	75	-	-	-
HVAC22	Lw/unit	75	-	-	-
HVAC23	Lw/unit	75	-	-	-
HVAC24	Lw/unit	75	-	-	-
HVAC25	Lw/unit	75	-	-	-
HVAC26	Lw/unit	75	-	-	-
HVAC27	Lw/unit	75	-	-	-
HVAC28	Lw/unit	75	-	-	-
HVAC29	Lw/unit	75	-	-	-
HVAC30	Lw/unit	75	-	-	-
HVAC31	Lw/unit	75	-	-	-
HVAC32	Lw/unit	75	-	-	-
HVAC33	Lw/unit	75	-	-	-
HVAC34	Lw/unit	75	-	-	-
HVAC35	Lw/unit	75	-	-	-
HVAC36	Lw/unit	75	-	-	-
HVAC37	Lw/unit	75	-	-	-
HVAC38	Lw/unit	75	-	-	-
HVAC39	Lw/unit	75	-	-	-
HVAC40	Lw/unit	75	-	-	-
HVAC41	Lw/unit	75	-	-	-
HVAC42	Lw/unit	75	-	-	-
HVAC43	Lw/unit	75	-	-	-
HVAC44	Lw/unit	75	-	-	-
HVAC45	Lw/unit	75	-	-	-
HVAC46	Lw/unit	75	-	-	-
HVAC47	Lw/unit	75	-	-	-
HVAC48	Lw/unit	75	-	-	-
HVAC49	Lw/unit	75	-	-	-
HVAC50	Lw/unit	75	-	-	-
HVAC51	Lw/unit	75	-	-	-
HVAC52	Lw/unit	75	-	-	-

10174 Mission Gorge Condos

SoundPLAN Data - HVAC

No.	Coordinates X (meters)	Y	Height m	Noise Level dB(A)
1	497352.13	3633214.73	107.36	43.5
2	497348.10	3633177.67	108.17	45.8
3	497339.51	3633130.66	108.80	44.9
4	497333.78	3633100.86	109.71	42.7
5	497333.96	3633075.08	110.72	40.9
6	497374.75	3633057.52	113.16	45.7
7	497418.12	3633049.90	113.11	51.0
8	497452.06	3633066.01	110.62	50.1
9	497460.05	3633103.76	108.00	50.9
10	497436.64	3633140.29	107.74	53.1
11	497418.64	3633160.98	106.35	50.9
12	497424.66	3633197.39	104.73	48.3
13	497499.27	3633166.19	105.15	39.4
14	497489.78	3633106.95	107.84	42.2
15	497481.51	3633061.26	111.14	41.8

Receivers

Source name				Noise Level dB(A)
1	1.Fl	43.5	0.0	
HVAC1				37.0
HVAC2				33.8
HVAC3				28.3
HVAC4				17.5
HVAC5				25.0
HVAC6				28.3
HVAC7				30.7
HVAC8				33.6
HVAC9				32.2
HVAC10				29.5
HVAC11				27.6
HVAC12				24.7
HVAC13				27.1
HVAC14				26.2
HVAC15				25.1
HVAC16				23.9
HVAC17				26.2
HVAC18				25.2
HVAC19				24.5
HVAC20				23.4
HVAC21				23.3
HVAC22				22.3
HVAC23				22.1
HVAC24				21.2
HVAC25				21.1
HVAC26				20.1
HVAC27				19.1
HVAC28				19.0
HVAC29				18.4
HVAC30				18.0
HVAC31				17.2
HVAC32				17.6
HVAC33				17.7
HVAC34				18.1
HVAC35				18.2
HVAC36				18.6
HVAC37				19.1
HVAC38				19.4
HVAC39				20.0
HVAC40				19.6
HVAC41				20.4
HVAC42				20.5
HVAC43				20.9
HVAC44				20.9
HVAC45				19.4
HVAC46				20.4
HVAC47				20.5
HVAC48				21.6
HVAC49				21.7
HVAC50				22.6
HVAC51				22.7
HVAC52				22.9
2	1.Fl	45.8	0.0	
HVAC1				30.1
HVAC2				29.3
HVAC3				26.5
HVAC4				16.7
HVAC5				25.6
HVAC6				29.3
HVAC7				32.4
HVAC8				37.1
HVAC9				39.2
HVAC10				32.8
HVAC11				29.7
HVAC12				25.9
HVAC13				34.8
HVAC14				31.3
HVAC15				28.8
HVAC16				26.5
HVAC17				33.2
HVAC18				30.2
HVAC19				28.2
HVAC20				26.3
HVAC21				26.0
HVAC22				24.4
HVAC23				24.2
HVAC24				22.8
HVAC25				22.7

HVAC26				21.3
HVAC27				20.6
HVAC28				20.6
HVAC29				20.1
HVAC30				19.7
HVAC31				18.8
HVAC32				19.5
HVAC33				19.5
HVAC34				20.2
HVAC35				20.2
HVAC36				20.9
HVAC37				21.3
HVAC38				21.7
HVAC39				22.4
HVAC40				21.9
HVAC41				22.7
HVAC42				22.8
HVAC43				23.5
HVAC44				23.4
HVAC45				22.1
HVAC46				23.4
HVAC47				23.6
HVAC48				24.9
HVAC49				25.1
HVAC50				26.3
HVAC51				26.9
HVAC52				27.4
3	1.Fl	44.9	0.0	
HVAC1				23.3
HVAC2				23.2
HVAC3				22.3
HVAC4				14.5
HVAC5				23.0
HVAC6				24.9
HVAC7				25.9
HVAC8				26.8
HVAC9				27.9
HVAC10				26.9
HVAC11				25.7
HVAC12				23.7
HVAC13				33.1
HVAC14				30.2
HVAC15				28.1
HVAC16				26.1
HVAC17				35.3
HVAC18				31.2
HVAC19				28.3
HVAC20				26.7
HVAC21				26.5
HVAC22				24.6
HVAC23				24.4
HVAC24				22.9
HVAC25				22.8
HVAC26				21.4
HVAC27				21.6
HVAC28				21.6
HVAC29				21.3
HVAC30				21.2
HVAC31				20.5
HVAC32				21.5
HVAC33				21.6
HVAC34				22.7
HVAC35				22.8
HVAC36				23.9
HVAC37				23.5
HVAC38				24.3
HVAC39				24.8
HVAC40				23.9
HVAC41				24.4
HVAC42				24.5
HVAC43				25.5
HVAC44				25.4
HVAC45				25.3
HVAC46				27.9
HVAC47				28.1
HVAC48				29.3
HVAC49				29.4
HVAC50				29.6
HVAC51				34.0
HVAC52				37.3
4	1.Fl	42.7	0.0	
HVAC1				20.7

HVAC2			20.6
HVAC3			20.1
HVAC4			13.3
HVAC5			20.9
HVAC6			22.2
HVAC7			22.8
HVAC8			23.2
HVAC9			23.9
HVAC10			23.5
HVAC11			22.9
HVAC12			21.7
HVAC13			27.2
HVAC14			26.2
HVAC15			25.1
HVAC16			24.0
HVAC17			28.5
HVAC18			27.2
HVAC19			25.6
HVAC20			24.8
HVAC21			24.7
HVAC22			23.3
HVAC23			23.1
HVAC24			21.9
HVAC25			21.8
HVAC26			20.7
HVAC27			21.3
HVAC28			21.3
HVAC29			21.4
HVAC30			21.5
HVAC31			20.9
HVAC32			21.9
HVAC33			22.0
HVAC34			23.2
HVAC35			23.3
HVAC36			24.8
HVAC37			23.9
HVAC38			24.7
HVAC39			25.0
HVAC40			24.1
HVAC41			23.9
HVAC42			23.9
HVAC43			24.8
HVAC44			24.8
HVAC45			26.8
HVAC46			28.5
HVAC47			28.5
HVAC48			29.2
HVAC49			29.1
HVAC50			27.7
HVAC51			32.0
HVAC52			34.3
5 1.Fl	40.9	0.0	
HVAC1			19.0
HVAC2			19.0
HVAC3			18.7
HVAC4			12.8
HVAC5			19.6
HVAC6			20.5
HVAC7			20.8
HVAC8			21.1
HVAC9			21.7
HVAC10			21.5
HVAC11			21.1
HVAC12			20.3
HVAC13			24.2
HVAC14			23.6
HVAC15			23.1
HVAC16			22.4
HVAC17			25.1
HVAC18			24.4
HVAC19			23.5
HVAC20			23.2
HVAC21			23.1
HVAC22			22.1
HVAC23			21.9
HVAC24			21.0
HVAC25			20.9
HVAC26			19.9
HVAC27			21.0
HVAC28			21.0
HVAC29			21.2
HVAC30			21.3

HVAC31				21.2
HVAC32				22.4
HVAC33				22.5
HVAC34				24.0
HVAC35				24.1
HVAC36				25.0
HVAC37				23.6
HVAC38				24.4
HVAC39				24.4
HVAC40				23.5
HVAC41				23.2
HVAC42				23.1
HVAC43				23.7
HVAC44				23.8
HVAC45				27.7
HVAC46				28.2
HVAC47				28.1
HVAC48				26.9
HVAC49				26.7
HVAC50				25.3
HVAC51				28.3
HVAC52				29.2
6	1.Fl	45.7	0.0	
HVAC1				18.7
HVAC2				18.8
HVAC3				18.9
HVAC4				17.0
HVAC5				20.6
HVAC6				20.8
HVAC7				20.8
HVAC8				20.6
HVAC9				21.1
HVAC10				21.4
HVAC11				21.4
HVAC12				21.2
HVAC13				23.4
HVAC14				23.8
HVAC15				23.8
HVAC16				23.6
HVAC17				24.1
HVAC18				24.7
HVAC19				24.4
HVAC20				24.8
HVAC21				24.7
HVAC22				24.0
HVAC23				23.9
HVAC24				23.3
HVAC25				23.2
HVAC26				22.3
HVAC27				24.5
HVAC28				24.6
HVAC29				25.7
HVAC30				26.3
HVAC31				26.2
HVAC32				28.1
HVAC33				28.2
HVAC34				30.9
HVAC35				31.3
HVAC36				34.4
HVAC37				30.2
HVAC38				31.6
HVAC39				30.1
HVAC40				29.1
HVAC41				27.2
HVAC42				27.0
HVAC43				27.6
HVAC44				27.9
HVAC45				38.8
HVAC46				35.1
HVAC47				34.5
HVAC48				30.5
HVAC49				30.2
HVAC50				26.3
HVAC51				28.2
HVAC52				27.4
7	1.Fl	51.0	0.0	
HVAC1				18.0
HVAC2				18.2
HVAC3				18.6
HVAC4				18.5
HVAC5				20.4
HVAC6				20.3

HVAC7				20.0
HVAC8				19.6
HVAC9				20.0
HVAC10				20.6
HVAC11				20.9
HVAC12				20.9
HVAC13				21.8
HVAC14				22.5
HVAC15				23.0
HVAC16				22.6
HVAC17				22.2
HVAC18				23.2
HVAC19				23.5
HVAC20				24.4
HVAC21				24.5
HVAC22				24.9
HVAC23				24.9
HVAC24				24.9
HVAC25				25.0
HVAC26				24.5
HVAC27				28.3
HVAC28				28.6
HVAC29				31.5
HVAC30				33.7
HVAC31				37.0
HVAC32				43.1
HVAC33				43.6
HVAC34				43.7
HVAC35				43.2
HVAC36				36.0
HVAC37				36.2
HVAC38				35.2
HVAC39				32.3
HVAC40				32.9
HVAC41				29.5
HVAC42				29.2
HVAC43				28.9
HVAC44				29.2
HVAC45				30.7
HVAC46				29.7
HVAC47				29.5
HVAC48				27.7
HVAC49				27.5
HVAC50				24.4
HVAC51				25.2
HVAC52				24.3
8	1.Fl	50.1	0.0	
HVAC1				17.9
HVAC2				18.3
HVAC3				19.0
HVAC4				18.9
HVAC5				20.6
HVAC6				20.4
HVAC7				19.9
HVAC8				19.3
HVAC9				19.6
HVAC10				20.4
HVAC11				20.9
HVAC12				21.1
HVAC13				21.0
HVAC14				21.8
HVAC15				22.5
HVAC16				22.9
HVAC17				21.2
HVAC18				22.3
HVAC19				22.6
HVAC20				24.4
HVAC21				24.6
HVAC22				25.7
HVAC23				25.7
HVAC24				26.7
HVAC25				26.8
HVAC26				27.3
HVAC27				33.0
HVAC28				33.4
HVAC29				39.1
HVAC30				44.5
HVAC31				44.8
HVAC32				38.3
HVAC33				37.5
HVAC34				32.5
HVAC35				32.1

HVAC36				28.9
HVAC37				32.8
HVAC38				30.9
HVAC39				30.1
HVAC40				31.8
HVAC41				29.8
HVAC42				29.5
HVAC43				28.5
HVAC44				28.7
HVAC45				26.0
HVAC46				25.8
HVAC47				25.8
HVAC48				25.2
HVAC49				25.2
HVAC50				23.5
HVAC51				23.1
HVAC52				22.3
9	1.Fl	50.9	0.0	
HVAC1				19.4
HVAC2				19.9
HVAC3				21.0
HVAC4				21.0
HVAC5				23.1
HVAC6				22.4
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HVAC8				20.7
HVAC9				20.9
HVAC10				22.0
HVAC11				22.8
HVAC12				23.7
HVAC13				21.9
HVAC14				23.1
HVAC15				24.2
HVAC16				25.7
HVAC17				22.0
HVAC18				23.3
HVAC19				24.5
HVAC20				26.9
HVAC21				27.2
HVAC22				29.6
HVAC23				29.8
HVAC24				33.2
HVAC25				33.6
HVAC26				37.4
HVAC27				46.3
HVAC28				45.8
HVAC29				38.9
HVAC30				34.7
HVAC31				28.2
HVAC32				28.4
HVAC33				28.2
HVAC34				27.0
HVAC35				26.8
HVAC36				25.4
HVAC37				29.6
HVAC38				28.3
HVAC39				29.1
HVAC40				30.7
HVAC41				31.7
HVAC42				31.8
HVAC43				30.0
HVAC44				29.9
HVAC45				23.9
HVAC46				24.6
HVAC47				24.7
HVAC48				25.0
HVAC49				25.1
HVAC50				24.6
HVAC51				23.2
HVAC52				22.2
10	1.Fl	53.1	0.0	
HVAC1				23.2
HVAC2				24.1
HVAC3				26.0
HVAC4				25.8
HVAC5				30.2
HVAC6				28.7
HVAC7				27.0
HVAC8				25.2
HVAC9				25.3
HVAC10				27.6
HVAC11				29.7

HVAC12				30.8
HVAC13				26.3
HVAC14				28.7
HVAC15				31.5
HVAC16				36.0
HVAC17				26.1
HVAC18				28.6
HVAC19				31.6
HVAC20				35.8
HVAC21				36.5
HVAC22				44.0
HVAC23				44.9
HVAC24				47.4
HVAC25				46.6
HVAC26				38.1
HVAC27				31.3
HVAC28				30.9
HVAC29				28.2
HVAC30				26.8
HVAC31				24.2
HVAC32				24.5
HVAC33				24.5
HVAC34				24.5
HVAC35				24.5
HVAC36				24.1
HVAC37				27.1
HVAC38				26.9
HVAC39				28.4
HVAC40				28.7
HVAC41				31.9
HVAC42				32.4
HVAC43				31.8
HVAC44				31.4
HVAC45				23.8
HVAC46				25.3
HVAC47				25.4
HVAC48				27.1
HVAC49				27.3
HVAC50				27.8
HVAC51				26.1
HVAC52				24.9
11	1.Fl	50.9	0.0	
HVAC1				26.0
HVAC2				27.4
HVAC3				30.1
HVAC4				29.5
HVAC5				39.9
HVAC6				36.1
HVAC7				32.2
HVAC8				29.0
HVAC9				29.1
HVAC10				33.2
HVAC11				38.4
HVAC12				45.0
HVAC13				29.1
HVAC14				32.4
HVAC15				36.5
HVAC16				41.7
HVAC17				28.3
HVAC18				31.2
HVAC19				35.0
HVAC20				37.3
HVAC21				37.4
HVAC22				36.6
HVAC23				36.3
HVAC24				33.0
HVAC25				32.6
HVAC26				29.4
HVAC27				26.0
HVAC28				25.8
HVAC29				24.4
HVAC30				23.6
HVAC31				21.8
HVAC32				22.2
HVAC33				22.2
HVAC34				22.4
HVAC35				22.4
HVAC36				22.4
HVAC37				24.5
HVAC38				24.5
HVAC39				25.9
HVAC40				25.7

HVAC41				27.8
HVAC42				28.2
HVAC43				28.6
HVAC44				28.3
HVAC45				23.1
HVAC46				24.8
HVAC47				25.0
HVAC48				26.9
HVAC49				27.2
HVAC50				29.1
HVAC51				26.7
HVAC52				25.6
12	1.Fl	48.3	0.0	
HVAC1				28.4
HVAC2				30.2
HVAC3				37.6
HVAC4				45.4
HVAC5				37.0
HVAC6				34.0
HVAC7				30.6
HVAC8				27.9
HVAC9				27.2
HVAC10				29.6
HVAC11				32.1
HVAC12				34.4
HVAC13				25.0
HVAC14				26.3
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HVAC16				27.9
HVAC17				24.2
HVAC18				25.3
HVAC19				26.6
HVAC20				27.1
HVAC21				27.1
HVAC22				27.0
HVAC23				26.9
HVAC24				26.4
HVAC25				26.2
HVAC26				25.2
HVAC27				22.2
HVAC28				22.1
HVAC29				21.0
HVAC30				20.3
HVAC31				19.0
HVAC32				19.2
HVAC33				19.2
HVAC34				19.4
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HVAC39				21.6
HVAC40				21.6
HVAC41				23.0
HVAC42				23.2
HVAC43				23.3
HVAC44				23.2
HVAC45				20.0
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HVAC47				21.3
HVAC48				22.5
HVAC49				22.7
HVAC50				23.6
HVAC51				22.5
HVAC52				21.9
13	1.Fl	39.4	0.0	
HVAC1				19.8
HVAC2				20.7
HVAC3				22.9
HVAC4				23.1
HVAC5				23.9
HVAC6				22.7
HVAC7				21.5
HVAC8				20.3
HVAC9				20.1
HVAC10				21.5
HVAC11				22.6
HVAC12				23.6
HVAC13				19.9
HVAC14				21.0
HVAC15				22.0
HVAC16				23.0

HVAC17				19.7
HVAC18				20.7
HVAC19				21.7
HVAC20				23.0
HVAC21				23.2
HVAC22				24.6
HVAC23				24.7
HVAC24				26.4
HVAC25				26.5
HVAC26				28.0
HVAC27				24.7
HVAC28				24.5
HVAC29				23.0
HVAC30				22.2
HVAC31				20.1
HVAC32				20.0
HVAC33				19.9
HVAC34				19.4
HVAC35				19.4
HVAC36				18.9
HVAC37				20.6
HVAC38				20.3
HVAC39				20.8
HVAC40				21.2
HVAC41				22.2
HVAC42				22.3
HVAC43				21.8
HVAC44				21.7
HVAC45				18.4
HVAC46				19.0
HVAC47				19.1
HVAC48				19.7
HVAC49				19.8
HVAC50				20.2
HVAC51				19.1
HVAC52				18.6
14	1.Fl	42.2	0.0	
HVAC1				18.4
HVAC2				19.0
HVAC3				20.4
HVAC4				20.4
HVAC5				21.9
HVAC6				21.1
HVAC7				20.0
HVAC8				19.1
HVAC9				19.1
HVAC10				20.2
HVAC11				21.0
HVAC12				22.1
HVAC13				19.8
HVAC14				20.8
HVAC15				21.7
HVAC16				23.0
HVAC17				19.8
HVAC18				20.9
HVAC19				21.9
HVAC20				23.5
HVAC21				23.8
HVAC22				25.7
HVAC23				25.7
HVAC24				28.5
HVAC25				28.8
HVAC26				32.0
HVAC27				31.9
HVAC28				31.7
HVAC29				30.0
HVAC30				28.8
HVAC31				25.1
HVAC32				24.4
HVAC33				24.3
HVAC34				23.5
HVAC35				23.4
HVAC36				22.3
HVAC37				25.1
HVAC38				24.3
HVAC39				24.7
HVAC40				25.6
HVAC41				26.0
HVAC42				26.0
HVAC43				25.1
HVAC44				25.1
HVAC45				21.2

HVAC46				21.7
HVAC47				21.7
HVAC48				21.9
HVAC49				21.9
HVAC50				21.7
HVAC51				20.6
HVAC52				19.8
15	1.Fl	41.8	0.0	
HVAC1				16.9
HVAC2				17.3
HVAC3				18.2
HVAC4				18.2
HVAC5				19.4
HVAC6				19.2
HVAC7				18.6
HVAC8				18.0
HVAC9				18.2
HVAC10				19.0
HVAC11				19.6
HVAC12				19.7
HVAC13				19.2
HVAC14				20.0
HVAC15				20.5
HVAC16				21.1
HVAC17				19.3
HVAC18				20.3
HVAC19				20.7
HVAC20				22.2
HVAC21				22.4
HVAC22				23.5
HVAC23				23.6
HVAC24				24.9
HVAC25				25.0
HVAC26				26.1
HVAC27				29.5
HVAC28				29.6
HVAC29				31.1
HVAC30				30.3
HVAC31				30.3
HVAC32				27.9
HVAC33				27.6
HVAC34				26.2
HVAC35				26.1
HVAC36				24.3
HVAC37				26.3
HVAC38				25.5
HVAC39				25.2
HVAC40				25.9
HVAC41				25.6
HVAC42				25.6
HVAC43				24.7
HVAC44				24.8
HVAC45				22.5
HVAC46				22.4
HVAC47				22.4
HVAC48				22.1
HVAC49				22.1
HVAC50				21.1
HVAC51				20.6
HVAC52				19.9

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December 17, 2024

Jesse Kleist
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SUBJECT: Operational Noise Evaluation of the adjacent Car Wash at the Aubrey Glen Residential Development – City of Santee

The firm of Ldn Consulting is pleased to submit the following noise impact analysis for the existing Car Wash adjacent to the proposed Aubrey Glen Residential Development in the City of Santee. The purpose of the survey is to determine the estimated noise levels from the existing and proposed operations of the car wash and recommend any mitigation measures, if needed, for compliance with the City of Santee Ordinance requirements for noise.

PROJECT LOCATION

The project consists of an existing car wash facility as part of an existing Shell gas station, located adjacent to the northern property line of the proposed Aubrey Glen residential development. The carwash is temporarily closed but would potentially be reopened after renovations. The existing car wash is located at 7751 Mission Gorge Road. The proposed Aubrey Glen Residential Development is located at 7737 Mission Gorge Road in the City of Santee, as can be seen in Figure 1.

PROJECT DESCRIPTION

The carwash facility was previously open Monday through Saturday, 8 am to 5 pm, and Sunday from 8 am to 4 pm. Previous and expected operations consist of stationary noise sources, including existing vacuum stations at the site that are supplied by a central vacuum system and a car wash tunnel. An existing 12-foot wall is located at the exit of the car wash and the proposed Aubrey Glen Residential Development is proposing a 6-foot perimeter wall located along the property line of the car wash. The project site configuration and noise producing equipment locations are provided in Figure 2.

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Figure 1: Project Site Location

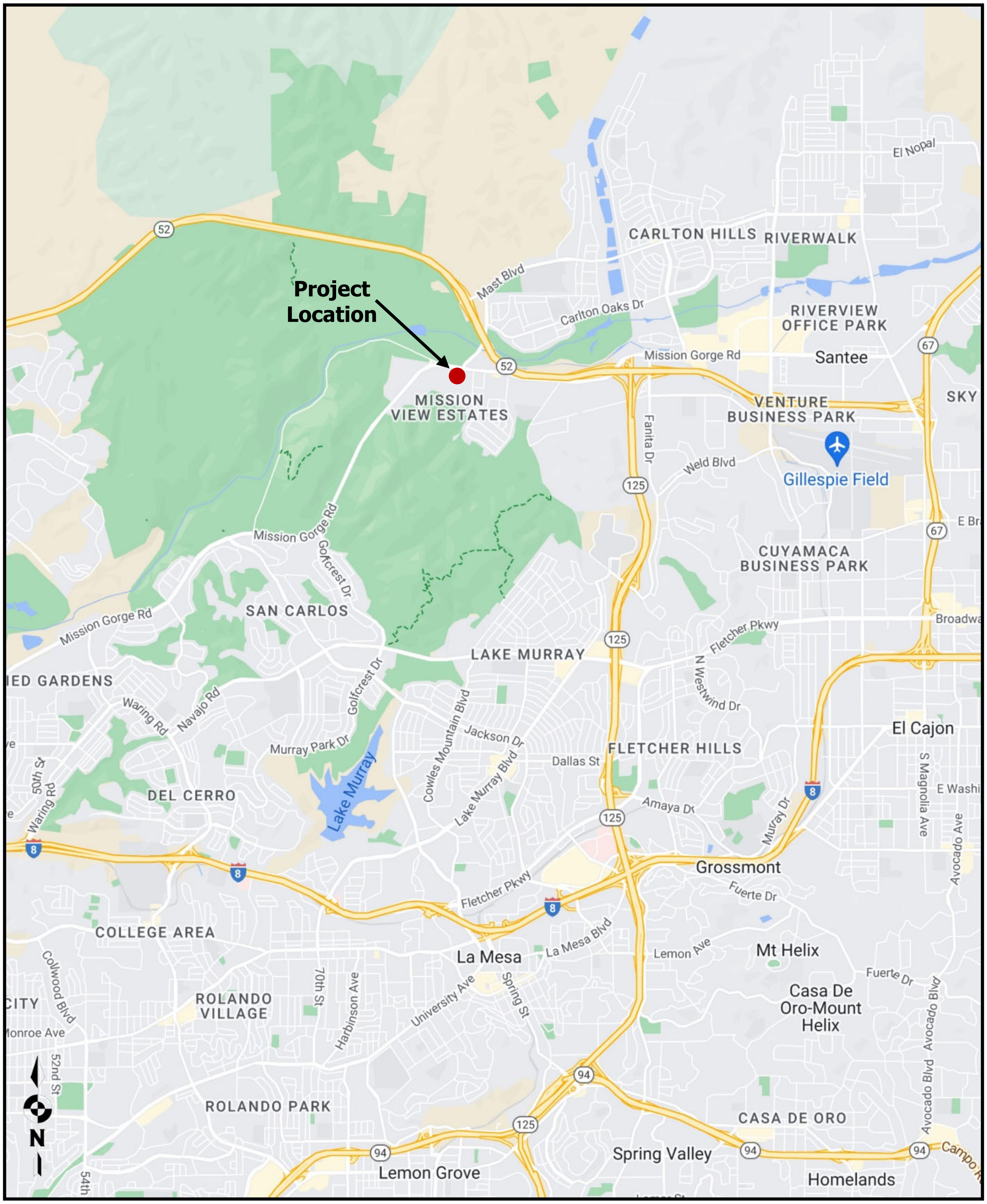

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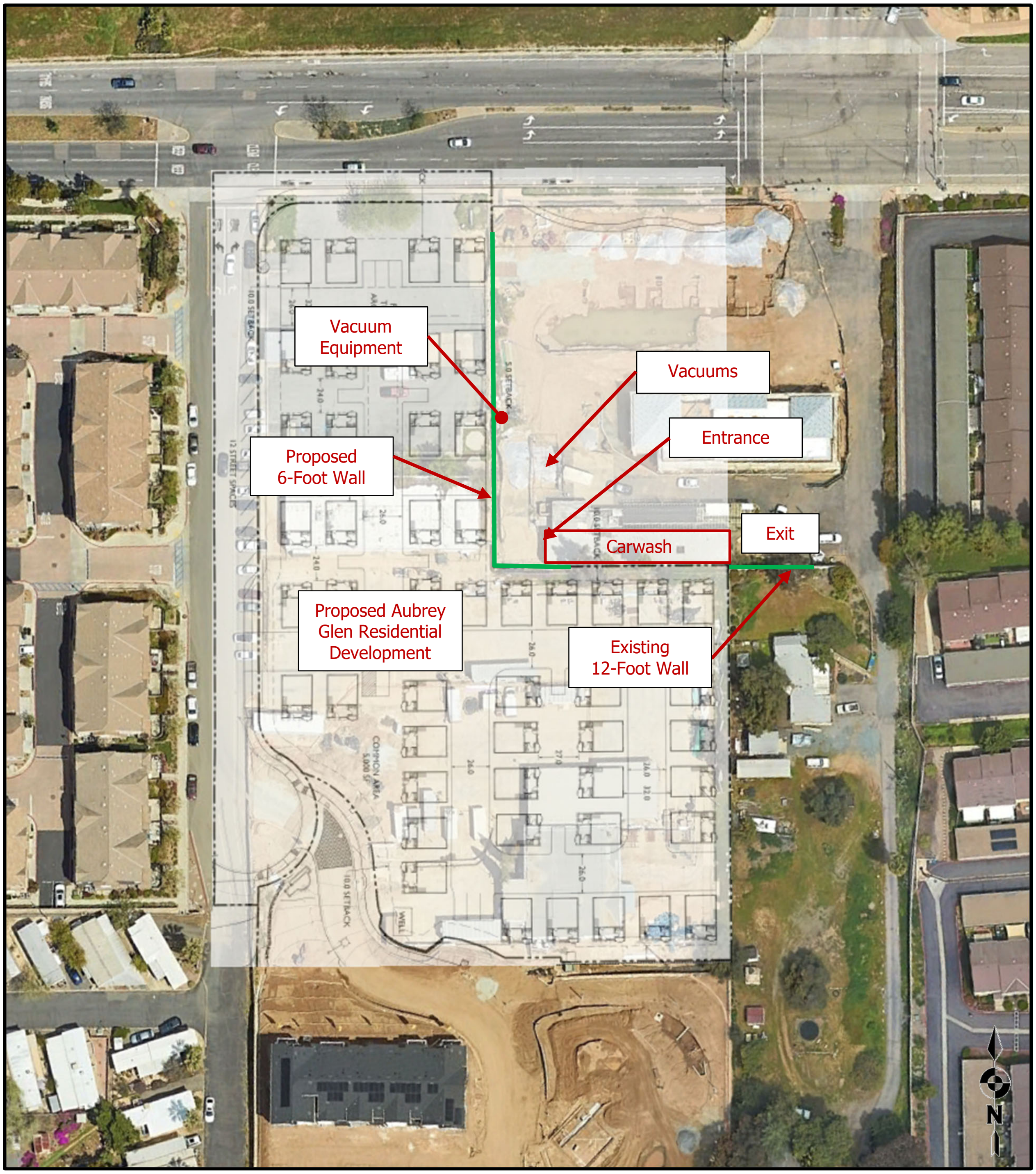
Figure 2: Project Site Configuration



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NOISE STANDARDS

Impacts to sensitive receptors generated by activities at a given location are regulated by the City's Municipal Code (Section 5.04.040). The municipal code states that" it is unlawful for any person to operate or allow the operation of any generator, air conditioning, refrigeration, or heating equipment in such manner as to create a noise disturbance on the premises of any other occupied property, or if a condominium, apartment house, duplex, or attached business, within any adjoining unit". The municipal code does not specify numerical sound level limits for operational noise, therefore, in accordance with the Noise Element of the General Plan, the noise level threshold is 65 dBA Leq at the residential property lines. Additionally, the previous noise study by RECON Environmental used a property line threshold of 65 dBA Leq (*Source: Noise Analysis for the Aubrey Glen Project, RECON Number 10174-1*).

ANALYSIS PROCEDURES

To examine the potential noise impacts associated with the operation of the proposed project, sound level measurements of the equipment were taken at a similar car wash. The noise measurements were taken at the existing Soapy Joe Car Wash in San Marcos in January 2019 using a Larson-Davis Model LxT Type 1 precision sound level meter, programmed, in "slow" mode, to record noise levels in "A" weighted form. The sound level meter was mounted on a tripod, five feet above the ground and equipped with a windscreen. The results of the noise measurements are shown in Table 1.

Table 1: Reference Noise Levels

Equipment	Distance from Source in Feet	Noise Level (dBA)	Quanity	Cumulative Noise Level (dBA)
Vacuums	5	70.2	4	76.2
Vacuum Equipment	3	81.8	1	81.8
Carwash Entrance	5	81.1	1	81.1
Carwash Exit	5	88.0	1	88.0

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FINDINGS

Fixed or point sources radiate outward uniformly as sound travels away from the source. Their sound levels attenuate or drop off at a rate of 6 dBA for each doubling of distance. Using a point-source noise prediction model, calculations of the expected operational noise impacts were completed. The essential model input data for these performance equations include the source levels of each type of equipment, relative source to receiver horizontal and vertical separations, the amount of time the equipment is operating in a given day (also referred to as the duty-cycle) and any transmission loss from topography or barriers. It is important to note that the projected noise levels assume the worst-case noise environment with the all the noise producing equipment operating at the same time. In reality, these noise levels will vary throughout the day and not operate on a continuous basis. The anticipated hours of operation will only occur during the daytime hours as described previously.

The worst case potentially affected property lines are the residential uses to the west and to the south. The noise levels for each source, as shown in Table 1 above, are provided in Table 2. Additionally, reductions from the existing 12-foot wall at the car wash exit as well as the proposed 6-foot perimeter wall to be constructed as part of the Aubrey Glen Residential Development were factored into the resultant noise levels. The 6-foot barrier will block the line of sight to the vacuums and the carwash entrance, therefore, a minimum 5 dBA noise reduction was factored in. The Fresnel Barrier calculations have been provided as an attachment to this report.

Table 2: Operational Noise Levels

Source	Cumulative Noise Level (dBA)	Distance to Property Line (Feet)	Reduction Due to Distance (dBA)	Reduction Due to Shielding (dBA)	Cumulative Noise Level (dBA)
Vacuums	76.2	48	-19.6	-5.0*	51.6
Vacuum Equipment	81.8	8	-8.5	-11.6	61.7
Carwash Entrance	81.1	18	-11.1	-5.0*	65.0
Carwash Exit	88.0	18	-11.1	-18.2	58.7

*Minimum shielding due to the proposed 6-foot wall.

Based upon the property line noise levels determined, none of the proposed noise sources exceed the property line standards at the property lines. Therefore, the existing car wash operational noise levels comply with the noise standards at the property lines and no substantial permanent noise increase is anticipated. No impacts are anticipated and no mitigation is required. Additionally, it is unlikely that the equipment would be running continuously during any given hour. Therefore, noise levels are likely to be reduced below the levels shown in Table 2.

Sincerely Ldn Consulting,

Jeremy Louden, Principal

Attachment: Noise Barrier Reduction Calculations

Vacuum Equipment

Source to Receiver Horizontal Distance (ft) = 8.00
Source to Barrier Horizontal Distance (ft) = 3.00
Barrier to Receiver Horizontal Distance (ft) = 5.00
Source Height (ft) = 4.00
Receiver Height (ft) = 5.00
Barrier Height (ft) = 6.00
Distance Source to Receptor (ft) d = 8.06
Distance Source to Barrier top (ft) d1 = 3.61
Distance Barrier top to Receiver (ft) d2 = 5.10

Frequency (Hz) = 8000 Attenuation (db) = 20.0 Fresnel N = 9.119
Frequency (Hz) = 4000 Attenuation (db) = 19.5 Fresnel N = 4.559
Frequency (Hz) = 2000 Attenuation (db) = 16.5 Fresnel N = 2.280
Frequency (Hz) = 1000 Attenuation (db) = 13.8 Fresnel N = 1.140
Frequency (Hz) = 500 Attenuation (db) = 11.6 Fresnel N = 0.570
Frequency (Hz) = 250 Attenuation (db) = 9.8 Fresnel N = 0.285
Frequency (Hz) = 125 Attenuation (db) = 8.3 Fresnel N = 0.142
Frequency (Hz) = 63 Attenuation (db) = 7.1 Fresnel N = 0.071

Car Wash Exit

Source to Receiver Horizontal Distance (ft) = 23.00
Source to Barrier Horizontal Distance (ft) = 18.00
Barrier to Receiver Horizontal Distance (ft) = 5.00
Source Height (ft) = 8.00
Receiver Height (ft) = 5.00
Barrier Height (ft) = 12.00
Distance Source to Receptor (ft) d = 23.19
Distance Source to Barrier top (ft) d1 = 18.44
Distance Barrier top to Receiver (ft) d2 = 8.60

Frequency (Hz) = 8000 Attenuation (db) = 20.0 Fresnel N = 54.610
Frequency (Hz) = 4000 Attenuation (db) = 20.0 Fresnel N = 27.305
Frequency (Hz) = 2000 Attenuation (db) = 20.0 Fresnel N = 13.652
Frequency (Hz) = 1000 Attenuation (db) = 20.0 Fresnel N = 6.826
Frequency (Hz) = 500 Attenuation (db) = 18.2 Fresnel N = 3.413
Frequency (Hz) = 250 Attenuation (db) = 15.3 Fresnel N = 1.707
Frequency (Hz) = 125 Attenuation (db) = 12.9 Fresnel N = 0.853
Frequency (Hz) = 63 Attenuation (db) = 10.8 Fresnel N = 0.427

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November 13, 2024

Mr. Troy Friedeck
KB Home Coastal, Inc.
9915 Mira Mesa Boulevard, Suite 100
San Diego, CA 92131

Reference: Air Quality Analysis for the Aubrey Glen Project (RECON Number 10174-1)

Dear Mr. Friedeck:

The purpose of this report is to assess potential short-term local and regional air quality impacts resulting from development of the Aubrey Glen Project (project) located in the city of Santee, California. The analysis of impacts is based on state and federal Ambient Air Quality Standards (AAQS) and assessed in accordance with the regional guidelines, policies, and standards and the San Diego Air Pollution Control District (SDAPCD) and the City of Santee (City).

1.0 Project Description

The project site is located at 7737 Mission Gorge Road (Assessor's Parcel Number 386-300-31-00) in the city of Santee, California. The project site is located east of Aubrey Glen Drive and south of Mission Gorge Road. The 2.63-acre project site is currently developed with 11,700 square feet of vacant retail buildings surrounded by concrete and asphalt parking lots and minimal landscape planters. The project is bordered by Mission Gorge Road to the north, commercial and residential uses to the east, and high-density residential uses to the south and west. Figure 1 shows the regional location of the project. Figure 2 shows an aerial photograph of the project site and vicinity.

The project would construct 52 residential dwelling units. Fourteen units would consist of attached residential, configured within seven, three-story duplex buildings, and each of the remaining 38 units would consist of three-story detached residential buildings. The residential units would average approximately 1,400 square feet in size, and the project would be consistent with the existing zoning designation of High-Density Residential R-22 (22 to 30 dwelling units per acre). All 52 residential units would be configured with 3 bedrooms and 2.5 bathrooms, and 25 of these residential units would also be configured with a den. All 52 residential units would have private open space by way of patio/entry space and balcony/deck. Vehicular access would be provided via a driveway connecting to Aubrey Glen Drive. All 52 residential units would include a private two-car garage, providing for a total of 104 residential parking spaces. The project would also provide 15 on-site guest parking spaces. Overall, the project would provide a total of 119 parking spaces, which would exceed the City's parking requirement of 2.25 parking spaces per unit. Furthermore, the project would provide 12 off-site parking spaces along Aubrey Glen Drive that would be regulated by City right-of-way with signage. These 12 off-site parking spaces would not be exclusive to the project, and therefore are not included in the parking count. The project would also provide approximately 5,000 square feet of common open space with amenities that would be managed by a private homeowners association. Figure 3 shows the proposed site plan.

FIGURE 1
Regional Location

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Image Source: NearMap (flown May 2024)

Project Boundary

FIGURE 2

Project Location on Aerial Photograph

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Map Source: Summa Architecture

PROJECT SUMMARY

THREE-STORY CONDOMINIUMS

RESIDENCES	52 HOMES
GROSS SITE AREA	2.63 ACRES
NET SITE AREA	2.23 ACRES
NET DENSITY	24.0 DU/AC
PARKING	131 SP (2.5 SP/DU)
ZONING	R-22

PRODUCT MIX

25	PLAN 1	3BD+DEN/2.5 BA	1,440 SF
27	PLAN 2	3BD/2.5 BA	1,470 SF
52 TOTAL UNITS			

PARKING SUMMARY

REQUIRED	
52 X 2.00 =	104 SP
52 X 0.25 GUEST =	13 SP
TOTAL	117 SP
PROVIDED - ONSITE / PRIVATE	
GARAGE	104 SP
OPEN PERPENDICULAR	6 SP
OPEN PARALLEL	9 SP
TOTAL	119 SP
PROVIDED - OFFSITE / PUBLIC	
STREET	12 SP
TOTAL	131 SP

ELECTRIC VEHICLE PARKING

15 GUEST X 13% = 2 SP REQUIRED / PROVIDED

EACH GARAGE SHALL BE INSTALLED WITH A MIN. LEVEL 2 EVCS (52 GARAGES = 52 EVCS)

SITE COVERAGE

BUILDINGS	32,292 SF	33%
PAVEMENT	34,776 SF	36%
OPEN SPACE	30,071 SF	31%
TOTAL NET AREA	97,139 SF	100%

OPEN SPACE

PRIVATE OPEN SPACE	
REQUIRED	
52 X 60 =	3,120 SF
PROVIDED	
DECK	4,140 SF
PATIO	7,162 SF
TOTAL	11,302 SF
COMMON OPEN SPACE	
REQUIRED	
52 X 100 =	5,200 SF
PROVIDED	5,490 SF

KEYNOTES

1	PROPERTY LINE
2	PERPENDICULAR PARKING SPACE (9' X 19')
3	PARALLEL PARKING SPACE (9' X 25')
4	ACCESSIBLE PARKING SPACE (9' X 19')
5	MAILBOX LOCATION
6	4FT MINIMUM WIDE WALKWAY
7	PRIVATE PATIO
8	PRIVATE YARD
9	COMMON REC AREA
10	AC UNIT
11	TRANSFORMER
12	LINE OF FLOOR ABOVE
13	OPEN LAWN AREA
14	SETBACK LINE
15	LIGHTED DIRECTORY MAP

FIGURE 3

Site Plan

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The following project conditions related to air quality would be required. These measures would be incorporated as Conditions of Approval for the entitlement of the site.

Standard Project Condition No. 1 – Air Quality:

1. The construction contractor shall use construction equipment powered by California Air Resources Board (CARB) certified Tier 4, or newer, engines and haul trucks that conform to current U.S. Environmental Protection Agency (U.S. EPA) truck standards.

2. During all grading and site preparation activities, the on-site construction superintendent shall ensure implementation of standard best management practices as required by the SDAPCD Rule 55, Fugitive Dust Control.

3. During all grading and site preparation activities, the on-site construction superintendent shall ensure implementation of applicable California Department of Resources Recycling and Recovery (CalRecycle) Sustainable (Green) Building Program Measures, as specified on the CalRecycle website.

4. The project shall utilize high-efficiency equipment and fixtures consistent with the current California Green Building Standards Code and Title 24 of the California Code of Regulations. The project shall include the installation of infrastructure to make the proposed project solar-ready.

5. The project shall include the installation of infrastructure necessary for electric vehicle parking, as well as providing preferential parking for electric vehicles. The project shall provide bike parking on-site.

6. The project shall comply with the Santee Water Efficient Landscape Ordinance. The ordinance promotes water conservation and efficiency by imposing various requirements related to evapotranspiration rates, irrigation efficiency, and plant factors.

7. The project shall comply with Chapters 9.02 and 9.04 of the City's Municipal Code that pertain to solid waste management and demolition and construction debris recycling.

8. In conformance with SDAPCD Rule 67.0.1, Architectural Coatings, the project shall use low volatile organic compound (VOC) paints.

9. The project shall not include wood burning stoves or fireplaces.

2.0 Environmental Setting

2.1 Regulatory Setting

2.1.1 Federal Regulations

AAQS represent the maximum levels of background pollution considered safe, with an adequate margin of safety, to protect the public health and welfare. The federal Clean Air Act (CAA) was enacted in 1970 and amended in 1977 and 1990 (42 U.S. Code [U.S.C.] 7401) for the purposes of protecting and enhancing the quality of the nation's air resources to benefit public health, welfare, and productivity. In 1971, in order to achieve the purposes of Section 109 of the CAA [42 U.S.C. 7409], the U.S. Environmental Protection Agency (U.S. EPA) developed primary and secondary National AAQS (NAAQS).

Six pollutants of primary concern were designated: ozone, carbon monoxide (CO), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), lead (Pb), particulate matter with a diameter of 10 microns and less (PM_{10}), and particulate matter with a diameter of 2.5 microns and less ($PM_{2.5}$). The primary NAAQS "in the judgment of the Administrator, based on such criteria and allowing an adequate margin of safety, are requisite to protect the public health…." and the secondary standards "… protect the public welfare from any known or anticipated adverse effects associated with the presence of such air pollutant in the ambient air" [42 U.S.C. 7409(b)(2)]. The primary NAAQS were established, with a margin of safety, considering long-term exposure for the most sensitive groups in the general population (i.e., children, senior citizens, and people with breathing difficulties). The NAAQS are presented in Table 1 (California Air Resources Board [CARB] 2016).

If an air basin is not in either federal or state attainment for a particular pollutant, the basin is classified as non-attainment area for that pollutant. The San Diego Air Basin (SDAB) is currently classified as a federal non-attainment area for ozone.

2.1.2 State Regulations

Criteria Pollutants

The CARB has developed the California AAQS (CAAQS) and generally has set more stringent limits on the criteria pollutants than the NAAQS (see Table 1). In addition to the federal criteria pollutants, the CAAQS also specify standards for visibility-reducing particles, sulfates, hydrogen sulfide, and vinyl chloride.

Similar to the federal CAA, the state classifies either "attainment" or "non-attainment" areas for each pollutant based on the comparison of measured data with the CAAQS. The SDAB is a non-attainment area for the state ozone standards, the state PM_{10} standard, and the state $PM_{2.5}$ standard. The California CAA, which became effective on January 1, 1989, requires all areas of the State to attain the CAAQS at the earliest practicable date. The California CAA has specific air quality management strategies that must be adopted by the agency responsible for the non-attainment area. In the case of the SDAB, the responsible agency is the SDAPCD.

Table 1
Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards[1]		National Standards[2]		
		Concentration[3]	Method[4]	Primary[3,5]	Secondary[3,6]	Method[7]
Ozone[8]	1 Hour	0.09 ppm ($180 \mu g/m^3$)	Ultraviolet Photometry	–	Same as Primary Standard	Ultraviolet Photometry
	8 Hour	0.07 ppm ($137 \mu g/m^3$)		0.070 ppm ($137 \mu g/m^3$)		
Respirable Particulate Matter (PM_{10})[9]	24 Hour	$50 \mu g/m^3$	Gravimetric or Beta Attenuation	$150 \mu g/m^3$	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	$20 \mu g/m^3$		–		
Fine Particulate Matter ($PM_{2.5}$)[9]	24 Hour	No Separate State Standard		$35 \mu g/m^3$	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	$12 \mu g/m^3$	Gravimetric or Beta Attenuation	$12 \mu g/m^3$	$15 \mu g/m^3$	
Carbon Monoxide (CO)	1 Hour	20 ppm ($23 mg/m^3$)	Non-dispersive Infrared Photometry	35 ppm ($40 mg/m^3$)	–	Non-dispersive Infrared Photometry
	8 Hour	9.0 ppm ($10 mg/m^3$)		9 ppm ($10 mg/m^3$)	–	
	8 Hour (Lake Tahoe)	6 ppm ($7 mg/m^3$)		–	–	
Nitrogen Dioxide (NO_2)[10]	1 Hour	0.18 ppm ($339 \mu g/m^3$)	Gas Phase Chemi-luminescence	100 ppb ($188 \mu g/m^3$)	–	Gas Phase Chemi-luminescence
	Annual Arithmetic Mean	0.030 ppm ($57 \mu g/m^3$)		0.053 ppm ($100 \mu g/m^3$)	Same as Primary Standard	
Sulfur Dioxide (SO_2)[11]	1 Hour	0.25 ppm ($655 \mu g/m^3$)	Ultraviolet Fluorescence	75 ppb ($196 \mu g/m^3$)	–	Ultraviolet Fluorescence; Spectro-photometry (Pararosaniline Method)
	3 Hour	–		–	0.5 ppm ($1,300 \mu g/m^3$)	
	24 Hour	0.04 ppm ($105 \mu g/m^3$)		0.14 ppm (for certain areas)[11]	–	
	Annual Arithmetic Mean	–		0.030 ppm (for certain areas)[11]	–	
Lead[12,13]	30 Day Average	$1.5 \mu g/m^3$	Atomic Absorption	–	–	High Volume Sampler and Atomic Absorption
	Calendar Quarter	–		$1.5 \mu g/m^3$ (for certain areas)[12]	Same as Primary Standard	
	Rolling 3-Month Average	–		$0.15 \mu g/m^3$		
Visibility Reducing Particles[14]	8 Hour	See footnote 14	Beta Attenuation and Transmittance through Filter Tape	No National Standards		
Sulfates	24 Hour	$25 \mu g/m^3$	Ion Chroma-tography			
Hydrogen Sulfide	1 Hour	0.03 ppm ($42 \mu g/m^3$)	Ultraviolet Fluorescence			
Vinyl Chloride[12]	24 Hour	0.01 ppm ($26 \mu g/m^3$)	Gas Chroma-tography			

Table 1
Ambient Air Quality Standards

NOTES:
ppm = parts per million; ppb = parts per billion; μg/m^3 = micrograms per cubic meter; – = not applicable.

[1] California standards for ozone, carbon monoxide (except 8-hour Lake Tahoe), sulfur dioxide (1 and 24 hour), nitrogen dioxide, particulate matter (PM_{10}, $PM_{2.5}$, and visibility reducing particles), are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.

[2] National standards (other than ozone, particulate matter, and those based on annual arithmetic mean) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest 8-hour concentration measured at each site in a year, averaged over three years, is equal to or less than the standard. For PM_{10}, the 24-hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 μg/m^3 is equal to or less than one. For $PM_{2.5}$, the 24-hour standard is attained when 98 percent of the daily concentrations, averaged over three years, are equal to or less than the standard. Contact the U.S. EPA for further clarification and current national policies.

[3] Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25°C and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.

[4] Any equivalent measurement method which can be shown to the satisfaction of the Air Resources Board to give equivalent results at or near the level of the air quality standard may be used.

[5] National Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.

[6] National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

[7] Reference method as described by the U.S. EPA. An "equivalent method" of measurement may be used but must have a "consistent relationship to the reference method" and must be approved by the U.S. EPA.

[8] On October 1, 2015, the national 8-hour ozone primary and secondary standards were lowered from 0.075 to 0.070 ppm.

[9] On December 14, 2012, the national annual $PM_{2.5}$ primary standard was lowered from 15 μg/m^3 to 12.0 μg/m^3. The existing national 24-hour $PM_{2.5}$ standards (primary and secondary) were retained at 35 μg/m^3, as was the annual secondary standards of 15 μg/m^3. The existing 24-hour PM_{10} standards (primary and secondary) of 150 μg/m^3 also were retained. The form of the annual primary and secondary standards is the annual mean, averaged over 3 years.

[10] To attain the 1-hour national standard, the 3-year average of the annual 98th percentile of the 1-hour daily maximum concentrations at each site must not exceed 100 ppb. Note that the national standards are in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the national standards to the California standards the units can be converted from ppb to ppm. In this case, the national standard of 100 ppb is identical to 0.100 ppm.

[11] On June 2, 2010, a new 1-hour SO_2 standard was established and the existing 24-hour and annual primary standards were revoked. To attain the 1-hour national standard, the 3-year average of the annual 99th percentile of the 1-hour daily maximum concentrations at each site must not exceed 75 ppb. The 1971 SO_2 national standards (24-hour and annual) remain in effect until one year after an area is designated for the 2010 standard, except that in areas designated nonattainment for the 1971 standards, the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standards are approved.
Note that the 1-hour national standard is in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the 1-hour national standard to the California standard the units can be converted to ppm. In this case, the national standard of 75 ppb is identical to 0.075 ppm.

[12] The CARB has identified lead and vinyl chloride as 'toxic air contaminants' with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.

[13] The national standard for lead was revised on October 15, 2008 to a rolling 3-month average. The 1978 lead standard (1.5 μg/m^3 as a quarterly average) remains in effect until one year after an area is designated for the 2008 standard, except that in areas designated nonattainment for the 1978 standard, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standard are approved.

[14] In 1989, the CARB converted both the general statewide 10-mile visibility standard and the Lake Tahoe 30-mile visibility standard to instrumental equivalents, which are "extinction of 0.23 per kilometer" and "extinction of 0.07 per kilometer" for the statewide and Lake Tahoe Air Basin standards, respectively.

SOURCE: CARB 2016.

Toxic Air Contaminants

The public's exposure to toxic air contaminants (TACs) is a significant public health issue in California. Diesel particulate matter (DPM) emissions have been identified as TACs. In 1983, the California Legislature enacted a program to identify the health effects of TACs and to reduce exposure to these contaminants to protect the public health (Assembly Bill [AB] 1807: Health and Safety Code Sections 39650–39674). The California Legislature established a two-step process to address the potential health effects from TACs. The first step is the risk assessment (or identification) phase. The second step is the risk management (or control) phase of the process.

The goals of the Air Toxics "Hot Spots" Act are to collect emission data, to identify facilities having localized impacts, to ascertain health risks, to notify nearby residents of significant risks, and to reduce those significant risks to acceptable levels.

The Children's Environmental Health Protection Act, California Senate Bill 25 (Chapter 731, Escutia, Statutes of 1999), focuses on children's exposure to air pollutants. The act requires CARB to review its air quality standards from a children's health perspective, evaluate the statewide air monitoring network, and develop any additional air toxic control measures needed to protect children's health. Locally, toxic air pollutants are regulated through the SDAPCD Regulation XII. Of particular concern statewide are DPM emissions. DPM was established as a TAC in 1998, and is estimated to represent a majority of the cancer risk from TACs statewide (based on the statewide average). Diesel exhaust is a complex mixture of gases, vapors, and fine particles. This complexity makes the evaluation of health effects of diesel exhaust a complex scientific issue. Some of the chemicals in diesel exhaust, such as benzene and formaldehyde, have been previously identified as TACs by the CARB and are listed as carcinogens either under the state's Proposition 65 or under the federal Hazardous Air Pollutants program.

The California Air Toxics Program establishes the process for the identification and control of TACs and includes provisions to make the public aware of significant toxic exposures and for reducing risk. Additionally, the Air Toxics "Hot Spots" Information and Assessment Act (AB 2588, 1987, Connelly Bill) was enacted in 1987 and requires stationary sources to report the types and quantities of certain substances routinely released into the air.

Following the identification of DPM as a TAC in 1998, CARB has worked on developing strategies and regulations aimed at reducing the risk from DPM. The overall strategy for achieving these reductions is found in the *Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles* (CARB 2000). A stated goal of the plan is to reduce the statewide cancer risk arising from exposure to DPM by 85 percent by 2020.

In April 2005, CARB published the *Air Quality and Land Use Handbook: A Community Health Perspective* (CARB 2005). The handbook makes recommendations directed at protecting sensitive land uses from air pollutant emissions while balancing a myriad of other land use issues (e.g., housing, transportation needs, economics, etc.). Sensitive land uses include but are not limited to, schools, hospitals, residences, resident care facilities, and day-care centers. The handbook is not regulatory or binding on local agencies and recognizes that application takes a qualitative approach. Therefore, the CARB has provided guidelines for the siting of land uses near heavily traveled roadways. Of pertinence to this study, the CARB guidelines indicate that siting new sensitive land uses within 500 feet of a freeway or urban roads with 100,000 or more vehicles/day should be avoided when possible.

As an ongoing process, CARB will continue to establish new programs and regulations for the control of DPM and other air-toxics emissions as appropriate. The continued development and implementation of these programs and policies will ensure that the public's exposure to DPM and other TACs will continue to decline.

State Implementation Plan

The State Implementation Plan (SIP) is a collection of documents that set forth the state's strategies for achieving the NAAQS. In California, the SIP is a compilation of new and previously submitted plans, programs (such as air quality management plans, monitoring, modeling, permitting, etc.), district rules, state regulations, and federal controls. The CARB is the lead agency for all purposes related to the SIP under state law. Local air districts and other agencies, such as the Department of Pesticide Regulation and the Bureau of Automotive Repair, prepare SIP elements and submit them to CARB for review and approval. The CARB then forwards SIP revisions to the U.S. EPA for approval and publication in the Federal Register. All of the items included in the California SIP are listed in the Code of Federal Regulations (CFR) at 40 CFR 52.220.

The SDAPCD is responsible for preparing and implementing the portion of the SIP applicable to the SDAB. The SIP plans for San Diego County specifically include the Redesignation Request and Maintenance Plan for the 1997 National Ozone Standard for San Diego County (2012), and the 2004 Revision to the California State Implementation Plan for Carbon Monoxide–Updated Maintenance Plan for Ten Federal Planning Areas.

California Environmental Quality Act

Section 15125(d) of the California Environmental Quality Act (CEQA) Guidelines requires discussion of any inconsistencies between the project and applicable general plans and regional plans, including the applicable air quality attainment or maintenance plan (or SIP).

2.1.3 Regional Air Quality Strategy

The SDAPCD prepared the original 1991/1992 Regional Air Quality Strategy (RAQS) in response to requirements set forth in the California CAA. The California CAA requires areas that are designated state non-attainment areas for ozone, CO, SO_2, and NO_2 prepare and implement plans to attain the standards by the earliest practicable date. The California CAA does not provide guidance on timing or requirements for attaining the state PM_{10} and $PM_{2.5}$ standards. Attached as part of the RAQS are the Transportation Control Measures (TCMs) adopted by the San Diego Association of Governments (SANDAG). Updates of the RAQS and corresponding TCM are required every three years. The RAQS and TCM set forth the steps needed to accomplish attainment of NAAQS and CAAQS. The most recent 2022 RAQS and TCM was adopted in 2023.

2.2 Existing Air Quality

The project is located in San Diego County, within the SDAB and approximately 15 miles east of the Pacific Ocean. The SDAB is currently classified as a federal non-attainment area for ozone, and a state non-attainment area for ozone, PM_{10}, and $PM_{2.5}$. The eastern portion of the SDAB is surrounded by mountains to the north, east, and south. These mountains tend to restrict airflow and concentrate pollutants in the valleys and low-lying areas.

2.2.1 Climate and Meteorology

The project area, like the rest of San Diego County, has a Mediterranean climate characterized by warm, dry summers and mild winters. The mean annual temperature for the project area is 65 degrees Fahrenheit (°F). The average annual precipitation is 12 inches, falling primarily from November to April. Winter low temperatures in the project area average about 43°F, and summer high temperatures average about 86°F. The average relative humidity is 69 percent and is based on the yearly average humidity at Lindbergh Field (Western Regional Climate Center 2022).

The dominant meteorological feature affecting the region is the Pacific High Pressure Zone, which produces the prevailing westerly to northwesterly winds. These winds tend to blow pollutants away from the coast toward the inland areas. Consequently, air quality near the coast is generally better than that which occurs at the base of the coastal mountain range.

Fluctuations in the strength and pattern of winds from the Pacific High Pressure Zone creates a temperature inversion layer (a layer in the atmosphere in which temperature increases with height) that acts as a lid to the vertical dispersion of air pollutants in the SDAB. Beneath the inversion layer pollutants become "trapped" as their ability to disperse diminishes. Sunlight reacts with air pollutants (reactive organic gas [ROG] and oxides of nitrogen [NO_X]) to create ozone (O_3). Thus, poorly dispersed pollutants along with strong sunlight results in the creation of ozone at this surface layer.

The prevailing wind pattern in the western portion of the SDAB includes a daytime onshore flow (i.e., sea breeze) and nighttime offshore flow (i.e., land breeze), which leads to pollutants being blown out to sea at night and returning to land the following day. The prevailing westerly wind pattern is sometimes interrupted by regional "Santa Ana" conditions. A Santa Ana occurs when a strong high pressure develops over the Nevada-Utah area and overcomes the prevailing westerly coastal winds, sending strong, steady, hot, dry northeasterly winds 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 during breakdown of these conditions, or if the Santa Ana is weak, local air quality may be adversely affected. In these cases, emissions from the South Coast Air Basin to the north are blown out over the ocean, and low pressure over Baja California, Mexico, draws this pollutant-laden air mass southward. As the high pressure weakens, prevailing northwesterly winds reassert themselves and send this cloud of contamination ashore in the SDAB. When this event does occur, the combination of transported and locally produced contaminants results in air quality conditions worse than normal.

2.2.2 Background Air Quality

Air quality at a particular location is a function of the kinds, amounts, and dispersal rates of pollutants being emitted into the air locally and throughout the basin. The major factors affecting pollutant dispersion are wind speed and direction, the vertical dispersion of pollutants (which is affected by inversions), and the local topography.

Air quality is commonly expressed as the number of days in which air pollution levels exceed state standards set by the CARB or federal standards set by the U.S. EPA. The SDAPCD maintains 11 air quality monitoring stations located throughout the greater San Diego metropolitan region. Air pollutant concentrations and meteorological information are continuously recorded at these stations. Measurements are then used by scientists to help forecast daily air pollution levels.

The San Diego – Kearny Villa Road monitoring station located at 6125 Kearny Villa Road, approximately 5.6 miles west of the project site, is the closest station to the project site. The second closest station with measurement data is the El Cajon – Lexington Elementary School monitoring station located at 533 South First Street, approximately 6 miles southeast of the project site. Both monitoring stations measure ozone, NO_X, PM_{10} and $PM_{2.5}$. Table 2 provides a summary of the measurements collected at the San Diego – Kearny Villa Road and El Cajon – Lexington Elementary School monitoring stations for the years 2018 through 2022.

Table 2 Summary of Air Quality Measurements Recorded at the El Cajon-Lexington Elementary School and San Diego – Kearny Villa Road Air Quality Monitoring Stations					
Pollutant/Standard	2018	2019	2020	2021	2022
El Cajon – Lexington Elementary School					
Ozone					
Federal Max 8-hr (ppm)	0.079	0.074	0.083	0.076	0.088
Days 2015 Federal 8-hour Standard Exceeded (0.07 ppm)	2	2	14	3	2
Days 2008 Federal 8-hour Standard Exceeded (0.075 ppm)	2	0	5	2	1
State Max 8-hr (ppm)	0.079	0.075	0.083	0.077	0.088
Days State 8-hour Standard Exceeded (0.07 ppm)	2	2	14	3	2
Max. 1-hr (ppm)	0.087	0.094	0.094	0.088	0.100
Days State 1-hour Standard Exceeded (0.09 ppm)	0	0	0	0	1
Nitrogen Dioxide					
Max 1-hr (ppm)	0.045	0.039	0.044	0.038	0.0365
Days State 1-hour Standard Exceeded (0.18 ppm)	0	0	0	0	0
Days Federal 1-hour Standard Exceeded (0.100 ppm)	0	0	0	0	0
Annual Average (ppm)	0.008	0.008	0.008	0.006	0.008
PM_{10}*					
Federal Max. Daily (µg/m^3)	43.0	38.7	--	--	--
Measured Days Federal 24-hour Standard Exceeded (150 µg/m^3)	0	0	0	--	--
Calculated Days Federal 24-hour Standard Exceeded (150 µg/m^3)	0.0	0.0	--	--	--
Federal Annual Average (µg/m^3)	22.6	20.1	--	--	--
State Max. Daily (µg/m^3)	44.7	37.4	--	--	--
Measured Days State 24-hour Standard Exceeded (50 µg/m^3)	0	0	0	--	--
Calculated Days State 24-hour Standard Exceeded (50 µg/m^3)	0.0	--	--	--	--
State Annual Average (µg/m^3)	23.0	--	--	--	--
$PM_{2.5}$*					
Federal Max. Daily (µg/m^3)	36.2	23.8	38.2	30.2	26.4
Measured Days Federal 24-hour Standard Exceeded (35 µg/m^3)	1	0	2	0	0
Calculated Days Federal 24-hour Standard Exceeded (35 µg/m^3)	1.0	0.0	2.2	0.0	0.0
Federal Annual Average (µg/m^3)	9.6	8.5	10.3	9.7	8.9
State Max. Daily (µg/m^3)	42.0	25.7	41.6	31.5	27.3
State Annual Average (µg/m^3)	10.5	--	11.6	10.4	--
San Diego – Kearny Villa Road					
Ozone					
Federal Max 8-hr (ppm)	0.077	0.075	0.102	0.071	0.083
Days 2015 Federal 8-hour Standard Exceeded (0.07 ppm)	5	1	10	1	2
Days 2008 Federal 8-hour Standard Exceeded (0.075 ppm)	1	0	6	0	1
State Max 8-hr (ppm)	0.077	0.076	0.102	0.072	0.083
Days State 8-hour Standard Exceeded (0.07 ppm)	5	1	12	2	2
Max. 1-hr (ppm)	0.102	0.083	0.123	0.095	0.095
Days State 1-hour Standard Exceeded (0.09 ppm)	1	0	2	1	1
Nitrogen Dioxide					
Max 1-hr (ppm)	0.045	0.046	0.052	0.060	0.0512
Days State 1-hour Standard Exceeded (0.18 ppm)	0	0	0	0	0
Days Federal 1-hour Standard Exceeded (0.100 ppm)	0	0	0	0	0
Annual Average (ppm)	0.008	0.008	0.007	0.007	0.008

Table 2 Summary of Air Quality Measurements Recorded at the El Cajon-Lexington Elementary School and San Diego – Kearny Villa Road Air Quality Monitoring Stations					
Pollutant/Standard	2018	2019	2020	2021	2022
PM_{10}*					
Federal Max. Daily (μg/m^3)	38.0	--	--	--	--
Measured Days Federal 24-hour Standard Exceeded (150 μg/m^3)	0	0	0	--	--
Calculated Days Federal 24-hour Standard Exceeded (150 μg/m^3)	0.0	--	--	--	--
Federal Annual Average (μg/m^3)	18.4	--	--	--	--
State Max. Daily (μg/m^3)	38.0	--	--	--	--
Measured Days State 24-hour Standard Exceeded (50 μg/m^3)	0	0	0	--	--
Calculated Days State 24-hour Standard Exceeded (50 μg/m^3)	0.0	--	--	--	--
State Annual Average (μg/m^3)	18.4	--	--	--	--
$PM_{2.5}$*					
Federal Max. Daily (μg/m^3)	32.2	16.2	47.5	20.9	13.9
Measured Days Federal 24-hour Standard Exceeded (35 μg/m^3)	0	0	2	0	0
Calculated Days Federal 24-hour Standard Exceeded (35 μg/m^3)	0.0	0.0	5.8	0.0	0.0
Federal Annual Average (μg/m^3)	8.3	7.0	8.7	7.6	6.8
State Max. Daily (μg/m^3)	32.2	15.0	--	--	--
State Annual Average (μg/m^3)	8.3	--	--	--	--

SOURCE: CARB 2024.
ppm = parts per million; μg/m^3 = micrograms per cubic meter; -- = Not available.
* Calculated days value. Calculated days are the estimated number of days that a measurement would have been greater than the level of the standard had measurements been collected every day. The number of days above the standard is not necessarily the number of violations of the standard for the year.

3.0 Thresholds of Significance

Thresholds used to evaluate potential impacts to air quality are based on applicable criteria in the CEQA Guidelines Appendix G. The project would have a significant air quality impact if it would:

1. Obstruct or conflict with the implementation of the RAQS.
2. Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard.
3. Expose sensitive receptors to substantial pollutant concentrations.
4. Result in other emissions such as those leading to odors adversely affecting a substantial number of people.

The City has not adopted air quality significance thresholds. The SDAPCD also does not provide specific numeric thresholds for determining the significance of air quality impacts under CEQA. However, the SDAPCD does specify Air Quality Impact Analysis trigger levels for new or modified stationary sources (SDAPCD Rules 20.1, 20.2, and 20.3). The SDAPCD does not consider these trigger levels to represent adverse air quality impacts; rather, if these trigger levels are exceeded by a project, the SDAPCD requires an air quality analysis to determine if a significant air quality impact would occur. While these trigger levels do not generally apply to mobile sources or general land development projects, for comparative purposes these levels are used to evaluate the increased emissions that would be discharged to the SDAB if the project were approved. The air quality impact screening levels used in this analysis are shown in Table 3.

Table 3 Air Quality Impact Screening Levels			
	Emission Rate		
Pollutant	Pounds/Hour	Pounds/Day	Tons/Year
NO_X	25	250	40
SO_X	25	250	40
CO	100	550	100
PM_{10}	--	100	15
Lead	--	3.2	0.6
VOC, ROG[1]	--	250	--
$PM_{2.5}$	--	67	10

SOURCE: SDAPCD, Rules 20.1, 20.2, 20.3.
[1]ROG threshold based on federal General Conformity *de minimus* levels for ozone precursors.

4.0 Emission Calculations

Air emissions were calculated using California Emissions Estimator Model (CalEEMod) 2022.1 (California Air Pollution Control Officers Association 2022). CalEEMod is a tool used to estimate air emissions resulting from land development projects in the state of California. The model generates air quality emission estimates from construction activities and breaks down operational criteria pollutant emissions into three categories: mobile sources (e.g., traffic), area sources (e.g., landscaping equipment, consumer projects, and architectural coatings), and energy sources (e.g., natural gas heating). CalEEMod provides emission estimates of NO_X, CO, SO_X, PM_{10}, $PM_{2.5}$, and ROG.

Inputs to CalEEMod include such items as the air basin containing the project, land uses, trip generation rates, trip lengths, as well as other parameters. The complete CalEEMod model outputs are included in Attachment 1.

4.1 Construction Emissions

Construction-related activities are temporary, short-term sources of air emissions. Sources of construction-related air emissions include the following:

- Fugitive dust from grading activities;
- Construction equipment exhaust;
- Construction-related trips by workers, delivery trucks, and material-hauling trucks; and
- Construction-related power consumption.

Construction-related pollutants result from dust raised during demolition and grading, emissions from construction vehicles, and chemicals used during construction. Fugitive dust emissions vary greatly during construction and are dependent on the amount and type of activity, silt content of the soil, and the weather. Vehicles moving over paved and unpaved surfaces, demolition, excavation, earth movement, grading, and wind erosion from exposed surfaces are all sources of fugitive dust. Construction operations are subject to the requirements established in Regulation 4, Rules 52, 54, and 55, of the SDAPCD's rules and regulations.

Heavy-duty construction equipment is usually diesel powered. In general, emissions from diesel-powered equipment contain more NO_X, SO_X, and particulate matter than gasoline-powered engines. However, diesel-powered engines generally produce less CO and less ROG than do gasoline-powered engines. Standard construction equipment includes tractors/loaders/backhoes, rubber-tired dozers, excavators, graders, cranes, forklifts, rollers, paving equipment, generator sets, welders, cement and mortar mixers, and air compressors. Due to the small size of the project site, only a minimal amount of heavy construction equipment would be used. However, as a conservative analysis, default CalEEMod construction equipment types and amounts were modeled.

Primary inputs are the numbers of each piece of equipment and the length of each construction stage. Specific construction phasing and equipment parameters are not available at this time. However, CalEEMod can estimate the required construction equipment when project-specific information is unavailable. The estimates are based on surveys, performed by the South Coast Air Quality Management District and the Sacramento Metropolitan Air Quality Management District, of typical construction projects which provide a basis for scaling equipment needs and schedule with a project's size. Air emission estimates in CalEEMod are based on the duration of construction phases; construction equipment type, quantity, and usage; grading area; season; and ambient temperature, among other parameters. Construction emissions were modeled assuming construction would begin in January 2025 and last for approximately 14 months. Assuming construction would begin in January 2025 is conservative, as continued implementation of regulations for off-road equipment, the primary construction emission source, would reduce emissions from these sources over time. Construction emissions were modeled using CalEEMod default equipment and phase duration. Table 4 summarizes the modeled construction parameters.

Table 4
Construction Parameters

Construction Phase	Phase Duration (Days)	Equipment	Amount	Hours per Day
Demolition	20	Concrete/Industrial Saw	1	8
		Excavators	3	8
		Rubber Tired Dozers	2	8
Site Preparation	5	Rubber Tired Dozers	3	8
		Tractors/Loaders/Backhoes	4	8
Grading	8	Excavator	1	8
		Grader	1	8
		Rubber Tired Dozer	1	8
		Tractors/Loaders/Backhoes	3	8
Building Construction	230	Crane	1	7
		Forklifts	3	8
		Generator Set	1	8
		Tractors/Loaders/Backhoes	3	7
		Welder	1	8
Paving	18	Cement and Mortar Mixers	2	6
		Paver	1	8
		Paving Equipment	2	6
		Rollers	2	6
		Tractor/Loader/Backhoe	1	8
Architectural Coatings	18	Air Compressor	1	6
SOURCE: California Emissions Estimator Model version 2022.1, Attachment 1.				

Table 5 shows the total projected construction maximum daily emission levels for each criteria pollutant. The CalEEMod output files for construction emissions are contained in Attachment 1.

Table 5
Summary of Worst-case Construction Emissions
(pounds per day)

Construction	Pollutant					
	ROG	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
Demolition	2	23	21	<1	2	1
Site Preparation	3	32	31	<1	9	5
Grading	2	16	19	<1	4	2
Building Construction	1	11	15	<1	1	<1
Paving	1	6	10	<1	<1	<1
Architectural Coatings	35	1	1	<1	<1	<1
Maximum Daily Emissions	**35**	**32**	**31**	**<1**	**9**	**5**
Significance Threshold	*250*	*250*	*550*	*250*	*100*	*67*

For assessing the significance of the air quality emissions resulting during construction of the project, the construction emissions were compared to the screening thresholds. As shown in Table 5, maximum daily construction emissions associated with the project are projected to be less than the applicable thresholds for all criteria pollutants. These thresholds are designed to provide limits below which project emissions would not significantly change regional air quality. In addition, the project would be subject to Standard Project Condition No. 1 – Air Quality, items 1 through 3, 7, and 8 (refer to Section 1.0). The project applicant would implement standard construction measures compliant with mandatory SDAPCD rules and regulations (Rules 50, 51, 52, 54, and 55) for controlling emissions from fugitive dust and fumes:

- Water the grading areas a minimum of twice daily to minimize fugitive dust.
- Provide sufficient erosion control to prevent washout of silty material onto public roads.
- Cover haul trucks or maintain at least 12 inches of freeboard to reduce blow-off during hauling.
- Periodically sweep up dirt and debris spilled onto paved surfaces to reduce re-suspension of particulate matter caused by vehicle movement. Clean approach routes to construction sites of construction-related dirt.

Further, all construction equipment is subject to the CARB In-Use Off-Road Diesel-Fueled Fleets Regulation. This regulation, which applies to all off-road diesel vehicles 25 horsepower or greater, limits unnecessary idling to five minutes, requires all construction fleets to be labeled and report to CARB, bans Tier 0 equipment and phases out Tier 1 and 2 equipment (thereby replacing fleets with cleaner equipment), and requires that fleets comply with Best Available Control Technology (BACT) requirements.

Because it would not exceed the applicable thresholds for all criteria pollutants and would implement standard construction measures compliant with mandatory SDAPCD rules and regulations and CARB's In-Use Off-Road Diesel-Fueled Fleets Regulation, project construction emissions would not result in regional emissions that would exceed the NAAQS or CAAQS or contribute to existing violations. Therefore, project construction would not result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment, and impacts would be less than significant.

4.2 Operational Emissions

4.2.1 Mobile Emissions

Mobile emissions are calculated based on the vehicle type and the trip rate. Mobile-source emissions were modeled using the default CalEEMod trip generation rates which are based on the Institute of Transportation (ITE) Trip Generation Manual, 11th Edition. Based on the ITE Trip Generation Manual, 11th Edition, the project would generate 7.20 weekday trips per unit for a total of 374 daily weekday trips (Linscott, Law & Greenspan, Engineers 2024). Weekend trip generation rates were calculated by proportionately adjusting the default CalEEMod trip rates. CalEEMod default trip lengths and vehicle emission factors based on CARB's 2021 Emissions Factor model were modeled for the soonest operational year of 2026.

4.2.2 Area Source Emissions

Area source emissions associated with the project include consumer products, architectural coatings, and landscaping equipment. Consumer products are chemically formulated products used by household and institutional consumers, including but not limited to detergents, cleaning compounds, polishes, floor finishes, disinfectants, sanitizers, and aerosol paints but do not include other paint products, furniture coatings, or architectural coatings.

For architectural coatings, emissions result from evaporation of solvents contained in surface coatings such as in paints and primers. Emission estimates are based on the building square footage and parking lot surface area, architectural coating emission factors, and a reapplication rate of 10 percent of area per year. Architectural coatings would comply with SDAPCD Rule 67.0.1, which limits the VOC content of paints sold within the county.

Landscaping maintenance includes fuel combustion emission from equipment such as lawn mowers, rototillers, shredders/grinders, blowers, trimmers, chain saws, and hedge trimmers as well as air compressors, generators, and pumps. Emission calculations take into account building area, equipment emission factors, and the number of operational days (summer days).

4.2.3 Energy Source Emissions

Energy source emissions associated with the project include natural gas used in space and water heating. Combustion of any type of fuel, including natural gas, emits criteria pollutants directly into the atmosphere. When this occurs within buildings, it is considered a direct emission source associated with that building. CalEEMod uses the California Commercial End Use Survey (CEUS) database to develop energy intensity values (electricity and natural gas usage per square foot per year) for non-residential buildings. Energy source emissions were modeled using CalEEMod default values.

4.2.4 Total Operational Emissions

Using the parameters discussed above, operational project emissions were calculated. Daily operational emissions are summarized in Table 6. The CalEEMod output files are contained in Attachment 1.

Table 6 Summary of Project Operational Emissions (pounds per day)						
	Pollutant					
	ROG	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
Mobile Sources	2	1	12	<1	3	1
Area Sources	3	<1	3	<1	<1	<1
Energy Sources	<1	<1	<1	<1	<1	<1
Total	**5**	**2**	**15**	**<1**	**3**	**1**
Significance Threshold	*250*	*250*	*550*	*250*	*100*	*67*

As shown in Table 6, maximum daily operational emissions associated with the project are projected to be less than the applicable thresholds for all criteria pollutants. Additionally, the project would be subject to Standard Project Condition No. 1 – Air Quality, items 4 through 9 (refer to Section 1.1). Therefore, operational emissions would not result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment, impacts would be less than significant.

5.0 Air Quality Impact Analysis

1. Would the project conflict with or obstruct the implementation of the RAQS and/or applicable portions of the SIP?

Project consistency is based on whether the project would conflict with or obstruct implementation of the RAQS and/or applicable portions of the SIP, which would lead to increases in the frequency or severity of existing air quality violations.

The RAQS is the applicable regional air quality plan that sets forth the SDAPCD's strategies for achieving the NAAQS and CAAQS. The SDAB is designated a non-attainment area for the federal and state ozone standard. Accordingly, the RAQS was developed to identify feasible emission control measures and provide expeditious progress toward attaining the standards for ozone. The two pollutants addressed in the RAQS are ROG and NO_X, which are precursors to the formation of ozone. Projected increases in motor vehicle usage, population, and growth create challenges in controlling emissions and, by extension, to maintaining and improving air quality. The most recent 2022 RAQS and TCM was adopted in 2023. (SDAPCD 2022).

The growth projections used by the SDAPCD to develop the RAQS emissions budgets are based on the population, vehicle trends, and land use plans developed in general plans and used by SANDAG in the development of the regional transportation plans and sustainable communities strategy. As such, projects that propose development that is consistent with the growth anticipated by SANDAG's growth projections and/or the General Plan would not conflict with the RAQS. In the event that a project would propose development that is less dense than anticipated by the growth projections, the project would likewise be consistent with the RAQS. In the event a project proposes development that is greater than anticipated in the growth projections, further analysis would be warranted to determine if the project would exceed the growth projections used in the RAQS for the specific subregional area.

The project site was evaluated as a part of the City's Housing Element Rezone Program Implementation Environmental Impact Report (EIR) (City of Santee 2022). The project site was previously designated as General Commercial (GC) and was rezoned to High Density Residential R-22 (22 to 30 dwelling units per acre). The Housing Element Rezone Program was developed prior to updates to the 2022 RAQS. Therefore, growth forecasting in the 2022 RAQS update utilized the previous General Commercial land use designation. Assuming a typical floor area ratio of 0.2 for commercial development in the City, the 3.34-acre site could have been developed with approximately 29,000 square feet of commercial uses. The SANDAG trip generation rate for a neighborhood shopping center use is 120 trips per 1,000 square feet and the SANDAG trip generation rate for a standard commercial office is 20 trips per 1,000 square feet (SANDAG 2002). Using these rates, a hypothetical retail project would have generated 3,480 daily trips and a hypothetical office project would have generated 580 daily trips. As discussed in Section 4.2.1 above, the project would generate 236 daily trips, which would be less than the trips generated by the hypothetical retail and office projects described above. Therefore, the project would generate fewer emissions than what is accounted for in the RAQS and would not exceed the growth assumptions used in the RAQS. Furthermore, as shown in Table 6 above, project emissions would not exceed the applicable significance thresholds for any criteria pollutants. Therefore, the project would not obstruct or conflict with implementation of the RAQS, and impacts would be less than significant.

2. *Would the project result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (PM_{10}, $PM_{2.5}$, or exceed quantitative thresholds for ozone precursors: NO_x and ROG)?*

The region is classified as an attainment area for all criterion pollutants except ozone, PM_{10}, and $PM_{2.5}$. The SDAB is a non-attainment area for the 8-hour federal and state ozone standards. Ozone is not emitted directly but is a result of atmospheric activity on precursors. NO_X and ROG are known as the chief “precursors” of ozone. These compounds react in the presence of sunlight to produce ozone. $PM_{2.5}$ includes fine particles that are found in smoke and haze and are emitted from all types of combustion activities (motor vehicles, power plants, wood burning, etc.) and certain industrial processes. PM_{10} includes both fine and coarse dust particles, and sources include crushing or grinding operations and dust from paved or unpaved roads.

As shown in Table 5 above, project construction would not exceed the applicable regional emissions thresholds, which are designed to provide limits below which project emissions would not significantly change regional air quality. Additionally, the project would implement standard construction measures compliant with mandatory SDAPCD rules and regulations and CARB’s In-Use Off-Road Diesel-Fueled Fleets Regulation, which would further reduce construction emissions. Therefore, project construction would not result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard, and impacts would be less than significant.

Long-term emissions of regional air pollutants occur from operational sources. As shown in Table 6 above, the project’s daily operational emissions would not exceed the applicable regional emissions thresholds for any pollutant. These thresholds align with attainment of the NAAQS which were developed to protect the public health, specifically the health of “sensitive” populations, including asthmatics, children, and the elderly. Consequently, project operation would not impact any sensitive populations. Therefore, project operation would not result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard, and impacts would be less than significant.

3. *Would the project expose sensitive receptors (including, but not limited to, schools, hospitals, resident care facilities, day-care centers and project residents) to substantial pollutant concentrations?*

Sensitive land uses include schools and schoolyards, parks and playgrounds, day care centers, nursing homes, hospitals, and residential communities. The nearest sensitive receptors include residential uses adjacent to as close as 40 feet from the western project boundary, 40 feet from the southern project boundary, and 135 feet from the eastern project boundary.

Carbon Monoxide Hot Spots

Localized CO concentration is a direct function of motor vehicle activity at signalized intersections (e.g., idling time and traffic flow conditions), particularly during peak commute hours and meteorological conditions. The SDAB is a CO maintenance area under the federal CAA. This means that SDAB was previously a non-attainment area and is currently implementing a 10-year plan for continuing to meet and maintain air quality standards.

Due to increased requirements for cleaner vehicles, equipment, and fuels, CO levels in the state have dropped substantially. All air basins are attainment or maintenance areas for CO. Therefore, more recent screening procedures based on more current methodologies have been developed. The Bay Area Air Quality Management District (BAAQMD) developed a screening threshold in their 2022 CEQA Guidelines (BAAQMD 2022). These screening criteria are considered applicable in the SDAB because the San Francisco Bay Air Basin and the SDAB have the same CO maintenance designations. If the following screening criteria are met, operation of a project would result in less than significant impacts related to CO:

- The project would be consistent with an applicable congestion management program established by the County congestion management agency for designated roads or highways, the regional transportation plan, and local congestion management agency plans.

- Project-generated traffic would not increase traffic volumes at affected intersections to more than 44,000 vehicles per hour.

- Project-generated traffic would not increase traffic volumes at affected intersections to more than 24,000 vehicles per hour where vertical and/or horizontal mixing is substantially limited (e.g., tunnel, parking garage, bridge underpass, natural or urban street canyon, below-grade roadway).

Based on SANDAG daily roadway segment traffic projections (SANDAG 2022) and a peak hour volume equal to approximately 10 percent of the daily roadway segment volume, roadways in the vicinity of the project carry significantly less than both the 44,000 vehicles per hour and 24,000 vehicles per hour screening levels identified above. Therefore, the project's traffic contribution of 374 would not generate a CO hot spot that could expose sensitive receptors to substantial pollutant concentration, and impacts would be less than significant.

Diesel Particulate Matter – Construction

Construction of the project and associated infrastructure would result in short-term diesel exhaust emissions from on-site heavy-duty equipment. Construction of the project would result in the generation of diesel-exhaust DPM emissions from the use of off-road diesel equipment required for site grading and excavation, paving, and other construction activities and on-road diesel equipment used to bring materials to and from the project site.

Generation of DPM from construction projects typically occurs in a single area for a short period. Construction is anticipated to last for approximately 14 months based on default CalEEMod phase durations. The dose to which the receptors are exposed is the primary factor used to determine health risk. Dose is a function of the concentration of a substance or substances in the environment and the extent of exposure that person has with the substance. Dose is positively correlated with time, meaning that a longer exposure period would result in a higher exposure level for the Maximally Exposed Individual. The risks estimated for a Maximally Exposed Individual are higher if a fixed exposure occurs over a longer period of time. According to the Office of Environmental Health Hazard Assessment (OEHHA), health risk assessments, which determine the exposure of sensitive receptors to toxic emissions, should be based on a 30-year exposure period; however, such assessments should be limited to the period/duration of activities associated with the project (OEHHA 2015). Thus, if the duration of proposed construction activities near any specific sensitive receptor were 14 months, the exposure would be less than 4 percent of the total 30-year exposure period (1.17 years divided by 30 years) used for health risk calculation. Additionally, the project would be subject to Standard Project Condition No. 1 – Air Quality, item 1 which would reduce construction equipment DPM emissions (refer to Section 1.1). Because construction of the project would be short term (14 months) and the amount of heavy equipment required would be minimal, project construction would not expose nearby residents to substantial pollutant concentrations, and impacts would be less than significant.

Diesel Particulate Matter – Operation

As discussed in Section 2.1.2 above, the CARB handbook indicates that siting new sensitive land uses within 500 feet of a freeway or urban roads with 100,000 or more vehicles per day should be avoided when possible. The roadways within 500 feet of the project site include Aubrey Glen Drive and Mission Gorge Road. Based on SANDAG daily roadway traffic projections, volumes on these roadways are projected to be well less than 100,000 vehicles per day (SANDAG 2022). Therefore, the project would not expose sensitive receptors to substantial pollutant concentrations associated with diesel particulate matter during operation, and impacts would be less than significant.

4. *Would the project result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?*

The potential for an odor impact is dependent on a number of variables, including the nature of the odor source, distance between the receptor and odor source, and local meteorological conditions. During construction, construction equipment may generate some nuisance odors. Sensitive receptors near the project site include residential uses; however, exposure to odors associated with project construction would be short term and temporary in nature (14 months), and only a minimal amount of construction equipment would be required. Therefore, project construction would not generate other emissions (such as those leading to odors) adversely affecting a substantial number of people, and impacts would be less than significant.

The following list provides some common types of facilities that are known producers of objectionable odors (Bay Area Air Quality Management District 2022). This list of facilities is not meant to be all-inclusive.

- Wastewater Treatment Plant
- Wastewater Pumping Facilities
- Sanitary Landfill
- Transfer Station
- Composting Facility
- Petroleum Refinery
- Asphalt Batch Plant
- Chemical Manufacturing
- Fiberglass Manufacturing
- Painting/Coating Operations
- Rendering Plant
- Coffee Roaster
- Food Processing Facility
- Confined Animal Facility/Feed Lot/Dairy
- Green Waste and Recycling Operations
- Metal Smelting Plants

The project does not include any of these uses that are typically associated with odor complaints. The project does not propose any uses or activities that would result in potentially significant operational-source odor impacts.

Therefore, project operation would not generate other emissions (such as those leading to odors) adversely affecting a substantial number of people, and impacts would be less than significant.

6.0 Conclusions

The primary goal of the RAQS is to reduce ozone precursor emissions. The project site was previously designated as General Commercial (GC) and was rezoned to High Density Residential R-22 (22 to 30 dwelling units per acre) as a part of the City's Housing Element Rezone Program (City of Santee 2022). The Housing Element Rezone Program was developed prior to updates to the 2022 RAQS. Therefore, growth forecasting in the 2022 RAQS update utilized the previous land use designation. However, emissions generated by the project would be less than those that would be generated by a commercial project that would have been consistent with the land use designation and growth projections assumed in the RAQS update. Furthermore, as shown in Table 6 above, project emissions would not exceed the applicable significance thresholds for any criteria pollutants. Therefore, the project would not obstruct or conflict with the implementation of the RAQS, and impacts would be less than significant.

As shown in Table 5 above, project construction emissions would not exceed the applicable regional emissions thresholds, which are designed to provide limits below which project emissions would not significantly change regional air quality. Additionally, the project would be subject to Standard Project Condition No. 1 – Air Quality, items 1 through 3, 7, and 8 (refer to Section 1.1). The project would implement standard construction measures compliant with mandatory SDAPCD rules and regulations and CARB's In-Use Off-Road Diesel-Fueled Fleets Regulation, which would further reduce construction emissions. Therefore, project construction would not result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard, and impacts would be less than significant. Additionally, construction emissions would be temporary, intermittent, and would cease at the end of project construction.

Long-term emissions of regional air pollutants occur from operational sources. As shown in Table 6 above, project operational emissions would not exceed the applicable regional emissions thresholds. Additionally, the project would be subject to Standard Project Condition No. 1 – Air Quality, items 4 through 9 (refer to Section 1.1). Therefore, project operation would not result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard, and impacts would be less than significant.

Sensitive land uses include schools and schoolyards, parks and playgrounds, daycare centers, nursing homes, hospitals, and residential communities. Residential uses are located adjacent to the project site. The project is not anticipated to result in a CO hot spot at project area intersections. Construction of the project and associated infrastructure would result in short-term diesel exhaust emissions from on-site heavy-duty equipment. However, because construction of the project would be short term (14 months) and the project would be subject to Standard Project Condition No. 1 – Air Quality, item 1, project construction is not anticipated to result in the exposure of nearby residents to substantial pollutant concentrations. Additionally, the project site is not located within 500 feet of a heavily travelled roadway. Therefore, the project would not expose sensitive receptors to substantial pollutant concentrations during construction or operation, and impacts would be less than significant.

The project does not include heavy industrial or agricultural uses that are typically associated with objectionable odors. The 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 and only a minimal amount of construction equipment would be required. Therefore, the project would not generate other emissions (such as those leading to odors) adversely affecting a substantial number of people, and impacts would be less than significant.

If you have any questions about the results of this analysis, please contact me at jfleming@reconenvironmental.com or (619) 308-9333 extension 177.

Sincerely,

Jessica Fleming

Jessica Fleming
Senior Air Quality Specialist

JLF:sh:jg

Attachment

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ATTACHMENT 1

CalEEMod Output

Aubrey Glen Detailed Report

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1. Basic Project Information

1.1. Basic Project Information

Data Field	Value
Project Name	Aubrey Glen
Construction Start Date	1/1/2025
Operational Year	2026
Lead Agency	City of Santee
Land Use Scale	Project/site
Analysis Level for Defaults	County
Windspeed (m/s)	2.60
Precipitation (days)	7.60
Location	32.836292138754175, -117.02807879137637
County	San Diego
City	Santee
Air District	San Diego County APCD
Air Basin	San Diego
TAZ	6524
EDFZ	12
Electric Utility	San Diego Gas & Electric
Gas Utility	San Diego Gas & Electric
App Version	2022.1.1.26

1.2. Land Use Types

Land Use Subtype	Size	Unit	Lot Acreage	Building Area (sq ft)	Landscape Area (sq ft)	Special Landscape Area (sq ft)	Population	Description
Condo/Townhouse	52.0	Dwelling Unit	3.34	99,375	50,861	0.00	145	—

1.3. User-Selected Emission Reduction Measures by Emissions Sector

No measures selected

2. Emissions Summary

2.1. Construction Emissions Compared Against Thresholds

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

Un/Mit.	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	1.52	1.28	10.7	14.9	0.02	0.43	0.35	0.79	0.40	0.08	0.48	—	2,892	2,892	0.12	0.05	1.69	2,912
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	34.7	34.7	31.7	30.9	0.05	1.37	7.81	9.18	1.26	3.97	5.23	—	5,452	5,452	0.22	0.11	0.04	5,472
Average Daily (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	1.78	1.77	8.70	11.0	0.02	0.35	0.43	0.79	0.33	0.14	0.47	—	2,142	2,142	0.09	0.04	0.50	2,157
Annual (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.33	0.32	1.59	2.01	< 0.005	0.06	0.08	0.14	0.06	0.03	0.09	—	355	355	0.01	0.01	0.08	357
Exceeds (Daily Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Threshold	—	250	250	550	250	—	—	100	—	—	67.0	—	—	—	—	—	—	—
Unmit.	—	No	No	No	No	—	—	No	—	—	No	—	—	—	—	—	—	—
Exceeds (Average Daily)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Threshold	—	250	250	550	250	—	—	100	—	—	67.0	—	—	—	—	—	—	—
Unmit.	—	No	No	No	No	—	—	No	—	—	No	—	—	—	—	—	—	—

2.2. Construction Emissions by Year, Unmitigated

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

Year	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily - Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2025	1.52	1.28	10.7	14.9	0.02	0.43	0.35	0.79	0.40	0.08	0.48	—	2,892	2,892	0.12	0.05	1.69	2,912
Daily - Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2025	4.02	3.38	31.7	30.9	0.05	1.37	7.81	9.18	1.26	3.97	5.23	—	5,452	5,452	0.22	0.11	0.04	5,472
2026	34.7	34.7	10.2	14.5	0.02	0.38	0.35	0.73	0.35	0.08	0.43	—	2,863	2,863	0.12	0.05	0.04	2,881
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2025	1.20	1.01	8.70	11.0	0.02	0.35	0.43	0.79	0.33	0.14	0.47	—	2,142	2,142	0.09	0.04	0.50	2,157
2026	1.78	1.77	0.49	0.74	< 0.005	0.02	0.02	0.04	0.02	< 0.005	0.02	—	124	124	0.01	< 0.005	0.03	125
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2025	0.22	0.18	1.59	2.01	< 0.005	0.06	0.08	0.14	0.06	0.03	0.09	—	355	355	0.01	0.01	0.08	357
2026	0.33	0.32	0.09	0.14	< 0.005	< 0.005	< 0.005	0.01	< 0.005	< 0.005	< 0.005	—	20.6	20.6	< 0.005	< 0.005	< 0.005	20.7

2.4. Operations Emissions Compared Against Thresholds

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

Un/Mit.	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	3.75	3.63	1.03	10.6	0.02	0.04	1.58	1.61	0.04	0.40	0.44	24.2	2,227	2,251	2.57	0.08	6.90	2,347

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	3.45	3.34	1.07	7.27	0.02	0.04	1.58	1.61	0.03	0.40	0.43	24.2	2,137	2,161	2.57	0.09	0.87	2,252
Average Daily (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	3.46	3.35	0.99	7.96	0.02	0.04	1.40	1.44	0.03	0.36	0.39	24.2	1,967	1,991	2.56	0.08	3.10	2,081
Annual (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.63	0.61	0.18	1.45	< 0.005	0.01	0.26	0.26	0.01	0.06	0.07	4.01	326	330	0.42	0.01	0.51	345
Exceeds (Daily Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Threshold	—	250	250	550	250	—	—	100	—	—	67.0	—	—	—	—	—	—	—
Unmit.	—	No	No	No	No	—	—	No	—	—	No	—	—	—	—	—	—	—
Exceeds (Average Daily)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Threshold	—	250	250	550	250	—	—	100	—	—	67.0	—	—	—	—	—	—	—
Unmit.	—	No	No	No	No	—	—	No	—	—	No	—	—	—	—	—	—	—

2.5. Operations Emissions by Sector, Unmitigated

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

Sector	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	1.15	1.05	0.73	7.57	0.02	0.01	1.58	1.59	0.01	0.40	0.41	—	1,848	1,848	0.09	0.07	6.19	1,877
Area	2.57	2.56	0.03	2.95	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	0.00	7.89	7.89	< 0.005	< 0.005	—	7.92
Energy	0.03	0.02	0.27	0.11	< 0.005	0.02	—	0.02	0.02	—	0.02	—	369	369	0.05	< 0.005	—	371

Water	—	—	—	—	—	—	—	—	—	—	—	3.50	2.15	5.65	0.36	0.01	—	17.3
Waste	—	—	—	—	—	—	—	—	—	—	—	20.7	0.00	20.7	2.07	0.00	—	72.5
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.71	0.71
Total	3.75	3.63	1.03	10.6	0.02	0.04	1.58	1.61	0.04	0.40	0.44	24.2	2,227	2,251	2.57	0.08	6.90	2,347
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	1.12	1.03	0.80	7.16	0.02	0.01	1.58	1.59	0.01	0.40	0.41	—	1,766	1,766	0.09	0.07	0.16	1,790
Area	2.30	2.30	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00
Energy	0.03	0.02	0.27	0.11	< 0.005	0.02	—	0.02	0.02	—	0.02	—	369	369	0.05	< 0.005	—	371
Water	—	—	—	—	—	—	—	—	—	—	—	3.50	2.15	5.65	0.36	0.01	—	17.3
Waste	—	—	—	—	—	—	—	—	—	—	—	20.7	0.00	20.7	2.07	0.00	—	72.5
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.71	0.71
Total	3.45	3.34	1.07	7.27	0.02	0.04	1.58	1.61	0.03	0.40	0.43	24.2	2,137	2,161	2.57	0.09	0.87	2,252
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.99	0.91	0.71	6.39	0.02	0.01	1.40	1.42	0.01	0.36	0.37	—	1,591	1,591	0.08	0.07	2.39	1,616
Area	2.43	2.43	0.01	1.45	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	0.00	3.89	3.89	< 0.005	< 0.005	—	3.90
Energy	0.03	0.02	0.27	0.11	< 0.005	0.02	—	0.02	0.02	—	0.02	—	369	369	0.05	< 0.005	—	371
Water	—	—	—	—	—	—	—	—	—	—	—	3.50	2.15	5.65	0.36	0.01	—	17.3
Waste	—	—	—	—	—	—	—	—	—	—	—	20.7	0.00	20.7	2.07	0.00	—	72.5
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.71	0.71
Total	3.46	3.35	0.99	7.96	0.02	0.04	1.40	1.44	0.03	0.36	0.39	24.2	1,967	1,991	2.56	0.08	3.10	2,081
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.18	0.17	0.13	1.17	< 0.005	< 0.005	0.26	0.26	< 0.005	0.06	0.07	—	263	263	0.01	0.01	0.40	267
Area	0.44	0.44	< 0.005	0.27	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	0.00	0.64	0.64	< 0.005	< 0.005	—	0.65
Energy	0.01	< 0.005	0.05	0.02	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	61.1	61.1	0.01	< 0.005	—	61.5
Water	—	—	—	—	—	—	—	—	—	—	—	0.58	0.36	0.93	0.06	< 0.005	—	2.86
Waste	—	—	—	—	—	—	—	—	—	—	—	3.43	0.00	3.43	0.34	0.00	—	12.0

Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.12	0.12
Total	0.63	0.61	0.18	1.45	< 0.005	0.01	0.26	0.26	0.01	0.06	0.07	4.01	326	330	0.42	0.01	0.51	345

3. Construction Emissions Details

3.1. Demolition (2025) - Unmitigated

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

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	2.86	2.40	22.2	19.9	0.03	0.92	—	0.92	0.84	—	0.84	—	3,425	3,425	0.14	0.03	—	3,437
Demolition	—	—	—	—	—	—	0.58	0.58	—	0.09	0.09	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.16	0.13	1.22	1.09	< 0.005	0.05	—	0.05	0.05	—	0.05	—	188	188	0.01	< 0.005	—	188
Demolition	—	—	—	—	—	—	0.03	0.03	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Off-Roa Equipment	0.03	0.02	0.22	0.20	< 0.005	0.01	—	0.01	0.01	—	0.01	—	31.1	31.1	< 0.005	< 0.005	—	31.2
Demolition	—	—	—	—	—	—	0.01	0.01	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.06	0.06	0.05	0.61	0.00	0.00	0.13	0.13	0.00	0.03	0.03	—	134	134	0.01	0.01	0.01	136
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.04	0.01	0.66	0.24	< 0.005	0.01	0.13	0.13	0.01	0.03	0.04	—	485	485	0.03	0.08	0.03	509
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.03	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	7.43	7.43	< 0.005	< 0.005	0.01	7.54
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	< 0.005	< 0.005	0.04	0.01	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	26.6	26.6	< 0.005	< 0.005	0.02	27.9
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	1.23	1.23	< 0.005	< 0.005	< 0.005	1.25
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	< 0.005	< 0.005	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	4.40	4.40	< 0.005	< 0.005	< 0.005	4.62

3.3. Site Preparation (2025) - Unmitigated

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

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

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	3.94	3.31	31.6	30.2	0.05	1.37	—	1.37	1.26	—	1.26	—	5,295	5,295	0.21	0.04	—	5,314
Dust From Material Movement	—	—	—	—	—	—	7.67	7.67	—	3.94	3.94	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.05	0.05	0.43	0.41	< 0.005	0.02	—	0.02	0.02	—	0.02	—	72.5	72.5	< 0.005	< 0.005	—	72.8
Dust From Material Movement	—	—	—	—	—	—	0.11	0.11	—	0.05	0.05	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.01	0.08	0.08	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	12.0	12.0	< 0.005	< 0.005	—	12.1
Dust From Material Movement	—	—	—	—	—	—	0.02	0.02	—	0.01	0.01	—	—	—	—	—	—	—

Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.08	0.07	0.06	0.71	0.00	0.00	0.15	0.15	0.00	0.03	0.03	—	157	157	0.01	0.01	0.02	159
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	2.17	2.17	< 0.005	< 0.005	< 0.005	2.20
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	< 0.005	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	0.36	0.36	< 0.005	< 0.005	< 0.005	0.36
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.5. Grading (2025) - Unmitigated

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

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

Off-Road Equipment	2.07	1.74	16.3	17.9	0.03	0.72	—	0.72	0.66	—	0.66	—	2,959	2,959	0.12	0.02	—	2,970
Dust From Material Movement	—	—	—	—	—	—	2.76	2.76	—	1.34	1.34	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.05	0.04	0.36	0.39	< 0.005	0.02	—	0.02	0.01	—	0.01	—	64.9	64.9	< 0.005	< 0.005	—	65.1
Dust From Material Movement	—	—	—	—	—	—	0.06	0.06	—	0.03	0.03	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.01	0.07	0.07	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	10.7	10.7	< 0.005	< 0.005	—	10.8
Dust From Material Movement	—	—	—	—	—	—	0.01	0.01	—	0.01	0.01	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.06	0.06	0.05	0.61	0.00	0.00	0.13	0.13	0.00	0.03	0.03	—	134	134	0.01	0.01	0.01	136
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	2.97	2.97	< 0.005	< 0.005	0.01	3.02
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	< 0.005	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	0.49	0.49	< 0.005	< 0.005	< 0.005	0.50
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.7. Building Construction (2025) - Unmitigated

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

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.35	1.13	10.4	13.0	0.02	0.43	—	0.43	0.40	—	0.40	—	2,398	2,398	0.10	0.02	—	2,406
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Off-Road Equipment	1.35	1.13	10.4	13.0	0.02	0.43	—	0.43	0.40	—	0.40	—	2,398	2,398	0.10	0.02	—	2,406
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.83	0.70	6.46	8.06	0.01	0.27	—	0.27	0.25	—	0.25	—	1,483	1,483	0.06	0.01	—	1,488
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.15	0.13	1.18	1.47	< 0.005	0.05	—	0.05	0.04	—	0.04	—	245	245	0.01	< 0.005	—	246
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.16	0.15	0.11	1.73	0.00	0.00	0.32	0.32	0.00	0.07	0.07	—	355	355	0.02	0.01	1.33	361
Vendor	0.01	0.01	0.19	0.09	< 0.005	< 0.005	0.04	0.04	< 0.005	0.01	0.01	—	139	139	0.01	0.02	0.36	145
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.16	0.15	0.13	1.52	0.00	0.00	0.32	0.32	0.00	0.07	0.07	—	335	335	0.02	0.01	0.03	340
Vendor	0.01	0.01	0.19	0.09	< 0.005	< 0.005	0.04	0.04	< 0.005	0.01	0.01	—	139	139	0.01	0.02	0.01	145
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Worker	0.10	0.09	0.08	0.95	0.00	0.00	0.19	0.19	0.00	0.05	0.05	—	209	209	0.01	0.01	0.36	212
Vendor	0.01	< 0.005	0.12	0.05	< 0.005	< 0.005	0.02	0.02	< 0.005	0.01	0.01	—	86.1	86.1	< 0.005	0.01	0.10	89.9
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.02	0.02	0.01	0.17	0.00	0.00	0.04	0.04	0.00	0.01	0.01	—	34.6	34.6	< 0.005	< 0.005	0.06	35.2
Vendor	< 0.005	< 0.005	0.02	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	14.2	14.2	< 0.005	< 0.005	0.02	14.9
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.9. Building Construction (2026) - Unmitigated

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

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.28	1.07	9.85	13.0	0.02	0.38	—	0.38	0.35	—	0.35	—	2,397	2,397	0.10	0.02	—	2,405
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.02	0.01	0.13	0.18	< 0.005	0.01	—	0.01	< 0.005	—	< 0.005	—	32.8	32.8	< 0.005	< 0.005	—	33.0
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Off-Road Equipment	< 0.005	< 0.005	0.02	0.03	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	5.44	5.44	< 0.005	< 0.005	—	5.46
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.15	0.13	0.12	1.43	0.00	0.00	0.32	0.32	0.00	0.07	0.07	—	329	329	0.02	0.01	0.03	333
Vendor	0.01	< 0.005	0.18	0.08	< 0.005	< 0.005	0.04	0.04	< 0.005	0.01	0.01	—	137	137	0.01	0.02	0.01	143
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.02	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	4.54	4.54	< 0.005	< 0.005	0.01	4.61
Vendor	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	1.87	1.87	< 0.005	< 0.005	< 0.005	1.96
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	< 0.005	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	0.75	0.75	< 0.005	< 0.005	< 0.005	0.76
Vendor	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	0.31	0.31	< 0.005	< 0.005	< 0.005	0.32
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.11. Paving (2026) - Unmitigated

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

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

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.81	0.68	6.23	8.81	0.01	0.26	—	0.26	0.24	—	0.24	—	1,350	1,350	0.05	0.01	—	1,355
Paving	0.10	0.10	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.04	0.03	0.31	0.43	< 0.005	0.01	—	0.01	0.01	—	0.01	—	66.6	66.6	< 0.005	< 0.005	—	66.8
Paving	0.01	0.01	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.01	0.06	0.08	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	11.0	11.0	< 0.005	< 0.005	—	11.1
Paving	< 0.005	< 0.005	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.08	0.07	0.06	0.76	0.00	0.00	0.17	0.17	0.00	0.04	0.04	—	176	176	0.01	0.01	0.02	178

Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.04	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	8.74	8.74	< 0.005	< 0.005	0.01	8.86
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	1.45	1.45	< 0.005	< 0.005	< 0.005	1.47
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.13. Architectural Coating (2026) - Unmitigated

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

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.15	0.12	0.86	1.13	< 0.005	0.02	—	0.02	0.02	—	0.02	—	134	134	0.01	< 0.005	—	134
Architectural Coatings	34.6	34.6	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.01	0.04	0.06	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	6.58	6.58	< 0.005	< 0.005	—	6.61
Architectural Coatings	1.70	1.70	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	1.09	1.09	< 0.005	< 0.005	—	1.09
Architectural Coatings	0.31	0.31	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.03	0.03	0.02	0.29	0.00	0.00	0.06	0.06	0.00	0.01	0.01	—	65.7	65.7	< 0.005	< 0.005	0.01	66.6
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	3.27	3.27	< 0.005	< 0.005	0.01	3.32

Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	< 0.005	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	0.54	0.54	< 0.005	< 0.005	< 0.005	0.55
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

4. Operations Emissions Details

4.1. Mobile Emissions by Land Use

4.1.1. Unmitigated

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

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Condo/Townhouse	1.15	1.05	0.73	7.57	0.02	0.01	1.58	1.59	0.01	0.40	0.41	—	1,848	1,848	0.09	0.07	6.19	1,877
Total	1.15	1.05	0.73	7.57	0.02	0.01	1.58	1.59	0.01	0.40	0.41	—	1,848	1,848	0.09	0.07	6.19	1,877
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Condo/Townhouse	1.12	1.03	0.80	7.16	0.02	0.01	1.58	1.59	0.01	0.40	0.41	—	1,766	1,766	0.09	0.07	0.16	1,790
Total	1.12	1.03	0.80	7.16	0.02	0.01	1.58	1.59	0.01	0.40	0.41	—	1,766	1,766	0.09	0.07	0.16	1,790
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Condo/Townhouse	0.18	0.17	0.13	1.17	< 0.005	< 0.005	0.26	0.26	< 0.005	0.06	0.07	—	263	263	0.01	0.01	0.40	267
Total	0.18	0.17	0.13	1.17	< 0.005	< 0.005	0.26	0.26	< 0.005	0.06	0.07	—	263	263	0.01	0.01	0.40	267

4.2. Energy

4.2.1. Electricity Emissions By Land Use - Unmitigated

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

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Condo/Townhouse	—	—	—	—	—	—	—	—	—	—	—	—	26.5	26.5	0.02	< 0.005	—	27.7
Total	—	—	—	—	—	—	—	—	—	—	—	—	26.5	26.5	0.02	< 0.005	—	27.7
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Condo/Townhouse	—	—	—	—	—	—	—	—	—	—	—	—	26.5	26.5	0.02	< 0.005	—	27.7
Total	—	—	—	—	—	—	—	—	—	—	—	—	26.5	26.5	0.02	< 0.005	—	27.7
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Condo/Townhouse	—	—	—	—	—	—	—	—	—	—	—	—	4.39	4.39	< 0.005	< 0.005	—	4.59
Total	—	—	—	—	—	—	—	—	—	—	—	—	4.39	4.39	< 0.005	< 0.005	—	4.59

4.2.3. Natural Gas Emissions By Land Use - Unmitigated

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

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Condo/Townhouse	0.03	0.02	0.27	0.11	< 0.005	0.02	—	0.02	0.02	—	0.02	—	343	343	0.03	< 0.005	—	344
Total	0.03	0.02	0.27	0.11	< 0.005	0.02	—	0.02	0.02	—	0.02	—	343	343	0.03	< 0.005	—	344
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Condo/Townhouse	0.03	0.02	0.27	0.11	< 0.005	0.02	—	0.02	0.02	—	0.02	—	343	343	0.03	< 0.005	—	344
Total	0.03	0.02	0.27	0.11	< 0.005	0.02	—	0.02	0.02	—	0.02	—	343	343	0.03	< 0.005	—	344
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Condo/Townhouse	0.01	< 0.005	0.05	0.02	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	56.7	56.7	0.01	< 0.005	—	56.9
Total	0.01	< 0.005	0.05	0.02	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	56.7	56.7	0.01	< 0.005	—	56.9

4.3. Area Emissions by Source

4.3.1. Unmitigated

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

Source	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hearths	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00

Consumer Products	2.13	2.13	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	0.17	0.17	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Landscape Equipment	0.28	0.26	0.03	2.95	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	7.89	7.89	< 0.005	< 0.005	—	7.92
Total	2.57	2.56	0.03	2.95	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	0.00	7.89	7.89	< 0.005	< 0.005	—	7.92
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hearths	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00
Consumer Products	2.13	2.13	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	0.17	0.17	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	2.30	2.30	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hearths	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00
Consumer Products	0.39	0.39	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	0.03	0.03	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Landscape	0.02	0.02	< 0.005	0.27	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	0.64	0.64	< 0.005	< 0.005	—	0.65
Total	0.44	0.44	< 0.005	0.27	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	0.00	0.64	0.64	< 0.005	< 0.005	—	0.65

4.4. Water Emissions by Land Use

4.4.1. Unmitigated

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

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Condo/Townhouse	—	—	—	—	—	—	—	—	—	—	—	3.50	2.15	5.65	0.36	0.01	—	17.3
Total	—	—	—	—	—	—	—	—	—	—	—	3.50	2.15	5.65	0.36	0.01	—	17.3
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Condo/Townhouse	—	—	—	—	—	—	—	—	—	—	—	3.50	2.15	5.65	0.36	0.01	—	17.3
Total	—	—	—	—	—	—	—	—	—	—	—	3.50	2.15	5.65	0.36	0.01	—	17.3
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Condo/Townhouse	—	—	—	—	—	—	—	—	—	—	—	0.58	0.36	0.93	0.06	< 0.005	—	2.86
Total	—	—	—	—	—	—	—	—	—	—	—	0.58	0.36	0.93	0.06	< 0.005	—	2.86

4.5. Waste Emissions by Land Use

4.5.1. Unmitigated

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

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Condo/Townhouse	—	—	—	—	—	—	—	—	—	—	—	20.7	0.00	20.7	2.07	0.00	—	72.5
Total	—	—	—	—	—	—	—	—	—	—	—	20.7	0.00	20.7	2.07	0.00	—	72.5
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Condo/Townhouse	—	—	—	—	—	—	—	—	—	—	—	20.7	0.00	20.7	2.07	0.00	—	72.5
Total	—	—	—	—	—	—	—	—	—	—	—	20.7	0.00	20.7	2.07	0.00	—	72.5
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Condo/Townhouse	—	—	—	—	—	—	—	—	—	—	—	3.43	0.00	3.43	0.34	0.00	—	12.0
Total	—	—	—	—	—	—	—	—	—	—	—	3.43	0.00	3.43	0.34	0.00	—	12.0

4.6. Refrigerant Emissions by Land Use

4.6.1. Unmitigated

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

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

Condo/Townhouse	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.71	0.71
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.71	0.71
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Condo/Townhouse	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.71	0.71
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.71	0.71
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Condo/Townhouse	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.12	0.12
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.12	0.12

4.7. Offroad Emissions By Equipment Type

4.7.1. Unmitigated

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

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

4.8. Stationary Emissions By Equipment Type

4.8.1. Unmitigated

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

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

4.9. User Defined Emissions By Equipment Type

4.9.1. Unmitigated

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

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

Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10. Soil Carbon Accumulation By Vegetation Type

4.10.1. Soil Carbon Accumulation By Vegetation Type - Unmitigated

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

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

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

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

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

Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.3. Avoided and Sequestered Emissions by Species - Unmitigated

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

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

Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

5. Activity Data

5.1. Construction Schedule

Phase Name	Phase Type	Start Date	End Date	Days Per Week	Work Days per Phase	Phase Description
Demolition	Demolition	1/1/2025	1/29/2025	5.00	20.0	—
Site Preparation	Site Preparation	1/30/2025	2/6/2025	5.00	5.00	—
Grading	Grading	2/7/2025	2/18/2025	5.00	8.00	—
Building Construction	Building Construction	2/19/2025	1/7/2026	5.00	230	—
Paving	Paving	1/8/2026	2/2/2026	5.00	18.0	—
Architectural Coating	Architectural Coating	2/3/2026	2/28/2026	5.00	18.0	—

5.2. Off-Road Equipment

5.2.1. Unmitigated

Phase Name	Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor
Demolition	Concrete/Industrial Saws	Diesel	Average	1.00	8.00	33.0	0.73
Demolition	Excavators	Diesel	Average	3.00	8.00	36.0	0.38
Demolition	Rubber Tired Dozers	Diesel	Average	2.00	8.00	367	0.40

Site Preparation	Rubber Tired Dozers	Diesel	Average	3.00	8.00	367	0.40
Site Preparation	Tractors/Loaders/Backhoes	Diesel	Average	4.00	8.00	84.0	0.37
Grading	Excavators	Diesel	Average	1.00	8.00	36.0	0.38
Grading	Graders	Diesel	Average	1.00	8.00	148	0.41
Grading	Rubber Tired Dozers	Diesel	Average	1.00	8.00	367	0.40
Grading	Tractors/Loaders/Backhoes	Diesel	Average	3.00	8.00	84.0	0.37
Building Construction	Cranes	Diesel	Average	1.00	7.00	367	0.29
Building Construction	Forklifts	Diesel	Average	3.00	8.00	82.0	0.20
Building Construction	Generator Sets	Diesel	Average	1.00	8.00	14.0	0.74
Building Construction	Tractors/Loaders/Backhoes	Diesel	Average	3.00	7.00	84.0	0.37
Building Construction	Welders	Diesel	Average	1.00	8.00	46.0	0.45
Paving	Cement and Mortar Mixers	Diesel	Average	2.00	6.00	10.0	0.56
Paving	Pavers	Diesel	Average	1.00	8.00	81.0	0.42
Paving	Paving Equipment	Diesel	Average	2.00	6.00	89.0	0.36
Paving	Rollers	Diesel	Average	2.00	6.00	36.0	0.38
Paving	Tractors/Loaders/Backhoes	Diesel	Average	1.00	8.00	84.0	0.37
Architectural Coating	Air Compressors	Diesel	Average	1.00	6.00	37.0	0.48

5.3. Construction Vehicles

5.3.1. Unmitigated

Phase Name	Trip Type	One-Way Trips per Day	Miles per Trip	Vehicle Mix
Demolition	—	—	—	—
Demolition	Worker	15.0	12.0	LDA,LDT1,LDT2
Demolition	Vendor	—	7.63	HHDT,MHDT

Demolition	Hauling	6.75	20.0	HHDT
Demolition	Onsite truck	—	—	HHDT
Site Preparation	—	—	—	—
Site Preparation	Worker	17.5	12.0	LDA,LDT1,LDT2
Site Preparation	Vendor	—	7.63	HHDT,MHDT
Site Preparation	Hauling	0.00	20.0	HHDT
Site Preparation	Onsite truck	—	—	HHDT
Grading	—	—	—	—
Grading	Worker	15.0	12.0	LDA,LDT1,LDT2
Grading	Vendor	—	7.63	HHDT,MHDT
Grading	Hauling	0.00	20.0	HHDT
Grading	Onsite truck	—	—	HHDT
Building Construction	—	—	—	—
Building Construction	Worker	37.4	12.0	LDA,LDT1,LDT2
Building Construction	Vendor	5.56	7.63	HHDT,MHDT
Building Construction	Hauling	0.00	20.0	HHDT
Building Construction	Onsite truck	—	—	HHDT
Paving	—	—	—	—
Paving	Worker	20.0	12.0	LDA,LDT1,LDT2
Paving	Vendor	—	7.63	HHDT,MHDT
Paving	Hauling	0.00	20.0	HHDT
Paving	Onsite truck	—	—	HHDT
Architectural Coating	—	—	—	—
Architectural Coating	Worker	7.49	12.0	LDA,LDT1,LDT2
Architectural Coating	Vendor	—	7.63	HHDT,MHDT
Architectural Coating	Hauling	0.00	20.0	HHDT
Architectural Coating	Onsite truck	—	—	HHDT

5.4. Vehicles

5.4.1. Construction Vehicle Control Strategies

Non-applicable. No control strategies activated by user.

5.5. Architectural Coatings

Phase Name	Residential Interior Area Coated (sq ft)	Residential Exterior Area Coated (sq ft)	Non-Residential Interior Area Coated (sq ft)	Non-Residential Exterior Area Coated (sq ft)	Parking Area Coated (sq ft)
Architectural Coating	201,234	67,078	0.00	0.00	—

5.6. Dust Mitigation

5.6.1. Construction Earthmoving Activities

Phase Name	Material Imported (cy)	Material Exported (cy)	Acres Graded (acres)	Material Demolished (Building Square Footage)	Acres Paved (acres)
Demolition	0.00	0.00	0.00	11,700	—
Site Preparation	—	—	7.50	0.00	—
Grading	—	—	8.00	0.00	—
Paving	0.00	0.00	0.00	0.00	0.70

5.6.2. Construction Earthmoving Control Strategies

Control Strategies Applied	Frequency (per day)	PM10 Reduction	PM2.5 Reduction
Water Exposed Area	2	61%	61%

5.7. Construction Paving

Land Use	Area Paved (acres)	% Asphalt
Condo/Townhouse	0.70	100%

5.8. Construction Electricity Consumption and Emissions Factors

kWh per Year and Emission Factor (lb/MWh)

Year	kWh per Year	CO2	CH4	N2O
2025	0.00	589	0.03	< 0.005
2026	0.00	589	0.03	< 0.005

5.9. Operational Mobile Sources

5.9.1. Unmitigated

Land Use Type	Trips/Weekday	Trips/Saturday	Trips/Sunday	Trips/Year	VMT/Weekday	VMT/Saturday	VMT/Sunday	VMT/Year
Condo/Townhouse	236	263	202	85,790	2,007	2,233	1,720	729,440

5.10. Operational Area Sources

5.10.1. Hearths

5.10.1.1. Unmitigated

Hearth Type	Unmitigated (number)
Condo/Townhouse	—
Wood Fireplaces	0
Gas Fireplaces	0
Propane Fireplaces	0
Electric Fireplaces	0
No Fireplaces	52
Conventional Wood Stoves	0
Catalytic Wood Stoves	0
Non-Catalytic Wood Stoves	0
Pellet Wood Stoves	0

5.10.2. Architectural Coatings

Residential Interior Area Coated (sq ft)	Residential Exterior Area Coated (sq ft)	Non-Residential Interior Area Coated (sq ft)	Non-Residential Exterior Area Coated (sq ft)	Parking Area Coated (sq ft)
201234.375	67,078	0.00	0.00	—

5.10.3. Landscape Equipment

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

5.11. Operational Energy Consumption

5.11.1. Unmitigated

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

Land Use	Electricity (kWh/yr)	CO2	CH4	N2O	Natural Gas (kBTU/yr)
Condo/Townhouse	214,726	45.1	0.0330	0.0040	1,069,366

5.12. Operational Water and Wastewater Consumption

5.12.1. Unmitigated

Land Use	Indoor Water (gal/year)	Outdoor Water (gal/year)
Condo/Townhouse	1,826,920	928,981

5.13. Operational Waste Generation

5.13.1. Unmitigated

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

Condo/Townhouse	38.4	—

5.14. Operational Refrigeration and Air Conditioning Equipment

5.14.1. Unmitigated

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

5.15. Operational Off-Road Equipment

5.15.1. Unmitigated

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

5.16. Stationary Sources

5.16.1. Emergency Generators and Fire Pumps

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

5.16.2. Process Boilers

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

5.17. User Defined

Equipment Type	Fuel Type

5.18. Vegetation

5.18.1. Land Use Change

5.18.1.1. Unmitigated

Vegetation Land Use Type	Vegetation Soil Type	Initial Acres	Final Acres

5.18.1. Biomass Cover Type

5.18.1.1. Unmitigated

Biomass Cover Type	Initial Acres	Final Acres

5.18.2. Sequestration

5.18.2.1. Unmitigated

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

6. Climate Risk Detailed Report

6.1. Climate Risk Summary

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

Climate Hazard	Result for Project Location	Unit
Temperature and Extreme Heat	12.1	annual days of extreme heat
Extreme Precipitation	3.85	annual days with precipitation above 20 mm
Sea Level Rise	—	meters of inundation depth
Wildfire	21.8	annual hectares burned

Temperature and Extreme Heat data are for grid cell in which your project are located. The projection is based on the 98th historical percentile of daily maximum/minimum temperatures from observed historical data (32 climate model ensemble from Cal-Adapt, 2040–2059 average under RCP 8.5). Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.
Extreme Precipitation data are for the grid cell in which your project are located. The threshold of 20 mm is equivalent to about ¾ an inch of rain, which would be light to moderate rainfall if received over a full day or heavy rain if received over a period of 2 to 4 hours. Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.
Sea Level Rise data are for the grid cell in which your project are located. The projections are from Radke et al. (2017), as reported in Cal-Adapt (Radke et al., 2017, CEC-500-2017-008), and consider inundation location and depth for the San Francisco Bay, the Sacramento-San Joaquin River Delta and California coast resulting different increments of sea level rise coupled with extreme storm events. Users may select from four scenarios to view the range in potential inundation depth for the grid cell. The four scenarios are: No rise, 0.5 meter, 1.0 meter, 1.41 meters
Wildfire data are for the grid cell in which your project are located. The projections are from UC Davis, as reported in Cal-Adapt (2040–2059 average under RCP 8.5), and consider historical data of climate, vegetation, population density, and large (> 400 ha) fire history. Users may select from four model simulations to view the range in potential wildfire probabilities for the grid cell. The four simulations make different assumptions about expected rainfall and temperature are: Warmer/drier (HadGEM2-ES), Cooler/wetter (CNRM-CM5), Average conditions (CanESM2), Range of different rainfall and temperature possibilities (MIROC5). Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.

6.2. Initial Climate Risk Scores

Climate Hazard	Exposure Score	Sensitivity Score	Adaptive Capacity Score	Vulnerability Score
Temperature and Extreme Heat	N/A	N/A	N/A	N/A
Extreme Precipitation	N/A	N/A	N/A	N/A
Sea Level Rise	1	0	0	N/A
Wildfire	1	0	0	N/A
Flooding	0	0	0	N/A
Drought	N/A	N/A	N/A	N/A
Snowpack Reduction	N/A	N/A	N/A	N/A
Air Quality Degradation	N/A	N/A	N/A	N/A

The sensitivity score reflects the extent to which a project would be adversely affected by exposure to a climate hazard. Exposure is rated on a scale of 1 to 5, with a score of 5 representing the greatest exposure.
The adaptive capacity of a project refers to its ability to manage and reduce vulnerabilities from projected climate hazards. Adaptive capacity is rated on a scale of 1 to 5, with a score of 5 representing the greatest ability to adapt.
The overall vulnerability scores are calculated based on the potential impacts and adaptive capacity assessments for each hazard. Scores do not include implementation of climate risk reduction measures.

6.3. Adjusted Climate Risk Scores

Climate Hazard	Exposure Score	Sensitivity Score	Adaptive Capacity Score	Vulnerability Score
Temperature and Extreme Heat	N/A	N/A	N/A	N/A
Extreme Precipitation	N/A	N/A	N/A	N/A
Sea Level Rise	1	1	1	2

Wildfire	1	1	1	2
Flooding	1	1	1	2
Drought	N/A	N/A	N/A	N/A
Snowpack Reduction	N/A	N/A	N/A	N/A
Air Quality Degradation	N/A	N/A	N/A	N/A

The sensitivity score reflects the extent to which a project would be adversely affected by exposure to a climate hazard. Exposure is rated on a scale of 1 to 5, with a score of 5 representing the greatest exposure.
The adaptive capacity of a project refers to its ability to manage and reduce vulnerabilities from projected climate hazards. Adaptive capacity is rated on a scale of 1 to 5, with a score of 5 representing the greatest ability to adapt.
The overall vulnerability scores are calculated based on the potential impacts and adaptive capacity assessments for each hazard. Scores include implementation of climate risk reduction measures.

6.4. Climate Risk Reduction Measures

7. Health and Equity Details

7.1. CalEnviroScreen 4.0 Scores

The maximum CalEnviroScreen score is 100. A high score (i.e., greater than 50) reflects a higher pollution burden compared to other census tracts in the state.

Indicator	Result for Project Census Tract
Exposure Indicators	—
AQ-Ozone	57.1
AQ-PM	43.8
AQ-DPM	45.9
Drinking Water	11.0
Lead Risk Housing	19.9
Pesticides	0.00
Toxic Releases	25.1
Traffic	49.0
Effect Indicators	—
CleanUp Sites	0.00
Groundwater	0.00

Haz Waste Facilities/Generators	26.7
Impaired Water Bodies	77.3
Solid Waste	35.7
Sensitive Population	—
Asthma	22.1
Cardio-vascular	11.8
Low Birth Weights	28.4
Socioeconomic Factor Indicators	—
Education	16.8
Housing	25.3
Linguistic	17.3
Poverty	36.4
Unemployment	58.4

7.2. Healthy Places Index Scores

The maximum Health Places Index score is 100. A high score (i.e., greater than 50) reflects healthier community conditions compared to other census tracts in the state.

Indicator	Result for Project Census Tract
Economic	—
Above Poverty	77.85191839
Employed	55.33170794
Median HI	53.2144232
Education	—
Bachelor's or higher	49.60862312
High school enrollment	100
Preschool enrollment	51.87989221
Transportation	—
Auto Access	70.20402926
Active commuting	12.35724368

Social	—
2-parent households	13.26831772
Voting	82.90773771
Neighborhood	—
Alcohol availability	70.62748621
Park access	62.68446041
Retail density	64.45528038
Supermarket access	10.67624791
Tree canopy	40.39522649
Housing	—
Homeownership	71.88502502
Housing habitability	87.19363531
Low-inc homeowner severe housing cost burden	65.7128192
Low-inc renter severe housing cost burden	80.803285
Uncrowded housing	71.88502502
Health Outcomes	—
Insured adults	78.05723085
Arthritis	0.0
Asthma ER Admissions	75.6
High Blood Pressure	0.0
Cancer (excluding skin)	0.0
Asthma	0.0
Coronary Heart Disease	0.0
Chronic Obstructive Pulmonary Disease	0.0
Diagnosed Diabetes	0.0
Life Expectancy at Birth	40.6
Cognitively Disabled	24.2
Physically Disabled	42.3

Heart Attack ER Admissions	77.2
Mental Health Not Good	0.0
Chronic Kidney Disease	0.0
Obesity	0.0
Pedestrian Injuries	59.8
Physical Health Not Good	0.0
Stroke	0.0
Health Risk Behaviors	—
Binge Drinking	0.0
Current Smoker	0.0
No Leisure Time for Physical Activity	0.0
Climate Change Exposures	—
Wildfire Risk	56.9
SLR Inundation Area	0.0
Children	67.0
Elderly	16.8
English Speaking	87.3
Foreign-born	8.0
Outdoor Workers	57.9
Climate Change Adaptive Capacity	—
Impervious Surface Cover	47.9
Traffic Density	57.7
Traffic Access	23.0
Other Indices	—
Hardship	34.9
Other Decision Support	—
2016 Voting	81.8

7.3. Overall Health & Equity Scores

Metric	Result for Project Census Tract
CalEnviroScreen 4.0 Score for Project Location (a)	13.0
Healthy Places Index Score for Project Location (b)	62.0
Project Located in a Designated Disadvantaged Community (Senate Bill 535)	No
Project Located in a Low-Income Community (Assembly Bill 1550)	No
Project Located in a Community Air Protection Program Community (Assembly Bill 617)	No

a: The maximum CalEnviroScreen score is 100. A high score (i.e., greater than 50) reflects a higher pollution burden compared to other census tracts in the state.
b: The maximum Health Places Index score is 100. A high score (i.e., greater than 50) reflects healthier community conditions compared to other census tracts in the state.

7.4. Health & Equity Measures

No Health & Equity Measures selected.

7.5. Evaluation Scorecard

Health & Equity Evaluation Scorecard not completed.

7.6. Health & Equity Custom Measures

No Health & Equity Custom Measures created.

8. User Changes to Default Data

Screen	Justification
Land Use	52 units, 3.34 acres, 50,861 sf open space
Construction: Paving	0.7 acres paved
Operations: Vehicle Data	4.54 weekday trips/unit Weekend trip rates adjusted proportionately
Operations: Hearths	No fireplaces or wood stoves

Drainage Study
For
Townsend Multi-Family
Preliminary Engineering

RICK Job No.19964
August 30, 2024
November 7, 2024
January 29, 2025
Revised March 21, 2025

RICK

DRAINAGE STUDY

FOR

TOWNSEND MULTI-FAMILY

Preliminary Engineering

RICK Job Number 19964

Shavger Rekani, PE
PE #90893, Exp. 03/26

Prepared For:
KB Homes Coastal
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Prepared By:
RICK
Water Resources Department
5620 Friars Road
San Diego, California 92110-2596
(619) 291-0707

August 30, 2024
November 7, 2024
January 29, 2025
Revised March 21, 2025

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DECLARATION OF RESPONSIBLE CHARGE

I HEREBY DECLARE THAT I AM THE ENGINEER OF WORK FOR THE DRAINAGE REPORT FOR THIS PROJECT, THAT I HAVE EXERCISED RESPONSIBLE CHARGE OVER THIS DRAINAGE REPORT AS DEFINED IN SECTION 6703 OF THE BUSINESS AND PROFESSIONALS CODE, AND OPINE THAT THE DRAINAGE REPORT IS CONSISTENT WITH CURRENT STANDARDS.

I UNDERSTAND THAT THE CHECK OF THE DRAINAGE REPORT BY THE CITY OF SANTEE IS CONFINED TO A REVIEW ONLY AND DOES NOT RELIEVE ME, AS THE ENGINEER OF WORK FOR THE DRAINAGE REPORT, OF ANY RESPONSIBILITIES FOR THE DRAINAGE REPORT.

REGISTERED PROFESSIONAL ENGINEER
SHAVGER FAHMY REKANI
No. 90893
CIVIL
STATE OF CALIFORNIA

Shavger Rekani P.E. #90893 Exp. 03/26 DATE: 3/21/2025

DRAINAGE STUDY FOR
AUBREY GLEN

Revision Page

March 21, 2025

This Drainage Study presents a revision to January 29, 2025, report pursuant to the City of Santee plan check comments received March 14, 2025. The following text identifies the plan check comments along with the responses in bold.

Drainage Study Review Comments (3rd Submittal) – Dr. Luis A. Parra & William O'Gorman (Dated 3/14/2025)

I. Drainage Study Review

1. EOW needs to sign and stamp report prior to approval. Change "County of San Diego" to "City of Santee" in Declaration of Responsible Charge. There are only minor corrections pending and it is anticipated that the drainage study will be approved next submittal.

   Noted; signature and stamp has been provided. Declaration of Responsible Charge has been updated to note the City of Santee.

2. The Type 'F' catch basin is located behind a 10 ft retaining wall on off-site property. Who will be responsible for the maintenance of this inlet? If it is the developer, provide a letter of permission from the Laurel Heights HOA and an adequate access easement for maintenance (to be granted prior to tentative map approval).

   a. Second & Third Review: EOW has stated the developer is in progress obtaining a letter of permission and easement from the Laurel Heights HOA. Comment will remain open until permission is granted.

      Noted.

3. PDF page 37 [Now page 39]: there is an error in the user-specified runoff coefficient: a value of 0.06 was used (see end of page). Change to 0.69 (as in 50 and 100 year storm events, see pages PDF 54 and PDF 71).

   a. Third Review: EOW has stated that this sub-basin C-Value has been corrected, but this is not apparent in the report. The AES run is from November 2024. Please ensure that these pages have been swapped out and update any results on the summary tables or drainage exhibits if necessary.

      Latest AES run for the 10-year event has been included in this submittal with the appropriate runoff coefficient of 0.69.

4. PDF page 38 [now page 40]: Subarea (acres) = 0.10 is different than subarea (acres) = 0.06 of pdf page 55 [now page 57] and pdf page 72[now page 74]. Please reconcile.

    a. Third Review: EOW has stated that this sub-basin area has been corrected, but this is not apparent in the report (page 40 shows 0.10 acres again). The AES run is from November 2024. Please ensure that these pages have been swapped out and update any results on the summary tables or drainage exhibits if necessary.

       Latest AES run for the 10-year event has been included in this submittal with the appropriate area of 0.06 acres.

DRAINAGE STUDY FOR
AUBREY GLEN

Revision Page

January 29, 2025

This Drainage Study presents a revision to the November 7, 2024, report pursuant to the City of Santee plan check comments received December 19, 2024. The following text identifies the plan check comments along with the responses in bold.

Drainage Study Review Comments (2nd Submittal) – Dr. Luis A. Parra & William O'Gorman (Dated 12/19/2024)

I. Drainage Study Review

i.1. Main Document

1. EOW needs to sign and stamp the report prior to approval.

   Noted; signature and stamp to be provided in later submittal prior to approval.

5. Section 2.2: Table 2.1 and text below are in contradiction: (SECOND REVIEW) – The text does not appear to be changed.

   Text has been updated accordingly.

23. Map Pocket, Pre-Development: (SECOND REVIEW) – The water-path does not appear to be added.

    Additional water path has been added to exhibit.

ii.1. Drainage Study & Tentative Map Comments

29. (SECOND REVIEW) – EOW has stated the developer is in progress obtaining a letter of permission and easement from the Laurel Heights HOA. Comment will remain open until permission is granted.

    Noted.

31. (SECOND REVIEW) – Please show pipe elevations of the existing sewer main and water main in Mission Gorge Road.

    Existing sewer main IEs provided within Mission Gorge Road. Additional call-out at crossing has been provided. Existing water main depth to be field verified for construction drawings.

38. (SECOND REVIEW) – Confirm if "swale" in Section D-D on sheet 2 should be "Browditch".

    Section D-D has been updated to reflect "brow ditch".

New 2nd Round Comments

39. Section 1.2, Post-Project Condition, first paragraph: It says: "… and a portion Basin 200 that drains…" It should say: "… an on a portion of Basin 200 that drains …" or the description narrative should change to make sense grammatically.

    Paragraph has been updated accordingly to state "Offsite flows are found in Basin 100 and on a portion Basin 200 that drains the existing Laurel Heights development".

40. PDF page 37: there is an error in the user-specified runoff coefficient: a value of 0.06 was used (see end of page). Change to 0.69 (as in 50- and 100-year storm events, see pages PDF 54 and PDF 71).

    Use-specified runoff coefficient has been updated from 0.06 to 0.69.

41. PDF page 38: Subarea (acres) = 0.10 is different than subarea (acres) = 0.06 of pdf page 55 and pdf page 72. Please reconcile.

    Subarea has been updated from 0.10 acres to 0.06 acres.

42. It caught REC attention than in previous version of the Drainage Report, Q10-post, Q50-post and Q100-post were, respectively, 23.4 cfs, 32.1 cfs and 33.8 cfs (Table 2.1), while in the new version those values are 31.47 cfs, 33.55 cfs and 33.90 cfs. We cannot review the assumptions of the AES software that were made before for 10 and 50 years in post-development as the report was incomplete, so we do not know why Q10 increased so much, Q50 increased over 1.4 cfs, and Q100 remained almost identical. However, we suspect that the problem is related with the USER-SPECIFIED VALUES in AES as they are all identical regardless of the return period (for undetained node 230 Q = 20 cfs, and node 270 = 10.97 regardless of return period). Please revise all user specified hydrology information conditions at node 230 and 270 for all conditions. Note: for the previous August version, user-specified values at node 230 were 14.10 cfs, 19.08 cfs, and 20.00 cfs for 10-year, 50 year and 100-year return period respectively. Also, at node 270, the values were 7.39 cfs, 10.40 cfs, and 10.97 cfs for 10, 50 and 100 years respectively. For the new version the value 20.00 cfs and the value 10.97 cfs were used regardless of return period, which seems to indicate that the real 50- and 10-year values were not used and the AES models need to be updated.

    The differences between the 10-, 50-, and 100-year AES post values stem from the user-specified values (Code 7) used in the AES post-project analysis. These user-specified values, which reference the Q100 values at Nodes 230 and 270, are derived from the Drainage Study for Laurel Heights, dated July 19, 2021, by RICK Engineering (TM 2020-02, DR 2020-04). Since Q10 and Q50 values were not required for the Laurel Heights project, a conservative approach was taken by using a ratio of P6 between the 10-year/100-year and 50-year/100-year flows (i.e., P6,Q10/P6,Q100 & P6,Q50/P6,Q100) to approximate flowrate values. This method resulted in approximately 70% of the Q100 value for the 10-year storm, and about 95% of the Q100 value for the 50-year storm. Based on this analysis, the user-specified flow

rates at Node 230 were 14.10 cfs, 19.08 cfs, and 20.00 cfs for the 10-, 50-, and 100-year return periods, respectively. At Node 270, the values were 7.39 cfs, 10.40 cfs, and 10.97 cfs for the 10-, 50-, and 100-year return periods, respectively. These values were provided in the previous August report and will be incorporated into the updated AES analysis.

DRAINAGE STUDY FOR
AUBREY GLEN

Revision Page

November 7, 2024

This Drainage Study presents a revision to the August 30, 2024 report pursuant to the City of Santee plan check comments received October 24, 2024. The following text identifies the plan check comments along with the responses in bold.

Drainage Study Review Comments – Dr. Luis A. Parra & William O'Gorman (Dated 10/21/2024)

I. Drainage Study Review

i.1. Main Document

1. EOW needs to sign and stamp the report prior to approval. Also, a declaration of responsible charge is needed in the report.

   Noted; signature and stamp to be provided in later submittal prior to approval. Declaration of responsible charge added to beginning of report.

2. Correct the following sentence from Section 1.2, Pre-Project Conditions: "Offsite flows adjacent to the project site are represented by Basin 100." It turns out that some offsite area is also in Basin 200.

   Sentence from Section 1.2 pre-project has been corrected as requested.

3. Correct the following sentence from Section 1.2, Post-Project Conditions or expand explanation: "… with offsite flows in Basin 100." Some offsite area is also in Basin 200.

   Sentence from Section 1.2 post-project has been corrected as requested.

4. The conditions of the emergency overflow are not clear. The document only mentions that "drainage from the project site will overtop the frontage of the site and drain onto Mission Gorge Road." No details are provided, nor design calculations. Please include.

   A detail has been provided in Appendix F for the emergency overflow calculations.

5. Section 2.2: Table 2.1 and text below are in contradiction: per Table 2.1, the Tributary Area has not changed, but per the text below, tributary areas have decreased. Correct the text below Table 2.1.

   The text following Table 2.1 has been revised, the tributary area has not changed.

6. Section 2.2: Minor corrections in the long paragraph below Table 2.1: It says "… results in a decrease of runoff." It should say "… results in a decrease of runoff peak flow." At the end, it says "… it can be decided that detention is not required for this project." Probably makes more sense as "… it can be concluded that detention is not required for this project."

   Comment noted, this sentence has been updated.

7. Section 3.1.2: Type B inlet in a Sump equation: This is not the typical inlet in a sump equation, as it does not depend on the depth (meaning that there is an assumption about the depth that is not explained there). Please explain or correct.

   The equation in Section 3.1.2 has been removed and instead Section 3.1.2 of the report references equations 2-8 and 2-9 from the County of San Diego Hydraulic Design Manual.

8. Appendix A: Calculations should be performed with areas (in acres) using 2 decimal places. Many areas that are clearly different in the exhibits have the same value (0.1 acres comes to mind), which might lead to a significant error (for example, 0.05 to 0.149 acres = 0.1 even if the latter value is almost 3 times the former). Please update.

   Areas associated with the project site location have been updated to use two decimal places. Other areas associated with offsite development to the south of the project site remain the same as the previously approved report titled, "Drainage Study for Laurel Heights" dated July 19, 2021.

9. Appendix A: User-specified runoff coefficient of 0.33 (Node 205 to 207) does not correspond with the value in Appendix C. Make appropriate adjustments in either A or C for all return periods.

   The runoff coefficient in Appendix C has been revised to match that in Appendix A for Node 205 to 207.

10. Appendix A: Manning's coefficient used is 0.013, while Section 3.1.1 uses 0.015. Reconcile or explain the difference.

    Section 3.1.1 of the report has been revised to state 0.013.

11. Appendix B: Hydraulic Analysis Report: Please provide a brief explanation at each sub-section. It is difficult to follow what was done in terms of calculations. Also, ensure that the equations used are properly described in Section 3.1.2, and that there is a correspondence between equations in 3.1.2 and Appendix B equations.

    These calculations have been moved to Appendix D and represent the inlet sizing for the specified Node number in the analysis.

12. Appendix B: Manning's coefficient shown in calculations is 0.013, while Section 3.1.1 uses 0.015. Reconcile or explain the difference.

    Section 3.1.1 of the report has been revised to state 0.013.

13. Percentage clogging for gutter analysis and curb opening is 0%, while it is 50% for grated inlets. REC agrees with the second but suggests a modification to the first assumption. While curb openings have a tendency to clog less than grated inlets, assume at least a 25% clogging or justify a reference for 0% clog.

    Based on the County of San Diego Hydraulic Design manual Section 2.2.2.3 for standard curb-openings the County states that they "tend to resist clogging". Furthermore, Tables 2-1 and 2-2 include footers for grate inlets to acknowledge weir length and opening area be reduced by 50%, but these footers are not used for Curb

Openings. Assuming no clogging for standard inlets is then consistent with these equations.

14. Appendix C: "Basin 200/POC 2" (pre-project) – There is no POC 2. Post-project "Basin 1/POC" is mislabeled.

    Appendix C has been updated and any reference to POC 2 has been removed.

15. Appendix C: Back-up for weighted C coefficient: A pervious C coefficient of 0.35 or 0.33 should not be used anywhere because there are no soils type D in the area analyzed. Please change to 0.30 (the use of C other than 0.3 contradicts the exhibit provided in Appendix C regarding soil group). Correct all C coefficients impacted.

    In the pre-project condition to the south of the project type-D soils are present. An updated hydrologic soil group map has been included to show the extents of the offsite area and the location of type-D soils.

16. Appendix C: Impervious and pervious tributary areas will change in C tables when areas are corrected to 2 decimal places.

    Areas associated with the project site location have been updated to use two decimal places. Other areas associated with offsite development to the south of the project site remain the same as the previously approved report titled, "Drainage Study for Laurel Heights" dated July 19, 2021.

17. Appendix C: Please correct the 0.14 value at the end of the Post-Project Table. It can also be removed, as it is not used in the model calculating peak flows.

    This value has been removed.

18. Appendix C: Provide a brief explanation about the 5.6-acre area in the post-project C table, as it is not specified in the exhibits: add a note saying that it is the total of pre-development areas x + y + …. that do not change with the development. Similarly with Area 6.3 acres.

    A note has been added to Appendix C. These areas represent offsite areas that will remain the same in both the pre and the post project conditions.

19. Appendix D: Inlet Sizing Calculations: Identify Le and Ae used in the tables to verify the capacity. Also, check parenthesis in Q100 line for some of the tables (regarding Node 145). Calculations will change when areas are provided with 1 decimal place.

    Ae and Le are associated with the typical sizes of the grate inlets minus the width of the bars times a debris factor of 50%. These values are now shown in the calculation in Appendix D.

20. Appendix E: Preliminary Storm Drain Size (pdf page 134): It is not clear if the full flow capacity was used for minimum pipe calculation or the maximum channel capacity was used (the former is some 7.5% smaller than the latter). Please add an explanation. Also, provide a pipe number in the table and an overall scheme of the pipes in this section for identification purposes. Identify the nodes for the pipes as well.

The Q100 with sizing factor is the Q that is used for storm drain sizing. A column has been added to correlate the table to the storm drain numbers on the plans sheets. The plan sheets have also been included.

21. Appendix E: Preliminary Storm Drain Size (pdf page 134): Inconsistencies in the design are discovered for large pipes: for example, for Q = 20. The pipe is 30” for 1% but 24” for 2%. Which one was used? Also, for Q = 28 cfs the pipe selected is not sufficient for the minimum size calculation provided. Please correct this issue.

    This table has been clarified. Wherever possible, the design of the system has tried to incorporate the unmitigated flows (20cfs) from the upstream Laurel Heights project. However, the release of unmitigated flows from the Laurel Heights project would be in an emergency overflow condition. In the typical case, it is anticipated that the mitigated flows (6.9 cfs) from Laurel Heights will be tributary to our site. Per Comment 26 below, using the mitigated flows we find the proposed system has adequate conveyance.

    The bypass storm drain has been designed to convey unmitigated flows (20 cfs) in a 24-in storm drain flowing at 2%. The system ties into an existing 24-in storm drain within Mission Gorge Road and to avoid telescoping, it cannot be upsized. Based on a meeting with the City Engineer at the outset of the project (7/22/2024), it was agreed upon that offsite storm drain would not need to be upsized. In the case that the downstream system does not have capacity, flows will pond up in the proposed biofiltration basin and eventually overtop into Mission Gorge Road. Detailed overflow calculations are provided in Appendix F.

22. Map Pocket, Pre-Development: Add delineation of area at Node 230 so that pre and post-development areas there are in agreement (in other words, a magenta line along the southerly property line is missing).

    A delineation line has been added to the pre-project map. Pre-project and Post-project delineations are now consistent.

23. Map Pocket, Pre-Development: Include the longest water-path in the map for upstream Basin 100.

    Flow paths have been included in the exhibit.

24. Map Pocket, Pre-Development: At nodes 230 & 290, clarify what “Pre-Mitigated” means in relation to this development or revise. No mitigation is proposed for this development and the Q is lower than the post-project condition.

    The upstream project site, south of the project area has both undetained and detained (mitigated) flows. For the design of Aubrey Glen, the undetained flows have been used as a conservative measure and the mitigated flows previously shown on the pre-project exhibit have been removed as it is not used as part of the proposed design.

ii.2. Drainage Study & Tentative Map Comments

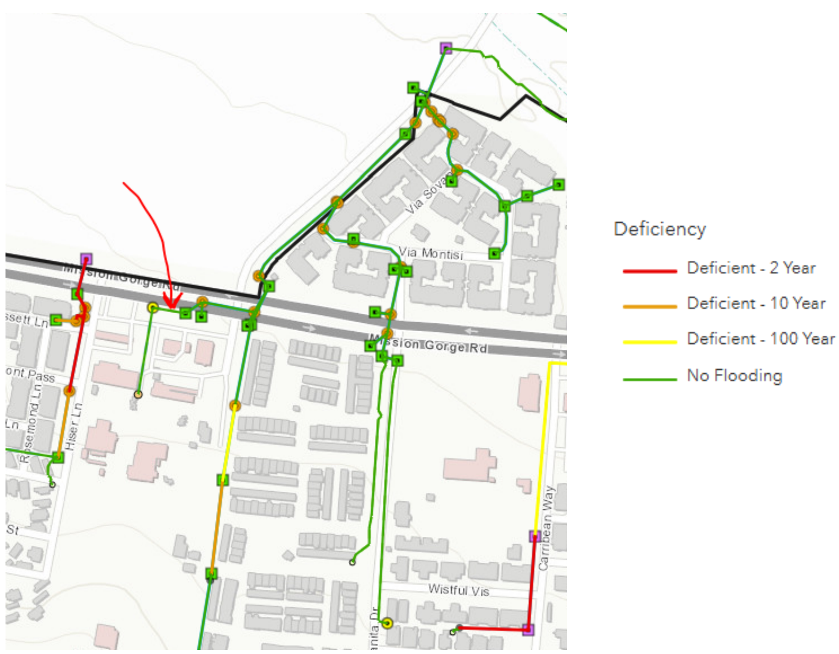
25. The proposed 24" pipe within Mission Gorge Road is proposed to be pressurized (between nodes 266 to 290). Per section 4.F. of Drainage Design Criteria within The City of Santee Public Works Standards, public storm drain pipes cannot be pressurized.

    Based on the comment below, we find that using the mitigated flow (6.9 cfs) from the Laurel Heights project that the capacity of the system from node 266 to 290 is sufficient and will not be pressurized.

    However, in an emergency flow condition, it is anticipated that the storm drain from node 266 to 290 will be pressurized. In the City of Santee's Public Works Standards Section 4.F states that conduits "should be designed to flow fee of pressure heads", however, it also acknowledges there are cases where "it is necessary to design for a pressure head in a system and it is approved, pressure pipe and appurtenance shall be used." Given the existing storm drain is 24-inches, it is anticipated that this will be a case where it will be necessary to design for pressure head for the emergency condition.

26. Utilizing the unmitigated Q100 may be overly conservative and show flooding onsite. To demonstrate the storm drain pipe wouldn't be pressurized, HGL Calculations may be performed using the mitigated peak 100-year flowrates from Laurel Heights if needed, however, ensure there is a path for emergency overflow to Mission Gorge Road.

    Wherever possible, we have designed for unmitigated flows (20cfs) from Laurel Heights, however it is anticipated that this will only occur in emergency overflow conditions. Using the mitigated flow from Laurel Heights we find free-flow conditions in the existing storm drain. This is consistent with the City of Santee Master Drainage Study, showing the existing storm drains have sufficient capacity for existing flows, which, based on our analysis are not increasing in the post-project condition. See a snip of the Master Drainage Study below:



27. Provide calculations for the Type ‘F’ catch basin demonstrating that:

    - (a) It can capture the entire unmitigated peak 100-year flowrate from Laurel Heights without overtopping the retaining wall (no clogging).
    - (b) It can capture the entire mitigated peak 100-year flowrate with a 50% clogging factor, whilst providing adequate freeboard. The “offsite storm drain detail” on sheet 3 of the TM shows rim elevation above the wall. Revise if necessary.

    Appendix F has been added to show emergency conveyance on the upstream side of the project where the undetained Q100 (20.0 cfs) can be conveyed without clogging and without over topping the wall. Additionally, another Type-F has been added to the west of the upstream project’s outfall in case clogging occurs. The brow-ditch has been sized to convey 50% of the Q100 (10cfs).

28. There is an inadequate path for runoff at the Type ‘F’ catch basin to be safely conveyed from the site in the event the inlet is clogged. As designed, it would overtop the 10’ wall and flow into the development. Consider either the brow ditch to Laurel Heights as an emergency path, or an additional pipe to the east or to the west of the development. In other words, demonstrate there is a path for overflow in the event the Type ‘F’ inlet becomes partially clogged. Can the brow ditch flow line high points be lowered to convey flow west in an emergency condition? Revise the plans (including the detail on sheet 3) as necessary and provide a discussion within the Drainage Study.

    See response to the comment above and refer to Appendix F.

29. The Type ‘F’ catch basin is located behind a 10 ft retaining wall on off-site property. Who will be responsible for the maintenance of this inlet? If it is the developer, provide a letter of permission from the Laurel Heights HOA and an adequate access easement for maintenance (to be granted prior to tentative map approval).

    This inlet will be maintained by the HOA. A permission letter and access easement are currently being coordinated with the property to the south.

1.0 INTRODUCTION

1.1 Project Description

This drainage study presents hydrologic and hydraulic analyses for the proposed Townsend Multi-Family Project (herein referred to as the “project”). The project is located within the City of Santee, approximately 230 feet south of the intersection of Mission Gorge Road and Aubrey Glen. (See Figure 1, Vicinity Map). The proposed project is a new development project that proposes the construction of 52 three-story townhomes with a 5,000 SF common area. The project’s existing condition currently consists of a concrete parking lot with an existing building, which will be demolished for construction.

1.2 Drainage Characteristics

<u>Pre-Project Condition</u>

The pre-project site drains generally in the north direction to a single point of comparison (POC-1) located on the northeast side of the property along Mission Gorge Road. The project site is situated in one major basin boundary, Basin 200. Offsite flows adjacent to the project site are represented by Basin 100 and a portion of Basin 200 that drains the existing Laurel Heights development. Basin 100 begins south of the project site and drains north to a cobble lined swale. Flows from the swale discharge through a curb opening onto Aubrey Glen Drive, then are collected by a v-gutter and conveyed north to an existing curb inlet on Mission Gorge Road. Basin 200 also begins on the south of the site and drains north to a detention vault and then to a water quality basin. Flows are discharged from the basin onto the Townsend Multi-Family project site, then collected by an existing brow ditch and conveyed to Mission Gorge Road. Flows from Basin 100 and Basin 200 confluence on Mission Gorge Road prior to entering the existing storm drain system and ultimately discharging into the San Diego River.

<u>Post-Project Condition</u>

Drainage patterns for the proposed condition will remain similar to drainage patterns in the pre-project condition. In the post-project condition, the project area is also found in Basin 200. Offsite flows are found in Basin 100 and on a portion Basin 200 that drains the existing Laurel Heights development. No improvements are proposed in Basin 100; therefore Basin 100 will remain in the same condition as the pre-project. Regarding Basin 200, flows from the adjacent sites south of the project are collected by a proposed clean water line storm drain system and conveyed north to the edge of the property boundary. The clean water line is intended to route offsite flows through the site which are already treated via the water quality basin south of the project. To ensure appropriate sizing, the clean water line is sized and designed for the unmitigated 100-year storm event rather than the mitigated 100-year storm event. Flows from the south are captured in a proposed type-F catch basin on the south property edge of the site and routed to the clean water line that flows north to the property frontage.

Drainage onsite of the Townsend Multi-Family project will be collected by curb inlets and grate inlets and conveyed by a proposed dirty water storm drain system to the northern edge of the property boundary. The dirty water line is treated via proposed modular wetland system (MWS), then confluenced with the clean water line prior to discharge from the site. Additional drainage along the northern portion of the Townsend Multi-Family site is collected by a grate inlet and treated by a biofiltration basin, then joined with flows discharging the site to Mission Gorge Road. Flows from Basin 100 and Basin 200 confluence in a proposed cleanout on Mission Gorge Road prior to ultimately discharging to the San Diego River. In the event of an emergency overflow, drainage from the project site will overtop the frontage of the site and drain onto Mission Gorge Road.

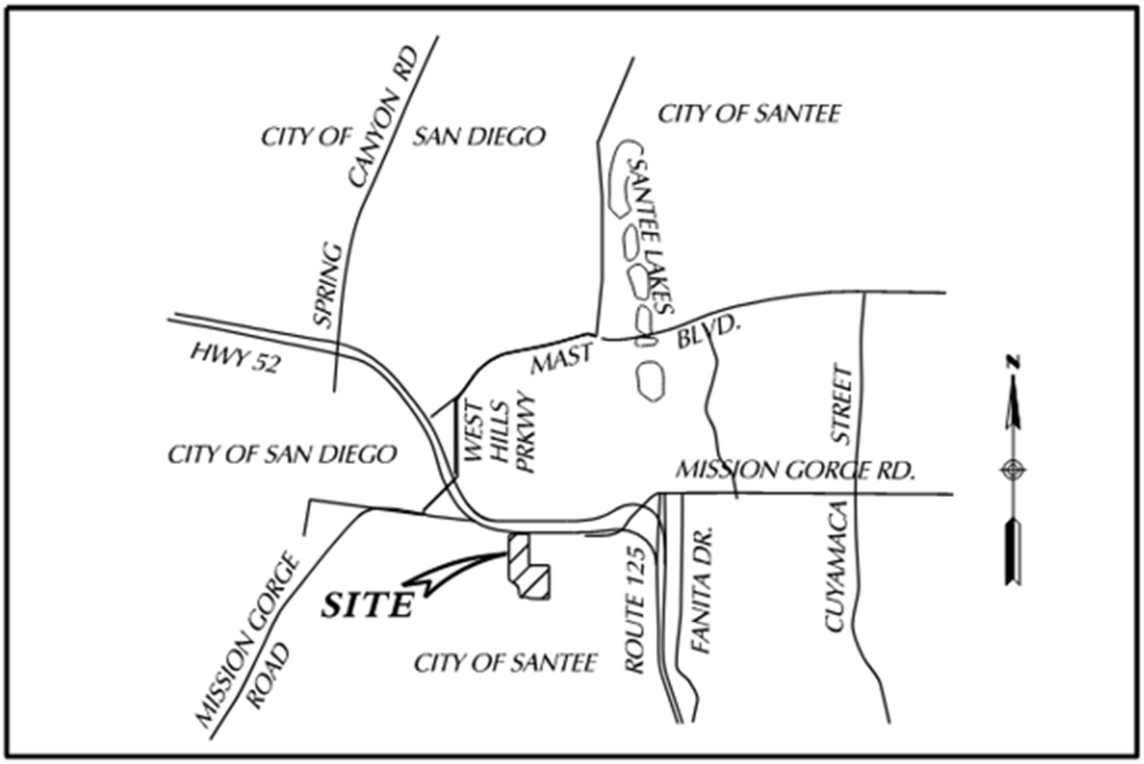
1.3 Hydrology, Hydraulics, and Detention

Hydrology, hydraulics, and detention are discussed in Sections 2.0, 3.0, and 4.0 respectively of this report.

1.4 Water Quality

Post-project storm water runoff will be managed via a combination of a biofiltration basin and a modular wetland system, designed pursuant to the guidelines from the City of Santee BMP Design Manual, dated February 2016. The PDP SWQMP specific to the Townsend Multi-Family project is dated August 30, 2024 (or any revision made thereafter) and prepared by RICK.

Figure 1: Vicinity Map



VICINITY MAP

NO SCALE

2.0 HYDROLOGY

The hydrologic conditions were analyzed in accordance with the June 2003 San Diego County *Hydrology Manual*.

2.1 Methodology

To determine the peak flows at the point of comparison (POC) identified on the provided drainage study exhibits, Advance Engineering Software (AES) 2014 Rational Method computer software version 21.0 was used. The hydrologic model was developed by first dividing each major drainage basin into several subareas. The delineation of each subarea was determined so that area within each subarea is comprised of similar hydrologic features, including topography, land use, and storm drain conveyance system (e.g., urban open channel, pipe, natural open channel, etc.). Nodes were identified at the upstream and downstream extents of each subarea, and subarea hydrologic data was determined, such as the land use(s) and drainage facility geometry, elevations, and lengths. Hydrologic backup information is included in Appendix C and AES output is provided in Appendix A and B for pre and post-project conditions respectively.

Next, the hydrologic data describing each subarea were incorporated into the AES software in order to create a node-link model for each watershed. For each subarea the AES software performs calculations for the specific hydrologic process occurring in the subarea. There are 15 different hydrologic processes programmed into the software, and each process is assigned a code number that is presented on the model results. The AES Rational Method computer software hydrologic processes code numbers are described in Table 1.

Table 1: Subarea Hydrologic Processes (Codes)

Code	Subarea Type
Code 1	Confluence analysis at a node
Code 2	Initial subarea analysis
Code 3	Pipe flow travel time (computer-estimated pipe sizes)
Code 4	Pipe flow travel time (user-specified pipe size)
Code 5	Trapezoidal channel travel time
Code 6	Street flow analysis through a subarea
Code 7	User-specified information at a node
Code 8	Addition of the subarea runoff to mainline
Code 9	V-Gutter flow through subarea
Code 10	Copy mainstream data onto a memory bank
Code 11	Confluence a memory bank with the mainstream memory

Table 1: Subarea Hydrologic Processes (Codes)

Code	Subarea Type
Code 12	Clear a memory bank
Code 13	Clear the mainstream memory
Code 14	Copy a memory bank onto the mainstream memory
Code 15	Hydrologic data bank storage functions

The hydrologic conditions were analyzed in accordance with the County of San Diego's design criteria as follows:

San Diego County Hydrology Manual, June 2003:

Design Storm:	100-year. 6-hour (for storm drain systems)
Runoff Coefficients:	Weighted Runoff Coefficients [(1)]
0% Impervious Areas	C=0.30 for Type-C soils
	C=0.35 for Type-D soils
100% Impervious Areas	C=0.9
Soil Type (Conservatively Applied)	"D"
Design Storm Precipitation[2]	100-year, 6-hour, P=2.4 inches
	50-year, 6-hour, P=2.3 inches
	10-year, 6-hour, P=1.7 inches
Rainfall Intensity:	Based on time-intensity criteria per Section 3.0 of the County Hydrology Manual (San Diego County, 2003)

[(1)] Utilized to calculate composite 'C' values based on percent impervious.

[(2)] Isopluvial maps provided in Appendix C.

2.2 Hydrologic Results

<u>Rational Method Results</u>

The 100-, 50-, and 10-year peak flow rates for the Pre- and Post-Project conditions are summarized in Table 2.1 below.

Table 2.1: Summary of Hydrologic Conditions

Drainage Basin ID	POC	Return Period (years)	Project Condition	Tributary Area (ac)	Time Of Concentration (minutes)	Q (cfs)
100 & 200	1	10	Pre-Project (Unmitigated)	14.59	8.85	30.30
			Post-Project (Unmitigated)		9.11	24.14
		50	Pre-Project (Unmitigated)	14.59	8.63	41.66
			Post-Project (Unmitigated)		8.83	32.53
		100	Pre-Project (Unmitigated)	14.59	8.59	43.62
			Post-Project (Unmitigated)		8.81	33.90
		100	Pre-Project (Mitigated)	14.59	17.14	22.88
			Post-Project (Mitigated)		17.37	22.67

Based on the Rational Method result and a comparison of the pre-and post-project POC 1, it can be observed that the peak discharge rate to POC 1 has decreased. Comparing the existing condition of the site and the proposed condition, there's a decrease in impervious areas as the site changes from an industrial site with a concrete parking lot to a multifamily residential development with landscaped areas. The decrease in impervious area results in a decrease of runoff peak flow. Additionally, referring to the Santee Master Drainage Plan published in 2023 by RICK, it's noted that the existing storm drain infrastructure at the project site is sized appropriately and not deficient. Due to the decrease in peak flows and the existing storm drain infrastructure in the project area, it can be concluded that detention is not required for this project.

Ultimately, the existing and the proposed condition flows from the site and drain in north direction to the existing storm drain system on Mission Gorge Road. Flows from Mission Gorge are then conveyed and discharged into the San Diego River. Refer to Appendix A and Appendix B of this report for pre- and post-project Rational Method calculations respectively and Appendix C for backup documentation. The location of the POC, drainage boundaries, flow patterns, and pervious/impervious areas can be found on the work maps titled, “Pre-project Drainage Study Map for Townsend Multi-Family” located in Map Pocket 1 and “Post-project Drainage Study Map for Townsend Multi-Family,” located in Map Pocket 2.

3.0 HYDRAULICS

3.1 Hydraulic Methodology and Criteria

The 100-year post-project peak flow rates determined using the Modified Rational Method was used to size the on-site storm drain system. In addition, hydraulic analyses regarding inlet sizing calculations are included in Appendix D.

3.1.1 Storm Drain Sizing

Storm drain pipe sizes were determined based on a normal depth calculation to verify storm drain capacity based on Manning’s equation.

$$Q = (1.486/n)\ A\ R^{2/3}\ S^{1/2}$$

Where:

Q = Discharge (cfs)

n = Manning’s roughness coefficient

A = Cross-sectional Area of flow (sq. ft.)

R = Hydraulic radius (ft.) (where hydraulic radius is defined as the cross-section area of flow divided by the wetted perimeter, R= A/P)

S = Slope of pipe (ft./ft.)

The Manning’s roughness coefficient “n” of 0.013 was used for the hydraulic calculations. This value is typically used for reinforced concrete pipe (RCP), polyvinyl chloride (PVC), and high-density polyethylene pipe (HDPE). The pipe sizes were evaluated based on the Rational Method flow rates with a 30% “bump up” sizing factor to account for hydraulic losses within the system.

Please refer to Appendix E for the storm drain sizes. The AES rational method results for the post-project condition are located in Appendix B of this report, which may be referenced for further information concerning pipe flow.

3.1.2 Inlet Design

Inlet design calculations were completed using a computer program based on the following equations for inlets on a grade and inlets in a sump:

Type B Inlets on a Grade

$$Q = 0.7\, L\, (a + y)^{3/2}$$

Where: y = depth of flow approaching the curb inlet, in feet (ft)

a = depth of depression of curb at inlet, in feet (ft)

L = length of clear opening of inlet for total interception, in feet (ft)

Q = interception capacity of the curb inlet, in cubic feet per second (cfs)

Type B Inlets in a Sump at Shallow Flow Depths (Weir)

$$Q = C_w\, L_w\, d^{3/2}$$

Where: Q = inlet capacity, in cubic feet per second (cfs)

C_w = weir discharge coefficient (see Table 2-1 of County of San Diego Hydraulic Design Manual)

L_w = weir length, in feet (ft)

d = flow depth, in feet (ft)

Type B Inlets in a Sump at Higher Flow Depths (Orifice)

$$Q = 0.67\, h\, L\, (2\, g\, d_o)^{1/2}$$

Where: Q = inlet capacity, in cubic feet per second (cfs)

h = curb opening height, in feet (ft)

L = curb opening length, in feet (ft)

g = gravitational acceleration, in feet squared per second (ft^2 / sec)

d_o = effective depth of flow at curb face, in feet (ft)

<u>Inlet Results</u>

Inlet locations have been identified for this project. Inlets are sized for the 100-year, 6-hour storm event. Each inlet is sized to provide 100% capture of the flow draining to the inlet. The inlet design calculations along with back up information is presented in Appendix D. Refer to the drainage study map provided in Map Pocket 2 for the location of each inlet.

4.0 DETENTION ANALYSES

No detention analysis was conducted or required for this project. Based on the Rational Method results and a comparison of the pre-and post-project POC, it was observed that the peak discharge rate to POC 1 has decreased. When comparing the existing condition of the site and the proposed condition, there's a decrease in impervious area as the site changes from an industrial site with a concrete parking lot to a multifamily residential development with landscaped areas. The decrease in impervious area results in a decrease of runoff peak flow. Additionally, when referring to the Santee Master Drainage Plan published in 2023 by RICK, its noted that the existing storm drain infrastructure at the project site is sized appropriately and not deficient. Since the existing storm drain infrastructure is appropriately sized, no detention is required.

5.0 CONCLUSION

This drainage study presents the hydrologic and hydraulic analyses for the Townsend Multi-Family project. The project is a new development project located in the City of Santee. The post-project condition peak discharge rates were determined using the Rational Method based on the hydrologic methodology and criteria described in the County of San Diego Hydrology Manual, dated June 2003.

Post-project flows will be treated per the City of Santee's BMP Design Manual, dated February 2016. For more information on water quality sizing, please refer to the separate report titled, "Priority Development Project Storm Water Quality Management Plan (PDP SWQMP) for Townsend Multi-Family," dated August 30th, 2024 or any revisions thereafter, and prepared by RICK.

Based on the Rational Method result and a comparison of the pre- and post-project POC, it can be observed that the post-project peak discharge rate to POC 1 has decreased. Therefore, it is anticipated that there will be no adverse effects to downstream drainage characteristics/systems as a result of the project.

APPENDIX A

Modified Rational Method Output
[Pre-project]

```
****************************************************************************

             RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
             Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                          2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2014 Advanced Engineering Software (aes)
              Ver. 21.0 Release Date: 06/01/2014  License ID 1261

                              Analysis prepared by:

                              RICK ENGINEERING COMPANY
                                  5620 Friars Road
                             San Diego, California 92110
                           619-291-0707   Fax 619-291-4165

 ************************** DESCRIPTION OF STUDY **************************
* (J-19964) AUBREY GLEN                                                     *
* UNDETAINED FLOWS FROM LAUREL HEIGHTS                                      *
* PRE-PROJECT CONDITION: 10-YR, 6-HR STORM EVENT                            *
 **************************************************************************

  FILE NAME: AG10PREU.RAT
  TIME/DATE OF STUDY: 14:59 03/20/2025
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) =  10.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   1.700
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    102.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
```

```
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    704.00
  DOWNSTREAM ELEVATION(FEET) =    694.00
  ELEVATION DIFFERENCE(FEET) =     10.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.267
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.872
  SUBAREA RUNOFF(CFS) =      0.14
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.14

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    110.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    694.00  DOWNSTREAM(FEET) =    445.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1323.00   CHANNEL SLOPE =  0.1882
  CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   5.00
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.376
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3800
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.92
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.11
  AVERAGE FLOW DEPTH(FEET) =   0.06   TRAVEL TIME(MIN.) =   7.10
  Tc(MIN.) =   13.36
  SUBAREA AREA(ACRES) =     1.70       SUBAREA RUNOFF(CFS) =    1.53
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.378
  TOTAL AREA(ACRES) =        1.8         PEAK FLOW RATE(CFS) =       1.62

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.08   FLOW VELOCITY(FEET/SEC.) =   3.79
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    110.00 =    1423.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    110.00 TO NODE    115.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    445.00  DOWNSTREAM(FEET) =    424.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   233.00   CHANNEL SLOPE =  0.0901
  CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =   1.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   2.00
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.312
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3300
```

```
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.69
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.71
  AVERAGE FLOW DEPTH(FEET) =   0.12   TRAVEL TIME(MIN.) =   0.58
  Tc(MIN.) =   13.94
  SUBAREA AREA(ACRES) =     0.20       SUBAREA RUNOFF(CFS) =    0.15
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.374
  TOTAL AREA(ACRES) =        2.0         PEAK FLOW RATE(CFS) =       1.73

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.12   FLOW VELOCITY(FEET/SEC.) =   6.84
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    115.00 =    1656.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    115.00 TO NODE    120.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   420.00  DOWNSTREAM(FEET) =   400.00
  FLOW LENGTH(FEET) =   161.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   3.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.01
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.73
  PIPE TRAVEL TIME(MIN.) =   0.24    Tc(MIN.) =   14.19
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    120.00 =    1817.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    120.00 TO NODE    125.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    400.00  DOWNSTREAM(FEET) =    395.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   100.00   CHANNEL SLOPE =  0.0500
  CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =   1.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   2.00
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.255
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3000
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.76
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.55
  AVERAGE FLOW DEPTH(FEET) =   0.15   TRAVEL TIME(MIN.) =   0.30
  Tc(MIN.) =   14.49
  SUBAREA AREA(ACRES) =     0.10       SUBAREA RUNOFF(CFS) =    0.07
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.370
  TOTAL AREA(ACRES) =        2.1         PEAK FLOW RATE(CFS) =       1.75

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.14   FLOW VELOCITY(FEET/SEC.) =   5.76
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    125.00 =    1917.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    125.00 TO NODE    130.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    387.00  DOWNSTREAM(FEET) =    381.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   150.00   CHANNEL SLOPE =  0.0400
  CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =   1.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   2.00
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.209
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3000
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.79
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.26
  AVERAGE FLOW DEPTH(FEET) =   0.16   TRAVEL TIME(MIN.) =   0.48
  Tc(MIN.) =   14.96
  SUBAREA AREA(ACRES) =     0.10       SUBAREA RUNOFF(CFS) =    0.07
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.367
  TOTAL AREA(ACRES) =        2.2         PEAK FLOW RATE(CFS) =       1.78

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.16   FLOW VELOCITY(FEET/SEC.) =   5.32
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    130.00 =    2067.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    130.00 TO NODE    135.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    372.00  DOWNSTREAM(FEET) =    360.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   200.00   CHANNEL SLOPE =  0.0600
  CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =   1.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   2.00
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.158
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3000
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.81
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.05
  AVERAGE FLOW DEPTH(FEET) =   0.14   TRAVEL TIME(MIN.) =   0.55
  Tc(MIN.) =   15.51
  SUBAREA AREA(ACRES) =     0.10       SUBAREA RUNOFF(CFS) =    0.06
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.364
  TOTAL AREA(ACRES) =        2.3         PEAK FLOW RATE(CFS) =       1.81

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.14   FLOW VELOCITY(FEET/SEC.) =   6.02
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    135.00 =    2267.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    135.00 TO NODE    150.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    357.00  DOWNSTREAM(FEET) =    354.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    70.00   CHANNEL SLOPE =  0.0429
  CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.50
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.127
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3000
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.84
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.32
  AVERAGE FLOW DEPTH(FEET) =   0.23   TRAVEL TIME(MIN.) =   0.35
  Tc(MIN.) =   15.86
  SUBAREA AREA(ACRES) =     0.10       SUBAREA RUNOFF(CFS) =    0.06
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.361
  TOTAL AREA(ACRES) =        2.4         PEAK FLOW RATE(CFS) =       1.84

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.23   FLOW VELOCITY(FEET/SEC.) =   3.33
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    150.00 =    2337.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    150.00 TO NODE    150.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.127
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6900
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.5221
  SUBAREA AREA(ACRES) =    2.30   SUBAREA RUNOFF(CFS) =    3.38
  TOTAL AREA(ACRES) =        4.7   TOTAL RUNOFF(CFS) =       5.22
  TC(MIN.) =   15.86

****************************************************************************
  FLOW PROCESS FROM NODE    150.00 TO NODE    250.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  354.00  DOWNSTREAM ELEVATION(FEET) =  353.00
  STREET LENGTH(FEET) =    65.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020
```

```
  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0100
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.31
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.34
    HALFSTREET FLOOD WIDTH(FEET) =   10.54
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.32
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.46
  STREET FLOW TRAVEL TIME(MIN.) =   0.25   Tc(MIN.) =   16.12
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.105
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8400
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.529
  SUBAREA AREA(ACRES) =    0.10      SUBAREA RUNOFF(CFS) =    0.18
  TOTAL AREA(ACRES) =        4.8        PEAK FLOW RATE(CFS) =      5.34

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.34   HALFSTREET FLOOD WIDTH(FEET) =  10.60
  FLOW VELOCITY(FEET/SEC.) =  4.31   DEPTH*VELOCITY(FT*FT/SEC.) =   1.46
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    250.00 =    2402.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    250.00 TO NODE    250.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.105
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8400
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.5471
  SUBAREA AREA(ACRES) =    0.30   SUBAREA RUNOFF(CFS) =    0.53
  TOTAL AREA(ACRES) =        5.1   TOTAL RUNOFF(CFS) =       5.87
  TC(MIN.) =   16.12

****************************************************************************
  FLOW PROCESS FROM NODE    250.00 TO NODE    260.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  353.00  DOWNSTREAM ELEVATION(FEET) =  339.00
  STREET LENGTH(FEET) =   400.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 24.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  19.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020
```

```
  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0100
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.21
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.32
    HALFSTREET FLOOD WIDTH(FEET) =    9.49
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    6.10
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.93
  STREET FLOW TRAVEL TIME(MIN.) =   1.09   Tc(MIN.) =   17.21
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.018
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8400
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.568
  SUBAREA AREA(ACRES) =    0.40      SUBAREA RUNOFF(CFS) =    0.68
  TOTAL AREA(ACRES) =        5.5        PEAK FLOW RATE(CFS) =       6.31

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =   9.56
  FLOW VELOCITY(FEET/SEC.) =  6.11   DEPTH*VELOCITY(FT*FT/SEC.) =   1.94
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    260.00 =    2802.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    260.00 TO NODE    260.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.018
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8400
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.5951
  SUBAREA AREA(ACRES) =    0.60   SUBAREA RUNOFF(CFS) =    1.02
  TOTAL AREA(ACRES) =        6.1   TOTAL RUNOFF(CFS) =       7.33
  TC(MIN.) =   17.21

****************************************************************************
  FLOW PROCESS FROM NODE    260.00 TO NODE    270.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  339.00  DOWNSTREAM ELEVATION(FEET) =  337.00
  STREET LENGTH(FEET) =   230.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 42.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  37.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020
```

```
  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0100
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       7.49
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.40
    HALFSTREET FLOOD WIDTH(FEET) =   13.71
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.75
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.50
  STREET FLOW TRAVEL TIME(MIN.) =   1.02   Tc(MIN.) =   18.23
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.944
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8400
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.603
  SUBAREA AREA(ACRES) =    0.20      SUBAREA RUNOFF(CFS) =    0.33
  TOTAL AREA(ACRES) =        6.3        PEAK FLOW RATE(CFS) =       7.39

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.40   HALFSTREET FLOOD WIDTH(FEET) =  13.64
  FLOW VELOCITY(FEET/SEC.) =  3.73   DEPTH*VELOCITY(FT*FT/SEC.) =   1.49
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    270.00 =    3032.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    270.00 TO NODE    270.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   18.23
  RAINFALL INTENSITY(INCH/HR) =   1.94
  TOTAL STREAM AREA(ACRES) =     6.30
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      7.39

****************************************************************************
  FLOW PROCESS FROM NODE    200.00 TO NODE    202.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    425.00
  DOWNSTREAM ELEVATION(FEET) =    417.00
  ELEVATION DIFFERENCE(FEET) =      8.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.455
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    98.00
```

```
         (Reference: Table 3-1B of Hydrology Manual)
         THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.479
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.27
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.27

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    205.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  417.00  DOWNSTREAM ELEVATION(FEET) =  407.00
  STREET LENGTH(FEET) =   300.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.018
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0100
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.80
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.18
    HALFSTREET FLOOD WIDTH(FEET) =    2.65
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.38
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.78
  STREET FLOW TRAVEL TIME(MIN.) =   1.14   Tc(MIN.) =    5.60
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.165
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8400
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.780
  SUBAREA AREA(ACRES) =    0.30      SUBAREA RUNOFF(CFS) =    1.05
  TOTAL AREA(ACRES) =       0.4       PEAK FLOW RATE(CFS) =      1.30

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.21   HALFSTREET FLOOD WIDTH(FEET) =   4.51
  FLOW VELOCITY(FEET/SEC.) =  4.29   DEPTH*VELOCITY(FT*FT/SEC.) =   0.90
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    205.00 =     400.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    205.00 TO NODE    205.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.165
  *USER SPECIFIED(SUBAREA):
```

```
  USER-SPECIFIED RUNOFF COEFFICIENT = .7000
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7320
  SUBAREA AREA(ACRES) =    0.60   SUBAREA RUNOFF(CFS) =    1.75
  TOTAL AREA(ACRES) =        1.0   TOTAL RUNOFF(CFS) =       3.05
  TC(MIN.) =    5.60

****************************************************************************
  FLOW PROCESS FROM NODE    205.00 TO NODE    207.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   403.00  DOWNSTREAM(FEET) =   400.00
  FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.00
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.05
  PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =    5.71
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    207.00 =     460.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    205.00 TO NODE    207.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.113
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3300
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.6955
  SUBAREA AREA(ACRES) =    0.10   SUBAREA RUNOFF(CFS) =    0.14
  TOTAL AREA(ACRES) =        1.1   TOTAL RUNOFF(CFS) =       3.15
  TC(MIN.) =    5.71

****************************************************************************
  FLOW PROCESS FROM NODE    206.00 TO NODE    207.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.113
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6900
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.6946
  SUBAREA AREA(ACRES) =    0.20   SUBAREA RUNOFF(CFS) =    0.57
  TOTAL AREA(ACRES) =        1.3   TOTAL RUNOFF(CFS) =       3.71
  TC(MIN.) =    5.71

****************************************************************************
  FLOW PROCESS FROM NODE    206.00 TO NODE    207.00 IS CODE =  81
----------------------------------------------------------------------------
```

```
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.113
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6900
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.6933
  SUBAREA AREA(ACRES) =    0.50   SUBAREA RUNOFF(CFS) =    1.42
  TOTAL AREA(ACRES) =        1.8   TOTAL RUNOFF(CFS) =       5.13
  TC(MIN.) =    5.71

****************************************************************************
  FLOW PROCESS FROM NODE    207.00 TO NODE    210.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   400.00  DOWNSTREAM(FEET) =   386.00
  FLOW LENGTH(FEET) =   170.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.49
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.13
  PIPE TRAVEL TIME(MIN.) =   0.23    Tc(MIN.) =    5.93
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    210.00 =     630.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    208.00 TO NODE    210.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.011
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6900
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.6925
  SUBAREA AREA(ACRES) =    0.60   SUBAREA RUNOFF(CFS) =    1.66
  TOTAL AREA(ACRES) =        2.4   TOTAL RUNOFF(CFS) =       6.67
  TC(MIN.) =    5.93

****************************************************************************
  FLOW PROCESS FROM NODE    209.00 TO NODE    210.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.011
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6900
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.6918
  SUBAREA AREA(ACRES) =    0.90   SUBAREA RUNOFF(CFS) =    2.49
  TOTAL AREA(ACRES) =        3.3   TOTAL RUNOFF(CFS) =       9.16
  TC(MIN.) =    5.93
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    210.00 TO NODE    215.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   386.00  DOWNSTREAM(FEET) =   374.00
  FLOW LENGTH(FEET) =   140.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.90
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.16
  PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =    6.09
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    215.00 =     770.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    212.00 TO NODE    215.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.944
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6900
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.6916
  SUBAREA AREA(ACRES) =    0.50   SUBAREA RUNOFF(CFS) =    1.36
  TOTAL AREA(ACRES) =        3.8   TOTAL RUNOFF(CFS) =      10.36
  TC(MIN.) =    6.09

****************************************************************************
  FLOW PROCESS FROM NODE    215.00 TO NODE    220.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   374.00  DOWNSTREAM(FEET) =   372.00
  FLOW LENGTH(FEET) =    10.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS   5.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  20.37
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.36
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =    6.10
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    220.00 =     780.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    211.00 TO NODE    220.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.940
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6900
```

```
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.6913
  SUBAREA AREA(ACRES) =    0.90   SUBAREA RUNOFF(CFS) =    2.45
  TOTAL AREA(ACRES) =        4.7   TOTAL RUNOFF(CFS) =      12.80
  TC(MIN.) =    6.10

****************************************************************************
  FLOW PROCESS FROM NODE    217.00 TO NODE    220.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.940
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6900
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.6912
  SUBAREA AREA(ACRES) =    0.40   SUBAREA RUNOFF(CFS) =    1.09
  TOTAL AREA(ACRES) =        5.1   TOTAL RUNOFF(CFS) =      13.89
  TC(MIN.) =    6.10

****************************************************************************
  FLOW PROCESS FROM NODE    217.00 TO NODE    220.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   375.00  DOWNSTREAM(FEET) =   370.00
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.62
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.89
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    6.15
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    220.00 =     830.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    218.00 TO NODE    220.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.921
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7200
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.6917
  SUBAREA AREA(ACRES) =    0.10   SUBAREA RUNOFF(CFS) =    0.28
  TOTAL AREA(ACRES) =        5.2   TOTAL RUNOFF(CFS) =      14.10
  TC(MIN.) =    6.15

****************************************************************************
  FLOW PROCESS FROM NODE    220.00 TO NODE    222.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   370.00  DOWNSTREAM(FEET) =   367.00
  FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS   8.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.29
  GIVEN PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      14.10
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    6.22
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    222.00 =     890.00 FEET.

******************************************************************************
  FLOW PROCESS FROM NODE    222.00 TO NODE    225.00 IS CODE =  51
------------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    369.25  DOWNSTREAM(FEET) =    369.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   100.00   CHANNEL SLOPE =  0.0025
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.50
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.544
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3300
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      14.34
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.72
  AVERAGE FLOW DEPTH(FEET) =   0.69   TRAVEL TIME(MIN.) =   0.97
  Tc(MIN.) =    7.19
  SUBAREA AREA(ACRES) =     0.40       SUBAREA RUNOFF(CFS) =    0.47
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.666
  TOTAL AREA(ACRES) =        5.6         PEAK FLOW RATE(CFS) =      14.10

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.68   FLOW VELOCITY(FEET/SEC.) =   1.71
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    225.00 =     990.00 FEET.

******************************************************************************
  FLOW PROCESS FROM NODE    225.00 TO NODE    230.00 IS CODE =  41
------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   367.00  DOWNSTREAM(FEET) =   360.00
  FLOW LENGTH(FEET) =    39.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  21.93
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      14.10
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =    7.22
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    230.00 =    1029.00 FEET.

******************************************************************************
```

```
  FLOW PROCESS FROM NODE    230.00 TO NODE    270.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    360.00  DOWNSTREAM(FEET) =    337.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   704.00   CHANNEL SLOPE =  0.0327
  CHANNEL BASE(FEET) =    3.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   5.00
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.168
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8400
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      17.44
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.78
  AVERAGE FLOW DEPTH(FEET) =   0.45   TRAVEL TIME(MIN.) =   1.34
  Tc(MIN.) =    8.55
  SUBAREA AREA(ACRES) =     2.51       SUBAREA RUNOFF(CFS) =    6.68
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.720
  TOTAL AREA(ACRES) =        8.1         PEAK FLOW RATE(CFS) =      18.49

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.47   FLOW VELOCITY(FEET/SEC.) =   8.92
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    270.00 =    1733.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    270.00 TO NODE    270.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.55
  RAINFALL INTENSITY(INCH/HR) =   3.17
  TOTAL STREAM AREA(ACRES) =     8.11
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     18.49

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1         7.39    18.23        1.944          6.30
     2        18.49     8.55        3.168          8.11

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
     1        21.96     8.55       3.168
     2        18.74    18.23       1.944
```

```
  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      21.96   Tc(MIN.) =    8.55
  TOTAL AREA(ACRES) =       14.4
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    270.00 =    3032.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    270.00 TO NODE    290.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  337.00  DOWNSTREAM ELEVATION(FEET) =  336.00
  STREET LENGTH(FEET) =    94.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 42.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  37.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0100
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      22.11
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.53
    HALFSTREET FLOOD WIDTH(FEET) =   21.59
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.27
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.79
  STREET FLOW TRAVEL TIME(MIN.) =   0.30   Tc(MIN.) =    8.85
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.099
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8400
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.670
  SUBAREA AREA(ACRES) =    0.12      SUBAREA RUNOFF(CFS) =    0.31
  TOTAL AREA(ACRES) =       14.5        PEAK FLOW RATE(CFS) =      30.17

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.58   HALFSTREET FLOOD WIDTH(FEET) =  26.65
  FLOW VELOCITY(FEET/SEC.) =  5.57   DEPTH*VELOCITY(FT*FT/SEC.) =   3.23
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    290.00 =    3126.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    290.00 TO NODE    290.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.099
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6900
  S.C.S. CURVE NUMBER (AMC II) =   0
```

```
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.6702
  SUBAREA AREA(ACRES) =    0.06   SUBAREA RUNOFF(CFS) =    0.13
  TOTAL AREA(ACRES) =       14.6   TOTAL RUNOFF(CFS) =      30.30
  TC(MIN.) =    8.85
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       14.6  TC(MIN.) =      8.85
  PEAK FLOW RATE(CFS)   =      30.30
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
****************************************************************************

              RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
              Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                          2003,1985,1981 HYDROLOGY MANUAL
           (c) Copyright 1982-2014 Advanced Engineering Software (aes)
               Ver. 21.0 Release Date: 06/01/2014  License ID 1261

                             Analysis prepared by:

                            RICK ENGINEERING COMPANY
                                5620 Friars Road
                          San Diego, California 92110
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 ************************** DESCRIPTION OF STUDY **************************
* (J-19964) AUBREY GLEN                                                    *
* UNDETAINED FLOWS FROM LAUREL HEIGHTS                                     *
* PRE-PROJECT CONDITION: 50-YR, 6-HR STORM EVENT                           *
 **************************************************************************

  FILE NAME: AG50PREU.RAT
  TIME/DATE OF STUDY: 16:59 11/05/2024
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) =  50.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.300
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    102.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
```

```
==========================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    704.00
  DOWNSTREAM ELEVATION(FEET) =    694.00
  ELEVATION DIFFERENCE(FEET) =     10.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.267
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.239
  SUBAREA RUNOFF(CFS) =      0.18
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.18

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    110.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    694.00  DOWNSTREAM(FEET) =    445.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1323.00   CHANNEL SLOPE =  0.1882
  CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   5.00
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.317
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3800
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.31
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.41
  AVERAGE FLOW DEPTH(FEET) =   0.07   TRAVEL TIME(MIN.) =   6.46
  Tc(MIN.) =   12.73
  SUBAREA AREA(ACRES) =     1.70       SUBAREA RUNOFF(CFS) =    2.14
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.378
  TOTAL AREA(ACRES) =        1.8         PEAK FLOW RATE(CFS) =       2.26

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.10   FLOW VELOCITY(FEET/SEC.) =   4.28
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    110.00 =    1423.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    110.00 TO NODE    115.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    445.00  DOWNSTREAM(FEET) =    424.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   233.00   CHANNEL SLOPE =  0.0901
  CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =   1.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   2.00
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.232
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3300
```

```
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.37
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.45
  AVERAGE FLOW DEPTH(FEET) =   0.15   TRAVEL TIME(MIN.) =   0.52
  Tc(MIN.) =   13.25
  SUBAREA AREA(ACRES) =     0.20       SUBAREA RUNOFF(CFS) =    0.21
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.374
  TOTAL AREA(ACRES) =        2.0         PEAK FLOW RATE(CFS) =       2.41

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.15   FLOW VELOCITY(FEET/SEC.) =   7.60
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    115.00 =    1656.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    115.00 TO NODE    120.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   420.00  DOWNSTREAM(FEET) =   400.00
  FLOW LENGTH(FEET) =   161.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   3.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.11
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.41
  PIPE TRAVEL TIME(MIN.) =   0.22    Tc(MIN.) =   13.47
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    120.00 =    1817.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    120.00 TO NODE    125.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    400.00  DOWNSTREAM(FEET) =    395.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   100.00   CHANNEL SLOPE =  0.0500
  CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =   1.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   2.00
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.158
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3000
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.46
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.34
  AVERAGE FLOW DEPTH(FEET) =   0.18   TRAVEL TIME(MIN.) =   0.26
  Tc(MIN.) =   13.73
  SUBAREA AREA(ACRES) =     0.10       SUBAREA RUNOFF(CFS) =    0.09
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.370
  TOTAL AREA(ACRES) =        2.1         PEAK FLOW RATE(CFS) =       2.45

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.18   FLOW VELOCITY(FEET/SEC.) =   6.32
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    125.00 =    1917.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    125.00 TO NODE    130.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    387.00  DOWNSTREAM(FEET) =    381.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   150.00   CHANNEL SLOPE =  0.0400
  CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =   1.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   2.00
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.097
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3000
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.50
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.89
  AVERAGE FLOW DEPTH(FEET) =   0.19   TRAVEL TIME(MIN.) =   0.42
  Tc(MIN.) =   14.16
  SUBAREA AREA(ACRES) =     0.10       SUBAREA RUNOFF(CFS) =    0.09
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.367
  TOTAL AREA(ACRES) =        2.2         PEAK FLOW RATE(CFS) =       2.50

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.19   FLOW VELOCITY(FEET/SEC.) =   5.88
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    130.00 =    2067.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    130.00 TO NODE    135.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    372.00  DOWNSTREAM(FEET) =    360.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   200.00   CHANNEL SLOPE =  0.0600
  CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =   1.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   2.00
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.030
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3000
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.54
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.87
  AVERAGE FLOW DEPTH(FEET) =   0.17   TRAVEL TIME(MIN.) =   0.49
  Tc(MIN.) =   14.65
  SUBAREA AREA(ACRES) =     0.10       SUBAREA RUNOFF(CFS) =    0.09
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.364
  TOTAL AREA(ACRES) =        2.3         PEAK FLOW RATE(CFS) =       2.54

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.17   FLOW VELOCITY(FEET/SEC.) =   6.84
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    135.00 =    2267.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    135.00 TO NODE    150.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    357.00  DOWNSTREAM(FEET) =    354.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    70.00   CHANNEL SLOPE =  0.0429
  CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.50
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.989
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3000
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.58
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.73
  AVERAGE FLOW DEPTH(FEET) =   0.27   TRAVEL TIME(MIN.) =   0.31
  Tc(MIN.) =   14.96
  SUBAREA AREA(ACRES) =     0.10       SUBAREA RUNOFF(CFS) =    0.09
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.361
  TOTAL AREA(ACRES) =        2.4         PEAK FLOW RATE(CFS) =       2.59

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.27   FLOW VELOCITY(FEET/SEC.) =   3.75
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    150.00 =    2337.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    150.00 TO NODE    150.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.989
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6900
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.5221
  SUBAREA AREA(ACRES) =    2.30   SUBAREA RUNOFF(CFS) =    4.74
  TOTAL AREA(ACRES) =        4.7   TOTAL RUNOFF(CFS) =       7.33
  TC(MIN.) =   14.96

****************************************************************************
  FLOW PROCESS FROM NODE    150.00 TO NODE    250.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  354.00  DOWNSTREAM ELEVATION(FEET) =  353.00
  STREET LENGTH(FEET) =    65.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020
```

```
  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0100
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       7.46
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.37
    HALFSTREET FLOOD WIDTH(FEET) =   12.18
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.66
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.72
  STREET FLOW TRAVEL TIME(MIN.) =   0.23   Tc(MIN.) =   15.19
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.959
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8400
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.529
  SUBAREA AREA(ACRES) =    0.10      SUBAREA RUNOFF(CFS) =    0.25
  TOTAL AREA(ACRES) =        4.8        PEAK FLOW RATE(CFS) =       7.51

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.37   HALFSTREET FLOOD WIDTH(FEET) =  12.24
  FLOW VELOCITY(FEET/SEC.) =  4.65   DEPTH*VELOCITY(FT*FT/SEC.) =   1.72
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    250.00 =    2402.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    250.00 TO NODE    250.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.959
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8400
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.5471
  SUBAREA AREA(ACRES) =    0.30   SUBAREA RUNOFF(CFS) =    0.75
  TOTAL AREA(ACRES) =        5.1   TOTAL RUNOFF(CFS) =       8.26
  TC(MIN.) =   15.19

****************************************************************************
  FLOW PROCESS FROM NODE    250.00 TO NODE    260.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  353.00  DOWNSTREAM ELEVATION(FEET) =  339.00
  STREET LENGTH(FEET) =   400.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 24.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  19.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020
```

```
  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0100
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       8.73
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.35
    HALFSTREET FLOOD WIDTH(FEET) =   10.97
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    6.60
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.28
  STREET FLOW TRAVEL TIME(MIN.) =   1.01   Tc(MIN.) =   16.20
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.839
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8400
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.568
  SUBAREA AREA(ACRES) =    0.40      SUBAREA RUNOFF(CFS) =    0.95
  TOTAL AREA(ACRES) =        5.5        PEAK FLOW RATE(CFS) =       8.87

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.35   HALFSTREET FLOOD WIDTH(FEET) =  11.05
  FLOW VELOCITY(FEET/SEC.) =  6.63   DEPTH*VELOCITY(FT*FT/SEC.) =   2.30
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    260.00 =    2802.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    260.00 TO NODE    260.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.839
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8400
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.5951
  SUBAREA AREA(ACRES) =    0.60   SUBAREA RUNOFF(CFS) =    1.43
  TOTAL AREA(ACRES) =        6.1   TOTAL RUNOFF(CFS) =      10.31
  TC(MIN.) =   16.20

****************************************************************************
  FLOW PROCESS FROM NODE    260.00 TO NODE    270.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  339.00  DOWNSTREAM ELEVATION(FEET) =  337.00
  STREET LENGTH(FEET) =   230.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 42.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  37.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020
```

```
  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0100
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      10.54
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.44
    HALFSTREET FLOOD WIDTH(FEET) =   15.73
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.06
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.79
  STREET FLOW TRAVEL TIME(MIN.) =   0.94   Tc(MIN.) =   17.14
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.737
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8400
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.603
  SUBAREA AREA(ACRES) =    0.20      SUBAREA RUNOFF(CFS) =    0.46
  TOTAL AREA(ACRES) =        6.3        PEAK FLOW RATE(CFS) =      10.40

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.44   HALFSTREET FLOOD WIDTH(FEET) =  15.59
  FLOW VELOCITY(FEET/SEC.) =  4.08   DEPTH*VELOCITY(FT*FT/SEC.) =   1.79
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    270.00 =    3032.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    270.00 TO NODE    270.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   17.14
  RAINFALL INTENSITY(INCH/HR) =   2.74
  TOTAL STREAM AREA(ACRES) =     6.30
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     10.40

****************************************************************************
  FLOW PROCESS FROM NODE    200.00 TO NODE    202.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    425.00
  DOWNSTREAM ELEVATION(FEET) =    417.00
  ELEVATION DIFFERENCE(FEET) =      8.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.455
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    98.00
```

```
         (Reference: Table 3-1B of Hydrology Manual)
         THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.060
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.36
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.36

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    205.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  417.00  DOWNSTREAM ELEVATION(FEET) =  407.00
  STREET LENGTH(FEET) =   300.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.018
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0100
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.07
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.20
    HALFSTREET FLOOD WIDTH(FEET) =    3.85
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.22
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.84
  STREET FLOW TRAVEL TIME(MIN.) =   1.18   Tc(MIN.) =    5.64
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.607
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8400
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.780
  SUBAREA AREA(ACRES) =    0.30      SUBAREA RUNOFF(CFS) =    1.41
  TOTAL AREA(ACRES) =       0.4        PEAK FLOW RATE(CFS) =      1.75

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.23   HALFSTREET FLOOD WIDTH(FEET) =   5.46
  FLOW VELOCITY(FEET/SEC.) =  4.50   DEPTH*VELOCITY(FT*FT/SEC.) =   1.02
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    205.00 =     400.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    205.00 TO NODE    205.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.607
  *USER SPECIFIED(SUBAREA):
```

```
  USER-SPECIFIED RUNOFF COEFFICIENT = .7000
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7320
  SUBAREA AREA(ACRES) =    0.60   SUBAREA RUNOFF(CFS) =    2.35
  TOTAL AREA(ACRES) =        1.0   TOTAL RUNOFF(CFS) =       4.10
  TC(MIN.) =    5.64

****************************************************************************
  FLOW PROCESS FROM NODE    205.00 TO NODE    207.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   403.00  DOWNSTREAM(FEET) =   400.00
  FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.81
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.10
  PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =    5.74
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    207.00 =     460.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    205.00 TO NODE    207.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.543
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3300
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.6955
  SUBAREA AREA(ACRES) =    0.10   SUBAREA RUNOFF(CFS) =    0.18
  TOTAL AREA(ACRES) =        1.1   TOTAL RUNOFF(CFS) =       4.24
  TC(MIN.) =    5.74

****************************************************************************
  FLOW PROCESS FROM NODE    206.00 TO NODE    207.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.543
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6900
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.6946
  SUBAREA AREA(ACRES) =    0.20   SUBAREA RUNOFF(CFS) =    0.76
  TOTAL AREA(ACRES) =        1.3   TOTAL RUNOFF(CFS) =       5.00
  TC(MIN.) =    5.74

****************************************************************************
  FLOW PROCESS FROM NODE    206.00 TO NODE    207.00 IS CODE =  81
----------------------------------------------------------------------------
```

```
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.543
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6900
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.6933
  SUBAREA AREA(ACRES) =    0.50   SUBAREA RUNOFF(CFS) =    1.91
  TOTAL AREA(ACRES) =        1.8   TOTAL RUNOFF(CFS) =      6.92
  TC(MIN.) =    5.74

****************************************************************************
  FLOW PROCESS FROM NODE    207.00 TO NODE    210.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   400.00  DOWNSTREAM(FEET) =   386.00
  FLOW LENGTH(FEET) =   170.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.58
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.92
  PIPE TRAVEL TIME(MIN.) =   0.21    Tc(MIN.) =    5.95
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    210.00 =     630.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    208.00 TO NODE    210.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.417
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6900
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.6925
  SUBAREA AREA(ACRES) =    0.60   SUBAREA RUNOFF(CFS) =    2.24
  TOTAL AREA(ACRES) =        2.4   TOTAL RUNOFF(CFS) =      9.00
  TC(MIN.) =    5.95

****************************************************************************
  FLOW PROCESS FROM NODE    209.00 TO NODE    210.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.417
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6900
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.6918
  SUBAREA AREA(ACRES) =    0.90   SUBAREA RUNOFF(CFS) =    3.36
  TOTAL AREA(ACRES) =        3.3   TOTAL RUNOFF(CFS) =     12.37
  TC(MIN.) =    5.95
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    210.00 TO NODE    215.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   386.00  DOWNSTREAM(FEET) =   374.00
  FLOW LENGTH(FEET) =   140.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.15
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.37
  PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =    6.09
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    215.00 =     770.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    212.00 TO NODE    215.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.333
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6900
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.6916
  SUBAREA AREA(ACRES) =    0.50   SUBAREA RUNOFF(CFS) =    1.84
  TOTAL AREA(ACRES) =        3.8   TOTAL RUNOFF(CFS) =      14.02
  TC(MIN.) =    6.09

****************************************************************************
  FLOW PROCESS FROM NODE    215.00 TO NODE    220.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   374.00  DOWNSTREAM(FEET) =   372.00
  FLOW LENGTH(FEET) =    10.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS   6.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  22.22
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      14.02
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =    6.10
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    220.00 =     780.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    211.00 TO NODE    220.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.329
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6900
```

```
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.6913
  SUBAREA AREA(ACRES) =    0.90   SUBAREA RUNOFF(CFS) =    3.31
  TOTAL AREA(ACRES) =        4.7   TOTAL RUNOFF(CFS) =      17.31
  TC(MIN.) =    6.10

****************************************************************************
  FLOW PROCESS FROM NODE    217.00 TO NODE    220.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.329
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6900
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.6912
  SUBAREA AREA(ACRES) =    0.40   SUBAREA RUNOFF(CFS) =    1.47
  TOTAL AREA(ACRES) =        5.1   TOTAL RUNOFF(CFS) =      18.79
  TC(MIN.) =    6.10

****************************************************************************
  FLOW PROCESS FROM NODE    217.00 TO NODE    220.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   375.00  DOWNSTREAM(FEET) =   370.00
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.00
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      18.79
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =    6.15
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    220.00 =     830.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    218.00 TO NODE    220.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.305
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7200
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.6917
  SUBAREA AREA(ACRES) =    0.10   SUBAREA RUNOFF(CFS) =    0.38
  TOTAL AREA(ACRES) =        5.2   TOTAL RUNOFF(CFS) =      19.08
  TC(MIN.) =    6.15

****************************************************************************
  FLOW PROCESS FROM NODE    220.00 TO NODE    222.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   370.00  DOWNSTREAM(FEET) =   367.00
  FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS   9.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.48
  GIVEN PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      19.08
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    6.22
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    222.00 =     890.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    222.00 TO NODE    225.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    369.25  DOWNSTREAM(FEET) =    369.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   100.00   CHANNEL SLOPE =  0.0025
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.50
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.837
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3300
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      19.40
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.90
  AVERAGE FLOW DEPTH(FEET) =   0.82   TRAVEL TIME(MIN.) =   0.88
  Tc(MIN.) =    7.09
  SUBAREA AREA(ACRES) =     0.40       SUBAREA RUNOFF(CFS) =    0.64
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.666
  TOTAL AREA(ACRES) =        5.6         PEAK FLOW RATE(CFS) =      19.08

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.81   FLOW VELOCITY(FEET/SEC.) =   1.89
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    225.00 =     990.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    225.00 TO NODE    230.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   367.00  DOWNSTREAM(FEET) =   360.00
  FLOW LENGTH(FEET) =    39.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  23.75
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      19.08
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =    7.12
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    230.00 =    1029.00 FEET.

****************************************************************************
```

```
 FLOW PROCESS FROM NODE    230.00 TO NODE    270.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    360.00  DOWNSTREAM(FEET) =    337.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   704.00   CHANNEL SLOPE =  0.0327
 CHANNEL BASE(FEET) =    3.00   "Z" FACTOR =   3.000
 MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   5.00
   50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.352
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .8400
 S.C.S. CURVE NUMBER (AMC II) =   0
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      23.67
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   9.51
 AVERAGE FLOW DEPTH(FEET) =   0.54   TRAVEL TIME(MIN.) =   1.23
 Tc(MIN.) =    8.35
 SUBAREA AREA(ACRES) =     2.51       SUBAREA RUNOFF(CFS) =    9.18
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.720
 TOTAL AREA(ACRES) =        8.1         PEAK FLOW RATE(CFS) =      25.41

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.56   FLOW VELOCITY(FEET/SEC.) =   9.70
 LONGEST FLOWPATH FROM NODE    200.00 TO NODE    270.00 =    1733.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    270.00 TO NODE    270.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    8.35
 RAINFALL INTENSITY(INCH/HR) =   4.35
 TOTAL STREAM AREA(ACRES) =     8.11
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     25.41

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1       10.40    17.14        2.737          6.30
     2       25.41     8.35        4.352          8.11

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
     1       30.47     8.35       4.352
     2       26.37    17.14       2.737
```

```
  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      30.47   Tc(MIN.) =    8.35
  TOTAL AREA(ACRES) =       14.4
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    270.00 =    3032.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    270.00 TO NODE    290.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  337.00  DOWNSTREAM ELEVATION(FEET) =  336.00
  STREET LENGTH(FEET) =    94.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 42.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  37.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0100
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      30.69
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.58
    HALFSTREET FLOOD WIDTH(FEET) =   26.94
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.59
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    3.25
  STREET FLOW TRAVEL TIME(MIN.) =   0.28   Tc(MIN.) =    8.63
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.261
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8400
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.670
  SUBAREA AREA(ACRES) =    0.12      SUBAREA RUNOFF(CFS) =    0.43
  TOTAL AREA(ACRES) =       14.5        PEAK FLOW RATE(CFS) =     41.48

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.64   HALFSTREET FLOOD WIDTH(FEET) =  32.43
  FLOW VELOCITY(FEET/SEC.) =  5.82   DEPTH*VELOCITY(FT*FT/SEC.) =   3.71
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    290.00 =    3126.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    290.00 TO NODE    290.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.261
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6900
  S.C.S. CURVE NUMBER (AMC II) =   0
```

```
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.6702
  SUBAREA AREA(ACRES) =    0.06   SUBAREA RUNOFF(CFS) =    0.18
  TOTAL AREA(ACRES) =       14.6   TOTAL RUNOFF(CFS) =      41.66
  TC(MIN.) =    8.63
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       14.6  TC(MIN.) =      8.63
  PEAK FLOW RATE(CFS)   =      41.66
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
****************************************************************************

              RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
              Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                          2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2014 Advanced Engineering Software (aes)
               Ver. 21.0 Release Date: 06/01/2014  License ID 1261

                              Analysis prepared by:

                             RICK ENGINEERING COMPANY
                                 5620 Friars Road
                           San Diego, California 92110
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 ************************** DESCRIPTION OF STUDY **************************
* (J-19964) AUBREY GLEN                                                    *
* UNDETAINED FLOWS FROM LAUREL HEIGHTS                                     *
* PRE-PROJECT CONDITION: 100-YR, 6-HR STORM EVENT                          *
 **************************************************************************

  FILE NAME: AG1HPRE.RAT
  TIME/DATE OF STUDY: 16:08 11/05/2024
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.400
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    102.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
```

```
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    704.00
  DOWNSTREAM ELEVATION(FEET) =    694.00
  ELEVATION DIFFERENCE(FEET) =     10.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.267
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.466
  SUBAREA RUNOFF(CFS) =      0.19
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.19

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    110.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    694.00  DOWNSTREAM(FEET) =    445.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1323.00   CHANNEL SLOPE =  0.1882
  CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   5.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.500
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3800
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.35
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.53
  AVERAGE FLOW DEPTH(FEET) =   0.07   TRAVEL TIME(MIN.) =   6.24
  Tc(MIN.) =   12.51
  SUBAREA AREA(ACRES) =     1.70       SUBAREA RUNOFF(CFS) =    2.26
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.378
  TOTAL AREA(ACRES) =        1.8         PEAK FLOW RATE(CFS) =       2.38

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.10   FLOW VELOCITY(FEET/SEC.) =   4.24
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    110.00 =    1423.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    110.00 TO NODE    115.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    445.00  DOWNSTREAM(FEET) =    424.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   233.00   CHANNEL SLOPE =  0.0901
  CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =   1.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.412
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3300
```

```
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.50
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.75
  AVERAGE FLOW DEPTH(FEET) =   0.15   TRAVEL TIME(MIN.) =   0.50
  Tc(MIN.) =   13.01
  SUBAREA AREA(ACRES) =     0.20       SUBAREA RUNOFF(CFS) =    0.23
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.374
  TOTAL AREA(ACRES) =        2.0         PEAK FLOW RATE(CFS) =       2.55

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.15   FLOW VELOCITY(FEET/SEC.) =   7.92
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    115.00 =    1656.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    115.00 TO NODE    120.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   420.00  DOWNSTREAM(FEET) =   400.00
  FLOW LENGTH(FEET) =   161.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   3.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.30
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.55
  PIPE TRAVEL TIME(MIN.) =   0.22    Tc(MIN.) =   13.23
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    120.00 =    1817.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    120.00 TO NODE    125.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    400.00  DOWNSTREAM(FEET) =    395.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   100.00   CHANNEL SLOPE =  0.0500
  CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =   1.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.334
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3000
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.60
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.39
  AVERAGE FLOW DEPTH(FEET) =   0.19   TRAVEL TIME(MIN.) =   0.26
  Tc(MIN.) =   13.49
  SUBAREA AREA(ACRES) =     0.10       SUBAREA RUNOFF(CFS) =    0.10
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.370
  TOTAL AREA(ACRES) =        2.1         PEAK FLOW RATE(CFS) =       2.59

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.18   FLOW VELOCITY(FEET/SEC.) =   6.59
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    125.00 =    1917.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    125.00 TO NODE    130.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    387.00  DOWNSTREAM(FEET) =    381.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   150.00   CHANNEL SLOPE =  0.0400
  CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =   1.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.270
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3000
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.64
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.15
  AVERAGE FLOW DEPTH(FEET) =   0.20   TRAVEL TIME(MIN.) =   0.41
  Tc(MIN.) =   13.90
  SUBAREA AREA(ACRES) =     0.10       SUBAREA RUNOFF(CFS) =    0.10
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.367
  TOTAL AREA(ACRES) =        2.2         PEAK FLOW RATE(CFS) =       2.64

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.20   FLOW VELOCITY(FEET/SEC.) =   6.15
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    130.00 =    2067.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    130.00 TO NODE    135.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    372.00  DOWNSTREAM(FEET) =    360.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   200.00   CHANNEL SLOPE =  0.0600
  CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =   1.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.199
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3000
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.69
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.92
  AVERAGE FLOW DEPTH(FEET) =   0.18   TRAVEL TIME(MIN.) =   0.48
  Tc(MIN.) =   14.38
  SUBAREA AREA(ACRES) =     0.10       SUBAREA RUNOFF(CFS) =    0.10
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.364
  TOTAL AREA(ACRES) =        2.3         PEAK FLOW RATE(CFS) =       2.68

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.18   FLOW VELOCITY(FEET/SEC.) =   6.89
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    135.00 =    2267.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    135.00 TO NODE    150.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    357.00  DOWNSTREAM(FEET) =    354.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    70.00   CHANNEL SLOPE =  0.0429
  CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.50
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.155
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3000
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.73
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.72
  AVERAGE FLOW DEPTH(FEET) =   0.29   TRAVEL TIME(MIN.) =   0.31
  Tc(MIN.) =   14.69
  SUBAREA AREA(ACRES) =     0.10       SUBAREA RUNOFF(CFS) =    0.09
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.361
  TOTAL AREA(ACRES) =        2.4         PEAK FLOW RATE(CFS) =       2.74

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.29   FLOW VELOCITY(FEET/SEC.) =   3.73
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    150.00 =    2337.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    150.00 TO NODE    150.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.155
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6900
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.5221
  SUBAREA AREA(ACRES) =    2.30   SUBAREA RUNOFF(CFS) =    5.01
  TOTAL AREA(ACRES) =        4.7   TOTAL RUNOFF(CFS) =       7.74
  TC(MIN.) =   14.69

****************************************************************************
  FLOW PROCESS FROM NODE    150.00 TO NODE    250.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  354.00  DOWNSTREAM ELEVATION(FEET) =  353.00
  STREET LENGTH(FEET) =    65.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020
```

```
  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0100
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       7.87
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.38
    HALFSTREET FLOOD WIDTH(FEET) =   12.47
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.71
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.77
  STREET FLOW TRAVEL TIME(MIN.) =   0.23   Tc(MIN.) =   14.92
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.124
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8400
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.529
  SUBAREA AREA(ACRES) =    0.10      SUBAREA RUNOFF(CFS) =    0.26
  TOTAL AREA(ACRES) =        4.8        PEAK FLOW RATE(CFS) =       7.93

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.38   HALFSTREET FLOOD WIDTH(FEET) =  12.47
  FLOW VELOCITY(FEET/SEC.) =  4.74   DEPTH*VELOCITY(FT*FT/SEC.) =   1.78
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    250.00 =    2402.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    250.00 TO NODE    250.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.124
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8400
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.5471
  SUBAREA AREA(ACRES) =    0.30   SUBAREA RUNOFF(CFS) =    0.79
  TOTAL AREA(ACRES) =        5.1   TOTAL RUNOFF(CFS) =       8.71
  TC(MIN.) =   14.92

****************************************************************************
  FLOW PROCESS FROM NODE    250.00 TO NODE    260.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  353.00  DOWNSTREAM ELEVATION(FEET) =  339.00
  STREET LENGTH(FEET) =   400.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 24.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  19.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020
```

```
  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0100
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       9.22
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.35
    HALFSTREET FLOOD WIDTH(FEET) =   11.20
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    6.72
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.35
  STREET FLOW TRAVEL TIME(MIN.) =   0.99   Tc(MIN.) =   15.91
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.997
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8400
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.568
  SUBAREA AREA(ACRES) =    0.40      SUBAREA RUNOFF(CFS) =    1.01
  TOTAL AREA(ACRES) =        5.5        PEAK FLOW RATE(CFS) =       9.37

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.35   HALFSTREET FLOOD WIDTH(FEET) =  11.27
  FLOW VELOCITY(FEET/SEC.) =  6.75   DEPTH*VELOCITY(FT*FT/SEC.) =   2.37
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    260.00 =    2802.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    260.00 TO NODE    260.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.997
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8400
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.5951
  SUBAREA AREA(ACRES) =    0.60   SUBAREA RUNOFF(CFS) =    1.51
  TOTAL AREA(ACRES) =        6.1   TOTAL RUNOFF(CFS) =      10.88
  TC(MIN.) =   15.91

****************************************************************************
  FLOW PROCESS FROM NODE    260.00 TO NODE    270.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  339.00  DOWNSTREAM ELEVATION(FEET) =  337.00
  STREET LENGTH(FEET) =   230.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 42.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  37.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020
```

```
  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0100
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      11.12
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.45
    HALFSTREET FLOOD WIDTH(FEET) =   16.02
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.14
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.85
  STREET FLOW TRAVEL TIME(MIN.) =   0.93   Tc(MIN.) =   16.84
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.889
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8400
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.603
  SUBAREA AREA(ACRES) =    0.20      SUBAREA RUNOFF(CFS) =    0.49
  TOTAL AREA(ACRES) =       6.3        PEAK FLOW RATE(CFS) =      10.97

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.45   HALFSTREET FLOOD WIDTH(FEET) =  15.95
  FLOW VELOCITY(FEET/SEC.) =  4.12   DEPTH*VELOCITY(FT*FT/SEC.) =   1.84
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    270.00 =    3032.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    270.00 TO NODE    270.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   16.84
  RAINFALL INTENSITY(INCH/HR) =   2.89
  TOTAL STREAM AREA(ACRES) =     6.30
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     10.97

****************************************************************************
  FLOW PROCESS FROM NODE    200.00 TO NODE    202.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    425.00
  DOWNSTREAM ELEVATION(FEET) =    417.00
  ELEVATION DIFFERENCE(FEET) =      8.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.455
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    98.00
```

```
        (Reference: Table 3-1B of Hydrology Manual)
        THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.323
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.38
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.38

****************************************************************************
 FLOW PROCESS FROM NODE    202.00 TO NODE    205.00 IS CODE =  61
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  417.00  DOWNSTREAM ELEVATION(FEET) =  407.00
 STREET LENGTH(FEET) =   300.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.018
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.018
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0100
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.12
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.20
   HALFSTREET FLOOD WIDTH(FEET) =    3.96
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.27
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.86
 STREET FLOW TRAVEL TIME(MIN.) =   1.17   Tc(MIN.) =    5.63
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.860
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .8400
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.780
 SUBAREA AREA(ACRES) =    0.30      SUBAREA RUNOFF(CFS) =    1.48
 TOTAL AREA(ACRES) =       0.4       PEAK FLOW RATE(CFS) =      1.83

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.23   HALFSTREET FLOOD WIDTH(FEET) =   5.56
 FLOW VELOCITY(FEET/SEC.) =  4.59   DEPTH*VELOCITY(FT*FT/SEC.) =   1.05
 LONGEST FLOWPATH FROM NODE    200.00 TO NODE    205.00 =     400.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    205.00 TO NODE    205.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.860
 *USER SPECIFIED(SUBAREA):
```

```
  USER-SPECIFIED RUNOFF COEFFICIENT = .7000
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7320
  SUBAREA AREA(ACRES) =    0.60   SUBAREA RUNOFF(CFS) =    2.46
  TOTAL AREA(ACRES) =        1.0   TOTAL RUNOFF(CFS) =      4.29
  TC(MIN.) =    5.63

****************************************************************************
  FLOW PROCESS FROM NODE    205.00 TO NODE    207.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   403.00  DOWNSTREAM(FEET) =   400.00
  FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.93
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.29
  PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =    5.73
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    207.00 =     460.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    205.00 TO NODE    207.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.793
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3300
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.6955
  SUBAREA AREA(ACRES) =    0.10   SUBAREA RUNOFF(CFS) =    0.19
  TOTAL AREA(ACRES) =        1.1   TOTAL RUNOFF(CFS) =      4.43
  TC(MIN.) =    5.73

****************************************************************************
  FLOW PROCESS FROM NODE    206.00 TO NODE    207.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.793
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6900
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.6946
  SUBAREA AREA(ACRES) =    0.20   SUBAREA RUNOFF(CFS) =    0.80
  TOTAL AREA(ACRES) =        1.3   TOTAL RUNOFF(CFS) =      5.23
  TC(MIN.) =    5.73

****************************************************************************
  FLOW PROCESS FROM NODE    206.00 TO NODE    207.00 IS CODE =  81
----------------------------------------------------------------------------
```

```
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.793
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6900
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.6933
  SUBAREA AREA(ACRES) =    0.50   SUBAREA RUNOFF(CFS) =    2.00
  TOTAL AREA(ACRES) =        1.8   TOTAL RUNOFF(CFS) =      7.23
  TC(MIN.) =    5.73

******************************************************************************
  FLOW PROCESS FROM NODE    207.00 TO NODE    210.00 IS CODE =  41
------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   400.00  DOWNSTREAM(FEET) =   386.00
  FLOW LENGTH(FEET) =   170.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.76
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.23
  PIPE TRAVEL TIME(MIN.) =   0.21    Tc(MIN.) =    5.93
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    210.00 =     630.00 FEET.

******************************************************************************
  FLOW PROCESS FROM NODE    208.00 TO NODE    210.00 IS CODE =  81
------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.663
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6900
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.6925
  SUBAREA AREA(ACRES) =    0.60   SUBAREA RUNOFF(CFS) =    2.34
  TOTAL AREA(ACRES) =        2.4   TOTAL RUNOFF(CFS) =      9.41
  TC(MIN.) =    5.93

******************************************************************************
  FLOW PROCESS FROM NODE    209.00 TO NODE    210.00 IS CODE =  81
------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.663
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6900
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.6918
  SUBAREA AREA(ACRES) =    0.90   SUBAREA RUNOFF(CFS) =    3.52
  TOTAL AREA(ACRES) =        3.3   TOTAL RUNOFF(CFS) =     12.93
  TC(MIN.) =    5.93
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    210.00 TO NODE    215.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   386.00  DOWNSTREAM(FEET) =   374.00
  FLOW LENGTH(FEET) =   140.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.33
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.93
  PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =    6.08
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    215.00 =     770.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    212.00 TO NODE    215.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.576
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6900
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.6916
  SUBAREA AREA(ACRES) =    0.50   SUBAREA RUNOFF(CFS) =    1.92
  TOTAL AREA(ACRES) =        3.8   TOTAL RUNOFF(CFS) =      14.65
  TC(MIN.) =    6.08

****************************************************************************
  FLOW PROCESS FROM NODE    215.00 TO NODE    220.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   374.00  DOWNSTREAM(FEET) =   372.00
  FLOW LENGTH(FEET) =    10.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS   6.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  22.51
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      14.65
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =    6.08
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    220.00 =     780.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    211.00 TO NODE    220.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.572
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6900
```

```
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.6913
  SUBAREA AREA(ACRES) =    0.90   SUBAREA RUNOFF(CFS) =    3.46
  TOTAL AREA(ACRES) =        4.7   TOTAL RUNOFF(CFS) =      18.10
  TC(MIN.) =    6.08

****************************************************************************
  FLOW PROCESS FROM NODE    217.00 TO NODE    220.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.572
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6900
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.6912
  SUBAREA AREA(ACRES) =    0.40   SUBAREA RUNOFF(CFS) =    1.54
  TOTAL AREA(ACRES) =        5.1   TOTAL RUNOFF(CFS) =      19.64
  TC(MIN.) =    6.08

****************************************************************************
  FLOW PROCESS FROM NODE    217.00 TO NODE    220.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   375.00  DOWNSTREAM(FEET) =   370.00
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.20
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      19.64
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =    6.13
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    220.00 =     830.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    218.00 TO NODE    220.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.546
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7200
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.6917
  SUBAREA AREA(ACRES) =    0.10   SUBAREA RUNOFF(CFS) =    0.40
  TOTAL AREA(ACRES) =        5.2   TOTAL RUNOFF(CFS) =      19.95
  TC(MIN.) =    6.13

****************************************************************************
  FLOW PROCESS FROM NODE    220.00 TO NODE    222.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   370.00  DOWNSTREAM(FEET) =   367.00
  FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS   9.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.66
  GIVEN PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      19.95
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    6.20
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    222.00 =     890.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    222.00 TO NODE    225.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    369.25  DOWNSTREAM(FEET) =    369.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   100.00   CHANNEL SLOPE =  0.0025
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.50
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.061
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3300
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      20.28
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.92
  AVERAGE FLOW DEPTH(FEET) =   0.84   TRAVEL TIME(MIN.) =   0.87
  Tc(MIN.) =    7.06
  SUBAREA AREA(ACRES) =     0.40       SUBAREA RUNOFF(CFS) =    0.67
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.666
  TOTAL AREA(ACRES) =        5.6         PEAK FLOW RATE(CFS) =      19.95

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.83   FLOW VELOCITY(FEET/SEC.) =   1.91
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    225.00 =     990.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    225.00 TO NODE    230.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   367.00  DOWNSTREAM(FEET) =   360.00
  FLOW LENGTH(FEET) =    39.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  24.03
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      19.95
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =    7.09
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    230.00 =    1029.00 FEET.

****************************************************************************
```

```
  FLOW PROCESS FROM NODE    230.00 TO NODE    270.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    360.00  DOWNSTREAM(FEET) =    337.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   704.00   CHANNEL SLOPE =  0.0327
  CHANNEL BASE(FEET) =    3.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   5.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.558
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8400
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      24.76
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   9.63
  AVERAGE FLOW DEPTH(FEET) =   0.55   TRAVEL TIME(MIN.) =   1.22
  Tc(MIN.) =    8.31
  SUBAREA AREA(ACRES) =     2.51       SUBAREA RUNOFF(CFS) =    9.61
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.720
  TOTAL AREA(ACRES) =        8.1         PEAK FLOW RATE(CFS) =      26.60

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.58   FLOW VELOCITY(FEET/SEC.) =   9.79
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    270.00 =    1733.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    270.00 TO NODE    270.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.31
  RAINFALL INTENSITY(INCH/HR) =   4.56
  TOTAL STREAM AREA(ACRES) =     8.11
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     26.60

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       10.97    16.84        2.889          6.30
      2       26.60     8.31        4.558          8.11

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       32.02     8.31       4.558
      2       27.84    16.84       2.889
```

```
  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      32.02   Tc(MIN.) =    8.31
  TOTAL AREA(ACRES) =       14.4
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    270.00 =    3032.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    270.00 TO NODE    290.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  337.00  DOWNSTREAM ELEVATION(FEET) =  336.00
  STREET LENGTH(FEET) =    94.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 42.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  37.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0100
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      32.24
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.59
    HALFSTREET FLOOD WIDTH(FEET) =   27.81
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.63
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    3.33
  STREET FLOW TRAVEL TIME(MIN.) =   0.28   Tc(MIN.) =    8.59
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.462
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8400
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.670
  SUBAREA AREA(ACRES) =    0.12      SUBAREA RUNOFF(CFS) =    0.45
  TOTAL AREA(ACRES) =       14.5        PEAK FLOW RATE(CFS) =     43.44

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.65   HALFSTREET FLOOD WIDTH(FEET) =  33.30
  FLOW VELOCITY(FEET/SEC.) =  5.86   DEPTH*VELOCITY(FT*FT/SEC.) =   3.79
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    290.00 =    3126.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    290.00 TO NODE    290.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.462
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6900
  S.C.S. CURVE NUMBER (AMC II) =   0
```

```
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.6702
  SUBAREA AREA(ACRES) =    0.06   SUBAREA RUNOFF(CFS) =    0.18
  TOTAL AREA(ACRES) =       14.6   TOTAL RUNOFF(CFS) =      43.62
  TC(MIN.) =    8.59
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       14.6  TC(MIN.) =      8.59
  PEAK FLOW RATE(CFS)   =      43.62
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
****************************************************************************

              RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
              Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                           2003,1985,1981 HYDROLOGY MANUAL
         (c) Copyright 1982-2014 Advanced Engineering Software (aes)
               Ver. 21.0 Release Date: 06/01/2014  License ID 1261

                              Analysis prepared by:

                             RICK ENGINEERING COMPANY
                                 5620 Friars Road
                            San Diego, California 92110
                          619-291-0707   Fax 619-291-4165

 ************************** DESCRIPTION OF STUDY **************************
* (J-19964) AUBREY GLEN                                                    *
* DETAINED FLOWS FROM LAUREL HEIGHTS                                       *
* PRE-PROJECT CONDITION: 100-YR, 6-HR STORM EVENT                          *
 **************************************************************************

  FILE NAME: AG1HPREU.RAT
  TIME/DATE OF STUDY: 16:50 11/05/2024
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.400
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE    230.00 TO NODE    230.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
```

```
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =  12.40   RAIN INTENSITY(INCH/HOUR) =  3.52
  TOTAL AREA(ACRES) =     5.60   TOTAL RUNOFF(CFS) =      6.90

****************************************************************************
  FLOW PROCESS FROM NODE    230.00 TO NODE    270.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    360.00  DOWNSTREAM(FEET) =    337.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   704.00   CHANNEL SLOPE =  0.0327
  CHANNEL BASE(FEET) =    3.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   5.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.256
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8400
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      10.32
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.38
  AVERAGE FLOW DEPTH(FEET) =   0.35   TRAVEL TIME(MIN.) =   1.59
  Tc(MIN.) =   13.99
  SUBAREA AREA(ACRES) =     2.51       SUBAREA RUNOFF(CFS) =    6.87
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.502
  TOTAL AREA(ACRES) =        8.1         PEAK FLOW RATE(CFS) =      13.25

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.39   FLOW VELOCITY(FEET/SEC.) =   8.04
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE    270.00 =     704.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    270.00 TO NODE    270.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   13.99
  RAINFALL INTENSITY(INCH/HR) =   3.26
  TOTAL STREAM AREA(ACRES) =     8.11
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     13.25

****************************************************************************
  FLOW PROCESS FROM NODE    270.00 TO NODE    270.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =  16.84   RAIN INTENSITY(INCH/HOUR) =  2.89
  TOTAL AREA(ACRES) =     6.30   TOTAL RUNOFF(CFS) =     10.97

****************************************************************************
```

```
  FLOW PROCESS FROM NODE    270.00 TO NODE    270.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   16.84
  RAINFALL INTENSITY(INCH/HR) =   2.89
  TOTAL STREAM AREA(ACRES) =     6.30
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     10.97

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1       13.25    13.99        3.256          8.11
     2       10.97    16.84        2.889          6.30

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
     1       22.36    13.99       3.256
     2       22.73    16.84       2.889

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      22.73   Tc(MIN.) =   16.84
  TOTAL AREA(ACRES) =       14.4
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE    270.00 =     704.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    270.00 TO NODE    290.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  337.00  DOWNSTREAM ELEVATION(FEET) =  336.00
  STREET LENGTH(FEET) =    94.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 42.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  37.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0100
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      22.87
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
```

```
    STREET FLOW DEPTH(FEET) =  0.53
    HALFSTREET FLOOD WIDTH(FEET) =   22.17
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.29
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.83
  STREET FLOW TRAVEL TIME(MIN.) =   0.30   Tc(MIN.) =   17.14
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.857
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8400
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.548
  SUBAREA AREA(ACRES) =    0.12      SUBAREA RUNOFF(CFS) =    0.29
  TOTAL AREA(ACRES) =       14.5        PEAK FLOW RATE(CFS) =      22.76

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.53   HALFSTREET FLOOD WIDTH(FEET) =  22.17
  FLOW VELOCITY(FEET/SEC.) =  5.27   DEPTH*VELOCITY(FT*FT/SEC.) =   2.82
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE    290.00 =     798.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    290.00 TO NODE    290.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.857
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6900
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.5488
  SUBAREA AREA(ACRES) =    0.06   SUBAREA RUNOFF(CFS) =    0.12
  TOTAL AREA(ACRES) =       14.6   TOTAL RUNOFF(CFS) =      22.88
  TC(MIN.) =   17.14
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       14.6  TC(MIN.) =     17.14
  PEAK FLOW RATE(CFS)   =      22.88
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

APPENDIX B

Modified Rational Method Output
[Post-project]

```
****************************************************************************

                RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
                Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                             2003,1985,1981 HYDROLOGY MANUAL
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                 Ver. 21.0 Release Date: 06/01/2014  License ID 1261

                               Analysis prepared by:

                              RICK ENGINEERING COMPANY
                                  5620 Friars Road
                            San Diego, California 92110
                          619-291-0707   Fax 619-291-4165

 ************************** DESCRIPTION OF STUDY **************************
* (J-19964) AUBREY GLEN                                                    *
* UNDETAINED FLOWS FROM LAUREL HEIGHTS                                     *
* POST-PROJECT CONDITION: 10-YR, 6-HR STORM EVENT                          *
 **************************************************************************

  FILE NAME: AG10PSTU.RAT
  TIME/DATE OF STUDY: 09:12 01/21/2025
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) =  10.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   1.700
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE    230.00 TO NODE    230.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
```

```
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =   7.10   RAIN INTENSITY(INCH/HOUR) =  3.57
  TOTAL AREA(ACRES) =     5.60   TOTAL RUNOFF(CFS) =     14.20

****************************************************************************
  FLOW PROCESS FROM NODE    230.00 TO NODE    266.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    94.34
  FLOW LENGTH(FEET) =   566.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  15.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.28
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      14.20
  PIPE TRAVEL TIME(MIN.) =   1.30    Tc(MIN.) =    8.40
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE    266.00 =     566.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    266.00 TO NODE    266.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.40
  RAINFALL INTENSITY(INCH/HR) =   3.21
  TOTAL STREAM AREA(ACRES) =     5.60
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     14.20

****************************************************************************
  FLOW PROCESS FROM NODE    240.00 TO NODE    242.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7700
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    67.00
  UPSTREAM ELEVATION(FEET) =    100.00
  DOWNSTREAM ELEVATION(FEET) =     99.50
  ELEVATION DIFFERENCE(FEET) =      0.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.961
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    57.39
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.479
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.17
  TOTAL AREA(ACRES) =      0.05   TOTAL RUNOFF(CFS) =      0.17
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    242.00 TO NODE    244.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  100.00  DOWNSTREAM ELEVATION(FEET) =   99.00
  STREET LENGTH(FEET) =   109.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.45
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.20
    HALFSTREET FLOOD WIDTH(FEET) =    2.00
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.08
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.41
  STREET FLOW TRAVEL TIME(MIN.) =   0.87   Tc(MIN.) =    5.83
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.055
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7700
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.770
  SUBAREA AREA(ACRES) =    0.18      SUBAREA RUNOFF(CFS) =    0.56
  TOTAL AREA(ACRES) =        0.2        PEAK FLOW RATE(CFS) =       0.72

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.25   HALFSTREET FLOOD WIDTH(FEET) =   4.97
  FLOW VELOCITY(FEET/SEC.) =  1.73   DEPTH*VELOCITY(FT*FT/SEC.) =   0.44
  LONGEST FLOWPATH FROM NODE    240.00 TO NODE    244.00 =     176.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    244.00 TO NODE    252.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    98.50
  FLOW LENGTH(FEET) =   140.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS   2.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.30
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.72
  PIPE TRAVEL TIME(MIN.) =   0.71    Tc(MIN.) =    6.54
```

```
  LONGEST FLOWPATH FROM NODE    240.00 TO NODE    252.00 =     316.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    252.00 TO NODE    252.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.766
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7700
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7700
  SUBAREA AREA(ACRES) =    0.11   SUBAREA RUNOFF(CFS) =    0.32
  TOTAL AREA(ACRES) =        0.3   TOTAL RUNOFF(CFS) =       0.99
  TC(MIN.) =    6.54

****************************************************************************
  FLOW PROCESS FROM NODE    252.00 TO NODE    254.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    99.27
  FLOW LENGTH(FEET) =    73.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS   3.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.54
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.99
  PIPE TRAVEL TIME(MIN.) =   0.34    Tc(MIN.) =    6.88
  LONGEST FLOWPATH FROM NODE    240.00 TO NODE    254.00 =     389.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    254.00 TO NODE    254.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.644
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7700
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7700
  SUBAREA AREA(ACRES) =    1.00   SUBAREA RUNOFF(CFS) =    2.81
  TOTAL AREA(ACRES) =        1.3   TOTAL RUNOFF(CFS) =       3.76
  TC(MIN.) =    6.88

****************************************************************************
  FLOW PROCESS FROM NODE    254.00 TO NODE    256.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    99.35
  FLOW LENGTH(FEET) =    65.00   MANNING'S N =  0.013
```

```
  DEPTH OF FLOW IN  24.0 INCH PIPE IS   6.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.24
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.76
  PIPE TRAVEL TIME(MIN.) =   0.21    Tc(MIN.) =    7.09
  LONGEST FLOWPATH FROM NODE    240.00 TO NODE    256.00 =     454.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    256.00 TO NODE    256.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.575
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7700
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7700
  SUBAREA AREA(ACRES) =    0.09   SUBAREA RUNOFF(CFS) =    0.25
  TOTAL AREA(ACRES) =        1.4   TOTAL RUNOFF(CFS) =       3.94
  TC(MIN.) =    7.09

****************************************************************************
  FLOW PROCESS FROM NODE    256.00 TO NODE    256.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.575
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7700
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7700
  SUBAREA AREA(ACRES) =    0.16   SUBAREA RUNOFF(CFS) =    0.44
  TOTAL AREA(ACRES) =        1.6   TOTAL RUNOFF(CFS) =       4.38
  TC(MIN.) =    7.09

****************************************************************************
  FLOW PROCESS FROM NODE    256.00 TO NODE    258.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    99.57
  FLOW LENGTH(FEET) =    43.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS   7.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.46
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.38
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =    7.22
  LONGEST FLOWPATH FROM NODE    240.00 TO NODE    258.00 =     497.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    258.00 TO NODE    258.00 IS CODE =  81
----------------------------------------------------------------------------
```

```
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.533
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7700
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7700
  SUBAREA AREA(ACRES) =    0.12   SUBAREA RUNOFF(CFS) =    0.33
  TOTAL AREA(ACRES) =        1.7   TOTAL RUNOFF(CFS) =       4.65
  TC(MIN.) =    7.22

****************************************************************************
  FLOW PROCESS FROM NODE    258.00 TO NODE    260.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    99.32
  FLOW LENGTH(FEET) =    68.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS   7.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.56
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.65
  PIPE TRAVEL TIME(MIN.) =   0.20    Tc(MIN.) =    7.43
  LONGEST FLOWPATH FROM NODE    240.00 TO NODE    260.00 =     565.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    260.00 TO NODE    260.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.470
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7700
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7700
  SUBAREA AREA(ACRES) =    0.07   SUBAREA RUNOFF(CFS) =    0.19
  TOTAL AREA(ACRES) =        1.8   TOTAL RUNOFF(CFS) =       4.76
  TC(MIN.) =    7.43

****************************************************************************
  FLOW PROCESS FROM NODE    260.00 TO NODE    260.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.470
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7700
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7700
  SUBAREA AREA(ACRES) =    0.07   SUBAREA RUNOFF(CFS) =    0.19
  TOTAL AREA(ACRES) =        1.9   TOTAL RUNOFF(CFS) =       4.94
  TC(MIN.) =    7.43
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    260.00 TO NODE    262.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    99.62
  FLOW LENGTH(FEET) =    38.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS   7.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.66
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.94
  PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =    7.54
  LONGEST FLOWPATH FROM NODE    240.00 TO NODE    262.00 =     603.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    262.00 TO NODE    262.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.437
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7700
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7700
  SUBAREA AREA(ACRES) =    0.24   SUBAREA RUNOFF(CFS) =    0.64
  TOTAL AREA(ACRES) =        2.1   TOTAL RUNOFF(CFS) =       5.53
  TC(MIN.) =    7.54

****************************************************************************
  FLOW PROCESS FROM NODE    262.00 TO NODE    264.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    99.47
  FLOW LENGTH(FEET) =    53.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS   8.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.84
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.53
  PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =    7.69
  LONGEST FLOWPATH FROM NODE    240.00 TO NODE    264.00 =     656.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    264.00 TO NODE    264.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.393
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7700
```

```
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7700
  SUBAREA AREA(ACRES) =    0.25   SUBAREA RUNOFF(CFS) =    0.65
  TOTAL AREA(ACRES) =        2.3   TOTAL RUNOFF(CFS) =       6.11
  TC(MIN.) =    7.69

****************************************************************************
  FLOW PROCESS FROM NODE    264.00 TO NODE    266.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    99.88
  FLOW LENGTH(FEET) =    12.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS   8.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.00
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.11
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =    7.72
  LONGEST FLOWPATH FROM NODE    240.00 TO NODE    266.00 =     668.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    266.00 TO NODE    266.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.72
  RAINFALL INTENSITY(INCH/HR) =   3.38
  TOTAL STREAM AREA(ACRES) =     2.34
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      6.11

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1       14.20     8.40        3.206          5.60
     2        6.11     7.72        3.384          2.34

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
     1       19.18     7.72       3.384
     2       19.99     8.40       3.206

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      19.99   Tc(MIN.) =    8.40
  TOTAL AREA(ACRES) =        7.9
  LONGEST FLOWPATH FROM NODE    240.00 TO NODE    266.00 =     668.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    266.00 TO NODE    270.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    99.68
  FLOW LENGTH(FEET) =    32.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  17.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.95
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      19.99
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    8.46
  LONGEST FLOWPATH FROM NODE    240.00 TO NODE    270.00 =     700.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    270.00 TO NODE    270.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.190
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7700
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7284
  SUBAREA AREA(ACRES) =    0.17   SUBAREA RUNOFF(CFS) =    0.42
  TOTAL AREA(ACRES) =        8.1   TOTAL RUNOFF(CFS) =      19.99
  TC(MIN.) =    8.46
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    270.00 TO NODE    290.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    98.76
  FLOW LENGTH(FEET) =   248.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.36
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      19.99
  PIPE TRAVEL TIME(MIN.) =   0.65    Tc(MIN.) =    9.11
  LONGEST FLOWPATH FROM NODE    240.00 TO NODE    290.00 =     948.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    290.00 TO NODE    290.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
```

```
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.11
  RAINFALL INTENSITY(INCH/HR) =   3.04
  TOTAL STREAM AREA(ACRES) =     8.11
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     19.99

****************************************************************************
  FLOW PROCESS FROM NODE    270.00 TO NODE    270.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =  16.84   RAIN INTENSITY(INCH/HOUR) =  2.05
  TOTAL AREA(ACRES) =     6.30   TOTAL RUNOFF(CFS) =      7.80

****************************************************************************
  FLOW PROCESS FROM NODE    270.00 TO NODE    290.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  100.00  DOWNSTREAM ELEVATION(FEET) =   99.00
  STREET LENGTH(FEET) =   100.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       7.90
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.46
    HALFSTREET FLOOD WIDTH(FEET) =   16.84
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.90
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.34
  STREET FLOW TRAVEL TIME(MIN.) =   0.57   Tc(MIN.) =   17.41
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.003
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8400
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.609
  SUBAREA AREA(ACRES) =    0.12      SUBAREA RUNOFF(CFS) =    0.20
  TOTAL AREA(ACRES) =        6.4        PEAK FLOW RATE(CFS) =       7.83

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.46   HALFSTREET FLOOD WIDTH(FEET) =  16.84
  FLOW VELOCITY(FEET/SEC.) =  2.88   DEPTH*VELOCITY(FT*FT/SEC.) =   1.33
  LONGEST FLOWPATH FROM NODE    240.00 TO NODE    290.00 =     768.00 FEET.
```

```
**************************************************************************
  FLOW PROCESS FROM NODE    290.00 TO NODE    290.00 IS CODE =  81
--------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==========================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.003
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6900
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.6101
  SUBAREA AREA(ACRES) =    0.06   SUBAREA RUNOFF(CFS) =    0.08
  TOTAL AREA(ACRES) =        6.5   TOTAL RUNOFF(CFS) =      7.92
  TC(MIN.) =   17.41

**************************************************************************
  FLOW PROCESS FROM NODE    290.00 TO NODE    290.00 IS CODE =   1
--------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
==========================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   17.41
  RAINFALL INTENSITY(INCH/HR) =   2.00
  TOTAL STREAM AREA(ACRES) =     6.48
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      7.92

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1       19.99     9.11       3.041          8.11
     2        7.92    17.41       2.003          6.48

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
     1       24.14     9.11       3.041
     2       21.08    17.41       2.003

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      24.14   Tc(MIN.) =    9.11
  TOTAL AREA(ACRES) =       14.6
  LONGEST FLOWPATH FROM NODE    240.00 TO NODE    290.00 =     948.00 FEET.
==========================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       14.6  TC(MIN.) =      9.11
  PEAK FLOW RATE(CFS)   =      24.14
==========================================================================
==========================================================================
```

END OF RATIONAL METHOD ANALYSIS

```
****************************************************************************

                RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
                Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                             2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2014 Advanced Engineering Software (aes)
                 Ver. 21.0 Release Date: 06/01/2014  License ID 1261

                              Analysis prepared by:

                             RICK ENGINEERING COMPANY
                                 5620 Friars Road
                            San Diego, California 92110
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 ************************** DESCRIPTION OF STUDY **************************
* (J-19964) AUBREY GLEN                                                     *
* UNDETAINED FLOWS FROM LAUREL HEIGHTS                                      *
* POST-PROJECT CONDITION: 50-YR, 6-HR STORM EVENT                           *
 **************************************************************************

  FILE NAME: AG50PSTU.RAT
  TIME/DATE OF STUDY: 09:20 01/21/2025
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) =  50.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.300
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE    230.00 TO NODE    230.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
```

```
==========================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =   7.10   RAIN INTENSITY(INCH/HOUR) =  4.83
  TOTAL AREA(ACRES) =     5.60   TOTAL RUNOFF(CFS) =     19.20

****************************************************************************
  FLOW PROCESS FROM NODE    230.00 TO NODE    266.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    94.34
  FLOW LENGTH(FEET) =   566.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  17.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.91
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     19.20
  PIPE TRAVEL TIME(MIN.) =   1.19    Tc(MIN.) =    8.29
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE    266.00 =     566.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    266.00 TO NODE    266.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
==========================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.29
  RAINFALL INTENSITY(INCH/HR) =   4.37
  TOTAL STREAM AREA(ACRES) =     5.60
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     19.20

****************************************************************************
  FLOW PROCESS FROM NODE    240.00 TO NODE    242.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7700
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    67.00
  UPSTREAM ELEVATION(FEET) =    100.00
  DOWNSTREAM ELEVATION(FEET) =     99.50
  ELEVATION DIFFERENCE(FEET) =      0.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.961
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    57.39
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.060
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.23
  TOTAL AREA(ACRES) =      0.05   TOTAL RUNOFF(CFS) =      0.23
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    242.00 TO NODE    244.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  100.00  DOWNSTREAM ELEVATION(FEET) =   99.00
  STREET LENGTH(FEET) =   109.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.61
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.24
    HALFSTREET FLOOD WIDTH(FEET) =    4.16
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.74
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.41
  STREET FLOW TRAVEL TIME(MIN.) =   1.04   Tc(MIN.) =    6.00
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.385
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7700
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.770
  SUBAREA AREA(ACRES) =    0.18      SUBAREA RUNOFF(CFS) =    0.75
  TOTAL AREA(ACRES) =        0.2        PEAK FLOW RATE(CFS) =       0.95

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.27   HALFSTREET FLOOD WIDTH(FEET) =   6.16
  FLOW VELOCITY(FEET/SEC.) =  1.79   DEPTH*VELOCITY(FT*FT/SEC.) =   0.49
  LONGEST FLOWPATH FROM NODE    240.00 TO NODE    244.00 =     176.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    244.00 TO NODE    252.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    98.50
  FLOW LENGTH(FEET) =   140.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS   3.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.59
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.95
  PIPE TRAVEL TIME(MIN.) =   0.65    Tc(MIN.) =    6.65
```

```
  LONGEST FLOWPATH FROM NODE    240.00 TO NODE    252.00 =     316.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    252.00 TO NODE    252.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.040
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7700
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7700
  SUBAREA AREA(ACRES) =    0.11   SUBAREA RUNOFF(CFS) =    0.43
  TOTAL AREA(ACRES) =        0.3   TOTAL RUNOFF(CFS) =      1.32
  TC(MIN.) =    6.65

****************************************************************************
  FLOW PROCESS FROM NODE    252.00 TO NODE    254.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    99.27
  FLOW LENGTH(FEET) =    73.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS   4.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.86
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.32
  PIPE TRAVEL TIME(MIN.) =   0.32    Tc(MIN.) =    6.97
  LONGEST FLOWPATH FROM NODE    240.00 TO NODE    254.00 =     389.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    254.00 TO NODE    254.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.892
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7700
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7700
  SUBAREA AREA(ACRES) =    1.00   SUBAREA RUNOFF(CFS) =    3.77
  TOTAL AREA(ACRES) =        1.3   TOTAL RUNOFF(CFS) =      5.05
  TC(MIN.) =    6.97

****************************************************************************
  FLOW PROCESS FROM NODE    254.00 TO NODE    256.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    99.35
  FLOW LENGTH(FEET) =    65.00   MANNING'S N =  0.013
```

```
 DEPTH OF FLOW IN  24.0 INCH PIPE IS   7.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.69
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       5.05
 PIPE TRAVEL TIME(MIN.) =   0.19    Tc(MIN.) =    7.16
 LONGEST FLOWPATH FROM NODE    240.00 TO NODE    256.00 =     454.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    256.00 TO NODE    256.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.807
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .7700
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.7700
 SUBAREA AREA(ACRES) =    0.09   SUBAREA RUNOFF(CFS) =    0.33
 TOTAL AREA(ACRES) =        1.4   TOTAL RUNOFF(CFS) =       5.29
 TC(MIN.) =    7.16

****************************************************************************
 FLOW PROCESS FROM NODE    256.00 TO NODE    256.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.807
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .7700
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.7700
 SUBAREA AREA(ACRES) =    0.16   SUBAREA RUNOFF(CFS) =    0.59
 TOTAL AREA(ACRES) =        1.6   TOTAL RUNOFF(CFS) =       5.89
 TC(MIN.) =    7.16

****************************************************************************
 FLOW PROCESS FROM NODE    256.00 TO NODE    258.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    99.57
 FLOW LENGTH(FEET) =    43.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS   8.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.94
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       5.89
 PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =    7.28
 LONGEST FLOWPATH FROM NODE    240.00 TO NODE    258.00 =     497.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    258.00 TO NODE    258.00 IS CODE =  81
----------------------------------------------------------------------------
```

```
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.756
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7700
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7700
  SUBAREA AREA(ACRES) =    0.12   SUBAREA RUNOFF(CFS) =    0.44
  TOTAL AREA(ACRES) =       1.7   TOTAL RUNOFF(CFS) =      6.26
  TC(MIN.) =    7.28

****************************************************************************
  FLOW PROCESS FROM NODE    258.00 TO NODE    260.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    99.32
  FLOW LENGTH(FEET) =    68.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS   8.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.04
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.26
  PIPE TRAVEL TIME(MIN.) =   0.19    Tc(MIN.) =    7.47
  LONGEST FLOWPATH FROM NODE    240.00 TO NODE    260.00 =     565.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    260.00 TO NODE    260.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.679
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7700
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7700
  SUBAREA AREA(ACRES) =    0.07   SUBAREA RUNOFF(CFS) =    0.25
  TOTAL AREA(ACRES) =       1.8   TOTAL RUNOFF(CFS) =      6.41
  TC(MIN.) =    7.47

****************************************************************************
  FLOW PROCESS FROM NODE    260.00 TO NODE    260.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.679
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7700
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7700
  SUBAREA AREA(ACRES) =    0.07   SUBAREA RUNOFF(CFS) =    0.25
  TOTAL AREA(ACRES) =       1.9   TOTAL RUNOFF(CFS) =      6.66
  TC(MIN.) =    7.47
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    260.00 TO NODE    262.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    99.62
  FLOW LENGTH(FEET) =    38.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS   9.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.15
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.66
  PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =    7.57
  LONGEST FLOWPATH FROM NODE    240.00 TO NODE    262.00 =     603.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    262.00 TO NODE    262.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.637
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7700
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7700
  SUBAREA AREA(ACRES) =    0.24   SUBAREA RUNOFF(CFS) =    0.86
  TOTAL AREA(ACRES) =        2.1   TOTAL RUNOFF(CFS) =      7.46
  TC(MIN.) =    7.57

****************************************************************************
  FLOW PROCESS FROM NODE    262.00 TO NODE    264.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    99.47
  FLOW LENGTH(FEET) =    53.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS   9.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.34
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.46
  PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =    7.71
  LONGEST FLOWPATH FROM NODE    240.00 TO NODE    264.00 =     656.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    264.00 TO NODE    264.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.583
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7700
```

```
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7700
  SUBAREA AREA(ACRES) =    0.25   SUBAREA RUNOFF(CFS) =    0.88
  TOTAL AREA(ACRES) =        2.3   TOTAL RUNOFF(CFS) =       8.26
  TC(MIN.) =    7.71

****************************************************************************
  FLOW PROCESS FROM NODE    264.00 TO NODE    266.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    99.88
  FLOW LENGTH(FEET) =    12.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  10.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.51
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.26
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =    7.74
  LONGEST FLOWPATH FROM NODE    240.00 TO NODE    266.00 =     668.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    266.00 TO NODE    266.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.74
  RAINFALL INTENSITY(INCH/HR) =   4.57
  TOTAL STREAM AREA(ACRES) =     2.34
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      8.26

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1       19.20     8.29        4.373          5.60
     2        8.26     7.74        4.571          2.34

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
     1       26.18     7.74       4.571
     2       27.10     8.29       4.373

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      27.10   Tc(MIN.) =    8.29
  TOTAL AREA(ACRES) =        7.9
  LONGEST FLOWPATH FROM NODE    240.00 TO NODE    266.00 =     668.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    266.00 TO NODE    270.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    99.68
  FLOW LENGTH(FEET) =    32.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.63
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      27.10
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =    8.35
  LONGEST FLOWPATH FROM NODE    240.00 TO NODE    270.00 =     700.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    270.00 TO NODE    270.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.352
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7700
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7281
  SUBAREA AREA(ACRES) =    0.17   SUBAREA RUNOFF(CFS) =    0.57
  TOTAL AREA(ACRES) =        8.1   TOTAL RUNOFF(CFS) =      27.10
  TC(MIN.) =    8.35
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    270.00 TO NODE    290.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    98.76
  FLOW LENGTH(FEET) =   248.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.63
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      27.10
  PIPE TRAVEL TIME(MIN.) =   0.48    Tc(MIN.) =    8.83
  LONGEST FLOWPATH FROM NODE    240.00 TO NODE    290.00 =     948.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    290.00 TO NODE    290.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
```

```
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.83
  RAINFALL INTENSITY(INCH/HR) =   4.20
  TOTAL STREAM AREA(ACRES) =     8.11
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     27.10

****************************************************************************
  FLOW PROCESS FROM NODE    270.00 TO NODE    270.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =  16.84   RAIN INTENSITY(INCH/HOUR) =  2.77
  TOTAL AREA(ACRES) =     6.30   TOTAL RUNOFF(CFS) =     10.50

****************************************************************************
  FLOW PROCESS FROM NODE    270.00 TO NODE    290.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  100.00  DOWNSTREAM ELEVATION(FEET) =   99.00
  STREET LENGTH(FEET) =   100.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      10.64
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.50
    HALFSTREET FLOOD WIDTH(FEET) =   19.02
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.11
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.56
  STREET FLOW TRAVEL TIME(MIN.) =   0.54   Tc(MIN.) =   17.38
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.713
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8400
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.606
  SUBAREA AREA(ACRES) =    0.12      SUBAREA RUNOFF(CFS) =    0.27
  TOTAL AREA(ACRES) =        6.4        PEAK FLOW RATE(CFS) =      10.56

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.50   HALFSTREET FLOOD WIDTH(FEET) =  18.95
  FLOW VELOCITY(FEET/SEC.) =  3.11   DEPTH*VELOCITY(FT*FT/SEC.) =   1.56
```

```
  LONGEST FLOWPATH FROM NODE    240.00 TO NODE    290.00 =     768.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    290.00 TO NODE    290.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.713
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6900
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.6071
  SUBAREA AREA(ACRES) =    0.06   SUBAREA RUNOFF(CFS) =    0.11
  TOTAL AREA(ACRES) =        6.5   TOTAL RUNOFF(CFS) =      10.68
  TC(MIN.) =   17.38

****************************************************************************
  FLOW PROCESS FROM NODE    290.00 TO NODE    290.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   17.38
  RAINFALL INTENSITY(INCH/HR) =   2.71
  TOTAL STREAM AREA(ACRES) =     6.48
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     10.68

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1       27.10     8.83        4.198          8.11
     2       10.68    17.38        2.713          6.48

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
     1       32.53     8.83       4.198
     2       28.19    17.38       2.713

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      32.53   Tc(MIN.) =    8.83
  TOTAL AREA(ACRES) =       14.6
  LONGEST FLOWPATH FROM NODE    240.00 TO NODE    290.00 =     948.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       14.6  TC(MIN.) =      8.83
  PEAK FLOW RATE(CFS)   =      32.53
============================================================================
```

==
  END OF RATIONAL METHOD ANALYSIS

```
****************************************************************************

              RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
              Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                           2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2014 Advanced Engineering Software (aes)
               Ver. 21.0 Release Date: 06/01/2014  License ID 1261

                             Analysis prepared by:

                            RICK ENGINEERING COMPANY
                                5620 Friars Road
                          San Diego, California 92110
                        619-291-0707   Fax 619-291-4165

 ************************** DESCRIPTION OF STUDY **************************
* (J-19964) AUBREY GLEN                                                    *
* UNDETAINED FLOWS FROM LAUREL HEIGHTS                                     *
* POST-PROJECT CONDITION: 100-YR, 6-HR STORM EVENT                         *
 **************************************************************************

  FILE NAME: AG1HPSTU.RAT
  TIME/DATE OF STUDY: 11:27 11/07/2024
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.400
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE    230.00 TO NODE    230.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
```

```
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =   7.10   RAIN INTENSITY(INCH/HOUR) =  5.04
  TOTAL AREA(ACRES) =     5.60   TOTAL RUNOFF(CFS) =     20.00

****************************************************************************
  FLOW PROCESS FROM NODE    230.00 TO NODE    266.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    94.34
  FLOW LENGTH(FEET) =   566.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  17.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.95
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      20.00
  PIPE TRAVEL TIME(MIN.) =   1.19    Tc(MIN.) =    8.29
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE    266.00 =     566.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    266.00 TO NODE    266.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.29
  RAINFALL INTENSITY(INCH/HR) =   4.56
  TOTAL STREAM AREA(ACRES) =     5.60
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     20.00

****************************************************************************
  FLOW PROCESS FROM NODE    240.00 TO NODE    242.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7700
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    67.00
  UPSTREAM ELEVATION(FEET) =    100.00
  DOWNSTREAM ELEVATION(FEET) =     99.50
  ELEVATION DIFFERENCE(FEET) =      0.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.961
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    57.39
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.323
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.24
  TOTAL AREA(ACRES) =      0.05   TOTAL RUNOFF(CFS) =      0.24
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    242.00 TO NODE    244.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  100.00  DOWNSTREAM ELEVATION(FEET) =   99.00
  STREET LENGTH(FEET) =   109.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.63
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.24
    HALFSTREET FLOOD WIDTH(FEET) =    4.34
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.75
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.42
  STREET FLOW TRAVEL TIME(MIN.) =   1.04   Tc(MIN.) =    6.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.621
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7700
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.770
  SUBAREA AREA(ACRES) =    0.18      SUBAREA RUNOFF(CFS) =    0.78
  TOTAL AREA(ACRES) =        0.2        PEAK FLOW RATE(CFS) =       1.00

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.28   HALFSTREET FLOOD WIDTH(FEET) =   6.34
  FLOW VELOCITY(FEET/SEC.) =  1.80   DEPTH*VELOCITY(FT*FT/SEC.) =   0.50
  LONGEST FLOWPATH FROM NODE    240.00 TO NODE    244.00 =     176.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    244.00 TO NODE    252.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    98.50
  FLOW LENGTH(FEET) =   140.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS   3.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.63
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.00
  PIPE TRAVEL TIME(MIN.) =   0.64    Tc(MIN.) =    6.64
```

```
 LONGEST FLOWPATH FROM NODE    240.00 TO NODE    252.00 =     316.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    252.00 TO NODE    252.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.264
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .7700
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.7700
 SUBAREA AREA(ACRES) =    0.11   SUBAREA RUNOFF(CFS) =    0.45
 TOTAL AREA(ACRES) =        0.3   TOTAL RUNOFF(CFS) =       1.38
 TC(MIN.) =    6.64

****************************************************************************
 FLOW PROCESS FROM NODE    252.00 TO NODE    254.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    99.27
 FLOW LENGTH(FEET) =    73.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS   4.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   3.90
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       1.38
 PIPE TRAVEL TIME(MIN.) =   0.31    Tc(MIN.) =    6.96
 LONGEST FLOWPATH FROM NODE    240.00 TO NODE    254.00 =     389.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    254.00 TO NODE    254.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.111
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .7700
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.7700
 SUBAREA AREA(ACRES) =    1.00   SUBAREA RUNOFF(CFS) =    3.94
 TOTAL AREA(ACRES) =        1.3   TOTAL RUNOFF(CFS) =       5.27
 TC(MIN.) =    6.96

****************************************************************************
 FLOW PROCESS FROM NODE    254.00 TO NODE    256.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    99.35
 FLOW LENGTH(FEET) =    65.00   MANNING'S N =  0.013
```

```
  DEPTH OF FLOW IN  24.0 INCH PIPE IS   8.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.76
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.27
  PIPE TRAVEL TIME(MIN.) =   0.19    Tc(MIN.) =    7.14
  LONGEST FLOWPATH FROM NODE    240.00 TO NODE    256.00 =     454.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    256.00 TO NODE    256.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.024
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7700
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7700
  SUBAREA AREA(ACRES) =    0.09   SUBAREA RUNOFF(CFS) =    0.35
  TOTAL AREA(ACRES) =        1.4   TOTAL RUNOFF(CFS) =       5.53
  TC(MIN.) =    7.14

****************************************************************************
  FLOW PROCESS FROM NODE    256.00 TO NODE    256.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.024
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7700
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7700
  SUBAREA AREA(ACRES) =    0.16   SUBAREA RUNOFF(CFS) =    0.62
  TOTAL AREA(ACRES) =        1.6   TOTAL RUNOFF(CFS) =       6.15
  TC(MIN.) =    7.14

****************************************************************************
  FLOW PROCESS FROM NODE    256.00 TO NODE    258.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    99.57
  FLOW LENGTH(FEET) =    43.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS   8.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.02
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.15
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =    7.26
  LONGEST FLOWPATH FROM NODE    240.00 TO NODE    258.00 =     497.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    258.00 TO NODE    258.00 IS CODE =  81
----------------------------------------------------------------------------
```

```
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.970
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7700
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7700
  SUBAREA AREA(ACRES) =    0.12   SUBAREA RUNOFF(CFS) =    0.46
  TOTAL AREA(ACRES) =        1.7   TOTAL RUNOFF(CFS) =       6.54
  TC(MIN.) =    7.26

******************************************************************************
  FLOW PROCESS FROM NODE    258.00 TO NODE    260.00 IS CODE =  41
------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    99.32
  FLOW LENGTH(FEET) =    68.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS   9.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.12
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.54
  PIPE TRAVEL TIME(MIN.) =   0.19    Tc(MIN.) =    7.45
  LONGEST FLOWPATH FROM NODE    240.00 TO NODE    260.00 =     565.00 FEET.

******************************************************************************
  FLOW PROCESS FROM NODE    260.00 TO NODE    260.00 IS CODE =  81
------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.890
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7700
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7700
  SUBAREA AREA(ACRES) =    0.07   SUBAREA RUNOFF(CFS) =    0.26
  TOTAL AREA(ACRES) =        1.8   TOTAL RUNOFF(CFS) =       6.70
  TC(MIN.) =    7.45

******************************************************************************
  FLOW PROCESS FROM NODE    260.00 TO NODE    260.00 IS CODE =  81
------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.890
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7700
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7700
  SUBAREA AREA(ACRES) =    0.07   SUBAREA RUNOFF(CFS) =    0.26
  TOTAL AREA(ACRES) =        1.9   TOTAL RUNOFF(CFS) =       6.97
  TC(MIN.) =    7.45
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    260.00 TO NODE    262.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    99.62
  FLOW LENGTH(FEET) =    38.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS   9.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.22
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.97
  PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =    7.55
  LONGEST FLOWPATH FROM NODE    240.00 TO NODE    262.00 =     603.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    262.00 TO NODE    262.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.848
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7700
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7700
  SUBAREA AREA(ACRES) =    0.24   SUBAREA RUNOFF(CFS) =    0.90
  TOTAL AREA(ACRES) =        2.1   TOTAL RUNOFF(CFS) =      7.80
  TC(MIN.) =    7.55

****************************************************************************
  FLOW PROCESS FROM NODE    262.00 TO NODE    264.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    99.47
  FLOW LENGTH(FEET) =    53.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS   9.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.42
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.80
  PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =    7.69
  LONGEST FLOWPATH FROM NODE    240.00 TO NODE    264.00 =     656.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    264.00 TO NODE    264.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.791
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7700
```

```
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7700
  SUBAREA AREA(ACRES) =    0.25   SUBAREA RUNOFF(CFS) =    0.92
  TOTAL AREA(ACRES) =        2.3   TOTAL RUNOFF(CFS) =       8.63
  TC(MIN.) =    7.69

****************************************************************************
  FLOW PROCESS FROM NODE    264.00 TO NODE    266.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    99.88
  FLOW LENGTH(FEET) =    12.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  10.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.59
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.63
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =    7.72
  LONGEST FLOWPATH FROM NODE    240.00 TO NODE    266.00 =     668.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    266.00 TO NODE    266.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.72
  RAINFALL INTENSITY(INCH/HR) =   4.78
  TOTAL STREAM AREA(ACRES) =     2.34
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      8.63

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       20.00     8.29        4.565          5.60
      2        8.63     7.72        4.779          2.34

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       27.26     7.72       4.779
      2       28.25     8.29       4.565

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      28.25   Tc(MIN.) =    8.29
  TOTAL AREA(ACRES) =        7.9
  LONGEST FLOWPATH FROM NODE    240.00 TO NODE    266.00 =     668.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    266.00 TO NODE    270.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    99.68
  FLOW LENGTH(FEET) =    32.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.99
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      28.25
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =    8.35
  LONGEST FLOWPATH FROM NODE    240.00 TO NODE    270.00 =     700.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    270.00 TO NODE    270.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.544
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7700
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7273
  SUBAREA AREA(ACRES) =    0.17   SUBAREA RUNOFF(CFS) =    0.59
  TOTAL AREA(ACRES) =        8.1   TOTAL RUNOFF(CFS) =      28.25
  TC(MIN.) =    8.35
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    270.00 TO NODE    290.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    98.76
  FLOW LENGTH(FEET) =   248.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.99
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      28.25
  PIPE TRAVEL TIME(MIN.) =   0.46    Tc(MIN.) =    8.81
  LONGEST FLOWPATH FROM NODE    240.00 TO NODE    290.00 =     948.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    290.00 TO NODE    290.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
```

```
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.81
  RAINFALL INTENSITY(INCH/HR) =   4.39
  TOTAL STREAM AREA(ACRES) =     8.11
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     28.25

****************************************************************************
  FLOW PROCESS FROM NODE    270.00 TO NODE    270.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =  16.84   RAIN INTENSITY(INCH/HOUR) =  2.89
  TOTAL AREA(ACRES) =     6.30   TOTAL RUNOFF(CFS) =     10.97

****************************************************************************
  FLOW PROCESS FROM NODE    270.00 TO NODE    290.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  100.00  DOWNSTREAM ELEVATION(FEET) =   99.00
  STREET LENGTH(FEET) =   100.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      11.11
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.51
    HALFSTREET FLOOD WIDTH(FEET) =   19.34
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.15
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.60
  STREET FLOW TRAVEL TIME(MIN.) =   0.53   Tc(MIN.) =   17.37
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.832
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8400
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.607
  SUBAREA AREA(ACRES) =    0.12      SUBAREA RUNOFF(CFS) =    0.29
  TOTAL AREA(ACRES) =        6.4        PEAK FLOW RATE(CFS) =      11.04

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.51   HALFSTREET FLOOD WIDTH(FEET) =  19.34
  FLOW VELOCITY(FEET/SEC.) =  3.12   DEPTH*VELOCITY(FT*FT/SEC.) =   1.59
```

```
  LONGEST FLOWPATH FROM NODE    240.00 TO NODE    290.00 =     768.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    290.00 TO NODE    290.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.832
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6900
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.6079
  SUBAREA AREA(ACRES) =    0.06   SUBAREA RUNOFF(CFS) =    0.12
  TOTAL AREA(ACRES) =       6.5   TOTAL RUNOFF(CFS) =      11.16
  TC(MIN.) =   17.37

****************************************************************************
  FLOW PROCESS FROM NODE    290.00 TO NODE    290.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   17.37
  RAINFALL INTENSITY(INCH/HR) =   2.83
  TOTAL STREAM AREA(ACRES) =     6.48
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     11.16

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1        28.25     8.81        4.390         8.11
     2        11.16    17.37        2.832         6.48

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
     1        33.90     8.81       4.390
     2        29.38    17.37       2.832

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      33.90   Tc(MIN.) =    8.81
  TOTAL AREA(ACRES) =      14.6
  LONGEST FLOWPATH FROM NODE    240.00 TO NODE    290.00 =     948.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =      14.6  TC(MIN.) =      8.81
  PEAK FLOW RATE(CFS)   =     33.90
============================================================================
```

==
 END OF RATIONAL METHOD ANALYSIS

```
****************************************************************************

              RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
              Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                           2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2014 Advanced Engineering Software (aes)
               Ver. 21.0 Release Date: 06/01/2014  License ID 1261

                              Analysis prepared by:

                              RICK ENGINEERING COMPANY
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                            San Diego, California 92110
                          619-291-0707   Fax 619-291-4165

 ************************** DESCRIPTION OF STUDY **************************
* (J-19964) AUBREY GLEN                                                    *
* DETAINED FLOWS FROM LAUREL HEIGHTS                                       *
* POST-PROJECT CONDITION: 100-YR, 6-HR STORM EVENT                         *
 **************************************************************************

  FILE NAME: AG1HPSTD.RAT
  TIME/DATE OF STUDY: 11:07 11/07/2024
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.400
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE    230.00 TO NODE    230.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
```

```
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =  12.40   RAIN INTENSITY(INCH/HOUR) =  3.52
  TOTAL AREA(ACRES) =     5.60   TOTAL RUNOFF(CFS) =      6.90

****************************************************************************
  FLOW PROCESS FROM NODE    230.00 TO NODE    266.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    94.34
  FLOW LENGTH(FEET) =   566.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.22
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.90
  PIPE TRAVEL TIME(MIN.) =   1.52    Tc(MIN.) =   13.92
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE    266.00 =     566.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    266.00 TO NODE    266.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   13.92
  RAINFALL INTENSITY(INCH/HR) =   3.27
  TOTAL STREAM AREA(ACRES) =     5.60
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      6.90

****************************************************************************
  FLOW PROCESS FROM NODE    240.00 TO NODE    242.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7700
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    67.00
  UPSTREAM ELEVATION(FEET) =    100.00
  DOWNSTREAM ELEVATION(FEET) =     99.50
  ELEVATION DIFFERENCE(FEET) =      0.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.961
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    57.39
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.323
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.24
  TOTAL AREA(ACRES) =      0.05   TOTAL RUNOFF(CFS) =      0.24
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    242.00 TO NODE    244.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  100.00  DOWNSTREAM ELEVATION(FEET) =   99.00
  STREET LENGTH(FEET) =   109.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.63
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.24
    HALFSTREET FLOOD WIDTH(FEET) =    4.34
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.75
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.42
  STREET FLOW TRAVEL TIME(MIN.) =   1.04   Tc(MIN.) =    6.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.621
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7700
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.770
  SUBAREA AREA(ACRES) =    0.18      SUBAREA RUNOFF(CFS) =    0.78
  TOTAL AREA(ACRES) =        0.2        PEAK FLOW RATE(CFS) =      1.00

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.28   HALFSTREET FLOOD WIDTH(FEET) =   6.34
  FLOW VELOCITY(FEET/SEC.) =  1.80   DEPTH*VELOCITY(FT*FT/SEC.) =   0.50
  LONGEST FLOWPATH FROM NODE    240.00 TO NODE    244.00 =     176.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    244.00 TO NODE    252.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    98.50
  FLOW LENGTH(FEET) =   140.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS   3.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.63
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.00
  PIPE TRAVEL TIME(MIN.) =   0.64    Tc(MIN.) =    6.64
```

```
 LONGEST FLOWPATH FROM NODE    240.00 TO NODE    252.00 =     316.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    252.00 TO NODE    252.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.264
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .7700
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.7700
 SUBAREA AREA(ACRES) =    0.11   SUBAREA RUNOFF(CFS) =    0.45
 TOTAL AREA(ACRES) =        0.3   TOTAL RUNOFF(CFS) =      1.38
 TC(MIN.) =    6.64

****************************************************************************
 FLOW PROCESS FROM NODE    252.00 TO NODE    254.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    99.27
 FLOW LENGTH(FEET) =    73.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS   4.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   3.90
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       1.38
 PIPE TRAVEL TIME(MIN.) =   0.31    Tc(MIN.) =    6.96
 LONGEST FLOWPATH FROM NODE    240.00 TO NODE    254.00 =     389.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    254.00 TO NODE    254.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.111
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .7700
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.7700
 SUBAREA AREA(ACRES) =    1.00   SUBAREA RUNOFF(CFS) =    3.94
 TOTAL AREA(ACRES) =        1.3   TOTAL RUNOFF(CFS) =      5.27
 TC(MIN.) =    6.96

****************************************************************************
 FLOW PROCESS FROM NODE    254.00 TO NODE    256.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    99.35
 FLOW LENGTH(FEET) =    65.00   MANNING'S N =  0.013
```

```
  DEPTH OF FLOW IN  24.0 INCH PIPE IS   8.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.76
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.27
  PIPE TRAVEL TIME(MIN.) =   0.19    Tc(MIN.) =    7.14
  LONGEST FLOWPATH FROM NODE    240.00 TO NODE    256.00 =     454.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    256.00 TO NODE    256.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.024
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7700
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7700
  SUBAREA AREA(ACRES) =    0.09   SUBAREA RUNOFF(CFS) =    0.35
  TOTAL AREA(ACRES) =        1.4   TOTAL RUNOFF(CFS) =       5.53
  TC(MIN.) =    7.14

****************************************************************************
  FLOW PROCESS FROM NODE    256.00 TO NODE    256.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.024
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7700
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7700
  SUBAREA AREA(ACRES) =    0.16   SUBAREA RUNOFF(CFS) =    0.62
  TOTAL AREA(ACRES) =        1.6   TOTAL RUNOFF(CFS) =       6.15
  TC(MIN.) =    7.14

****************************************************************************
  FLOW PROCESS FROM NODE    256.00 TO NODE    258.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    99.57
  FLOW LENGTH(FEET) =    43.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS   8.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.02
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.15
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =    7.26
  LONGEST FLOWPATH FROM NODE    240.00 TO NODE    258.00 =     497.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    258.00 TO NODE    258.00 IS CODE =  81
----------------------------------------------------------------------------
```

```
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.970
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7700
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7700
  SUBAREA AREA(ACRES) =    0.12   SUBAREA RUNOFF(CFS) =    0.46
  TOTAL AREA(ACRES) =        1.7   TOTAL RUNOFF(CFS) =       6.54
  TC(MIN.) =    7.26

****************************************************************************
  FLOW PROCESS FROM NODE    258.00 TO NODE    260.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    99.32
  FLOW LENGTH(FEET) =    68.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS   9.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.12
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.54
  PIPE TRAVEL TIME(MIN.) =   0.19    Tc(MIN.) =    7.45
  LONGEST FLOWPATH FROM NODE    240.00 TO NODE    260.00 =     565.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    260.00 TO NODE    260.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.890
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7700
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7700
  SUBAREA AREA(ACRES) =    0.07   SUBAREA RUNOFF(CFS) =    0.26
  TOTAL AREA(ACRES) =        1.8   TOTAL RUNOFF(CFS) =       6.70
  TC(MIN.) =    7.45

****************************************************************************
  FLOW PROCESS FROM NODE    260.00 TO NODE    260.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.890
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7700
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7700
  SUBAREA AREA(ACRES) =    0.07   SUBAREA RUNOFF(CFS) =    0.26
  TOTAL AREA(ACRES) =        1.9   TOTAL RUNOFF(CFS) =       6.97
  TC(MIN.) =    7.45
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    260.00 TO NODE    262.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    99.62
  FLOW LENGTH(FEET) =    38.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS   9.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.22
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.97
  PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =    7.55
  LONGEST FLOWPATH FROM NODE    240.00 TO NODE    262.00 =     603.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    262.00 TO NODE    262.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.848
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7700
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7700
  SUBAREA AREA(ACRES) =    0.24   SUBAREA RUNOFF(CFS) =    0.90
  TOTAL AREA(ACRES) =        2.1   TOTAL RUNOFF(CFS) =      7.80
  TC(MIN.) =    7.55

****************************************************************************
  FLOW PROCESS FROM NODE    262.00 TO NODE    264.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    99.47
  FLOW LENGTH(FEET) =    53.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS   9.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.42
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.80
  PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =    7.69
  LONGEST FLOWPATH FROM NODE    240.00 TO NODE    264.00 =     656.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    264.00 TO NODE    264.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.791
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7700
```

```
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7700
  SUBAREA AREA(ACRES) =    0.25   SUBAREA RUNOFF(CFS) =    0.92
  TOTAL AREA(ACRES) =        2.3   TOTAL RUNOFF(CFS) =       8.63
  TC(MIN.) =    7.69

****************************************************************************
  FLOW PROCESS FROM NODE    264.00 TO NODE    266.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    99.88
  FLOW LENGTH(FEET) =    12.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  10.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.59
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.63
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =    7.72
  LONGEST FLOWPATH FROM NODE    240.00 TO NODE    266.00 =     668.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    266.00 TO NODE    266.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.72
  RAINFALL INTENSITY(INCH/HR) =   4.78
  TOTAL STREAM AREA(ACRES) =     2.34
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      8.63

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        6.90    13.92        3.267          5.60
      2        8.63     7.72        4.779          2.34

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       12.46     7.72       4.779
      2       12.80    13.92       3.267

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      12.80   Tc(MIN.) =   13.92
  TOTAL AREA(ACRES) =        7.9
  LONGEST FLOWPATH FROM NODE    240.00 TO NODE    266.00 =     668.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    266.00 TO NODE    270.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    99.68
  FLOW LENGTH(FEET) =    32.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  13.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.28
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.80
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =   13.99
  LONGEST FLOWPATH FROM NODE    240.00 TO NODE    270.00 =     700.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    270.00 TO NODE    270.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.256
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7700
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.4800
  SUBAREA AREA(ACRES) =    0.17   SUBAREA RUNOFF(CFS) =    0.43
  TOTAL AREA(ACRES) =        8.1   TOTAL RUNOFF(CFS) =      12.80
  TC(MIN.) =   13.99
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    270.00 TO NODE    290.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    98.76
  FLOW LENGTH(FEET) =   248.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.54
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.80
  PIPE TRAVEL TIME(MIN.) =   0.75    Tc(MIN.) =   14.74
  LONGEST FLOWPATH FROM NODE    240.00 TO NODE    290.00 =     948.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    290.00 TO NODE    290.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
```

```
  TIME OF CONCENTRATION(MIN.) =   14.74
  RAINFALL INTENSITY(INCH/HR) =   3.15
  TOTAL STREAM AREA(ACRES) =     8.11
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     12.80

****************************************************************************
  FLOW PROCESS FROM NODE    270.00 TO NODE    270.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =  16.84   RAIN INTENSITY(INCH/HOUR) =  2.89
  TOTAL AREA(ACRES) =     6.30   TOTAL RUNOFF(CFS) =     10.97

****************************************************************************
  FLOW PROCESS FROM NODE    270.00 TO NODE    290.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  100.00  DOWNSTREAM ELEVATION(FEET) =   99.00
  STREET LENGTH(FEET) =   100.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      11.11
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.51
    HALFSTREET FLOOD WIDTH(FEET) =   19.34
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.15
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.60
  STREET FLOW TRAVEL TIME(MIN.) =   0.53   Tc(MIN.) =   17.37
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.832
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8400
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.607
  SUBAREA AREA(ACRES) =    0.12      SUBAREA RUNOFF(CFS) =    0.29
  TOTAL AREA(ACRES) =        6.4        PEAK FLOW RATE(CFS) =      11.04

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.51   HALFSTREET FLOOD WIDTH(FEET) =  19.34
  FLOW VELOCITY(FEET/SEC.) =  3.12   DEPTH*VELOCITY(FT*FT/SEC.) =   1.59
  LONGEST FLOWPATH FROM NODE    240.00 TO NODE    290.00 =     768.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    290.00 TO NODE    290.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.832
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6900
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.6079
  SUBAREA AREA(ACRES) =    0.06   SUBAREA RUNOFF(CFS) =    0.12
  TOTAL AREA(ACRES) =        6.5   TOTAL RUNOFF(CFS) =      11.16
  TC(MIN.) =   17.37

****************************************************************************
  FLOW PROCESS FROM NODE    290.00 TO NODE    290.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   17.37
  RAINFALL INTENSITY(INCH/HR) =   2.83
  TOTAL STREAM AREA(ACRES) =     6.48
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     11.16

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1       12.80    14.74        3.149          8.11
     2       11.16    17.37        2.832          6.48

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
     1       22.27    14.74       3.149
     2       22.67    17.37       2.832

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      22.67   Tc(MIN.) =   17.37
  TOTAL AREA(ACRES) =       14.6
  LONGEST FLOWPATH FROM NODE    240.00 TO NODE    290.00 =     948.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       14.6  TC(MIN.) =     17.37
  PEAK FLOW RATE(CFS)   =      22.67
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

APPENDIX C

Backup for Weighted Runoff Coefficients

19964 - AUBREY GLEN RUNOFF COEFFICENT DETERMINATION (PRE PROJECT)

Upstream Node	Downstream Node	TRIBUTARY AREA (SQ FT)	AREA (AC.)	%IMPERVIOUS (ASSUMED)	IMPERVIOUS POST PROJECT (SQFT)	SOIL TYPE	IMPERVIOUS RUNOFF COEFFICENT	PERVIOUS RUNOFF COEFFICENT	WEIGHTED RUNOFF COEFFICENT
BASIN 100/POC 1									
100	102	4356	0.1	0%	0	D	0.9	0.35	0.35
102	110	74052	1.7	5%	3703	D	0.9	0.35	0.38
110	115	8712	0.2	5%	436	C	0.9	0.30	0.33
115	120								
120	125	4356	0.1	0%	0	C	0.9	0.30	0.30
125	130	4356	0.1	0%	0	C	0.9	0.30	0.30
130	135	4356	0.1	0%	0	C	0.9	0.30	0.30
135	150	4356	0.1	0%	0	C	0.9	0.30	0.30
150	150	100188	2.3	65%	65122	C	0.9	0.30	0.69
150	250	4356	0.1	90%	3920	C	0.9	0.30	0.84
250	250	13068	0.3	90%	11761	C	0.9	0.30	0.84
250	260	17424	0.4	90%	15682	C	0.9	0.30	0.84
260	260	26136	0.6	90%	23522	C	0.9	0.30	0.84
260	270	8712	0.2	90%	7841	C	0.9	0.30	0.84
270	270								
BASIN 200/POC 1									
200	202	4356	0.1	50%	2178	C	0.9	0.3	0.60
202	205	13068	0.3	90%	11761	C	0.9	0.3	0.84
205	205	26136	0.6	65%	16988	C/D	0.9	0.33	0.70
205	207								
205	207	4356	0.1	0%	0	C/D	0.9	0.33	0.33
206	207	8712	0.2	65%	5663	C	0.9	0.3	0.69
206	207	21780	0.5	65%	14157	C	0.9	0.3	0.69
207	210								
208	210	26136	0.6	65%	16988	C	0.9	0.3	0.69
209	210	39204	0.9	65%	25483	C	0.9	0.3	0.69
210	215								
212	215	21780	0.5	65%	14157	C	0.9	0.3	0.69
215	220								

211	220	39204	0.9	65%	25483	C	0.9	0.3	0.69
217	220	17424	0.4	65%	11326	C	0.9	0.3	0.69
217	220								
218	220	4356	0.1	70%	3049	C	0.9	0.3	0.72
220	222								
222	225	17424	0.4	5%	871	C	0.9	0.3	0.33
225	230								
230	270	109335.6	2.51	90%	98402	C	0.9	0.3	0.84
270	270								
270	290	5227.2	0.12	90%	4704	C	0.9	0.3	0.84
290	290	2613.6	0.06	65%	1699	C	0.9	0.3	0.69
SUM		**635540.4**	**14.59**						

19964 - AUBREY GLEN RUNOFF COEFFICENT DETERMINATION (POST PROJECT)

Upstream Node	Downstream Node	TRIBUTARY AREA (SQ FT)	AREA (AC.)	%IMPERVIOUS (ASSUMED)	IMPERVIOUS POST PROJECT (SQFT)	SOIL TYPE	IMPERVIOUS RUNOFF COEFFICENT	PERVIOUS RUNOFF COEFFICENT	WEIGHTED RUNOFF COEFFICENT
BASIN 100/POC 1									
230 [1]	230 [1]	243936	5.6		0	C	0.9	0.3	
230	266								
266	266								
240	242	2178	0.05	78%	1699	C	0.9	0.3	0.77
242	244	7840.8	0.18	78%	6116	C	0.9	0.3	0.77
244	252								
252	252	4791.6	0.11	78%	3737	C	0.9	0.3	0.77
252	254								
254	254	43560	1.00	78%	33977	C	0.9	0.3	0.77
254	256								
256	256	3920.4	0.09	78%	3058	C	0.9	0.3	0.77
256	256	6969.6	0.16	78%	5436	C	0.9	0.3	0.77
256	258								
258	258	5227.2	0.12	78%	4077	C	0.9	0.3	0.77
258	260								
260	260	3049.2	0.07	78%	2378	C	0.9	0.3	0.77
260	260	3049.2	0.07	78%	2378	C	0.9	0.3	0.77
260	262								
262	262	10454.4	0.24	78%	8154	C	0.9	0.3	0.77
262	264								
264	264	10890	0.25	78%	8494	C	0.9	0.3	0.77
264	266								
266	266								
266	270								
270	270	7405.2	0.17	78%	5776	C	0.9	0.3	0.77
270	290								
290	290								
270 [2]	270 [2]	274428	6.3		0	C	0.9	0.3	
270	290	5227.2	0.12	78%	4077	C	0.9	0.3	0.77

290	290	2613.6	0.06	78%	2039	C	0.9	0.3	0.77
290	290								
SUM		**635540.4**	**14.59**						

Notes:

1. Node 230 is the summation of offsite areas of Basin 200 that are tributary to Node 270. There is no change in the offsite development and it is equivalent to the pre-project hydrolodgy for the offsite area in Basin 200 tributary to Node 270, hence the reason the AES code 7 and user information is specfied at that node. Reference the Post-Project Drainage Study Map provided in Map Pocket 2 of the Drainage Study for Aubrey Glen, published by RICK Engineering dated August 30th, 2024 or revision thereof for more specific information.

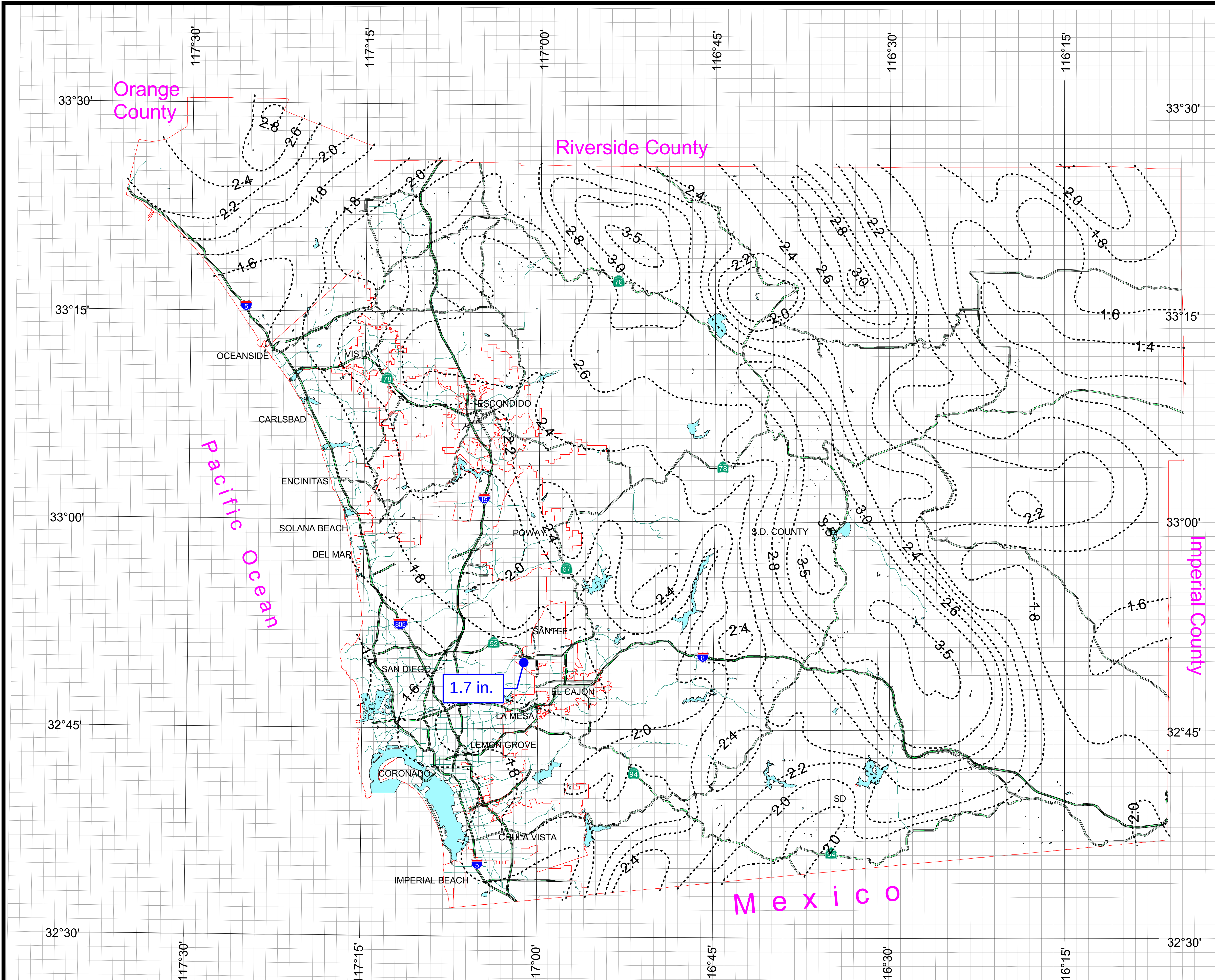
2. Node 270 is the summation of offsite areas of Basin 100 that are tributary to Node 270. There is no change in the offsite development and it is equivalent to the pre-project hydrolodgy for the offsite area in Basin 100 tributary to Node 270, hence the reason the AES code 7 and user information is specfied at that node. Reference the Post-Project Drainage Study Map provided in Map Pocket 2 of the Drainage Study for Aubrey Glen, published by RICK Engineering dated August 30th, 2024 or revision thereof for more specific information.

County of San Diego Hydrology Manual

Rainfall Isopluvials

10 Year Rainfall Event - 6 Hours

Isopluvial (inches)



Department of Public Works Geographic Information Services

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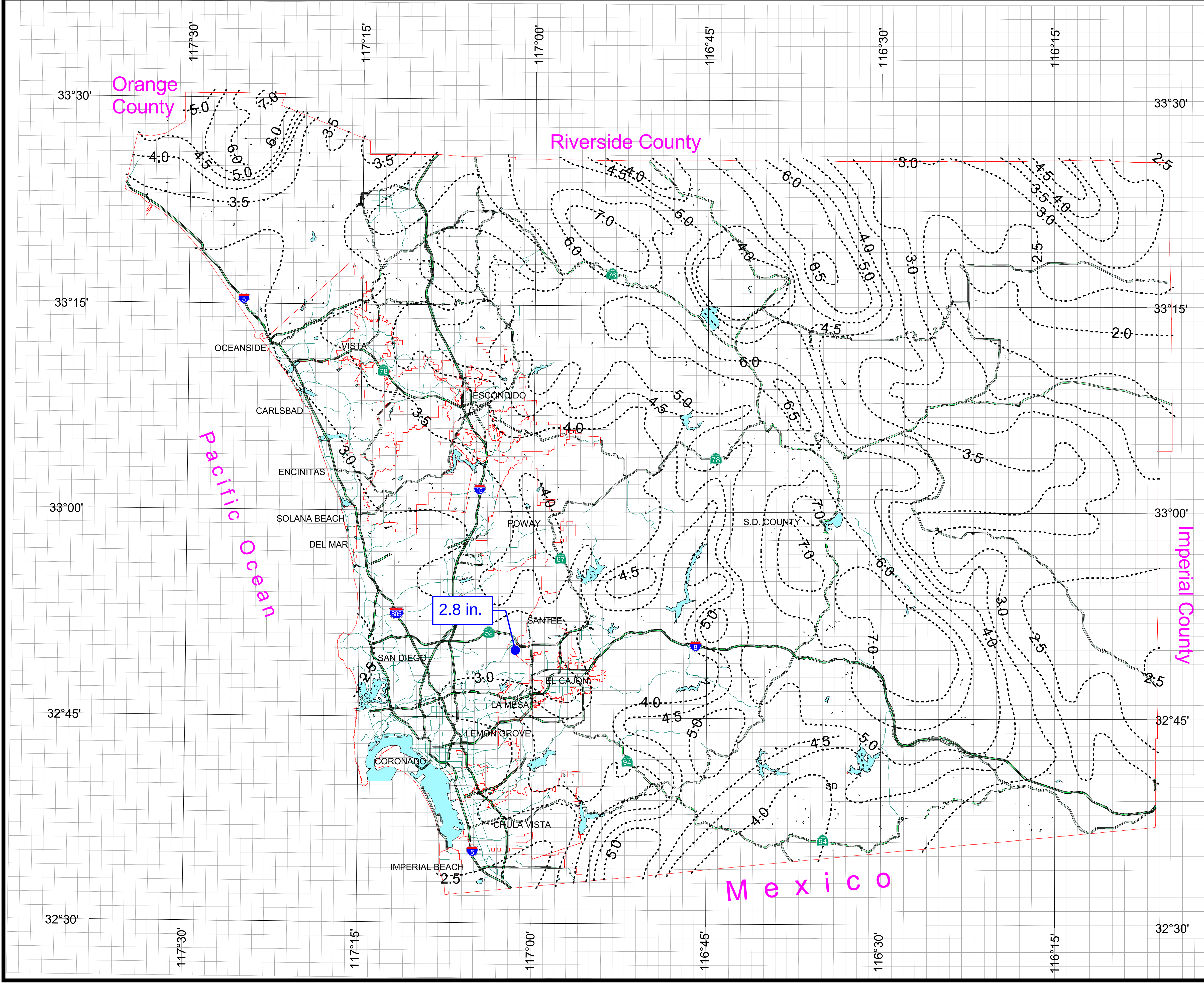
County of San Diego Hydrology Manual

Rainfall Isopluvials



10 Year Rainfall Event - 24 Hours

Isopluvial (inches)

DPW GIS
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Geographic Information Services

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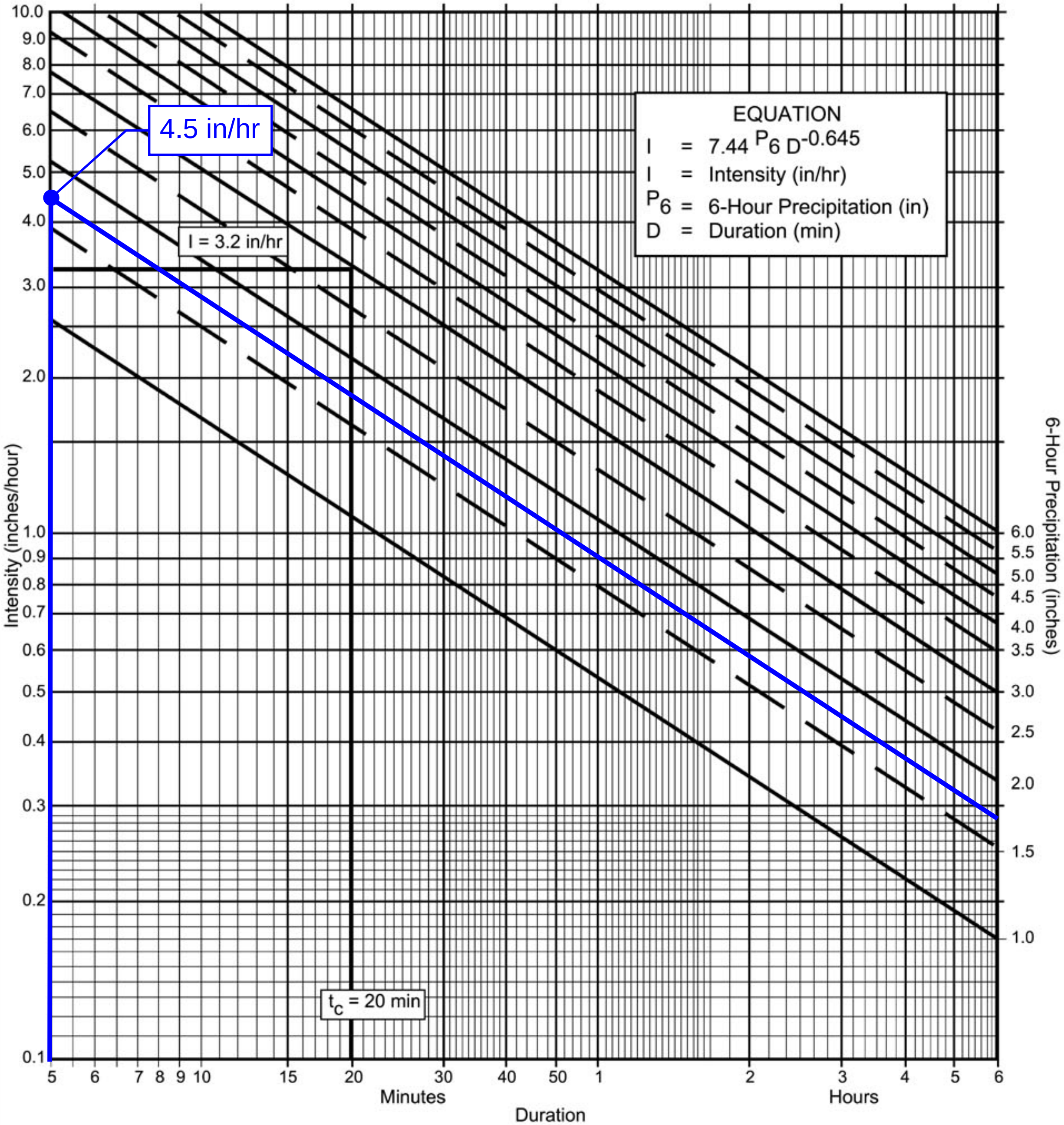
N S W E

3 0 3 Miles



Directions for Application:

(1) From precipitation maps determine 6 hr and 24 hr amounts for the selected frequency. These maps are included in the County Hydrology Manual (10, 50, and 100 yr maps included in the Design and Procedure Manual).

(2) Adjust 6 hr precipitation (if necessary) so that it is within the range of 45% to 65% of the 24 hr precipitation (not applicable to Desert).

(3) Plot 6 hr precipitation on the right side of the chart.

(4) Draw a line through the point parallel to the plotted lines.

(5) This line is the intensity-duration curve for the location being analyzed.

Application Form:

(a) Selected frequency ___10___ year

(b) P_6 = ___1.7___ in., P_{24} = ___2.8___, $\frac{P_6}{P_{24}}$ = ___60.7___ %(2)

(c) Adjusted $P_6^{(2)}$ = ___n/a___ in.

(d) t_x = ___20___ min.

(e) I = ___3.2___ in./hr.

Note: This chart replaces the Intensity-Duration-Frequency curves used since 1965.

P6	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
Duration	I	I	I	I	I	I	I	I	I	I	I
5	2.63	3.95	5.27	6.59	7.90	9.22	10.54	11.86	13.17	14.49	15.81
7	2.12	3.18	4.24	5.30	6.36	7.42	8.48	9.54	10.60	11.66	12.72
10	1.68	2.53	3.37	4.21	5.05	5.90	6.74	7.58	8.42	9.27	10.11
15	1.30	1.95	2.59	3.24	3.89	4.54	5.19	5.84	6.49	7.13	7.78
20	1.08	1.62	2.15	2.69	3.23	3.77	4.31	4.85	5.39	5.93	6.46
25	0.93	1.40	1.87	2.33	2.80	3.27	3.73	4.20	4.67	5.13	5.60
30	0.83	1.24	1.66	2.07	2.49	2.90	3.32	3.73	4.15	4.56	4.98
40	0.69	1.03	1.38	1.72	2.07	2.41	2.76	3.10	3.45	3.79	4.13
50	0.60	0.90	1.19	1.49	1.79	2.09	2.39	2.69	2.98	3.28	3.58
60	0.53	0.80	1.06	1.33	1.59	1.86	2.12	2.39	2.65	2.92	3.18
90	0.41	0.61	0.82	1.02	1.23	1.43	1.63	1.84	2.04	2.25	2.45
120	0.34	0.51	0.68	0.85	1.02	1.19	1.36	1.53	1.70	1.87	2.04
150	0.29	0.44	0.59	0.73	0.88	1.03	1.18	1.32	1.47	1.62	1.76
180	0.26	0.39	0.52	0.65	0.78	0.91	1.04	1.18	1.31	1.44	1.57
240	0.22	0.33	0.43	0.54	0.65	0.76	0.87	0.98	1.08	1.19	1.30
300	0.19	0.28	0.38	0.47	0.56	0.66	0.75	0.85	0.94	1.03	1.13
360	0.17	0.25	0.33	0.42	0.50	0.58	0.67	0.75	0.84	0.92	1.00

Intensity-Duration Design Chart - Example

FIGURE

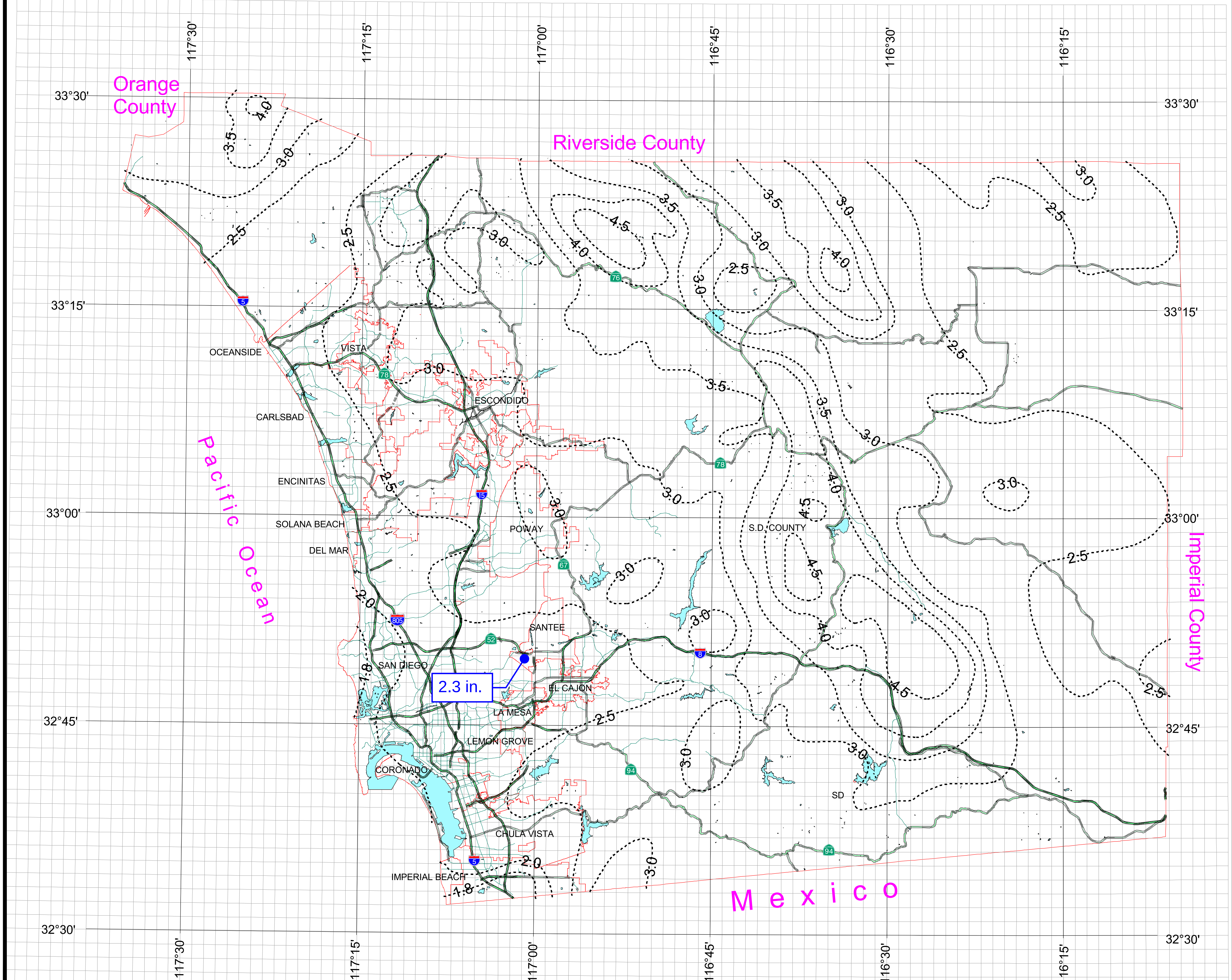
3-2

County of San Diego Hydrology Manual

Rainfall Isopluvials

50 Year Rainfall Event - 6 Hours

Isopluvial (inches)



Department of Public Works
Geographic Information Services

We Have San Diego Covered!

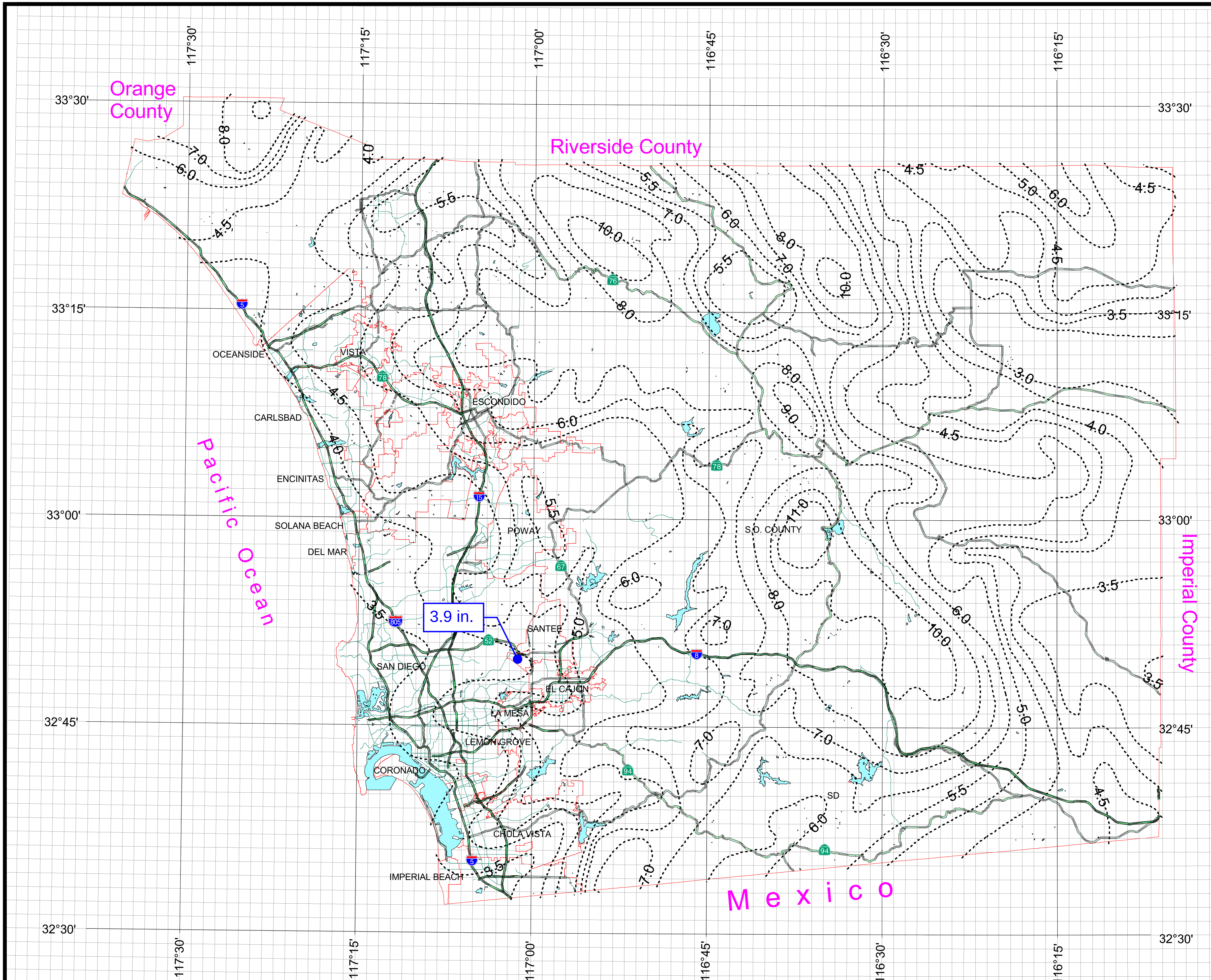
N
W
E
S

3 0 3 Miles

County of San Diego Hydrology Manual

Rainfall Isopluvials

50 Year Rainfall Event - 24 Hours

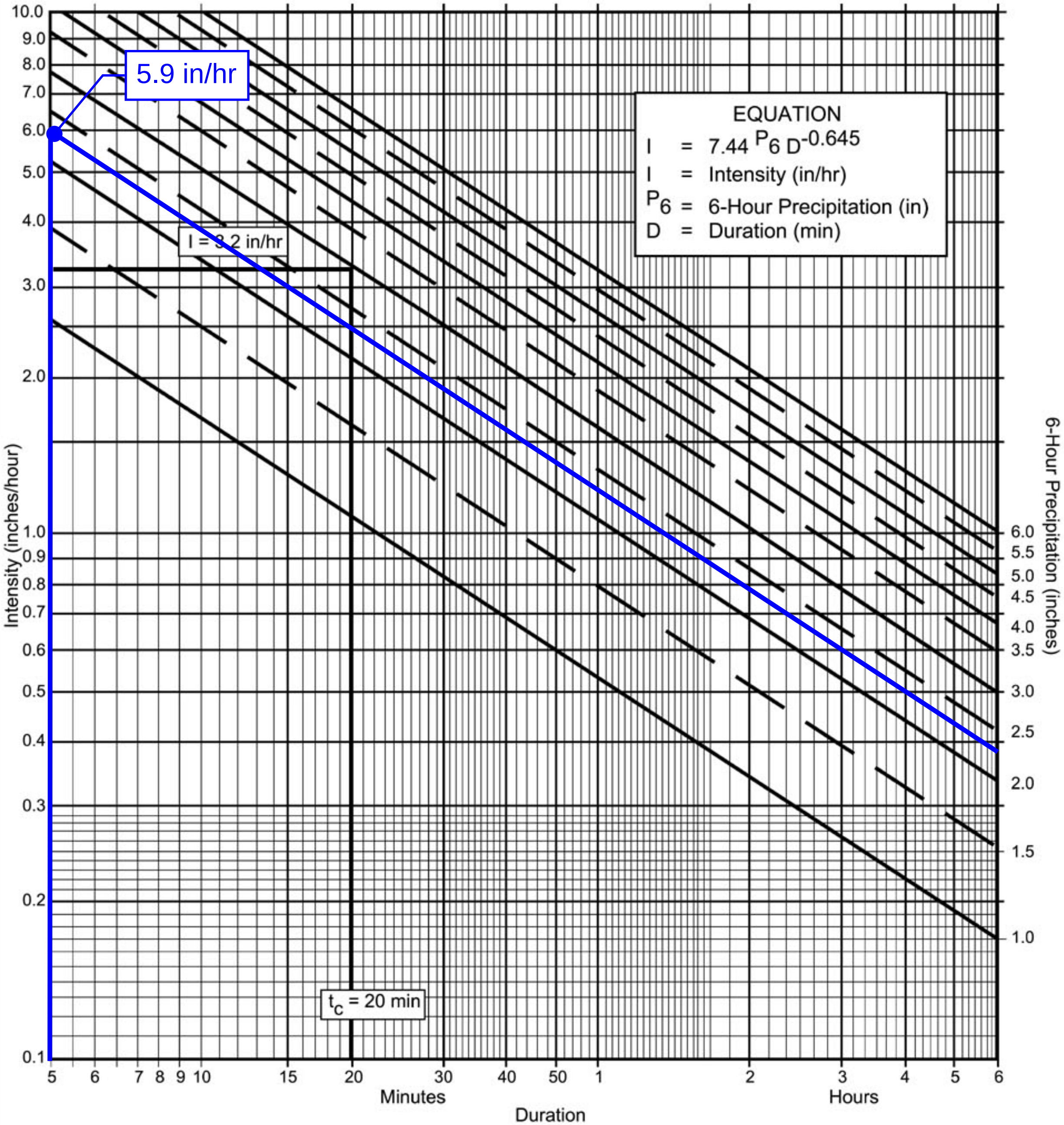


Isopluvial (inches)

DPW GIS
Department of Public Works
Geographic Information Services

SanGIS
We Have San Diego Covered!

3 0 3 Miles



Directions for Application:

(1) From precipitation maps determine 6 hr and 24 hr amounts for the selected frequency. These maps are included in the County Hydrology Manual (10, 50, and 100 yr maps included in the Design and Procedure Manual).

(2) Adjust 6 hr precipitation (if necessary) so that it is within the range of 45% to 65% of the 24 hr precipitation (not applicable to Desert).

(3) Plot 6 hr precipitation on the right side of the chart.

(4) Draw a line through the point parallel to the plotted lines.

(5) This line is the intensity-duration curve for the location being analyzed.

Application Form:

(a) Selected frequency 50 year

(b) P_6 = 2.3 in., P_{24} = 3.9 , $\frac{P_6}{P_{24}}$ = 58.9 %(2)

(c) Adjusted P_6(2) = n/a in.

(d) t_x = 20 min.

(e) I = 3.2 in./hr.

Note: This chart replaces the Intensity-Duration-Frequency curves used since 1965.

P6	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
Duration	I	I	I	I	I	I	I	I	I	I	I
5	2.63	3.95	5.27	6.59	7.90	9.22	10.54	11.86	13.17	14.49	15.81
7	2.12	3.18	4.24	5.30	6.36	7.42	8.48	9.54	10.60	11.66	12.72
10	1.68	2.53	3.37	4.21	5.05	5.90	6.74	7.58	8.42	9.27	10.11
15	1.30	1.95	2.59	3.24	3.89	4.54	5.19	5.84	6.49	7.13	7.78
20	1.08	1.62	2.15	2.69	3.23	3.77	4.31	4.85	5.39	5.93	6.46
25	0.93	1.40	1.87	2.33	2.80	3.27	3.73	4.20	4.67	5.13	5.60
30	0.83	1.24	1.66	2.07	2.49	2.90	3.32	3.73	4.15	4.56	4.98
40	0.69	1.03	1.38	1.72	2.07	2.41	2.76	3.10	3.45	3.79	4.13
50	0.60	0.90	1.19	1.49	1.79	2.09	2.39	2.69	2.98	3.28	3.58
60	0.53	0.80	1.06	1.33	1.59	1.86	2.12	2.39	2.65	2.92	3.18
90	0.41	0.61	0.82	1.02	1.23	1.43	1.63	1.84	2.04	2.25	2.45
120	0.34	0.51	0.68	0.85	1.02	1.19	1.36	1.53	1.70	1.87	2.04
150	0.29	0.44	0.59	0.73	0.88	1.03	1.18	1.32	1.47	1.62	1.76
180	0.26	0.39	0.52	0.65	0.78	0.91	1.04	1.18	1.31	1.44	1.57
240	0.22	0.33	0.43	0.54	0.65	0.76	0.87	0.98	1.08	1.19	1.30
300	0.19	0.28	0.38	0.47	0.56	0.66	0.75	0.85	0.94	1.03	1.13
360	0.17	0.25	0.33	0.42	0.50	0.58	0.67	0.75	0.84	0.92	1.00

Intensity-Duration Design Chart - Example

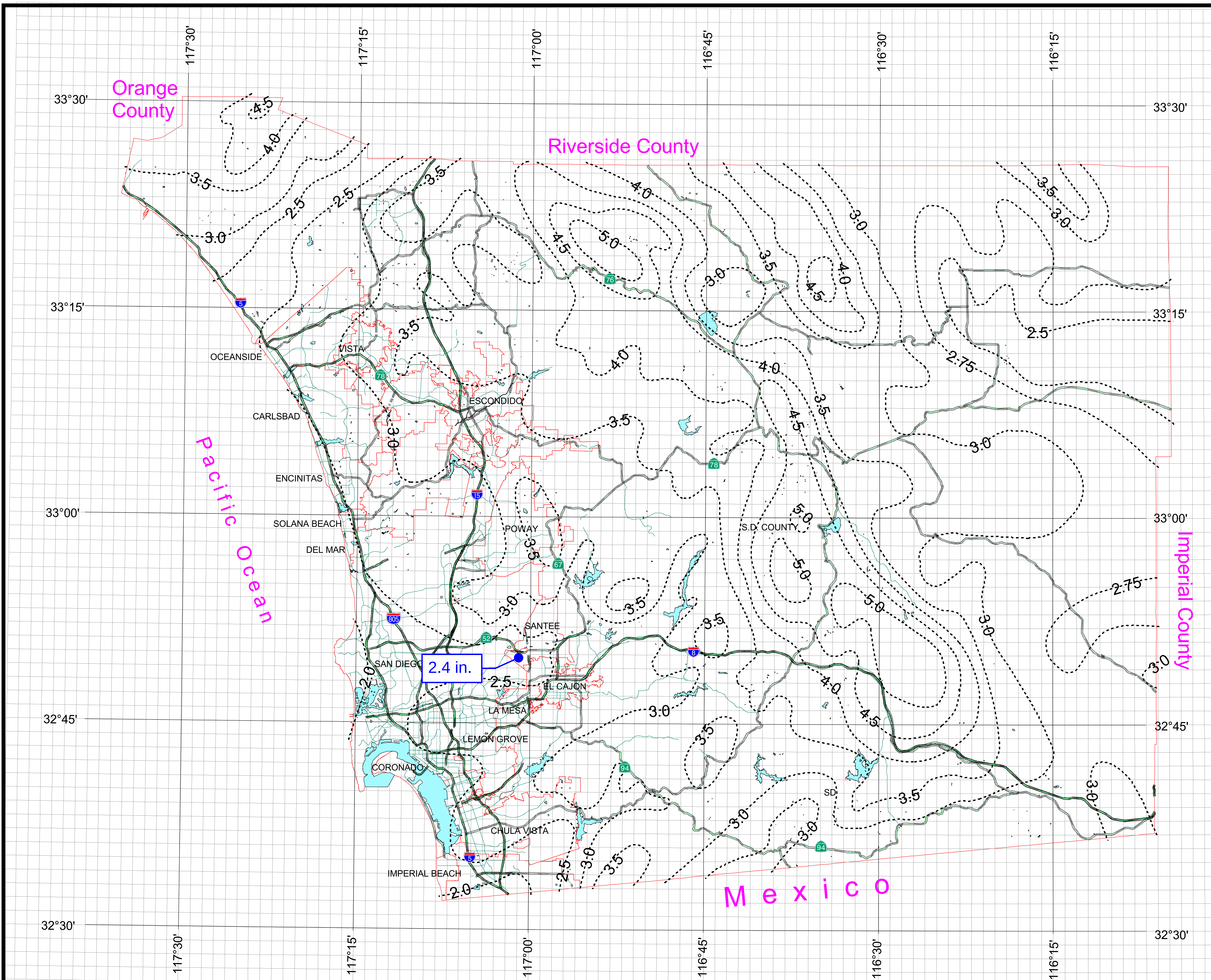
FIGURE

3-2

County of San Diego Hydrology Manual

Rainfall Isopluvials

100 Year Rainfall Event - 6 Hours



Isopluvial (inches)

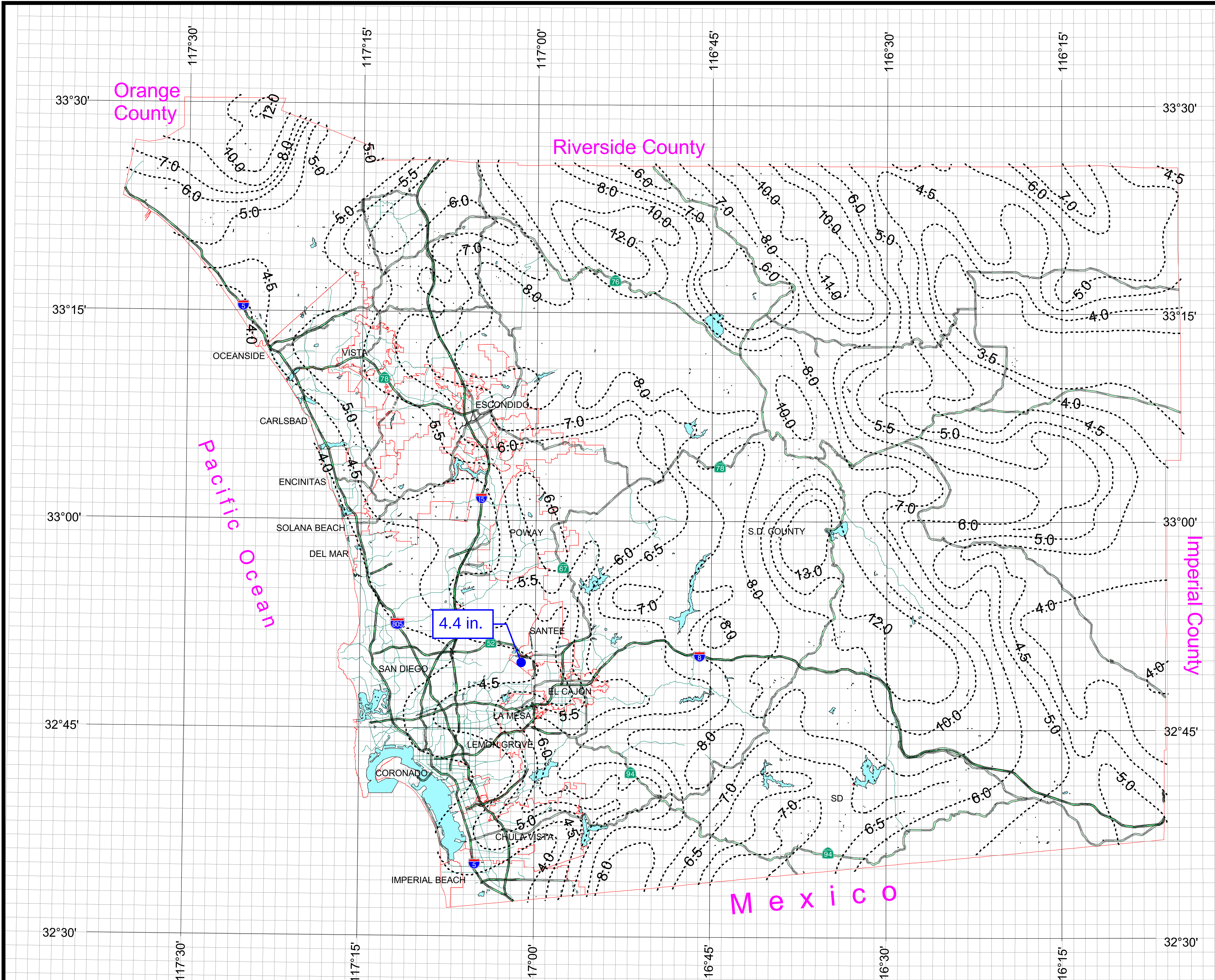
N
W E
S

3 0 3 Miles

County of San Diego Hydrology Manual

Rainfall Isopluvials

100 Year Rainfall Event - 24 Hours



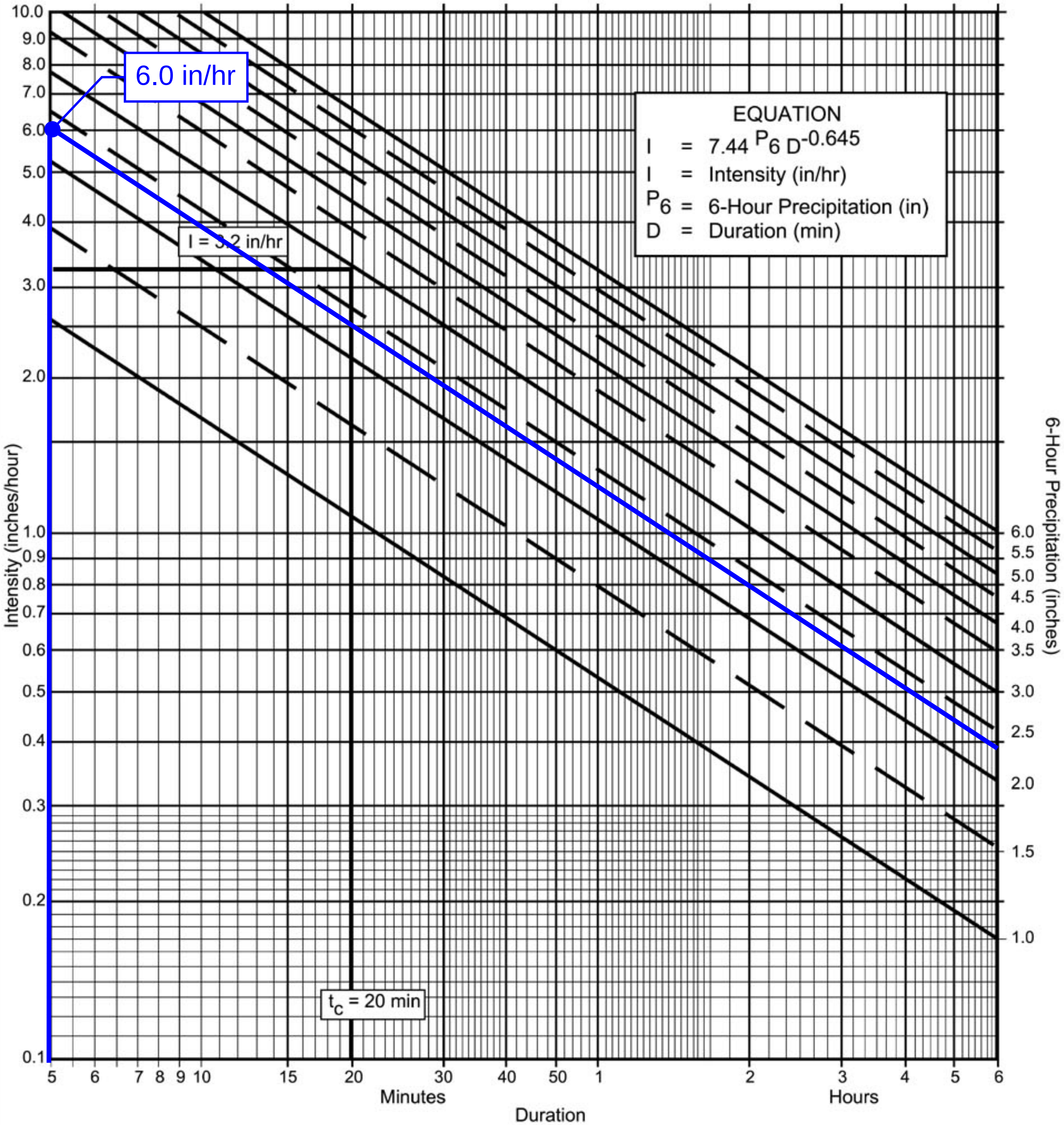
Legend	
- - - - -	Isopluvial (inches)

DPW GIS
Department of Public Works
Geographic Information Services

SanGIS
We Have San Diego Covered!

N S W E

3 0 3 Miles



Directions for Application:

(1) From precipitation maps determine 6 hr and 24 hr amounts for the selected frequency. These maps are included in the County Hydrology Manual (10, 50, and 100 yr maps included in the Design and Procedure Manual).

(2) Adjust 6 hr precipitation (if necessary) so that it is within the range of 45% to 65% of the 24 hr precipitation (not applicable to Desert).

(3) Plot 6 hr precipitation on the right side of the chart.

(4) Draw a line through the point parallel to the plotted lines.

(5) This line is the intensity-duration curve for the location being analyzed.

Application Form:

(a) Selected frequency 100 year

(b) P_6 = 2.4 in., P_{24} = 4.4, $\frac{P_6}{P_{24}}$ = 54.5 %(2)

(c) Adjusted P_6(2) = n/a in.

(d) t_x = 20 min.

(e) I = 3.2 in./hr.

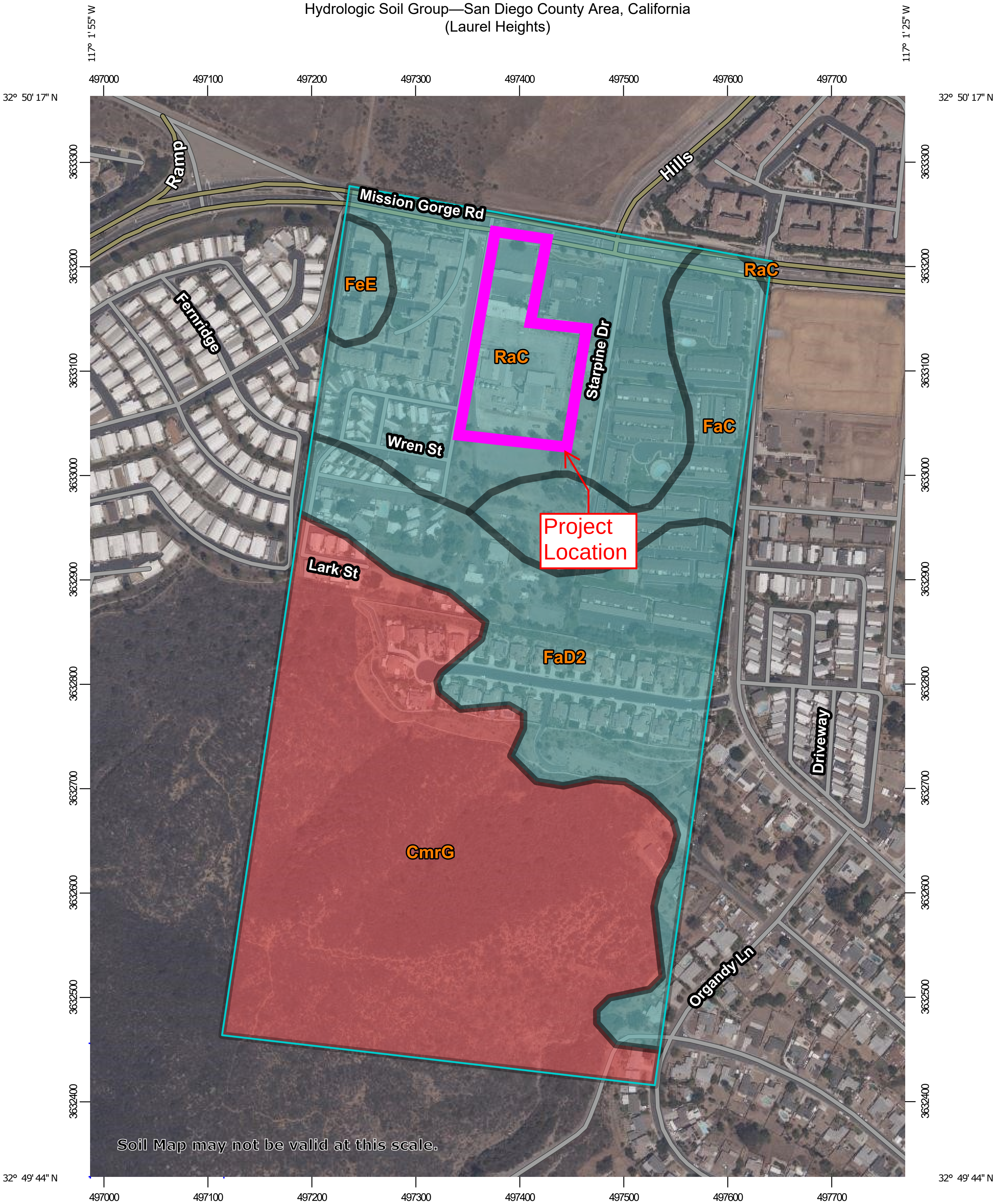
Note: This chart replaces the Intensity-Duration-Frequency curves used since 1965.

P6	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
Duration	I	I	I	I	I	I	I	I	I	I	I
5	2.63	3.95	5.27	6.59	7.90	9.22	10.54	11.86	13.17	14.49	15.81
7	2.12	3.18	4.24	5.30	6.36	7.42	8.48	9.54	10.60	11.66	12.72
10	1.68	2.53	3.37	4.21	5.05	5.90	6.74	7.58	8.42	9.27	10.11
15	1.30	1.95	2.59	3.24	3.89	4.54	5.19	5.84	6.49	7.13	7.78
20	1.08	1.62	2.15	2.69	3.23	3.77	4.31	4.85	5.39	5.93	6.46
25	0.93	1.40	1.87	2.33	2.80	3.27	3.73	4.20	4.67	5.13	5.60
30	0.83	1.24	1.66	2.07	2.49	2.90	3.32	3.73	4.15	4.56	4.98
40	0.69	1.03	1.38	1.72	2.07	2.41	2.76	3.10	3.45	3.79	4.13
50	0.60	0.90	1.19	1.49	1.79	2.09	2.39	2.69	2.98	3.28	3.58
60	0.53	0.80	1.06	1.33	1.59	1.86	2.12	2.39	2.65	2.92	3.18
90	0.41	0.61	0.82	1.02	1.23	1.43	1.63	1.84	2.04	2.25	2.45
120	0.34	0.51	0.68	0.85	1.02	1.19	1.36	1.53	1.70	1.87	2.04
150	0.29	0.44	0.59	0.73	0.88	1.03	1.18	1.32	1.47	1.62	1.76
180	0.26	0.39	0.52	0.65	0.78	0.91	1.04	1.18	1.31	1.44	1.57
240	0.22	0.33	0.43	0.54	0.65	0.76	0.87	0.98	1.08	1.19	1.30
300	0.19	0.28	0.38	0.47	0.56	0.66	0.75	0.85	0.94	1.03	1.13
360	0.17	0.25	0.33	0.42	0.50	0.58	0.67	0.75	0.84	0.92	1.00

Intensity-Duration Design Chart - Example

FIGURE 3-2

Hydrologic Soil Group—San Diego County Area, California
(Laurel Heights)



Map Scale: 1:5,050 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0, 50, 100, 200, 300

Feet: 0, 200, 400, 800, 1200

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

Soil Rating Polygons

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: San Diego County Area, California
Survey Area Data: Version 15, May 27, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Aug 22, 2018—Aug 31, 2018

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
CmrG	Cieneba very rocky coarse sandy loam, 30 to 75 percent slopes	D	36.5	43.8%
FaC	Fallbrook sandy loam, 5 to 9 percent slopes	C	7.5	9.0%
FaD2	Fallbrook sandy loam, 9 to 15 percent slopes, eroded	C	17.8	21.3%
FeE	Fallbrook rocky sandy loam, 9 to 30 percent slopes	C	1.4	1.6%
RaC	Ramona sandy loam, 5 to 9 percent slopes	C	20.3	24.3%
Totals for Area of Interest			**83.5**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

APPENDIX D

Inlet Sizing Calculations

Aubrey Glen
Jn-19964
11/06/2024

Grate Inlet Sizing (Weir vs. Orifice)

Weir coefficient, C_w	3.0
Orifice coefficient, C_o	0.60
Available head, h (feet)	0.25
Q100 (Node 252) cfs	0.44

Inlet Type	Effective Length, L_e (inches)	Effective Length, L_e (feet)	Debris Factor[3] x L_e (feet)	Effective Area, A_e (in^2)	Effective Area, A_e (ft^2)	Debris Factor[3] x A_e (ft^2)	Capacity based on Weir Equation[3, 4], Q_{cap} (cfs[5])	Capacity based on Orifice Equation[3, 4], Q_{cap} (cfs[5])	Governing Equation
1212 Series - 12"x12" Catch Basin[1]	51.17	4.26	2.13	160.79	1.12	0.56	0.8	1.3	Weir
1218 Series - 12"x18" Catch Basin[1]	59.17	4.93	2.47	214.44	1.49	0.74	0.9	1.8	Weir
1818 Series - 18"x18" Catch Basin[1]	67.06	5.59	2.79	272.77	1.89	0.95	1.0	2.3	Weir
2424 Series - 24"x24" Catch Basin[1]	86.72	7.23	3.61	455.94	3.17	1.58	1.4	3.8	Weir
3636 Series - 36"x36" Catch Basin[1]	126.38	10.53	5.27	952.59	6.62	3.31	2.0	8.0	Weir

Type 'I' Catch Basin[2]	110.75	9.23	4.61	699.56	4.86	2.43	1.7	5.8	Weir

Note:

1. Based on Brooks Products, Inc. - H 20-44 Traffic, Steel Grate, not Parkway, Cast-iron grate
2. Based on Drawing Number D-13 & D-15 in the City of San Diego Regional Standard Drawings, dated April 2003
3. A reduction factor of 50% assumed for clogging.
4. Weir equation, $Q = C_w L_e (h)^{3/2}$; Orifice equation, $Q = C_o A_e (2gh)^{1/2}$
5. "cfs" = cubic feet per second

Aubrey Glen
Jn-19964
11/06/2024

Grate Inlet Sizing (Weir vs. Orifice)

Weir coefficient, C_w	3.0
Orifice coefficient, C_o	0.60
Available head, h (feet)	0.25
Q100 (Node 256, 0.09 AC) cfs	0.34

Inlet Type	Effective Length, L_e (inches)	Effective Length, L_e (feet)	Debris Factor[3] x L_e (feet)	Effective Area, A_e (in^2)	Effective Area, A_e (ft^2)	Debris Factor[3] x A_e (ft^2)	Capacity based on Weir Equation[3, 4], Q_{cap} (cfs[5])	Capacity based on Orifice Equation[3, 4], Q_{cap} (cfs[5])	Governing Equation
1212 Series - 12"x12" Catch Basin[1]	51.17	4.26	2.13	160.79	1.12	0.56	0.8	1.3	Weir
1218 Series - 12"x18" Catch Basin[1]	59.17	4.93	2.47	214.44	1.49	0.74	0.9	1.8	Weir
1818 Series - 18"x18" Catch Basin[1]	67.06	5.59	2.79	272.77	1.89	0.95	1.0	2.3	Weir
2424 Series - 24"x24" Catch Basin[1]	86.72	7.23	3.61	455.94	3.17	1.58	1.4	3.8	Weir
3636 Series - 36"x36" Catch Basin[1]	126.38	10.53	5.27	952.59	6.62	3.31	2.0	8.0	Weir
Type 'I' Catch Basin[2]	110.75	9.23	4.61	699.56	4.86	2.43	1.7	5.8	Weir

Note:

1. Based on Brooks Products, Inc. - H 20-44 Traffic, Steel Grate, not Parkway, Cast-iron grate
2. Based on Drawing Number D-13 & D-15 in the City of San Diego Regional Standard Drawings, dated April 2003
3. A reduction factor of 50% assumed for clogging.
4. Weir equation, $Q = C_w L_e (h)^{3/2}$; Orifice equation, $Q = C_o A_e (2gh)^{1/2}$
5. "cfs" = cubic feet per second

Aubrey Glen
Jn-19964
11/06/2024

Grate Inlet Sizing (Weir vs. Orifice)

Weir coefficient, C_w	3.0
Orifice coefficient, C_o	0.60
Available head, h (feet)	0.25
Q100 (Node 256, 0.16 AC) cfs	0.61

Inlet Type	Effective Length, L_e (inches)	Effective Length, L_e (feet)	Debris Factor[3] x L_e (feet)	Effective Area, A_e (in^2)	Effective Area, A_e (ft^2)	Debris Factor[3] x A_e (ft^2)	Capacity based on Weir Equation[3, 4], Q_{cap} (cfs[5])	Capacity based on Orifice Equation[3, 4], Q_{cap} (cfs[5])	Governing Equation
1212 Series - 12"x12" Catch Basin[1]	51.17	4.26	2.13	160.79	1.12	0.56	0.8	1.3	Weir
1218 Series - 12"x18" Catch Basin[1]	59.17	4.93	2.47	214.44	1.49	0.74	0.9	1.8	Weir
1818 Series - 18"x18" Catch Basin[1]	67.06	5.59	2.79	272.77	1.89	0.95	1.0	2.3	Weir
2424 Series - 24"x24" Catch Basin[1]	86.72	7.23	3.61	455.94	3.17	1.58	1.4	3.8	Weir
3636 Series - 36"x36" Catch Basin[1]	126.38	10.53	5.27	952.59	6.62	3.31	2.0	8.0	Weir
Type 'I' Catch Basin[2]	110.75	9.23	4.61	699.56	4.86	2.43	1.7	5.8	Weir

Note:
1. Based on Brooks Products, Inc. - H 20-44 Traffic, Steel Grate, not Parkway, Cast-iron grate
2. Based on Drawing Number D-13 & D-15 in the City of San Diego Regional Standard Drawings, dated April 2003
3. A reduction factor of 50% assumed for clogging.
4. Weir equation, $Q = C_w L_e (h)^{3/2}$; Orifice equation, $Q = C_o A_e (2gh)^{1/2}$
5. "cfs" = cubic feet per second

Aubrey Glen
Jn-19964
11/06/2024

Grate Inlet Sizing (Weir vs. Orifice)

Weir coefficient, C_w	3.0
Orifice coefficient, C_o	0.60
Available head, h (feet)	0.25
Q100 (Node (260) cfs	0.26

Inlet Type	Effective Length, L_e (inches)	Effective Length, L_e (feet)	Debris Factor[3] x L_e (feet)	Effective Area, A_e (in^2)	Effective Area, A_e (ft^2)	Debris Factor[3] x A_e (ft^2)	Capacity based on Weir Equation[3, 4], Q_{cap} (cfs[5])	Capacity based on Orifice Equation[3, 4], Q_{cap} (cfs[5])	Governing Equation
1212 Series - 12"x12" Catch Basin[1]	51.17	4.26	2.13	160.79	1.12	0.56	0.8	1.3	Weir
1218 Series - 12"x18" Catch Basin[1]	59.17	4.93	2.47	214.44	1.49	0.74	0.9	1.8	Weir
1818 Series - 18"x18" Catch Basin[1]	67.06	5.59	2.79	272.77	1.89	0.95	1.0	2.3	Weir
2424 Series - 24"x24" Catch Basin[1]	86.72	7.23	3.61	455.94	3.17	1.58	1.4	3.8	Weir
3636 Series - 36"x36" Catch Basin[1]	126.38	10.53	5.27	952.59	6.62	3.31	2.0	8.0	Weir
Type 'I' Catch Basin[2]	110.75	9.23	4.61	699.56	4.86	2.43	1.7	5.8	Weir

Note:
1. Based on Brooks Products, Inc. - H 20-44 Traffic, Steel Grate, not Parkway, Cast-iron grate
2. Based on Drawing Number D-13 & D-15 in the City of San Diego Regional Standard Drawings, dated April 2003
3. A reduction factor of 50% assumed for clogging.
4. Weir equation, $Q = C_w L_e (h)^{3/2}$; Orifice equation, $Q = C_o A_e (2gh)^{1/2}$
5. "cfs" = cubic feet per second

Aubrey Glen
Jn-19964
11/06/2024

Grate Inlet Sizing (Weir vs. Orifice)

Weir coefficient, C_w	3.0
Orifice coefficient, C_o	0.60
Available head, h (feet)	0.25
Q100 (Node (270) cfs	0.59

Inlet Type	Effective Length, L_e (inches)	Effective Length, L_e (feet)	Debris Factor[3] x L_e (feet)	Effective Area, A_e (in^2)	Effective Area, A_e (ft^2)	Debris Factor[3] x A_e (ft^2)	Capacity based on Weir Equation[3, 4], Q_{cap} (cfs[5])	Capacity based on Orifice Equation[3, 4], Q_{cap} (cfs[5])	Governing Equation
1212 Series - 12"x12" Catch Basin[1]	51.17	4.26	2.13	160.79	1.12	0.56	0.8	1.3	Weir
1218 Series - 12"x18" Catch Basin[1]	59.17	4.93	2.47	214.44	1.49	0.74	0.9	1.8	Weir
1818 Series - 18"x18" Catch Basin[1]	67.06	5.59	2.79	272.77	1.89	0.95	1.0	2.3	Weir
2424 Series - 24"x24" Catch Basin[1]	86.72	7.23	3.61	455.94	3.17	1.58	1.4	3.8	Weir
3636 Series - 36"x36" Catch Basin[1]	126.38	10.53	5.27	952.59	6.62	3.31	2.0	8.0	Weir
Type 'I' Catch Basin[2]	110.75	9.23	4.61	699.56	4.86	2.43	1.7	5.8	Weir

Note:

1. Based on Brooks Products, Inc. - H 20-44 Traffic, Steel Grate, not Parkway, Cast-iron grate
2. Based on Drawing Number D-13 & D-15 in the City of San Diego Regional Standard Drawings, dated April 2003
3. A reduction factor of 50% assumed for clogging.
4. Weir equation, $Q = C_w L_e (h)^{3/2}$; Orifice equation, $Q = C_o A_e (2gh)^{1/2}$
5. "cfs" = cubic feet per second

Hydraulic Analysis Report

Project Data

Project Title: 19964 - Aubrey Glen

Designer:

Project Date: Thursday, October 19, 2023

Project Units: U.S. Customary Units

Notes:

Curb and Gutter Analysis: Node 244

Notes:

Gutter Input Parameters

Longitudinal Slope of Road: 0.0200 ft/ft

Cross-Slope of Pavement: 0.0200 ft/ft

Uniform Gutter Geometry

Manning's n: 0.0130

Gutter Width: 1.5000 ft

Design Flow: 1.0000 cfs

Gutter Result Parameters

Width of Spread: 5.8556 ft

Gutter Depression: 0.0000 in

Area of Flow: 0.3429 ft^2

Eo (Gutter Flow to Total Flow): 0.5462

Gutter Depth at Curb: 1.4053 in

Inlet Input Parameters

Inlet Location: Inlet on Grade

Inlet Type: Curb Opening

Length of Inlet: 8.0000 ft

Local Depression: 4.0000 in

Inlet Result Parameters

Intercepted Flow: 0.9994 cfs

Bypass Flow: 0.0006 cfs

Efficiency: 0.9994

Curb and Gutter Analysis: Node 254

Notes:

Gutter Input Parameters

Longitudinal Slope of Road: 0.0200 ft/ft

Cross-Slope of Pavement: 0.0200 ft/ft

Uniform Gutter Geometry

Manning's n: 0.0130

Gutter Width: 1.5000 ft

Design Flow: 3.9000 cfs

Gutter Result Parameters

Width of Spread: 9.7549 ft

Gutter Depression: 0.0000 in

Area of Flow: 0.9516 ft^2

Eo (Gutter Flow to Total Flow): 0.3597

Gutter Depth at Curb: 2.3412 in

Inlet Input Parameters

Inlet Location: Inlet on Grade

Inlet Type: Curb Opening

Length of Inlet: 18.0000 ft

Local Depression: 4.0000 in

Inlet Result Parameters

Intercepted Flow: 3.9000 cfs

Bypass Flow: 0.0000 cfs

Efficiency: 1.0000

Curb and Gutter Analysis: Node 258

Notes:

Gutter Input Parameters

Longitudinal Slope of Road: 0.0200 ft/ft

Cross-Slope of Pavement: 0.0200 ft/ft

Uniform Gutter Geometry

Manning's n: 0.0130

Gutter Width: 1.5000 ft

Design Flow: 0.4500 cfs

Gutter Result Parameters

Width of Spread: 4.3404 ft

Gutter Depression: 0.0000 in

Area of Flow: 0.1884 ft^2

Eo (Gutter Flow to Total Flow): 0.6777

Gutter Depth at Curb: 1.0417 in

Inlet Input Parameters

Inlet Location: Inlet on Grade

Inlet Type: Curb Opening

Length of Inlet: 6.0000 ft

Local Depression: 4.0000 in

Inlet Result Parameters

Intercepted Flow: 0.4500 cfs

Bypass Flow: 0.0000 cfs

Efficiency: 1.0000

Curb and Gutter Analysis: Node 262

Notes:

Gutter Input Parameters

Longitudinal Slope of Road: 0.0200 ft/ft

Cross-Slope of Pavement: 0.0200 ft/ft

Uniform Gutter Geometry

Manning's n: 0.0130

Gutter Width: 1.5000 ft

Design Flow: 0.8800 cfs

Gutter Result Parameters

Width of Spread: 5.5815 ft

Gutter Depression: 0.0000 in

Area of Flow: 0.3115 ft^2

Eo (Gutter Flow to Total Flow): 0.5664

Gutter Depth at Curb: 1.3396 in

Inlet Input Parameters

Inlet Location: Inlet on Grade

Inlet Type: Curb Opening

Length of Inlet: 8.0000 ft

Local Depression: 4.0000 in

Inlet Result Parameters

Intercepted Flow: 0.8800 cfs

Bypass Flow: 0.0000 cfs

Efficiency: 1.0000

Curb and Gutter Analysis: Node 264

Notes:

Gutter Input Parameters

Longitudinal Slope of Road: 0.0200 ft/ft

Cross-Slope of Pavement: 0.0200 ft/ft

Uniform Gutter Geometry

Manning's n: 0.0130

Gutter Width: 1.5000 ft

Design Flow: 0.9100 cfs

Gutter Result Parameters

Width of Spread: 5.6521 ft

Gutter Depression: 0.0000 in

Area of Flow: 0.3195 ft^2

Eo (Gutter Flow to Total Flow): 0.5611

Gutter Depth at Curb: 1.3565 in

Inlet Input Parameters

Inlet Location: Inlet on Grade

Inlet Type: Curb Opening

Length of Inlet: 8.0000 ft

Local Depression: 4.0000 in

Inlet Result Parameters

Intercepted Flow: 0.9100 cfs

Bypass Flow: 0.0000 cfs

Efficiency: 1.0000

APPENDIX E

Storm Drain Sizing Calculations

Aubrey Glen
J-19964
11/7/2024

Preliminary Storm Drain Size

The purpose of this table is to provide an estimated pipe size to convey the 100-year flow rates with a sizing factor.

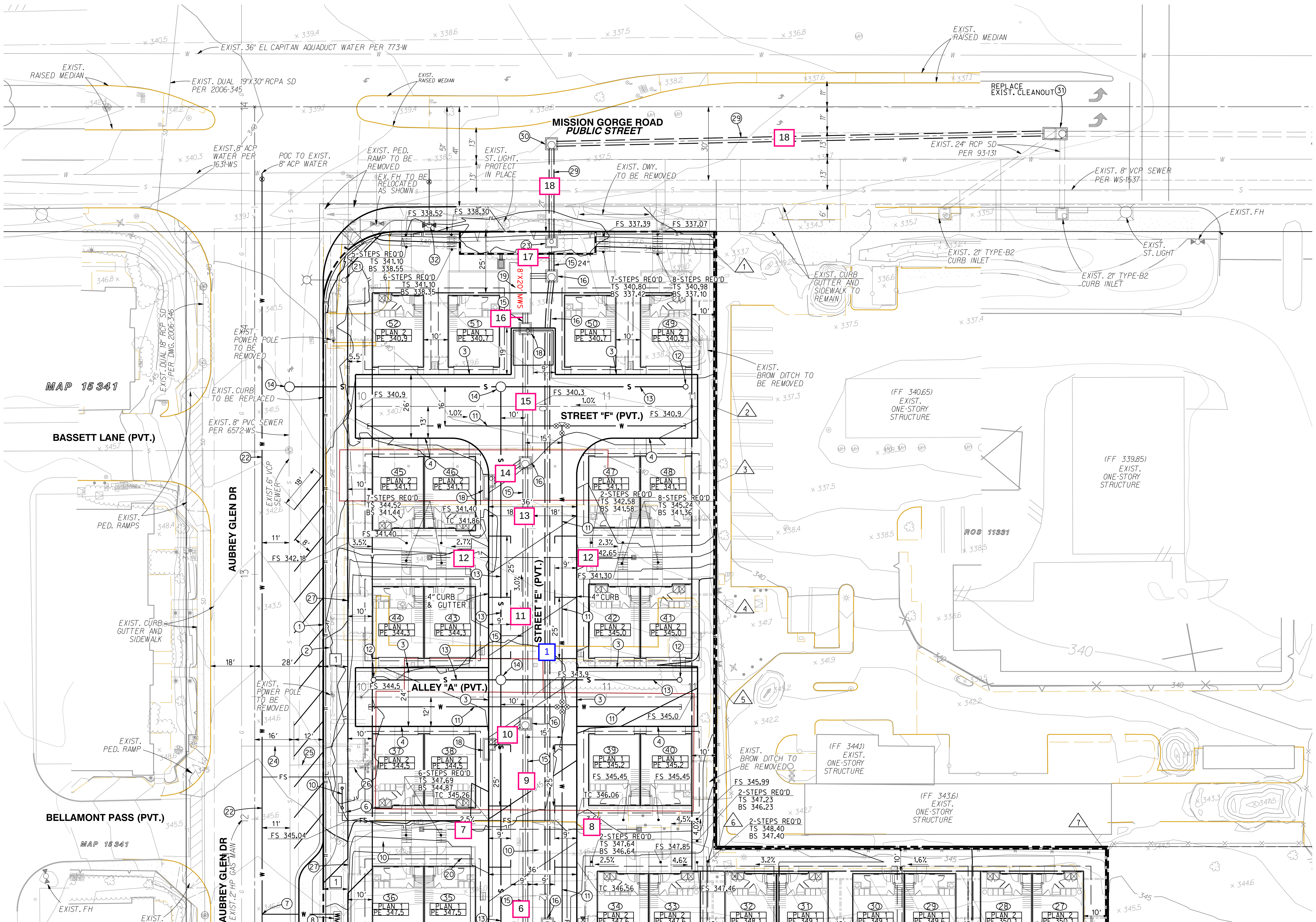
Manning's n: 0.013

Sizing Factor (%): 30

			Slope at:	1.0%		2.0%	
Node ID (Post-Project)	Storm Drain ID	Q_{100} (cfs[1])	Q_{100} with Sizing Factor (cfs[1])	Minimum Pipe Size[2] (feet)	~~Recommended Pipe Size (inches)~~	Minimum Pipe Size[2] (feet)	Recommended Pipe Size (inches)
230-266 (Detained Flow)	1	6.9	8.97	~~1.41~~	~~18"~~	1.24	18"
230-266 (Undetained Flow)	1	20.0	26.00	~~2.11~~	~~30"~~	1.85	24"
244-252	2	1.00	1.30	0.68	10"	0.60	8"
252 (Curb Inlet Lateral)	3	0.45	0.59	0.51	6"	0.45	6"
252-254	4	1.38	1.79	0.77	10"	0.68	10"
254 Lateral	5	3.94	5.12	1.14	18"	1.01	12"
254-256	6	5.27	6.85	1.28	18"	1.12	18"
256 (Grate Inlet Lateral)	7	0.35	0.46	0.46	6"	0.41	6"
256 (Grate Inlet Lateral)	8	0.62	0.81	0.57	8"	0.50	6"
256-258	9	6.15	8.00	1.35	18"	1.19	18"
258 (Curb Inlet Lateral)	10	0.46	0.60	0.51	6"	0.45	6"
258-260	11	6.54	8.50	1.38	18"	1.22	18"
260 (Grate Inlet Laterals)	12	0.26	0.34	0.41	6"	0.36	6"
260-262	13	6.97	9.06	1.42	18"	1.24	18"
262 (Curb Inlet Lateral)	14	0.90	1.17	0.66	8"	0.58	8"
262-264	15	7.80	10.14	1.48	18"	1.30	18"
264-266	16	8.63	11.22	1.54	24"	1.35	18"
266-270 (Detained Flow)	17	12.80	16.64	1.78	24"	1.56	24"
270-290 (Detained Flow)	18	12.80	16.64	1.78	24"	1.56	24"
266-270 (Undetained Flow)	17	28.25	36.73	2.40	24" [3]	2.10	24" [3]
270-290 (Undetained Flow)	18	28.25	36.73	2.40	24" [3]	2.10	24" [3]

Note:

1. "cfs" = cubic feet per second.
2. Minimum pipe sizes are calculated using the Manning's equation and are based on the flow rates with 30% factor.
3. The existing infrasture at the tie-in location is 24" storm drain. To avoid telescoping, the recommended pipe size at this location is limited to a 24".



SEE SHEET 7

CONSTRUCTION NOTES

1. PROPOSED 6" CURB & GUTTER PER RSD G-02 (PUBLIC)
2. PROPOSED 5' SIDEWALK PER RSD G-07 (PUBLIC)
3. PROPOSED 4" ROLLED CURB. SEE DETAIL, SHT. 3 (PVT.)
4. PROPOSED 0" CURB (PVT.)
5. PROPOSED SIDEWALK PER RSD G-07 (PVT.)
6. PROPOSED FIRE SERVICE W/ RPDA (PVT.)
7. PROPOSED DOMESTIC WATER LATERAL (PVT.)
8. PROPOSED DOMESTIC WATER METER ASSEMBLY
9. PROPOSED DOMESTIC WATER RP DEVICE (PVT.)
10. PROPOSED FIRE SERVICE (PVT.)
11. PROPOSED DOMESTIC WATER (PVT.)
12. PROPOSED SEWER CLEANOUT (PVT.)
13. PROPOSED SEWER MAIN (PVT.)
14. PROPOSED SEWER MANHOLE (PVT.)
15. PROPOSED STORM DRAIN (PVT.) (18" HDPE UNLESS NOTED OTHERWISE)
16. PROPOSED STORM DRAIN CLEAN OUT (PVT.) (RSD D-09)
17. PROPOSED STORM DRAIN INLET (PVT.) (PROVIDE "NO DUMPING" STENCILING
18. PROPOSED STORM DRAIN TYPE-A CURB INLET (PVT.) (RSD D-01) (PROVIDE "NO DUMPING" STENCILING
19. PROPOSED S.D. WATER QUALITY TREATMENT DEVICE (PVT.) (MODULAR WETLAND SYSTEM) (BMP-1)
20. PROPOSED FIRE HYDRANT (PVT.)
21. PROPOSED STREET LIGHT (PVT.)
22. PROPOSED 10" PVC WATER MAIN (PUBLIC)
23. PROPOSED TYPE F CATCH BASIN PER RSD D-07 (PVT.)
24. *EXIST. GAS LATERAL TO BE REMOVED. CAP AT MAIN.*
25. *EXIST. SEWER LATERAL TO BE REMOVED. CAP AT MAIN.*
26. *EXIST. WATER LATERAL TO BE REMOVED. CAP AT MAIN.*
27. *EXIST. 6" ACP WATER MAIN TO BE REMOVED/ABANDONED*
29. PROPOSED 24" RCP STORM DRAIN (PUBLIC)
30. PROPOSED STORM DRAIN CLEANOUT PER RSD D-09 (TYPE-A) (PUBLIC)
31. PROPOSED STORM DRAIN CLEANOUT PER RSD D-10 (TYPE-B9) (PUBLIC)
32. PROPOSED FIRE HYDRANT PER WAS. STD. WF-02

WALL ELEVATION TABLE

XX	TW	BW
1	341.0	337.0
2	341.5	338.5
3	341.0	339.8
4	345.1	342.0
5	345.5	342.9
6	348.5	344.5
7	350.5	343.5

EASEMENT TABLE

1. *EXIST. 10' PADRA DAM MUNICIPAL WATER DISTRICT EASEMENT TO BE VACATED.*

PDMWD EASEMENT NOTE:
ALL DISTRICT FACILITIES, I.E. WATER MAINS, FIRE HYDRANTS, WATER METERS, BLOW OFF VALVES, AIR-VAC VALVES, AND ALL RELATED APPURTENANCES SHOWN HEREON WITHIN PRIVATE PROPERTY ARE TO BE LOCATED WITHIN A UTILITY EASEMENT DEDICATED TO PADRE DAM MUNICIPAL WATER DISTRICT FOR ACCESS AND MAINTENANCE TO SAID FACILITIES. SAID EASEMENT WILL BE SHOWN ON ALL FINAL CONSTRUCTION DOCUMENTS

GRAPHIC SCALE 1" = 20'

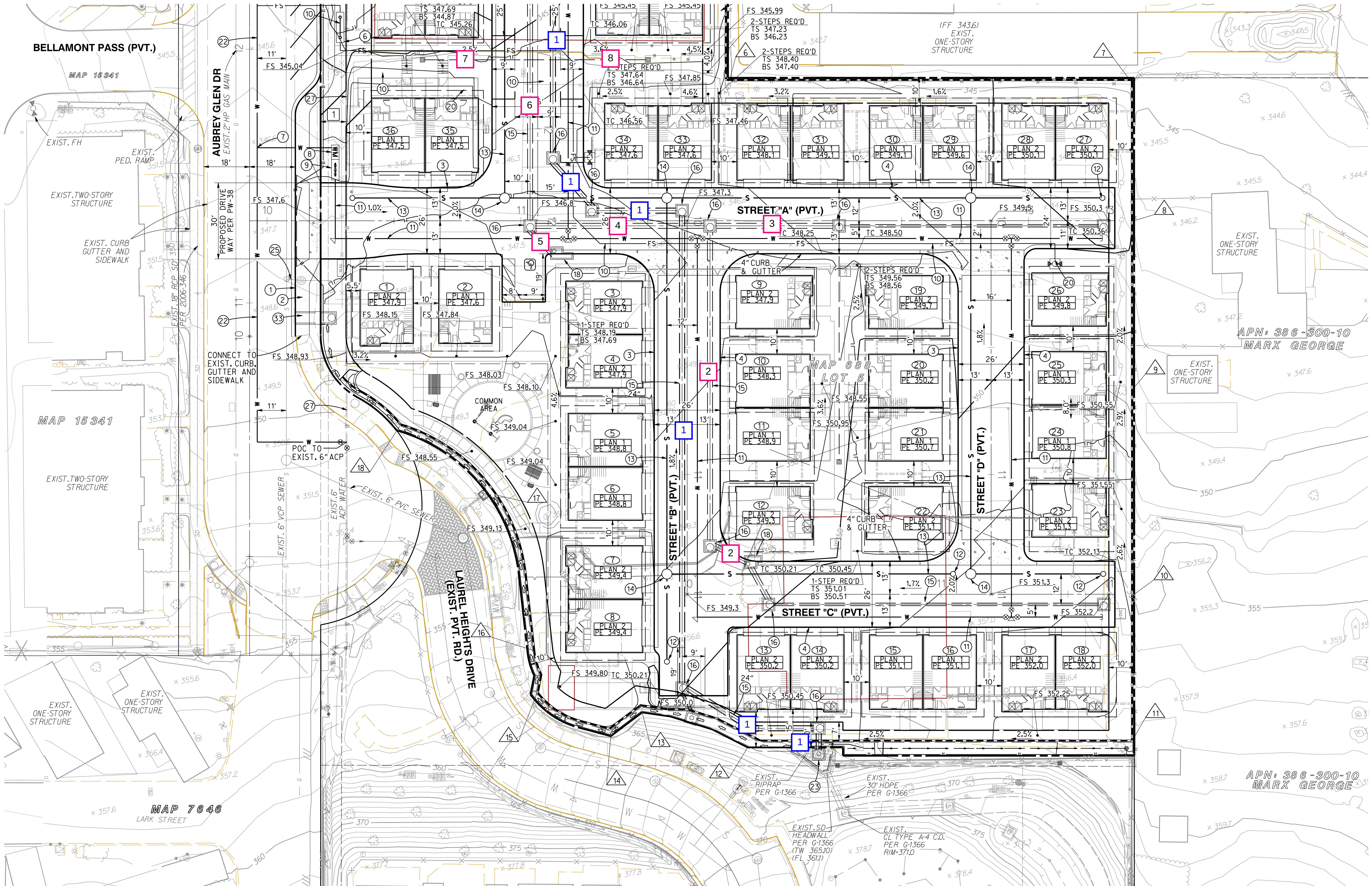
RICK
619-291-0707
rickengineering.com
5620 FRIARS ROAD
SAN DIEGO, CA 92110
SAN DIEGO ORANGE RIVERSIDE SACRAMENTO SAN LUIS OBISPO
SANTA CLARITA PHOENIX TUCSON LAS VEGAS DENVER

TM NO. 2024-XX/DR 2024-XX
SITE NORTH TO MISSION GORGE ROAD

MISSION GORGE SITE

City of Santee, California

SEE SHEET 5



CONSTRUCTION NOTES

1. PROPOSED 6" CURB & GUTTER PER RSD G-02 (PUBLIC)
2. PROPOSED 5' SIDEWALK PER RSD G-07 (PUBLIC)
3. PROPOSED 4" ROLLED CURB. SEE DETAIL, SHT. 3 (PVT.)
4. PROPOSED 0" CURB (PVT.)
5. PROPOSED SIDEWALK PER RSD G-07 (PVT.)
6. PROPOSED FIRE SERVICE W/ RPDA (PVT.)
7. PROPOSED DOMESTIC WATER LATERAL (PVT.)
8. PROPOSED DOMESTIC WATER METER ASSEMBLY
9. PROPOSED DOMESTIC WATER RP DEVICE (PVT.)
10. PROPOSED FIRE SERVICE (PVT.)
11. PROPOSED DOMESTIC WATER (PVT.)
12. PROPOSED SEWER CLEANOUT (PVT.)
13. PROPOSED SEWER MAIN (PVT.)
14. PROPOSED SEWER MANHOLE (PVT.)
15. PROPOSED STORM DRAIN (PVT.) (18" HDPE UNLESS NOTED OTHERWISE)
16. PROPOSED STORM DRAIN CLEAN OUT (PVT.) (RSD D-09)
17. PROPOSED STORM DRAIN INLET (PVT.) (PROVIDE "NO DUMPING" STENCILING
18. PROPOSED STORM DRAIN TYPE-A CURB INLET (PVT.) (RSD D-01) (PROVIDE "NO DUMPING" STENCILING
19. PROPOSED S.D. WATER QUALITY TREATMENT DEVICE (PVT.) (MODULAR WETLAND SYSTEM) (BMP-1)
20. PROPOSED FIRE HYDRANT (PVT.)
21. PROPOSED STREET LIGHT (PVT.)
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24. *EXIST. GAS LATERAL TO BE REMOVED. CAP AT MAIN.*
25. *EXIST. SEWER LATERAL TO BE REMOVED. CAP AT MAIN.*
26. *EXIST. WATER LATERAL TO BE REMOVED. CAP AT MAIN.*
27. *EXIST. 6" ACP WATER MAIN TO BE REMOVED/ABANDONED*
29. PROPOSED 24" RCP STORM DRAIN (PUBLIC)
30. PROPOSED STORM DRAIN CLEANOUT PER RSD D-09 (TYPE-A) (PUBLIC)
31. PROPOSED STORM DRAIN CLEANOUT PER RSD D-10 (TYPE-B9) (PUBLIC)
32. PROPOSED FIRE HYDRANT PER WAS. STD. WF-02
33. PROPOSED CURB OUTLET PER RSD D-25A

WALL ELEVATION TABLE

XX	TW	BW
7	350.5	343.5
8	350.5	346.5
9	350.5	349.5
10	355.0	351.8
11	359.0	352.1
12	362.5	350.3
13	361.0	349.0
14	361.5	349.0
15	359.5	349.0
16	357.5	349.0
17	350.5	349.0
18	350.0	349.0

EASEMENT TABLE

1. *EXIST. 10' PADRA DAM MUNICIPAL WATER DISTRICT EASEMENT TO BE VACATED.*

PDMWD EASEMENT NOTE:

ALL DISTRICT FACILITIES, I.E. WATER MAINS, FIRE HYDRANTS, WATER METERS, BLOW OFF VALVES, AIR-VAC VALVES, AND ALL RELATED APPURTENANCES SHOWN HEREON WITHIN PRIVATE PROPERTY ARE TO BE LOCATED WITHIN A UTILITY EASEMENT DEDICATED TO PADRE DAM MUNICIPAL WATER DISTRICT FOR ACCESS AND MAINTENANCE TO SAID FACILITIES. SAID EASEMENT WILL BE SHOWN ON ALL FINAL CONSTRUCTION DOCUMENTS

GRAPHIC SCALE 1" = 20'

RICK
619-291-0707
rickengineering.com
5620 FRIARS ROAD
SAN DIEGO, CA 92110
SAN DIEGO ORANGE RIVERSIDE SACRAMENTO SAN LUIS OBISPO
SANTA CLARITA PHOENIX TUCSON LAS VEGAS DENVER

TM NO. 2024-XX/DR 2024-XX

SITE SOUTH

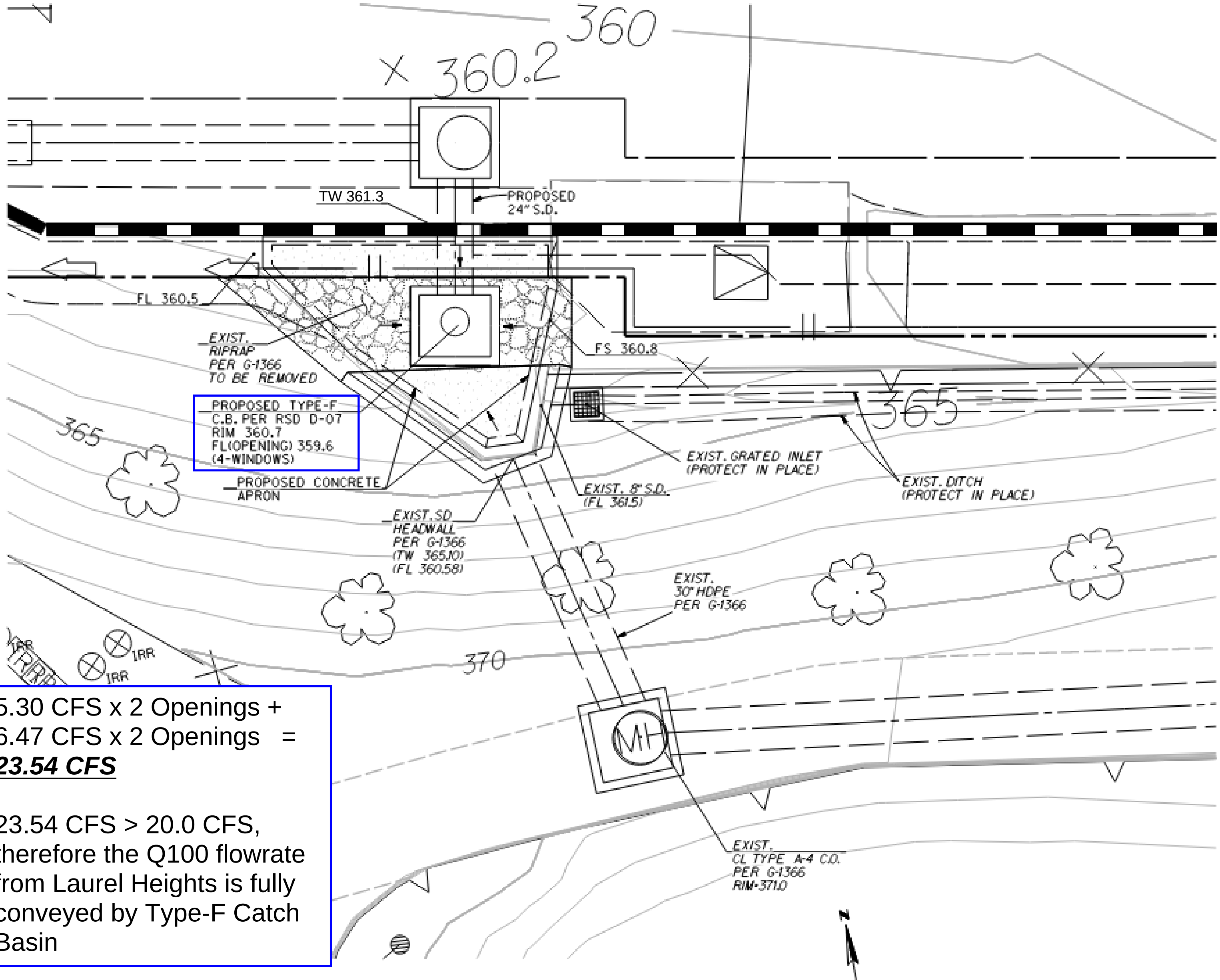
MISSION GORGE SITE

City of Santee, California

APPENDIX F

Emergency Overflow Calculations

SCHEMATIC OF OFF-SITE FLOW CONVEYANCE FROM LAUREL HEIGHTS

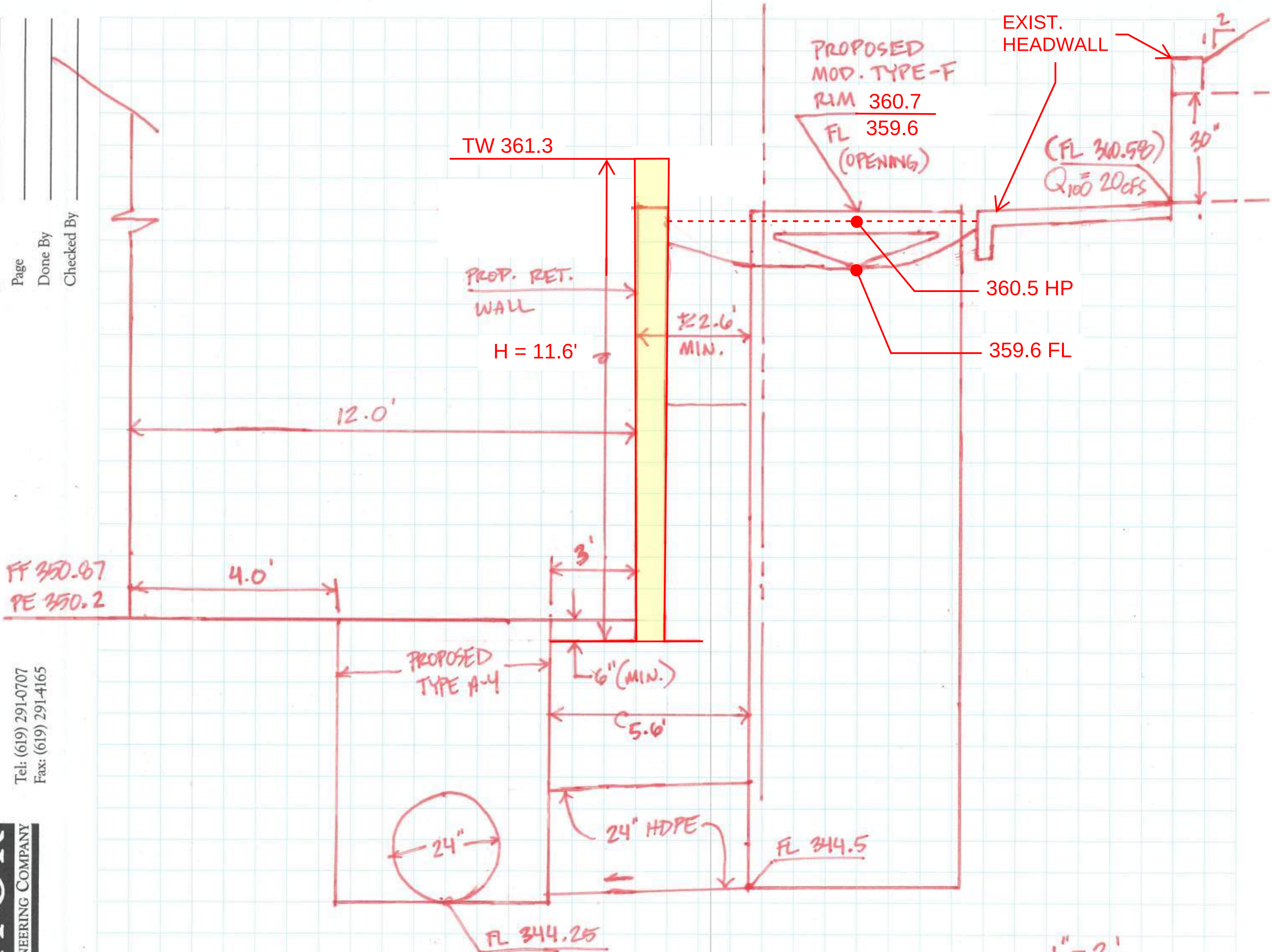


OFFSITE STORM DRAIN DETAIL

SCALE: 1"=5'

5.30 CFS x 2 Openings +
6.47 CFS x 2 Openings =
23.54 CFS

23.54 CFS > 20.0 CFS, therefore the Q100 flowrate from Laurel Heights is fully conveyed by Type-F Catch Basin



CROSS SECTION OF OFF-SITE FLOW CONVEYANCE FROM LAUREL HEIGHTS

RICK™ ENGINEERING COMPANY
5620 Friars Road
San Diego, CA 92110-2596
Tel: (619) 291-0707
Fax: (619) 291-4165

Date
Job No.
Page
Done By
Checked By

RICK™
ENGINEERING COMPANY
5620 Friars Road
San Diego, CA 92110-2596
Tel: (619) 291-0707
Fax: (619) 291-4165

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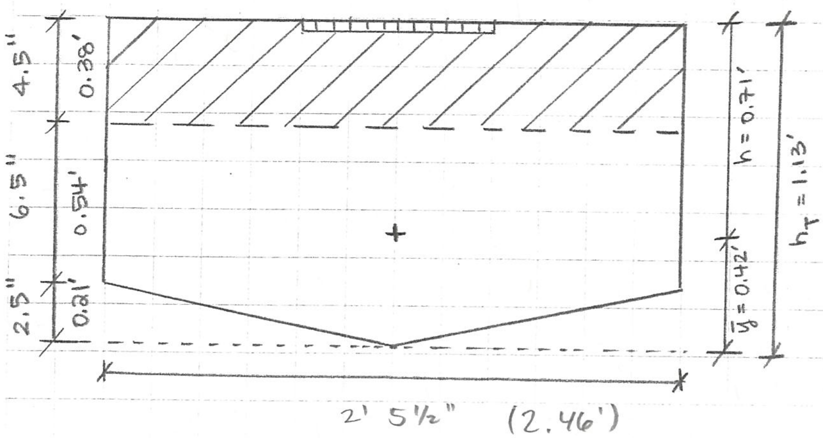
TYPE 'F' CATCH BASIN CAPACITY

NARROW OPENING:



* OPENING AREA

$$A = (2.46')(0.54') + \tfrac{1}{2}(2.46')(0.21')$$
$$= 1.59\ ft^2$$

* CENTROID LOCATION

$$\bar{y} = \frac{\Sigma A_i y_i}{\Sigma A_i}$$
$$= \frac{(2.46')(0.54')(0.48') + \tfrac{1}{2}(2.46')(0.21')(0.1')}{1.59\ ft^2}$$
$$= 0.42'$$

* ORIFICE FLOW

$$Q = CA\sqrt{2gH}$$
$$= 0.6(1.59\ ft^2)\sqrt{2(32.2\ ft/s^2)(0.9' - 0.42')}$$
$$= \underline{5.30\ cfs}$$

5.30 CFS x 2 Openings = **10.6 CFS**

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ENGINEERING COMPANY
5620 Friars Road
San Diego, CA 92110-2596
Tel: (619) 291-0707
Fax: (619) 291-4165

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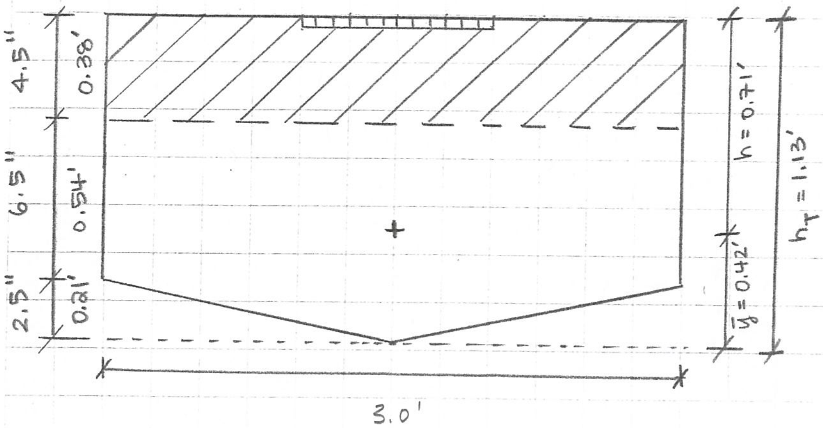
TYPE 'F' CATCH BASIN CAPACITY

WIDE OPENING



* OPENING AREA

$$A = (3.0')(0.54') + \tfrac{1}{2}(3.0')(0.21')$$
$$A = 1.94\ ft^2$$

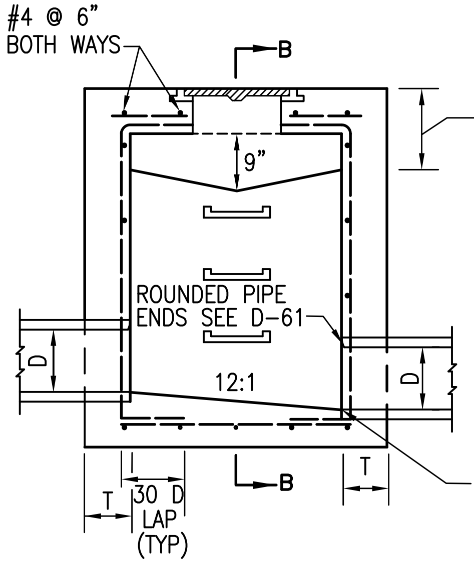
* CENTROID LOCATION

$$\bar{y} = \frac{\Sigma A_i y_i}{\Sigma A_i}$$
$$= \frac{(3.0')(0.54')(0.48') + \tfrac{1}{2}(3.0')(0.21')(0.1')}{1.94\ ft^2}$$
$$= 0.42' \text{ to centroid}$$

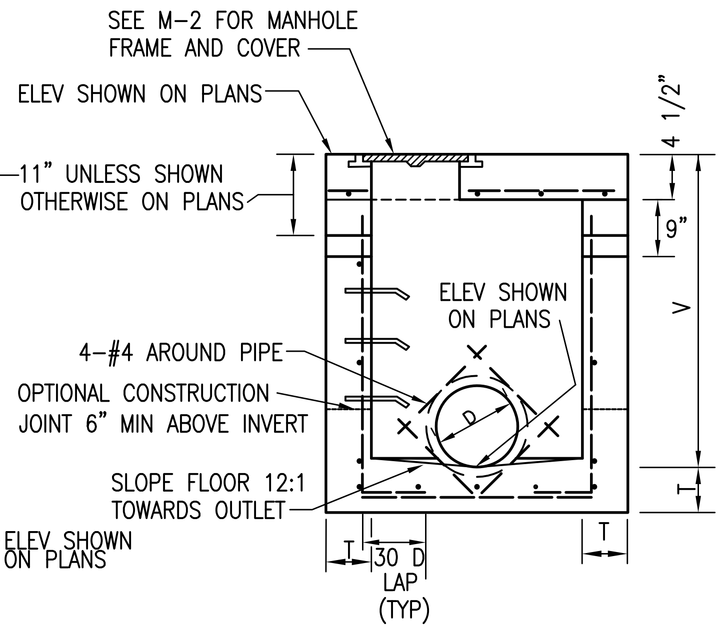
* ORIFICE FLOW

$$Q = CA\sqrt{2gH}$$
$$= 0.6(1.94\ ft^2)\sqrt{2(32.2\ ft/s^2)(0.9' - 0.42')}$$
$$= \underline{6.47\ cfs}$$

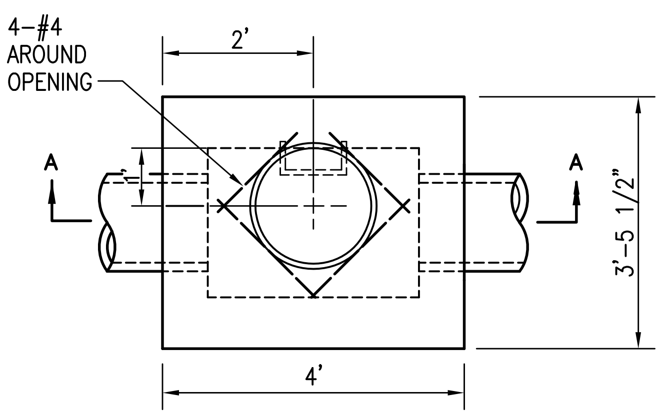
6.47 CFS x 4 Openings = **12.94 CFS**



SECTION A-A



SECTION B-B

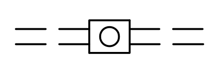


PLAN

NOTES

1. SEE D-11A & 11B FOR ADDITIONAL NOTES AND DETAILS.
2. WHEN V EXCEEDS 4' STEPS SHALL BE INSTALLED. SEE D-11A FOR DETAILS.
3. EXPOSED EDGES OF CONCRETE SHALL BE ROUNDED WITH A RADIUS OF 1/2".
4. CONSTRUCT OPENINGS ON BOTH SIDES UNLESS OTHERWISE SHOWN ON PLANS.
5. MAINTAIN 1-1/2" CLEAR SPACING BETWEEN REINFORCING AND CONCRETE SURFACE.
6. INSTALL 1" STEEL PROTECTION BAR ACROSS OPENING.
7. DIAMETER "D" SHALL BE 18" MAX, FOR LARGER DIAMETER PIPES THIS DRAWING MUST BE MODIFIED. PIPE DIAMETERS TO BE SHOWN ON PLANS.
8. IF CONSTRUCTED ADJACENT TO SIDEWALK, THE SURFACE OF THE TOP SLAB OF THE CATCH BASIN SHALL MATCH THE SIDEWALK SLOPE AND FINISH.

LEGEND ON PLANS



Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Edited	T.R.	T. Regello	10/15
Edited	M.W.	M. Widelski	10/18
Reviewed	RP	S. Engeda	03/22

SAN DIEGO REGIONAL STANDARD DRAWING

CATCH BASIN - TYPE F

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

Samson Engeda 03/24/2022

Chairperson R.C.E. 52241 Date

DRAWING NUMBER **D-07**

```
****************************************************************************
  FLOW PROCESS FROM NODE    266.00 TO NODE    270.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    99.68
  FLOW LENGTH(FEET) =    32.00   MANNING'S N =  0.015
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.97
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      28.17
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =    8.46
  LONGEST FLOWPATH FROM NODE    240.00 TO NODE    270.00 =     700.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    270.00 TO NODE    270.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.504
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7700
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7273
  SUBAREA AREA(ACRES) =    0.17   SUBAREA RUNOFF(CFS) =    0.59
  TOTAL AREA(ACRES) =       8.1   TOTAL RUNOFF(CFS) =      28.17
  TC(MIN.) =    8.46
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
```

Total Q discharging from Aubrey Glen Site

```
****************************************************************************
  FLOW PROCESS FROM NODE    270.00 TO NODE    290.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   100.00  DOWNSTREAM(FEET) =    98.76
  FLOW LENGTH(FEET) =   248.00   MANNING'S N =  0.015
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.97
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      28.17
  PIPE TRAVEL TIME(MIN.) =   0.46    Tc(MIN.) =    8.92
  LONGEST FLOWPATH FROM NODE    240.00 TO NODE    290.00 =     948.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    290.00 TO NODE    290.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
```

Channel Report

19964 - Aubrey Glen 24in. SD Capacity

Circular

Diameter (ft)	= 2.00
Invert Elev (ft)	= 100.00
Slope (%)	= 0.50
N-Value	= 0.013

Calculations

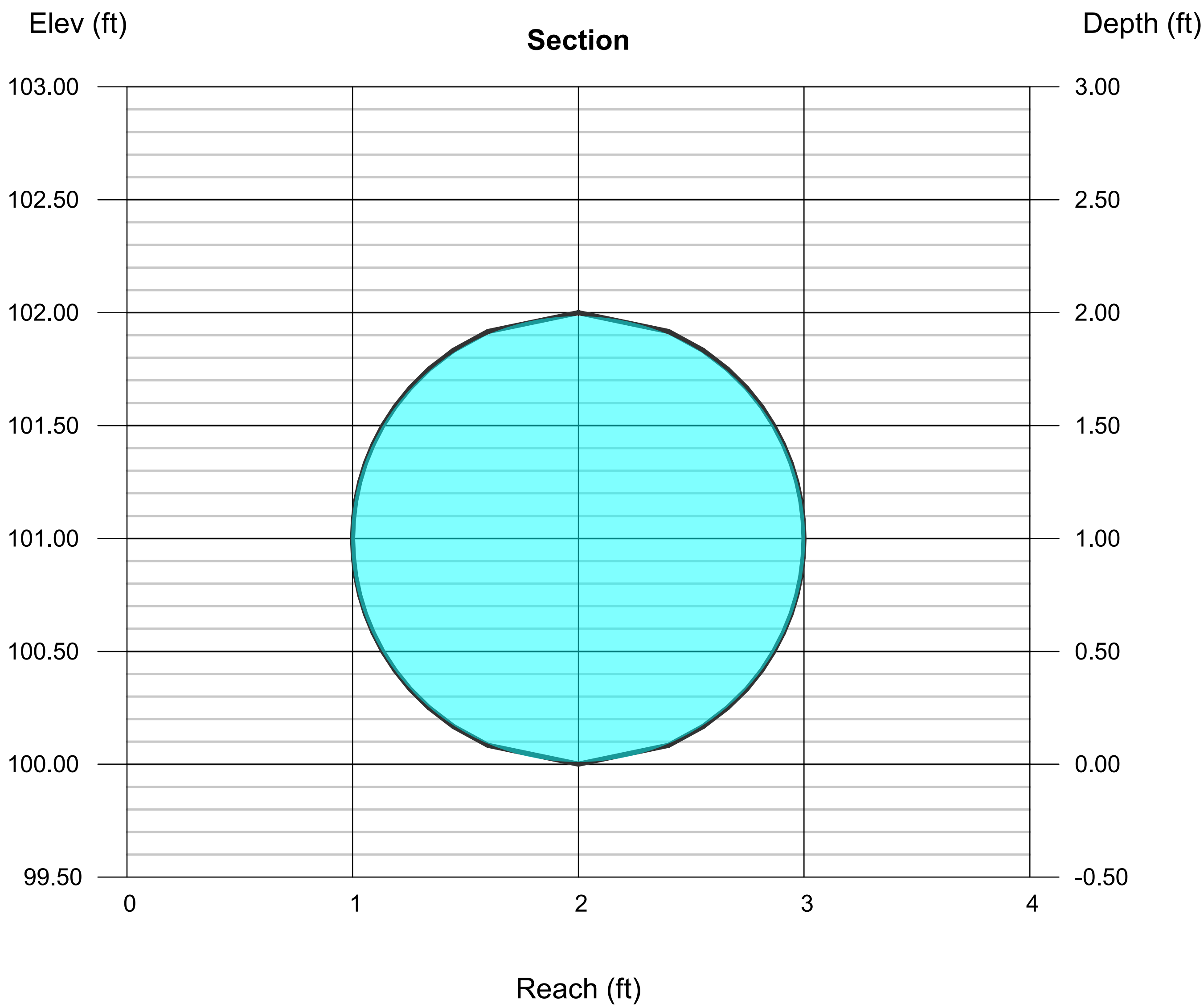
Compute by:	Known Depth
Known Depth (ft)	= 2.00

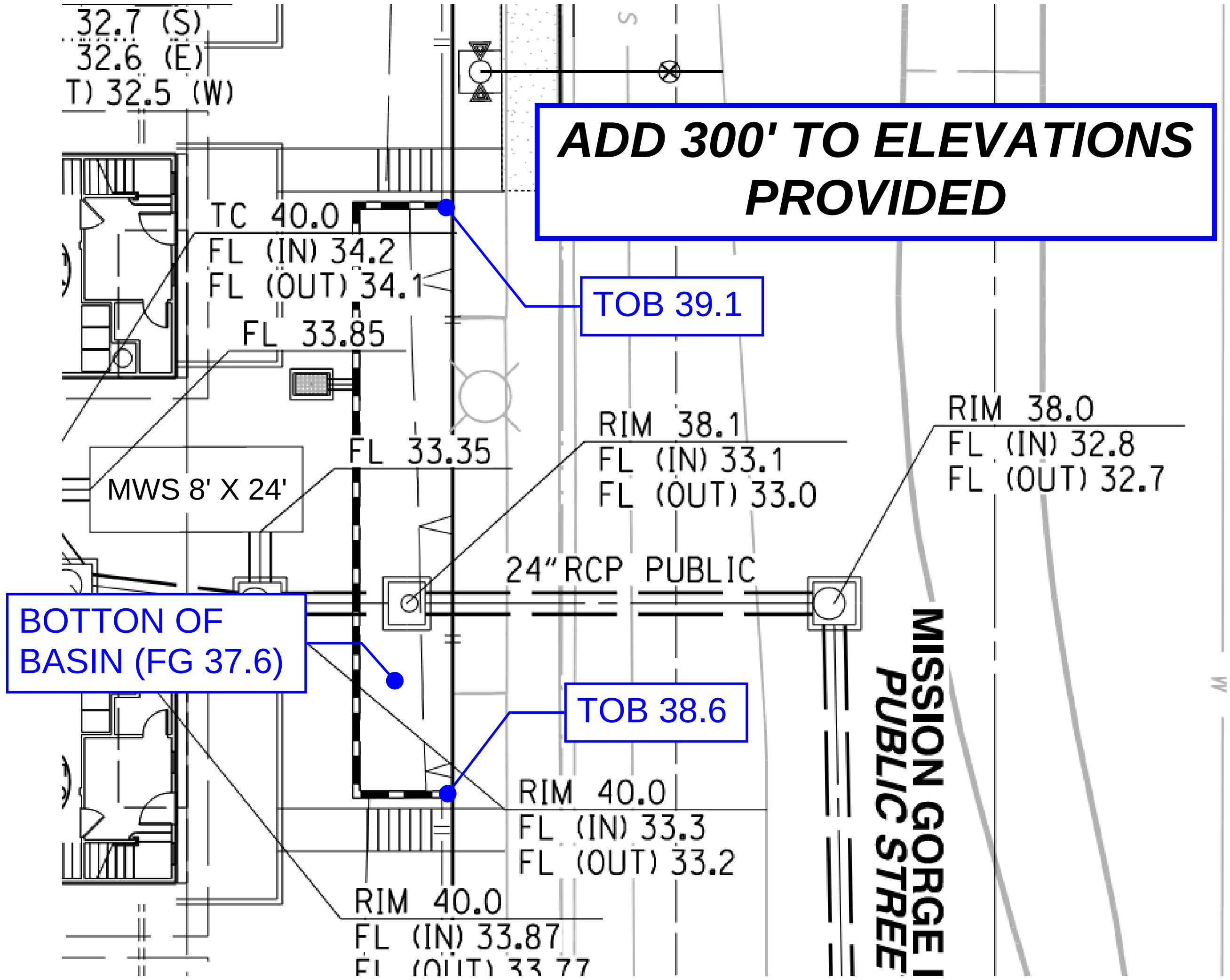
Highlighted

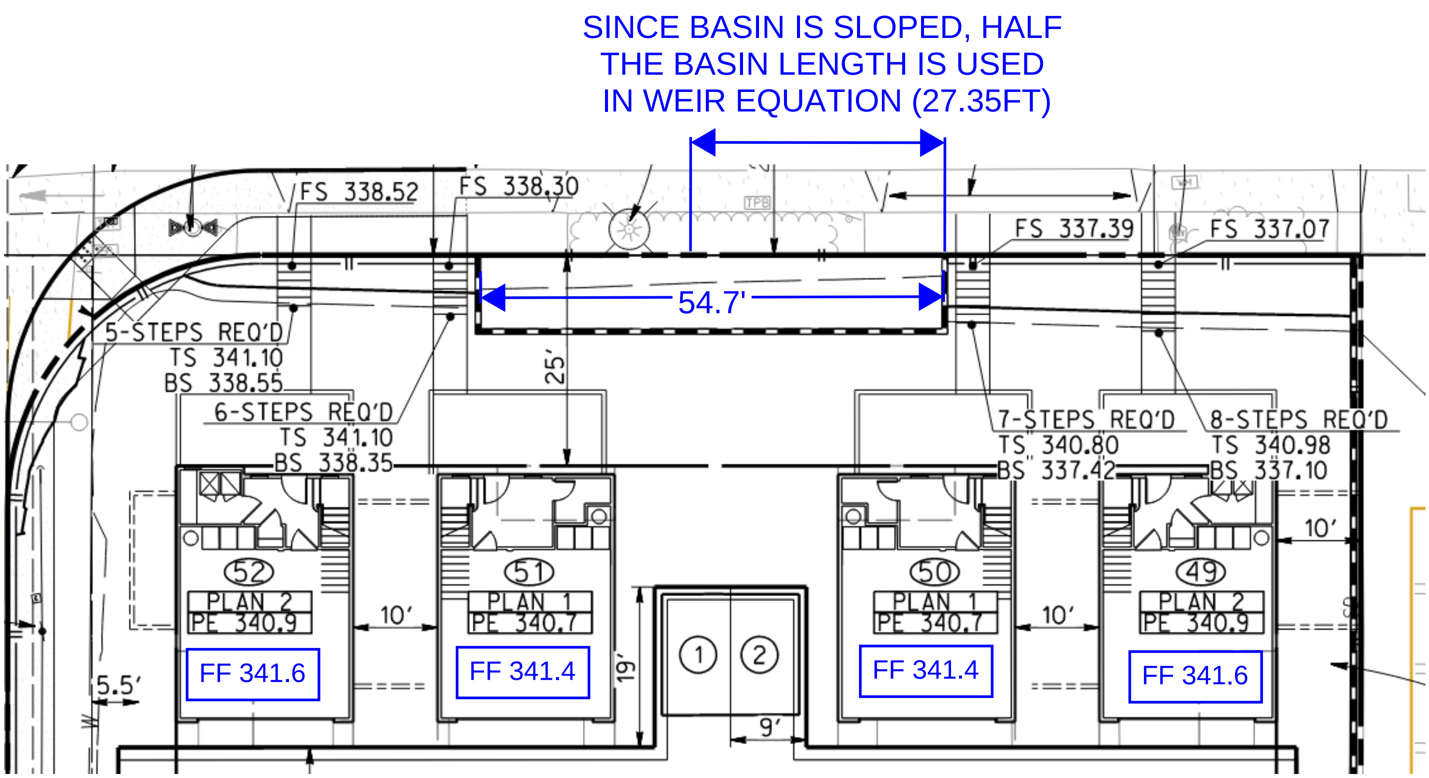
Depth (ft)	= 2.00
Q (cfs)	= 15.99
Area (sqft)	= 3.14
Velocity (ft/s)	= 5.09
Wetted Perim (ft)	= 6.28
Crit Depth, Yc (ft)	= 1.44
Top Width (ft)	= 0.00
EGL (ft)	= 2.40

28.17 CFS - 15.99 CFS =

12.18 CFS OF OVERFLOW




ADD 300' TO ELEVATIONS PROVIDED
32.7 (S)
32.6 (E)
T) 32.5 (W)
TC 40.0
FL (IN) 34.2
FL (OUT) 34.1
FL 33.85
TOB 39.1
MWS 8' X 24'
FL 33.35
RIM 38.1
FL (IN) 33.1
FL (OUT) 33.0
RIM 38.0
FL (IN) 32.8
FL (OUT) 32.7
24" RCP PUBLIC
BOTTON OF BASIN (FG 37.6)
TOB 38.6
MISSION GORGE
PUBLIC STREE
RIM 40.0
FL (IN) 33.3
FL (OUT) 33.2
RIM 40.0
FL (IN) 33.87


SINCE BASIN IS SLOPED, HALF THE BASIN LENGTH IS USED IN WEIR EQUATION (27.35FT)
FS 338.52
FS 338.30
FS 337.39
FS 337.07
54.7'
25'
5-STEPS REQ'D
TS 341.10
BS 338.55
6-STEPS REQ'D
TS 341.10
BS 338.35
7-STEPS REQ'D
TS 340.80
BS 337.42
8-STEPS REQ'D
TS 340.98
BS 337.10
52
PLAN 2
PE 340.9
FF 341.6
51
PLAN 1
PE 340.7
FF 341.4
50
PLAN 1
PE 340.7
FF 341.4
49
PLAN 2
PE 340.9
FF 341.6
10'
19'
9'
5.5'
1
2

Weir Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Wednesday, Nov 6 2024

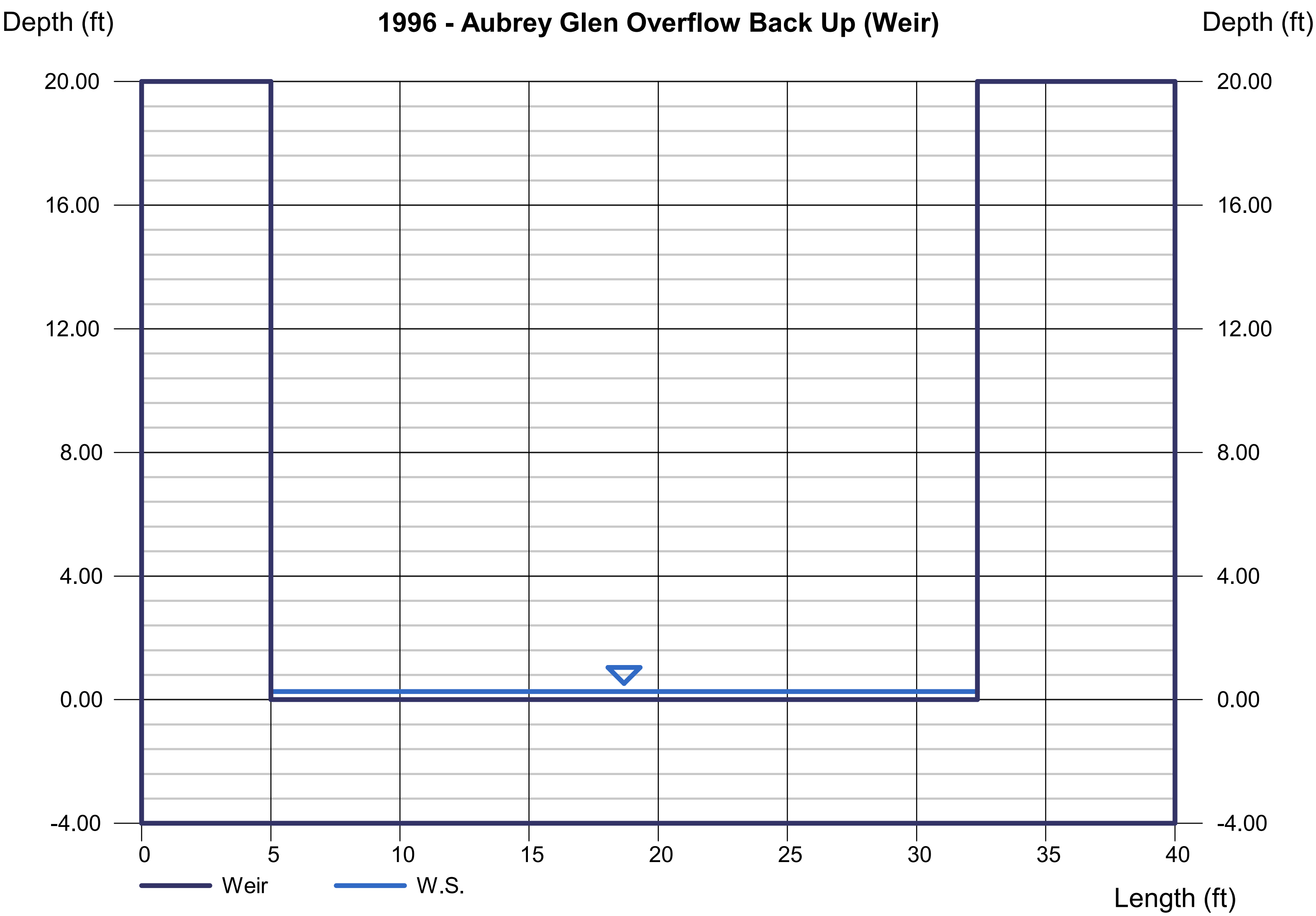
1996 - Aubrey Glen Overflow Back Up (Weir)

Rectangular Weir		**Highlighted**	
Crest	= Sharp	Depth (ft)	= 0.26
Bottom Length (ft)	= 27.35	Q (cfs)	= 12.18
Total Depth (ft)	= 20.00	Area (sqft)	= 7.15
		Velocity (ft/s)	= 1.70
Calculations		Top Width (ft)	= 27.35
Weir Coeff. Cw	= 3.33		
Compute by:	Known Q		
Known Q (cfs)	= 12.18		

0.26 + 338.6 = 338.86 FT

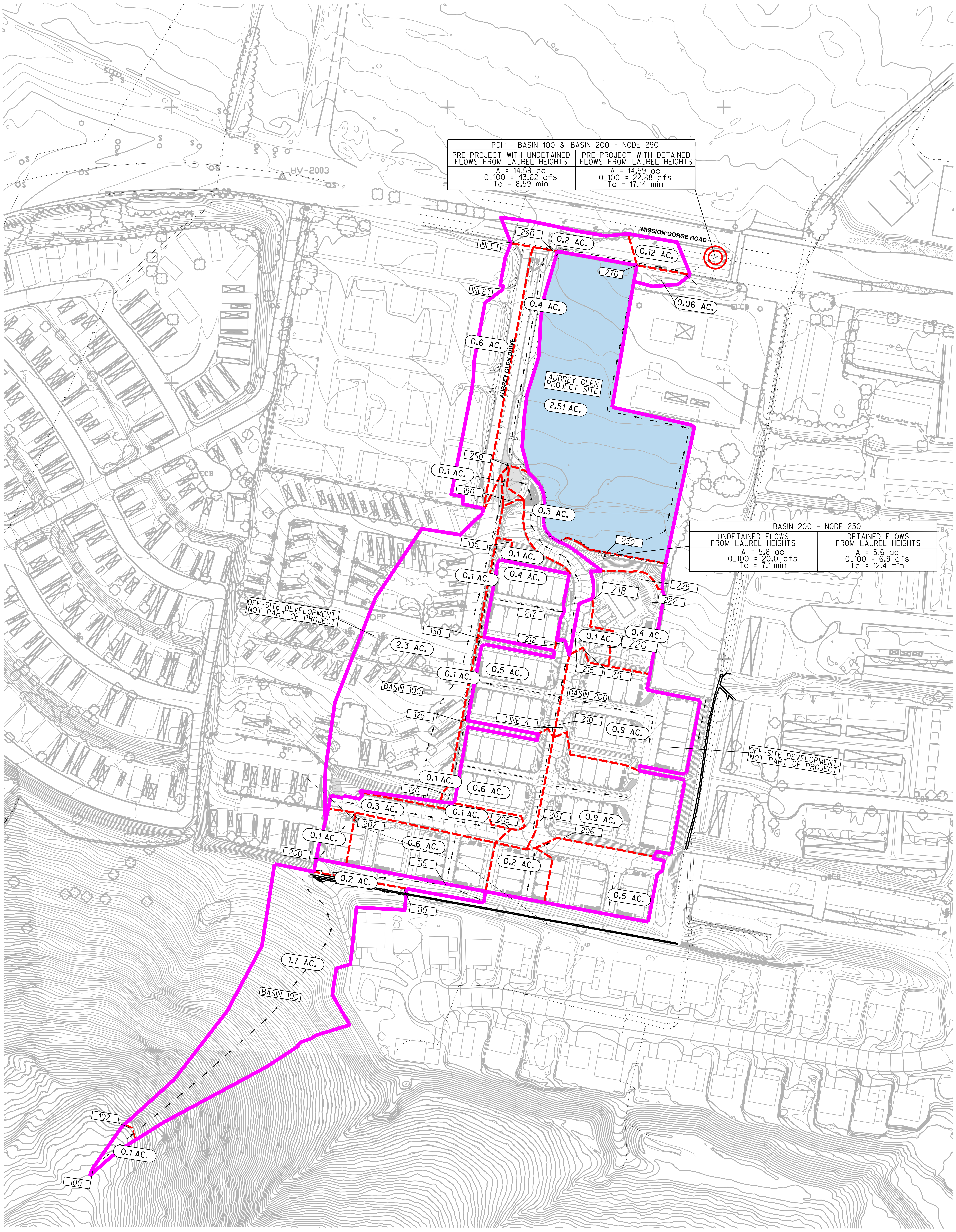
338.86 OVERFLOW DEPTH < 341.4 (FF ELEV)

EMERGENCY OVERFLOW TO DISCHARGE ONTO MISSION GORGE ROAD



MAP POCKET 1

Drainage Study Map
for
Townsend Multi-Family
[Pre-Project]



NOTES

1. FLOWS FROM BASIN 100 DISCHARGE TO A COBBLE SWALE LOCATED ON THE NORTHWEST CORNER OF THE SITE. FLOWS THEN DISCHARGE ALONG THE EASTERN EDGE OF AUBREY GLEN DRIVE WHERE THEY ARE CONVEYED NORTH, TURNING EAST ON MISSION GORGE ROAD AND COLLECTED BY INLETS AND CONVEYED TO THE SAN DIEGO RIVER.

2. AREAS HATCHED IN BLUE ARE REPRESENTATIVE OF THE ON-SITE DRAINAGE AREA OF THE AUBREY GLEN PROJECT. AREAS NOT HATCHED IN BLUE ARE REPRESENTATIVE OF OFF-SITE DRAINAGE AREAS.

3. FLOWS TO NODE 230 ARE PROVIDED FOR REFERENCE ONLY AND SOURCED FROM THE LAUREL HEIGHTS DRAINAGE STUDY, PUBLISHED BY RICK ENGINEERING ON JULY 19, 2021.

LEGEND

- MAJOR DRAINAGE BASIN BOUNDARY
- SUB BASIN DRAINAGE BOUNDARY
- XX.X AC. — DRAINAGE AREA
- XXXXX — DRAINAGE NODE ID
- ON-SITE DRAINAGE AREA
- POINT OF COMPARISON (POC)
- FLOW PATH

DRAINAGE STUDY MAP FOR TOWNSEND MULTI-FAMILY (PRE-PROJECT)

619-291-0707
rickengineering.com
5620 FRIARS ROAD
SAN DIEGO, CA 92110
RICK
SAN DIEGO ORANGE RIVERSIDE SACRAMENTO SAN LUIS OBISPO
SANTA CLARITA PHOENIX TUCSON LAS VEGAS DENVER

80 40 0 80 160 240
GRAPHIC SCALE 1" = 80'

J-19964

November 7, 2024
Revised January 29, 2025

NOT FOR CONSTRUCTION - EXHIBIT FOR DRAINAGE STUDY ONLY

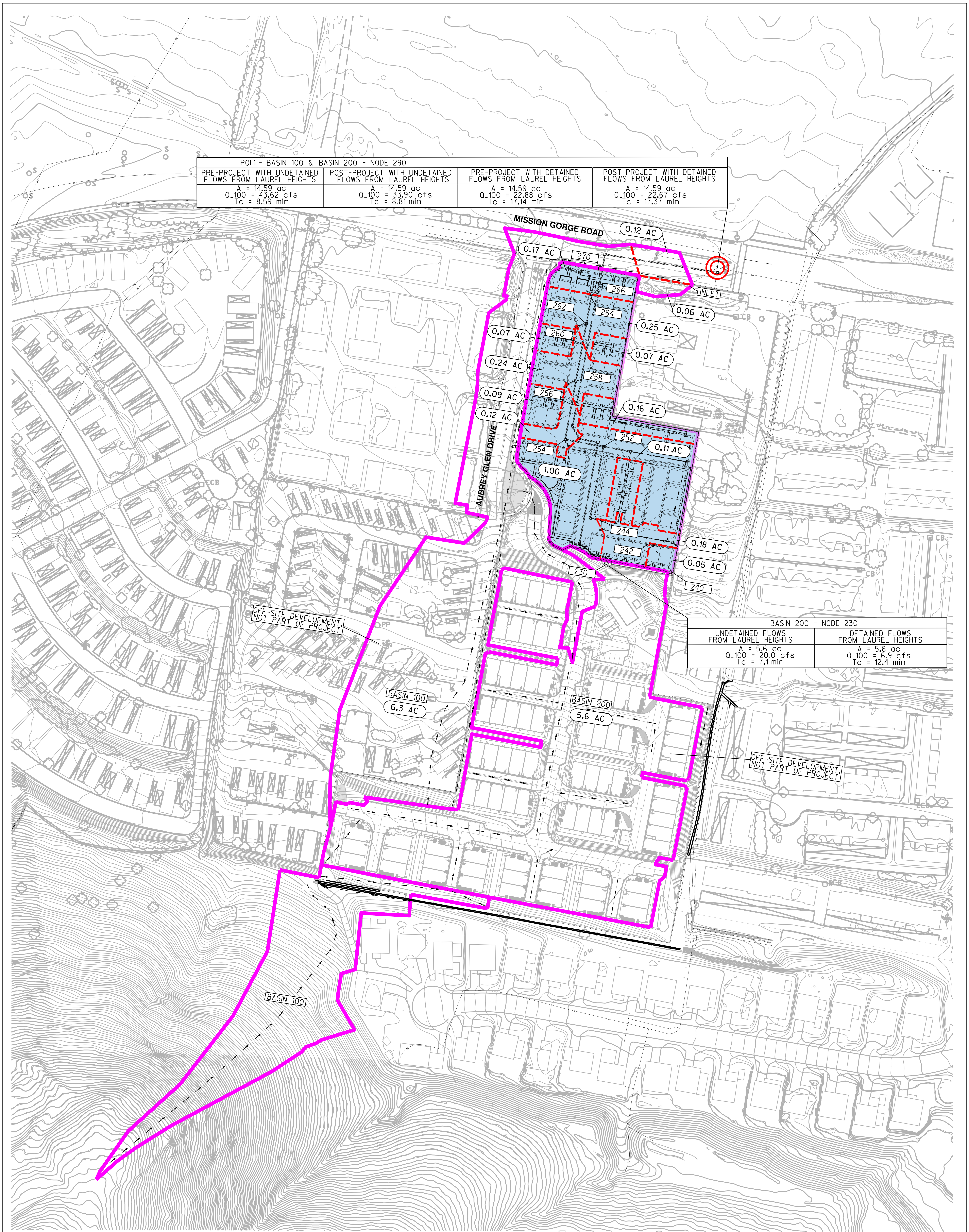
MAP POCKET 2

Drainage Study Map

for

Townsend Multi-Family

[Post-Project]



NOTES

1. THE POST PROJECT CONDITION PROPOSES A REDUCTION IN IMPERVIOUS AREA IN COMPARISON TO THE PRE PROJECT CONDITION, RESULTING IN A REDUCTION OF RUNOFF AND PEAK FLOW.

2. FLOWS FROM BASIN 200 ARE COLLECTED BY A TYPE-F CATCH BASIN AT NODE 230 AND ROUTED THROUGH THE PROJECT SITE THROUGH A CLEAN WATER STORM DRAIN LINE.

3. IN THE EVENT OF EMERGENCY OVERFLOW, FLOWS WILL OVERTOP THE PROJECT FRONTAGE OF DISCHARGE DIRECTLY TO MISSION GORGE ROAD.

4. NO IMPROVEMENTS ARE PROPOSED IN BASIN 100. FLOWS REMAIN UNCHANGED AT

4. PEAK FLOWS CALCULATED AT POI 1 ARE CALCULATED USING THE UNDETAINED Q100 FLOWS FROM THE ADJACENT LAUREL HEIGHTS PROJECT.

LEGEND

MAJOR DRAINAGE BASIN BOUNDARY

SUB BASIN DRAINAGE BOUNDARY

XX.X AC. — DRAINAGE AREA

XXXXX — DRAINAGE NODE ID

ON-SITE DRAINAGE AREA

POINT OF COMPARISON (POC)

FLOW PATH

80 40 0 80 160 240

GRAPHIC SCALE 1"= 80'

DRAINAGE STUDY MAP FOR TOWNSEND MULTI-FAMILY (POST-PROJECT)

November 7, 2024
January 29, 2025
Revised March 21, 2025

J-19964

RICK
619-291-0707
rickengineering.com
5620 FRIARS ROAD
SAN DIEGO, CA 92110
SAN DIEGO ORANGE RIVERSIDE SACRAMENTO SAN LUIS OBISPO SANTA CLARITA PHOENIX TUCSON LAS VEGAS DENVER

NOT FOR CONSTRUCTION - EXHIBIT FOR DRAINAGE STUDY ONLY

CITY OF SANTEE

PRIORITY DEVELOPMENT PROJECT (PDP)

STORM WATER QUALITY MANAGEMENT PLAN (SWQMP)

FOR
TOWNSEND MULTI-FAMILY
TM-2024-0003
7735 Mission Gorge Road
Santee, CA 92071

ASSESSOR'S PARCEL NUMBER(S):
386-701-02

ENGINEER OF WORK:
Shavger Rekani PE

Shavger Rekani PE 90893, 3/26

PREPARED FOR:

KB Homes Coastal
9915 Mira Mesa Boulevard, Suite 600
San Diego, California 90025

PDP SWQMP PREPARED BY:

RICK
5620 Friars Rd, San Diego, CA 92110
(619) 291-0707

PLANS PREPARED BY:

RICK
5620 Friars Rd, San Diego, CA 92110
(619) 291-0707

DATE OF SWQMP:
November 7, 2024
January 29, 2025
Revised March 21, 2025

Page intentionally blank

TABLE OF CONTENTS

ACRONYMS

APN	Assessor's Parcel Number
BMP	Best Management Practice
HMP	Hydromodification Management Plan
HSG	Hydrologic Soil Group
MS4	Municipal Separate Storm Sewer System
N/A	Not Applicable
NRCS	Natural Resources Conservation Service
PDP	Priority Development Project
PE	Professional Engineer
SC	Source Control
SD	Site Design
SDRWQCB	San Diego Regional Water Quality Control Board
SIC	Standard Industrial Classification
SWQMP	Storm Water Quality Management Plan

PRIORITY DEVELOPMENT PROJECT STORM WATER QUALITY MANAGEMENT PLAN (PDPSWQMP)

AUBREY GLEN

Revision Page

March 21, 2025

This PDPSWQMP presents a revision to the January 29, 2025, report pursuant to the City of Santee plan check comments received March 14, 2025. The following text identifies the plan check comments along with the responses in bold.

PDPSWQMP Review Comments – Dr. Luis A. Parra & William O'Gorman (Dated 3/14/2025)

II. SWQMP Study Review

1. EOW to sign and stamp report prior to approval.

   Noted; signature and stamp has been provided.

2. Developer to sign Owners Certification to approval.

   Noted; signature has been provided.

3b. Third Review: EOW has stated in the response that the dispersion area will have amended soil. On the DMA Exhibit, revise the callout for pervious dispersion by adding "with amended soil".

Callout has been revised to add "with amended soil" as requested.

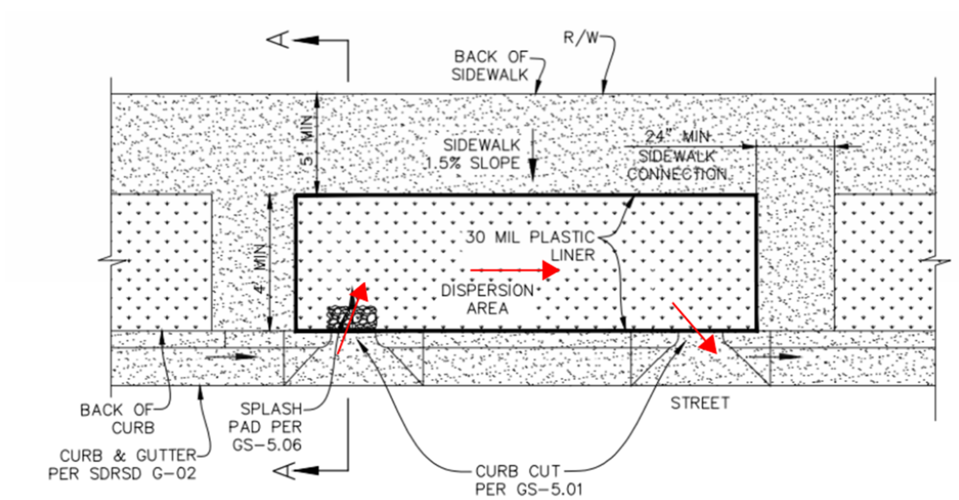
4a. Second Review: A rock lined swale on Mission Gorge Road is proposed to treat runoff from the Aubrey Glen Drive & Mission Gorge Road improvements. However, there is a concern that a 40' long swale is inadequate to treat all tributary runoff including co-mingled flows, approximately 6.3 acres according to the drainage study. We believe there is an adequate area within Aubrey Glen Drive Right-Of-Way to provide additional treatment opportunities.

i. New Comment, Third Review: The EOW responded that green street BMPs do not need to be sized. However, we believe that 2 x 20 feet swales to treat 500 linear feet of new sidewalk—most of which is on a different road—along with approximately 6.3 acres of comingled flow, does not provide adequate treatment. We also believe that the fact that green street BMPs do not need to be sized to a specific numeric criteria is not excuse to completely disregard a reasonable practical size (after all, if the designer were right and sizing is completely irrelevant when we assign the green street definition into a design, then what prevents the design to use a 5 ft long swale using the designer's logic)? Common engineering sense should be the prevailing criteria in this case. In reality, the swale may become inundated and the short length of the swale most likely prevents pollutants attached to sediment particles from settling, and also establishes a very short residence time inside the swale. It is the reviewers' opinion that treatment should be provided to the maximum extent practicable (MEP) when using green-street BMPs to follow the intent of the MS4 permit. It is our belief that such MEP has not been satisfied in this case. Refer to section E.3.b.(3).(a) on page 96 of 139 of the MS4 permit for design criteria regarding new or retrofit paved sidewalks for PDP Exemptions, subject to the City's discretion. New sidewalks should direct runoff to adjacent vegetated areas or remain hydraulically disconnected from paved roads. Along Aubrey Glen Drive, east of the sidewalk, there are opportunities within the 5-foot landscaped area for sidewalk runoff to discharge into and remain hydraulically disconnected from the paved road. In summary, the reviewer does not believe that (a) the swales proposed are the only possible option, and (b) that they satisfied the non-numerical criteria of "to the maximum extent practicable".

Per meeting with the City of Santee, REC Consultants, and RICK on 3/19/2025, the removal of the green street elements along Mission Gorge Road was discussed in-lieu of installing green street elements along Aubrey Glen Drive. However, due to constraints, a portion of the proposed sidewalk along Aubrey Glen Drive has been hydraulically disconnected and will flow across a 4.5' wide landscape buffer and into Aubrey Glen Drive. During the meeting, the removal of the green street element along Mission Gorge Road was discussed. After further consideration, they will remain to treat the full depth pavement replacement of Aubrey Glen Drive which is tributary to the green street elements along Mission Gorge Road. It is noted that a large area is tributary to these green street elements and it's likely that a higher maintenance frequency will be required. Please see the updated O&M Table provided in Attachment 3 of the PDP SWQMP.

4bi. New Comment, Third Review: The detail shows 20" of ponding and storage within a lined swale. How will this runoff drain?

The downstream finished grade of the swale will tie into the flow line of the gutter to allow the surface ponding to draw down. The remaining water held below the surface will be taken up by vegetation or evapotranspiration. Runoff drains through curb cuts located upstream and downstream of the swale. A screenshot of the County of San Diego Green Street Standard GS-2.01 plan view has been provided for reference.



PLAN VIEW

5ai. New Comment, Third Review: The storm drain callouts have been added but each point to the incorrect storm drain. Please swap the callouts to resolve the comment.

Callouts have been updated to reference the correct storm drain system.

CITY OF SANTEE INTER-OFFICE MEMO

TO: John Keane, Principal Civil Engineer
FROM: Emily Stein, Storm Water Program Coordinator
DATE: March 6, 2025
SUBJECT: TM-2024-0003 Aubrey Glen 7737 Mission Gorge Rd

The Stormwater Department has reviewed this project's most recent submittal dated January 29, 2025, and requests that the applicant address the following:

1. Storm Water Quality Management Plan:

a. Please fill out Form I-6 for each of the two green streets elements. Assign a unique identifying number to each swale.

I-6 forms have been filled out for each green street element along Mission Gorge Road. The green street elements have been given ID's of 3A and 3B.

b. Please fill out Form I-8 to its entirety.

A complete I-8 Form has been provided by the geotechnical engineer and included in report. In both Part 1 and Part 2 of the Form, a no infiltration condition has been identified and a basis of very low infiltration rates provided as the basis. Part 1 results (Page 2 of the Form) states that if any answers from row 1-4 is 'no' that infiltration may be possible. Given the answer to Criteria 1 is no, the Geotech moved directly to Part 2. Similarly in Part 2, the answer to Criteria 5 is no, so the Geotech moved directly to the Part 2 results stating 'no infiltration'.

c. DMA Exhibit

i. Repeat Comment: In addition to the MWS, add a note calling out the HOA as the responsible party for maintenance of the biofiltration basin, green streets elements, brow ditches, and FTC devices. HOAs tend to resist all of their maintenance obligations and it is easier to enforce when it is called out in the SWQMP.

Note on DMA has been updated to state that the modular wetland system, biofiltration basin, green street elements, and brow ditches are to be maintained by the HOA into perpetuity. The modular wetland system is designated as the proposed FTC device.

ii. DMA Nos. SM-1 and SM-2 are called out twice on the exhibit.

a. Please assign unique DMA IDs for all DMAs, or, can also consider combining SM-1 and SM-2 with GS-1, per recommendation from REC.

SM-1 and SM-2 have been split to create SM-3 and SM-4. It is not intended for SM-1 and SM-2 to be treated by the green street elements as they are self-treating areas.

b. Consider combining DM-1 with GS-1, if feasible.

DM-1 cannot be combined with GS-1 as its not tributary to the green street elements along Mission Gorge Road.

c. Update the DMA table in the exhibit and also in Attachment 1B depending on how you want to proceed.

DMA Table in exhibit and Attachment 1B has been updated accordingly.

iii. Please call out/identify relocated dispersion areas.

Dispersion areas are not identified in any backyard areas and are called out on the DMA exhibit.

d. Attachment 3a: Include maintenance actions and items for the green streets elements and FTC devices.

The Operations and Maintenance (O&M) Table in Attachment 3a has been updated to include maintenance action items for the green street elements. Since the modular wetland system (MWS) is the proposed FTC device, its operations and maintenance items are listed.

PRIORITY DEVELOPMENT PROJECT STORM WATER QUALITY MANAGEMENT PLAN (PDPSWQMP)

AUBREY GLEN

Revision Page

January 29, 2025

This PDPSWQMP presents a revision to the November 7, 2024 report pursuant to the City of Santee plan check comments received December 19, 2024. The following text identifies the plan check comments along with the responses in bold.

PDPSWQMP Review Comments – Dr. Luis A. Parra & William O'Gorman (Dated 12/19/2024)

II. SWQMP Study Review

ii.1. Main SWQMP Comments

1a. Second Review: The EOW is proposing Impervious Area Dispersion to satisfy retention requirements utilizing Dispersion Area from the City of San Diego Criteria & worksheet. This is acceptable; however, the calculations within the worksheet relies on this area being amended soil per their SD-F BMP Factsheet. Confirm this area will feature amended soil. If it is, call this out as a BMP on the DMA exhibit, with a detail showing the depth of amended soil.

Noted; dispersion areas are classified as amended soils. Amended soil detail will be provided in future submittal during Final Engineering. Amended soils for this project are only used for site design and to prove that on site retention is met, classifying the amended soils as BMPs is not necessary as they're not a structural BMP. In Final Engineering, the amended soils will be included in the maintenance agreement to be maintained into perpetuity.

1b. Second Review: A portion of the dispersion area is located within the private yards according to the Landscape Concept Plan. Please remove the dispersion area from the private yards, as the dispersion area needs to be a permanent BMP and there is no guarantee what future homeowners will use this area for.

Noted; dispersion areas removed from private yards.

1c. Second Review: Add preliminary roof ridge lines and downspout locations to the DMA exhibit to show the intent that a portion of the roofs are to drain to that area. Add a note saying that roof downspout locations are to be verified prior to issuance of the building permits.

Roof ridge lines and downspout locations have been assumed by bisecting the roof area. Its anticipated that revisions will occur between preliminary and final engineering, and roof

ridge lines and downspout locations will be provided in the final engineering phase. Note added to exhibit as requested.

ii.2. Additional SWQMP Comments

3. EOW to sign and stamp report prior to approval.

   Noted; signature and stamp to be provided in later submittal prior to approval.

4. EOW to sign and stamp report prior to approval.

   Noted; signature and stamp to be provided in later submittal prior to approval.

6a. New Comment, Second Review: A rock lined swale on Mission Gorge Road is proposed to treat runoff from the Aubrey Glen Drive & Mission Gorge Road improvements. However, there is a concern that a 40’ long swale is inadequate to treat all tributary runoff including co-mingled flows, approximately 6.3 acres according to the drainage study. We believe there is an adequate area within Aubrey Glen Drive Right-Of-Way to provide additional treatment opportunities.

   The rock lined swale are proposed as a green street element feature, which are not required to be numerically sized. The city has requested a meandering sidewalk to match the existing frontage improvements of the neighboring property, given the constraints, the proposed swales have been maximized within the area adjacent to roadway.

6b. New Comment, Second Review: Provide a detail of the rock lined swale. Call out the swale or revise callout #33 on the Preliminary Grading Plan.

   Details for "green street element" have been added to the TM plans.

6c. New Comment, Second Review: The small landscaped slope area upstream of the rock lined swales are delineated as a self-mitigating DMA, however, these DMA’s do not fit the criteria of a self-mitigating DMA as they drain into a BMP (the rock swale). Revise to include them within the DMA that flows into the swale.

   Classified self-mitigating areas meet the criteria as noted in the City of Santee BMP Design Manual. The called-out areas are pervious areas along the property line of the project which don't require treatment.

7a. Second Review: A Trash Capture Device has not been shown on the plans.

   The proposed modular wetland system is already considered an acceptable certified full trash capture system per Table 2: High Flow Capacity Trash Full Capture Systems, developed by the State Water Resources Control Board. No additional Trash Capture Device is required.

8ai. Second Review: The upstream bypass was removed, and it appears the MWS was not designed with internal bypass. The MWS detail on sheet 15 of the Tentative Map includes notes that “Unit was set offline doe to not meeting the required inlet to outlet drop ratio of 1.33’ for sediment storage. If internal bypass is required, EOR must adjust elevations to meet manufacturing requirements.” & “Recommended external bypass at elevation = 337.02”. Revise the design/detail to convey the bypass peak flow rate.

The external bypass has been re-added to plans. During a high flow event, flows will back up in the modular wetland system (MWS) to the external bypass, then discharge to a bypass pipe with a flow line set at an elevation above the water quality depth. High flows will be diverted to continue downstream in the storm drain, with low flows directed to the MWS. Refer to the MWS detail for the water quality ponding depth.

8bi. Second Review: Provide a Modular Wetland detail prepared by CONTECH, or other approved proprietary system, for the proposed BMP due to invert elevations of the downstream storm drain being critical. At minimum, show the flow line in, flow line out, and adequate internal bypass (if utilized). See comment above. Provide adequate bypass.

The external bypass has been re-added to plans. During a high flow event, flows will back up in the modular wetland system (MWS) to the external bypass, then discharge to a bypass pipe with a flow line set at an elevation above the water quality depth. High flows will be diverted to continue downstream in the storm drain, with low flows directed to the MWS. Refer to the MWS detail for the water quality ponding depth.

8ci. Second Review: The planting for the Modular Wetland System remains unchanged from the 1st submittal. The selected plants do not appear on the approved plant list from Contech. Revise planting or provide documentation from Contech that the selected plants are appropriate.

Noted; selected plants revised per Landscape Architect recommendations.

9b. Second Review, New Comment: Please provide a detail of the biofiltration basin.

Detail for biofiltration basin has been included on sheet 15 of 16 of the TM.

12ci. Second Review: Comment has not been addressed. - Call out the storm drain system. Identify the offsite storm drain for runoff from Laurel Heights.

Callout added to DMA exhibit, one for the Aubrey Glen Storm Drain, and another for the Laurel Heights Storm Drain.

PRIORITY DEVELOPMENT PROJECT STORM WATER QUALITY MANAGEMENT PLAN (PDPSWQMP)

AUBREY GLEN

Revision Page

November 7, 2024

This PDPSWQMP presents a revision to the August 30, 2024 report pursuant to the City of Santee plan check comments received October 24, 2024. The following text identifies the plan check comments along with the responses in bold.

PDPSWQMP Review Comments – Dr. Luis A. Parra & William O'Gorman (Dated 10/21/2024)

II. SWQMP Study Review

ii.1. Main SWQMP Comments

1. The main discussion regarding the SWQMP is not included in the document submitted: How to justify the use of a proprietary BMP with negligible retention capacity as a replacement of a retention or partial retention non-proprietary BMP in a development occurring in soil type C with groundwater deep in excess of 20 ft (per form 1-3B) when a certain percentage of retention is expected? The document does not address this issue and leaves it open for a next submittal. Therefore, without more details or explanations, the reviewers cannot agree with the BMP selection occurring in the document presented, and cannot prepare a detailed review. Please provide detailed justification of the selection of a proprietary BMP and how the project is planning to comply with retention requirements. Also, justify why some areas destined as parks cannot be used for some detention/infiltration capabilities in such a way that:

    - (a) The layout of the buildings is not altered.
    - (b) The functionality as a park/open space remains.
    - (c) Some water quality/retention function can be gained by the project.

    The City of Santee does not have a retention worksheet as part of its BMP Design Manual, so worksheet B-5.2 and B-5.6 from the City of San Diego have been included based on direction from City Staff on 11/5/2024. The DMA exhibit has designated the areas that will be reserved for impervious area dispersion.

2. A DMA Map with a clear estimation of percentage impervious of each DMA has not been included. A clear estimation of impervious percentages cannot be verified, and it seems that pervious percentage has been assigned very generously, from what can be approximately inferred

from the Open Space Map provided (pervious areas overlap doors, impervious pathways for walking, do not include BMP area nor landscape in sidewalks, include what it looks like walking paths as pervious areas, etc). The reviewers do not believe that the overall perviousness of the project approaches 27% (BMP-1 25% pervious + BMP-2 50% pervious gives an overall 72% pervious). Consequently, a detailed review of the calculations is not possible. Please provide a detailed DMA map with reliable pervious percentage calculations to provide a detailed review. When updating the percentage pervious, update of the drainage calculations will also be necessary.

Typically for the first submittal of entitlements, a rough assumption of impervious area is used acknowledging there likely will be site changes that would impact a detailed impervious area calculation. However, given this comment, a detailed measurement was performed and details provided in Attachment 1A showing the calculation of impervious area. DMA-1 is 73% impervious and DMA-2 is 44% impervious.

However, anticipating that there might be additional site changes that could potentially increase the percent impervious, the proposed MWS that treats DMA-1 was sized for a tributary area of 85%. The required water quality flow rate based on its actual percent impervious is 0.529cfs per Attachment 1E, however 0.58cfs will be provided. Similarly, the footprint of the biofiltration basin is well oversized for the area tributary to it (103 sf required vs 296 sf provided).

As a consequence of comments 1 and 2, a detailed review will occur in the next submittal. However, some comments have been added in the following section to reduce review time in the future. New comments should be expected in the next round when the main issues are addressed.

ii.2. Additional SWQMP Comments

3. EOW to sign and stamp report prior to approval.

   Comment noted. This will be included in a future submittal.

4. Developer to sign Owners Certification prior to approval.

   Comment noted. This will be included in a future submittal.

5. Check "Miscellaneous Drain or Wash Water" for AC Condensation lines on forms I-3B and I-4.

   "Miscellaneous Drain or Wash Water" for AC Condensation lines on forms I-3B and I-4 has been checked.

6. The proposed street improvements (sidewalk) along Aubrey Glen is included within DMA 1, but it is not clear how runoff is captured and conveyed to the Modular Wetland System (BMP-1) for treatment. Either demonstrate how runoff is captured & conveyed, or delineate a separate DMA and provide an additional BMP for treatment of the Aubrey Glen Improvements.

   Separate DMAs have been delineated for frontage improvements that will be tributary to a green street element on Mission Gorge Road as well as self-mitigating areas that define vegetated slopes on the edge of the property and one de minimis area on the eastern edge that is not tributary to any BMPs.

7. On the DMA Exhibit, call out a Trash Capture Device to be installed on the cleanout downstream of the Modular Wetland and bypass storm drain line to comply with the NPDES Full Trash Capture Order.

   After review of the memorandum titled, "Full Capture Device Installation Planning for Compliance with the Statewide Trash Control Policy" dated January 17, 2019 and prepared by DMax, it appears that the public inlets downstream of our project site will provide full trash capture compliance. Additionally, it states for years 7 through 10 that the City of Santee would pass an ordinance requiring private properties to install BMPs on their property to address private PLUs. If this ordinance has been passed, please provide a copy for reference. The memorandum includes exhibits that define a strategy for full compliance and this site has not been identified for the placement of a full trash capture device within the private property.

8. Modular Wetland System (BMP-1) General Comments:

   - (a) The proposed curb inlet immediately upstream from the MWS has one 24" pipe discharging into the MWS and another 24" pipe discharging into a proposed cleanout. Clarify what is happening in this area on the plans and in the reports. If this is being utilized as a diversion structure, provide calculations and details demonstrating the entire water quality flow is treated by the modular wetland without overflowing to the clean water line.

   - (b) Provide a Modular Wetland detail prepared by CONTECH, or other approved proprietary system, for the proposed BMP due to invert elevations of the downstream storm drain being critical. At minimum, show the flow line in, flow line out, and adequate internal bypass (if utilized).

     The following is a response to comment 8a and 8b above. To simplify the design, internal bypass within the MWS is proposed for high flows and the upstream diversion structure has been removed along with the small reach of storm drain. We have provided a detail from Contech, however it will need to be revised to show an internal weir wall. Coordination with the vendor is currently ongoing and this detail will be provided with a future submittal.

   - (c) Ensure the planting is appropriate for the BMP based on the Modular Wetland Plant List.

     Comment noted. Planting will be appropriate.

9. Biofiltration Basin (BMP-2) General Comment:

   - (a) Provide calculations for the proposed biofiltration basin in accordance with Appendix B.5 and Worksheet B.5-1 of the City's BMP Manual.

     Worksheet B.5-1 has been included in Attachment 1E.

10. Include the Infiltration Feasibility Worksheet Form I-8. Justify a no infiltration condition and how the retention condition will be satisfied.

    Form I-8 has been included in Attachment 1D.

11. Attachment 1B DCV Calculation references "Summit Avenue". Please revise.

Comment noted, this has been revised.

12. DMA Exhibit General Comments:

    - (a) Identify all pervious areas in the exhibit with a typical color as it does not seem in agreement with grading plans to assume DMA-1 with 25% pervious and DMA-2 with 50% pervious.

    For clarity, an additional exhibit has been prepared showing the impervious and pervious area of the site and it has been included in Attachment 1A.

    - (b) Label contours and add arrows for flow paths.

    Comment noted and addressed.

    - (c) Call out the storm drain system. Identify the offsite storm drain for runoff from Laurel Heights.

    Comment noted and addressed.

    - (d) Label Aubrey Glen and Mission Gorge Road.

    Comment noted and addressed.

CITY OF SANTEE INTER-OFFICE MEMO

TO: Michael Coyne, Principal Planner
FROM: John Keane, Principal Civil Engineer
VIA: Emily Stein, Storm Water Program Coordinator
DATE: October 15, 2024
SUBJECT: TM-2024-0003 Mission Gorge Condos Aubrey Glen 7737 Mission Gorge Rd

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The Stormwater Department has reviewed this project's most recent submittal dated September 25, 2024, and requests that the applicant address the following:

1. Storm Water Quality Management Plan (for Priority Development Projects):

    a. On the DMA Exhibit:

        i. Call out all storm drain inlets as containing a Full Trash Capture Device (FTC) and identify type/model.

    After review of the memorandum titled, "Full Capture Device Installation Planning for Compliance with the Statewide Trash Control Policy" dated January 17, 2019 and prepared by DMax, it appears that the public inlets downstream of our project site will provide full trash capture compliance. Additionally, it states for years 7 through 10 that the City of Santee would pass an ordinance requiring private properties to install BMPs on their property to address private PLUs. If this ordinance has been passed, please provide a copy for reference. The memorandum includes exhibits that define a strategy for full compliance and this site

has not been identified for the placement of a full trash capture device within the private property.

ii. Call out location(s) of pet waste stations.

Pet waste stations have been called out.

iii. Add a note designating the HOA as the responsible party for maintenance of the Modular Wetland System (MWS), biofiltration basin, and FTC devices.

Form I-6 in the PDPSWQMP calls out the HOA as the responsible part for maintenance of the MWS.

iv. Include details of the MWS, biofiltration basin, FTC devices, and pet waste stations. These may be added as separate sheet(s) if necessary.

Details of the MWS and biofiltration basin have been provided in Attachment 1A.

- b. Attachment 1B (sheet no. 42 of 74):

i. Calls out DMA-1 as being treated by BMP-1A and 1B. Please confirm if this is a typo or if two MWSs/BMPs are treating DMA-1.

This has been revised. DMA-1is treated by BMP-1 (MWS) and DMA-2 is treated by BMP-2 (biofiltration basin).

SWQMP PREPARER'S
CERTIFICATION PAGE

Project Name: Townsend Multi-Family
Permit Application Number: TM-2024-0003

PREPARER'S CERTIFICATION

I hereby declare that I am the Engineer in Responsible Charge of design of storm water best management practices (BMPs) for this project, and that I have exercised responsible charge over the design of the BMPs as defined in Section 6703 of the Business and Professions Code, and that the design is consistent with the PDP requirements of the City of Santee BMP Design Manual, which is a design manual for compliance with local City of Santee and regional MS4 Permit (California Regional Water Quality Control Board San Diego Region Order No. R9-2015-0100) requirements for storm water management.

I have read and understand that the [City Engineer] has adopted minimum requirements for managing urban runoff, including storm water, from land development activities, as described in the BMP Design Manual. I certify that this PDP SWQMP has been completed to the best of my ability and accurately reflects the project being proposed and the applicable BMPs proposed to minimize the potentially negative impacts of this project's land development activities on water quality. I understand and acknowledge that the plan check review of this PDP SWQMP by the [City Engineer] is confined to a review and does not relieve me, as the Engineer in Responsible Charge of design of storm water BMPs for this project, of my responsibilities for project design.

REGISTERED PROFESSIONAL ENGINEER
SHAVGER FAHMY REKANI
No. 90893
CIVIL
STATE OF CALIFORNIA

____
Engineer of Work's Signature, PE Number & Expiration Date

Shavger Rekani
____
Print Name

RICK____
Company

3/21/2025
Date

Engineer's Seal:

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SWQMP PROJECT OWNER'S
CERTIFICATION PAGE

Project Name: Townsend Multi-Family
Permit Application Number: TM-2024-0003

PROJECT OWNER'S CERTIFICATION

This PDP SWQMP has been prepared for KB Homes Coastal by RICK. The PDP SWQMP is intended to comply with the PDP requirements of the City of Santee BMP Design Manual, which is a design manual for compliance with local City of Santee and regional MS4 Permit (California Regional Water Quality Control Board San Diego Region Order No. R9-2015-0100) requirements for storm water management.

The undersigned, while it owns the subject property, is responsible for the implementation of the provisions of this plan. Once the undersigned transfers its interests in the property, its successor-in-interest shall bear the aforementioned responsibility to implement the best management practices (BMPs) described within this plan, including ensuring on-going operation and maintenance of structural BMPs. A signed copy of this document shall be available on the subject property into perpetuity.

____
Project Owner's Signature

Jesse Kleist
Print Name

KB Homes Coastal
Company

3/21/2025
Date

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SUBMITTAL RECORD

Use this Table to keep a record of submittals of this PDP SWQMP. Each time the PDP SWQMP is re-submitted, provide the date and status of the project. In column 4 summarize the changes that have been made or indicate if response to plancheck comments is included. When applicable, insert response to plancheck comments behind this page.

Submittal Number	Date	Project Status	Summary of Changes
1	8/30/2024	☒ Preliminary Design / Planning/ CEQA ☐ Final Design	Initial Submittal
2	11/7/2024	☒ Preliminary Design / Planning/ CEQA ☐ Final Design	Minor site changes, addition of retention area, and impervious area exhibit
3	1/29/2025	☒ Preliminary Design / Planning/ CEQA ☐ Final Design	Update retention areas and address City of Santee comments.
4	3/21/2025	☒ Preliminary Design / Planning/ CEQA ☐ Final Design	Address City of Santee comments. Addition of green street elements along Aubrey Glen.

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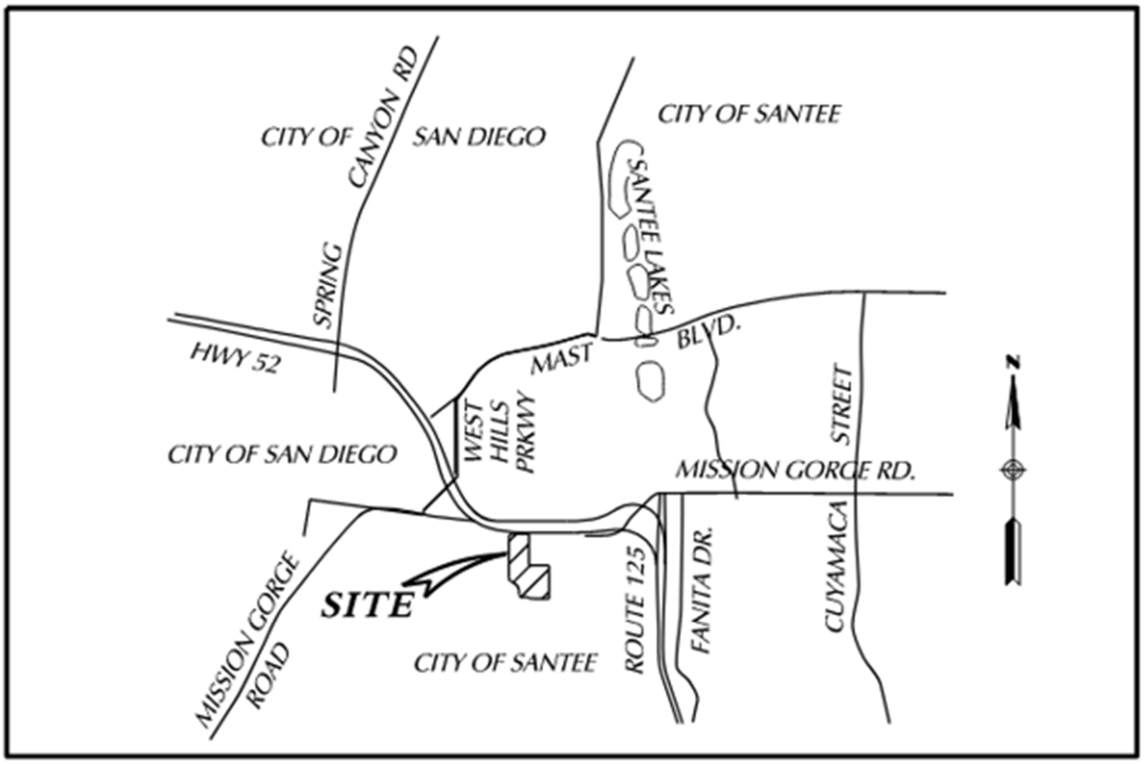
PROJECT VICINITY MAP

Project Name: Townsend Multi-Family
Permit Application Number: TM-2024-0003



VICINITY MAP
NO SCALE

<table>
<tr><td colspan="2">Applicability of Permanent, Post-Construction Storm Water BMP Requirements
(Storm Water Intake Form for all Development Permit Applications)</td><td>Form I-1
Model BMP Design Manual
[August 31, 2015]</td></tr>
<tr><td colspan="3">Project Identification</td></tr>
<tr><td colspan="3">Project Name: Aubrey Glen</td></tr>
<tr><td colspan="2">Permit Application Number: TM-2024-0003</td><td>Date: 3/21/2025</td></tr>
<tr><td colspan="3">Project Address:
7735 Mission Gorge Road Santee, CA 92071</td></tr>
<tr><td colspan="3">Determination of Requirements</td></tr>
<tr><td colspan="3">The purpose of this form is to identify permanent, post-construction requirements that apply to the project. This form serves as a short <u>summary</u> of applicable requirements, in some cases referencing separate forms that will serve as the backup for the determination of requirements.

Answer each step below, starting with Step 1 and progressing through each step until reaching "Stop".
Upon reaching a Stop, do not complete further Steps beyond the Stop.

Refer to BMP Design Manual sections and/or separate forms referenced in each step below.</td></tr>
<tr><td>Step</td><td>Answer</td><td>Progression</td></tr>
<tr><td rowspan="2">Step 1: Is the project a "development project"?
See Section 1.3 of the BMP Design Manual for guidance.</td><td>☒ Yes</td><td>Go to Step 2.</td></tr>
<tr><td>☐ No</td><td>Stop.
Permanent BMP requirements do not apply.
No SWQMP will be required. Provide discussion below.</td></tr>
<tr><td colspan="3">Discussion / justification if the project is <u>not</u> a "development project" (e.g., the project includes only interior remodels within an existing building):</td></tr>
<tr><td rowspan="3">Step 2: Is the project a Standard Project, Priority Development Project (PDP), or exception to PDP definitions?
To answer this item, see Section 1.4 of the BMP Design Manual in its entirety for guidance, AND complete Form I-2, Project Type Determination.</td><td>☐ Standard Project</td><td>Stop.
<u>Only</u> Standard Project requirements apply, including <u>Standard Project SWQMP</u>.</td></tr>
<tr><td>☒ PDP</td><td><u>Standard and PDP</u> requirements apply, including <u>PDP SWQMP</u>.
Go to Step 3.</td></tr>
<tr><td>☐ Exception to PDP definitions</td><td>Stop.
<u>Standard Project</u> requirements apply, <u>and any additional requirements specific to the type of project</u>. Provide discussion and list any additional requirements below. Prepare <u>Standard Project SWQMP</u>.</td></tr>
</table>

Form I-1 Page 2, Form Template Date: August 31, 2015		
[Step 2 Continued from Page 1] Discussion / justification, and additional requirements for exceptions to PDP definitions, if applicable:		
Step 3 (PDPs only). Is the project subject to earlier PDP requirements due to a prior lawful approval? See Section 1.10 of the BMP Design Manual for guidance.	☐ Yes	Consult the [City Engineer] to determine requirements. Provide discussion and identify requirements below. Go to Step 4.
	☒ No	BMP Design Manual PDP requirements apply. Go to Step 4.
Discussion / justification of prior lawful approval, and identify requirements (*not required if prior lawful approval does not apply*):		
Step 4 (PDPs only). Do hydromodification control requirements apply? See Section 1.6 of the BMP Design Manual for guidance.	☐ Yes	PDP structural BMPs required for pollutant control (Chapter 5) and hydromodification control (Chapter 6). Go to Step 5.
	☒ No	Stop. PDP structural BMPs required for pollutant control (Chapter 5) only. Provide brief discussion of exemption to hydromodification control below.
Discussion / justification if hydromodification control requirements do not apply: The entirety of the site is collected by on storm drain and discharged directly to the San Diego River, which is considered a hydromodification exempt body at the discharge location.		
Step 5 (PDPs subject to hydromodification control requirements only). Does protection of critical coarse sediment yield areas apply based on review of WMAA Potential Critical Coarse Sediment Yield Area Map? See Section 6.2 of the BMP Design Manual for guidance.	☐ Yes	Management measures required for protection of critical coarse sediment yield areas (Chapter 6.2). Stop.
	☒ No	Management measures not required for protection of critical coarse sediment yield areas. Provide brief discussion below. No CCSYA exist in project boundary.

<table>
<tr><td colspan="4">Priority Determination Form</td><td>Form I-2
Model BMP Design Manual
[August 31, 2015]</td></tr>
<tr><td colspan="5">Project Information</td></tr>
<tr><td colspan="5">Project Name: Townsend Multi-Family</td></tr>
<tr><td colspan="4">Permit Application Number: TM-2024-0003</td><td>Date: 3/21/2025</td></tr>
<tr><td colspan="5">Project Address:
7735 Mission Gorge Road Santee, CA 92071</td></tr>
<tr><td colspan="5">Project Type Determination: Standard Project or Priority Development Project (PDP)</td></tr>
<tr><td colspan="5">The project is (select one): New Development X Redevelopment</td></tr>
<tr><td colspan="5">The total proposed newly created or replaced impervious area is: _81,554_ ft² (__1.9__) acres</td></tr>
<tr><td colspan="5">Is the project in any of the following categories, (a) through (f)?</td></tr>
<tr><td>Yes</td><td>No
X</td><td>(a)</td><td colspan="2">New development projects that create 10,000 square feet or more of impervious surfaces (collectively over the entire project site). This includes commercial, industrial, residential, mixed-use, and public development projects on public or private land.</td></tr>
<tr><td>Yes
X</td><td>No</td><td>(b)</td><td colspan="2">Redevelopment projects that create and/or replace 5,000 square feet or more of impervious surface (collectively over the entire project site on an existing site of 10,000 square feet or more of impervious surfaces). This includes commercial, industrial, residential, mixed-use, and public development projects on public or private land.</td></tr>
<tr><td>Yes
X</td><td>No</td><td>(c)</td><td colspan="2">New and redevelopment projects that create and/or replace 5,000 square feet or more of impervious surface (collectively over the entire project site), and support one or more of the following uses:
(i) Restaurants. This category is defined as a facility that sells prepared foods and drinks for consumption, including stationary lunch counters and refreshment stands selling prepared foods and drinks for immediate consumption (Standard Industrial Classification (SIC) code 5812).
(ii) Hillside development projects. This category includes development on any natural slope that is twenty-five percent or greater.
(iii) Parking lots. This category is defined as a land area or facility for the temporary parking or storage of motor vehicles used personally, for business, or for commerce.
(iv) Streets, roads, highways, freeways, and driveways. This category is defined as any paved impervious surface used for the transportation of automobiles, trucks, motorcycles, and other vehicles.</td></tr>
</table>

Form I-2 Page 2, Form Template Date: August 31, 2015			
Yes	No X	(d)	New or redevelopment projects that create and/or replace 2,500 square feet or more of impervious surface (collectively over the entire project site), and discharging directly to an Environmentally Sensitive Area (ESA). "Discharging directly to" includes flow that is conveyed overland a distance of 200 feet or less from the project to the ESA, or conveyed in a pipe or open channel any distance as an isolated flow from the project to the ESA (i.e. not commingled with flows from adjacent lands). *Note: ESAs are areas that include but are not limited to all Clean Water Act Section 303(d) impaired water bodies; areas designated as Areas of Special Biological Significance by the State Water Board and San Diego Water Board; State Water Quality Protected Areas; water bodies designated with the RARE beneficial use by the State Water Board and San Diego Water Board; and any other equivalent environmentally sensitive areas which have been identified by the Copermittees. See BMP Design Manual Section 1.4.2 for additional guidance.*
Yes	No X	(e)	New development projects, or redevelopment projects that create and/or replace 5,000 square feet or more of impervious surface, that support one or more of the following uses: (i) Automotive repair shops. This category is defined as a facility that is categorized in any one of the following SIC codes: 5013, 5014, 5541, 7532-7534, or 7536-7539. (ii) Retail gasoline outlets (RGOs). This category includes RGOs that meet the following criteria: (a) 5,000 square feet or more or (b) a projected Average Daily Traffic (ADT) of 100 or more vehicles per day.
Yes X	No	(f)	New or redevelopment projects that result in the disturbance of one or more acres of land and are expected to generate pollutants post construction. *Note: See BMP Design Manual Section 1.4.2 for additional guidance.*
Does the project meet the definition of one or more of the Priority Development Project categories (a) through (f) listed above? No – the project is not a Priority Development Project (Standard Project). X Yes – the project is a Priority Development Project (PDP).			
The following is for redevelopment PDPs only: The area of existing (pre-project) impervious area at the project site is: 101,930 ft² (A) The total proposed newly created or replaced impervious area is 81,554 ft² (B) Percent impervious surface created or replaced (B/A)*100: 81 % The percent impervious surface created or replaced is (select one based on the above calculation): less than or equal to fifty percent (50%) – only new impervious areas are considered PDP OR X greater than fifty percent (50%) – the entire project site is a PDP			

Site Design Checklist For PDPs	Form I-3B (PDPs) Model BMP Design Manual [August 31, 2015]
Project Summary Information	
Project Name	Townsend Multi-Family
Project Address	7735 Mission Gorge Rd, Santee, CA 92071
Assessor's Parcel Number(s) (APN(s))	386-701-02
Permit Application Number	TM-2024-0003
Project Hydrologic Unit	Select One: ☐ Santa Margarita 902 ☐ San Luis Rey 903 ☐ Carlsbad 904 ☐ San Dieguito 905 ☐ Penasquitos 906 ☒ San Diego 907 ☐ Pueblo San Diego 908 ☐ Sweetwater 909 ☐ Otay 910 ☐ Tijuana 911
Project Watershed (Complete Hydrologic Unit, Area, and Subarea Name with Numeric Identifier)	San Diego Hydrologic Unit Lower San Diego Hydrologic Area Santee Hydrologic Subarea (907.12)
Parcel Area (total area of Assessor's Parcel(s) associated with the project)	2.55 Acres (111,078 Square Feet)
Area to be Disturbed by the Project (Project Area)	2.69 Acres (117,351 Square Feet)
Project Proposed Impervious Area (subset of Project Area)	1.87 Acres (81,554 Square Feet)
Project Proposed Pervious Area (subset of Project Area)	0.82 Acres (35,797 Square Feet)
Note: Proposed Impervious Area + Proposed Pervious Area = Area to be Disturbed by the Project. This may be less than the Parcel Area.	

Form I-3B Page 2 of 10, Form Template Date: August 31, 2015
Description of Existing Site Condition
Current Status of the Site (select all that apply): ☒ Existing development ☐ Previously graded but not built out ☐ Demolition completed without new construction ☐ Agricultural or other non-impervious use ☐ Vacant, undeveloped/natural Description / Additional Information: The existing site is an industrial lot with a building and concrete parking lot.
Existing Land Cover Includes (select all that apply): ☐ Vegetative Cover ☐ Non-Vegetated Pervious Areas ☒ Impervious Areas Description / Additional Information: The existing site is an industrial lot with a building and concrete parking lot.
Underlying Soil belongs to Hydrologic Soil Group (select all that apply): ☐ NRCS Type A ☐ NRCS Type B ☒ NRCS Type C ☐ NRCS Type D
Approximate Depth to Groundwater (GW): ☐ GW Depth < 5 feet ☐ 5 feet < GW Depth < 10 feet ☐ 10 feet < GW Depth < 20 feet ☒ GW Depth > 20 feet

Existing Natural Hydrologic Features (select all that apply):

☐ Watercourses

☐ Seeps

☐ Springs

☐ Wetlands

X None

Description / Additional Information:

Form I-3B Page 3 of 10, Form Template Date: August 31, 2015
Description of Existing Site Drainage Patterns
How is storm water runoff conveyed from the site? At a minimum, this description should answer: (1) whether existing drainage conveyance is natural or urban; **The existing drainage conveyance onsite is urban. Drainage from the existing project flows south to north and is discharged onto Mission Gorge Road and collected by existing inlets. The inlets convey flows to the existing storm drain conveyance system on Mission Gorge Road, and flow towards the San Diego River.** (2) Is runoff from offsite conveyed through the site? if yes, quantify all offsite drainage areas, design flows, and locations where offsite flows enter the project site, and summarize how such flows are conveyed through the site, **Approximately 5.6 acres with 20 cfs of unmitigated offsite flows are conveyed through the existing site. Drainage from the south is collected by a water quality basin and detention vault and discharged onto the Townsend Multi-Family site. Flows from the site are collected by an existing brow ditch and conveyed to Mission Gorge Road.** (3) Provide details regarding existing project site drainage conveyance network, including any existing storm drains, concrete channels, swales, detention facilities, storm water treatment facilities, natural or constructed channels; **An existing brow ditch conveys flows from the northern offsite area through the Townsend Multi-Family site.** (4) Identify all discharge locations from the existing project site along with a summary of conveyance system size and capacity for each of the discharge locations. Provide summary of the pre-project drainage areas and design flows to each of the existing runoff discharge locations; **The pre-project drainage area discharges to the POC-1 location located on Mission Gorge Road. The project site is 2.55 acres, located within Basin 200. Basin 200 includes a portion of southern offsite areas which is 5.6 acres. The total area of Basin 200 inclusive of the project site is 8.15 acres. Basin 100 is represented by the adjacent offsite area that's also tributary to POC-1. Basin 100 has a total area of 6.44 acres. The total tributary area to POC-1 is 14.59 acres, with a 100-year undetained runoff value of 43.62 cfs, and a detained runoff value of 22.88 cfs.** (5) Describe existing site drainage patterns; **The pre-project site drains generally in the north direction to POC-1 on the northeast side of the property along Mission Gorge Road. The project site is situated in one major basin boundary, Basin 200. Offsite flows adjacent to the project site are represented by Basin 100 and a portion of Basin 200. Basin 100 begins south of the project site and drains north to a cobble lined swale. Flows from the swale discharge through a curb opening onto Aubrey Glen Drive, then are collected by a v-gutter and conveyed north to an existing curb inlet on Mission Gorge Road. Basin 200 also begins on the south of the site and drains north to a detention vault and then to a water quality basin. Flows are discharged from the basin onto the Townsend Multi-Family project site, then collected by an existing brow ditch and conveyed to Mission Gorge Road. Flows from Basin 100 and 200 confluence on Mission Gorge Road prior to entering the existing storm drain system and ultimately discharging into the San Diego River.**

Form I-3B Page 4 of 10, Form Template Date: August 31, 2015
Description of Proposed Site Development
Project Description / Proposed Land Use and/or Activities: The proposed project is a 2.69 acre redevelopment project that proposes the construction of multifamily homes, a residential street with street parking, and green street elements along Mission Gorge Road.
List/describe proposed impervious features of the project (e.g., buildings, roadways, parking lots, courtyards, athletic courts, other impervious features): The project's impervious features include multifamily dwellings, residential street with parking, and street improvements.
List/describe proposed pervious features of the project (e.g., landscape areas): The project's pervious features include landscaped areas.
Does the project include grading and changes to site topography? ☒ Yes ☐ No Description / Additional Information: The site will be mass graded for the proposed development.

Form I-3B Page 5 of 10, Form Template Date: August 31, 2015
Description of Proposed Site Drainage Patterns

Does the project include changes to site drainage (e.g., installation of new storm water conveyance systems)?

☒ Yes
☐ No

If yes, provide details regarding the proposed project site drainage conveyance network, including storm drains, concrete channels, swales, detention facilities, storm water treatment facilities, natural or constructed channels, and the method for conveying offsite flows through or around the proposed project site. Identify all discharge locations from the proposed project site along with a summary of the conveyance system size and capacity for each of the discharge locations. Provide a summary of pre- and post-project drainage areas and design flows to each of the runoff discharge locations. Reference the drainage study for detailed calculations.

The proposed drainage system will collect surface flows via grate and curb storm drain inlets. Flows will be conveyed via underground storm drains to a modular wetland system located north of the property. The modular wetland system discharges flow to additional storm drain which drains to a point of comparison (POC-1) located at a proposed cleanout on Mission Gorge Road. A biofiltration basin is also proposed to treat 0.2 acres of the project frontage that isn't captured by the modular wetland system. Runoff from the basin confluence flows with the remaining site in a proposed cleanout and drain to POC-1 on Mission Gorge Road.

Describe proposed site drainage patterns:

Drainage patterns for the proposed condition will remain similar to drainage patterns in the pre-project condition. In the post-project condition, the project area is also found in Basin 200, with offsite flows in Basin 100. No improvements are proposed in Basin 100; therefore Basin 100 will remain in the same condition as the pre-project. Regarding Basin 200, flows from the adjacent sites south of the project are collected by a proposed clean water line storm drain system and conveyed north to the edge of the property boundary. The clean water line is intended to route offsite flows through the site which are already treated via the water quality basin south of the project. To ensure appropriate sizing, the clean water line is sized and designed for the unmitigated 100-year storm event rather than the mitigated 100-year storm event. Flows from the south are captured in a proposed type-F catch basin on the south property edge of the site and routed to the clean water line that flows north to the property frontage.

Drainage onsite of the Townsend Multi-Family project will be collected by curb inlets and grate inlets and conveyed by a proposed dirty water storm drain system to the northern edge of the property boundary. The dirty water line is treated via proposed modular wetland system (MWS), then confluenced with the clean water line prior to discharge from the site. Additional drainage along the northern portion of the Townsend Multi-Family site is collected by a grate inlet and treated by a biofiltration basin, then joined with flows discharging the site to Mission Gorge Road. Flows from Basin 100 and Basin 200 confluence in a proposed cleanout on Mission Gorge Road prior to ultimately discharging to the San Diego River.

Form I-3B Page 6 of 10, Form Template Date: August 31, 2015
Identify whether any of the following features, activities, and/or pollutant source areas will be present (select all that apply): ☒ On-site storm drain inlets ☐ Interior floor drains and elevator shaft sump pumps ☐ Interior parking garages ☒ Need for future indoor & structural pest control ☒ Landscape/Outdoor Pesticide Use ☐ Pools, spas, ponds, decorative fountains, and other water features ☐ Food service ☒ Refuse areas ☐ Industrial processes ☐ Outdoor storage of equipment or materials ☐ Vehicle and Equipment Cleaning ☐ Vehicle/Equipment Repair and Maintenance ☐ Fuel Dispensing Areas ☐ Loading Docks ☒ Fire Sprinkler Test Water ☒ Miscellaneous Drain or Wash Water ☒ Plazas, sidewalks, and parking lots Description / Additional Information:

Form I-3B Page 7 of 10, Form Template Date: August 31, 2015		
Identification and Narrative of Receiving Water and Pollutants of Concern		
Runoff from the project site enters a curb inlet at the intersection of Summit Avenue and Princess Joann Road and flows to the San Diego River. After entering the San Diego River, runoff is discharged to the Pacific Ocean.		
List any 303(d) impaired water bodies within the path of storm water from the project site to the Pacific Ocean (or bay, lagoon, lake or reservoir, as applicable), identify the pollutant(s)/stressor(s) causing impairment, and identify any TMDLs and/or Highest Priority Pollutants from the WQIP for the impaired water bodies:		
303(d) Impaired Water Body	**Pollutant(s)/Stressor(s)**	**TMDLs / WQIP Highest Priority Pollutant**
San Diego River	Enterococcus, Fecal Coliform, Low Dissolved Oxygen, Manganese, Nitrogen, Phosphorus, Total Dissolved Solids, Toxicity	Indicator bacteria.

Identification of Project Site Pollutants*

***Identification of project site pollutants is only required if flow-thru treatment BMPs are implemented onsite in lieu of retention or biofiltration BMPs (note the project must also participate in an alternative compliance program unless prior lawful approval to meet earlier PDP requirements is demonstrated)**

Identify pollutants expected from the project site based on all proposed use(s) of the site (see BMP Design Manual Appendix B.6):

Pollutant	Not Applicable to the Project Site	Expected from the Project Site	Also a Receiving Water Pollutant of Concern
Sediment			
Nutrients			
Heavy Metals			
Organic Compounds			
Trash & Debris			
Oxygen Demanding Substances			
Oil & Grease			
Bacteria & Viruses			
Pesticides			

Form I-3B Page 8 of 10, Form Template Date: August 31, 2015
Hydromodification Management Requirements
Do hydromodification management requirements apply (see Section 1.6 of the BMP Design Manual)? ☐ Yes, hydromodification management flow control structural BMPs required. ☒ No, the project will discharge runoff directly to existing underground storm drains discharging directly to water storage reservoirs, lakes, enclosed embayments, or the Pacific Ocean. ☐ No, the project will discharge runoff directly to conveyance channels whose bed and bank are concrete-lined all the way from the point of discharge to water storage reservoirs, lakes, enclosed embayments, or the Pacific Ocean. ☐ No, the project will discharge runoff directly to an area identified as appropriate for an exemption by the WMAA for the watershed in which the project resides. Description / Additional Information (to be provided if a 'No' answer has been selected above): The project site ties into the existing storm drain system on Mission Gorge Road, then discharges directly to the San Diego River.

Critical Coarse Sediment Yield Areas* ***This Section only required if hydromodification management requirements apply**
Based on the maps provided within the WMAA, do potential critical coarse sediment yield areas exist within the project drainage boundaries? ☐ Yes ☐ No, No critical coarse sediment yield areas to be protected based on WMAA maps If yes, have any of the optional analyses presented in Section 6.2 of the BMP Design Manual been performed? ☐ 6.2.1 Verification of Geomorphic Landscape Units (GLUs) Onsite ☐ 6.2.2 Downstream Systems Sensitivity to Coarse Sediment ☐ 6.2.3 Optional Additional Analysis of Potential Critical Coarse Sediment Yield Areas Onsite ☐ No optional analyses performed, the project will avoid critical coarse sediment yield areas identified based on WMAA maps If optional analyses were performed, what is the final result? ☐ No critical coarse sediment yield areas to be protected based on verification of GLUs onsite ☐ Critical coarse sediment yield areas exist but additional analysis has determined that protection is not required. Documentation attached in Attachment 2.b of the SWQMP. ☐ Critical coarse sediment yield areas exist and require protection. The project will implement management measures described in Sections 6.2.4 and 6.2.5 as applicable, and the areas are identified on the SWQMP Exhibit. Discussion / Additional Information:

Form I-3B Page 9 of 10, Form Template Date: August 31, 2015
Flow Control for Post-Project Runoff* ***This Section only required if hydromodification management requirements apply**
List and describe point(s) of compliance (POCs) for flow control for hydromodification management (see Section 6.3.1). For each POC, provide a POC identification name or number correlating to the project's HMP Exhibit and a receiving channel identification name or number correlating to the project's HMP Exhibit.
☐ No, the low flow threshold is 0.1Q2 (default low flow threshold) ☐ Yes, the result is the low flow threshold is 0.1Q2 ☐ Yes, the result is the low flow threshold is 0.3Q2 ☐ Yes, the result is the low flow threshold is 0.5Q2 If a geomorphic assessment has been performed, provide title, date, and preparer: Discussion / Additional Information: (optional)

Form I-3B Page 10 of 10, Form Template Date: August 31, 2015
Other Site Requirements and Constraints
When applicable, list other site requirements or constraints that will influence storm water management design, such as zoning requirements including setbacks and open space, or local codes governing minimum street width, sidewalk construction, allowable pavement types, and drainage requirements.
Optional Additional Information or Continuation of Previous Sections As Needed
This space provided for additional information or continuation of information from previous sections as needed.

Source Control BMP Checklist for All Development Projects (Standard Projects and Priority Development Projects)			Form I-4 Model BMP Design Manual [August 31, 2015]
Project Identification			
Project Name: Townsend Multi-Family			
Permit Application Number: TM-2024-0003			
Source Control BMPs			
All development projects must implement source control BMPs SC-1 through SC-6 where applicable and feasible. See Chapter 4 and Appendix E of the Model BMP Design Manual for information to implement source control BMPs shown in this checklist. Answer each category below pursuant to the following. • "Yes" means the project will implement the source control BMP as described in Chapter 4 and/or Appendix E of the Model BMP Design Manual. Discussion / justification is not required. • "No" means the BMP is applicable to the project but it is not feasible to implement. Discussion / justification must be provided. • "N/A" means the BMP is not applicable at the project site because the project does not include the feature that is addressed by the BMP (e.g., the project has no outdoor materials storage areas). Discussion / justification may be provided.			
Source Control Requirement	**Applied?**		
SC-1 Prevention of Illicit Discharges into the MS4	☒ Yes	☐ No	☐ N/A
Discussion / justification if SC-1 not implemented:			
SC-2 Storm Drain Stenciling or Signage	☒ Yes	☐ No	☐ N/A
Discussion / justification if SC-2 not implemented:			
SC-3 Protect Outdoor Materials Storage Areas from Rainfall, Run-On, Runoff, and Wind Dispersal	☐ Yes	☐ No	☒ N/A
Discussion / justification if SC-3 not implemented: Not anticipated for site.			
SC-4 Protect Materials Stored in Outdoor Work Areas from Rainfall, Run-On, Runoff, and Wind Dispersal	☐ Yes	☐ No	☒ N/A
Discussion / justification if SC-4 not implemented: Not anticipated for site.			

Form I-4 Page 2 of 2, Form Template Date: August 31, 2015			
Source Control Requirement	**Applied?**		
SC-5 Protect Trash Storage Areas from Rainfall, Run-On, Runoff, and Wind Dispersal	☐ Yes	☐ No	☒ N/A
Discussion / justification if SC-5 not implemented:			
SC-6 Additional BMPs Based on Potential Sources of Runoff Pollutants (must answer for each source listed below)			
☒ On-site storm drain inlets	☒ Yes	☐ No	☐ N/A
☐ Interior floor drains and elevator shaft sump pumps	☐ Yes	☐ No	☒ N/A
☐ Interior parking garages	☐ Yes	☐ No	☒ N/A
☒ Need for future indoor & structural pest control	☒ Yes	☐ No	☐ N/A
☒ Landscape/Outdoor Pesticide Use	☒ Yes	☐ No	☐ N/A
☐ Pools, spas, ponds, decorative fountains, and other water features	☐ Yes	☐ No	☒ N/A
☐ Food service	☐ Yes	☐ No	☒ N/A
☒ Refuse areas	☒ Yes	☐ No	☐ N/A
☐ Industrial processes	☐ Yes	☐ No	☒ N/A
☐ Outdoor storage of equipment or materials	☐ Yes	☐ No	☒ N/A
☐ Vehicle and Equipment Cleaning	☐ Yes	☐ No	☒ N/A
☐ Vehicle/Equipment Repair and Maintenance	☐ Yes	☐ No	☒ N/A
☐ Fuel Dispensing Areas	☐ Yes	☐ No	☒ N/A
☐ Loading Docks	☐ Yes	☐ No	☒ N/A
☒ Fire Sprinkler Test Water	☒ Yes	☐ No	☐ N/A
☒ Miscellaneous Drain or Wash Water	☒ Yes	☐ No	☐ N/A
☒ Plazas, sidewalks, and parking lots	☒ Yes	☐ No	☐ N/A

Discussion / justification if SC-6 not implemented. Clearly identify which sources of runoff pollutants are discussed. Justification must be provided for all "No" answers shown above.

Site Design BMP Checklist for All Development Projects (Standard Projects and Priority Development Projects)			Form I-5 Model BMP Design Manual [August 31, 2015]
Project Identification			
Project Name: Townsend Multi-Family			
Permit Application Number: TM-2024-0003			
Site Design BMPs			
All development projects must implement site design BMPs SD-1 through SD-8 where applicable and feasible. See Chapter 4 and Appendix E of the Model BMP Design Manual for information to implement site design BMPs shown in this checklist. Answer each category below pursuant to the following. • "Yes" means the project will implement the site design BMP as described in Chapter 4 and/or Appendix E of the Model BMP Design Manual. Discussion / justification is not required. • "No" means the BMP is applicable to the project but it is not feasible to implement. Discussion / justification must be provided. • "N/A" means the BMP is not applicable at the project site because the project does not include the feature that is addressed by the BMP (e.g., the project site has no existing natural areas to conserve). Discussion / justification may be provided.			
Site Design Requirement	**Applied?**		
SD-1 Maintain Natural Drainage Pathways and Hydrologic Features	☒ Yes	☐ No	☐ N/A
Discussion / justification if SD-1 not implemented:			
SD-2 Conserve Natural Areas, Soils, and Vegetation	☒ Yes	☐ No	☐ N/A
Discussion / justification if SD-2 not implemented:			
SD-3 Minimize Impervious Area	☒ Yes	☐ No	☐ N/A
Discussion / justification if SD-3 not implemented:			
SD-4 Minimize Soil Compaction	☒ Yes	☐ No	☐ N/A
Discussion / justification if SD-4 not implemented:			
SD-5 Impervious Area Dispersion	☒ Yes	☐ No	☐ N/A
Discussion / justification if SD-5 not implemented:			

Form I-5 Page 2 of 2, Form Template Date: August 31, 2015			
Site Design Requirement	**Applied?**		
SD-6 Runoff Collection	☐ Yes	☐ No	☒ N/A
Discussion / justification if SD-6 not implemented: Rain barrels or permeable pavements not proposed; therefore runoff collection is not applicable to project.			
SD-7 Landscaping with Native or Drought Tolerant Species	☒ Yes	☐ No	☐ N/A
Discussion / justification if SD-7 not implemented:			
SD-8 Harvesting and Using Precipitation	☐ Yes	☐ No	☒ N/A
Discussion / justification if SD-8 not implemented: Harvest and use is not feasible for project. Reference Worksheet B.3-1 (Form I-7) in Attachment 1c of this report for the Harvest and Use Feasibility Screening Checklist.			

Summary of PDP Structural BMPs	**Form I-6 (PDPs)** Model BMP Design Manual [August 31, 2015]
Project Identification	
Project Name: Townsend Multi-Family	
Permit Application Number: TM-2024-0003	
PDP Structural BMPs	
All PDPs must implement structural BMPs for storm water pollutant control (see Chapter 5 of the BMP Design Manual). Selection of PDP structural BMPs for storm water pollutant control must be based on the selection process described in Chapter 5. PDPs subject to hydromodification management requirements must also implement structural BMPs for flow control for hydromodification management (see Chapter 6 of the BMP Design Manual). Both storm water pollutant control and flow control for hydromodification management can be achieved within the same structural BMP(s). PDP structural BMPs must be verified by the local jurisdiction at the completion of construction. This may include requiring the project owner or project owner's representative and engineer of record to certify construction of the structural BMPs (see Section 1.12 of the BMP Design Manual). PDP structural BMPs must be maintained into perpetuity, and the local jurisdiction must confirm the maintenance (see Section 7 of the BMP Design Manual). Use this form to provide narrative description of the general strategy for structural BMP implementation at the project site in the box below. Then complete the PDP structural BMP summary information sheet (page 3 of this form) for each structural BMP within the project (copy the BMP summary information page as many times as needed to provide summary information for each individual structural BMP).	
Describe the general strategy for structural BMP implementation at the site. This information must describe how the steps for selecting and designing storm water pollutant control BMPs presented in Section 5.1 of the BMP Design Manual were followed, and the results (type of BMPs selected). For projects requiring hydromodification flow control BMPs, indicate whether pollutant control and flow control BMPs are integrated or separate. The site consists of two management areas. DMA-1, which includes the majority of the proposed development that drains to the Modular Wetland system, and DMA-2 which comprises of the north project frontage not captured by the MWS. DMA-1 is 2.40 acres, and DMA-2 is 0.15 acres. Both DMAs require pollutant control BMPs. The total drainage area is 2.55 acres. (Continue on page 2 as necessary.)	

Form I-6 Page 1 of 4 (Copy as many as needed) , Form Template Date: August 31, 2015	
Structural BMP Summary Information **(Copy this page as needed to provide information for each individual proposed structural BMP)**	
Structural BMP ID No. BMP – 1	
Construction Plan Sheet No.	
Type of structural BMP: ☐ Retention by harvest and use (HU-1) ☐ Retention by infiltration basin (INF-1) ☐ Retention by bioretention (INF-2) ☐ Retention by permeable pavement (INF-3) ☐ Partial retention by biofiltration with partial retention (PR-1) ☐ Biofiltration (BF-1) ☐ Biofiltration with Nutrient Sensitive Media Design (BF-2) X Proprietary Biofiltration (BF-3) meeting all requirements of Appendix F ☐ Flow-thru treatment control with prior lawful approval to meet earlier PDP requirements (provide BMP type/description in discussion section below) ☐ Flow-thru treatment control included as pre-treatment/forebay for an onsite retention or biofiltration BMP (provide BMP type/description and indicate which onsite retention or biofiltration BMP it serves in discussion section below) ☐ Flow-thru treatment control with alternative compliance (provide BMP type/description in discussion section below) ☐ Detention pond or vault for hydromodification management ☐ Other (describe in discussion section below)	
Purpose: X Pollutant control only ☐ Hydromodification control only ☐ Combined pollutant control and hydromodification control ☐ Pre-treatment/forebay for another structural BMP ☐ Other (describe in discussion section below)	
Who will certify construction of this BMP? Provide name and contact information for the party responsible to sign BMP verification forms if required by the [City Engineer] (See Section 1.12 of the BMP Design Manual)	RICK Shavger Rekani PE (619) 291-0707
Who will be the final owner of this BMP?	HOA
Who will maintain this BMP into perpetuity?	HOA
What is the funding mechanism for maintenance?	HOA

Form I-6 Page 2 of 4 (Copy as many as needed) , Form Template Date: August 31, 2015	
Structural BMP Summary Information **(Copy this page as needed to provide information for each individual proposed structural BMP)**	
Structural BMP ID No. BMP – 2	
Construction Plan Sheet No.	
Type of structural BMP: ☐ Retention by harvest and use (HU-1) ☐ Retention by infiltration basin (INF-1) ☐ Retention by bioretention (INF-2) ☐ Retention by permeable pavement (INF-3) ☐ Partial retention by biofiltration with partial retention (PR-1) ☒ Biofiltration (BF-1) ☐ Biofiltration with Nutrient Sensitive Media Design (BF-2) ☐ Proprietary Biofiltration (BF-3) meeting all requirements of Appendix F ☐ Flow-thru treatment control with prior lawful approval to meet earlier PDP requirements (provide BMP type/description in discussion section below) ☐ Flow-thru treatment control included as pre-treatment/forebay for an onsite retention or biofiltration BMP (provide BMP type/description and indicate which onsite retention or biofiltration BMP it serves in discussion section below) ☐ Flow-thru treatment control with alternative compliance (provide BMP type/description in discussion section below) ☐ Detention pond or vault for hydromodification management ☐ Other (describe in discussion section below)	
Purpose: ☒ Pollutant control only ☐ Hydromodification control only ☐ Combined pollutant control and hydromodification control ☐ Pre-treatment/forebay for another structural BMP ☐ Other (describe in discussion section below)	
Who will certify construction of this BMP? Provide name and contact information for the party responsible to sign BMP verification forms if required by the [City Engineer] (See Section 1.12 of the BMP Design Manual)	RICK Shavger Rekani PE (619) 291-0707
Who will be the final owner of this BMP?	HOA
Who will maintain this BMP into perpetuity?	HOA
What is the funding mechanism for maintenance?	HOA

Form I-6 Page 3 of 4 (Copy as many as needed) , Form Template Date: August 31, 2015	
Structural BMP Summary Information **(Copy this page as needed to provide information for each individual proposed structural BMP)**	
Structural BMP ID No. BMP – 3A	
Construction Plan Sheet No.	
Type of structural BMP: ☐ Retention by harvest and use (HU-1) ☐ Retention by infiltration basin (INF-1) ☐ Retention by bioretention (INF-2) ☐ Retention by permeable pavement (INF-3) ☐ Partial retention by biofiltration with partial retention (PR-1) ☐ Biofiltration (BF-1) ☐ Biofiltration with Nutrient Sensitive Media Design (BF-2) ☐ Proprietary Biofiltration (BF-3) meeting all requirements of Appendix F ☐ Flow-thru treatment control with prior lawful approval to meet earlier PDP requirements (provide BMP type/description in discussion section below) ☐ Flow-thru treatment control included as pre-treatment/forebay for an onsite retention or biofiltration BMP (provide BMP type/description and indicate which onsite retention or biofiltration BMP it serves in discussion section below) ☐ Flow-thru treatment control with alternative compliance (provide BMP type/description in discussion section below) ☐ Detention pond or vault for hydromodification management Other (describe in discussion section below) ***GREEN STREET ELEMENT – DISPERSION AREA***	
Purpose: ☐ Pollutant control only ☐ Hydromodification control only ☐ Combined pollutant control and hydromodification control ☐ Pre-treatment/forebay for another structural BMP ☐ Other (describe in discussion section below)	
Who will certify construction of this BMP? Provide name and contact information for the party responsible to sign BMP verification forms if required by the [City Engineer] (See Section 1.12 of the BMP Design Manual)	RICK Shavger Rekani PE (619) 291-0707
Who will be the final owner of this BMP?	HOA
Who will maintain this BMP into perpetuity?	HOA
What is the funding mechanism for maintenance?	HOA

Form I-6 Page 4 of 4 (Copy as many as needed) , Form Template Date: August 31, 2015	
Structural BMP Summary Information **(Copy this page as needed to provide information for each individual proposed structural BMP)**	
Structural BMP ID No. BMP – 3B	
Construction Plan Sheet No.	
Type of structural BMP: ☐ Retention by harvest and use (HU-1) ☐ Retention by infiltration basin (INF-1) ☐ Retention by bioretention (INF-2) ☐ Retention by permeable pavement (INF-3) ☐ Partial retention by biofiltration with partial retention (PR-1) ☐ Biofiltration (BF-1) ☐ Biofiltration with Nutrient Sensitive Media Design (BF-2) ☐ Proprietary Biofiltration (BF-3) meeting all requirements of Appendix F ☐ Flow-thru treatment control with prior lawful approval to meet earlier PDP requirements (provide BMP type/description in discussion section below) ☐ Flow-thru treatment control included as pre-treatment/forebay for an onsite retention or biofiltration BMP (provide BMP type/description and indicate which onsite retention or biofiltration BMP it serves in discussion section below) ☐ Flow-thru treatment control with alternative compliance (provide BMP type/description in discussion section below) ☐ Detention pond or vault for hydromodification management ☒ Other (describe in discussion section below) ***GREEN STREET ELEMENT – DISPERSION AREA***	
Purpose: ☒ Pollutant control only ☐ Hydromodification control only ☐ Combined pollutant control and hydromodification control ☐ Pre-treatment/forebay for another structural BMP ☐ Other (describe in discussion section below)	
Who will certify construction of this BMP? Provide name and contact information for the party responsible to sign BMP verification forms if required by the [City Engineer] (See Section 1.12 of the BMP Design Manual)	
Who will be the final owner of this BMP?	RICK Shavger Rekani PE (619) 291-0707
Who will maintain this BMP into perpetuity?	HOA
What is the funding mechanism for maintenance?	HOA
	HOA

ATTACHMENT 1
BACKUP FOR PDP POLLUTANT CONTROL BMPS

This is the cover sheet for Attachment 1.

Indicate which Items are Included behind this cover sheet:

Attachment Sequence	**Contents**	**Checklist**
Attachment 1a	DMA Exhibit (Required) See DMA Exhibit Checklist on the back of this Attachment cover sheet.	☒ Included
Attachment 1b	Tabular Summary of DMAs Showing DMA ID matching DMA Exhibit, DMA Area, and DMA Type (Required)* *Provide table in this Attachment OR on DMA Exhibit in Attachment 1a	☐ Included on DMA Exhibit in Attachment 1a ☒ Included as Attachment 1b, separate from DMA Exhibit
Attachment 1c	Form I-7, Harvest and Use Feasibility Screening Checklist (Required unless the entire project will use infiltration BMPs) Refer to Appendix B.3-1 of the BMP Design Manual to complete Form I-7.	☒ Included ☐ Not included because the entire project will use infiltration BMPs
Attachment 1d	Form I-8, Categorization of Infiltration Feasibility Condition (Required unless the project will use harvest and use BMPs) Refer to Appendices C and D of the BMP Design Manual to complete Form I-8.	☒ Included ☐ Not included because the entire project will use harvest and use BMPs
Attachment 1e	Pollutant Control BMP Design Worksheets / Calculations (Required) Refer to Appendices B and E of the BMP Design Manual for structural pollutant control BMP design guidelines	☒ Included

Use this checklist to ensure the required information has been included on the DMA Exhibit:

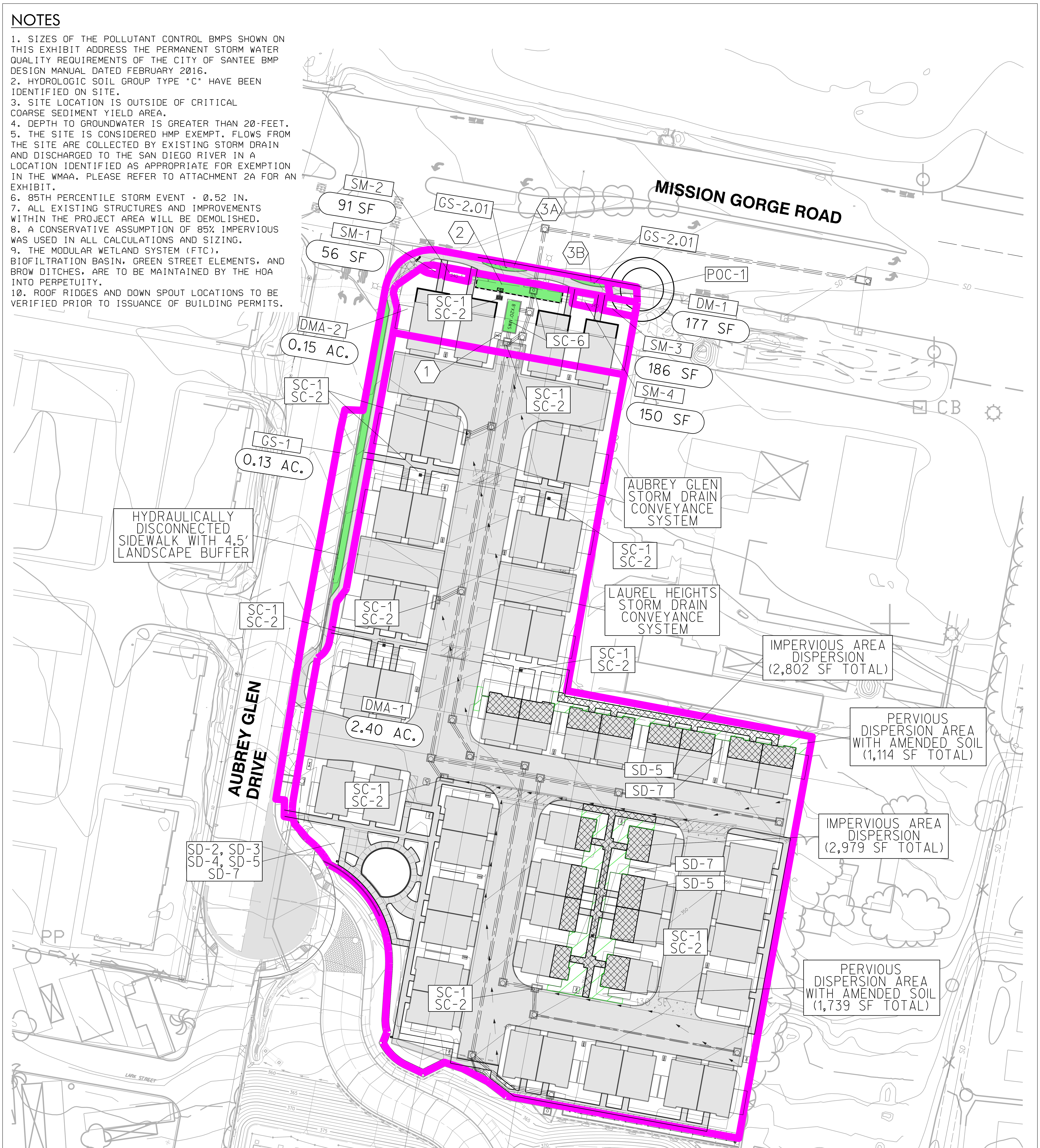
The DMA Exhibit must identify:

- [X] Underlying hydrologic soil group
- [X] Approximate depth to groundwater
- [X] Existing natural hydrologic features (watercourses, seeps, springs, wetlands)
- [X] Critical coarse sediment yield areas to be protected
- [X] Existing topography and impervious areas
- [X] Existing and proposed site drainage network and connections to drainage offsite
- [ ] Proposed demolition
- [X] Proposed grading
- [X] Proposed impervious features
- [X] Proposed design features and surface treatments used to minimize imperviousness
- [X] Drainage management area (DMA) boundaries, DMA ID numbers, and DMA areas (square footage or acreage), and DMA type (i.e., drains to BMP, self-retaining, or self-mitigating)
- [X] Potential pollutant source areas and corresponding required source controls (see Chapter 4, Appendix E.1, and Form I-3B)
- [X] Structural BMPs (identify location, type of BMP, and size/detail)

Attachment 1A

NOTES

1. SIZES OF THE POLLUTANT CONTROL BMPS SHOWN ON THIS EXHIBIT ADDRESS THE PERMANENT STORM WATER QUALITY REQUIREMENTS OF THE CITY OF SANTEE BMP DESIGN MANUAL DATED FEBRUARY 2016.
2. HYDROLOGIC SOIL GROUP TYPE "C" HAVE BEEN IDENTIFIED ON SITE.
3. SITE LOCATION IS OUTSIDE OF CRITICAL COARSE SEDIMENT YIELD AREA.
4. DEPTH TO GROUNDWATER IS GREATER THAN 20-FEET.
5. THE SITE IS CONSIDERED HMP EXEMPT. FLOWS FROM THE SITE ARE COLLECTED BY EXISTING STORM DRAIN AND DISCHARGED TO THE SAN DIEGO RIVER IN A LOCATION IDENTIFIED AS APPROPRIATE FOR EXEMPTION IN THE WMAA. PLEASE REFER TO ATTACHMENT 2A FOR AN EXHIBIT.
6. 85TH PERCENTILE STORM EVENT = 0.52 IN.
7. ALL EXISTING STRUCTURES AND IMPROVEMENTS WITHIN THE PROJECT AREA WILL BE DEMOLISHED.
8. A CONSERVATIVE ASSUMPTION OF 85% IMPERVIOUS WAS USED IN ALL CALCULATIONS AND SIZING.
9. THE MODULAR WETLAND SYSTEM (FTC), BIOFILTRATION BASIN, GREEN STREET ELEMENTS, AND BROW DITCHES, ARE TO BE MAINTAINED BY THE HOA INTO PERPETUITY.
10. ROOF RIDGES AND DOWN SPOUT LOCATIONS TO BE VERIFIED PRIOR TO ISSUANCE OF BUILDING PERMITS.



DMA ID	Total Area [SF]	Total Area [AC]	Impervious Area [SF]	Impervious Area [AC]	Impervious [%]	BMP ID
DMA-1	104338	2.40	75985	1.74	73%	1
DMA-2	6586	0.15	2872	0.07	44%	2
GS-1	5767	0.13	2520	0.06	44%	3A/3B
SM-1	56	0.0	0	0	0%	Self Mitigating
SM-2	91	0.0	0	0	0%	Self Mitigating
SM-3	186	0.0	0	0	0%	Self Mitigating
SM-4	150	0.0	0	0	0%	Self Mitigating
DM-1	177	0.0	177	0.00	100%	Deminimis
TOTAL	117351	2.69	81554	1.87	69%	

SOURCE CONTROL/SITE DESIGN LEGEND

- SC-1 PREVENTION OF ILLICIT DISCHARGES TO MS4
- SC-2 STORM DRAIN STENCILING OR SIGNAGE
- SC-6 ADDITIONAL BMPS BASED ON POTENTIAL SOURCES OF RUNOFF POLLUTANTS
- SD-2 CONSERVE NATURAL AREAS, SOILS, AND VEGETATION
- SD-3 MINIMIZE IMPERVIOUS AREAS
- SD-4 MINIMIZE SOIL COMPACTION
- SD-5 IMPERVIOUS AREA DISPERSION
- SD-7 LANDSCAPING WITH NATIVE OR DROUGHT TOLERANT SPECIES

STORM WATER MANAGEMENT BMP LEGEND

- DRAINAGE MANAGEMENT AREA (DMA) BOUNDARY
- BEST MANAGEMENT PRACTICE (BMP) ELEMENT
- IMPERVIOUS AREA
- IMPERVIOUS AREA DIRECTED TO PERVIOUS AREA
- PERVIOUS DISPERSION AREA
- XX.X AC. DMA AREA
- XXXXX DMA ID
- #XX BMP ID
- FLOW PATH

30 15 0 30 60 90
GRAPHIC SCALE 1" = 30'

DRAINAGE MANAGEMENT AREA EXHIBIT FOR TOWNSEND MULTI-FAMILY

November 7, 2024
January 29, 2025
Revised March 21, 2025

J-19964

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NOT FOR CONSTRUCTION - EXHIBIT FOR PDP SWQMP ONLY

CONTECH® ENGINEERED SOLUTIONS LLC
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MODULAR WETLANDS
FOR PATENT INFORMATION, GO TO www.ContechES.com/IP

AUBREY GLEN
SANTEE, CA

PROPOSAL PACKAGE
MODULAR WETLANDS MWSL0820OP - 827143-010
SITE DESIGNATION: BMP 1

MATERIAL LIST (INCLUDED WITH STRUCTURE DELIVERY UNLESS NOTED OTHERWISE)

COUNT	DESCRIPTION	PART NUMBER	PROVIDED BY	INSTALLED BY
487.70 CF	WETLAND MEDIA (19 BAGS, 14.45 TONS)	BIO-WMEDIA	CONTECH	CONTRACTOR
1	MWSL0820 INTERNALS KIT	MWSINT082059586V	CONTECH	CONTRACTOR
5	DRAINDOWN ASSEMBLY	----	CONTECH	PRECASTER
1	SEALANT FOR JOINTS		PRECASTER	CONTRACTOR
4	30"Ø x 4" FRAME AND COVER, EJ #001810119A02, NV	325-003656	CONTECH	PRECASTER

GENERAL NOTES

1. MODULAR WETLANDS LINEAR (MWSL) WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING
2. STRUCTURE SHALL MEET PEDESTRIAN (300 PSF) LIVE LOAD WITH INCIDENTAL HS-20 SURCHARGE AND GROUNDWATER ELEVATION AT OR BELOW OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION
3. MWSL STRUCTURE SHALL BE PRECAST CONCRETE CONFORMING TO ASTM C857, ASTM C918 AND ACI-318-14 LOAD FACTOR DESIGN METHOD
4. WETLAND MEDIA SUPPLIED BY CONTECH AND DELIVERED IN ACCORDANCE WITH PROJECT SCHEDULE, UNLESS MEDIA IS INSTALLED PRIOR TO SHIPPING
5. PLANTINGS ARE NOT PROVIDED BY CONTECH. PLANT SELECTION SHALL BE DONE BY THE ENGINEER OF RECORD IN ACCORDANCE WITH THE PROJECT PLANS AND SPECIFICATIONS

INSTALLATION NOTES

A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD
B. MWSL UNIT MUST BE INSTALLED ON A LEVEL BASE. MANUFACTURER RECOMMENDS A MINIMUM 6" LEVEL ROCK BASE UNLESS SPECIFIED BY THE ENGINEER OF RECORD. CONTRACTOR IS RESPONSIBLE FOR VERIFYING THE RECOMMENDED BASE SPECIFICATIONS OF THE PROJECT ENGINEER
C. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE MWSL STRUCTURE. SPREADER BAR WITH SUFFICIENT CABLE IS REQUIRED FOR SAFETY AND REDUCTION OF DAMAGE TO CONCRETE STRUCTURE
D. CONTRACTOR TO INSTALL JOINT SEALANT BETWEEN ALL STRUCTURE SECTIONS FOR STRUCTURE ASSEMBLY
E. CONTRACTOR TO PROVIDE AND INSTALL ALL EXTERNAL CONNECTING PIPE(S). MATCH PIPE INVERTS WITH ELEVATIONS SHOWN. INVERT OF OUTLET PIPE MUST BE FLUSH WITH OUTLET BAY FLOOR. ALL PIPES MUST BE FLUSH WITH INSIDE SURFACE OF CONCRETE WALLS (PIPES CANNOT INTRUDE BEYOND FLUSH). ALL PIPES SHALL BE SEALED PER MANUFACTURER'S STANDARD CONNECTION DETAIL
F. CONTRACTOR IS RESPONSIBLE FOR INSTALLATION OF ALL RISERS AND CASTINGS, UNLESS SHIPPED CAST INTO TOP SLAB. CONTRACTOR TO USE GROUT AND/OR BRICKS TO MATCH COVERS WITH FINISHED SURFACE, UNLESS SPECIFIED OTHERWISE
G. CONTRACTOR TO SUPPLY AND INSTALL INLET PROTECTION BAR IF REQUIRED BY LOCAL JURISDICTION
H. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO PROTECT THE MWSL MEDIA BAY FROM CONSTRUCTION-RELATED EROSION RUNOFF
I. CONTRACTOR IS RESPONSIBLE FOR CONTACTING CONTECH FOR ACTIVATION OF THE SYSTEM. ACTIVATION OCCURS WHEN THE SITE IS FULLY STABILIZED WITH FINAL PAVEMENT INSTALLED AND SWEPT CLEAN OF CONSTRUCTION SEDIMENT, UNLESS SPECIFIED OTHERWISE
J. CONTACT CONTECH MAINTENANCE AND FIELD OPERATIONS AT 513-645-7770 TO SCHEDULE ACTIVATION. MANUFACTURER'S WARRANTY IS VOID WITHOUT PROPER ACTIVATION BY A CONTECH REPRESENTATIVE
K. IT IS RECOMMENDED THAT ALL MWSL UNITS BE WATERED BY IRRIGATION LINES OR SPRINKLER SYSTEMS ON A REGULAR BASIS. IF DRIP OR SPRAY IRRIGATION SYSTEMS ARE TO BE USED, THEY ARE NOT SUPPLIED OR INSTALLED BY CONTECH

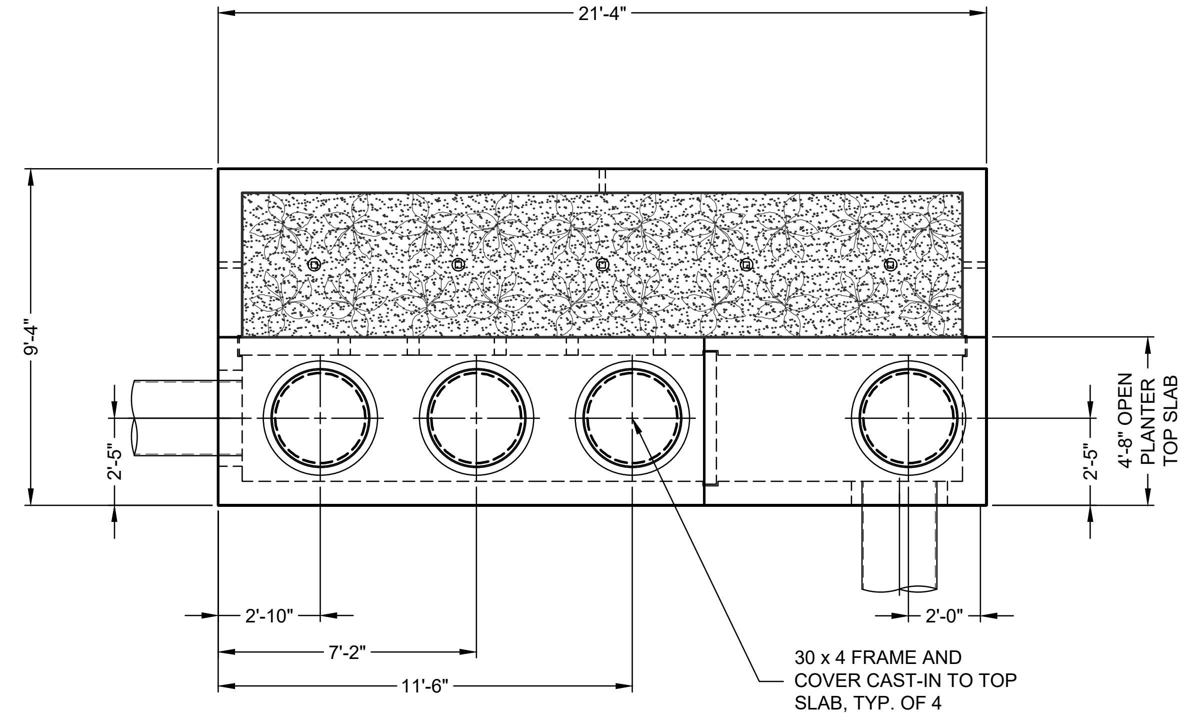
\\PSUWQKTWCRMF01.QUIKRETE.NET\MERLIN\PROJECT\ACTIVE\827100\827143\827143-10-MODULAR WETLANDS\DRAWINGS\827143-10-MWSL0820OP-CONFAB.DWG 11/6/2024 1:19 PM

MARK	DATE	REVISION DESCRIPTION	BY

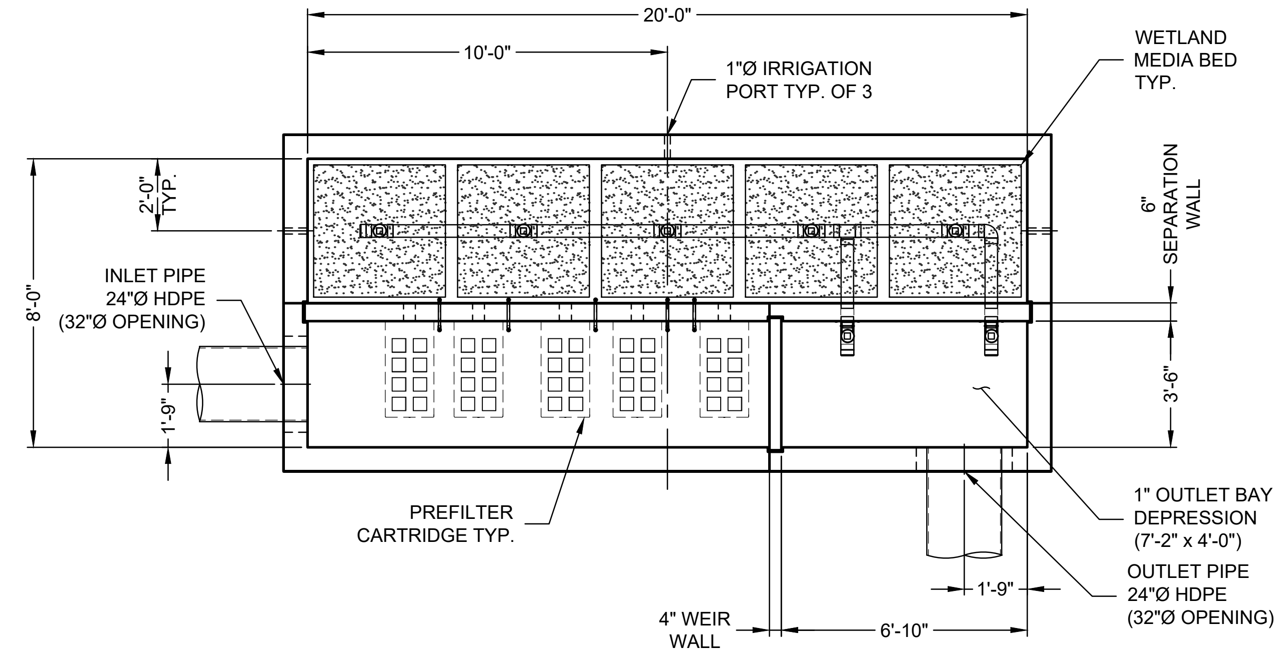
MODULAR WETLANDS MWSL0820OP - 827143-010
AUBREY GLEN
SANTEE, CA
SITE DESIGNATION: BMP 1

PROJECT No.: 827143	SEQ. No.: 010	DATE: 11/06/24
DESIGNED: BCT		DRAWN: BCT
CHECKED: BCT		APPROVED: BCT
SHEET NO.: 1 OF 2		

THIS DOCUMENT IS FOR INFORMATIONAL PURPOSES
ONLY AND IS NOT A FINAL CONSTRUCTION CONTRACT



PLAN VIEW



PLAN VIEW
TOP SLAB NOT SHOWN

SITE DESIGN DATA	
WATER QUALITY FLOW (CFS)	0.58
MAXIMUM POLLUTANT DENSITY (PREFILTER) (GPM/SF)	2.1
PREFILTER LOADING RATE (GPM/SF)	2.03
WETLAND MEDIA LOADING RATE (GPM/SF)	1.00
MEDIA OPERATING HEAD (FT)	3.42
SURFACE LOADING	PEDESTRIAN
GROUNDWATER ELEVATION*	333.35

*GROUNDWATER ELEVATION IS ASSUMED. EOR TO PROVIDE IF KNOWN

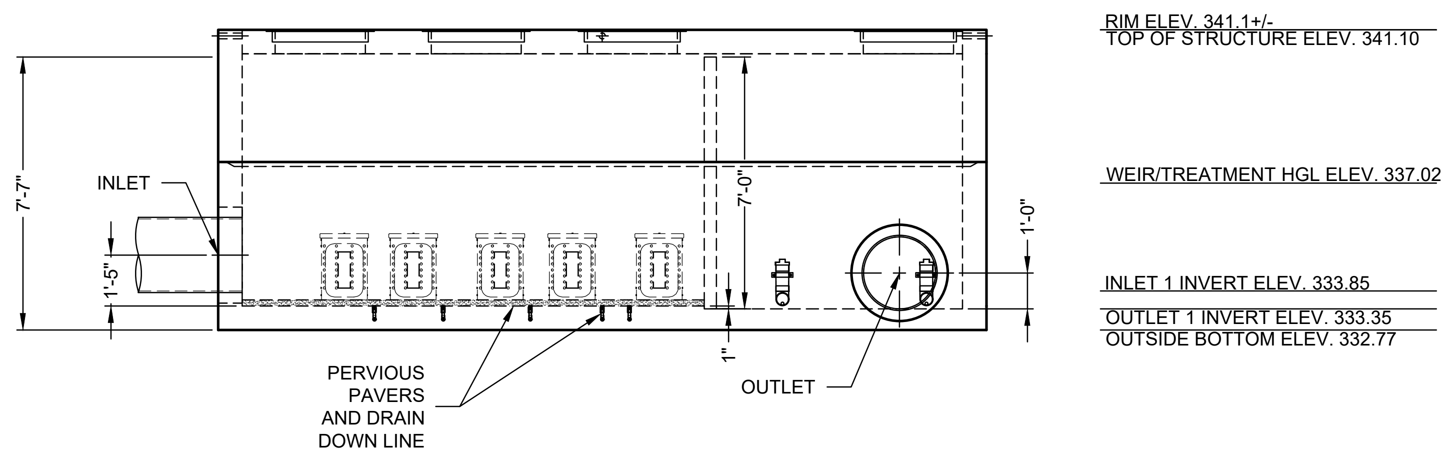
STRUCTURE DETAILS	
NUMBER OF DELIVERED PIECES (DOES NOT INCLUDE GRADE RINGS/RISERS)	2
MAXIMUM FOOTPRINT	9.33' x 21.33'
DELIVERED HEAVIEST PICK*	52175 LB.
TOP SECTION	30950 LB.
BASE SECTION	52175 LB.

*BASE SECTION SHIPPED WITH INTERNAL WALLS INSTALLED

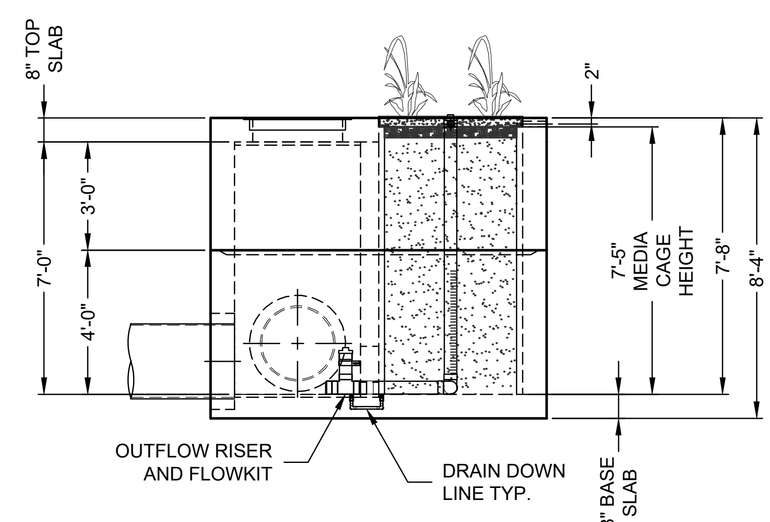
UNIT WAS SET OFFLINE DUE TO NOT MEETING THE REQUIRED INLET TO OUTLET DROP OF 1.33' FOR SEDIMENT STORAGE. IF INTERNAL BYPASS IS REQUIRED, EOR MUST ADJUST ELEVATIONS TO MEET MANUFACTURING REQUIREMENTS.

INTERNAL COMPONENTS TO BE INSTALLED ON SITE BY CONTECH FIELD CONSULTANT.
PLEASE CONTACT CONTECH FOR CURRENT INSTALLATION LEAD TIME

RECOMMENDED EXTERNAL BYPASS AT ELEVATION = 337.02



ELEVATION VIEW*



RIGHT END VIEW

RVRSD
6505 / 000000
LAYOUT 4
MWS-L-8-20-L
33.81 TS
5.70 TIW

*MEDIA CASTINGS, IF REQUIRED, NOT SHOWN

MARK	DATE	REVISION DESCRIPTION	BY

CONTECH® ENGINEERED SOLUTIONS LLC
A QUIKRETE® COMPANY
12901 SE 97th Avenue, Clackamas, OR 97015
800-548-4667 503-240-3393 800-561-1271 FAX

MODULAR WETLANDS
FOR PATENT INFORMATION, GO TO www.ContechES.com/IP

CONTECH PROPOSAL DRAWING

MODULAR WETLANDS MWSL0820OP - 827143-010
AUBREY GLEN
SANTEE, CA
SITE DESIGNATION: BMP 1

PROJECT No.:	SEQ. No.:	DATE:
827143	010	11/06/24
DESIGNED: BCT		DRAWN: BCT
CHECKED: BCT		APPROVED: BCT
SHEET No.: 2 OF 2		

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Attachment 1B

TABULAR SUMMARY OF DMAs, (AUBREY GLEN)

DMA ID	TRIBUTARY AREA (SQ FT)	AREA (ACRES)	IMPERVIOUS AREA (ACRES)	%IMPERVIOUS	HSG	IMPERVIOUS RUNOFF FACTOR	PERVIOUS RUNOFF FACTOR	AREA WEIGHTED RUNOFF FACTOR	DCV (Cubic Feet)	TREATED BY	POLLUTANT CONTROL TYPE	DRAINS TO (POC ID)
DMA-1	104338	2.40	1.7	73%	C	0.90	0.23	0.72	3243	BMP-1	BIOFIL- MOD WETLAND	POC-1
DMA-2	6586	0.15	0.1	44%	C	0.90	0.23	0.52	148	BMP-2	PROP. BIOFILTRATION	POC-1
GS-1	5767	0.13	0.1	44%	C	0.90	0.23	0.52		BMP-3	LID ELEMENT - ROCK SWALE	POC-1
SM-1	56	0.00	0.0	0%	C	0.90	0.23	0.23	NA	NA	SELF MITIGATING	POC-1
SM-2	91	0.00	0.0	0%	C	0.90	0.23	0.23	NA	NA	SELF MITIGATING	POC-1
SM-3	186	0.00	0.0	0%	C	0.90	0.23	0.23	NA	NA	SELF MITIGATING	POC-1
SM-4	150	0.00	0.0	0%	C	0.90	0.23	0.23	NA	NA	SELF MITIGATING	POC-1
DM-1	177	0.00	0.0	100%	C	0.90	0.23	0.90	NA	NA	DE MINIMIS	POC-1
SUM	**117351**	**2.7**	**1.9**	**70%**				**0.70**	**3391**			

SUMMARY OF DMA INFORMATION (MUST MATCH PROJECT DESCRIPTION AND SWQMP NARRATIVE)

NO OF DMA		TOTAL DMA AREA (ACRES)	TOTAL IMPERVIOUS AREA (ACRES)	% IMP				AREA WEIGHTED RUNOFF COEFFICIENT	TOTAL DCV (CUBIC FEET)	TOTAL AREA TREATED (ACRES)		NO. OF POCS
8		**2.7**	**1.9**	**70%**				**0.70**	**3391**	**2.7**		**1**

Attachment 1C

Worksheet 0-2. Harvest and Use Feasibility Screening

<table>
<tr><th colspan="2">Harvest and Use Feasibility Screening</th><th>Worsksheet B.3-1</th></tr>
<tr><td colspan="3">1. Is there a demand for harvested water (check all that apply) at the project site that is reliably present during the wet season?
☒ Toilet and urinal flushing
☒ Landscape irrigation
☐ Other:______________</td></tr>
<tr><td colspan="3">2. If there is a demand; estimate the anticipated average wet season demand over a period of 36 hours. Guidance for planning level demand calculations for toilet/urinal flushing and landscape irrigation is provided in Section B.3.2.
9.3 gal/person/day * 200 people = (1,860 gal/day) * 1.5 days = 2,790 gal/36 hours
Moderate plant water use = 1,470 gal/acre * 2.6 acres = 3,822 gal/36 hours
Total Demand = 6,612 gallons = 884 cubic feet</td></tr>
<tr><td colspan="3">3. Calculate the DCV using worksheet B-2.1.

DCV = 3,391 cubic feet</td></tr>
<tr><td>3a. Is the 36-hour demand greater than or equal to the DCV?
Yes / No ⇨
⇩</td><td>3b. Is the 36-hour demand greater than 0.25DCV but less than the full DCV?
Yes / No ⇨
⇩</td><td>3c. Is the 36-hour demand less than 0.25DCV?
Yes
⇩</td></tr>
<tr><td>Harvest and use appears to be feasible. Conduct more detailed evaluation and sizing calculations to confirm that DCV can be used at an adequate rate to meet drawdown criteria.</td><td>Harvest and use may be feasible. Conduct more detailed evaluation and sizing calculations to determine feasibility. Harvest and use may only be able to be used for a portion of the site, or (optionally) the storage may need to be upsized to meet long term capture targets while draining in longer than 36 hours.</td><td>Harvest and use is considered to be infeasible.
✓</td></tr>
</table>

Worksheet 0-1. DCV

Design Capture Volume		Worksheet B-2.1		
1	85^{th} percentile 24-hr storm depth from Figure B.1-1	d=	0.52	inches
2	Area tributary to BMP (s)	A=	2.6	acres
3	Area weighted runoff factor (estimate using Appendix B.1.1 and B.2.1)	C=	0.72	unitless
4	Street trees volume reduction	TCV=	0	cubic-feet
5	Rain barrels volume reduction	RCV=	0	cubic-feet
6	Calculate DCV = (3630 x C x d x A) – TCV - RCV	DCV=	3,391	cubic-feet

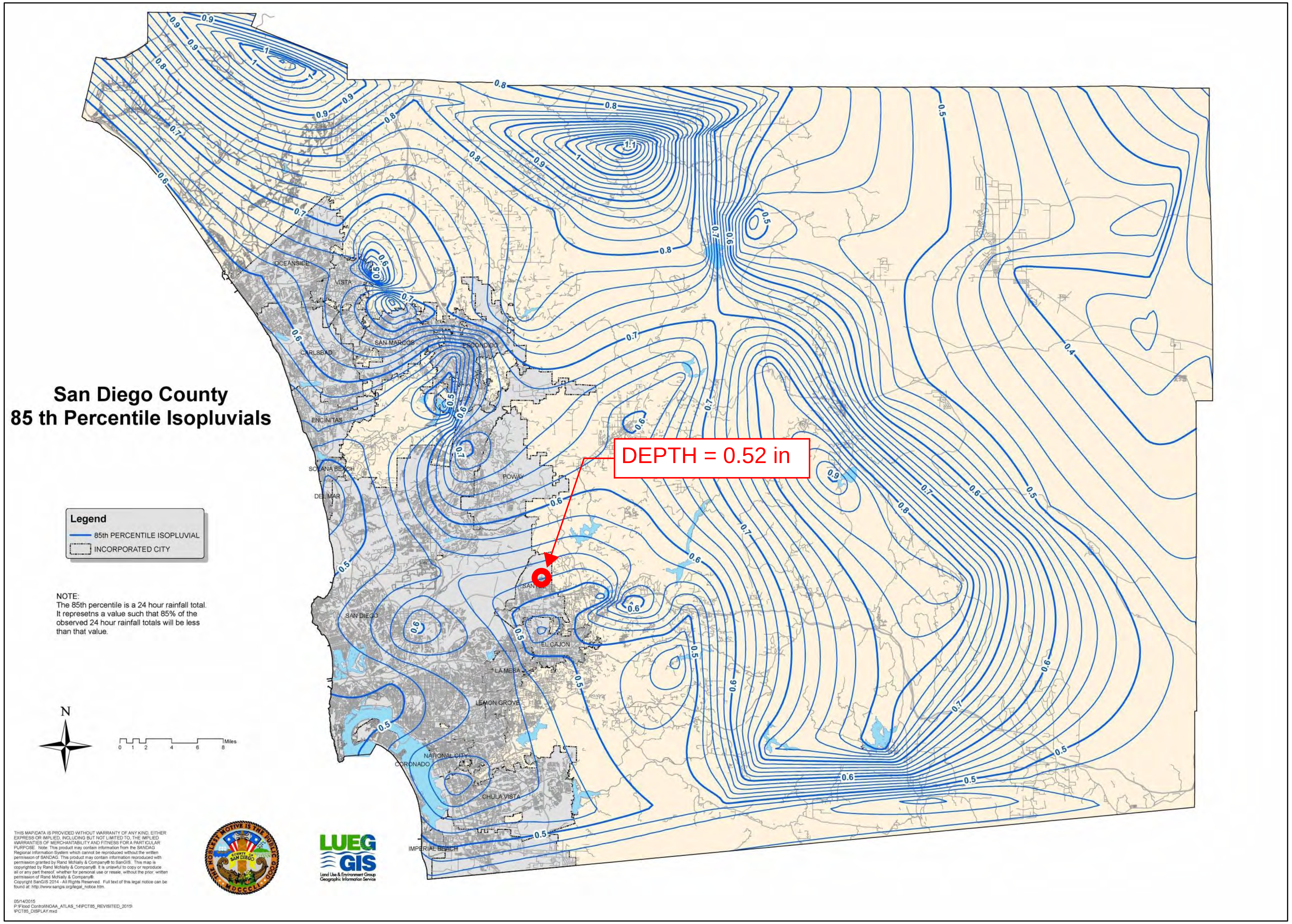


Figure 0-1: 85th Percentile 24-hour Isopluvial Map

Attachment 1D

Categorization of Infiltration Feasibility Condition	Form I-8

Part 1 - Full Infiltration Feasibility Screening Criteria

Would infiltration of the full design volume be feasible from a physical perspective without any undesirable consequences that cannot be reasonably mitigated?

Criteria	Screening Question	Yes	No
1	**Is the estimated reliable infiltration rate below proposed facility locations greater than 0.5 inches per hour?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2 and Appendix D.		X

Provide basis:

The subject site is underlain by very dense/cemented cyrstalline bedrock (tonalite) located within the upper reaches of Mission Gorge. Several onsite borings encountered shallow refusal on hard rock and/or had very high blow counts for minimal penetration. Preliminary percolation testing of soils in the uppermost 10 feet indicated very low rates (0.07 in/hr). Additionally, very shallow/perched groundwater (10 feet below ground surface) was encountered during prior onsite exploration.

Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.

Criteria	Screening Question	Yes	No
2	**Can infiltration greater than 0.5 inches per hour be allowed without increasing risk of geotechnical hazards (slope stability, groundwater mounding, utilities, or other factors) that cannot be mitigated to an acceptable level?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2.		

Provide basis:

Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.

<table>
<tr><th colspan="4">Form I-8 Page 2 of 4</th></tr>
<tr><td>Criteria</td><td>Screening Question</td><td>Yes</td><td>No</td></tr>
<tr><td>3</td><td>Can infiltration greater than 0.5 inches per hour be allowed without increasing risk of groundwater contamination (shallow water table, storm water pollutants or other factors) that cannot be mitigated to an acceptable level? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.</td><td></td><td></td></tr>
<tr><td colspan="4">Provide basis:

Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.</td></tr>
<tr><td>4</td><td>Can infiltration greater than 0.5 inches per hour be allowed without causing potential water balance issues such as change of seasonality of ephemeral streams or increased discharge of contaminated groundwater to surface waters? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.</td><td></td><td></td></tr>
<tr><td colspan="4">Provide basis:

Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.</td></tr>
<tr><td>Part 1 Result *</td><td colspan="2">If all answers to rows 1 - 4 are “Yes” a full infiltration design is potentially feasible. The feasibility screening category is Full Infiltration

If any answer from row 1-4 is “No”, infiltration may be possible to some extent but would not generally be feasible or desirable to achieve a “full infiltration” design. Proceed to Part 2</td><td>No</td></tr>
</table>

*To be completed using gathered site information and best professional judgment considering the definition of MEP in the MS4 Permit. Additional testing and/or studies may be required by Agency/Jurisdictions to substantiate findings

Form I-8 Page 3 of 4

Part 2 – Partial Infiltration vs. No Infiltration Feasibility Screening Criteria

Would infiltration of water in any appreciable amount be physically feasible without any negative consequences that cannot be reasonably mitigated?

Criteria	Screening Question	Yes	No
5	**Do soil and geologic conditions allow for infiltration in any appreciable rate or volume?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2 and Appendix D.		X

Provide basis:

The subject site is underlain by very dense/cemented cyrstalline bedrock (tonalite) located within the upper reaches of Mission Gorge. Several onsite borings encountered shallow refusal on hard rock and/or had very high blow counts for minimal penetration. Preliminary percolation testing of soils in the uppermost 10 feet indicated very low rates (0.07 in/hr). Additionally, very shallow/perched groundwater (10 feet below ground surface) was encountered during prior onsite exploration.

Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.

Criteria	Screening Question	Yes	No
6	**Can Infiltration in any appreciable quantity be allowed without increasing risk of geotechnical hazards (slope stability, groundwater mounding, utilities, or other factors) that cannot be mitigated to an acceptable level**? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2.		

Provide basis:

Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.

Form I-8 Page 4 of 4			
Criteria	Screening Question	**Yes**	**No**
7	**Can Infiltration in any appreciable quantity be allowed without posing significant risk for groundwater related concerns (shallow water table, storm water pollutants or other factors)?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.		
Provide basis: Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.			
8	**Can infiltration be allowed without violating downstream water rights**? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.		
Provide basis: Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.			
Part 2 Result*	If all answers from row 1-4 are yes then partial infiltration design is potentially feasible. The feasibility screening category is **Partial Infiltration.** If any answer from row 5-8 is no, then infiltration of any volume is considered to be **infeasible** within the drainage area. The feasibility screening category is **No Infiltration.**	No Infiltration	

*To be completed using gathered site information and best professional judgment considering the definition of MEP in the MS4 Permit. Additional testing and/or studies may be required by Agency/Jurisdictions to substantiate findings

Attachment 1E

AUBREY GLEN
J-19964
11/6/2024

Water Quality - Mod Wetland - BMP Sizing Calculations

DMA/BMP Name	BMP Type	Drainage Management Area (acres)	Drainage Management Area (ft^2)	% Impervious	Impervious Area (ft^2)	Pervious Area (ft^2)	Runoff Factor for Impervious Area	Runoff Factor for Pervious Area	Effective Impervious Area (ft^2)	Runoff Factor	85th Percentile Storm Event (in)	Design Capture Volume (c.f.)	Biofiltration Area Provided (ft^2)	Biofiltration Area Required (ft^2)	DCV Multiplier	Volume Provided (ft^3)	Volume Required (ft^3)	Required Water Quality Flow Rate (cfs) 1.5*Q	Provided BMP Flow Rate (cfs)	MWS Model Name
DMA-1	Compact Biofiltration - Mod Wetlands	2.40	104338	73%	75895	28443	0.9	0.3	76,838	0.72	0.52	3,243	-	2,245	1.50	-	4,865	0.529	0.577	MWS-L-8-20

Notes:

1. The required and provided Water Quality volumes are based on the 2013 MS4 permit and the City of Santee BMP Design Manual
2. Runoff Factors for pervious and impervious areas were determined from Table 0-1: " Runoff Factors for Surfaces Draining to BMPs - Pollutant Control BMPs" from the City of Santee BMP Design Manual
3.The DCV multiplier was found using Section B.4.2 Percent Capture Method and Figure 0-1 Percent Capture Nomgraph from the City of Santee BMP Design Manual

SPECIFICATIONS

FLOW-BASED

The MWS Linear can be used in stand-alone applications to meet treatment flow requirements. Since the MWS Linear is the only biofiltration system that can accept inflow pipes several feet below the surface, it can be used not only in decentralized design applications but also as a large central end-of-the-line application for maximum feasibility.

MODEL #	DIMENSIONS	WETLANDMEDIA SURFACE AREA (sq.ft.)	TREATMENT FLOW RATE (cfs)
MWS-L-4-4	4' x 4'	23	0.052
MWS-L-4-6	4' x 6'	32	0.073
MWS-L-4-8	4' x 8'	50	0.115
MWS-L-4-13	4' x 13'	63	0.144
MWS-L-4-15	4' x 15'	76	0.175
MWS-L-4-17	4' x 17'	90	0.206
MWS-L-4-19	4' x 19'	103	0.237
MWS-L-4-21	4' x 21'	117	0.268
MWS-L-6-8	7' x 9'	64	0.147
MWS-L-8-8	8' x 8'	100	0.230
MWS-L-8-12	8' x 12'	151	0.346
MWS-L-8-16	8' x 16'	201	0.462
MWS-L-8-20	9' x 21'	252	0.577
MWS-L-8-24	9' x 25'	302	0.693

REQUIRED TREATMENT FLOW RATE PER ACTUAL PERCENT IMPERVIOUS (73%) IS 0.529CFS. HOWEVER, THE PROVIDED TREATMENT FLOW RATE OF 0.577CFS IS BASED ON A TRIBUTARY AREA OF APPROXIMATELY 85% IMPERVIOUS.

Worksheet 0-1: Simple Sizing Method for Biofiltration BMPs

Simple Sizing Method for Biofiltration BMPs		Worksheet B.5-1	
1	Remaining DCV after implementing retention BMPs	148	cubic-feet
Partial Retention			
2	Infiltration rate from Worksheet D.5-1 if partial infiltration is feasible	0	in/hr.
3	Allowable drawdown time for aggregate storage below the underdrain	36	hours
4	Depth of runoff that can be infiltrated [Line 2 x Line 3]	0	inches
5	Aggregate pore space	0.40	in/in
6	Required depth of gravel below the underdrain [Line 4/ Line 5]	0	inches
7	Assumed surface area of the biofiltration BMP	296	sq-ft
8	Media retained pore space	0.1	in/in
9	Volume retained by BMP [[Line 4 + (Line 12 x Line 8)]/12] x Line 7	3	cubic-feet
10	DCV that requires biofiltration [Line 1 – Line 9]	145	cubic-feet
BMP Parameters			
11	Surface Ponding [6 inch minimum, 12 inch maximum]	6	inches
12	Media Thickness [18 inches minimum]	18	inches
13	Aggregate Storage above underdrain invert (12 inches typical) – use 0 inches for sizing if the aggregate is not over the entire bottom surface area	12	inches
14	Media available pore space	0.2	in/in
15	Media filtration rate to be used for sizing	5	in/hr.
Baseline Calculations			
16	Allowable Routing Time for sizing	6	hours
17	Depth filtered during storm [Line 15 x Line 16]	30	inches
18	Depth of Detention Storage [Line 11 + (Line 12 x Line 14) + (Line 13 x Line 5)]	17.4	inches
19	Total Depth Treated [Line 17 + Line 18]	47.4	inches
Option 1 – Biofilter 1.5 times the DCV			
20	Required biofiltered volume [1.5 x Line 10]	223	cubic-feet
21	Required Footprint [Line 20/ Line 19] x 12	56	sq-ft
Option 2 - Store 0.75 of remaining DCV in pores and ponding			
22	Required Storage (surface + pores) Volume [0.75 x Line 10]	111	cubic-feet
23	Required Footprint [Line 22/ Line 18] x 12	77	sq-ft
Footprint of the BMP			
24	Area draining to the BMP	6586	sq-ft
25	Adjusted Runoff Factor for drainage area (Refer to Appendix B.1 and B.2)	0.52	
26	Minimum BMP Footprint [Line 24 x Line 25 x 0.03]	103	sq-ft
25	Footprint of the BMP = Maximum(Minimum(Line 21, Line 23), Line 26)	103	sq-ft

Note: Line 7 is used to estimate the amount of volume retained by the BMP. Update assumed surface area in Line 7 until its equivalent to the required biofiltration footprint (either Line 21 or Line 23)

PROVIDED BOTTOM FOOTPRINT IS 296 SF. THIS WILL BE REFINED DURING FINAL ENGINEERING.

The City of SAN DIEGO	Project Name	Aubrey Glen	
	BMP ID		
Sizing Method for Volume Retention Criteria		**Worksheet B.5-2**	

1	Area draining to the BMP	104338	sq. ft.
2	Adjusted runoff factor for drainage area (Refer to Appendix B.1 and B.2)	0.72	
3	85th percentile 24-hour rainfall depth	0.52	inches
4	Design capture volume [Line 1 x Line 2 x (Line 3/12)]	3255	cu. ft.
Volume Retention Requirement			
5	Measured infiltration rate in the DMA Note: When mapped hydrologic soil groups are used enter 0.10 for NRCS Type D soils and for NRCS Type C soils enter 0.30 When in no infiltration condition and the actual measured infiltration rate is unknown enter 0.0 if there are geotechnical and/or groundwater hazards identified in Appendix C	0	in/hr.
6	Factor of safety	2	
7	Reliable infiltration rate, for biofiltration BMP sizing [Line 5 / Line 6]	0	in/hr.
8	Average annual volume reduction target (Figure B.5-2) When Line 7 > 0.01 in/hr. = Minimum (40, 166.9 x Line 7 +6.62) When Line 7 ≤ 0.01 in/hr. = 3.5%	3.5	%
9	Fraction of DCV to be retained (Figure B.5-3) When Line 8 > 8% = $0.0000013 \times \text{Line } 8^3 - 0.000057 \times \text{Line } 8^2 + 0.0086 \times \text{Line } 8 - 0.014$ When Line 8 ≤ 8% = 0.023	0.023	
10	Target volume retention [Line 9 x Line 4]	75	cu. ft.

The City of SAN DIEGO	Project Name	Aubrey Glen				
	BMP ID					

Volume Retention for No Infiltration Condition		Worksheet B.5-6	
1	Area draining to the biofiltration BMP	104338	sq. ft.
2	Adjusted runoff factor for drainage area (Refer to Appendix B.1 and B.2)	0.72	
3	Effective impervious area draining to the BMP [Line 1 x Line 2]	75123	sq. ft.
4	Required area for Evapotranspiration [Line 3 x 0.03]	2254	sq. ft.
5	Biofiltration BMP Footprint		sq. ft.

Landscape Area (must be identified on DS-3247)						
	Identification	1	2	3	4	5
6	Landscape area that meet the requirements in SD-B and SD-F Fact Sheet (sq. ft.)	1114	1739			
7	Impervious area draining to the landscape area (sq. ft.)	2802	2979			
8	Impervious to Pervious Area ratio [Line 7/Line 6]	2.52	1.71	0.00	0.00	0.00
9	Effective Credit Area If (Line 8 >1.5, Line 6, Line 7/1.5]	1114	1739	0	0	0
10	Sum of Landscape area [sum of Line 9 Id's 1 to 5]				2853	sq. ft.
11	Provided footprint for evapotranspiration [Line 5 + Line 10]				2853	sq. ft.

Volume Retention Performance Standard			
12	Is Line 11 ≥ Line 4?	Volume Retention Performance Standard is Met	
13	Fraction of the performance standard met through the BMP footprint and/or landscaping [Line 11/Line 4]	1.27	
14	Target Volume Retention [Line 10 from Worksheet B.5.2]	75	cu. ft.
15	Volume retention required from other site design BMPs [(1-Line 13) x Line 14]	-20.25	cu. ft.

Site Design BMP				
	Identification	Site Design Type	Credit	
16	1			cu. ft.
	2			cu. ft.
	3			cu. ft.
	4			cu. ft.
	5			cu. ft.
	Sum of volume retention benefits from other site design BMPs (e.g. trees; rain barrels etc.). [sum of Line 16 Credits for Id's 1 to 5] Provide documentation of how the site design credit is calculated in the PDP SWQMP.		0	cu. ft.
17	Is Line 16 ≥ Line 15?	Volume Retention Performance Standard is Met		

THE PROJECT IS PROPOSING IMPERVIOUS AREA DISPERSION TO MEET THE MINIMUM RETENTION REQUIREMENTS.

UPON CONVERSATION WITH THE CITY STAFF ON 11/5/2024, WE HAVE AGREED UPON USING CITY OF SAN DIEGO WORKSHEET B.5-6 TO PROVIDE BACKUP CALCULATIONS FOR VOLUME RETENTION CALCULATIONS

ATTACHMENT 2
BACKUP FOR PDP HYDROMODIFICATION CONTROL MEASURES

This is the cover sheet for Attachment 2.

☐ Mark this box if this attachment is empty because the project is exempt from PDP hydromodification management requirements.

Indicate which Items are Included behind this cover sheet:

Attachment Sequence	**Contents**	**Checklist**
Attachment 2a	Hydromodification Management Exhibit (Required)	☒ Included See Hydromodification Management Exhibit Checklist on the back of this Attachment cover sheet.
Attachment 2b	Management of Critical Coarse Sediment Yield Areas (WMAA Exhibit is required, additional analyses are optional) See Section 6.2 of the BMP Design Manual.	☒ Exhibit showing project drainage boundaries marked on WMAA Critical Coarse Sediment Yield Area Map (Required) Optional analyses for Critical Coarse Sediment Yield Area Determination ☐ 6.2.1 Verification of Geomorphic Landscape Units Onsite ☐ 6.2.2 Downstream Systems Sensitivity to Coarse Sediment ☐ 6.2.3 Optional Additional Analysis of Potential Critical Coarse Sediment Yield Areas Onsite
Attachment 2c	Geomorphic Assessment of Receiving Channels (Optional) See Section 6.3.4 of the BMP Design Manual.	☒ Not performed ☐ Included ☐ Submitted as separate stand-alone document
Attachment 2d	Flow Control Facility Design, including Structural BMP Drawdown Calculations and Overflow Design Summary (Required) See Chapter 6 and Appendix G of the BMP Design Manual	☐ Included ☐ Submitted as separate stand-alone document **NOT APPLICABLE**
Attachment 2e	Vector Control Plan (Required when structural BMPs will not drain in 96 hours)	☐ Included ☒ Not required because BMPs will drain in less than 96 hours

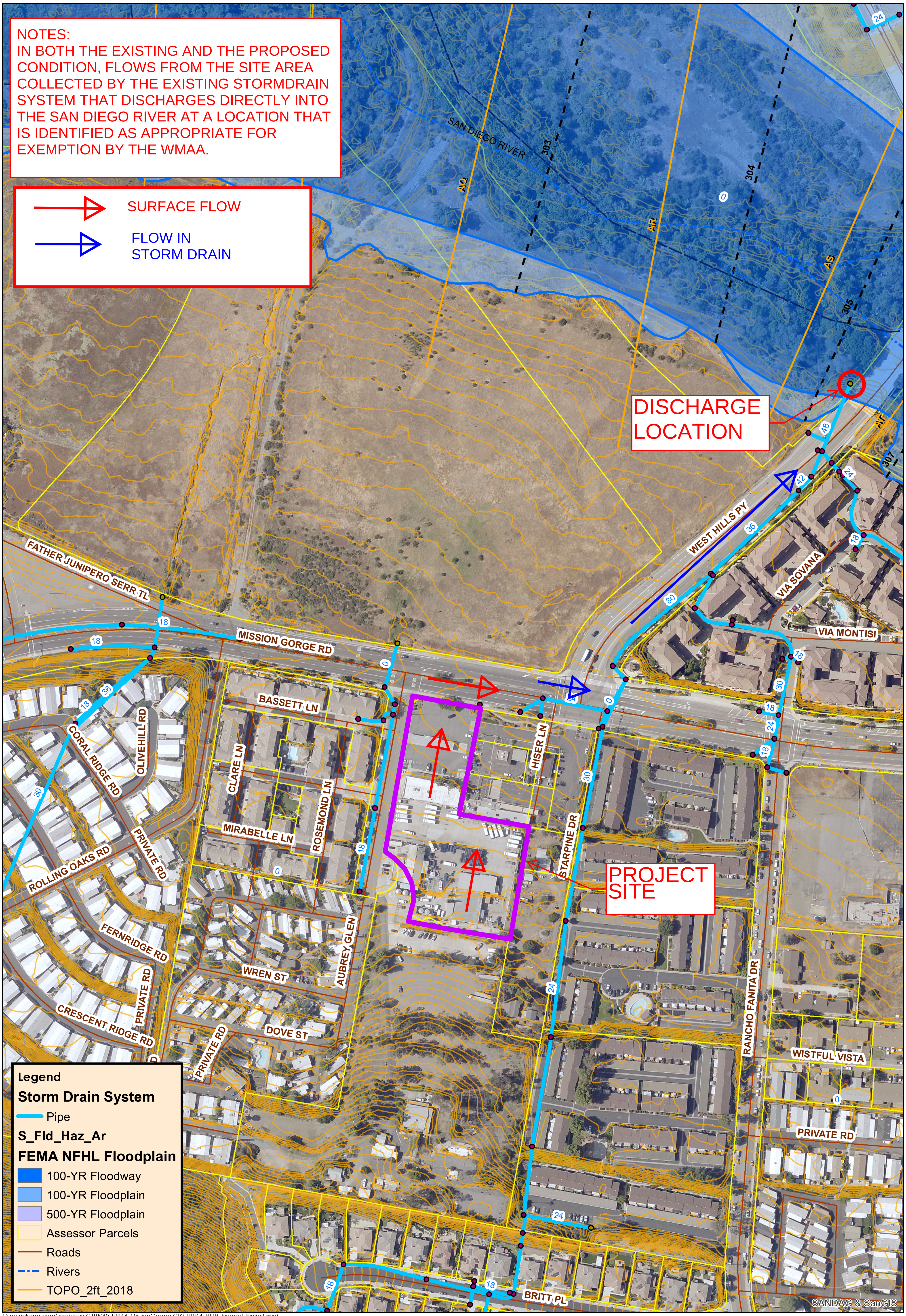
Use this checklist to ensure the required information has been included on the Hydromodification Management Exhibit:

The Hydromodification Management Exhibit must identify:

X Underlying hydrologic soil group
X Approximate depth to groundwater
X Existing natural hydrologic features (watercourses, seeps, springs, wetlands)
X Critical coarse sediment yield areas to be protected
X Existing topography
X Existing and proposed site drainage network and connections to drainage offsite
X Proposed grading
X Proposed impervious features
X Proposed design features and surface treatments used to minimize imperviousness
X Point(s) of Compliance (POC) for Hydromodification Management
X Existing and proposed drainage boundary and drainage area to each POC (when necessary, create separate exhibits for pre-development and post-project conditions)
X Structural BMPs for hydromodification management (identify location, type of BMP, and size/detail)

Note: Please Reference Attachment 1A to find specified information.

Attachment 2A



\\cp.rickeng.com\projects\C19500\19964_MissionGorge\GIS\19964_HMP_Exempt_Exhibit.mxd

RICK ENGINEERING COMPANY

Scale in Feet
0 200 400
North

Date of Exhibit: 9/3/2024
DigitalGlobe Aerial Image: 2017

Aubrey Glen
HMP Exemption Exhibit

J-19964

Attachment 2B

\\cp.rickeng.com\projects\C19500\19964_MissionGorge\GIS\19964_CCSYA_Exhibit_portrait.mxd

RICK

5620 Friars Road
San Diego, CA 92110

619-291-0707
rickengineering.com

SAN DIEGO RIVERSIDE ORANGE COUNTY SACRAMENTO SAN LUIS OBISPO
SANTA CLARITA LAS VEGAS PHOENIX TUCSON DENVER

Scale in Feet

0 200 400

North

CCSYA Exhibit

Aubrey Glen

Date of Exhibit: 9/3/2024

DigitalGlobe Aerial Image: See Lower Right of Image

Jn - 19964

ATTACHMENT 3
Structural BMP Maintenance Information

This is the cover sheet for Attachment 3.

Indicate which Items are Included behind this cover sheet:

Attachment Sequence	**Contents**	**Checklist**
Attachment 3a	Structural BMP Maintenance Thresholds and Actions (Required)	☒ Included See Structural BMP Maintenance Information Checklist on the back of this Attachment cover sheet.
Attachment 3b	Draft Maintenance Agreement (when applicable)	☐ Included ☐ Not Applicable

ATTACHMENT 3B TO BE INCLUDED DURING FINAL ENGINEERING

Use this checklist to ensure the required information has been included in the Structural BMP Maintenance Information Attachment:

X **Preliminary Design / Planning / CEQA level submittal:**

Attachment 3a must identify:

X Typical maintenance indicators and actions for proposed structural BMP(s) based on Section 7.7 of the BMP Design Manual

Attachment 3b is not required for preliminary design / planning / CEQA level submittal.

☐ **Final Design level submittal:**

Attachment 3a must identify:

☐ Specific maintenance indicators and actions for proposed structural BMP(s). This shall be based on Section 7.7 of the BMP Design Manual and enhanced to reflect actual proposed components of the structural BMP(s)

☐ How to access the structural BMP(s) to inspect and perform maintenance

☐ Features that are provided to facilitate inspection (e.g., observation ports, cleanouts, silt posts, or other features that allow the inspector to view necessary components of the structural BMP and compare to maintenance thresholds)

☐ Manufacturer and part number for proprietary parts of structural BMP(s) when applicable

☐ Maintenance thresholds specific to the structural BMP(s), with a location-specific frame of reference (e.g., level of accumulated materials that triggers removal of the materials, to be identified based on viewing marks on silt posts or measured with a survey rod with respect to a fixed benchmark within the BMP)

☐ Recommended equipment to perform maintenance

☐ When applicable, necessary special training or certification requirements for inspection and maintenance personnel such as confined space entry or hazardous waste management

Attachment 3b: For private entity operation and maintenance, Attachment 3b shall include a draft maintenance agreement in the local jurisdiction's standard format (PDP applicant to contact the [City Engineer] to obtain the current maintenance agreement forms).

SITE DESIGN, SOURCE CONTROL AND POLLUTANT CONTROL BMP OPERATION & MAINTENANCE PROCEDURE DETAILS					
STORM WATER MANAGEMENT AND DISCHARGE CONTROL MAINTENANCE AGREEMENT APPROVAL NO.:					
O&M RESPONSIBLE PARTY DESIGNEE:					
BMP DESCRIPTION		**INSPECTION FREQUENCY**	**MAINTENANCE FREQUENCY**	**MAINTENANCE METHOD**	**INCLUDED IN O&M MANUAL**
SITE DESIGN	LANDSCAPED AREAS	MONTHLY (NOTE: INSPECTOR SHALL CHECK FOR THE FOLLOWING MAINTENANCE INDICATORS: EROSION IN THE FORM OF RILLS OR GULLIES, PONDING WATER, BARE AREAS, BURROWS, MOUNDS, AND TRASH.)	1. AS DETERMINED BY INSPECTION; AND 2. ON OR BEFORE SEPTEMBER 30TH.	1. FILL AND COMPACT AREAS OF RUTS, RILLS, OR GULLIES; 2. RE-SEED AND/OR PLANT SLOPES AND AREAS OF EXPOSED SOILS; AND 3. ROUTINE MOWING AND TRIMMING AND TRASH REMOVAL.	YES
	AMENDED SOILS	MONTHLY (NOTE: INSPECTOR SHALL CHECK FOR THE FOLLOWING MAINTENANCE INDICATORS: EROSION IN THE FORM OF RILLS OR GULLIES, PONDING WATER, BARE AREAS, ANIMAL BURROWS, HOLES, MOUNDS, AND TRASH)	1. AS DETERMINED BY INSPECTION; AND 2. ON OR BEFORE SEPTEMBER 30TH.	1. REAPPLICATION OF AMENDED SOILS IF SIGNS OF COMPACTION, WATERLOGGING AND UNHEALTHY VEGETATION IS PRESENT 2. RE-SEED AND/OR PLANT SLOPES AND AREAS OF EXPOSED SOILS; AND 3. ROUTINE MOWING AND TRIMMING AND TRASH REMOVAL.	YES
	IMPERVIOUS AREA DISPERSION	MONTHLY (NOTE: INSPECTOR SHALL CHECK FOR THE FOLLOWING MAINTENANCE INDICATORS: EROSION IN THE FORM OF RILLS OR GULLIES, PONDING WATER, BARE AREAS, ANIMAL BURROWS, HOLES, MOUNDS, AND TRASH)	1. AS DETERMINED BY INSPECTION; AND 2. ON OR BEFORE SEPTEMBER 30TH.	1. REAPPLICATION OF AMENDED SOILS. 2. RE-SEED AND/OR PLANT SLOPES AND AREAS OF EXPOSED SOILS; AND 3. ROUTINE MOWING AND TRIMMING AND TRASH REMOVAL.	YES
SOURCE CONTROL	TRASH STORAGE AREAS	WEEKLY	1. AS DETERMINED BY INSPECTION; 2. STANDING WATER IN TRASH STORAGE AREA. 3. LOOSE TRASH OR DEBRIS. 4. LEAKED OR SPILLED MATERIALS. 5. COMPROMISED FENCE, SCREEN, GATE, WALL, BIN. LID OR ROOF AWNING (WHERE APPLICABLE). 6. CRACKED OR OTHERWISE COMPROMISED PAVING OR OTHER FLAWED FLOOR SURFACE (AS APPLICABLE).	1. IF STANDING WATER IS OBSERVED IN THE AREA, DETERMINE THE WATER SOURCE AND REMOVE THE SOURCE. ALLOW STANDING WATER TO EVAPORATE. IF WATER DOES NOT EVAPORATE IN 48 HOURS, REDISTRIBUTE THE WATER TO LANDSCAPED AREA(S). DO NOT DRAIN WATER TO STORM DRAIN SYSTEM; 2. REMOVE AND PROPERLY DISPOSE LOOSE TRASH, DEBRIS, AND LEAKED OR SPILLED MATERIALS. USE APPROPRIATE SPILL CLEANUP MATERIAL AS NECESSARY TO REMOVE ALL LEAKED AND SPILLED MATERIALS INCLUDING MATERIALS ADHERED TO PAVEMENT. IDENTIFY AND REMOVE OR REPAIR THE SOURCE OF ANY LEAKED OR SPILLED MATERIALS; AND 3. REPAIR THE FOLLOWING AS APPLICABLE: COMPROMISED FENCE, SCREEN, GATE, WALL, BIN, LID OR ROOF AWNING, CRACKED OR COMPROMISED PAVING OR OTHER FLOOR SURFACE.	YES
	PREVENTIVE STENCILING AND SIGNAGE	ANNUALLY	WHEN FULLY OR PARTIALLY ERASED SIGNS ARE OBSERVED; WHEN DUMPING OF TRASH ARE OBSERVED AT PUBLIC ACCESS POINTS, BUILDING ENTRANCES, PUBLIC PARKS, ETC.	1. REPLACE OR REPAINT THE STENCILS AND SIGNAGE SO THAT THEY ARE LEGIBLE; AND 2. MAKE SURE THAT THEY ARE PLACED AT ALL REQUIRED LOCATIONS (I.E.- ALL INLETS).	YES
STRUCTURAL BMP	BIOFILTRATION FACILITY (BMP-2)	1. TWICE A YEAR (ON OR BEFORE SEPTEMBER 15TH AND FOLLOWING THE RAINY SEASON AFTER MAY 1ST); AND 2. AFTER EACH "SIGNIFICANT RAIN EVENT" (NOTE: INSPECTOR SHALL CHECK FOR THE FOLLOWING MAINTENANCE INIDICATORS: EROSION IN THE FORM OF RILLS OR GULLIES, PONDING WATER, BARE AREAS, DEAD VEGETATION, ANIMAL BURROWS, HOLES, MOUNDS, AND TRASH)	1. AS DETERMINED BY INSPECTION; AND 2. ON OR BEFORE SEPTEMBER 30TH AND FOLLOWING THE RAINY SEASON AFTER MAY 1ST; AND 3. AFTER EACH "SIGNIFICANT RAIN EVENT"[2]	1. REPLACE MULCH IN AREAS OF RUTS, RILLS, OR GULLIES 2. RE-SEED AND/OR PLANT SLOPES AND AREAS OF EXPOSED SOILS 3. ROUTINE MAINTENANCE TO REMOVE ACCUMULATED MATERIALS SUCH AS TRASH AND DEBRIS 4. NON-ROUTINE MAINTENANCE WILL BE REQUIRED TO BACKWASH AND CLEAR UNDERDRAINS IF INSPECTION INDICATES UNDERDRAINS ARE CLOGGED 5. DEPENDING ON POLLUTANT LOADS, SOILS MAY NEED TO BE REPLACED EVERY 5 TO 10 YEARS. 6. THE RISER STRUCTURE SHOULD BE MAINTAINED TO AVOID CLOGGING AND ANY LEAKAGE THROUGH BOLTHOLES.	YES
	MODULAR WETLAND SYSTEM (BMP-1)	1. MINIMUM TWICE A YEAR (ON OR BEFORE SEPTEMBER 15TH AND FOLLOWING THE RAINY SEASON AFTER MAY 1ST); AND 2. AFTER EACH "SIGNIFICANT RAIN EVENT"	AS NEEDED BASED ON INSPECTION FINDINGS	1. ROUTINE MAINTENANCE TO REMOVE THE ACCUMULATED MATERIALS IN THE SCREENING FILTER, SEPARATION CHAMBER, AND PERIMETER FILTER (BIOMEDIA GREEN) AND REPLACE FILTER MEDIA PERFORMED BY A QUALIFIED SERVICE PROVIDER PER MANUFACTUER'S GUIDELINES AND CONDITIONS DEFINED IN THE WASHINGTON ECOLOGY T.A.P.E. CERTIFICATION. 2. IF INSPECTION INDICATES INTERNAL COMPONENTS ARE DAMAGED, ADDITIONAL NON-ROUTINE MAINTENANCE WILL BE REQUIRED TO REPAIR OR REPLACE DAMAGED PARTS AS APPLICABLE.	YES

NOTES:

1. REFER TO THE "PRIORITY DEVELOPMENT PROJECT (PDP) STORM WATER QUALITY MANAGEMENT PLAN (SWQMP) AUBREY GLEN", DATED AUGUST 30, 2024 OR ANY REVISIONS THEREOF FOR MORE SPECIFIC INFORMATION.

2. A SIGNIFICANT RAIN EVENT CONSIDERED WHENEVER THE NATIONAL WEATHER SERVICE REPORTS 0.50" OF RAIN IN 48 HOURS FOR THE LOCAL COMMUNITY.

INSPECTION AND MAINTENANCE FREQUENCY SHOULD BE DETERMINED BASED ON THE RESULTS OF THE FIRST YEAR INSPECTIONS.

SITE DESIGN, SOURCE CONTROL AND POLLUTANT CONTROL BMP OPERATION & MAINTENANCE PROCEDURE DETAILS					
STORM WATER MANAGEMENT AND DISCHARGE CONTROL MAINTENANCE AGREEMENT APPROVAL NO.:					
O&M RESPONSIBLE PARTY DESIGNEE:					
BMP DESCRIPTION		**INSPECTION FREQUENCY**	**MAINTENANCE FREQUENCY**	**MAINTENANCE METHOD**	**INCLUDED IN O&M MANUAL**
FULL TRASH CAPTURE SYSTEM	MODULAR WETLAND SYSTEM (BMP-1)	1. MINIMUM TWICE A YEAR (ON OR BEFORE SEPTEMBER 15TH AND FOLLOWING THE RAINY SEASON AFTER MAY 1ST); AND 2. AFTER EACH "SIGNIFICANT RAIN EVENT"	AS NEEDED BASED ON INSPECTION FINDINGS	1. ROUTINE MAINTENANCE TO REMOVE THE ACCUMULATED MATERIALS IN THE SCREENING FILTER, SEPARATION CHAMBER, AND PERIMETER FILTER (BIOMEDIA GREEN) AND REPLACE FILTER MEDIA PERFORMED BY A QUALIFIED SERVICE PROVIDER PER MANUFACTUER'S GUIDELINES AND CONDITIONS DEFINED IN THE WASHINGTON ECOLOGY T.A.P.E. CERTIFICATION. 2. IF INSPECTION INDICATES INTERNAL COMPONENTS ARE DAMAGED, ADDITIONAL NON-ROUTINE MAINTENANCE WILL BE REQUIRED TO REPAIR OR REPLACE DAMAGED PARTS AS APPLICABLE.	YES
GREEN STREET ELEMENTS	DISPERSION AREA WITH AMENDED SOIL (GS-2.01)	QUATERLY	AS NEEDED BASED ON INSPECTION FINDINGS	1. ROUTINE MAINTENANCE , CHECK CURB CUTS FOR ACCUMULATED GRIT, LEAVES, AND DEBRIS THAT MAY BLOCK INFLOW. 2. IDENTIFY MAINTENANCE TASK NEEDS. 3. LOOK FOR EROSION, BARE AREAS, AND WHERE MULCH, IF APPLICABLE, NEEDS TO BE APPLIED. 4. REMOVE WEEDS, AND ANY DEAD OR DYING PLANTS. REMOVE TRASH AND ANIMAL WASTE.	YES
	VEGETATED BUFFER FOR HYDRAULICLY DISCONNECTED SIDEWALK	QUATERLY	AS NEEDED BASED ON INSPECTION FINDINGS	1. ROUTINE MAINTENANCE, CHECK FOR MAINTENANCE NEEDS. 2. REMOVAL OF TRASH AND ANIMAL WASTE. 3. REMOVE ANY DEAD OR DYING PLANT MATERIAL.	YES

NOTES:

1. REFER TO THE "PRIORITY DEVELOPMENT PROJECT (PDP) STORM WATER QUALITY MANAGEMENT PLAN (SWQMP) AUBREY GLEN", DATED AUGUST 30, 2024 OR ANY REVISIONS THEREOF FOR MORE SPECIFIC INFORMATION.

2. A SIGNIFICANT RAIN EVENT CONSIDERED WHENEVER THE NATIONAL WEATHER SERVICE REPORTS 0.50" OF RAIN IN 48 HOURS FOR THE LOCAL COMMUNITY.

AND MAINTENANCE FREQUENCY SHOULD BE DETERMINED BASED ON THE RESULTS OF THE FIRST YEAR INSPECTIONS.

ATTACHMENT 4
Copy of Plan Sheets Showing Permanent Storm Water BMPs

This is the cover sheet for Attachment 4.

Use this checklist to ensure the required information has been included on the plans:

The plans must identify:

- ☒ Structural BMP(s) with ID numbers matching Form I-6 Summary of PDP Structural BMPs
- ☒ The grading and drainage design shown on the plans must be consistent with the delineation of DMAs shown on the DMA exhibit
- ☒ Details and specifications for construction of structural BMP(s)
- ☒ Signage indicating the location and boundary of structural BMP(s) as required by the [City Engineer]
- ☐ How to access the structural BMP(s) to inspect and perform maintenance
- ☒ Features that are provided to facilitate inspection (e.g., observation ports, cleanouts, silt posts, or other features that allow the inspector to view necessary components of the structural BMP and compare to maintenance thresholds)
- ☒ Manufacturer and part number for proprietary parts of structural BMP(s) when applicable
- ☒ Maintenance thresholds specific to the structural BMP(s), with a location-specific frame of reference (e.g., level of accumulated materials that triggers removal of the materials, to be identified based on viewing marks on silt posts or measured with a survey rod with respect to a fixed benchmark within the BMP)
- ☐ Recommended equipment to perform maintenance
- ☐ When applicable, necessary special training or certification requirements for inspection and maintenance personnel such as confined space entry or hazardous waste management
- ☒ Include landscaping plan sheets showing vegetation requirements for vegetated structural BMP(s)
- ☒ All BMPs must be fully dimensioned on the plans
- ☒ When proprietary BMPs are used, site-specific cross section with outflow, inflow, and model number shall be provided. Photocopies of general brochures are not acceptable.