11.6 Hydrology/Water Quality Reports

This document is designed for double-sided printing to conserve natural resources.

(D22-00016, T22-00006, GPA22-00002, RC22-00011)

CITY OF OCEANSIDE
ENGINEERING DIVISION

PRIORITY DEVELOPMENT PROJECT

STORM WATER QUALITY MANAGEMENT PLAN

FOR

NCTD Oceanside Transit Center
235 South Tremont Street

ENGINEER OF WORK:

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August 9, 2024

How to Use This Template

This template, assembled by GHD Inc. on behalf of the City of Oceanside, is for the development of Storm Water Quality Management Plans (SWQMPs) for Priority Development Projects (PDPs) proposed within Oceanside, CA. It is based on requirements set forth in the Regional Water Quality Control Board's National Pollutant Discharge Elimination System MS4 Permit that covers the San Diego Region (Order No. R9-2013-0001).

All references within the template refer to the City of Oceanside BMP Design Manual dated February 2016 (Manual). Use of this template in conjunction with the Manual is intended to help a project applicant develop a SWQMP compliant with City of Oceanside and MS4 Permit requirements.

Template Date: February 16, 2016

Assembled By:

Quick Reference Guide

Item	Project Information
Project Name	NCTD Oceanside Transit Center
Application Number(s)	D22-00016, T22-00006, GPA22-00002, RC22-00011
Project Address	235 South Tremont Street
Total Parcel Area	522,720 sq. ft.
Project Description	The project site located at 235 South Tremont Street consists of approximately 11.9 acres located in Oceanside, California and is enclosed within South Tremont Street, Missouri Avenue, A.T.& S.F. railroad, and Seagaze Drive (Figure 1). The 11.9 acres is comprised of public right-of-way improvements (3.3 acres) and 8.6 acres of onsite project development. The site will be developed as a transit-oriented development (TOD) with a mixed-use program generally consisting of approximately 547 residential apartment units with associated indoor and outdoor amenities, a boutique hotel with amenities, a 50,000 square feet (SF) office building for the new NCTD headquarters, a 4,000 SF replacement intermodal transportation center for train and bus travellers, a 12-bus exterior transfer center, approximately 22,000 SF of retail store front, and parking structures on each block to accommodate the needs of the proposed land use mix. Construction phasing of the project is not known at this time and will be determined during final engineering.
Proposed Disturbed Area (includes Public Green Street improvements)	519,474 sq. ft.
Created or Replaced Impervious (includes Public Green Street improvements)	468,967 sq. ft.
Project Hydrologic Unit Watershed	☐ Santa Maria ☐ San Luis Rey ☒ Carlsbad
Required to implement HMP	☐ Yes ☒ No

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CERTIFICATION PAGE

Project Name: NCTD Oceanside Transit Center – 235 S. Tremont St.
Permit Application Number: D22-00016, T22-00006, GPA22-00002, RC22-00011

I hereby declare that I am the Engineer in Responsible Charge of design of storm water BMPs for this project, and that I have exercised responsible charge over the design of the project as defined in Section 6703 of the Business and Professions Code, and that the design is consistent with the requirements of the City of Oceanside BMP Design Manual, which is based on the requirements of San Diego Regional Water Quality Control Board Order No. R9-2013-0001 (MS4 Permit).

I have read and understand that the City 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 SWQMP has been completed to the best of my ability and accurately reflects the project being proposed and the applicable source control and site design 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 SWQMP by City staff 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.

As Engineer of Work, I agree to indemnify, defend, and hold harmless the City of Oceanside, its officers, agents, and employees from any and all liability, claims, damages, or injuries to any person or property which might arise from the negligent acts, errors, or omissions of the Engineer of Work, my employees, agents or consultants.

R.C.E. 67379, EXP. 9/30/2024
Engineer of Work's Signature, PE Number & Expiration Date

Edward S. Perez, PE
Print Name

Stantec Consulting, Inc.
Company

8/9/2024
Date

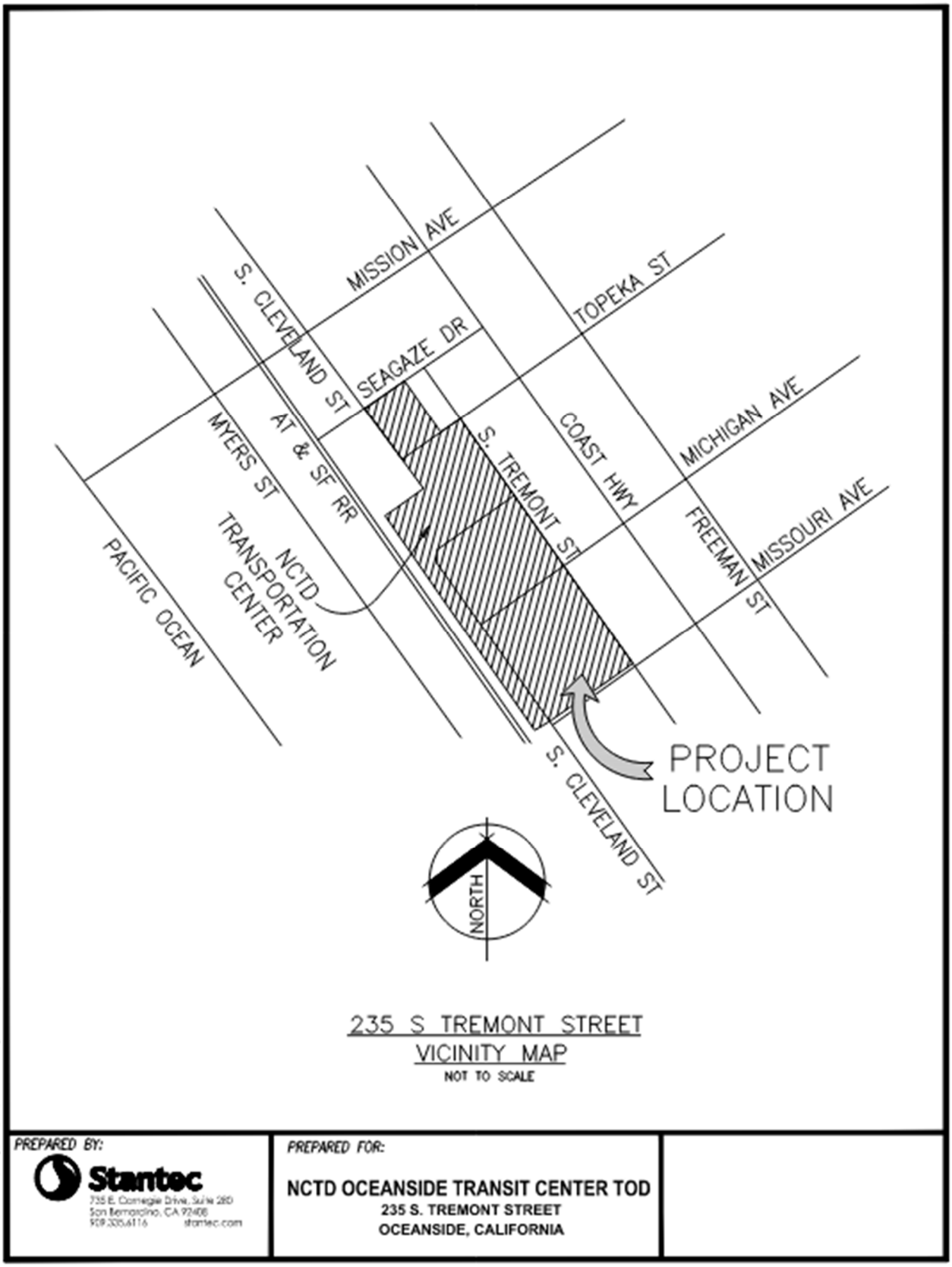
Engineer's Seal:



SUBMITTAL RECORD

Use this Table to keep a record of submittals of this SWQMP. Each time the SWQMP is re-submitted, provide the date and status of the project. In last column indicate 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	Changes
1	08/26/2022	☒ Preliminary Design/ Planning/ CEQA ☐ Final Design	Original report.
2	02/27/2023	☒ Preliminary Design/ Planning/ CEQA ☐ Final Design	Revised to address City review comments.
3	10/09/2023	☒ Preliminary Design/ Planning/ CEQA ☐ Final Design	Revised to address City review comments.
4	4/8/2024	☒ Preliminary Design/ Planning/ CEQA ☐ Final Design	Revised to address City review comments.
5	6/17/2024	☒ Preliminary Design/ Planning/ CEQA ☐ Final Design	Revised to address City review comments.
6	8/9/2024	☒ Preliminary Design/ Planning/ CEQA ☐ Final Design	Revised to address City review comments.


MISSION AVE
S. CLEVELAND ST
SEAGAZE DR
TOPEKA ST
MICHIGAN AVE
MYERS ST
AT & SF RR
S. TREMONT ST
COAST HWY
FREEMAN ST
MISSOURI AVE
PACIFIC OCEAN
NCTD TRANSPORTATION CENTER
PROJECT LOCATION
S. CLEVELAND ST
NORTH
235 S TREMONT STREET
VICINITY MAP
NOT TO SCALE
PREPARED BY:
Stantec
735 E. Carnegie Drive, Suite 280
San Bernardino, CA 92408
909.335.6116 stantec.com
PREPARED FOR:
NCTD OCEANSIDE TRANSIT CENTER TOD
235 S. TREMONT STREET
OCEANSIDE, CALIFORNIA

Applicability of Permanent, Post-Construction Storm Water BMP Requirements (Storm Water Intake Form for all Development Permit Applications)	Form I-1

Project Identification

Project Name: NCTD Oceanside Transit – 235 South Tremont Street

Permit Application Number: D22-00016, T22-00006, GPA22-00002, RC22-00011 | Date: 8/9/2024

Determination of Requirements

The purpose of this form is to identify permanent, post-construction requirements that apply to the project. This form serves as a short summary 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".
Refer to the manual sections and/or separate forms referenced in each step below.

Step	Answer	Progression
Step 1: Is the project a "development project"? See Section 1.3 of the manual for guidance.	☒Yes	Go to Step 2.
	☐No	Stop. Permanent BMP requirements do not apply. No SWQMP will be required. Provide discussion below.
Discussion / justification if the project is not a "development project" (e.g., the project includes *only* interior remodels within an existing building):		
Step 2: Is the project a Standard Project, PDP, or exception to PDP definitions? To answer this item, see Section 1.4 of the manual *in its entirety* for guidance, AND complete Form I-2, Project Type Determination.	☐Standard Project	Stop. Standard Project requirements apply, including Standard Project SWQMP.
	☒PDP	PDP requirements apply, including PDP SWQMP. Go to Step 3.
	☐ Exception to PDP definitions	Stop. Standard Project requirements apply. Provide discussion and list any additional requirements below. Prepare Standard Project SWQMP.
Discussion / justification, and additional requirements for exceptions to PDP definitions, if applicable:		

Form I-1 Page 2 of 2		
Step	**Answer**	**Progression**
Step 3. Is the project subject to earlier PDP requirements due to a prior lawful approval? See Section 1.10 of the 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. Do hydromodification control requirements apply? See Section 1.6 of the 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 <u>not</u> apply: DMA A is captured by an existing storm drain system located north of the project at the intersection of Seagaze Drive and S. Cleveland Street. The storm drain system ultimately flows to a 60-inch outfall at the Pacific Ocean. DMA B connects to an existing 15" storm drain to the west that travels underneath the railroad. Flow eventually outlets directly into S. Myers Street. DMA C outlets into S. Cleveland Street via a new storm drain extension that connects to the existing system located at the intersection of Wisconsin Avenue approximately 1,400 feet from the project site. The storm drain system continues downstream in Wisconsin Avenue and discharges to an outfall in the Pacific Ocean. See Attachment 1a for DMA Exhibit. All DMAs discharge to publicly maintained hardened systems that discharge directly into the Pacific Ocean.		
Step 5. Does protection of critical coarse sediment yield areas apply? See Section 6.2 of the 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. Stop.
Discussion / justification if protection of critical coarse sediment yield areas does <u>not</u> apply: As shown in the Potential Critical Coarse Sediment Yield Areas exhibit and kmz file downloaded from the County of San Diego website, there are no areas within the project limits that would require the protection of critical coarse sediment yield areas.		

Project Type Determination Checklist			Form I-2
Project Information			
Project Name: NCTD Oceanside Transit Center			
Permit Application Number: D22-00016, T22-00006, GPA22-00002, RC22-00011			
Project Type Determination: Standard Project or PDP			
The project is (select one): ☐ New Development ☒ Redevelopment			
The total proposed newly created or replaced impervious area is: 468,967 ft² (10.8 acres)			
Is the project in any of the following categories, (a) through (f)?			
Yes ☐	No ☒	(a)	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.
Yes ☒	No ☐	(b)	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.
Yes ☒	No ☐	(c)	New and redevelopment projects that create 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 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.

Form I-2 Page 2 of 2			
Yes ☐	No ☒	(d)	New or redevelopment projects that create 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 SDRWQCB; State Water Quality Protected Areas; water bodies designated with the RARE beneficial use by the State Water Board and SDRWQCB; and any other equivalent environmentally sensitive areas which have been identified by the Copermittees. See manual Section 1.4.2 for additional guidance.
Yes ☐	No ☒	(e)	New development projects 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. This category includes retail gasoline outlets that meet the following criteria: (a) 5,000 square feet or more or (b) a projected Average Daily Traffic of 100 or more vehicles per day.
Yes ☒	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 manual Section 1.4.2 for additional guidance.*

Does the project meet the definition of one or more of the PDP categories (a) through (f) listed above?

☐ No – the project is not a PDP (Standard Project).

☒ Yes – the project is a PDP.

The following is for redevelopment PDPs only:

The area of existing (pre-project) impervious area at the project site is: 440,609 ft² (A)
The total proposed newly created or replaced impervious area is: 468,967 ft² (B)
Percent impervious surface created or replaced (A/B)*100: [(B/A)*100] is 106 %
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

☒ greater than fifty percent (50%) – the entire project site is a PDP

Site Information Checklist For PDPs	Form I-3B (PDPs)
Project Summary Information	
Project Name	NCTD Oceanside Transit – 235 South Tremont Street
Project Address	235 South Tremont Street Oceanside, CA 92054
Assessor's Parcel Number(s)	147-350-24; 150-046-17;150-046-01 thru 08; 150-043-01 thru 06; and 147-350-25
Permit Application Number	D22-00016, T22-00006, GPA22-00002, RC22-00011
Project Watershed (Hydrologic Unit)	Select One: ☐Santa Margarita 902 ☐San Luis Rey 903 ☒Carlsbad 904
Parcel Area (total area of Assessor's Parcel(s) associated with the project)	12.0 Acres
Area to be disturbed by the project (Includes Public Right-of-Way Improvements)	11.9 Acres
Project Proposed Impervious Area (subset of Project Area and Public Area)	10.8 Acres
Project Proposed Pervious Area (subset of Project Area and Public Area)	1.1 Acres
Note: Proposed Impervious Area + Proposed Pervious Area = Area to be Disturbed by the Project. This may be less than the Parcel Area.	

Hydrologic Unit	Hydrologic Area	Hydrologic Sub-Area
Santa Margarita 902.00	☐ Ysidora 902.10	☐ Lower Ysidora 902.11
San Luis Rey 903.00	☐ Lower San Luis 903.10	☐ Mission 903.11
		☐ Bonsall 903.12
Carlsbad 904.00	☒ Loma Alta 904.10	Not Applicable
	☐ Buena Vista Creek 904.20	☐ El Salto 904.21
		☐ Vista 904.22
	☐ Agua Hedionda 4.30	☐ Los Monos 904.31

Description of Existing Site Condition and Drainage Patterns

Current Status of the Site (select all that apply):

☒Existing development

☐Previously graded but not built out

☐Agricultural or other non-impervious use

☐Vacant, undeveloped/natural

Description / Additional Information:

The existing development is a transportation hub that includes a bus transit center, train station, and office space for North County Transit District employees. The property is comprised of parking lots, landscaping, and structural buildings. In general, onsite runoff discharges away from the property at three different locations: (1) northerly at the intersection of S. Cleveland Street and Seagaze Drive, (2) westerly under the railroad tracks towards S. Myers Street, and (3) southerly at the S. Cleveland Street and Missouri Avenue intersection. There is offsite drainage that enters the site from the area east of South Tremont Street.

Existing Land Cover Includes (select all that apply):

☒Vegetative Cover

☐Non-Vegetated Pervious Areas

☒Impervious Areas

Description / Additional Information:

The onsite walkways, parking lots, and buildings make up 85% of the total area that is impervious. The remaining 15% are pervious areas comprised of sparsely vegetated landscape.

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:

☐Groundwater Depth < 5 feet

☐5 feet < Groundwater Depth < 10 feet

☐10 feet < Groundwater Depth < 20 feet

☒Groundwater Depth > 20 feet

Description of Existing Site Topography and Drainage [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; (2) describe existing constructed storm water conveyance systems, if applicable; and (3) is runoff from offsite conveyed through the site? If so, describe]:

In general, onsite runoff discharges away from the property at three different locations: (1) northerly at the intersection of S. Cleveland Street and Seagaze Drive, (2) westerly under the railroad tracks towards S. Myers Street, and (3) southerly at the S. Cleveland Street and Missouri Avenue intersection. There is offsite drainage that enters the site from the area east of South Tremont Street. A more detailed description of the three tributaries and their drainage patterns is provided below.

(1) The northerly tributary drains in a northwest direction towards the S. Cleveland Avenue and Seagaze Drive intersection as surface flow. Runoff is conveyed by gutters and streets until it is picked up by curb inlets just north of the intersection. Drainage from the existing parking structure and adjacent dead-end street are also picked up by this existing storm drain. There is approximately 3.5 acres of offsite drainage that originates in an area just east of project. The underground storm drain continues downstream and drains to a 60-inch outfall that discharges directly into the Pacific Ocean.

(2) The middle tributary drains in a westerly direction where it is picked up by catch basins and an underground storm drain system with a portion of the tributary draining into an underground detention system comprised of parallel 36-inch pipes under South Cleveland Street. There is approximately 0.2 acres of offsite drainage that originates in an area east of South Tremont Street. The onsite system flows downstream where it is picked up by a 15-inch storm drain pipe under the railroad right-of-way. The pipe discharges directly into South Myers Street via a sidewalk underdrain. Runoff then travels south in South Myers Street and west in Tyson Street where it is picked up by a curb inlet at South Pacific Street. The existing underground storm drain continues downstream and drains to an outfall that discharges directly into the Pacific Ocean.

(3) The southerly tributary drains in a southwesterly direction towards the South Cleveland Avenue and Missouri intersection. The onsite storm drain system is comprised of catch basins, underground storm drain pipe, and a box culvert that picks up onsite and offsite drainage. There is approximately 6.7 acres of offsite drainage that originates from an area east of South Tremont Street. The onsite system flows downstream towards the Missouri Avenue and South Cleveland Street intersection where it discharges as surface flow via a sidewalk underdrain. Runoff continues downstream to the south in South Cleveland Street until it is picked up by curb inlets just north of Wisconsin Street. The existing underground storm drain system drains to an outfall that discharges directly into the Pacific Ocean.

The onsite project area sits at a maximum elevation of approximately 61 feet in South Tremont Street to the east and then to a minimum elevation of about 49 feet at the railroad platform located at the west end of the property. Surface slopes are within a range of 0 to 6 percent.

See Attachment 5 for copy of drainage report and hydrology exhibit for the existing condition.

Description of Proposed Site Development and Drainage Patterns

Project Description / Proposed Land Use and/or Activities:

The proposed design is a mixed-used program consisting of two 5-story structures comprising of approximately 547 residential apartment units with indoor and outdoor amenities, a 6-story boutique hotel with amenities with an adjacent 5-story parking structure, 4,000 square foot replacement intermodal transportation center, a 50,000 square foot 5-story office building (relocated NCTD headquarters location), a 12-stall bus exterior transfer center, and an existing parking structure on the northwest end that will remain.

Construction phasing is not known at this time and will be determined during final engineering. It is generally understood that this preliminary SWQMP is further refined during final engineering and will need to consider implementation of structural BMPs to support each of the developed phases of the project.

List/describe proposed impervious features of the project (e.g., buildings, roadways, parking lots, courtyards, athletic courts, other impervious features):

This proposed development will incorporate the following impervious features:

- Building structures (office space, residential apartments, and hotel),
- parking structures and lots,
- public and private drives,
- bus transit area, and
- courtyards.

List/describe proposed pervious features of the project (e.g., landscape areas):

There will be planting for residential amenities of the residential units and at ground level dispersed throughout the proposed development along sidewalks, streets, and plaza areas.

Does the project include grading and changes to site topography?

☒Yes

☐No

Description / Additional Information:

Changes to site topography include the following, but are not limited to:

- Relocation of bus transit station (pick-up and drop-off)
- Construction of new building structures (offices, residential apartments, hotel, and parking structures)
- Realigned roadways and walkways
- New landscape and hardscape features

Does the project include changes to site drainage (e.g., installation of new storm water conveyance systems)?

☒Yes

☐No

Description / Additional Information:

New storm-drain systems are proposed at the following locations:

- In N. Cleveland Street, located in the northerly tributary, that will connect to the existing storm drain system at the N. Cleveland Street and Seagaze Drive intersection. There is an ongoing CIP project to install new curb inlets and storm drain in Seagaze Drive. The start of construction is not known at this time, but the project will be compatible to both the existing and CIP storm drain systems.
- In Topeka Street from S. Tremont Street to the point of connection to the west with the 15" storm drain at the railroad platform.
- In S. Tremont Street and Michigan Avenue through the proposed bus transit center and in S. Cleveland Street through a new storm drain system that extends to the Wisconsin Avenue intersection.
- In the alleyway running parallel with S. Tremont Street and then south in Missouri Avenue until it connects to the new storm drain at the S. Cleveland Street and Missouri Avenue intersection.

Due to limited flow capacity in the existing 15" storm drain under the railroad, (3) underground detention basins are proposed located north and south of the new NCTD office building. See preliminary grading and drainage sheet provided in the Vesting Tentative Parcel Map. To prevent the surcharge of downstream infrastructure and minimize outflow onto S. Myers Street, the underground detention basins are designed to attenuate flows so as not to exceed the capacity of the existing 15" RCP underneath the railroad. The downstream conveyance is hard lined all the way to the discharge point into the Pacific Ocean. Therefore, hydromodification is not required.

Form I-3B Page 5 of 10

Identify whether any of the following features, activities, and/or pollutant source areas will be present (select all that apply):

☒Onsite 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

Form I-3B Page 6 of 10		
Identification of Receiving Water Pollutants of Concern		
Describe path of storm water from the project site to the Pacific Ocean (or bay, lagoon, lake or reservoir, as applicable): In general, runoff from the project site is conveyed by gutters and streets where it is picked up by catch basins and underground storm drain systems. Flows continue downstream in the underground storm drain system where it eventually outlets into 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 for the impaired water bodies:		
303(d) Impaired Water Body	**Pollutant(s)/Stressor(s)**	**TMDLs**
Northerly Cleveland Street storm drain outlets to Pacific Ocean shoreline, San Luis Rey HU, at Surfrider Way.	No 303(d) pollutants listed.	TMDL for indicator bacteria.
S. Myers Street outlets to Pacific Ocean shoreline, Loma Alta HSA, at Tyson Way.	303(d) impairment for indicator bacteria.	No TMDL.
Southerly Cleveland Street storm drain outlets to Pacific Ocean shoreline, Loma Alta HSA, at Wisconsin Street.	No 303(d) pollutants listed.	No TMDL.

Form I-3B Page 7 of 10			
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 manual Appendix B.6):			
Pollutant	**Not Applicable to the Project Site**	**Expected from the Project Site**	**Also a Receiving Water Pollutant of Concern**
Sediment	see above * ☒		
Nutrients	see above * ☒		
Heavy Metals	see above * ☒		
Organic Compounds	see above * ☒		
Trash & Debris	see above * ☒		
Oxygen Demanding Substances	see above * ☒		
Oil & Grease	see above * ☒		
Bacteria & Viruses	see above * ☒		
Pesticides	see above * ☒		

Note: Nutrients shall be addressed as a Pollutant of Concern (POC) for projects located in the Loma Alta Hydrologic Area.

Form I-3B Page 8 of 10
Hydromodification Management Requirements
Do hydromodification management requirements apply (see Section 1.6 of the 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): DMAs A1-A10 and E1-E3 are conveyed by an existing storm drain system located north of the project at the intersection of Seagaze Drive and N. Cleveland Street. The storm drain system ultimately flows to a 60-inch outfall at the Pacific Ocean. DMAs B1-B4, B6, E4-E7, E9, E10, and D1-D11 are conveyed by an existing 15" storm drain to the west that travels underneath the railroad. Flow outlets directly into S. Myers Street where it is conveyed by gutter and street until it is picked up by an existing inlet at the intersection of Tyson Street and S. Pacific Street intersection. The storm drain ultimately flows to an outfall at the Pacific Ocean. DMAs B5, E8, E11-E16, and C1-C11 discharge into S. Cleveland Street via a new storm drain extension that connects to the existing system at the Wisconsin intersection. The storm drain system continues downstream and discharges to an outfall in the Pacific Ocean. See Attachment 1a for DMA Exhibit. All DMAs discharge to publicly maintained hardened systems that discharge directly into the Pacific Ocean.

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 manual been performed?

☐6.2.1 Verification of 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 8 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:

N/A – Refer to Form I-1 Page 2 of 2.

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.

N/A

Has a geomorphic assessment been performed for the receiving channel(s)?

☐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)

N/A

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.

Hydromodification is not required since the downstream conveyance is hard lined all the way to the discharge point into the Pacific Ocean. The proposed underground vaults are for the detention of flows, so as not to surcharge the existing 15-inch RCP under the railroad.

Optional Additional Information or Continuation of Previous Sections As Needed

Please note that this preliminary SWQMP presents the ultimate build-out condition and that a Final SWQMP, concurrent to each phase, will be prepared at such time as engineering permits are processed at a later date.

Construction phasing is not known at this time and will be determined during final engineering. The project will provide appropriate post-construction BMPs to adequately support each phase of the project.

Source Control BMP Checklist for All Development Projects (Standard Projects and PDPs)	Form I-4

Project Identification

Project Name: NCTD Oceanside Transit Center

Permit Application Number: D22-00016, T22-00006, GPA22-00002, RC22-00011

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 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 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	Implemented?		
SC-1 Prevention of Illicit Discharges into the MS4	☒ Yes	☐ No	☐ N/A
Discussion / justification if SC-1 not implemented: Drainage design shall comply with City storm drain and water quality standards. Inspection of the facilities shall be conducted regularly to avoid illicit connections and discharges.			
SC-2 Storm Drain Stenciling or Signage	☒ Yes	☐ No	☐ N/A
Discussion / justification if SC-2 not implemented: Placards will be installed at each catch basin to state no dumping allowed and that the system drains to the ocean.			
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: Material storage areas are not proposed for project.			

Form I-4 Page 2 of 3			
Source Control Requirement	**Implemented?**		
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: Outdoor work areas are not proposed for project.			
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: Proper covers will be provided to help protect trash storage areas to avoid contamination of runoff and eliminate dispersion of trash and debris.			

Form I-4 Page 3 of 3			
SC-6 Additional BMPs Based on Potential Sources of Runoff Pollutants (must answer for each source listed below)	**Implemented?**		
Onsite 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 area	☒ 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.

Various items checked "yes" above will be assessed and/or inspected with proper protection provided to avoid discharge of pollutants into the storm drain system. This may include inlet protection, diversion of flows to acceptable conveyance system, monitoring of pest control and pesticide use, and the cleanup of spilled trash and debris. See following 12 pages for **Appendix E: BMP Design Fact Sheets** checklist.

If These Sources Will Be on the Project Site …	… Then Your SWQMP Shall Consider These Source Control BMPs		
1 **Potential Sources of Runoff Pollutants**	2 **Permanent Controls—Show on Drawings**	3 **Permanent Controls—List in Table and Narrative**	4 **Operational BMPs—Include in Table and Narrative**
☒ **A.** Onsite storm drain inlets ☐ Not Applicable	☒ Locations of inlets.	☒ Mark all inlets with the words "No Dumping! Flows to Bay" or similar.	☒ Maintain and periodically repaint or replace inlet markings. ☒ Provide storm water pollution prevention information to new site owners, lessees, or operators. ☒ See applicable operational BMPs in Fact Sheet SC-44, "Drainage System Maintenance," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com. ☒ Include the following in lease agreements: "Tenant shall not allow anyone to discharge anything to storm drains or to store or deposit materials so as to create a potential discharge to storm drains."

If These Sources Will Be on the Project Site …	… Then Your SWQMP shall consider These Source Control BMPs		
1 **Potential Sources of Runoff Pollutants**	2 **Permanent Controls—Show on Drawings**	3 **Permanent Controls—List in Table and Narrative**	4 **Operational BMPs—Include in Table and Narrative**
☒ **B.** Interior floor drains and elevator shaft sump pumps ☐ Not Applicable		☒ State that interior floor drains and elevator shaft sump pumps will be plumbed to sanitary sewer.	☒ Inspect and maintain drains to prevent blockages and overflow.
☒ **C.** Interior parking garages ☐ Not Applicable		☒ State that parking garage floor drains will be plumbed to the sanitary sewer.	☒ Inspect and maintain drains to prevent blockages and overflow.
☒ **D1.** Need for future indoor & structural pest control ☐ Not Applicable		☒ Note building design features that discourage entry of pests.	☒ Provide Integrated Pest Management information to owners, lessees, and operators.

If These Sources Will Be on the Project Site …	… Then Your SWQMP shall consider These Source Control BMPs		
1 **Potential Sources of Runoff Pollutants**	2 **Permanent Controls—Show on Drawings**	3 **Permanent Controls—List in Table and Narrative**	4 **Operational BMPs—Include in Table and Narrative**
☒ **D2.** Landscape/ Outdoor Pesticide Use ☐ Not Applicable	☒ Show locations of existing trees or areas of shrubs and ground cover to be undisturbed and retained. ☒ Show self-retaining landscape areas, if any. ☒ Show storm water treatment facilities.	State that final landscape plans will accomplish all of the following. ☒ Preserve existing drought tolerant trees, shrubs, and ground cover to the maximum extent possible. ☒ Design landscaping to minimize irrigation and runoff, to promote surface infiltration where appropriate, and to minimize the use of fertilizers and pesticides that can contribute to storm water pollution. ☒ Where landscaped areas are used to retain or detain storm water, specify plants that are tolerant of periodic saturated soil conditions. ☒ Consider using pest-resistant plants, especially adjacent to hardscape. ☒ To ensure successful establishment, select plants appropriate to site soils, slopes, climate, sun, wind, rain, land use, air movement, ecological consistency, and plant interactions.	☒ Maintain landscaping using minimum or no pesticides. ☒ See applicable operational BMPs in Fact Sheet SC-41, "Building and Grounds Maintenance," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com. ☒ Provide IPM information to new owners, lessees and operators.

If These Sources Will Be on the Project Site …	… Then Your SWQMP shall consider These Source Control BMPs		
1 **Potential Sources of Runoff Pollutants**	2 **Permanent Controls—Show on Drawings**	3 **Permanent Controls—List in Table and Narrative**	4 **Operational BMPs—Include in Table and Narrative**
☒ **E.** Pools, spas, ponds, decorative fountains, and other water features. ☐ Not Applicable	☒ Show location of water feature and a sanitary sewer cleanout in an accessible area within 10 feet.	☒ If the City requires pools to be plumbed to the sanitary sewer, place a note on the plans and state in the narrative that this connection will be made according to City requirements.	☒ See applicable operational BMPs in Fact Sheet SC-72, "Fountain and Pool Maintenance," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com.
☒ **F.** Food service ☐ Not Applicable	☒ For restaurants, grocery stores, and other food service operations, show location (indoors or in a covered area outdoors) of a floor sink or other area for cleaning floor mats, containers, and equipment. ☒ On the drawing, show a note that this drain will be connected to a grease interceptor before discharging to the sanitary sewer.	☒ Describe the location and features of the designated cleaning area. ☒ Describe the items to be cleaned in this facility and how it has been sized to ensure that the largest items can be accommodated.	

If These Sources Will Be on the Project Site …	… Then Your SWQMP shall consider These Source Control BMPs		
1 **Potential Sources of Runoff Pollutants**	2 **Permanent Controls—Show on Drawings**	3 **Permanent Controls—List in Table and Narrative**	4 **Operational BMPs—Include in Table and Narrative**
☒ **G.** Refuse areas ☐ Not Applicable	☒ Show where site refuse and recycled materials will be handled and stored for pickup. See City requirements for sizes and other details of refuse areas. ☒ If dumpsters or other receptacles are outdoors, show how the designated area will be covered, graded, and paved to prevent run- on and show locations of berms to prevent runoff from the area. Also show how the designated area will be protected from wind dispersal. ☒ Any drains from dumpsters, compactors, and tallow bin areas shall be connected to a grease removal device before discharge to sanitary sewer.	☒ State how site refuse will be handled and provide supporting detail to what is shown on plans. ☒ State that signs will be posted on or near dumpsters with the words "Do not dump hazardous materials here" or similar.	☒ State how the following will be implemented: Provide adequate number of receptacles. Inspect receptacles regularly; repair or replace leaky receptacles. Keep receptacles covered. Prohibit/prevent dumping of liquid or hazardous wastes. Post "no hazardous materials" signs. Inspect and pick up litter daily and clean up spills immediately. Keep spill control materials available on- site. See Fact Sheet SC-34, "Waste Handling and Disposal" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com.

If These Sources Will Be on the Project Site …	… Then Your SWQMP shall consider These Source Control BMPs		
1 **Potential Sources of Runoff Pollutants**	2 **Permanent Controls—Show on Drawings**	3 **Permanent Controls—List in Table and Narrative**	4 **Operational BMPs—Include in Table and Narrative Table and Narrative**
❑ **H.** Industrial processes. ❑ Not Applicable	❑ Show process area.	❑ If industrial processes are to be located onsite, state: "All process activities to be performed indoors. No processes to drain to exterior or to storm drain system."	❑ See Fact Sheet SC-10, "Non-Stormwater Discharges" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com.
❑ **I.** Outdoor storage of equipment or materials. (See rows J and K for source control measures for vehicle cleaning, repair, and maintenance.) ❑ Not Applicable	❑ Show any outdoor storage areas, including how materials will be covered. Show how areas will be graded and bermed to prevent run-on or runoff from area and protected from wind dispersal. ❑ Storage of non-hazardous liquids shall be covered by a roof and/or drain to the sanitary sewer system, and be contained by berms, dikes, liners, or vaults. ❑ Storage of hazardous materials and wastes must be in compliance with the local hazardous materials ordinance and a Hazardous Materials Management Plan for the site.	❑ Include a detailed description of materials to be stored, storage areas, and structural features to prevent pollutants from entering storm drains. Where appropriate, reference documentation of compliance with the requirements of local Hazardous Materials Programs for: ▪ Hazardous Waste Generation ▪ Hazardous Materials Release Response and Inventory ▪ California Accidental Release Prevention Program ▪ Aboveground Storage Tank ▪ Uniform Fire Code Article 80 Section 103(b) & (c) 1991 ▪ Underground Storage Tank	❑ See the Fact Sheets SC-31, "Outdoor Liquid Container Storage" and SC-33, "Outdoor Storage of Raw Materials" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com.

If These Sources Will Be on the Project Site …	… Then Your SWQMP shall consider These Source Control BMPs		
1 **Potential Sources of Runoff Pollutants**	2 **Permanent Controls—Show on Drawings**	3 **Permanent Controls—List in Table and Narrative**	4 **Operational BMPs—Include in Table and Narrative**
❑ **J.** Vehicle and Equipment Cleaning ❑ Not Applicable	❑ Show on drawings as appropriate: (1) Commercial/industrial facilities having vehicle /equipment cleaning needs shall either provide a covered, bermed area for washing activities or discourage vehicle/equipment washing by removing hose bibs and installing signs prohibiting such uses. (2) Multi-dwelling complexes shall have a paved, bermed, and covered car wash area (unless car washing is prohibited onsite and hoses are provided with an automatic shut- off to discourage such use). (3) Washing areas for cars, vehicles, and equipment shall be paved, designed to prevent run-on to or runoff from the area, and plumbed to drain to the sanitary sewer. (4) Commercial car wash facilities shall be designed such that no runoff from the facility is discharged to the storm drain system. Wastewater from the facility shall discharge to the sanitary sewer, or a wastewater reclamation system shall be installed.	❑ If a car wash area is not provided, describe measures taken to discourage onsite car washing and explain how these will be enforced.	Describe operational measures to implement the following (if applicable): ❑ Washwater from vehicle and equipment washing operations shall not be discharged to the storm drain system. ❑ Car dealerships and similar may rinse cars with water only. ❑ See Fact Sheet SC-21, "Vehicle and Equipment Cleaning," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com

If These Sources Will Be on the Project Site …	… Then Your SWQMP shall consider These Source Control BMPs		
1 **Potential Sources of Runoff Pollutants**	**2** **Permanent Controls—Show on Drawings**	**3** **Permanent Controls—List in Table and Narrative**	**4** **Operational BMPs—Include in Table and Narrative**
❑ **K.** Vehicle/Equipment Repair and Maintenance ❑ Not Applicable	❑ Accommodate all vehicle equipment repair and maintenance indoors. Or designate an outdoor work area and design the area to protect from rainfall, run-on runoff, and wind dispersal. ❑ Show secondary containment for exterior work areas where motor oil, brake fluid, gasoline, diesel fuel, radiator fluid, acid-containing batteries or other hazardous materials or hazardous wastes are used or stored. Drains shall not be installed within the secondary containment areas. ❑ Add a note on the plans that states either (1) there are no floor drains, or (2) floor drains are connected to wastewater pretreatment systems prior to discharge to the sanitary sewer and an industrial waste discharge permit will be obtained.	❑ State that no vehicle repair or maintenance will be done outdoors, or else describe the required features of the outdoor work area. ❑ State that there are no floor drains or if there are floor drains, note the agency from which an industrial waste discharge permit will be obtained and that the design meets that agency's requirements. ❑ State that there are no tanks, containers or sinks to be used for parts cleaning or rinsing or, if there are, note the agency from which an industrial waste discharge permit will be obtained and that the design meets that agency's requirements.	In the report, note that all of the following restrictions apply to use the site: ❑ No person shall dispose of, nor permit the disposal, directly or indirectly of vehicle fluids, hazardous materials, or rinsewater from parts cleaning into storm drains. ❑ No vehicle fluid removal shall be performed outside a building, nor on asphalt or ground surfaces, whether inside or outside a building, except in such a manner as to ensure that any spilled fluid will be in an area of secondary containment. Leaking vehicle fluids shall be contained or drained from the vehicle immediately. ❑ No person shall leave unattended drip parts or other open containers containing vehicle fluid, unless such containers are in use or in an area of secondary containment.

If These Sources Will Be on the Project Site …	… Then Your SWQMP shall consider These Source Control BMPs		
1 **Potential Sources of Runoff Pollutants**	2 **Permanent Controls—Show on Drawings**	3 **Permanent Controls—List in Table and Narrative**	4 **Operational BMPs—Include in Table and Narrative**
❑ **L.** Fuel Dispensing Areas ❑ Not Applicable	❑ Fueling areas[1] shall have impermeable floors (i.e., portland cement concrete or equivalent smooth impervious surface) that are (1) graded at the minimum slope necessary to prevent ponding; and (2) separated from the rest of the site by a grade break that prevents run-on of storm water to the MEP. ❑ Fueling areas shall be covered by a canopy that extends a minimum of ten feet in each direction from each pump. [Alternative: The fueling area must be covered and the cover's minimum dimensions must be equal to or greater than the area within the grade break or fuel dispensing area1.] The canopy [or cover] shall not drain onto the fueling area.		❑ The property owner shall dry sweep the fueling area routinely. ❑ See the Business Guide Sheet, "Automotive Service—Service Stations" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com.

1. The fueling area shall be defined as the area extending a minimum of 6.5 feet from the corner of each fuel dispenser or the length at which the hose and nozzle assembly may be operated plus a minimum of one foot, whichever is greater.

If These Sources Will Be on the Project Site …	… Then Your SWQMP shall consider These Source Control BMPs		
1 **Potential Sources of Runoff Pollutants**	2 **Permanent Controls—Show on Drawings**	3 **Permanent Controls—List in Table and Narrative**	4 **Operational BMPs—Include in Table and Narrative**
M. Loading Docks ☐ Not Applicable	☒ Show a preliminary design for the loading dock area, including roofing and drainage. Loading docks shall be covered and/or graded to minimize run-on to and runoff from the loading area. Roof downspouts shall be positioned to direct storm water away from the loading area. Water from loading dock areas should be drained to the sanitary sewer where feasible. Direct connections to storm drains from depressed loading docks are prohibited. ☒ Loading dock areas draining directly to the sanitary sewer shall be equipped with a spill control valve or equivalent device, which shall be kept closed during periods of operation. ☒ Provide a roof overhang over the loading area or install door skirts (cowling) at each bay that enclose the end of the trailer.		☒ Move loaded and unloaded items indoors as soon as possible. ☒ See Fact Sheet SC-30, "Outdoor Loading and Unloading," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com.

If These Sources Will Be on the Project Site …	… Then Your SWQMP shall consider These Source Control BMPs		
1 **Potential Sources of Runoff Pollutants**	2 **Permanent Controls—Show on Drawings**	3 **Permanent Controls—List in Table and Narrative**	4 **Operational BMPs—Include in Table and Narrative**
☒ **N.** Fire Sprinkler Test Water ☐ Not Applicable		☒ Provide a means to drain fire sprinkler test water to the sanitary sewer.	☒ See the note in Fact Sheet SC-41, "Building and Grounds Maintenance," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com.
O. Miscellaneous Drain or Wash Water ☒ Boiler drain lines ☐ Condensate drain lines ☐ Rooftop equipment ☐ Drainage sumps ☒ Roofing, gutters, and trim ☐ Not Applicable		☒ Boiler drain lines shall be directly or indirectly connected to the sanitary sewer system and may not discharge to the storm drain system. ☐ Condensate drain lines may discharge to landscaped areas if the flow is small enough that runoff will not occur. Condensate drain lines may not discharge to the storm drain system. ☐ Rooftop mounted equipment with potential to produce pollutants shall be roofed and/or have secondary containment. ☐ Any drainage sumps onsite shall feature a sediment sump to reduce the quantity of sediment in pumped water. ☒ Avoid roofing, gutters, and trim made of copper or other unprotected metals that may leach into runoff.	

If These Sources Will Be on the Project Site …	… Then Your SWQMP shall consider These Source Control BMPs		
1 **Potential Sources of Runoff Pollutants**	2 **Permanent Controls—Show on Drawings**	3 **Permanent Controls—List in Table and Narrative**	4 **Operational BMPs—Include in Table and Narrative**
☒ **P.** Plazas, sidewalks, and parking lots. ☐ Not Applicable			☒ Plazas, sidewalks, and parking lots shall be swept regularly to prevent the accumulation of litter and debris. Debris from pressure washing shall be collected to prevent entry into the storm drain system. Washwater containing any cleaning agent or degreaser shall be collected and discharged to the sanitary sewer and not discharged to a storm drain.

Site Design BMP Checklist for All Development Projects (Standard Projects and PDPs)	Form I-5

Project Identification

Project Name: NCTD Oceanside Transit Center

Permit Application Number: D22-00016, T22-00006, GPA22-00002, RC22-00011

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 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 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: The existing development does not have any natural drainage pathways. All of the proposed tributaries will drain to new storm drain facilities.			
SD-2 Conserve Natural Areas, Soils, and Vegetation	☐ Yes	☐ No	☒ N/A
Discussion / justification if SD-2 not implemented: The existing development does not have natural areas. The entire limits of the project will be regraded.			
SD-3 Minimize Impervious Area	☒ Yes	☐ No	☐ N/A
Discussion / justification if SD-3 not implemented: This redevelopment will install minimum roadway and walkway widths at all possible to minimize impervious areas. To be detailed further at engineering phase.			
SD-4 Minimize Soil Compaction	☐ Yes	☒ No	☐ N/A
Discussion / justification if SD-4 not implemented: The entire limits of the project will be regraded and recompacted.			

Form I-5 Page 2 of 2			
Site Design Requirement	**Applied?**		
SD-5 Impervious Area Dispersion	☒ Yes	☐ No	☐ N/A
Discussion / justification if SD-5 not implemented: To the maximum extent practicable, drainage areas will be dispersed into planter areas. To be detailed further in engineering phase.			
SD-6 Runoff Collection	☒ Yes	☐ No	☐ N/A
Discussion / justification if SD-6 not implemented: Tree wells are also used to capture and treat runoff from the public right-of-way.			
SD-7 Landscaping with Native or Drought Tolerant Species	☒ Yes	☐ No	☐ N/A
Discussion / justification if SD-7 not implemented: Proposed plants shall be native and drought tolerant species.			
SD-8 Harvesting and Using Precipitation	☐ Yes	☒ No	☐ N/A
Discussion / justification if SD-8 not implemented: The site is expected to connect to the City's new recycled water line in Tremont to provide long term irrigation service for the project's life cycle.			

Summary of PDP Structural BMPs	Form I-6 (PDPs)
Project Identification	
Project Name: NCTD Oceanside Transit Center	
Permit Application Number: D22-00016, T22-00006, GPA22-00002, RC22-00011	
PDP Structural BMPs	
All PDPs must implement structural BMPs for storm water pollutant control (see Chapter 5 of the 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 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 to certify construction of the structural BMPs (see Section 1.12 of the manual). PDP structural BMPs must be maintained into perpetuity, and the local jurisdiction must confirm the maintenance (see Section 7 of the 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 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. Design Capture Volumes are presented in Attachment 1b. The determination of the project's water quality treatment follows the BMP hierarchy with preference to retain stormwater runoff to the maximum extent practicable. Based on the project's geotechnical study, retention and infiltration is NOT feasible and so a combination of standard and proprietary biofiltration BMPs are of choice. The project-scale retention volume required is 18,275 CF with the project-sale retention volume provided being 3678 CF. The subareas for DMA A include the hotel, alley, and pedestrian walkway next to the existing parking structure. The water quality treatment approach is to direct rooftops to raised biofiltration BMP planters located on upper-level floors. Ground-level areas will be treated by in-ground biofiltration BMP planters. These BMP facilities capture and treat the DCV. The amenity deck will be treated by a biofiltration proprietary unit (Modular Wetland System) that is flow based and will treat for the calculated water treatment flow rate. Runoff from DMAs B, C and D will be treated in a similar manner. Runoff from rooftops will drain to raised biofiltration BMP planters located on upper-level floors. Ground-level areas will be treated by in-ground biofiltration BMP planters. These BMP facilities capture and treat the DCV. Amenity decks and top floor of parking structures will be treated by biofiltration proprietary units (Modular Wetland System) that are flow based and will treat for the calculated water treatment flow rate. Runoff from DMA E include areas of the public right-of-way and are directed to tree wells (green street BMPs) and in-ground biofiltration planters. These BMP facilities capture and treat the DCV for these areas. Proposed BMPs are shown on the WQMP DMA Exhibit and are sized to meet water quality treatment requirements. A more detailed description is provided in the following pages.	

Form I-6 Page 2 of 21
Structural BMP Summary Information **(Copy this page as needed to provide information for each individual proposed structural BMP)**
Structural BMP ID Nos. **A7, A8, A9, and A10**
Construction Plan Sheet No.: **WQMP DMA EXHIBIT & SHEET C9 OF VTM**
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) ☐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 manual)	**To be determined in final engineering.**
Who will be the final owner of this BMP?	**North County Transit District**
Who will maintain this BMP into perpetuity?	**North County Transit District**
What is the funding mechanism for maintenance?	**North County Transit District**

Structural BMP Summary Information

(Copy this page as needed to provide information for each individual proposed structural BMP)

Discussion (as needed):

Runoff from walkways and alley of the private property are directed to in-ground biofiltration planters for the treatment of the Design Capture Volumes.

See BMP details provided in Attachment 4.

Form I-6 Page 4 of 21
Structural BMP Summary Information **(Copy this page as needed to provide information for each individual proposed structural BMP)**
Structural BMP ID Nos. **A2, A3, A4, and A5**
Construction Plan Sheet No.: **WQMP DMA EXHIBIT, SHT C9 OF VTM**
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) ☐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 manual)	**To be determined in final engineering.**
Who will be the final owner of this BMP?	**North County Transit District**
Who will maintain this BMP into perpetuity?	**North County Transit District**
What is the funding mechanism for maintenance?	**North County Transit District**

Structural BMP Summary Information

(Copy this page as needed to provide information for each individual proposed structural BMP)

Discussion (as needed):

Runoff from the rooftops are directed to raised biofiltration planters located on the amenity deck and balconies for the treatment of the Design Capture Volumes.

See BMP details provided in Attachment 4.

Form I-6 Page 6 of 21	
Structural BMP Summary Information **(Copy this page as needed to provide information for each individual proposed structural BMP)**	
Structural BMP ID No. **A6**	
Construction Plan Sheet No.: **WQMP DMA EXHIBIT, SHT C9 OF VTM**	
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) ☐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 manual)	**To be determined in final engineering.**
Who will be the final owner of this BMP?	**North County Transit District**
Who will maintain this BMP into perpetuity?	**North County Transit District**
What is the funding mechanism for maintenance?	**North County Transit District**

Structural BMP Summary Information

(Copy this page as needed to provide information for each individual proposed structural BMP)

Discussion (as needed):

Runoff from the amenity deck and valet drop off are directed to a biofiltration proprietary unit for the treatment of the Design Capture Volumes. The unit uses a flow-based design and is classified as a "proprietary biofiltration" (BF-3). The unit is a vault-underground type located in the valet drop area.

See BMP details provided in Attachment 4.

Structural BMP Summary Information

(Copy this page as needed to provide information for each individual proposed structural BMP)

Structural BMP ID No. **B1, B2, B3, B4, and B5**

Construction Plan Sheet No.: **WQMP DMA EXHIBIT & SHEET C9 & C10 OF VTM**

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)

☐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 manual)	**To be determined in final engineering.**
Who will be the final owner of this BMP?	**North County Transit District**
Who will maintain this BMP into perpetuity?	**North County Transit District**
What is the funding mechanism for maintenance?	**North County Transit District**

Structural BMP Summary Information

(Copy this page as needed to provide information for each individual proposed structural BMP)

Discussion (as needed):

Runoff from the rooftops are directed to raised biofiltration planters located on the amenity deck for the treatment of the Design Capture Volumes.

See BMP details provided in Attachment 4.

Structural BMP Summary Information
(Copy this page as needed to provide information for each individual proposed structural BMP)

Structural BMP ID No. **B6**

Construction Plan Sheet No.: **WQMP DMA EXHIBIT & SHEET C9 OF VTM**

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)

☐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 manual)	**To be determined in final engineering.**
Who will be the final owner of this BMP?	**North County Transit District**
Who will maintain this BMP into perpetuity?	**North County Transit District**
What is the funding mechanism for maintenance?	**North County Transit District**

Structural BMP Summary Information

(Copy this page as needed to provide information for each individual proposed structural BMP)

Discussion (as needed):

Runoff from the amenity deck is directed to a biofiltration proprietary unit for the treatment of the Design Capture Volumes. The unit uses a flow-based design and is classified as a "proprietary biofiltration" (BF-3). The unit is an open-top type located in the planter area in front of the building.

See BMP details provided in Attachment 4.

Form I-6 Page 12 of 21	
Structural BMP Summary Information **(Copy this page as needed to provide information for each individual proposed structural BMP)**	
Structural BMP ID Nos. **C1, C2, C4, C5, C6, C7, and C8**	
Construction Plan Sheet No.: **WQMP DMA EXHIBIT & SHEET C10 OF VTM**	
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) ☐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 manual)	**To be determined in final engineering.**
Who will be the final owner of this BMP?	**North County Transit District**
Who will maintain this BMP into perpetuity?	**North County Transit District**
What is the funding mechanism for maintenance?	**North County Transit District**

Structural BMP Summary Information

(Copy this page as needed to provide information for each individual proposed structural BMP)

Discussion (as needed):

Runoff from the rooftops are directed to raised biofiltration planters located on the amenity deck for the treatment of the Design Capture Volumes.

See BMP details provided in Attachment 4.

Form I-6 Page 14 of 21
Structural BMP Summary Information **(Copy this page as needed to provide information for each individual proposed structural BMP)**
Structural BMP ID No. **C3 and C11**
Construction Plan Sheet No.: **WQMP DMA EXHIBIT & SHEET C10 OF VTM**
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) ☐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 manual)	**To be determined in final engineering.**
Who will be the final owner of this BMP?	**North County Transit District**
Who will maintain this BMP into perpetuity?	**North County Transit District**
What is the funding mechanism for maintenance?	**North County Transit District**

Structural BMP Summary Information

(Copy this page as needed to provide information for each individual proposed structural BMP)

Discussion (as needed):

Runoff from the amenity deck is directed to two separate biofiltration proprietary units for the treatment of the Design Capture Volumes. The units use a flow-based design and is classified as a "proprietary biofiltration" (BF-3). The units are an open-top type located in the planter areas in front of the building.

See BMP details provided in Attachment 4.

Structural BMP Summary Information
(Copy this page as needed to provide information for each individual proposed structural BMP)

Structural BMP ID Nos. **C9 and C10**

Construction Plan Sheet No.: **WQMP DMA EXHIBIT & SHEET C10 OF VTM**

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)

☐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 manual)	**To be determined in final engineering.**
Who will be the final owner of this BMP?	**North County Transit District**
Who will maintain this BMP into perpetuity?	**North County Transit District**
What is the funding mechanism for maintenance?	**North County Transit District**

Structural BMP Summary Information

(Copy this page as needed to provide information for each individual proposed structural BMP)

Discussion (as needed):

Runoff from walkways, alley, and bus terminal of the private property are directed to in-ground biofiltration planters for the treatment of the Design Capture Volumes.

See BMP details provided in Attachment 4.

Structural BMP Summary Information
(Copy this page as needed to provide information for each individual proposed structural BMP)

Structural BMP ID No. **D1 and D11**

Construction Plan Sheet No.: **WQMP DMA EXHIBIT & SHEET C9 OF VTM**

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)

☐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 manual)	**To be determined in final engineering.**
Who will be the final owner of this BMP?	**North County Transit District**
Who will maintain this BMP into perpetuity?	**North County Transit District**
What is the funding mechanism for maintenance?	**North County Transit District**

Structural BMP Summary Information

(Copy this page as needed to provide information for each individual proposed structural BMP)

Discussion (as needed):

Runoff from the top floor of the existing parking structure and new parking structure next to the hotel are directed to two separate biofiltration proprietary units for the treatment of the Design Capture Volumes. The units use a flow-based design and are classified as a "proprietary biofiltration" (BF-3). Both are open-top type located in planter areas. One of the units is located just outside the southeast corner of the existing parking structure. The other is located just outside the southeast corner of the new office building.

See BMP details provided in Attachment 4.

Form I-6 Page 20 of 21	
Structural BMP Summary Information **(Copy this page as needed to provide information for each individual proposed structural BMP)**	
Structural BMP ID Nos. **D2, D3, D4, D5, D6, D7, D8, D9, and D10**	
Construction Plan Sheet No.: **WQMP DMA EXHIBIT; SHEET C9 & C10 OF VTM**	
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) ☐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 manual)	**To be determined in final engineering.**
Who will be the final owner of this BMP?	**North County Transit District**
Who will maintain this BMP into perpetuity?	**North County Transit District**
What is the funding mechanism for maintenance?	**North County Transit District**

Structural BMP Summary Information

(Copy this page as needed to provide information for each individual proposed structural BMP)

Discussion (as needed):

Runoff from building rooftops, walkways, and plazas are directed to in-ground biofiltration planters for the treatment of the Design Capture Volumes.

See BMP details provided in Attachment 4.

	City of Oceanside 300 N Coast Highway Oceanside, CA 92054	**Permanent BMP Construction** **Self Certification Form**	February 2016

Date Prepared: Click here to enter text.	Project No.: Click here to enter text.
Project Applicant: Click here to enter text.	Phone: Click here to enter text.
Project Address: Click here to enter text.	
Project Engineer: Click here to enter text.	Phone: Click here to enter text.

The purpose of this form is to verify that the site improvements for the project, identified above, have been constructed in conformance with the approved Storm Water Quality Management Plan (SWQMP) documents and drawings.

This form must be completed by the engineer and installing contractor and submitted prior to final inspection of the construction permit. Completion and submittal of this form is required for all new development and redevelopment projects in order to comply with the City's Storm Water ordinances and NDPES Permit Order No. R9-2013-0001. Final inspection for occupancy and/or release of grading or public improvement bonds may be delayed if this form is not submitted and approved by the City of Oceanside.

ENGINEER'S CERTIFICATION:

As the professional in responsible charge for the design of the above project, I certify that I have inspected all constructed Low Impact Development (LID) site design, source control and treatment control BMP's required per the approved SWQMP and Construction Permit No. Click here to enter text.; and that said BMP's have been constructed in compliance with the approved plans and all applicable specifications, permits, ordinances and Order No. R9-2013-0001 of the San Diego Regional Water Quality Control Board.

I understand that this BMP certification statement does not constitute an operation and maintenance verification.

Signature: _____

Date of Signature: _ Click here to enter text.___

Printed Name: _ Click here to enter text._____

Title: _ Click here to enter text._____

Phone No. _ Click here to enter text. _____

Engineer's Stamp

CONTRACTOR'S CERTIFICATION:

As the professional in responsible charge for construction of the above project, I certify that all constructed Low Impact Development (LID) site design, source control and treatment control BMP's required per the approved SWQMP and Construction Permit No. Click here to enter text.; have been constructed in compliance with the approved plans and all applicable specifications, permits, and ordinances.

I understand that this BMP certification statement does not constitute an operation and maintenance verification.

Signature: _____

Date of Signature: _ Click here to enter text.___

Printed Name: _ Click here to enter text._____

Title: _ Click here to enter text._____

Phone No. _ Click here to enter text. _____

ATTACHMENT 1

BACKUP FOR PDP POLLUTANT CONTROL BMPS

Indicate which Items are Included:

Attachment Sequence	Contents	Checklist
Attachment 1a	DMA Exhibit (Required) See DMA Exhibit Checklist.	☒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	Design Capture Volume Worksheet	☒Included
Attachment 1d	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 1e	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 1f	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

ATTACHMENT 1a

DMA EXHIBIT

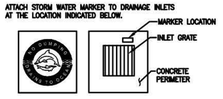
Use this checklist to ensure the required information has been included on the DMA Exhibit:

The DMA Exhibit must identify:

☒Underlying hydrologic soil group
☒Approximate depth to groundwater
☐Existing natural hydrologic features (watercourses, seeps, springs, wetlands)
☐Critical coarse sediment yield areas to be protected
☒Existing topography and impervious areas
☒Existing and proposed site drainage network and connections to drainage offsite
☒Proposed grading
☒Proposed impervious features
☒Proposed design features and surface treatments used to minimize imperviousness
☒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)
☒Potential pollutant source areas and corresponding required source controls (see Chapter 4, Appendix E.1, and Form I-3B)
☒Structural BMPs (identify location, type of BMP, and size/detail)

SOURCE CONTROL BMPs

A. ATTACH STORM WATER MARKER TO DRAINAGE INLETS AT THE LOCATION INDICATED BELOW.



B. TRASH ENCLOSURE TO BE PAVED. AND ALL TRASH CONTAINERS SHALL BE LEAK PROOF WITH ATTACHED COVERS.

C. INLETS SHALL BE INSPECTED FOR DEBRIS ON A MONTHLY BASIS. SEDIMENT AND SLUDGE SHALL BE REMOVED ON A BI-ANNUAL BASIS.

D. FACILITY TO BE MAINTAINED PER MANUFACTURER RECOMMENDATIONS PROVIDED IN APPENDIX F AND PER GUIDELINES OUTLINED ON PAGE 1-31 OF THIS PWQMP.

BMP SUMMARY TABLE (FLOW BASED)

DMA	BMP TYPE	DESCRIPTION	REQUIRED WATER QUALITY TREATMENT FLOW RATE (CFS)	PROVIDED WATER QUALITY TREATMENT FLOW RATE (CFS)	MWS TREATMENT FLOWRATE (CFS)	MWS TYPE (OPEN OR UNDERGROUND)	BMP LOCATION
A6	STUCTURAL	MODULAR WETLAND SYSTEM UNIT (MWS-L-4-8)	0.078	0.115	0.115	Underground	At-grade in pavement
B6	STUCTURAL	MODULAR WETLAND SYSTEM UNIT (MWS-L-4-8)	0.088	0.115	0.115	Open	At-grade in planter
C3	STUCTURAL	MODULAR WETLAND SYSTEM UNIT (MWS-L-4-8)	0.076	0.115	0.115	Open	At-grade in planter
C11	STUCTURAL	MODULAR WETLAND SYSTEM UNIT (MWS-L-4-4)	0.021	0.052	0.052	Open	At-grade in planter
D1	STUCTURAL	MODULAR WETLAND SYSTEM UNIT (MWS-L-8-16)	0.348	0.462	0.462	Open	At-grade in planter
D11	STUCTURAL	MODULAR WETLAND SYSTEM UNIT (MWS-L-8-8)	0.175	0.230	0.230	Open	At-grade in planter

SEAGAZE DR.

S. TREMONT ST.

TOPEKA ST.

OFFSITE DRAINAGE

MICHIGAN AVE.

MISSOURI AVE.

S. CLEVELAND ST.

EXISTING PARKING STRUCTURE

AT & SF RAILROAD

FIR ST.

POOL

SPA

Proposed Grass Crete or Pervious Pavers

ALLEY A=3490sf See DMA E16

DMA A1 A=16084sf req=478sf prov=479sf (includes alley (10701 SF) and intersection (5383 SF) draining away from project) Per proposed condition hydrology map, approximately 3.2 acres offsite area drains to A1 BMP.

DMA E16 A=4710sf+3490+6114sf A=14314sf req=390sf prov=480sf (includes Missouri Ave (4710 SF), alley (3490 SF) and intersection (6114 SF) draining away from project) Per proposed condition hydrology map, approximately 1.8 acres offsite area drains to DMA E16 BMPs.

INTERSECTION DRAINING AWAY FROM PROJECT A=6144sf See DMA E16

DMA A2 A=8277sf req=230 sf prov=792 sf

DMA A3 A=8939sf req=250 sf prov=623 sf

DMA A4 A=10079sf req=280 sf prov=306 sf

DMA A5 A=4473sf req=130sf prov=183sf

DMA A6 A=12539sf Qtreat=0.08cfs MWS-L-4-8

DMA A7 A=1539sf req=42sf prov=45sf

DMA A8 A=1222sf req=33sf prov=60sf

DMA A9 A=2529sf req=70sf prov=71sf

DMA A10 A=1599sf req=50sf prov=68sf

DMA B1 A=13288sf req=360 sf prov=366 sf

DMA B2 A=12628sf req=370 sf prov=380 sf

DMA B3 A=2702sf req=80sf prov=80sf

DMA B4 A=5456sf req=150 sf prov=150 sf

DMA B5 A=28517 sf req=792 sf prov=794 sf

DMA B6 AMENITY DECK A=14233sf Qtreat=0.09cfs MWS-L-4-8

DMA C1 A=11736 sf req=320 sf prov=430 sf

DMA C2 A=11692 sf req= 316sf prov=319sf

DMA C3 AMENITY DECK A=12394sf Qtreat=0.08cfs MWS-L-4-8

DMA C4 A=9292 sf req=530 sf prov=616 sf

DMA C5 A=3204sf req=90sf prov=160sf

DMA C6 A=7422sf req=210sf prov=263sf

DMA C7 A=8754sf req=240sf prov=254sf

DMA C8 A=6615sf req=180sf prov=195sf

DMA C9 A=57349 sf req= 1550sf prov=1600sf

DMA C10 A=1209sf req=40sf prov=137sf

DMA C11 AMENITY DECK A=3400sf Qtreat=0.02cfs MWS-L-4-4

DMA D1 A=56117sf Qtreat=0.35cfs MWS-L-8-12

DMA D2 A=1163sf req=40sf prov=88sf

DMA D3 A=9477sf req=260sf prov=279sf

DMA D4 A=8816sf req=240sf prov=250sf

DMA D5 A=6363sf req=180sf prov=192sf

DMA D6 A=6454sf req=180sf prov=200sf

DMA D7 A=2802 sf req= 80sf prov=139sf

DMA D8 A=9550sf req=260sf prov=295sf

DMA D9 A=9197sf req=260sf prov=290sf

DMA D10 A=337sf req=10sf prov=47sf

DMA E1 A=8917sf req=250sf prov=280sf

DMA E2 A=12965sf req=360sf prov=360sf

DMA E3 A=4770sf req=130sf prov=200sf

DMA E4 A=4720sf req=130sf prov=303sf

DMA E5 A=1941sf req=60sf prov=120sf

DMA E6 A=5155sf req=140sf prov=575sf

DMA E7 A=6440sf req=180sf prov=205sf

DMA E8 A=12054sf req=330sf prov=333sf

DMA E9 A=5776sf req=160sf prov=165sf

DMA E10 A=24492sf req=670sf prov=800sf

DMA E11 A=5864sf req=160sf prov=355sf

DMA E12 A=2580sf req=70sf prov=72sf

DMA E13 A=10398sf req=290sf prov=300sf

DMA E14 A=3795sf req=110sf prov=149sf

DMA E15 A=5164sf req=140sf prov=338sf

BMP SUMMARY TABLE (VOLUME BASED)

DMA ID	BMP TYPE	DESCRIPTION	DMA AREA (SF)	REQUIRED SURFACE AREA (SF)	PROVIDED SURFACE AREA (SF)	NEW OR RETROFITTED LANDSCAPE	VERTICAL WALL OR SIDE-SLOPED	SURFACE OR PIPED TO BMP
A1	GREEN STREET	TREE WELLS	16084	478	479	NEW	VERTICAL WALL	SURFACE
A2	STUCTURAL	BIOFILTRATION PLANTER	8277	230	792	NEW	VERTICAL WALL	PIPED
A3	STUCTURAL	BIOFILTRATION PLANTER	8939	250	263	NEW	VERTICAL WALL	PIPED
A4	STUCTURAL	BIOFILTRATION PLANTER	10079	280	306	NEW	VERTICAL WALL	PIPED
A5	STUCTURAL	BIOFILTRATION PLANTER	4473	130	183	NEW	VERTICAL WALL	PIPED
A7	STUCTURAL	BIOFILTRATION PLANTER	1539	42	45	RETROFIT	VERTICAL WALL	SURFACE
A8	STUCTURAL	BIOFILTRATION PLANTER	1222	33	60	RETROFIT	VERTICAL WALL	SURFACE
A9	STUCTURAL	BIOFILTRATION PLANTER	2529	70	71	RETROFIT	VERTICAL WALL	SURFACE
A10	STUCTURAL	BIOFILTRATION PLANTER	1599	50	68	RETROFIT	VERTICAL WALL	SURFACE
B1	STUCTURAL	BIOFILTRATION PLANTER	13288	360	366	NEW	VERTICAL WALL	PIPED
B2	STUCTURAL	BIOFILTRATION PLANTER	12628	370	380	NEW	VERTICAL WALL	PIPED
B3	STUCTURAL	BIOFILTRATION PLANTER	2702	80	80	NEW	VERTICAL WALL	PIPED
B4	STUCTURAL	BIOFILTRATION PLANTER	5456	150	150	NEW	VERTICAL WALL	PIPED
B5	STUCTURAL	BIOFILTRATION PLANTER	28517	792	794	NEW	VERTICAL WALL	PIPED
C1	STUCTURAL	BIOFILTRATION PLANTER	11736	320	430	NEW	VERTICAL WALL	PIPED
C2	STUCTURAL	BIOFILTRATION PLANTER	11692	316	319	NEW	VERTICAL WALL	PIPED
C4	STUCTURAL	BIOFILTRATION PLANTER	19292	530	616	NEW	VERTICAL WALL	PIPED
C5	STUCTURAL	BIOFILTRATION PLANTER	3204	90	160	NEW	VERTICAL WALL	PIPED
C6	STUCTURAL	BIOFILTRATION PLANTER	7422	210	263	NEW	VERTICAL WALL	PIPED
C7	STUCTURAL	BIOFILTRATION PLANTER	8754	240	254	NEW	VERTICAL WALL	PIPED
C8	STUCTURAL	BIOFILTRATION PLANTER	6615	180	195	NEW	VERTICAL WALL	PIPED
C9	STUCTURAL	BIOFILTRATION PLANTER	57349	1550	1600	NEW	VERTICAL WALL	SURFACE
C10	STUCTURAL	BIOFILTRATION PLANTER	1209	40	162	NEW	VERTICAL WALL	SURFACE

BMP SUMMARY TABLE (VOLUME BASED)

DMA	BMP TYPE	DESCRIPTION	DMA AREA (SF)	REQUIRED SURFACE AREA (SF)	PROVIDED SURFACE AREA (SF)	NEW OR RETROFITTED LANDSCAPE	VERTICAL WALL OR SIDE-SLOPED BMP	SURFACE OR PIPED TO BMP
D2	STUCTURAL	BIOFILTRATION PLANTER	1163	40	242	NEW	VERTICAL WALL	SURFACE
D3	STUCTURAL	BIOFILTRATION PLANTER	9477	260	522	NEW	VERTICAL WALL	PIPED
D4	STUCTURAL	BIOFILTRATION PLANTER	8816	240	242	NEW	VERTICAL WALL	SURFACE
D5	STUCTURAL	BIOFILTRATION PLANTER	6363	180	325	NEW	VERTICAL WALL	SURFACE/PIPED
D6	STUCTURAL	BIOFILTRATION PLANTER	6454	180	370	NEW	VERTICAL WALL	PIPED
D7	STUCTURAL	BIOFILTRATION PLANTER	2802	80	118	NEW	VERTICAL WALL	SURFACE
D8	STUCTURAL	BIOFILTRATION PLANTER	9550	260	295	NEW	VERTICAL WALL	SURFACE/PIPED
D9	STUCTURAL	BIOFILTRATION PLANTER	9197	250	290	NEW	VERTICAL WALL	SURFACE
D10	STUCTURAL	BIOFILTRATION PLANTER	337	10	47	NEW	VERTICAL WALL	PIPED
E1	GREEN STREET	TREE WELLS	8917	250	280	NEW	VERTICAL WALL	SURFACE
E2	GREEN STREET	TREE WELLS	12965	360	360	NEW	VERTICAL WALL	SURFACE
E3	GREEN STREET	TREE WELLS	4770	130	200	NEW	VERTICAL WALL	SURFACE
E4	GREEN STREET	TREE WELLS	4720	130	303	NEW	VERTICAL WALL	SURFACE
E5	GREEN STREET	TREE WELLS	1941	60	120	NEW	VERTICAL WALL	SURFACE
E6	GREEN STREET	TREE WELLS	5155	140	575	NEW	VERTICAL WALL	SURFACE
E7	GREEN STREET	TREE WELLS	6440	180	205	NEW	VERTICAL WALL	SURFACE
E8	GREEN STREET	TREE WELLS	12054	330	333	NEW	VERTICAL WALL	SURFACE
E9	GREEN STREET	TREE WELLS	5776	160	165	NEW	VERTICAL WALL	SURFACE
E10	GREEN STREET	TREE WELLS	24492	670	800	NEW	VERTICAL WALL	SURFACE
E11	GREEN STREET	TREE WELLS	5864	160	355	NEW	VERTICAL WALL	SURFACE
E12	GREEN STREET	TREE WELLS	2580	70	72	NEW	VERTICAL WALL	SURFACE
E13	GREEN STREET	TREE WELLS	10398	290	300	NEW	VERTICAL WALL	SURFACE
E14	GREEN STREET	TREE WELLS	3795	110	149	NEW	VERTICAL WALL	SURFACE
E15	GREEN STREET	TREE WELLS	5164	140	338	NEW	VERTICAL WALL	SURFACE
E16	GREEN STREET	TREE WELLS	14314	390	480	NEW	VERTICAL WALL	SURFACE

LEGEND

- DMA BOUNDARY
- PERVIOUS LANDSCAPE
- IN GROUND BIO FILTRATION PLANTER
- RAISED BIO FILTRATION PLANTER
- PROPRIETARY BIO FILTRATION UNIT
- TREE WELL
- PROPOSED CURB INLET WITH PLACARD
- RIGHT OF WAY BOUNDARY
- PROJECT BOUNDARY
- LIMITS OF DRAINAGE BOUNDARY

NOTES:

1. HYDROLOGIC SOIL GROUP IS TYPE A.
2. APPROXIMATE GROUNDWATER DEPTH IS GREATER THAN 20 FT.
3. PROPOSED STORM DRAIN SHALL BE MONITORED AND INSPECTED TO AVOID ILLICIT DISCHARGES.
4. TRASH STORAGE AREAS AND RECEPTACLES WILL HAVE COVERS TO AVOID CONTAMINATION OF RUNOFF AND ELIMINATE DISPERSION OF TRASH AND DEBRIS.
5. ROOF PLANS NOT AVAILABLE AT THIS STAGE OF THE PROJECT AND ENGINEERING JUDGEMENT WAS USED TO DELINEATE ROOF DRAIN MANAGEMENT AREAS. REFINEMENT OF DRAINAGE MANAGEMENT AREAS WILL BE COMPLETED DURING THE ENGINEERING PHASE.

S-BMP Structural BMP

LID-BMP Low Impact Development BMP

SSD-BMP Significant Site Design BMP

GI-BMP Green Infrastructure BMP

GRAPHIC SCALE

40 0 20 40 80 160

(IN FEET)
1 inch = 40 ft.

Stantec

Toll Brothers APARTMENT LIVING

NCTD OCEANSIDE TRANSIT CENTER
235 S. TREMONT AVENUE
WQMP DMA EXHIBIT
CITY OF OCEANSIDE, CALIFORNIA

PROJECT NO. 2042 577600

SHEET 1 OF 1

JUNE 10, 2024

DRAWING: o:\204217900\drawing\exhibit_files\217900c-ex-7026.dwg PLOTTED: 8/9/2024 12:38 PM BY: Elizondo, Christian

S. COAST HIGHWAY

SEAGAZE DR.

TOPEKA ST.

MICHIGAN AVE.

MISSOURI AVE.

S. TREMONT ST.

S. TREMONT ST.

DMA A1

DMA E16

S. CLEVELAND ST.

S. CLEVELAND ST.

S. CLEVELAND ST.

S. CLEVELAND ST.

DB1

DB2

AT&SF RAILWAY

EX. 15" RCP

S. MYERS ST.

1ST ST.

TYSON ST.

FIR ST.

LEGEND

- EXISTING STORM DRAIN
- PROPERTY LINE
- OFFSITE TRIBUTARY AREA TO DMA A1
- OFFSITE TRIBUTARY AREA TO DMA E16
- DRAINAGE FLOW DIRECTION

GRAPHIC SCALE

50 0 25 50 100 400

(IN FEET)

1 inch = 50 ft.

Stantec

Toll Brothers APARTMENT LIVING

NCTD OCEANSIDE TRANSIT CENTER TOD
235 S. TREMONT AVENUE
OFFSITE AREA TRIBUTARY TO DMA A1 & E16

PROJECT NO. 2042217900

SHEET 1 OF 1

JUNE 14, 2024

DRAWING: c:\2042217900\Drawing\exhibit_files\2217900C-ex7028.dwg PLOTTED: 6/14/2024 11:30 AM BY: Ramirez, Nayid

ATTACHMENT 1b

TABULAR SUMMARY OF DMAs

Placeholder – **Tabular Summary of DMAs (if separate from DMA Exhibit)**

Leave placeholder intact if not applicable.

☐Not Applicable – Tabular Summary included on DMA Exhibit

BMP SUMMARY TABLE (VOLUME BASED)

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BMP SUMMARY TABLE (VOLUME BASED)

DMA	BMP TYPE	DESCRIPTION	DMA AREA (SF)	REQUIRED SURFACE AREA (SF)	PROVIDED SURFACE AREA (SF)	NEW OR RETROFITTED LANDSCAPE	VERTICAL WALL OR SIDE-SLOPED BMP	SURFACE OR PIPED TO BMP
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D5	STUCTURAL	BIOFILTRATION PLANTER	6363	180	325	NEW	VERTICAL WALL	SURFACE/PIPED
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D9	STUCTURAL	BIOFILTRATION PLANTER	9197	250	290	NEW	VERTICAL WALL	SURFACE
D10	STUCTURAL	BIOFILTRATION PLANTER	337	10	47	NEW	VERTICAL WALL	PIPED
E1	GREEN STREET	TREE WELLS	8917	250	280	NEW	VERTICAL WALL	SURFACE
E2	GREEN STREET	TREE WELLS	12965	360	360	NEW	VERTICAL WALL	SURFACE
E3	GREEN STREET	TREE WELLS	4770	130	200	NEW	VERTICAL WALL	SURFACE
E4	GREEN STREET	TREE WELLS	4720	130	303	NEW	VERTICAL WALL	SURFACE
E5	GREEN STREET	TREE WELLS	1941	60	120	NEW	VERTICAL WALL	SURFACE
E6	GREEN STREET	TREE WELLS	5155	140	575	NEW	VERTICAL WALL	SURFACE
E7	GREEN STREET	TREE WELLS	6440	180	205	NEW	VERTICAL WALL	SURFACE
E8	GREEN STREET	TREE WELLS	12054	330	333	NEW	VERTICAL WALL	SURFACE
E9	GREEN STREET	TREE WELLS	5776	160	165	NEW	VERTICAL WALL	SURFACE
E10	GREEN STREET	TREE WELLS	24492	670	800	NEW	VERTICAL WALL	SURFACE
E11	GREEN STREET	TREE WELLS	5864	160	355	NEW	VERTICAL WALL	SURFACE
E12	GREEN STREET	TREE WELLS	2580	70	72	NEW	VERTICAL WALL	SURFACE
E13	GREEN STREET	TREE WELLS	10398	290	300	NEW	VERTICAL WALL	SURFACE
E14	GREEN STREET	TREE WELLS	3795	110	149	NEW	VERTICAL WALL	SURFACE
E15	GREEN STREET	TREE WELLS	5164	140	338	NEW	VERTICAL WALL	SURFACE
E16	GREEN STREET	TREE WELLS	14314	390	480	NEW	VERTICAL WALL	SURFACE

BMP SUMMARY TABLE (FLOW BASED)

DMA	BMP TYPE	DESCRIPTION	REQUIRED WATER QUALITY TREATMENT FLOW RATE (CFS)	PROVIDED WATER QUALITY TREATMENT FLOW RATE (CFS)	MWS TREATMENT FLOWRATE (CFS)	MWS TYPE (OPEN OR UNDERGROUND)	BMP LOCATION
A6	STUCTURAL	MODULAR WETLAND SYSTEM UNIT (MWS-L-4-8)	0.078	0.115	0.115	Underground	At-grade in pavement
B6	STUCTURAL	MODULAR WETLAND SYSTEM UNIT (MWS-L-4-8)	0.088	0.115	0.115	Open	At-grade in planter
C3	STUCTURAL	MODULAR WETLAND SYSTEM UNIT (MWS-L-4-8)	0.076	0.115	0.115	Open	At-grade in planter
C11	STUCTURAL	MODULAR WETLAND SYSTEM UNIT (MWS-L-4-4)	0.021	0.052	0.052	Open	At-grade in planter
D1	STUCTURAL	MODULAR WETLAND SYSTEM UNIT (MWS-L-8-16)	0.348	0.462	0.462	Open	At-grade in planter
D11	STUCTURAL	MODULAR WETLAND SYSTEM UNIT (MWS-L-8-8)	0.175	0.230	0.230	Open	At-grade in planter

ATTACHMENT 1c

DESIGN CAPTURE VOLUME WORKSHEETS

Automated Worksheet B.1: Calculation of Design Capture Volume (V2.0)

Category	#	Description	*i*	*ii*	*iii*	*iv*	*v*	*vi*	*vii*	*viii*	*ix*	*x*	Units
Standard Drainage Basin Inputs	1	Drainage Basin ID or Name	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	unitless
	2	85th Percentile 24-hr Storm Depth	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	inches
	3	Impervious Surfaces Not Directed to Dispersion Area (C=0.90)	16,084	8,277	8,939	10,079	4,473	12,539	1,539	1,222	2,529	1,599	sq-ft
	4	Semi-Pervious Surfaces Not Serving as Dispersion Area (C=0.30)											sq-ft
	5	Engineered Pervious Surfaces Not Serving as Dispersion Area (C=0.10)											sq-ft
	6	Natural Type A Soil Not Serving as Dispersion Area (C=0.10)											sq-ft
	7	Natural Type B Soil Not Serving as Dispersion Area (C=0.14)											sq-ft
	8	Natural Type C Soil Not Serving as Dispersion Area (C=0.23)											sq-ft
	9	Natural Type D Soil Not Serving as Dispersion Area (C=0.30)											sq-ft
Dispersion Area, Tree Well & Rain Barrel Inputs (Optional)	10	Does Tributary Incorporate Dispersion, Tree Wells, and/or Rain Barrels?	No	No	No	No	No	No	No	No	No	No	yes/no
	11	Impervious Surfaces **Directed to Dispersion Area** per SD-B (Ci=0.90)											sq-ft
	12	Semi-Pervious Surfaces **Serving as Dispersion Area** per SD-B (Ci=0.30)											sq-ft
	13	Engineered Pervious Surfaces **Serving as Dispersion Area** per SD-B (Ci=0.10)											sq-ft
	14	Natural Type A Soil **Serving as Dispersion Area** per SD-B (Ci=0.10)											sq-ft
	15	Natural Type B Soil **Serving as Dispersion Area** per SD-B (Ci=0.14)											sq-ft
	16	Natural Type C Soil **Serving as Dispersion Area** per SD-B (Ci=0.23)											sq-ft
	17	Natural Type D Soil **Serving as Dispersion Area** per SD-B (Ci=0.30)											sq-ft
	18	Number of Tree Wells Proposed per SD-A											#
	19	Average Mature Tree Canopy Diameter											ft
	20	Number of Rain Barrels Proposed per SD-E											#
	21	Average Rain Barrel Size											gal
Initial Runoff Factor Calculation	22	Total Tributary Area	16,084	8,277	8,939	10,079	4,473	12,539	1,539	1,222	2,529	1,599	sq-ft
	23	Initial Runoff Factor for Standard Drainage Areas	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	unitless
	24	Initial Runoff Factor for Dispersed & Dispersion Areas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	unitless
	25	Initial Weighted Runoff Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	unitless
	26	Initial Design Capture Volume	712	366	396	446	198	555	68	54	112	71	cubic-feet
Dispersion Area Adjustments	27	Total Impervious Area Dispersed to Pervious Surface	0	0	0	0	0	0	0	0	0	0	sq-ft
	28	Total Pervious Dispersion Area	0	0	0	0	0	0	0	0	0	0	sq-ft
	29	Ratio of Dispersed Impervious Area to Pervious Dispersion Area	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	ratio
	30	Adjustment Factor for Dispersed & Dispersion Areas	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	ratio
	31	Runoff Factor After Dispersion Techniques	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	unitless
	32	Design Capture Volume After Dispersion Techniques	712	366	396	446	198	555	68	54	112	71	cubic-feet
Tree & Barrel Adjustments	33	Total Tree Well Volume Reduction	0	0	0	0	0	0	0	0	0	0	cubic-feet
	34	Total Rain Barrel Volume Reduction	0	0	0	0	0	0	0	0	0	0	cubic-feet
Results	35	Final Adjusted Runoff Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	unitless
	36	Final Effective Tributary Area	14,476	7,449	8,045	9,071	4,026	11,285	1,385	1,100	2,276	1,439	sq-ft
	37	Initial Design Capture Volume Retained by Site Design Elements	0	0	0	0	0	0	0	0	0	0	cubic-feet
	38	Final Design Capture Volume Tributary to BMP	712	366	396	446	198	555	68	54	112	71	cubic-feet

No Warning Messages

Automated Worksheet B.2: Retention Requirements (V2.0)

Category	#	Description	*i*	*ii*	*iii*	*iv*	*v*	*vi*	*vii*	*viii*	*ix*	*x*	Units
Basic Analysis	1	Drainage Basin ID or Name	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	unitless
	2	85th Percentile Rainfall Depth	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	inches
	3	Predominant NRCS Soil Type Within BMP Location	A	A	A	A	A	A	A	A	A	A	unitless
	4	Is proposed BMP location Restricted or Unrestricted for Infiltration Activities?	Restricted	Restricted	Restricted	Restricted	Restricted	Restricted	Restricted	Restricted	Restricted	Restricted	unitless
	5	Nature of Restriction	Other	Other	Other	Other	Other	Other	Other	Other	Other	Other	unitless
	6	Do Minimum Retention Requirements Apply to this Project?	No	No	No	No	No	No	No	No	No	No	yes/no
	7	Are Habitable Structures Greater than 9 Stories Proposed?	No	No	No	No	No	No	No	No	No	No	yes/no
Advanced Analysis	8	Has Geotechnical Engineer Performed an Infiltration Analysis?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	yes/no
	9	Design Infiltration Rate Recommended by Geotechnical Engineer	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	in/hr
Result	10	Design Infiltration Rate Used To Determine Retention Requirements	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	in/hr
	11	Percent of Average Annual Runoff that Must be Retained within DMA	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	percentage
	12	Fraction of DCV Requiring Retention	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ratio
	13	Required Retention Volume	0	0	0	0	0	0	0	0	0	0	cubic-feet

Attention!

-Retention requirements have been omitted in these calculations. Such an omission is only be acceptable for Green Street projects or projects that submit supplemental calculations demonstrating retention requirements are satisfied at the project-level.

Automated Worksheet B.3: BMP Performance (V2.0)

* PROPRIETARY BIOFILTRATION UNIT. SEE WATER QUALITY TREATMENT FLOW RATE TABLE.

Category	#	Description	*i*	*ii*	*iii*	*iv*	*v*	*vi*	*vii*	*viii*	*ix*	*x*	Units
BMP Inputs	1	Drainage Basin ID or Name	A1	A2	A3	A4	A5	A6*	A7	A8	A9	A10	sq-ft
	2	Design Infiltration Rate Recommended	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	in/hr
	3	Design Capture Volume Tributary to BMP	712	366	396	446	198	555	68	54	112	71	cubic-feet
	4	Is BMP Vegetated or Unvegetated?	Vegetated	Vegetated	Vegetated	Vegetated	Vegetated	Vegetated	Vegetated	Vegetated	Vegetated	Vegetated	unitless
	5	Is BMP Impermeably Lined or Unlined?	Lined	Lined	Lined	Lined	Lined	Lined	Lined	Lined	Lined	Lined	unitless
	6	Does BMP Have an Underdrain?	Underdrain	Underdrain	Underdrain	Underdrain	Underdrain	Underdrain	Underdrain	Underdrain	Underdrain	Underdrain	unitless
	7	Does BMP Utilize Standard or Specialized Media?	Standard	Standard	Standard	Standard	Standard	Standard	Standard	Standard	Standard	Standard	unitless
	8	Provided Surface Area	478	230	250	280	130	340	42	33	70	50	sq-ft
	9	Provided Surface Ponding Depth	6	6	6	6	6	6	6	6	6	6	inches
	10	Provided Soil Media Thickness	24	24	24	24	24	24	24	24	24	24	inches
	11	Provided Gravel Thickness (Total Thickness)	12	12	12	12	12	12	12	12	12	12	inches
	12	Underdrain Offset	3	3	3	3	3	3	3	3	3	3	inches
	13	Diameter of Underdrain or Hydromod Orifice (Select Smallest)	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	inches
	14	Specialized Soil Media Filtration Rate											in/hr
	15	Specialized Soil Media Pore Space for Retention											unitless
	16	Specialized Soil Media Pore Space for Biofiltration											unitless
	17	Specialized Gravel Media Pore Space											unitless
Retention Calculations	18	Volume Infiltrated Over 6 Hour Storm	0	0	0	0	0	0	0	0	0	0	cubic-feet
	19	Ponding Pore Space Available for Retention	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	unitless
	20	Soil Media Pore Space Available for Retention	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	unitless
	21	Gravel Pore Space Available for Retention (Above Underdrain)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	unitless
	22	Gravel Pore Space Available for Retention (Below Underdrain)	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	unitless
	23	Effective Retention Depth	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40	inches
	24	Fraction of DCV Retained (Independent of Drawdown Time)	0.13	0.13	0.13	0.13	0.13	0.12	0.12	0.12	0.13	0.14	ratio
	25	Calculated Retention Storage Drawdown Time	120	120	120	120	120	120	120	120	120	120	hours
	26	Efficacy of Retention Processes	0.15	0.15	0.15	0.15	0.15	0.14	0.14	0.14	0.15	0.16	ratio
	27	Volume Retained by BMP (Considering Drawdown Time)	107	55	60	67	30	78	10	8	17	11	cubic-feet
	28	Design Capture Volume Remaining for Biofiltration	605	311	336	379	168	477	58	46	95	60	cubic-feet
Biofiltration Calculations	29	Max Hydromod Flow Rate through Underdrain	1.6375	1.6375	1.6375	1.6375	1.6375	1.6375	1.6375	1.6375	1.6375	1.6375	cfs
	30	Max Soil Filtration Rate Allowed by Underdrain Orifice	147.99	307.57	282.96	252.64	544.16	208.06	1,684.30	2,143.65	1,010.58	1,414.81	in/hr
	31	Soil Media Filtration Rate per Specifications	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	in/hr
	32	Soil Media Filtration Rate to be used for Sizing	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	in/hr
	33	Depth Biofiltered Over 6 Hour Storm	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	inches
	34	Ponding Pore Space Available for Biofiltration	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	unitless
	35	Soil Media Pore Space Available for Biofiltration	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	unitless
	36	Gravel Pore Space Available for Biofiltration (Above Underdrain)	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	unitless
	37	Effective Depth of Biofiltration Storage	14.40	14.40	14.40	14.40	14.40	14.40	14.40	14.40	14.40	14.40	inches
	38	Drawdown Time for Surface Ponding	1	1	1	1	1	1	1	1	1	1	hours
	39	Drawdown Time for Effective Biofiltration Depth	3	3	3	3	3	3	3	3	3	3	hours
	40	Total Depth Biofiltered	44.40	44.40	44.40	44.40	44.40	44.40	44.40	44.40	44.40	44.40	inches
	41	Option 1 - Biofilter 1.50 DCV: Target Volume	907	466	504	568	252	715	88	70	143	89	cubic-feet
	42	Option 1 - Provided Biofiltration Volume	907	466	504	568	252	715	88	70	143	89	cubic-feet
	43	Option 2 - Store 0.75 DCV: Target Volume	453	233	252	284	126	358	44	35	71	45	cubic-feet
	44	Option 2 - Provided Storage Volume	453	233	252	284	126	358	44	35	71	45	cubic-feet
	45	Portion of Biofiltration Performance Standard Satisfied	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	ratio
Result	46	Do Site Design Elements and BMPs Satisfy Annual Retention Requirements?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	yes/no
	47	Overall Portion of Performance Standard Satisfied (BMP Efficacy Factor)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	ratio
	48	**Deficit of Effectively Treated Stormwater**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	cubic-feet

No Warning Messages

Automated Worksheet B.1: Calculation of Design Capture Volume (V2.0)

Category	#	Description	*i*	*ii*	*iii*	*iv*	*v*	*vi*	*vii*	*viii*	*ix*	*x*	Units
Standard Drainage Basin Inputs	1	Drainage Basin ID or Name	B1	B2	B3	B4	B5	B6					unitless
	2	85th Percentile 24-hr Storm Depth	0.59	0.59	0.59	0.59	0.59	0.59					inches
	3	Impervious Surfaces Not Directed to Dispersion Area (C=0.90)	13,288	12,628	2,702	5,456	28,517	14,233					sq-ft
	4	Semi-Pervious Surfaces Not Serving as Dispersion Area (C=0.30)											sq-ft
	5	Engineered Pervious Surfaces Not Serving as Dispersion Area (C=0.10)											sq-ft
	6	Natural Type A Soil Not Serving as Dispersion Area (C=0.10)											sq-ft
	7	Natural Type B Soil Not Serving as Dispersion Area (C=0.14)											sq-ft
	8	Natural Type C Soil Not Serving as Dispersion Area (C=0.23)											sq-ft
	9	Natural Type D Soil Not Serving as Dispersion Area (C=0.30)											sq-ft
Dispersion Area, Tree Well & Rain Barrel Inputs (Optional)	10	Does Tributary Incorporate Dispersion, Tree Wells, and/or Rain Barrels?	No	No	No	No	No	No					yes/no
	11	Impervious Surfaces **Directed to Dispersion Area** per SD-B (Ci=0.90)	0	0	0	0	0						sq-ft
	12	Semi-Pervious Surfaces **Serving as Dispersion Area** per SD-B (Ci=0.30)											sq-ft
	13	Engineered Pervious Surfaces **Serving as Dispersion Area** per SD-B (Ci=0.10)											sq-ft
	14	Natural Type A Soil **Serving as Dispersion Area** per SD-B (Ci=0.10)											sq-ft
	15	Natural Type B Soil **Serving as Dispersion Area** per SD-B (Ci=0.14)											sq-ft
	16	Natural Type C Soil **Serving as Dispersion Area** per SD-B (Ci=0.23)											sq-ft
	17	Natural Type D Soil **Serving as Dispersion Area** per SD-B (Ci=0.30)											sq-ft
	18	Number of Tree Wells Proposed per SD-A											#
	19	Average Mature Tree Canopy Diameter											ft
	20	Number of Rain Barrels Proposed per SD-E											#
	21	Average Rain Barrel Size											gal
Initial Runoff Factor Calculation	22	Total Tributary Area	13,288	12,628	2,702	5,456	28,517	14,233	0	0	0	0	sq-ft
	23	Initial Runoff Factor for Standard Drainage Areas	0.90	0.90	0.90	0.90	0.90	0.90	0.00	0.00	0.00	0.00	unitless
	24	Initial Runoff Factor for Dispersed & Dispersion Areas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	unitless
	25	Initial Weighted Runoff Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.00	0.00	0.00	0.00	unitless
	26	Initial Design Capture Volume	588	559	120	241	1,262	630	0	0	0	0	cubic-feet
Dispersion Area Adjustments	27	Total Impervious Area Dispersed to Pervious Surface	0	0	0	0	0	0	0	0	0	0	sq-ft
	28	Total Pervious Dispersion Area	0	0	0	0	0	0	0	0	0	0	sq-ft
	29	Ratio of Dispersed Impervious Area to Pervious Dispersion Area	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	ratio
	30	Adjustment Factor for Dispersed & Dispersion Areas	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	ratio
	31	Runoff Factor After Dispersion Techniques	0.90	0.90	0.90	0.90	0.90	0.90	n/a	n/a	n/a	n/a	unitless
	32	Design Capture Volume After Dispersion Techniques	588	559	120	241	1,262	630	0	0	0	0	cubic-feet
Tree & Barrel Adjustments	33	Total Tree Well Volume Reduction	0	0	0	0	0	0	0	0	0	0	cubic-feet
	34	Total Rain Barrel Volume Reduction	0	0	0	0	0	0	0	0	0	0	cubic-feet
Results	35	Final Adjusted Runoff Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.00	0.00	0.00	0.00	unitless
	36	Final Effective Tributary Area	11,959	11,365	2,432	4,910	25,665	12,810	0	0	0	0	sq-ft
	37	Initial Design Capture Volume Retained by Site Design Elements	0	0	0	0	0	0	0	0	0	0	cubic-feet
	38	Final Design Capture Volume Tributary to BMP	588	559	120	241	1,262	630	0	0	0	0	cubic-feet

No Warning Messages

Automated Worksheet B.2: Retention Requirements (V2.0)

Category	#	Description	*i*	*ii*	*iii*	*iv*	*v*	*vi*	*vii*	*viii*	*ix*	*x*	Units
Basic Analysis	1	Drainage Basin ID or Name	B1	B2	B3	B4	B5	B6	-	-	-	-	unitless
	2	85th Percentile Rainfall Depth	0.59	0.59	0.59	0.59	0.59	0.59	-	-	-	-	inches
	3	Predominant NRCS Soil Type Within BMP Location	A	A	A	A	A	A					unitless
	4	Is proposed BMP location Restricted or Unrestricted for Infiltration Activities?	Restricted	Restricted	Restricted	Restricted	Restricted	Restricted					unitless
	5	Nature of Restriction	Other	Other	Other	Other	Other	Other					unitless
	6	Do Minimum Retention Requirements Apply to this Project?	No	No	No	No	No	No					yes/no
	7	Are Habitable Structures Greater than 9 Stories Proposed?	No	No	No	No	No	No					yes/no
Advanced Analysis	8	Has Geotechnical Engineer Performed an Infiltration Analysis?	Yes	Yes	Yes	Yes	Yes	Yes					yes/no
	9	Design Infiltration Rate Recommended by Geotechnical Engineer	0.200	0.200	0.200	0.200	0.200	0.200					in/hr
Result	10	Design Infiltration Rate Used To Determine Retention Requirements	0.000	0.000	0.000	0.000	0.000	0.000	-	-	-	-	in/hr
	11	Percent of Average Annual Runoff that Must be Retained within DMA	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	-	-	-	-	percentage
	12	Fraction of DCV Requiring Retention	0.00	0.00	0.00	0.00	0.00	0.00	-	-	-	-	ratio
	13	Required Retention Volume	0	0	0	0	0	0	-	-	-	-	cubic-feet

Attention!

-Retention requirements have been omitted in these calculations. Such an omission is only be acceptable for Green Street projects or projects that submit supplemental calculations demonstrating retention requirements are satisfied at the project-level.

Automated Worksheet B.3: BMP Performance (V2.0)

* PROPRIETARY BIOFILTRATION UNIT. SEE WATER QUALITY TREATMENT FLOW RATE TABLE.

Category	#	Description	*i*	*ii*	*iii*	*iv*	*v*	*vi*	*vii*	*viii*	*ix*	*x*	Units
BMP Inputs	1	Drainage Basin ID or Name	B1	B2	B3	B4	B5	B6*	-	-	-	-	sq-ft
	2	Design Infiltration Rate Recommended	0.000	0.000	0.000	0.000	0.000	0.000	-	-	-	-	in/hr
	3	Design Capture Volume Tributary to BMP	588	559	120	241	1,262	630	-	-	-	-	cubic-feet
	4	Is BMP Vegetated or Unvegetated?	Vegetated	Vegetated	Vegetated	Vegetated	Vegetated	Vegetated					unitless
	5	Is BMP Impermeably Lined or Unlined?	Lined	Lined	Lined	Lined	Lined	Lined					unitless
	6	Does BMP Have an Underdrain?	Underdrain	Underdrain	Underdrain	Underdrain	Underdrain	Underdrain					unitless
	7	Does BMP Utilize Standard or Specialized Media?	Standard	Standard	Standard	Standard	Standard	Standard					unitless
	8	Provided Surface Area	360	370	80	150	792	792					sq-ft
	9	Provided Surface Ponding Depth	6	6	6	6	6	6					inches
	10	Provided Soil Media Thickness	24	24	24	24	24	24					inches
	11	Provided Gravel Thickness (Total Thickness)	12	12	12	12	12	12					inches
	12	Underdrain Offset	3	3	3	3	3	3					inches
	13	Diameter of Underdrain or Hydromod Orifice (Select Smallest)	6.00	6.00	6.00	6.00	6.00	6.00					inches
	14	Specialized Soil Media Filtration Rate											in/hr
	15	Specialized Soil Media Pore Space for Retention											unitless
	16	Specialized Soil Media Pore Space for Biofiltration											unitless
	17	Specialized Gravel Media Pore Space											unitless
Retention Calculations	18	Volume Infiltrated Over 6 Hour Storm	0	0	0	0	0	0	0	0	0	0	cubic-feet
	19	Ponding Pore Space Available for Retention	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	unitless
	20	Soil Media Pore Space Available for Retention	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	unitless
	21	Gravel Pore Space Available for Retention (Above Underdrain)	0.00	0.00	0.00	0.00	0.00	0.00	0.40	0.40	0.40	0.40	unitless
	22	Gravel Pore Space Available for Retention (Below Underdrain)	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	unitless
	23	Effective Retention Depth	2.40	2.40	2.40	2.40	2.40	2.40	0.00	0.00	0.00	0.00	inches
	24	Fraction of DCV Retained (Independent of Drawdown Time)	0.12	0.13	0.13	0.12	0.13	0.25	0.00	0.00	0.00	0.00	ratio
	25	Calculated Retention Storage Drawdown Time	120	120	120	120	120	120	0	0	0	0	hours
	26	Efficacy of Retention Processes	0.14	0.15	0.15	0.14	0.15	0.26	0.00	0.00	0.00	0.00	ratio
	27	Volume Retained by BMP (Considering Drawdown Time)	83	84	18	34	190	166	0	0	0	0	cubic-feet
	28	Design Capture Volume Remaining for Biofiltration	505	475	102	207	1,072	464	0	0	0	0	cubic-feet
Biofiltration Calculations	29	Max Hydromod Flow Rate through Underdrain	1.6375	1.6375	1.6375	1.6375	1.6375	1.6375	0.0000	0.0000	0.0000	0.0000	cfs
	30	Max Soil Filtration Rate Allowed by Underdrain Orifice	196.50	191.19	884.26	471.60	89.32	89.32	0.00	0.00	0.00	0.00	in/hr
	31	Soil Media Filtration Rate per Specifications	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	in/hr
	32	Soil Media Filtration Rate to be used for Sizing	5.00	5.00	5.00	5.00	5.00	5.00	0.00	0.00	0.00	0.00	in/hr
	33	Depth Biofiltered Over 6 Hour Storm	30.00	30.00	30.00	30.00	30.00	30.00	0.00	0.00	0.00	0.00	inches
	34	Ponding Pore Space Available for Biofiltration	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	unitless
	35	Soil Media Pore Space Available for Biofiltration	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	unitless
	36	Gravel Pore Space Available for Biofiltration (Above Underdrain)	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	unitless
	37	Effective Depth of Biofiltration Storage	14.40	14.40	14.40	14.40	14.40	14.40	0.00	0.00	0.00	0.00	inches
	38	Drawdown Time for Surface Ponding	1	1	1	1	1	1	0	0	0	0	hours
	39	Drawdown Time for Effective Biofiltration Depth	3	3	3	3	3	3	0	0	0	0	hours
	40	Total Depth Biofiltered	44.40	44.40	44.40	44.40	44.40	44.40	0.00	0.00	0.00	0.00	inches
	41	Option 1 - Biofilter 1.50 DCV: Target Volume	758	712	153	311	1,607	696	0	0	0	0	cubic-feet
	42	Option 1 - Provided Biofiltration Volume	758	712	153	311	1,607	696	0	0	0	0	cubic-feet
	43	Option 2 - Store 0.75 DCV: Target Volume	379	356	76	155	804	348	0	0	0	0	cubic-feet
	44	Option 2 - Provided Storage Volume	379	356	76	155	804	348	0	0	0	0	cubic-feet
	45	Portion of Biofiltration Performance Standard Satisfied	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	ratio
Result	46	Do Site Design Elements and BMPs Satisfy Annual Retention Requirements?	Yes	Yes	Yes	Yes	Yes	Yes	-	-	-	-	yes/no
	47	Overall Portion of Performance Standard Satisfied (BMP Efficacy Factor)	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	ratio
	48	**Deficit of Effectively Treated Stormwater**	**0**	**0**	**0**	**0**	**0**	**0**	**n/a**	**n/a**	**n/a**	**n/a**	cubic-feet

No Warning Messages

Automated Worksheet B.1: Calculation of Design Capture Volume (V2.0)

Category	#	Description	*i*	*ii*	*iii*	*iv*	*v*	*vi*	*vii*	*viii*	*ix*	*x*	Units
Standard Drainage Basin Inputs	1	Drainage Basin ID or Name	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	unitless
	2	85th Percentile 24-hr Storm Depth	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	inches
	3	Impervious Surfaces Not Directed to Dispersion Area (C=0.90)	11,736	11,692	12,394	19,292	3,204	7,422	8,754	6,615	57,349	1,209	sq-ft
	4	Semi-Pervious Surfaces Not Serving as Dispersion Area (C=0.30)											sq-ft
	5	Engineered Pervious Surfaces Not Serving as Dispersion Area (C=0.10)											sq-ft
	6	Natural Type A Soil Not Serving as Dispersion Area (C=0.10)											sq-ft
	7	Natural Type B Soil Not Serving as Dispersion Area (C=0.14)											sq-ft
	8	Natural Type C Soil Not Serving as Dispersion Area (C=0.23)											sq-ft
	9	Natural Type D Soil Not Serving as Dispersion Area (C=0.30)											sq-ft
Dispersion Area, Tree Well & Rain Barrel Inputs (Optional)	10	Does Tributary Incorporate Dispersion, Tree Wells, and/or Rain Barrels?	No	No	No	No	No	No	No	No	No	No	yes/no
	11	Impervious Surfaces **Directed to Dispersion Area** per SD-B (Ci=0.90)	0	0	0	0	0						sq-ft
	12	Semi-Pervious Surfaces **Serving as Dispersion Area** per SD-B (Ci=0.30)											sq-ft
	13	Engineered Pervious Surfaces **Serving as Dispersion Area** per SD-B (Ci=0.10)											sq-ft
	14	Natural Type A Soil **Serving as Dispersion Area** per SD-B (Ci=0.10)											sq-ft
	15	Natural Type B Soil **Serving as Dispersion Area** per SD-B (Ci=0.14)											sq-ft
	16	Natural Type C Soil **Serving as Dispersion Area** per SD-B (Ci=0.23)											sq-ft
	17	Natural Type D Soil **Serving as Dispersion Area** per SD-B (Ci=0.30)											sq-ft
	18	Number of Tree Wells Proposed per SD-A											#
	19	Average Mature Tree Canopy Diameter											ft
	20	Number of Rain Barrels Proposed per SD-E											#
	21	Average Rain Barrel Size											gal
Initial Runoff Factor Calculation	22	Total Tributary Area	11,736	11,692	12,394	19,292	3,204	7,422	8,754	6,615	57,349	1,209	sq-ft
	23	Initial Runoff Factor for Standard Drainage Areas	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	unitless
	24	Initial Runoff Factor for Dispersed & Dispersion Areas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	unitless
	25	Initial Weighted Runoff Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	unitless
	26	Initial Design Capture Volume	519	517	548	854	142	328	387	293	2,538	53	cubic-feet
Dispersion Area Adjustments	27	Total Impervious Area Dispersed to Pervious Surface	0	0	0	0	0	0	0	0	0	0	sq-ft
	28	Total Pervious Dispersion Area	0	0	0	0	0	0	0	0	0	0	sq-ft
	29	Ratio of Dispersed Impervious Area to Pervious Dispersion Area	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	ratio
	30	Adjustment Factor for Dispersed & Dispersion Areas	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	ratio
	31	Runoff Factor After Dispersion Techniques	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	unitless
	32	Design Capture Volume After Dispersion Techniques	519	517	548	854	142	328	387	293	2,538	53	cubic-feet
Tree & Barrel Adjustments	33	Total Tree Well Volume Reduction	0	0	0	0	0	0	0	0	0	0	cubic-feet
	34	Total Rain Barrel Volume Reduction	0	0	0	0	0	0	0	0	0	0	cubic-feet
Results	35	Final Adjusted Runoff Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	unitless
	36	Final Effective Tributary Area	10,562	10,523	11,155	17,363	2,884	6,680	7,879	5,954	51,614	1,088	sq-ft
	37	Initial Design Capture Volume Retained by Site Design Elements	0	0	0	0	0	0	0	0	0	0	cubic-feet
	38	Final Design Capture Volume Tributary to BMP	519	517	548	854	142	328	387	293	2,538	53	cubic-feet

No Warning Messages

Automated Worksheet B.2: Retention Requirements (V2.0)

Category	#	Description	*i*	*ii*	*iii*	*iv*	*v*	*vi*	*vii*	*viii*	*ix*	*x*	Units
Basic Analysis	1	Drainage Basin ID or Name	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	unitless
	2	85th Percentile Rainfall Depth	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	inches
	3	Predominant NRCS Soil Type Within BMP Location	A	A	A	A	A	A	A	A	A	A	unitless
	4	Is proposed BMP location Restricted or Unrestricted for Infiltration Activities?	Restricted	Restricted	Restricted	Restricted	Restricted	Restricted	Restricted	Restricted	Restricted	Restricted	unitless
	5	Nature of Restriction	Other	Other	Other	Other	Other	Other	Other	Other	Other	Other	unitless
	6	Do Minimum Retention Requirements Apply to this Project?	No	No	No	No	No	No	No	No	No	No	yes/no
	7	Are Habitable Structures Greater than 9 Stories Proposed?	No	No	No	No	No	No	No	No	No	No	yes/no
Advanced Analysis	8	Has Geotechnical Engineer Performed an Infiltration Analysis?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	yes/no
	9	Design Infiltration Rate Recommended by Geotechnical Engineer	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	in/hr
Result	10	Design Infiltration Rate Used To Determine Retention Requirements	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	in/hr
	11	Percent of Average Annual Runoff that Must be Retained within DMA	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	percentage
	12	Fraction of DCV Requiring Retention	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ratio
	13	Required Retention Volume	0	0	0	0	0	0	0	0	0	0	cubic-feet

Attention!

-Retention requirements have been omitted in these calculations. Such an omission is only be acceptable for Green Street projects or projects that submit supplemental calculations demonstrating retention requirements are satisfied at the project-level.

Automated Worksheet B.3: BMP Performance (V2.0)

* PROPRIETARY BIOFILTRATION UNIT. SEE WATER QUALITY TREATMENT FLOW RATE TABLE.

Category	#	Description	*i*	*ii*	*iii*	*iv*	*v*	*vi*	*vii*	*viii*	*ix*	*x*	Units
BMP Inputs	1	Drainage Basin ID or Name	C1	C2	C3*	C4	C5	C6	C7	C8	C9	C10	sq-ft
	2	Design Infiltration Rate Recommended	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	in/hr
	3	Design Capture Volume Tributary to BMP	519	517	548	854	142	328	387	293	2,538	53	cubic-feet
	4	Is BMP Vegetated or Unvegetated?	Vegetated	Vegetated	Vegetated	Vegetated	Vegetated	Vegetated	Vegetated	Vegetated	Vegetated	Vegetated	unitless
	5	Is BMP Impermeably Lined or Unlined?	Lined	Lined	Lined	Lined	Lined	Lined	Lined	Lined	Lined	Lined	unitless
	6	Does BMP Have an Underdrain?	Underdrain	Underdrain	Underdrain	Underdrain	Underdrain	Underdrain	Underdrain	Underdrain	Underdrain	Underdrain	unitless
	7	Does BMP Utilize Standard or Specialized Media?	Standard	Standard	Standard	Standard	Standard	Standard	Standard	Standard	Standard	Standard	unitless
	8	Provided Surface Area	320	316	340	530	90	210	240	180	1,550	40	sq-ft
	9	Provided Surface Ponding Depth	6	6	6	6	6	6	6	6	6	6	inches
	10	Provided Soil Media Thickness	24	24	24	24	24	24	24	24	24	24	inches
	11	Provided Gravel Thickness (Total Thickness)	12	12	12	12	12	12	12	12	12	12	inches
	12	Underdrain Offset	3	3	3	3	3	3	3	3	3	3	inches
	13	Diameter of Underdrain or Hydromod Orifice (Select Smallest)	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	inches
	14	Specialized Soil Media Filtration Rate											in/hr
	15	Specialized Soil Media Pore Space for Retention											unitless
	16	Specialized Soil Media Pore Space for Biofiltration											unitless
	17	Specialized Gravel Media Pore Space											unitless
Retention Calculations	18	Volume Infiltrated Over 6 Hour Storm	0	0	0	0	0	0	0	0	0	0	cubic-feet
	19	Ponding Pore Space Available for Retention	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	unitless
	20	Soil Media Pore Space Available for Retention	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	unitless
	21	Gravel Pore Space Available for Retention (Above Underdrain)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	unitless
	22	Gravel Pore Space Available for Retention (Below Underdrain)	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	unitless
	23	Effective Retention Depth	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40	inches
	24	Fraction of DCV Retained (Independent of Drawdown Time)	0.12	0.12	0.12	0.12	0.13	0.13	0.12	0.12	0.12	0.15	ratio
	25	Calculated Retention Storage Drawdown Time	120	120	120	120	120	120	120	120	120	120	hours
	26	Efficacy of Retention Processes	0.14	0.14	0.14	0.14	0.15	0.15	0.14	0.14	0.14	0.17	ratio
	27	Volume Retained by BMP (Considering Drawdown Time)	73	73	77	120	21	49	55	41	357	9	cubic-feet
	28	Design Capture Volume Remaining for Biofiltration	446	444	471	734	121	279	332	252	2,181	44	cubic-feet
Biofiltration Calculations	29	Max Hydromod Flow Rate through Underdrain	1.6375	1.6375	1.6375	1.6375	1.6375	1.6375	1.6375	1.6375	1.6375	1.6375	cfs
	30	Max Soil Filtration Rate Allowed by Underdrain Orifice	221.06	223.86	208.06	133.47	786.01	336.86	294.75	393.00	45.64	1,768.51	in/hr
	31	Soil Media Filtration Rate per Specifications	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	in/hr
	32	Soil Media Filtration Rate to be used for Sizing	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	in/hr
	33	Depth Biofiltered Over 6 Hour Storm	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	inches
	34	Ponding Pore Space Available for Biofiltration	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	unitless
	35	Soil Media Pore Space Available for Biofiltration	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	unitless
	36	Gravel Pore Space Available for Biofiltration (Above Underdrain)	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	unitless
	37	Effective Depth of Biofiltration Storage	14.40	14.40	14.40	14.40	14.40	14.40	14.40	14.40	14.40	14.40	inches
	38	Drawdown Time for Surface Ponding	1	1	1	1	1	1	1	1	1	1	hours
	39	Drawdown Time for Effective Biofiltration Depth	3	3	3	3	3	3	3	3	3	3	hours
	40	Total Depth Biofiltered	44.40	44.40	44.40	44.40	44.40	44.40	44.40	44.40	44.40	44.40	inches
	41	Option 1 - Biofilter 1.50 DCV: Target Volume	669	666	706	1,101	181	418	499	378	3,271	66	cubic-feet
	42	Option 1 - Provided Biofiltration Volume	669	666	706	1,101	181	418	499	378	3,271	66	cubic-feet
	43	Option 2 - Store 0.75 DCV: Target Volume	334	333	353	550	90	209	249	189	1,635	33	cubic-feet
	44	Option 2 - Provided Storage Volume	334	333	353	550	90	209	249	189	1,635	33	cubic-feet
	45	Portion of Biofiltration Performance Standard Satisfied	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	ratio
Result	46	Do Site Design Elements and BMPs Satisfy Annual Retention Requirements?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	yes/no
	47	Overall Portion of Performance Standard Satisfied (BMP Efficacy Factor)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	ratio
	48	**Deficit of Effectively Treated Stormwater**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	cubic-feet

No Warning Messages

Automated Worksheet B.1: Calculation of Design Capture Volume (V2.0)

Category	#	Description	*i*	*ii*	*iii*	*iv*	*v*	*vi*	*vii*	*viii*	*ix*	*x*	Units
Standard Drainage Basin Inputs	1	Drainage Basin ID or Name	C11										unitless
	2	85th Percentile 24-hr Storm Depth	0.59										inches
	3	Impervious Surfaces Not Directed to Dispersion Area (C=0.90)	3,400										sq-ft
	4	Semi-Pervious Surfaces Not Serving as Dispersion Area (C=0.30)											sq-ft
	5	Engineered Pervious Surfaces Not Serving as Dispersion Area (C=0.10)											sq-ft
	6	Natural Type A Soil Not Serving as Dispersion Area (C=0.10)											sq-ft
	7	Natural Type B Soil Not Serving as Dispersion Area (C=0.14)											sq-ft
	8	Natural Type C Soil Not Serving as Dispersion Area (C=0.23)											sq-ft
	9	Natural Type D Soil Not Serving as Dispersion Area (C=0.30)											sq-ft
Dispersion Area, Tree Well & Rain Barrel Inputs (Optional)	10	Does Tributary Incorporate Dispersion, Tree Wells, and/or Rain Barrels?	No										yes/no
	11	Impervious Surfaces **Directed to Dispersion Area** per SD-B (Ci=0.90)	0										sq-ft
	12	Semi-Pervious Surfaces **Serving as Dispersion Area** per SD-B (Ci=0.30)											sq-ft
	13	Engineered Pervious Surfaces **Serving as Dispersion Area** per SD-B (Ci=0.10)											sq-ft
	14	Natural Type A Soil **Serving as Dispersion Area** per SD-B (Ci=0.10)											sq-ft
	15	Natural Type B Soil **Serving as Dispersion Area** per SD-B (Ci=0.14)											sq-ft
	16	Natural Type C Soil **Serving as Dispersion Area** per SD-B (Ci=0.23)											sq-ft
	17	Natural Type D Soil **Serving as Dispersion Area** per SD-B (Ci=0.30)											sq-ft
	18	Number of Tree Wells Proposed per SD-A											#
	19	Average Mature Tree Canopy Diameter											ft
	20	Number of Rain Barrels Proposed per SD-E											#
	21	Average Rain Barrel Size											gal
Initial Runoff Factor Calculation	22	Total Tributary Area	3,400	0	0	0	0	0	0	0	0	0	sq-ft
	23	Initial Runoff Factor for Standard Drainage Areas	0.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	unitless
	24	Initial Runoff Factor for Dispersed & Dispersion Areas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	unitless
	25	Initial Weighted Runoff Factor	0.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	unitless
	26	Initial Design Capture Volume	150	0	0	0	0	0	0	0	0	0	cubic-feet
Dispersion Area Adjustments	27	Total Impervious Area Dispersed to Pervious Surface	0	0	0	0	0	0	0	0	0	0	sq-ft
	28	Total Pervious Dispersion Area	0	0	0	0	0	0	0	0	0	0	sq-ft
	29	Ratio of Dispersed Impervious Area to Pervious Dispersion Area	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	ratio
	30	Adjustment Factor for Dispersed & Dispersion Areas	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	ratio
	31	Runoff Factor After Dispersion Techniques	0.90	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	unitless
	32	Design Capture Volume After Dispersion Techniques	150	0	0	0	0	0	0	0	0	0	cubic-feet
Tree & Barrel Adjustments	33	Total Tree Well Volume Reduction	0	0	0	0	0	0	0	0	0	0	cubic-feet
	34	Total Rain Barrel Volume Reduction	0	0	0	0	0	0	0	0	0	0	cubic-feet
Results	35	Final Adjusted Runoff Factor	0.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	unitless
	36	Final Effective Tributary Area	3,060	0	0	0	0	0	0	0	0	0	sq-ft
	37	Initial Design Capture Volume Retained by Site Design Elements	0	0	0	0	0	0	0	0	0	0	cubic-feet
	38	Final Design Capture Volume Tributary to BMP	150	0	0	0	0	0	0	0	0	0	cubic-feet

No Warning Messages

Automated Worksheet B.2: Retention Requirements (V2.0)

Category	#	Description	*i*	*ii*	*iii*	*iv*	*v*	*vi*	*vii*	*viii*	*ix*	*x*	Units
Basic Analysis	1	Drainage Basin ID or Name	C11	-	-	-	-	-	-	-	-	-	unitless
	2	85th Percentile Rainfall Depth	0.59	-	-	-	-	-	-	-	-	-	inches
	3	Predominant NRCS Soil Type Within BMP Location	A										unitless
	4	Is proposed BMP location Restricted or Unrestricted for Infiltration Activities?	Restricted										unitless
	5	Nature of Restriction	Other										unitless
	6	Do Minimum Retention Requirements Apply to this Project?	No										yes/no
	7	Are Habitable Structures Greater than 9 Stories Proposed?	No										yes/no
Advanced Analysis	8	Has Geotechnical Engineer Performed an Infiltration Analysis?	Yes										yes/no
	9	Design Infiltration Rate Recommended by Geotechnical Engineer	0.200										in/hr
Result	10	Design Infiltration Rate Used To Determine Retention Requirements	0.000	-	-	-	-	-	-	-	-	-	in/hr
	11	Percent of Average Annual Runoff that Must be Retained within DMA	0.0%	-	-	-	-	-	-	-	-	-	percentage
	12	Fraction of DCV Requiring Retention	0.00	-	-	-	-	-	-	-	-	-	ratio
	13	Required Retention Volume	0	-	-	-	-	-	-	-	-	-	cubic-feet

Attention!

-Retention requirements have been omitted in these calculations. Such an omission is only be acceptable for Green Street projects or projects that submit supplemental calculations demonstrating retention requirements are satisfied at the project-level.

Automated Worksheet B.3: BMP Performance (V2.0)

* PROPRIETARY BIOFILTRATION UNIT. SEE WATER QUALITY TREATMENT FLOW RATE TABLE.

Category	#	Description	*i*	*ii*	*iii*	*iv*	*v*	*vi*	*vii*	*viii*	*ix*	*x*	Units
BMP Inputs	1	Drainage Basin ID or Name	C11*	-	-	-	-	-	-	-	-	-	sq-ft
	2	Design Infiltration Rate Recommended	0.000	-	-	-	-	-	-	-	-	-	in/hr
	3	Design Capture Volume Tributary to BMP	150	-	-	-	-	-	-	-	-	-	cubic-feet
	4	Is BMP Vegetated or Unvegetated?	Vegetated										unitless
	5	Is BMP Impermeably Lined or Unlined?	Lined										unitless
	6	Does BMP Have an Underdrain?	Underdrain										unitless
	7	Does BMP Utilize Standard or Specialized Media?	Standard										unitless
	8	Provided Surface Area	100										sq-ft
	9	Provided Surface Ponding Depth	6										inches
	10	Provided Soil Media Thickness	24										inches
	11	Provided Gravel Thickness (Total Thickness)	12										inches
	12	Underdrain Offset	3										inches
	13	Diameter of Underdrain or Hydromod Orifice (Select Smallest)	6.00										inches
	14	Specialized Soil Media Filtration Rate											in/hr
	15	Specialized Soil Media Pore Space for Retention											unitless
	16	Specialized Soil Media Pore Space for Biofiltration											unitless
	17	Specialized Gravel Media Pore Space											unitless
Retention Calculations	18	Volume Infiltrated Over 6 Hour Storm	0	0	0	0	0	0	0	0	0	0	cubic-feet
	19	Ponding Pore Space Available for Retention	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	unitless
	20	Soil Media Pore Space Available for Retention	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	unitless
	21	Gravel Pore Space Available for Retention (Above Underdrain)	0.00	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	unitless
	22	Gravel Pore Space Available for Retention (Below Underdrain)	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	unitless
	23	Effective Retention Depth	2.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	inches
	24	Fraction of DCV Retained (Independent of Drawdown Time)	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ratio
	25	Calculated Retention Storage Drawdown Time	120	0	0	0	0	0	0	0	0	0	hours
	26	Efficacy of Retention Processes	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ratio
	27	Volume Retained by BMP (Considering Drawdown Time)	23	0	0	0	0	0	0	0	0	0	cubic-feet
	28	Design Capture Volume Remaining for Biofiltration	127	0	0	0	0	0	0	0	0	0	cubic-feet
Biofiltration Calculations	29	Max Hydromod Flow Rate through Underdrain	1.6375	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	cfs
	30	Max Soil Filtration Rate Allowed by Underdrain Orifice	707.41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	in/hr
	31	Soil Media Filtration Rate per Specifications	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	in/hr
	32	Soil Media Filtration Rate to be used for Sizing	5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	in/hr
	33	Depth Biofiltered Over 6 Hour Storm	30.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	inches
	34	Ponding Pore Space Available for Biofiltration	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	unitless
	35	Soil Media Pore Space Available for Biofiltration	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	unitless
	36	Gravel Pore Space Available for Biofiltration (Above Underdrain)	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	unitless
	37	Effective Depth of Biofiltration Storage	14.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	inches
	38	Drawdown Time for Surface Ponding	1	0	0	0	0	0	0	0	0	0	hours
	39	Drawdown Time for Effective Biofiltration Depth	3	0	0	0	0	0	0	0	0	0	hours
	40	Total Depth Biofiltered	44.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	inches
	41	Option 1 - Biofilter 1.50 DCV: Target Volume	191	0	0	0	0	0	0	0	0	0	cubic-feet
	42	Option 1 - Provided Biofiltration Volume	191	0	0	0	0	0	0	0	0	0	cubic-feet
	43	Option 2 - Store 0.75 DCV: Target Volume	96	0	0	0	0	0	0	0	0	0	cubic-feet
	44	Option 2 - Provided Storage Volume	96	0	0	0	0	0	0	0	0	0	cubic-feet
	45	Portion of Biofiltration Performance Standard Satisfied	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ratio
Result	46	Do Site Design Elements and BMPs Satisfy Annual Retention Requirements?	Yes	-	-	-	-	-	-	-	-	-	yes/no
	47	Overall Portion of Performance Standard Satisfied (BMP Efficacy Factor)	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ratio
	48	**Deficit of Effectively Treated Stormwater**	0	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	cubic-feet

No Warning Messages

Automated Worksheet B.1: Calculation of Design Capture Volume (V2.0)

Category	#	Description	*i*	*ii*	*iii*	*iv*	*v*	*vi*	*vii*	*viii*	*ix*	*x*	Units
Standard Drainage Basin Inputs	1	Drainage Basin ID or Name	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	unitless
	2	85th Percentile 24-hr Storm Depth	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	inches
	3	Impervious Surfaces Not Directed to Dispersion Area (C=0.90)	56,117	1,163	9,477	8,816	6,363	6,454	2,802	9,550	9,197	337	sq-ft
	4	Semi-Pervious Surfaces Not Serving as Dispersion Area (C=0.30)											sq-ft
	5	Engineered Pervious Surfaces Not Serving as Dispersion Area (C=0.10)											sq-ft
	6	Natural Type A Soil Not Serving as Dispersion Area (C=0.10)											sq-ft
	7	Natural Type B Soil Not Serving as Dispersion Area (C=0.14)											sq-ft
	8	Natural Type C Soil Not Serving as Dispersion Area (C=0.23)											sq-ft
	9	Natural Type D Soil Not Serving as Dispersion Area (C=0.30)											sq-ft
Dispersion Area, Tree Well & Rain Barrel Inputs (Optional)	10	Does Tributary Incorporate Dispersion, Tree Wells, and/or Rain Barrels?	No	No	No	No	No	No	No	No	No	No	yes/no
	11	Impervious Surfaces **Directed to Dispersion Area** per SD-B (Ci=0.90)	0	0	0	0	0						sq-ft
	12	Semi-Pervious Surfaces **Serving as Dispersion Area** per SD-B (Ci=0.30)											sq-ft
	13	Engineered Pervious Surfaces **Serving as Dispersion Area** per SD-B (Ci=0.10)											sq-ft
	14	Natural Type A Soil **Serving as Dispersion Area** per SD-B (Ci=0.10)											sq-ft
	15	Natural Type B Soil **Serving as Dispersion Area** per SD-B (Ci=0.14)											sq-ft
	16	Natural Type C Soil **Serving as Dispersion Area** per SD-B (Ci=0.23)											sq-ft
	17	Natural Type D Soil **Serving as Dispersion Area** per SD-B (Ci=0.30)											sq-ft
	18	Number of Tree Wells Proposed per SD-A											#
	19	Average Mature Tree Canopy Diameter											ft
	20	Number of Rain Barrels Proposed per SD-E											#
	21	Average Rain Barrel Size											gal
Initial Runoff Factor Calculation	22	Total Tributary Area	56,117	1,163	9,477	8,816	6,363	6,454	2,802	9,550	9,197	337	sq-ft
	23	Initial Runoff Factor for Standard Drainage Areas	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	unitless
	24	Initial Runoff Factor for Dispersed & Dispersion Areas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	unitless
	25	Initial Weighted Runoff Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	unitless
	26	Initial Design Capture Volume	2,483	51	419	390	282	286	124	423	407	15	cubic-feet
Dispersion Area Adjustments	27	Total Impervious Area Dispersed to Pervious Surface	0	0	0	0	0	0	0	0	0	0	sq-ft
	28	Total Pervious Dispersion Area	0	0	0	0	0	0	0	0	0	0	sq-ft
	29	Ratio of Dispersed Impervious Area to Pervious Dispersion Area	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	ratio
	30	Adjustment Factor for Dispersed & Dispersion Areas	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	ratio
	31	Runoff Factor After Dispersion Techniques	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	unitless
	32	Design Capture Volume After Dispersion Techniques	2,483	51	419	390	282	286	124	423	407	15	cubic-feet
Tree & Barrel Adjustments	33	Total Tree Well Volume Reduction	0	0	0	0	0	0	0	0	0	0	cubic-feet
	34	Total Rain Barrel Volume Reduction	0	0	0	0	0	0	0	0	0	0	cubic-feet
Results	35	Final Adjusted Runoff Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	unitless
	36	Final Effective Tributary Area	50,505	1,047	8,529	7,934	5,727	5,809	2,522	8,595	8,277	303	sq-ft
	37	Initial Design Capture Volume Retained by Site Design Elements	0	0	0	0	0	0	0	0	0	0	cubic-feet
	38	Final Design Capture Volume Tributary to BMP	2,483	51	419	390	282	286	124	423	407	15	cubic-feet

No Warning Messages

Automated Worksheet B.2: Retention Requirements (V2.0)

Category	#	Description	*i*	*ii*	*iii*	*iv*	*v*	*vi*	*vii*	*viii*	*ix*	*x*	Units
Basic Analysis	1	Drainage Basin ID or Name	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	unitless
	2	85th Percentile Rainfall Depth	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	inches
	3	Predominant NRCS Soil Type Within BMP Location	A	A	A	A	A	A	A	A	A	A	unitless
	4	Is proposed BMP location Restricted or Unrestricted for Infiltration Activities?	Restricted	Restricted	Restricted	Restricted	Restricted	Restricted	Restricted	Restricted	Restricted	Restricted	unitless
	5	Nature of Restriction	Other	Other	Other	Other	Other	Other	Other	Other	Other	Other	unitless
	6	Do Minimum Retention Requirements Apply to this Project?	No	No	No	No	No	No	No	No	No	No	yes/no
	7	Are Habitable Structures Greater than 9 Stories Proposed?	No	No	No	No	No	No	No	No	No	No	yes/no
Advanced Analysis	8	Has Geotechnical Engineer Performed an Infiltration Analysis?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	yes/no
	9	Design Infiltration Rate Recommended by Geotechnical Engineer	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	in/hr
Result	10	Design Infiltration Rate Used To Determine Retention Requirements	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	in/hr
	11	Percent of Average Annual Runoff that Must be Retained within DMA	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	percentage
	12	Fraction of DCV Requiring Retention	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ratio
	13	Required Retention Volume	0	0	0	0	0	0	0	0	0	0	cubic-feet

Attention!

-Retention requirements have been omitted in these calculations. Such an omission is only be acceptable for Green Street projects or projects that submit supplemental calculations demonstrating retention requirements are satisfied at the project-level.

Automated Worksheet B.3: BMP Performance (V2.0)

* PROPRIETARY BIOFILTRATION UNIT. SEE WATER QUALITY TREATMENT FLOW RATE TABLE.

Category	#	Description	*i*	*ii*	*iii*	*iv*	*v*	*vi*	*vii*	*viii*	*ix*	*x*	Units
BMP Inputs	1	Drainage Basin ID or Name	D1*	D2	D3	D4	D5	D6	D7	D8	D9	D10	sq-ft
	2	Design Infiltration Rate Recommended	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	in/hr
	3	Design Capture Volume Tributary to BMP	2,483	51	419	390	282	286	124	423	407	15	cubic-feet
	4	Is BMP Vegetated or Unvegetated?	Vegetated	Vegetated	Vegetated	Vegetated	Vegetated	Vegetated	Vegetated	Vegetated	Vegetated	Vegetated	unitless
	5	Is BMP Impermeably Lined or Unlined?	Lined	Lined	Lined	Lined	Lined	Lined	Lined	Lined	Lined	Lined	unitless
	6	Does BMP Have an Underdrain?	Underdrain	Underdrain	Underdrain	Underdrain	Underdrain	Underdrain	Underdrain	Underdrain	Underdrain	Underdrain	unitless
	7	Does BMP Utilize Standard or Specialized Media?	Standard	Standard	Standard	Standard	Standard	Standard	Standard	Standard	Standard	Standard	unitless
	8	Provided Surface Area	1,520	40	260	240	180	180	80	260	260	10	sq-ft
	9	Provided Surface Ponding Depth	6	6	6	6	6	6	6	6	6	6	inches
	10	Provided Soil Media Thickness	24	24	24	24	24	24	24	24	24	24	inches
	11	Provided Gravel Thickness (Total Thickness)	12	12	12	12	12	12	12	12	12	12	inches
	12	Underdrain Offset	3	3	3	3	3	3	3	3	3	3	inches
	13	Diameter of Underdrain or Hydromod Orifice (Select Smallest)	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	inches
	14	Specialized Soil Media Filtration Rate											in/hr
	15	Specialized Soil Media Pore Space for Retention											unitless
	16	Specialized Soil Media Pore Space for Biofiltration											unitless
	17	Specialized Gravel Media Pore Space											unitless
Retention Calculations	18	Volume Infiltrated Over 6 Hour Storm	0	0	0	0	0	0	0	0	0	0	cubic-feet
	19	Ponding Pore Space Available for Retention	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	unitless
	20	Soil Media Pore Space Available for Retention	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	unitless
	21	Gravel Pore Space Available for Retention (Above Underdrain)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	unitless
	22	Gravel Pore Space Available for Retention (Below Underdrain)	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	unitless
	23	Effective Retention Depth	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40	inches
	24	Fraction of DCV Retained (Independent of Drawdown Time)	0.12	0.16	0.12	0.12	0.13	0.13	0.13	0.12	0.13	0.13	ratio
	25	Calculated Retention Storage Drawdown Time	120	120	120	120	120	120	120	120	120	120	hours
	26	Efficacy of Retention Processes	0.14	0.18	0.14	0.14	0.15	0.15	0.15	0.14	0.15	0.15	ratio
	27	Volume Retained by BMP (Considering Drawdown Time)	350	9	59	55	43	43	19	60	61	2	cubic-feet
	28	Design Capture Volume Remaining for Biofiltration	2,133	42	360	335	239	243	105	363	346	13	cubic-feet
Biofiltration Calculations	29	Max Hydromod Flow Rate through Underdrain	1.6375	1.6375	1.6375	1.6375	1.6375	1.6375	1.6375	1.6375	1.6375	1.6375	cfs
	30	Max Soil Filtration Rate Allowed by Underdrain Orifice	46.54	1,768.51	272.08	294.75	393.00	393.00	884.26	272.08	272.08	7,074.06	in/hr
	31	Soil Media Filtration Rate per Specifications	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	in/hr
	32	Soil Media Filtration Rate to be used for Sizing	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	in/hr
	33	Depth Biofiltered Over 6 Hour Storm	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	inches
	34	Ponding Pore Space Available for Biofiltration	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	unitless
	35	Soil Media Pore Space Available for Biofiltration	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	unitless
	36	Gravel Pore Space Available for Biofiltration (Above Underdrain)	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	unitless
	37	Effective Depth of Biofiltration Storage	14.40	14.40	14.40	14.40	14.40	14.40	14.40	14.40	14.40	14.40	inches
	38	Drawdown Time for Surface Ponding	1	1	1	1	1	1	1	1	1	1	hours
	39	Drawdown Time for Effective Biofiltration Depth	3	3	3	3	3	3	3	3	3	3	hours
	40	Total Depth Biofiltered	44.40	44.40	44.40	44.40	44.40	44.40	44.40	44.40	44.40	44.40	inches
	41	Option 1 - Biofilter 1.50 DCV: Target Volume	3,200	63	540	503	359	364	158	545	518	19	cubic-feet
	42	Option 1 - Provided Biofiltration Volume	3,200	63	540	503	359	364	158	545	518	19	cubic-feet
	43	Option 2 - Store 0.75 DCV: Target Volume	1,600	31	270	251	180	182	79	273	259	10	cubic-feet
	44	Option 2 - Provided Storage Volume	1,600	31	270	251	180	182	79	273	259	10	cubic-feet
	45	Portion of Biofiltration Performance Standard Satisfied	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	ratio
Result	46	Do Site Design Elements and BMPs Satisfy Annual Retention Requirements?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	yes/no
	47	Overall Portion of Performance Standard Satisfied (BMP Efficacy Factor)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	ratio
	48	**Deficit of Effectively Treated Stormwater**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	cubic-feet

No Warning Messages

Automated Worksheet B.1: Calculation of Design Capture Volume (V2.0)

Category	#	Description	*i*	*ii*	*iii*	*iv*	*v*	*vi*	*vii*	*viii*	*ix*	*x*	Units
Standard Drainage Basin Inputs	1	Drainage Basin ID or Name	D11										unitless
	2	85th Percentile 24-hr Storm Depth	0.59										inches
	3	Impervious Surfaces Not Directed to Dispersion Area (C=0.90)	28,158										sq-ft
	4	Semi-Pervious Surfaces Not Serving as Dispersion Area (C=0.30)											sq-ft
	5	Engineered Pervious Surfaces Not Serving as Dispersion Area (C=0.10)											sq-ft
	6	Natural Type A Soil Not Serving as Dispersion Area (C=0.10)											sq-ft
	7	Natural Type B Soil Not Serving as Dispersion Area (C=0.14)											sq-ft
	8	Natural Type C Soil Not Serving as Dispersion Area (C=0.23)											sq-ft
	9	Natural Type D Soil Not Serving as Dispersion Area (C=0.30)											sq-ft
Dispersion Area, Tree Well & Rain Barrel Inputs (Optional)	10	Does Tributary Incorporate Dispersion, Tree Wells, and/or Rain Barrels?	No										yes/no
	11	Impervious Surfaces **Directed to Dispersion Area** per SD-B (Ci=0.90)	0										sq-ft
	12	Semi-Pervious Surfaces **Serving as Dispersion Area** per SD-B (Ci=0.30)											sq-ft
	13	Engineered Pervious Surfaces **Serving as Dispersion Area** per SD-B (Ci=0.10)											sq-ft
	14	Natural Type A Soil **Serving as Dispersion Area** per SD-B (Ci=0.10)											sq-ft
	15	Natural Type B Soil **Serving as Dispersion Area** per SD-B (Ci=0.14)											sq-ft
	16	Natural Type C Soil **Serving as Dispersion Area** per SD-B (Ci=0.23)											sq-ft
	17	Natural Type D Soil **Serving as Dispersion Area** per SD-B (Ci=0.30)											sq-ft
	18	Number of Tree Wells Proposed per SD-A											#
	19	Average Mature Tree Canopy Diameter											ft
	20	Number of Rain Barrels Proposed per SD-E											#
	21	Average Rain Barrel Size											gal
Initial Runoff Factor Calculation	22	Total Tributary Area	28,158	0	0	0	0	0	0	0	0	0	sq-ft
	23	Initial Runoff Factor for Standard Drainage Areas	0.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	unitless
	24	Initial Runoff Factor for Dispersed & Dispersion Areas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	unitless
	25	Initial Weighted Runoff Factor	0.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	unitless
	26	Initial Design Capture Volume	1,246	0	0	0	0	0	0	0	0	0	cubic-feet
Dispersion Area Adjustments	27	Total Impervious Area Dispersed to Pervious Surface	0	0	0	0	0	0	0	0	0	0	sq-ft
	28	Total Pervious Dispersion Area	0	0	0	0	0	0	0	0	0	0	sq-ft
	29	Ratio of Dispersed Impervious Area to Pervious Dispersion Area	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	ratio
	30	Adjustment Factor for Dispersed & Dispersion Areas	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	ratio
	31	Runoff Factor After Dispersion Techniques	0.90	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	unitless
	32	Design Capture Volume After Dispersion Techniques	1,246	0	0	0	0	0	0	0	0	0	cubic-feet
Tree & Barrel Adjustments	33	Total Tree Well Volume Reduction	0	0	0	0	0	0	0	0	0	0	cubic-feet
	34	Total Rain Barrel Volume Reduction	0	0	0	0	0	0	0	0	0	0	cubic-feet
Results	35	Final Adjusted Runoff Factor	0.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	unitless
	36	Final Effective Tributary Area	25,342	0	0	0	0	0	0	0	0	0	sq-ft
	37	Initial Design Capture Volume Retained by Site Design Elements	0	0	0	0	0	0	0	0	0	0	cubic-feet
	38	Final Design Capture Volume Tributary to BMP	1,246	0	0	0	0	0	0	0	0	0	cubic-feet

No Warning Messages

Automated Worksheet B.2: Retention Requirements (V2.0)

Category	#	Description	*i*	*ii*	*iii*	*iv*	*v*	*vi*	*vii*	*viii*	*ix*	*x*	Units
Basic Analysis	1	Drainage Basin ID or Name	D11	-	-	-	-	-	-	-	-	-	unitless
	2	85th Percentile Rainfall Depth	0.59	-	-	-	-	-	-	-	-	-	inches
	3	Predominant NRCS Soil Type Within BMP Location	A										unitless
	4	Is proposed BMP location Restricted or Unrestricted for Infiltration Activities?	Restricted										unitless
	5	Nature of Restriction	Other										unitless
	6	Do Minimum Retention Requirements Apply to this Project?	No										yes/no
	7	Are Habitable Structures Greater than 9 Stories Proposed?	No										yes/no
Advanced Analysis	8	Has Geotechnical Engineer Performed an Infiltration Analysis?	Yes										yes/no
	9	Design Infiltration Rate Recommended by Geotechnical Engineer	0.200										in/hr
Result	10	Design Infiltration Rate Used To Determine Retention Requirements	0.000	-	-	-	-	-	-	-	-	-	in/hr
	11	Percent of Average Annual Runoff that Must be Retained within DMA	0.0%	-	-	-	-	-	-	-	-	-	percentage
	12	Fraction of DCV Requiring Retention	0.00	-	-	-	-	-	-	-	-	-	ratio
	13	Required Retention Volume	0	-	-	-	-	-	-	-	-	-	cubic-feet

Attention!

-Retention requirements have been omitted in these calculations. Such an omission is only be acceptable for Green Street projects or projects that submit supplemental calculations demonstrating retention requirements are satisfied at the project-level.

Automated Worksheet B.3: BMP Performance (V2.0)

* PROPRIETARY BIOFILTRATION UNIT. SEE WATER QUALITY TREATMENT FLOW RATE TABLE.

Category	#	Description	*i*	*ii*	*iii*	*iv*	*v*	*vi*	*vii*	*viii*	*ix*	*x*	Units
BMP Inputs	1	Drainage Basin ID or Name	D11*	-	-	-	-	-	-	-	-	-	sq-ft
	2	Design Infiltration Rate Recommended	0.000	-	-	-	-	-	-	-	-	-	in/hr
	3	Design Capture Volume Tributary to BMP	1,246	-	-	-	-	-	-	-	-	-	cubic-feet
	4	Is BMP Vegetated or Unvegetated?	Vegetated										unitless
	5	Is BMP Impermeably Lined or Unlined?	Lined										unitless
	6	Does BMP Have an Underdrain?	Underdrain										unitless
	7	Does BMP Utilize Standard or Specialized Media?	Standard										unitless
	8	Provided Surface Area	770										sq-ft
	9	Provided Surface Ponding Depth	6										inches
	10	Provided Soil Media Thickness	24										inches
	11	Provided Gravel Thickness (Total Thickness)	12										inches
	12	Underdrain Offset	3										inches
	13	Diameter of Underdrain or Hydromod Orifice (Select Smallest)	6.00										inches
	14	Specialized Soil Media Filtration Rate											in/hr
	15	Specialized Soil Media Pore Space for Retention											unitless
	16	Specialized Soil Media Pore Space for Biofiltration											unitless
	17	Specialized Gravel Media Pore Space											unitless
Retention Calculations	18	Volume Infiltrated Over 6 Hour Storm	0	0	0	0	0	0	0	0	0	0	cubic-feet
	19	Ponding Pore Space Available for Retention	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	unitless
	20	Soil Media Pore Space Available for Retention	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	unitless
	21	Gravel Pore Space Available for Retention (Above Underdrain)	0.00	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	unitless
	22	Gravel Pore Space Available for Retention (Below Underdrain)	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	unitless
	23	Effective Retention Depth	2.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	inches
	24	Fraction of DCV Retained (Independent of Drawdown Time)	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ratio
	25	Calculated Retention Storage Drawdown Time	120	0	0	0	0	0	0	0	0	0	hours
	26	Efficacy of Retention Processes	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ratio
	27	Volume Retained by BMP (Considering Drawdown Time)	176	0	0	0	0	0	0	0	0	0	cubic-feet
	28	Design Capture Volume Remaining for Biofiltration	1,070	0	0	0	0	0	0	0	0	0	cubic-feet
Biofiltration Calculations	29	Max Hydromod Flow Rate through Underdrain	1.6375	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	cfs
	30	Max Soil Filtration Rate Allowed by Underdrain Orifice	91.87	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	in/hr
	31	Soil Media Filtration Rate per Specifications	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	in/hr
	32	Soil Media Filtration Rate to be used for Sizing	5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	in/hr
	33	Depth Biofiltered Over 6 Hour Storm	30.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	inches
	34	Ponding Pore Space Available for Biofiltration	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	unitless
	35	Soil Media Pore Space Available for Biofiltration	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	unitless
	36	Gravel Pore Space Available for Biofiltration (Above Underdrain)	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	unitless
	37	Effective Depth of Biofiltration Storage	14.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	inches
	38	Drawdown Time for Surface Ponding	1	0	0	0	0	0	0	0	0	0	hours
	39	Drawdown Time for Effective Biofiltration Depth	3	0	0	0	0	0	0	0	0	0	hours
	40	Total Depth Biofiltered	44.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	inches
	41	Option 1 - Biofilter 1.50 DCV: Target Volume	1,606	0	0	0	0	0	0	0	0	0	cubic-feet
	42	Option 1 - Provided Biofiltration Volume	1,606	0	0	0	0	0	0	0	0	0	cubic-feet
	43	Option 2 - Store 0.75 DCV: Target Volume	803	0	0	0	0	0	0	0	0	0	cubic-feet
	44	Option 2 - Provided Storage Volume	803	0	0	0	0	0	0	0	0	0	cubic-feet
	45	Portion of Biofiltration Performance Standard Satisfied	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ratio
Result	46	Do Site Design Elements and BMPs Satisfy Annual Retention Requirements?	Yes	-	-	-	-	-	-	-	-	-	yes/no
	47	Overall Portion of Performance Standard Satisfied (BMP Efficacy Factor)	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ratio
	48	**Deficit of Effectively Treated Stormwater**	0	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	cubic-feet

No Warning Messages

Automated Worksheet B.1: Calculation of Design Capture Volume (V2.0)

Category	#	Description	*i*	*ii*	*iii*	*iv*	*v*	*vi*	*vii*	*viii*	*ix*	*x*	Units
Standard Drainage Basin Inputs	1	Drainage Basin ID or Name	E1	E2	E3	E4	E5	E6	E7	E8	E9	E10	unitless
	2	85th Percentile 24-hr Storm Depth	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	inches
	3	Impervious Surfaces Not Directed to Dispersion Area (C=0.90)	8,917	12,965	4,770	4,720	1,941	5,155	6,440	12,054	5,776	24,492	sq-ft
	4	Semi-Pervious Surfaces Not Serving as Dispersion Area (C=0.30)											sq-ft
	5	Engineered Pervious Surfaces Not Serving as Dispersion Area (C=0.10)											sq-ft
	6	Natural Type A Soil Not Serving as Dispersion Area (C=0.10)											sq-ft
	7	Natural Type B Soil Not Serving as Dispersion Area (C=0.14)											sq-ft
	8	Natural Type C Soil Not Serving as Dispersion Area (C=0.23)											sq-ft
	9	Natural Type D Soil Not Serving as Dispersion Area (C=0.30)											sq-ft
Dispersion Area, Tree Well & Rain Barrel Inputs (Optional)	10	Does Tributary Incorporate Dispersion, Tree Wells, and/or Rain Barrels?	No	No	No	No	No	No	No	No	No	No	yes/no
	11	Impervious Surfaces **Directed to Dispersion Area** per SD-B (Ci=0.90)	0	0	0	0	0						sq-ft
	12	Semi-Pervious Surfaces **Serving as Dispersion Area** per SD-B (Ci=0.30)											sq-ft
	13	Engineered Pervious Surfaces **Serving as Dispersion Area** per SD-B (Ci=0.10)											sq-ft
	14	Natural Type A Soil **Serving as Dispersion Area** per SD-B (Ci=0.10)											sq-ft
	15	Natural Type B Soil **Serving as Dispersion Area** per SD-B (Ci=0.14)											sq-ft
	16	Natural Type C Soil **Serving as Dispersion Area** per SD-B (Ci=0.23)											sq-ft
	17	Natural Type D Soil **Serving as Dispersion Area** per SD-B (Ci=0.30)											sq-ft
	18	Number of Tree Wells Proposed per SD-A											#
	19	Average Mature Tree Canopy Diameter											ft
	20	Number of Rain Barrels Proposed per SD-E											#
	21	Average Rain Barrel Size											gal
Initial Runoff Factor Calculation	22	Total Tributary Area	8,917	12,965	4,770	4,720	1,941	5,155	6,440	12,054	5,776	24,492	sq-ft
	23	Initial Runoff Factor for Standard Drainage Areas	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	unitless
	24	Initial Runoff Factor for Dispersed & Dispersion Areas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	unitless
	25	Initial Weighted Runoff Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	unitless
	26	Initial Design Capture Volume	395	574	211	209	86	228	285	533	256	1,084	cubic-feet
Dispersion Area Adjustments	27	Total Impervious Area Dispersed to Pervious Surface	0	0	0	0	0	0	0	0	0	0	sq-ft
	28	Total Pervious Dispersion Area	0	0	0	0	0	0	0	0	0	0	sq-ft
	29	Ratio of Dispersed Impervious Area to Pervious Dispersion Area	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	ratio
	30	Adjustment Factor for Dispersed & Dispersion Areas	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	ratio
	31	Runoff Factor After Dispersion Techniques	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	unitless
	32	Design Capture Volume After Dispersion Techniques	395	574	211	209	86	228	285	533	256	1,084	cubic-feet
Tree & Barrel Adjustments	33	Total Tree Well Volume Reduction	0	0	0	0	0	0	0	0	0	0	cubic-feet
	34	Total Rain Barrel Volume Reduction	0	0	0	0	0	0	0	0	0	0	cubic-feet
Results	35	Final Adjusted Runoff Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	unitless
	36	Final Effective Tributary Area	8,025	11,669	4,293	4,248	1,747	4,640	5,796	10,849	5,198	22,043	sq-ft
	37	Initial Design Capture Volume Retained by Site Design Elements	0	0	0	0	0	0	0	0	0	0	cubic-feet
	38	Final Design Capture Volume Tributary to BMP	395	574	211	209	86	228	285	533	256	1,084	cubic-feet

No Warning Messages

Automated Worksheet B.2: Retention Requirements (V2.0)

Category	#	Description	*i*	*ii*	*iii*	*iv*	*v*	*vi*	*vii*	*viii*	*ix*	*x*	Units
Basic Analysis	1	Drainage Basin ID or Name	E1	E2	E3	E4	E5	E6	E7	E8	E9	E10	unitless
	2	85th Percentile Rainfall Depth	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	inches
	3	Predominant NRCS Soil Type Within BMP Location	A	A	A	A	A	A	A	A	A	A	unitless
	4	Is proposed BMP location Restricted or Unrestricted for Infiltration Activities?	Restricted	Restricted	Restricted	Restricted	Restricted	Restricted	Restricted	Restricted	Restricted	Restricted	unitless
	5	Nature of Restriction	Other	Other	Other	Other	Other	Other	Other	Other	Other	Other	unitless
	6	Do Minimum Retention Requirements Apply to this Project?	No	No	No	No	No	No	No	No	No	No	yes/no
	7	Are Habitable Structures Greater than 9 Stories Proposed?	No	No	No	No	No	No	No	No	No	No	yes/no
Advanced Analysis	8	Has Geotechnical Engineer Performed an Infiltration Analysis?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	yes/no
	9	Design Infiltration Rate Recommended by Geotechnical Engineer	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	in/hr
Result	10	Design Infiltration Rate Used To Determine Retention Requirements	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	in/hr
	11	Percent of Average Annual Runoff that Must be Retained within DMA	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	percentage
	12	Fraction of DCV Requiring Retention	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ratio
	13	Required Retention Volume	0	0	0	0	0	0	0	0	0	0	cubic-feet

Attention!

-Retention requirements have been omitted in these calculations. Such an omission is only be acceptable for Green Street projects or projects that submit supplemental calculations demonstrating retention requirements are satisfied at the project-level.

Automated Worksheet B.3: BMP Performance (V2.0)

Category	#	Description	*i*	*ii*	*iii*	*iv*	*v*	*vi*	*vii*	*viii*	*ix*	*x*	Units
BMP Inputs	1	Drainage Basin ID or Name	E1	E2	E3	E4	E5	E6	E7	E8	E9	E10	sq-ft
	2	Design Infiltration Rate Recommended	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	in/hr
	3	Design Capture Volume Tributary to BMP	395	574	211	209	86	228	285	533	256	1,084	cubic-feet
	4	Is BMP Vegetated or Unvegetated?	Vegetated	Vegetated	Vegetated	Vegetated	Vegetated	Vegetated	Vegetated	Vegetated	Vegetated	Vegetated	unitless
	5	Is BMP Impermeably Lined or Unlined?	Lined	Lined	Lined	Lined	Lined	Lined	Lined	Lined	Lined	Lined	unitless
	6	Does BMP Have an Underdrain?	Underdrain	Underdrain	Underdrain	Underdrain	Underdrain	Underdrain	Underdrain	Underdrain	Underdrain	Underdrain	unitless
	7	Does BMP Utilize Standard or Specialized Media?	Standard	Standard	Standard	Standard	Standard	Standard	Standard	Standard	Standard	Standard	unitless
	8	Provided Surface Area	250	360	130	130	60	140	180	330	160	670	sq-ft
	9	Provided Surface Ponding Depth	6	6	6	6	6	6	6	6	6	6	inches
	10	Provided Soil Media Thickness	24	30	24	24	24	24	24	24	24	24	inches
	11	Provided Gravel Thickness (Total Thickness)	12	12	12	12	12	12	12	12	12	12	inches
	12	Underdrain Offset	3	3	3	3	3	3	3	3	3	3	inches
	13	Diameter of Underdrain or Hydromod Orifice (Select Smallest)	6.00	8.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	inches
	14	Specialized Soil Media Filtration Rate											in/hr
	15	Specialized Soil Media Pore Space for Retention											unitless
	16	Specialized Soil Media Pore Space for Biofiltration											unitless
	17	Specialized Gravel Media Pore Space											unitless
Retention Calculations	18	Volume Infiltrated Over 6 Hour Storm	0	0	0	0	0	0	0	0	0	0	cubic-feet
	19	Ponding Pore Space Available for Retention	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	unitless
	20	Soil Media Pore Space Available for Retention	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	unitless
	21	Gravel Pore Space Available for Retention (Above Underdrain)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	unitless
	22	Gravel Pore Space Available for Retention (Below Underdrain)	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	unitless
	23	Effective Retention Depth	2.40	2.70	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40	inches
	24	Fraction of DCV Retained (Independent of Drawdown Time)	0.13	0.14	0.12	0.12	0.14	0.12	0.13	0.12	0.13	0.12	ratio
	25	Calculated Retention Storage Drawdown Time	120	120	120	120	120	120	120	120	120	120	hours
	26	Efficacy of Retention Processes	0.15	0.16	0.14	0.14	0.16	0.14	0.15	0.14	0.15	0.14	ratio
	27	Volume Retained by BMP (Considering Drawdown Time)	60	92	30	29	14	32	43	75	39	153	cubic-feet
	28	Design Capture Volume Remaining for Biofiltration	335	482	181	180	72	196	242	458	217	931	cubic-feet
Biofiltration Calculations	29	Max Hydromod Flow Rate through Underdrain	1.6375	3.1067	1.6375	1.6375	1.6375	1.6375	1.6375	1.6375	1.6375	1.6375	cfs
	30	Max Soil Filtration Rate Allowed by Underdrain Orifice	282.96	372.81	544.16	544.16	1,179.01	505.29	393.00	214.37	442.13	105.58	in/hr
	31	Soil Media Filtration Rate per Specifications	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	in/hr
	32	Soil Media Filtration Rate to be used for Sizing	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	in/hr
	33	Depth Biofiltered Over 6 Hour Storm	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	inches
	34	Ponding Pore Space Available for Biofiltration	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	unitless
	35	Soil Media Pore Space Available for Biofiltration	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	unitless
	36	Gravel Pore Space Available for Biofiltration (Above Underdrain)	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	unitless
	37	Effective Depth of Biofiltration Storage	14.40	15.60	14.40	14.40	14.40	14.40	14.40	14.40	14.40	14.40	inches
	38	Drawdown Time for Surface Ponding	1	1	1	1	1	1	1	1	1	1	hours
	39	Drawdown Time for Effective Biofiltration Depth	3	3	3	3	3	3	3	3	3	3	hours
	40	Total Depth Biofiltered	44.40	45.60	44.40	44.40	44.40	44.40	44.40	44.40	44.40	44.40	inches
	41	Option 1 - Biofilter 1.50 DCV: Target Volume	503	722	272	269	108	294	363	687	326	1,397	cubic-feet
	42	Option 1 - Provided Biofiltration Volume	503	722	272	269	108	294	363	687	326	1,397	cubic-feet
	43	Option 2 - Store 0.75 DCV: Target Volume	252	361	136	135	54	147	181	343	163	698	cubic-feet
	44	Option 2 - Provided Storage Volume	252	361	136	135	54	147	181	343	163	698	cubic-feet
	45	Portion of Biofiltration Performance Standard Satisfied	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	ratio
Result	46	Do Site Design Elements and BMPs Satisfy Annual Retention Requirements?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	yes/no
	47	Overall Portion of Performance Standard Satisfied (BMP Efficacy Factor)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	ratio
	48	**Deficit of Effectively Treated Stormwater**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	cubic-feet

No Warning Messages

Automated Worksheet B.1: Calculation of Design Capture Volume (V2.0)

Category	#	Description	*i*	*ii*	*iii*	*iv*	*v*	*vi*	*vii*	*viii*	*ix*	*x*	Units
Standard Drainage Basin Inputs	1	Drainage Basin ID or Name	E11	E12	E13	E14	E15	E16					unitless
	2	85th Percentile 24-hr Storm Depth	0.59	0.59	0.59	0.59	0.59	0.59					inches
	3	Impervious Surfaces Not Directed to Dispersion Area (C=0.90)	5,864	2,580	10,398	3,795	5,164	14,314					sq-ft
	4	Semi-Pervious Surfaces Not Serving as Dispersion Area (C=0.30)											sq-ft
	5	Engineered Pervious Surfaces Not Serving as Dispersion Area (C=0.10)											sq-ft
	6	Natural Type A Soil Not Serving as Dispersion Area (C=0.10)											sq-ft
	7	Natural Type B Soil Not Serving as Dispersion Area (C=0.14)											sq-ft
	8	Natural Type C Soil Not Serving as Dispersion Area (C=0.23)											sq-ft
	9	Natural Type D Soil Not Serving as Dispersion Area (C=0.30)											sq-ft
Dispersion Area, Tree Well & Rain Barrel Inputs (Optional)	10	Does Tributary Incorporate Dispersion, Tree Wells, and/or Rain Barrels?	No	No	No	No	No	No					yes/no
	11	Impervious Surfaces **Directed to Dispersion Area** per SD-B (Ci=0.90)	0	0	0	0	0						sq-ft
	12	Semi-Pervious Surfaces **Serving as Dispersion Area** per SD-B (Ci=0.30)											sq-ft
	13	Engineered Pervious Surfaces **Serving as Dispersion Area** per SD-B (Ci=0.10)											sq-ft
	14	Natural Type A Soil **Serving as Dispersion Area** per SD-B (Ci=0.10)											sq-ft
	15	Natural Type B Soil **Serving as Dispersion Area** per SD-B (Ci=0.14)											sq-ft
	16	Natural Type C Soil **Serving as Dispersion Area** per SD-B (Ci=0.23)											sq-ft
	17	Natural Type D Soil **Serving as Dispersion Area** per SD-B (Ci=0.30)											sq-ft
	18	Number of Tree Wells Proposed per SD-A											#
	19	Average Mature Tree Canopy Diameter											ft
	20	Number of Rain Barrels Proposed per SD-E											#
	21	Average Rain Barrel Size											gal
Initial Runoff Factor Calculation	22	Total Tributary Area	5,864	2,580	10,398	3,795	5,164	14,314	0	0	0	0	sq-ft
	23	Initial Runoff Factor for Standard Drainage Areas	0.90	0.90	0.90	0.90	0.90	0.90	0.00	0.00	0.00	0.00	unitless
	24	Initial Runoff Factor for Dispersed & Dispersion Areas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	unitless
	25	Initial Weighted Runoff Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.00	0.00	0.00	0.00	unitless
	26	Initial Design Capture Volume	259	114	460	168	229	633	0	0	0	0	cubic-feet
Dispersion Area Adjustments	27	Total Impervious Area Dispersed to Pervious Surface	0	0	0	0	0	0	0	0	0	0	sq-ft
	28	Total Pervious Dispersion Area	0	0	0	0	0	0	0	0	0	0	sq-ft
	29	Ratio of Dispersed Impervious Area to Pervious Dispersion Area	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	ratio
	30	Adjustment Factor for Dispersed & Dispersion Areas	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	ratio
	31	Runoff Factor After Dispersion Techniques	0.90	0.90	0.90	0.90	0.90	0.90	n/a	n/a	n/a	n/a	unitless
	32	Design Capture Volume After Dispersion Techniques	259	114	460	168	229	633	0	0	0	0	cubic-feet
Tree & Barrel Adjustments	33	Total Tree Well Volume Reduction	0	0	0	0	0	0	0	0	0	0	cubic-feet
	34	Total Rain Barrel Volume Reduction	0	0	0	0	0	0	0	0	0	0	cubic-feet
Results	35	Final Adjusted Runoff Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.00	0.00	0.00	0.00	unitless
	36	Final Effective Tributary Area	5,278	2,322	9,358	3,416	4,648	12,883	0	0	0	0	sq-ft
	37	Initial Design Capture Volume Retained by Site Design Elements	0	0	0	0	0	0	0	0	0	0	cubic-feet
	38	Final Design Capture Volume Tributary to BMP	259	114	460	168	229	633	0	0	0	0	cubic-feet

No Warning Messages

Automated Worksheet B.2: Retention Requirements (V2.0)

Category	#	Description	*i*	*ii*	*iii*	*iv*	*v*	*vi*	*vii*	*viii*	*ix*	*x*	Units
Basic Analysis	1	Drainage Basin ID or Name	E11	E12	E13	E14	E15	E16	-	-	-	-	unitless
	2	85th Percentile Rainfall Depth	0.59	0.59	0.59	0.59	0.59	0.59	-	-	-	-	inches
	3	Predominant NRCS Soil Type Within BMP Location	A	A	A	A	A	A					unitless
	4	Is proposed BMP location Restricted or Unrestricted for Infiltration Activities?	Restricted	Restricted	Restricted	Restricted	Restricted	Restricted					unitless
	5	Nature of Restriction	Other	Other	Other	Other	Other	Other					unitless
	6	Do Minimum Retention Requirements Apply to this Project?	No	No	No	No	No	No					yes/no
	7	Are Habitable Structures Greater than 9 Stories Proposed?	No	No	No	No	No	No					yes/no
Advanced Analysis	8	Has Geotechnical Engineer Performed an Infiltration Analysis?	Yes	Yes	Yes	Yes	Yes	Yes					yes/no
	9	Design Infiltration Rate Recommended by Geotechnical Engineer	0.200	0.200	0.200	0.200	0.200	0.200					in/hr
Result	10	Design Infiltration Rate Used To Determine Retention Requirements	0.000	0.000	0.000	0.000	0.000	0.000	-	-	-	-	in/hr
	11	Percent of Average Annual Runoff that Must be Retained within DMA	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	-	-	-	-	percentage
	12	Fraction of DCV Requiring Retention	0.00	0.00	0.00	0.00	0.00	0.00	-	-	-	-	ratio
	13	Required Retention Volume	0	0	0	0	0	0	-	-	-	-	cubic-feet

Attention!

-Retention requirements have been omitted in these calculations. Such an omission is only be acceptable for Green Street projects or projects that submit supplemental calculations demonstrating retention requirements are satisfied at the project-level.

Automated Worksheet B.3: BMP Performance (V2.0)

Category	#	Description	*i*	*ii*	*iii*	*iv*	*v*	*vi*	*vii*	*viii*	*ix*	*x*	Units
BMP Inputs	1	Drainage Basin ID or Name	E11	E12	E13	E14	E15	E16	-	-	-	-	sq-ft
	2	Design Infiltration Rate Recommended	0.000	0.000	0.000	0.000	0.000	0.000	-	-	-	-	in/hr
	3	Design Capture Volume Tributary to BMP	259	114	460	168	229	633	-	-	-	-	cubic-feet
	4	Is BMP Vegetated or Unvegetated?	Vegetated	Vegetated	Vegetated	Vegetated	Vegetated	Vegetated					unitless
	5	Is BMP Impermeably Lined or Unlined?	Lined	Lined	Lined	Lined	Lined	Lined					unitless
	6	Does BMP Have an Underdrain?	Underdrain	Underdrain	Underdrain	Underdrain	Underdrain	Underdrain					unitless
	7	Does BMP Utilize Standard or Specialized Media?	Standard	Standard	Standard	Standard	Standard	Standard					unitless
	8	Provided Surface Area	160	70	290	110	140	390					sq-ft
	9	Provided Surface Ponding Depth	6	6	6	6	6	6					inches
	10	Provided Soil Media Thickness	24	30	24	24	24	24					inches
	11	Provided Gravel Thickness (Total Thickness)	12	12	12	12	12	12					inches
	12	Underdrain Offset	3	3	3	3	3	3					inches
	13	Diameter of Underdrain or Hydromod Orifice (Select Smallest)	6.00	8.00	6.00	6.00	6.00	6.00					inches
	14	Specialized Soil Media Filtration Rate											in/hr
	15	Specialized Soil Media Pore Space for Retention											unitless
	16	Specialized Soil Media Pore Space for Biofiltration											unitless
	17	Specialized Gravel Media Pore Space											unitless
Retention Calculations	18	Volume Infiltrated Over 6 Hour Storm	0	0	0	0	0	0	0	0	0	0	cubic-feet
	19	Ponding Pore Space Available for Retention	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	unitless
	20	Soil Media Pore Space Available for Retention	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	unitless
	21	Gravel Pore Space Available for Retention (Above Underdrain)	0.00	0.00	0.00	0.00	0.00	0.00	0.40	0.40	0.40	0.40	unitless
	22	Gravel Pore Space Available for Retention (Below Underdrain)	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	unitless
	23	Effective Retention Depth	2.40	2.70	2.40	2.40	2.40	2.40	0.00	0.00	0.00	0.00	inches
	24	Fraction of DCV Retained (Independent of Drawdown Time)	0.12	0.14	0.13	0.13	0.12	0.12	0.00	0.00	0.00	0.00	ratio
	25	Calculated Retention Storage Drawdown Time	120	120	120	120	120	120	0	0	0	0	hours
	26	Efficacy of Retention Processes	0.14	0.16	0.15	0.15	0.14	0.14	0.00	0.00	0.00	0.00	ratio
	27	Volume Retained by BMP (Considering Drawdown Time)	36	18	69	25	32	89	0	0	0	0	cubic-feet
	28	Design Capture Volume Remaining for Biofiltration	223	96	391	143	197	544	0	0	0	0	cubic-feet
Biofiltration Calculations	29	Max Hydromod Flow Rate through Underdrain	1.6375	3.1067	1.6375	1.6375	1.6375	1.6375	0.0000	0.0000	0.0000	0.0000	cfs
	30	Max Soil Filtration Rate Allowed by Underdrain Orifice	442.13	1,917.29	243.93	643.10	505.29	181.39	0.00	0.00	0.00	0.00	in/hr
	31	Soil Media Filtration Rate per Specifications	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	in/hr
	32	Soil Media Filtration Rate to be used for Sizing	5.00	5.00	5.00	5.00	5.00	5.00	0.00	0.00	0.00	0.00	in/hr
	33	Depth Biofiltered Over 6 Hour Storm	30.00	30.00	30.00	30.00	30.00	30.00	0.00	0.00	0.00	0.00	inches
	34	Ponding Pore Space Available for Biofiltration	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	unitless
	35	Soil Media Pore Space Available for Biofiltration	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	unitless
	36	Gravel Pore Space Available for Biofiltration (Above Underdrain)	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	unitless
	37	Effective Depth of Biofiltration Storage	14.40	15.60	14.40	14.40	14.40	14.40	0.00	0.00	0.00	0.00	inches
	38	Drawdown Time for Surface Ponding	1	1	1	1	1	1	0	0	0	0	hours
	39	Drawdown Time for Effective Biofiltration Depth	3	3	3	3	3	3	0	0	0	0	hours
	40	Total Depth Biofiltered	44.40	45.60	44.40	44.40	44.40	44.40	0.00	0.00	0.00	0.00	inches
	41	Option 1 - Biofilter 1.50 DCV: Target Volume	334	143	586	214	295	816	0	0	0	0	cubic-feet
	42	Option 1 - Provided Biofiltration Volume	334	143	586	214	295	816	0	0	0	0	cubic-feet
	43	Option 2 - Store 0.75 DCV: Target Volume	167	72	293	107	148	408	0	0	0	0	cubic-feet
	44	Option 2 - Provided Storage Volume	167	72	293	107	148	408	0	0	0	0	cubic-feet
	45	Portion of Biofiltration Performance Standard Satisfied	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	ratio
Result	46	Do Site Design Elements and BMPs Satisfy Annual Retention Requirements?	Yes	Yes	Yes	Yes	Yes	Yes	-	-	-	-	yes/no
	47	Overall Portion of Performance Standard Satisfied (BMP Efficacy Factor)	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	ratio
	48	**Deficit of Effectively Treated Stormwater**	**0**	**0**	**0**	**0**	**0**	**0**	**n/a**	**n/a**	**n/a**	**n/a**	cubic-feet

No Warning Messages

ATTACHMENT 1d

FORM I-7: HARVEST AND USE FEASIBILITY SCREENING CHECKLIST

Harvest and Use Feasibility Checklist	Form I-7

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:_____

Infeasibility assessment is based on automated Worksheet B.2. Line 7. No habitable structures greater than 9 stories proposed.

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.

We anticipate no demand since a new recycled water line in Tremont would provide long term irrigation service for the project's life cycle.

3. Calculate the DCV using worksheet B-2.1.

DCV = _____ (cubic feet)

3a. Is the 36 hour demand greater than or equal to the DCV?	3b. Is the 36 hour demand greater than 0.25DCV but less than the full DCV?	3c. Is the 36 hour demand less than 0.25DCV?
☐ Yes / ☐ No ⇨ ⇩	☐ Yes / ☐ No ⇨ ⇩	☐ Yes ⇩
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.	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.	Harvest and use is considered to be infeasible.

Is harvest and use feasible based on further evaluation?

☐ Yes, refer to Appendix E to select and size harvest and use BMPs.

☒ No, select alternate BMPs.

ATTACHMENT 1e

FORM I-8: CATEGORIZATION OF INFILTRATION FEASIBILITY CONDITION
(NOTE FORM 4 PROVIDED IN LIEU OF FORM I-8)

INFILTRATION RESTRICTIONS

Form 4 from the BMP Design Manual is intended to present the mandatory and optional criteria when considering stormwater infiltration feasibility at a site. NOVA has selected *Restricted* on this form due to the geologic conditions and proximity to the coastal bluff. Form 4 is presented below. Further discussion is presented following the form.

Infiltration Restrictions		Form 4	
Retention is required at the project site to the maximum extent practicable. Complete this form to summarize applicable infiltration restrictions. Supporting documentation must be provided in the Attachments.			
	Restriction Element	**Applicable?**	
Mandatory Considerations	BMP is within 100 feet of contaminated soils	☐ Yes	☒ No
	BMP is within 100 feet of industrial activities lacking source control	☐ Yes	☒ No
	BMP is within 100 feet of well/groundwater basin	☐ Yes	☒ No
	BMP is within 50 feet of septic tanks/leach fields	☐ Yes	☒ No
	BMP is within 10 feet of structures/tanks/walls	☐ Yes	☒ No
	BMP is within 10 feet of sewer utilities	☐ Yes	☒ No
	BMP is within 10 feet of groundwater table	☐ Yes	☒ No
	BMP is within hydric soils	☐ Yes	☒ No
	BMP is within highly liquefiable soils and has connectivity to structures	☐ Yes	☒ No
	BMP is within 1.5 times the height of adjacent steep slopes (≥25%)	☐ Yes	☒ No
	City staff has assigned "Restricted" Infiltration Category	☐ Yes	☒ No
Optional Considerations	BMP is within predominantly Type D soil	☐ Yes	☒ No
	BMP is within 10 feet of property line	☐ Yes	☒ No
	BMP is within fill depths of ≥5 feet (existing or proposed)	☐ Yes	☒ No
	BMP is within 10 feet of underground utilities	☐ Yes	☒ No
	BMP is within 250 feet of ephemeral stream	☐ Yes	☒ No
	Other (provide detailed geotechnical support in Attachment 6)	☒ Yes	☐ No
Result	**Unrestricted** – No restriction elements are applicable	☐	
	Restricted – One or more restriction elements are applicable	☒	

* Note BMP 2 is within fill depths of ≥5 feet. Therefore the "BMP is within fill depths ≥5 feet" consideration is applicable.

ATTACHMENT 1f

POLLUTANT CONTROL BMP DESIGN WORKSHEETS/CALCULATIONS

SEE ATTACHMENT 1C FOR WORKSHEETS AND WATER QUALITY CALCULATIONS.

ATTACHMENT 2
BACKUP FOR PDP HYDROMODIFICATION CONTROL MEASURES

AS SHOWN IN FORM I-1 OF THIS REPORT, THE PROJECT IS NOT REQUIRED TO PROVIDE HYDROMODIFICATION CONTROL MEASURES SINCE ALL OF THE THREE TRIBUTARIES OF THE PROJECT DRAIN TO EXISTING FACILITIES THAT ARE HARDLINED TO THE ULTIMATE DISCHARGE POINT IN THE PACIFIC OCEAN.

ATTACHMENT 3
STRUCTURAL BMP MAINTENANCE INFORMATION

Indicate which Items are Included:

Attachment Sequence	Contents	Checklist
Attachment 3a	Structural BMP Maintenance Thresholds and Actions (Required)	☒Included See Structural BMP Maintenance Information Checklist.
Attachment 3b	Draft Maintenance Agreement (when applicable)	☐Included ☒Not Applicable

Use this checklist to ensure the required information has been included in the Structural BMP Maintenance Information Attachment:

Preliminary Design / Planning / CEQA level submittal:

- Attachment 3a must identify:

☒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).

E.2 SD-1 Street Trees



MS4 Permit Category
Site Design
Manual Category
Site Design
Applicable Performance Standard
Site Design
Primary Benefits
Volume Reduction

Street Trees (Source: County of San Diego LID Manual – EOA, Inc.)

Description

Trees planted to intercept rainfall and runoff can be used as storm water management measures that provide additional benefits beyond those typically associated with trees, including energy conservation, air quality improvement, and aesthetic enhancement. Typical storm water management benefits associated with trees include:

- **Interception of rainfall** – tree surfaces (roots, foliage, bark, and branches) intercept, evaporate, store, or convey precipitation to the soil before it reaches surrounding impervious surfaces
- **Reduced erosion** – trees protect denuded area by intercepting or reducing the velocity of rain drops as they fall through the tree canopy
- **Increased infiltration** – soil conditions created by roots and fallen leaves promote infiltration
- **Treatment of storm water** – trees provide treatment through uptake of nutrients and other storm water pollutants (phytoremediation) and support of other biological processes that break down pollutants

Typical street tree system components include:

- Trees of the appropriate species for site conditions and constraints
- Available growing space based on tree species, soil type, water availability, surrounding land uses, and project goals

- Optional suspended pavement design to provide structural support for adjacent pavement without requiring compaction of underlying layers
- Optional root barrier devices as needed; a root barrier is a device installed in the ground, between a tree and the sidewalk, intended to guide roots down and away from the sidewalk in order to prevent sidewalk lifting from tree roots.
- Optional tree grates; to be considered to maximize available space for pedestrian circulation and to protect tree roots from compaction related to pedestrian circulation; tree grates are typically made up of porous material that will allow the runoff to soak through.
- Optional shallow surface depression for ponding of excess runoff
- Optional planter box drain

Design Adaptations for Project Goals

Site design BMP to provide incidental treatment. Street trees primarily functions as site design BMPs for incidental treatment. Benefits from street trees are accounted for by adjustment factors presented in Appendix B.2. This credit can apply to non-street trees as well (that meet the same criteria). Trees as a site design BMP are only credited up to 0.25 times the DCV from the project footprint (with a maximum single tree credit volume of 400 ft^3).

Storm water pollutant control BMP to provide treatment. Applicants are allowed to design trees as a pollutant control BMP and obtain credit greater than 0.25 times the DCV from the project footprint (or a credit greater than 400 ft^3 from a single tree). For this option to be approved by the City Engineer, applicant is required to do infiltration feasibility screening (Appendix C and D) and provide calculations supporting the amount of credit claimed from implementing trees within the project footprint. The City Engineer has the discretion to request additional analysis before approving credits greater than 0.25 times the DCV from the project footprint (or a credit greater than 400 ft^3 from a single tree).

Design Criteria and Considerations

Street Trees must meet the following design criteria and considerations. Deviations from the below criteria may be approved at the discretion of the City Engineer if it is determined to be appropriate:

Siting and Design		*Intent/Rationale*
☐	**Tree species** is appropriately chosen for the development (private or public). For public rights-of-ways, City planning guidelines and zoning provisions for the permissible species and placement of trees are consulted. A list of trees appropriate for site design that can be	Proper tree placement and species selection minimizes problems such as pavement damage by surface roots and poor growth.

Siting and Design		*Intent/Rationale*
	used by all county municipalities are provided in Appendix E.20	
☐	**Location of trees** planted along public streets follows City requirements and guidelines. Vehicle and pedestrian line of sight are considered in tree selection and placement. Unless exemption is granted by the City Engineer the following minimum tree separation distance is followed Improvement — Minimum distance to Street Tree Traffic Signal, Stop sign — 20 feet Underground Utility lines (except sewer) — 5 feet Sewer Lines — 10 feet Above ground utility structures (Transformers, Hydrants, Utility poles, etc.) — 10 feet Driveways — 10 feet Intersections (intersecting curb lines of two streets) — 25 feet	Roadway safety for both vehicular and pedestrian traffic is a key consideration for placement along public streets.
☐	**Underground utilities and overhead wires** are considered in the design and avoided or circumvented. Underground utilities are routed around or through the planter in suspended pavement applications. All underground utilities are protected from water and root penetration.	Tree growth can damage utilities and overhead wires resulting in service interruptions. Protecting utilities routed through the planter prevents damage and service interruptions.

Siting and Design		*Intent/Rationale*
☐	**Suspended pavement** design was developed where appropriate to minimize soil compaction and improve infiltration and filtration capabilities. Suspended pavement was constructed with an approved structural cell.	Suspended pavement designs provide structural support without compaction of the underlying layers, thereby promoting tree growth. Recommended structural cells include poured in place concrete columns, Silva Cells manufactured by Deeproot Green Infrastructures and Stratacell and Stratavault systems manufactured by Citygreen Systems.
☐	A minimum soil volume of 2 cubic feet per square foot of canopy projection volume is provided for each tree. Canopy projection area is the ground area beneath the tree, measured at the drip line.	The minimum soil volume ensures that there is adequate storage volume to allow for unrestricted evapotranspiration. A lower amount of soil volume may be allowed at the discretion of the City Engineer if certified by a landscape architect or agronomist. The retention credit from the tree is directly proportional to the soil volume provided for the tree.
☐	DCV from the tributary area draining to the tree is equal to or greater than the tree credit volume	The minimum tributary area ensures that the tree receives enough runoff to fully utilize the infiltration and evapotranspiration potential provided. In cases where the minimum tributary area is not provided, the tree credit volume must be reduced proportionately to the actual tributary area.
☐	Inlet opening to the tree that is at least 18 inches wide. A minimum 2 inch drop in grade from the inlet to the finish grade of the tree.	Design requirement to ensure that the runoff from the tributary area is not bypassed. Different inlet openings and drops in grade may be allowed at the discretion of the City Engineer if calculations are shown that the diversion flow rate (Appendix B.1.2) from the tributary area can be conveyed to the tree. In cases

Siting and Design	*Intent/Rationale*
Grated inlets are allowed for pedestrian circulation. Grates need to be ADA compliant and have sufficient slip resistance.	where the inlet capacity is limiting the amount of runoff draining to the tree, the tree credit volume must be reduced proportionately.

Conceptual Design and Sizing Approach for Site Design

1. Determine the areas where street trees can be used in the site design to achieve incidental treatment. Street trees reduce runoff volumes from the site. Refer to Appendix B.2. Document the proposed tree locations in the SWQMP.

2. When trees are proposed as a storm water pollutant control BMP, the project proponent must submit detailed calculations for the DCV treated by trees. Document the proposed tree locations on the BMP Plan & DMA Map, and provide sizing calculations in the SWQMP Attachment following the steps in Appendix B.

3. When trees are proposed as a flow control BMP, the project proponent must submit detailed calculations for the Required Retention Volume (RRV) treated by trees. Document the proposed tree locations on the BMP Plan & DMA Map, and provide sizing calculations in the SWQMP Attachment. Tree Wells that are designed to meet flow control requirements are designated as SSD BMPs.

    a. Determine how much volume you need. The Required Retention Volume (RRV) is the volume of rainfall that must be retained by the tree wells in the DMA to meet flow control requirements. It is calculated by multiplying the DCV by a DCV multiplier.

        i. Determine the DCV. See Appendix B.

        ii. Determine the DCV Multiplier. The DCV Multiplier is based on two factors: (1) The tree well soil depth and, (2) The Hydrologic Soil Group. Once you know both values, determine the DCV Multiplier using this table:

        iii. Calculate the Required Retention Volume (DCV x DCV Multiplier). Calculate the RRV by multiplying the DCV by the DCV Multiplier. This is the volume of runoff that must be offset by the Tree Well Credit Volume. Repeat this process for each DMA.

Minimum Tree Well Soil Depth (inches)	Hydrologic Soil Group				
	A	B	C	D (Default)	
30"	1.60	2.20	2.50	2.90	DCV Multiplier
36"	1.80	2.47	2.83	3.17	
42"	2.00	2.73	3.17	3.43	
48"	2.20	3.00	3.50	3.70	

DCV Multiplier Table

Tree Well Soil Depth is the vertical distance from the top to the bottom of the soil layer in the tree well. Hydrologic Soil Group describes the native soil surrounding the tree well. Soil type affects how well water can infiltrate into the area surrounding the tree well. Group A soils provide the most infiltration and Group D the least. If your soil type is unknown, you can assume Group D. But this will result in larger DCV Multipliers, and in turn increase the size or number of tree wells needed.

Alternative Proposals: You can also propose RRV values or use methods and assumptions different than those described here. Proposals must be based on SWMM modeling or other methods acceptable to the County.

b. Determine how much volume you have. The Tree Well Credit Volume is the volume of runoff retention in cubic feet per tree (ft3/tree) to be provided by each tree well (or group) in the DMA. Together retain a volume that is equal to or greater than the RRV for the DMA.

   The volume credited for each tree well is based on the mature canopy diameter of the tree species selected. Any species listed below can be used in a tree well so long as it meets all other applicable restrictions and requirements for the project area. Native and drought tolerant species are required where feasible.

c. Determine if you have enough volume. Compare your total Tree Well Credit Volume from Step 2 to the RRV you calculated in Step 1. Once your Credit Volume is equal to or greater than your RRV, this requirement is satisfied. If your Credit Volume is initially too low, adjust your design either to (1) increase it with more or bigger trees, or (2) decrease the RRV through DCV reductions.

Tree wells will normally be placed at the discharge point of the DMA, either individually or in groups. If some of them will retain runoff from different areas in the DMA, RRV and DCV calculations must be specific to each subarea.

If an underdrain is proposed for the Tree Well, the sizing factors shown in the DCV Multiplier Table cannot be used, and instead continuous simulation modeling should be performed. This would allow to obtain credit for soil volume underneath the underdrain.

E.12 BF-1 Biofiltration



Location: 43rd Street and Logan Avenue, San Diego, California

MS4 Permit Category
Biofiltration

Manual Category
Biofiltration

Applicable Performance Standard
Pollutant Control
Flow Control

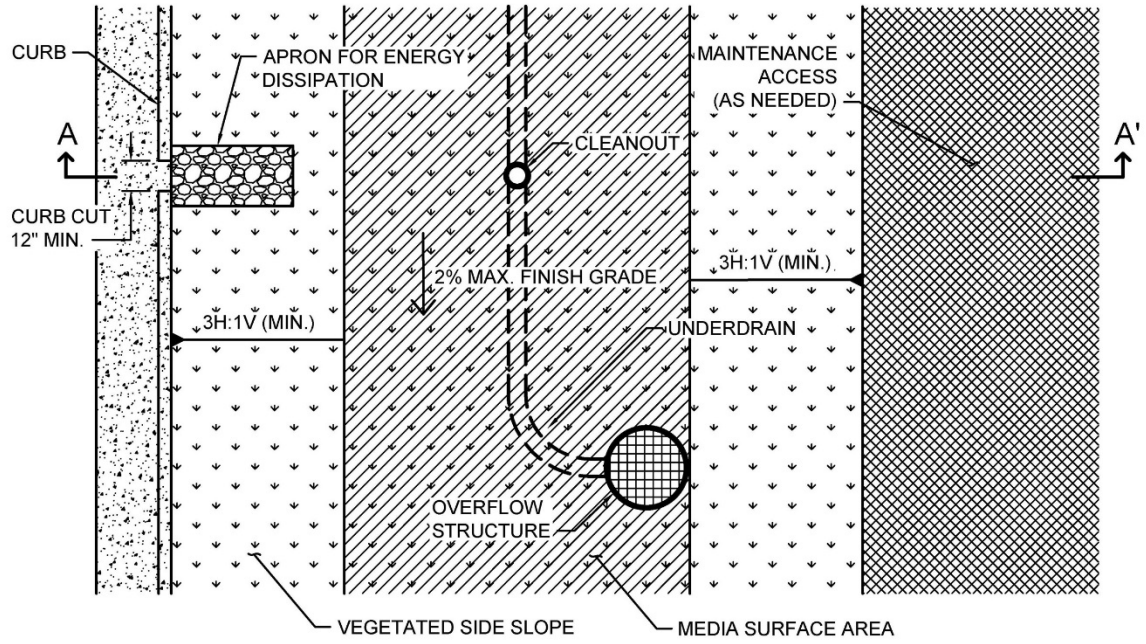
Primary Benefits
Treatment
Volume Reduction (Incidental)
Peak Flow Attenuation (Optional)

Description

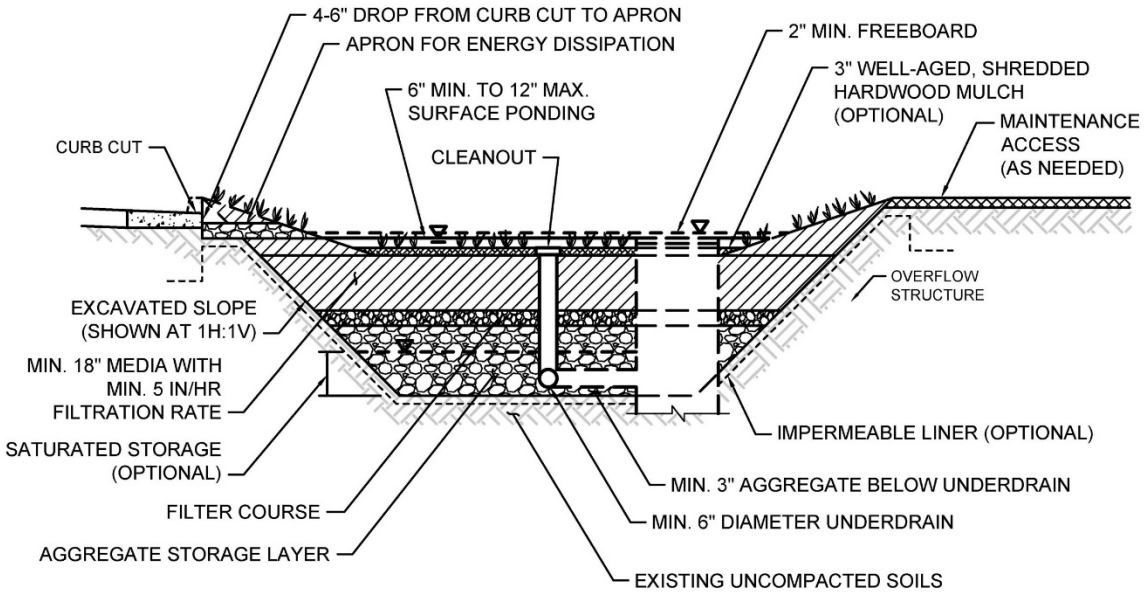
Biofiltration (Bioretention with underdrain) facilities are vegetated surface water systems that filter water through vegetation, and soil or engineered media prior to discharge via underdrain or overflow to the downstream conveyance system. Bioretention with underdrain facilities are commonly incorporated into the site within parking lot landscaping, along roadsides, and in open spaces. Because these types of facilities have limited or no infiltration, they are typically designed to provide enough hydraulic head to move flows through the underdrain connection to the storm drain system. Treatment is achieved through filtration, sedimentation, sorption, biochemical processes and plant uptake.

Typical bioretention with underdrain components include:

- Inflow distribution mechanisms (e.g, perimeter flow spreader or filter strips)
- Energy dissipation mechanism for concentrated inflows (e.g., splash blocks or riprap)
- Shallow surface ponding for captured flows
- Side slope and basin bottom vegetation selected based on expected climate and ponding depth
- Non-floating mulch layer (Optional)
- Media layer (planting mix or engineered media) capable of supporting vegetation growth
- Filter course layer consisting of aggregate to prevent the migration of fines into uncompacted native soils or the aggregate storage layer
- Aggregate storage layer with underdrain(s)
- Impermeable liner or uncompacted native soils at the bottom of the facility
- Overflow structure



PLAN
NOT TO SCALE



SECTION A-A'
NOT TO SCALE

Typical plan and Section view of a Biofiltration BMP

Design Adaptations for Project Goals

Biofiltration Treatment BMP for storm water pollutant control. The system is lined or un-lined to provide incidental infiltration, and an underdrain is provided at the bottom to carry away filtered runoff. This configuration is considered to provide biofiltration treatment via flow through the media layer. Storage provided above the underdrain within surface ponding, media, and aggregate storage is considered included in the biofiltration treatment volume. Saturated storage within the aggregate storage layer can be added to this design by raising the underdrain above the bottom of the aggregate storage layer or via an internal weir structure designed to maintain a specific water level elevation.

Integrated storm water flow control and pollutant control configuration. The system can be designed to provide flow rate and duration control by primarily providing increased surface ponding and/or having a deeper aggregate storage layer above the underdrain. This will allow for significant detention storage, which can be controlled via inclusion of an outlet structure at the downstream end of the underdrain.

Design Criteria and Considerations

Bioretention with underdrain must meet the following design criteria. Deviations from the below criteria may be approved at the discretion of the City Engineer if it is determined to be appropriate:

	Siting and Design	*Intent/Rationale*
☐	Placement observes geotechnical recommendations regarding potential hazards (e.g., slope stability, landslides, liquefaction zones) and setbacks (e.g., slopes, foundations, utilities).	Must not negatively impact existing site geotechnical concerns.
☐	An impermeable liner or other hydraulic restriction layer is included if site constraints indicate that infiltration or lateral flows should not be allowed.	Lining prevents storm water from impacting groundwater and/or sensitive environmental or geotechnical features. Incidental infiltration, when allowable, can aid in pollutant removal and groundwater recharge.
☐	Contributing tributary area shall be ≤ 5 acres (≤ 1 acre preferred).	Bigger BMPs require additional design features for proper performance. Contributing tributary area greater than 5 acres may be allowed at the discretion of the City Engineer if the following conditions are met: 1) incorporate design features (e.g. flow spreaders) to minimizing short circuiting of flows in

Siting and Design		*Intent/Rationale*
		the BMP and 2) incorporate additional design features requested by the City Engineer for proper performance of the regional BMP.
☐	Finish grade of the facility is ≤ 2%.	Flatter surfaces reduce erosion and channelization within the facility.
Surface Ponding		
☐	Surface ponding is limited to a 24-hour drawdown time.	Surface ponding limited to 24 hours for plant health. Surface ponding drawdown time greater than 24-hours but less than 96 hours may be allowed at the discretion of the City Engineer if certified by a landscape architect or agronomist.
☐	Surface ponding depth is ≥ 6 and ≤ 12 inches.	Surface ponding capacity lowers subsurface storage requirements. Deep surface ponding raises safety concerns. Surface ponding depth greater than 12 inches (for additional pollutant control or surface outlet structures or flow-control orifices) may be allowed at the discretion of the City Engineer if the following conditions are met: 1) surface ponding depth drawdown time is less than 24 hours; and 2) safety issues and fencing requirements are considered (typically ponding greater than 18" will require a fence and/or flatter side slopes) and 3) potential for elevated clogging risk is considered.
☐	A minimum of 12 inches of freeboard is provided.	Freeboard provides room for head over overflow structures and minimizes risk of uncontrolled surface discharge.
☐	Side slopes are stabilized with vegetation and are = 3H:1V or shallower.	Gentler side slopes are safer, less prone to erosion, able to establish vegetation more quickly and easier to maintain.
Vegetation		

Siting and Design		*Intent/Rationale*
☐	Plantings are suitable for the climate and expected ponding depth. A plant list to aid in selection can be found in Appendix E.20.	Plants suited to the climate and ponding depth are more likely to survive.
☐	An irrigation system with a connection to water supply should be provided as needed.	Seasonal irrigation might be needed to keep plants healthy.
Mulch		
☐	A minimum of 3 inches of well-aged, shredded hardwood mulch that has been stockpiled or stored for at least 12 months is provided.	Mulch will suppress weeds and maintain moisture for plant growth. Aging mulch kills pathogens and weed seeds and allows the beneficial microbes to multiply.
Media Layer		
☐	Media maintains a minimum filtration rate of 5 in/hr over lifetime of facility. An initial filtration rate of 8 to 12 in/hr is recommended to allow for clogging over time; the initial filtration rate should not exceed 12 inches per hour.	A filtration rate of at least 5 inches per hour allows soil to drain between events. The initial rate should be higher than long term target rate to account for clogging over time. However an excessively high initial rate can have a negative impact on treatment performance, therefore an upper limit is needed.
☐	Media is a minimum 18 inches deep, meeting either of these two media specifications: City of San Diego Storm Water Standards Appendix F.3 (May 2021, unless superseded by more recent edition) **or** County of San Diego BMP Design Manual: Appendix F.2 Biofiltration Soil Media Composition, Testing,(September 2020, unless superseded by more recent edition). Alternatively, for proprietary designs and custom media mixes not meeting the media specifications contained in the 2021 City of San Diego Storm Water Standards or County LID Manual, the media meets the pollutant treatment performance criteria in Section F.1.	A deep media layer provides additional filtration and supports plants with deeper roots. Standard specifications shall be followed. For non-standard or proprietary designs, compliance with F.1 ensures that adequate treatment performance will be provided.

Siting and Design		*Intent/Rationale*
☐	Media surface area is 3% of contributing area times adjusted runoff factor or greater. Unless demonstrated that the BMP surface area can be smaller than 3%.	Greater surface area to tributary area ratios: a) maximizes volume retention as required by the MS4 Permit and b) decrease loading rates per square foot and therefore increase longevity. Adjusted runoff factor is to account for site design BMPs implemented upstream of the BMP (such as rain barrels, impervious area dispersion, etc.). Refer to Appendix B.2 guidance. Use Worksheet B.5-1 Line 26 to estimate the minimum surface area required per this criteria.
☐	Where receiving waters are impaired or have a TMDL for nutrients, the system is designed with nutrient sensitive media design (see fact sheet BF-2).	Potential for pollutant export is partly a function of media composition; media design must minimize potential for export of nutrients, particularly where receiving waters are impaired for nutrients.
Filter Course Layer		
☐	A filter course is used to prevent migration of fines through layers of the facility. Filter fabric is not used.	Migration of media can cause clogging of the aggregate storage layer void spaces or subgrade. Filter fabric is more likely to clog.
☐	Filter course is washed and free of fines.	Washing aggregate will help eliminate fines that could clog the facility and impede infiltration.
☐	Filter course calculations assessing suitability for particle migration prevention have been completed.	Gradation relationship between layers can evaluate factors (e.g., bridging, permeability, and uniformity) to determine if particle sizing is appropriate or if an intermediate layer is needed.
Aggregate Storage Layer		
☐	Class 2 Permeable per Caltrans specification 68-1.025 is recommended for the storage layer. Washed, open-graded crushed rock may be used, however a 4-6 inch washed pea gravel	Washing aggregate will help eliminate fines that could clog the aggregate storage layer void spaces or subgrade.

Siting and Design		*Intent/Rationale*
	filter course layer at the top of the crushed rock is required.	
☐	The depth of aggregate provided (12-inch typical) and storage layer configuration is adequate for providing conveyance for underdrain flows to the outlet structure.	Proper storage layer configuration and underdrain placement will minimize facility drawdown time.
Inflow, Underdrain, and Outflow Structures		
☐	Inflow, underdrains and outflow structures are accessible for inspection and maintenance.	Maintenance will prevent clogging and ensure proper operation of the flow control structures.
☐	Inflow velocities are limited to 3 ft/s or less or use energy dissipation methods. (e.g., riprap, level spreader) for concentrated inflows.	High inflow velocities can cause erosion, scour and/or channeling.
☐	Curb cut inlets are at least 12 inches wide, have a 4-6 inch reveal (drop) and an apron and energy dissipation as needed.	Inlets must not restrict flow and apron prevents blockage from vegetation as it grows in. Energy dissipation prevents erosion.
☐	Underdrain outlet elevation should be a minimum of 3 inches above the bottom elevation of the aggregate storage layer.	A minimal separation from subgrade or the liner lessens the risk of fines entering the underdrain and can improve hydraulic performance by allowing perforations to remain unblocked.
☐	Minimum underdrain diameter is 6 inches.	Smaller diameter underdrains are prone to clogging.
☐	Underdrains are made of slotted, PVC pipe conforming to ASTM D 3034 or equivalent or corrugated, HDPE pipe conforming to AASHTO 252M or equivalent.	Slotted underdrains provide greater intake capacity, clog resistant drainage, and reduced entrance velocity into the pipe, thereby reducing the chances of solids migration.
☐	An underdrain cleanout with a minimum 6-inch diameter and lockable cap is placed every 250 to 300 feet as required based on underdrain length.	Properly spaced cleanouts will facilitate underdrain maintenance.
☐	Overflow is safely conveyed to a downstream storm drain system or discharge point Size overflow structure to pass 100-year peak flow	Planning for overflow lessens the risk of property damage due to flooding.

Siting and Design	*Intent/Rationale*
for on-line infiltration basins and water quality peak flow for off-line basins.	

Conceptual Design and Sizing Approach for Storm Water Pollutant Control Only

To design bioretention with underdrain for storm water pollutant control only (no flow control required), the following steps should be taken:

1. Verify that siting and design criteria have been met, including placement requirements, contributing tributary area, maximum side and finish grade slopes, and the recommended media surface area tributary ratio.
2. Calculate the DCV per Appendix B based on expected site design runoff for tributary areas.
3. Use the sizing worksheet presented in Appendix B.5 to size biofiltration BMPs.

Conceptual Design and Sizing Approach when Storm Water Flow Control is Applicable

Control of flow rates and/or durations will typically require significant surface ponding and/or aggregate storage volumes, and therefore the following steps should be taken prior to determination of storm water pollutant control design. Pre-development and allowable post-project flow rates and durations should be determined as discussed in Chapter 6 of the manual.

1. Verify that siting and design criteria have been met, including placement requirements, contributing tributary area, maximum side and finish grade slopes, and the recommended media surface area tributary ratio.
2. Iteratively determine the facility footprint area, surface ponding and/or aggregate storage layer depth required to provide detention storage to reduce flow rates and durations to allowable limits. Flow rates and durations can be controlled from detention storage by altering outlet structure orifice size(s) and/or water control levels. Multi-level orifices can be used within an outlet structure to control the full range of flows.
3. If bioretention with underdrain cannot fully provide the flow rate and duration control required by this manual, an upstream or downstream structure with significant storage volume such as an underground vault can be used to provide remaining controls.
4. After bioretention with underdrain has been designed to meet flow control requirements, calculations must be completed to verify if storm water pollutant control requirements to treat the DCV have been met.

E.13 BF-2 Nutrient Sensitive Media Design

Some studies of bioretention with underdrains have observed export of nutrients, particularly inorganic nitrogen (nitrate and nitrite) and dissolved phosphorus. This has been observed to be a short-lived phenomenon in some studies or a long term issue in some studies. The composition of the soil media, including the chemistry of individual elements is believed to be an important factor in the potential for nutrient export. Organic amendments, often compost, have been identified as the most likely source of nutrient export. The quality and stability of organic amendments can vary widely.

The biofiltration media specifications contained in the County of San Diego BMP Design Manual: Appendix F.2 Biofiltration Soil Media Composition, Testing,(September 2020, unless superseded by more recent edition) and the City of San Diego Low Impact Development Design Manual (page B-18) (July 2011, unless superseded by more recent edition) were developed with consideration of the potential for nutrient export. These specifications include criteria for individual component characteristics and quality in order to control the overall quality of the blended mixes. As of the publication of this manual, the September 2020 County of San Diego specifications provide more detail regarding mix design and quality control.

The City and County specifications noted above were developed for general purposes to meet permeability and treatment goals. In cases where the BMP discharges to receiving waters with nutrient impairments or nutrient TMDLs, the biofiltration media should be designed with the specific goal of minimizing the potential for export of nutrients from the media. Therefore, in addition to adhering to the City or County media specifications, the following guidelines should be followed:

1. Select plant palette to minimize plant nutrient needs

A landscape architect or agronomist should be consulted to select a plant palette that minimizes nutrient needs. Utilizing plants with low nutrient needs results in less need to enrich the biofiltration soil mix. If nutrient quantity is then tailored to plants with lower nutrient needs, these plants will generally have less competition from weeds, which typically need higher nutrient content. The following practices are recommended to minimize nutrient needs of the plant palette:

- **Utilize native, drought-tolerant plants and grasses where possible.** Native plants generally have a broader tolerance for nutrient content, and can be longer lived in leaner/lower nutrient soils.

- **Start plants from smaller starts or seed.** Younger plants are generally more tolerant of lower nutrient levels and tend to help develop soil structure as they grow. Given the lower cost of smaller plants, the project should be able to accept a plant mortality rate that is somewhat higher than starting from larger plants and providing high organic content.

2. Minimize excess nutrients in media mix

Once the low-nutrient plant palette is established (item 1), the landscape architect and/or agronomist should be consulted to assist in the design of a biofiltration media to balance the interests of plant establishment, water retention capacity (irrigation demand), and the potential for nutrient export. The following guidelines should be followed:

- **The mix should not exceed the nutrient needs of plants.** In conventional landscape design, the nutrient needs of plants are often exceeded intentionally in order to provide a factor of safety for plant survival. This practice must be avoided in biofiltration media as excess nutrients will increase the chance of export. The mix designer should keep in mind that nutrients can be added later (through mulching, tilling of amendments into the surface), but it is not possible to remove nutrients, once added.

- **The actual nutrient content and organic content of the selected organic amendment source should be determined when specifying mix proportions.** Nutrient content (i.e., C:N ratio; plant extractable nutrients) and organic content (i.e, % organic material) are relatively inexpensive to measure via standard agronomic methods and can provide important information about mix design. If mix design relies on approximate assumption about nutrient/organic content and this is not confirmed with testing (or the results of prior representative testing), it is possible that the mix could contain much more nutrient than intended.

- **Nutrients are better retained in soils with higher cation exchange capacity.** Cation exchange capacity can be increased through selection of organic material with naturally high cation exchange capacity, such as peat or coconut coir pith, and/or selection of inorganic material with high cation exchange capacity such as some sands or engineered minerals (e.g., low P-index sands, zeolites, rhyolites, etc). Including higher cation exchange capacity materials would tend to reduce the net export of nutrients. Natural silty materials also provide cation exchange capacity; however potential impacts to permeability need to be considered.

- **Focus on soil structure as well as nutrient content.** Soil structure is loosely defined as the ability of the soil to conduct and store water and nutrients as well as the degree of aeration of the soil. Soil structure can be more important than nutrient content in plant survival and biologic health of the system. If a good soil structure can be created with very low amounts of organic amendment, plants survivability should still be provided. While soil structure generally develops with time, biofiltration media can be designed to promote earlier development of soil structure. Soil structure is enhanced by the use of amendments with high humus content (as found in well-aged organic material). In addition, soil structure can be enhanced through the use of organic material with a distribution of particle sizes (i.e., a more heterogeneous mix).

- **Consider alternatives to compost.** Compost, by nature, is a material that is continually evolving and decaying. It can be challenging to determine whether tests previously done on a given compost stock are still representative. It can also be challenging to determine how the properties of the compost will change once placed in the media bed. More stable materials

such as aged coco coir pith, peat, biochar, shredded bark, and/or other amendments should be considered.

With these considerations, it is anticipated that less than 10 percent organic amendment by volume could be used, while still balancing plant survivability and water retention. If compost is used, designers should strongly consider utilizing less than 10 percent by volume.

3. Design with partial retention and/or internal water storage

An internal water storage zone, as described in Fact Sheet PR-1 is believed to improve retention of nutrients. For lined systems, an internal water storage zone worked by providing a zone that fluctuates between aerobic and anaerobic conditions, resulting in nitrification/denitrification. In soils that will allow infiltration, a partial retention design (PR-1) allows significant volume reduction and can also promote nitrification/denitrification.

Acknowledgment: This fact sheet has been adapted from the Orange County Technical Guidance Document (May 2011). It was originally developed based on input from: Deborah Deets, City of Los Angeles Bureau of Sanitation, Drew Ready, Center for Watershed Health, Rick Fisher, ASLA, City of Los Angeles Bureau of Engineering, Dr. Garn Wallace, Wallace Laboratories, Glen Dake, GDML, and Jason Schmidt, Tree People. The guidance provided herein does not reflect the individual opinions of any individual listed above and should not be cited or otherwise attributed to those listed.

E.14 BF-3 Proprietary Biofiltration Systems

The purpose of this fact sheet is to help explain the potential role of proprietary BMPs in meeting biofiltration requirements, when full retention of the DCV is not feasible. The fact sheet does not describe design criteria like the other fact sheets in this appendix because this information varies by BMP product model.

Criteria for Use of a Proprietary BMP as a Biofiltration BMP

A proprietary BMP may be acceptable as a "biofiltration BMP" under the following conditions:

(1) The BMP meets the minimum design criteria listed in Appendix F, including the pollutant treatment performance standard in Appendix F.1;

(2) The BMP is designed and maintained in a manner consistent with its performance certifications (See explanation in Appendix F.2); and

(3) The BMP is acceptable at the discretion of the City Engineer. In determining the acceptability of a BMP, the City Engineer should consider, as applicable, (a) the data submitted; (b) representativeness of the data submitted; (c) consistency of the BMP performance claims with pollutant control objectives; certainty of the BMP performance claims; (d) for projects within the public right of way and/or public projects: maintenance requirements, cost of maintenance activities, relevant previous local experience with operation and maintenance of the BMP type, ability to continue to operate the system in event that the vending company is no longer operating as a business; and (e) other relevant factors. If a proposed BMP is not accepted by the City Engineer, a written explanation/reason will be provided to the applicant.

Guidance for Sizing a Proprietary BMP as a Biofiltration BMP

Proprietary biofiltration BMPs must meet the same sizing guidance as non-proprietary BMPs. Sizing is typically based on capturing and treating 1.50 times the DCV not reliably retained. Guidance for sizing biofiltration BMPs to comply with requirements of this manual is provided in Appendix F.2.

City of Oceanside Specific Guidance and Criteria

Proprietary systems being submitted for approval must have, at a minimum, a General Use Level Designation (GULD) through the Washington Dept. of Ecology's TAPE process or certification through The Technology Acceptance Reciprocity Partnership (TARP) to treat the project's pollutants of concern. While a GULD or TARP certification is required for consideration of

approval, it does not guarantee the system will be approved. Additional project specific factors such as project applicability and maintenance requirements will also be considered in the evaluation process.

Proprietary Devices claiming to remove or destroy bacteria must be registered pursuant to the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) prior to approval by the City of Oceanside.

ATTACHMENT 4
Copy of Plan Sheets Showing Permanent Storm Water BMPs

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 propritery BMPs are used, site specific cross section with outflow, inflow and model number shall be provided. Broucher photocopies are not allowed.

VESTING TENTATIVE MAP AND DEVELOPMENT PLAN

NCTD OCEANSIDE TRANSIT CENTER, 235 SOUTH TREMONT STREET
CITY OF OCEANSIDE, CALIFORNIA

GENERAL NOTES:

1.	TOTAL AREA:	GROSS: 438,912 SF (10.06 ACRES)
2.	EXISTING ZONING:	D-5, D-14, OP, PUT, R-3, D-5
3.	PROPOSED ZONING:	D-1
4.	NUMBER OF EXISTING PARCELS:	8
5.	FEMA FLOOD INSURANCE RATE MAP NO.:	06073C0734J eff. 12/20/2019, ZONE X, WITH BFE ZONE AE, AO, AH, VE, AR
6.	CONTOUR INTERVAL:	1 FT
7.	MAX. SLOPE GRADIENT:	10% MAX
8.	PERCENT OF PROJECT IN STREETS:	19.20% (1.93 ACRES)
9.	AMOUNT OF GRADING:	286,000 CY CUT; 1,000 CY FILL
10.	ASSESSORS PARCEL NUMBERS:	SEE SHEET C9

DESIGN NOTES:

1. ALL STREET DESIGN SHALL CONFORM TO THE CITY OF OCEANSIDE DESIGN STANDARDS AS REQUIRED BY THE CITY ENGINEER.
2. EASEMENTS SHALL BE PROVIDED, REMOVED OR RELOCATED AS REQUIRED BY THE CITY ENGINEER.
3. ALL PROPOSED UTILITIES SHALL BE UNDERGROUNDED AND EASEMENTS PROVIDED.
4. GEOTECHNICAL INVESTIGATION PREPARED BY: NOVA
5. THE DEVELOPER SHALL INSTALL STREET LIGHTS PER THE CITY OF OCEANSIDE ENGINEERING DEPARTMENT TRAFFIC DIVISION, THE STREET LIGHT DESIGN MANUAL AND THE CITY OF OCEANSIDE STANDARD DRAWING NO. M-4. STREET LIGHT LOCATIONS MAY VARY IN FINAL DESIGN.
6. ALL RETAINING WALLS IN EXCESS OF 4 FEET SHALL BE PLANTABLE.
7. ALL PROPOSED SEWER IS PUBLIC AND SHALL BE INSTALLED PER CITY OF OCEANSIDE STANDARDS.
8. ALL PROPOSED WATER IS PUBLIC AND SHALL BE INSTALLED PER CITY OF OCEANSIDE STANDARDS.
9. FINISH GRADES ARE APPROXIMATE AND SUBJECT TO CHANGE IN FINAL DESIGN, AS ALLOWED PER SUBSTANTIAL CONFORMITY.
10. ALL FUTURE DRIVEWAYS AND GEOMETRIC DESIGN SHALL BE DESIGNED IN COMPLIANCE WITH THE CITY OF OCEANSIDE ENGINEERS DESIGN STANDARDS.

BENCHMARK:

NATIONAL GEODETIC SURVEY DX3234, STAMPED PIER NO 2 1933

ELEVATION 28.65' (NAVD88)

AT THE END OF THE PIER EXTENDING WEST FROM THE WEST END OF THIRD STREET, APPROXIMATELY 420' WEST OF THE CENTER LINE OF PACIFIC STREET, SET IN THE TOP OF THE SOUTH CONCRETE CURBING ON THE PIER, 25.9' EAST OF THE STATION MARK

BASIS OF BEARINGS:

THE BASIS OF COORDINATES FOR THIS SURVEY IS THE CALIFORNIA COORDINATE SYSTEM (CCS83) ZONE VI, NAD 83 (2011.00 EPOCH), AS PER RECORD OF SURVEY 21787, FILED 8/21/2014 BY RBF CONSULTING, AS DETERMINED BY THE FOLLOWING CONTROL STATIONS:

3002 (DSME), 3004 (P474), 3005 (P478), 3006 (SBCC), 1004, 1005, 1006 AND 2102 (DX3432)

TOPOGRAPHY SOURCE:

THIS SURVEY IS BASED UPON AERIAL PHOTOGRAPHY FLOWN ON APRIL 2, 2021 BY R.J. LUNG AND ASSOCIATES.

LEGAL DESCRIPTION:

SEE SHEET C9

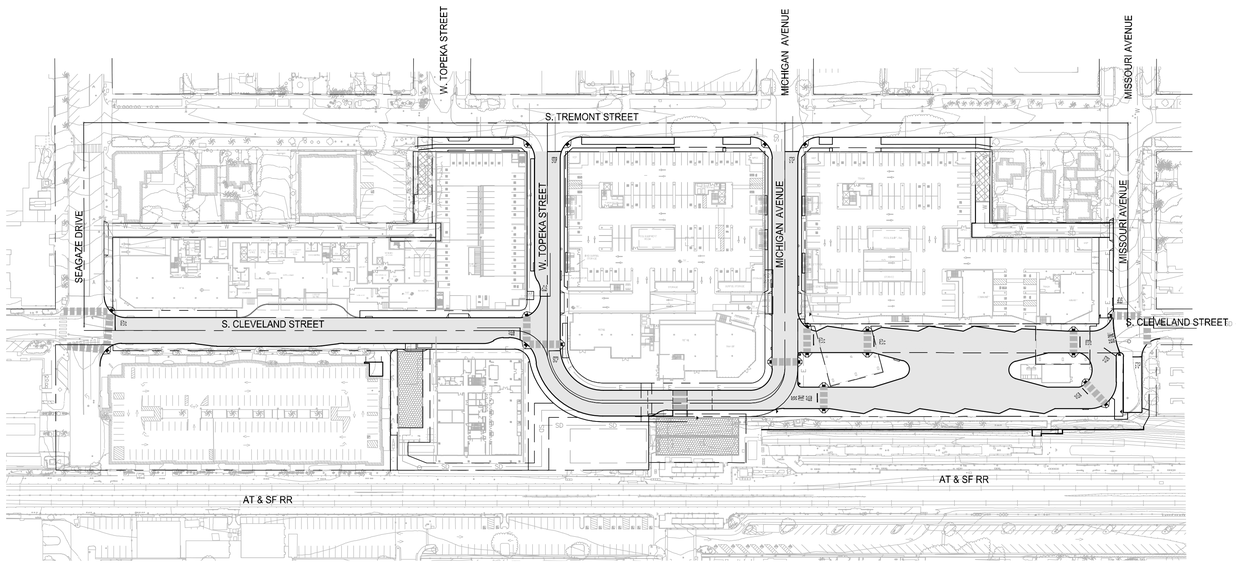
EASEMENTS:

SEE SHEET C10

SITE DATA:

1. SETBACKS:
   - BACKYARD: NONE
   - FRONT YARD: NONE
   - SIDE YARD: NONE
2. LANDSCAPE COVERAGE: 43,891 SF

LOT #	DESCRIPTION	AREA (ACRES)
1	HOTEL	1.10
2	PARKING STRUCTURE	0.72
3	RESIDENTIAL MIXED USE	2.03
4	RESIDENTIAL	1.85
5	NCTD BUS STATION (PUBLIC ACCESS)	1.37
6	NCTD TRAIN PLATFORM PLAZA (PUBLIC ACCESS)	0.31
7	NCTD OFFICE	0.71
TOTAL		8.09
PUBLIC R.O.W.		2.06
SUBTOTAL SUBDIVISION BOUNDARY		10.15
LOT 8	CITY OF OCEANSIDE PARKING STRUCTURE	1.84
TRACT MAP PROJECT AREA		12.00

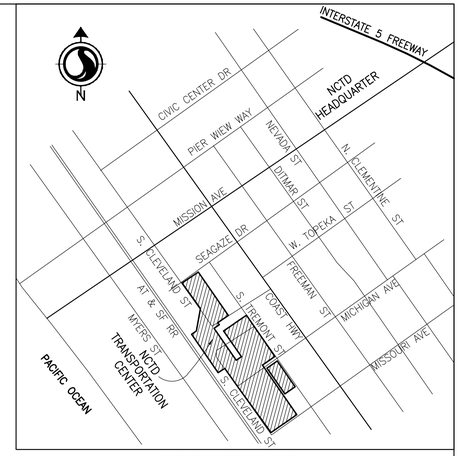


LOCATION MAP

GRAPHIC SCALE

100 0 50 100 200 400

(IN FEET)
1 inch = 100 ft.



VINCINITY MAP

NOT TO SCALE

OWNER:

NORTH SAN DIEGO COUNTY TRANSIT DEVELOPMENT BOARD, AS TO TRACTS I, III AND PARCEL 2 OF TRACT II.
NORTH SAN DIEGO COUNTY TRANSIT BOARD, AS TO PARCEL 1 OF TRACT II.

DEVELOPER:

TOLL BROTHERS APARTMENT LIVING
MICHAEL MCCANN
23422 MILL CREEK DRIVE, SUITE 105
LAGUNA HILLS, CA 92653
(949) 370-8155

CIVIL ENGINEER:

STANTEC
EDWARD DAWSON GROVE
801 SOUTH FIGUEROA STREET, #300
LOS ANGELES, CA 90017-3007
TED.GROVE@STANTEC.COM

08.23.24

EDWARD DAWSON GROVE RCE 61374 DATE

REGISTERED PROFESSIONAL ENGINEER EDWARD DAWSON GROVE No. C61374 STATE OF CALIFORNIA

ARCHITECT:

CALLISONRTKL INC
333 SOUTH HOPE STREET, SUITE C-200
LOS ANGELES, CA 90034

GEOTECHNICAL:

NOVA SERVICES
4373 VIEWRIDGE AVENUE, SUITE B
SAN DIEGO, CA 92123

SHEET INDEX:

SHEET C1 - TITLE SHEET
SHEET C2 - SITE SECTIONS AND DETAILS
SHEET C3 - SITE SECTIONS AND DETAILS
SHEET C4 - MASTER TECHNICAL SITE PLAN
SHEET C5 - VESTING TENTATIVE TRACT MAP
SHEET C6 - PRELIMINARY GRADING & DRAINAGE
SHEET C7 - LID BMP FEATURES
SHEET C8 - LID BMP FEATURES
SHEET C9 - PRELIMINARY WET UTILITIES
SHEET C10 - S. CLEVELAND ST. PRELIMINARY STORM DRAIN
SHEET C11 - FIRE ACCESS CIRCULATION PLAN
SHEET C12 - ENCUMBRANCE MAP
SHEET C13 - ENCUMBRANCE MAP

LEGEND:

- BOUNDARY LINE
- CENTER LINE
- CURB AND GUTTER
- PROP. DRIVEWAY
- EXIST. CONTOUR (54)
- PROP. CONTOUR (54)
- EASEMENT LINE
- PROP. RETAINING WALL
- EXIST. SEWER (SS)
- EXIST. WATER (W)
- EXIST. STORM DRAIN (SD)
- EXIST. GAS (G)
- EXIST. OVERHEAD POWER (E(OH))
- PROP. SEWER (SS)
- PROP. WATER (W)
- PROP. STORM DRAIN (SD)
- PROP. GAS (G)
- EXIST. FIRE HYDRANT
- PROP. FIRE HYDRANT
- EXIST. SUBDIVISION BOUNDARY
- FH FIRE HYDRANT
- MH MANHOLE
- PA LANDSCAPE PLANTERS
- PAE PUBLIC ACCESS EASEMENT
- TURF BLOCK BOMANITE GRASSCRETE
- UNDERGROUND WATER QUALITY BMP CHAMBERS
- PROP. ADA RAMP

DEVELOPMENT PLAN - D22-00016
TENTATIVE MAP - T22-00006
GENERAL PLAN AMENDMENT - GPA22-00002
REGULAR COASTAL PERMIT - RC22-00011

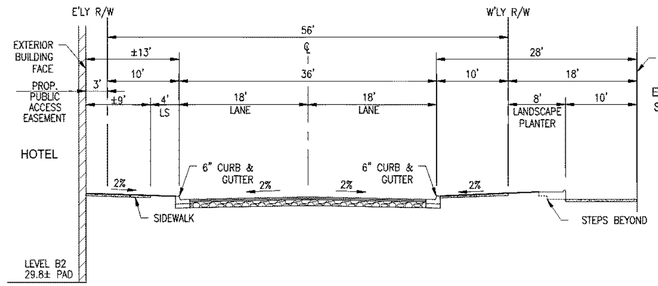
PREPARED BY:

Stantec
38 Technology Drive
Irvine, CA 92618
949-923-6000 stantec.com

VESTING TENTATIVE MAP AND DEVELOPMENT PLAN
TITLE SHEET
NCTD OCEANSIDE TRANSIT CENTER, SOUTH TREMONT STREET
CITY OF OCEANSIDE, CALIFORNIA

SHEET C1 OF C13

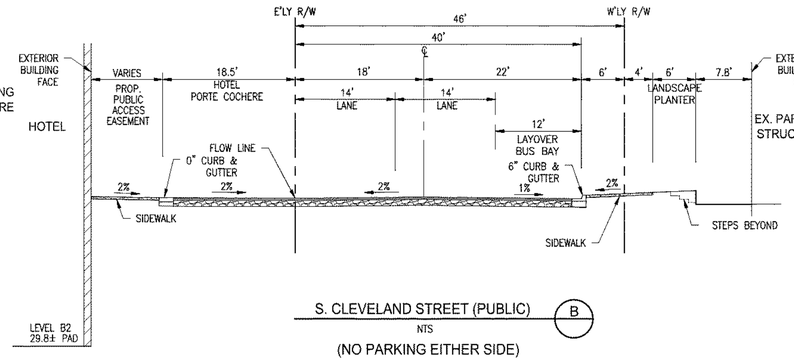
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S. CLEVELAND STREET (PUBLIC) A

NTS

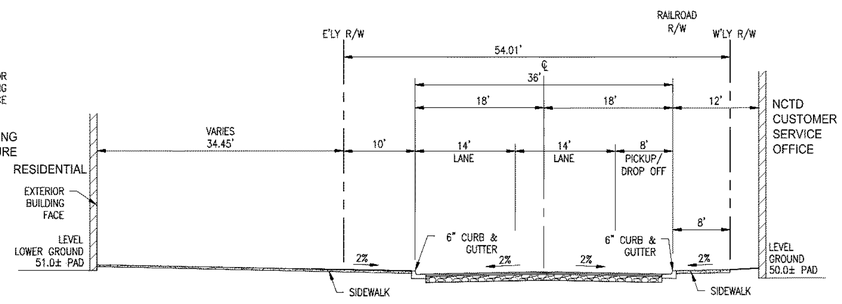
(NO PARKING EITHER SIDE)



S. CLEVELAND STREET (PUBLIC) B

NTS

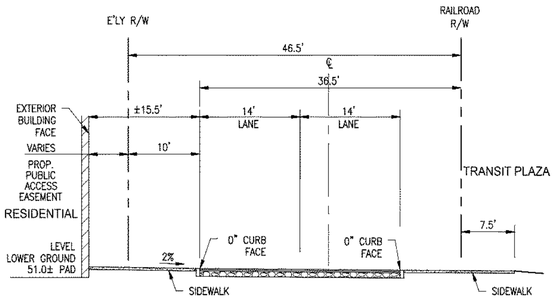
(NO PARKING EITHER SIDE)



S. CLEVELAND STREET (PUBLIC) C

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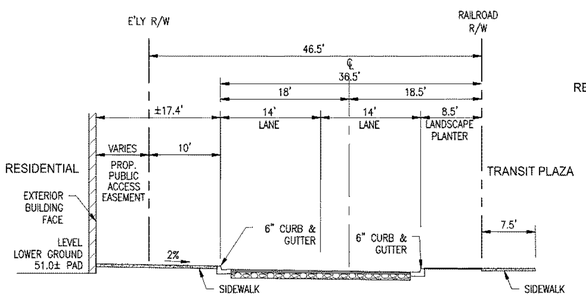
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S. CLEVELAND STREET (PUBLIC) C1

NTS

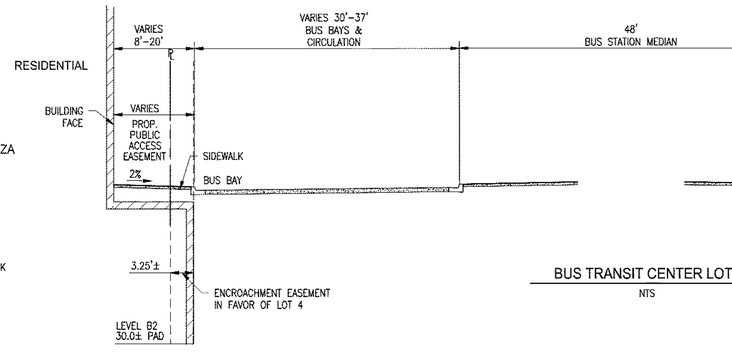
(NO PARKING EITHER SIDE)



S. CLEVELAND STREET (PUBLIC) C2

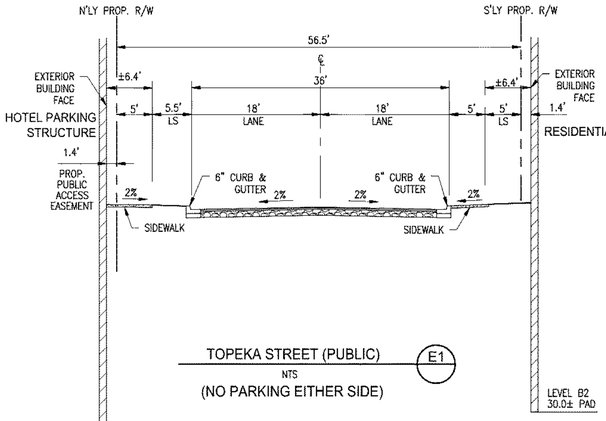
NTS

(NO PARKING EITHER SIDE)



BUS TRANSIT CENTER LOT D

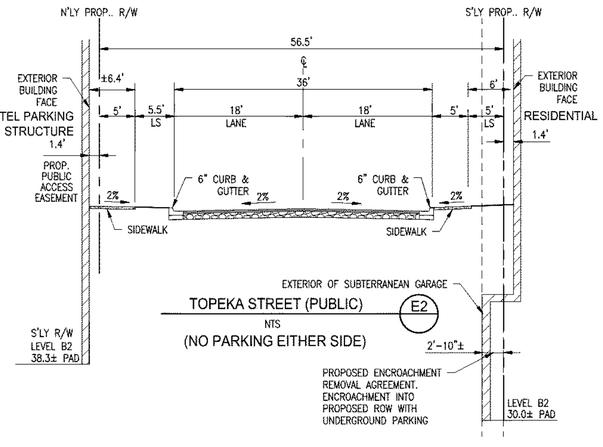
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TOPEKA STREET (PUBLIC) E1

NTS

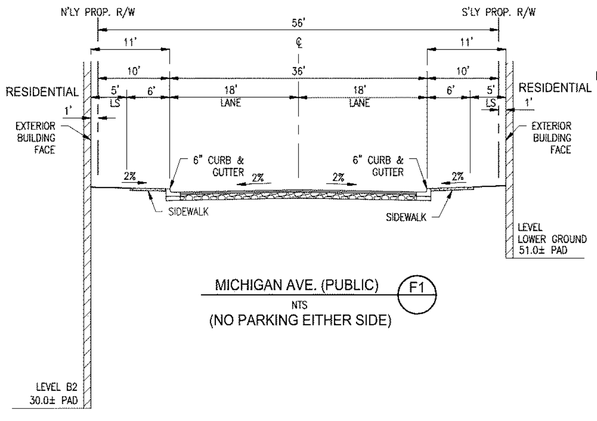
(NO PARKING EITHER SIDE)



TOPEKA STREET (PUBLIC) E2

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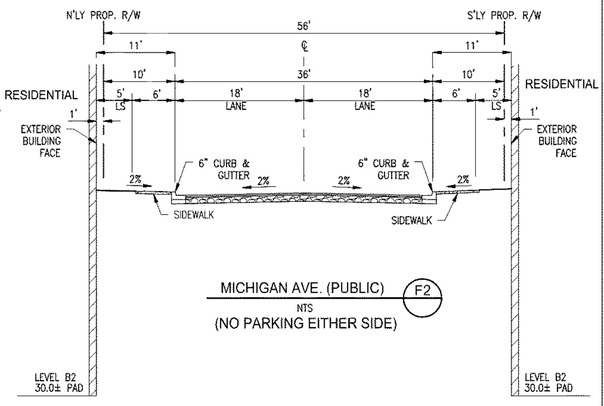
(NO PARKING EITHER SIDE)



MICHIGAN AVE. (PUBLIC) F1

NTS

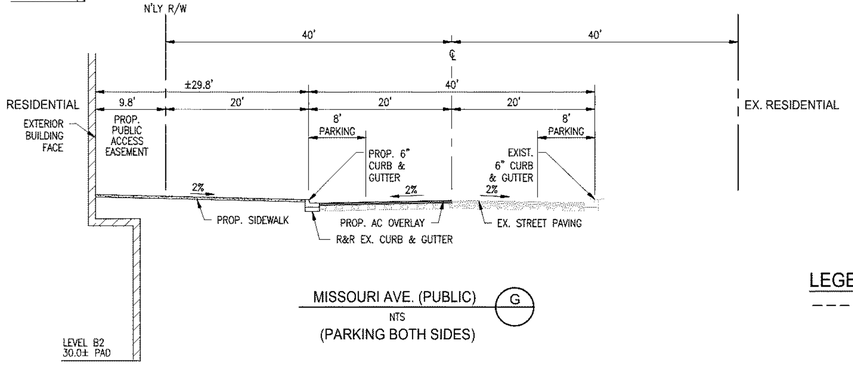
(NO PARKING EITHER SIDE)



MICHIGAN AVE. (PUBLIC) F2

NTS

(NO PARKING EITHER SIDE)



MISSOURI AVE. (PUBLIC) G

NTS

(PARKING BOTH SIDES)

LEGEND:

EASEMENT LINE

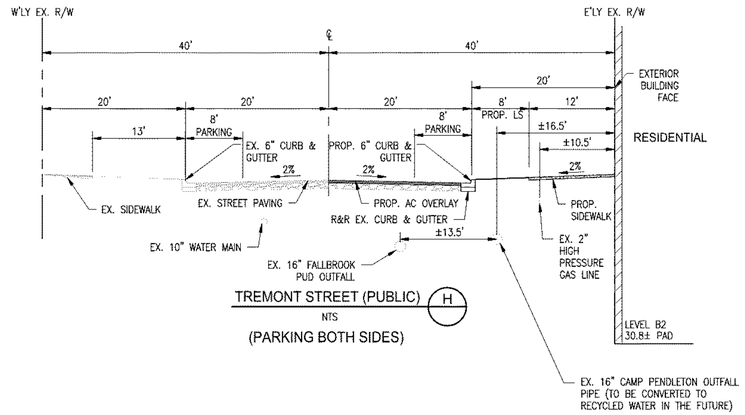
PREPARED BY:

Stantec
38 Technology Drive
Irvine, CA 92618
949-923-6000 stantec.com

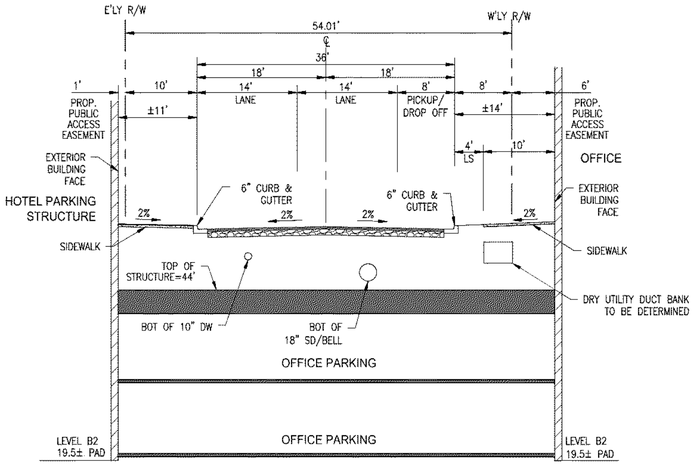
VESTING TENTATIVE MAP AND DEVELOPMENT PLAN
SITE SECTIONS AND DETAILS
NCTD OCEANSIDE TRANSIT CENTER, SOUTH TREMONT STREET
CITY OF OCEANSIDE, CALIFORNIA

SHEET C2 OF C13

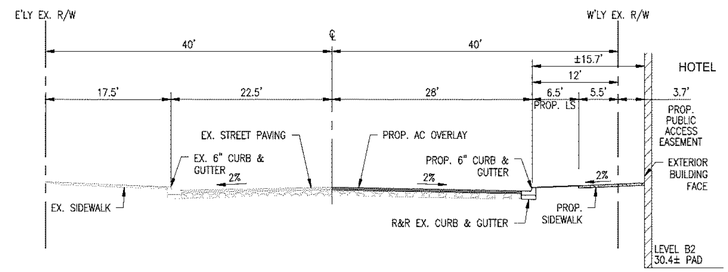
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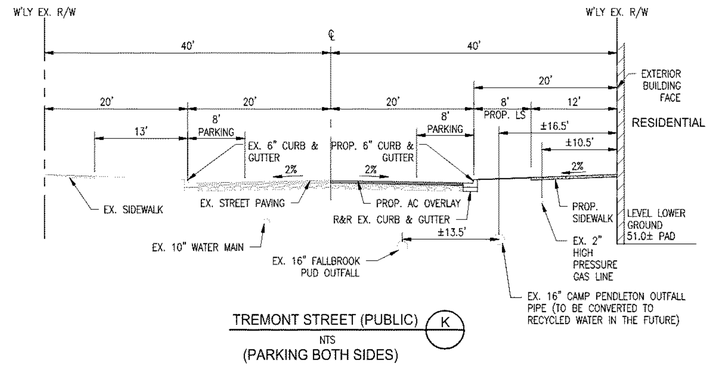
TREMONT STREET (PUBLIC) H
NTS
(PARKING BOTH SIDES)



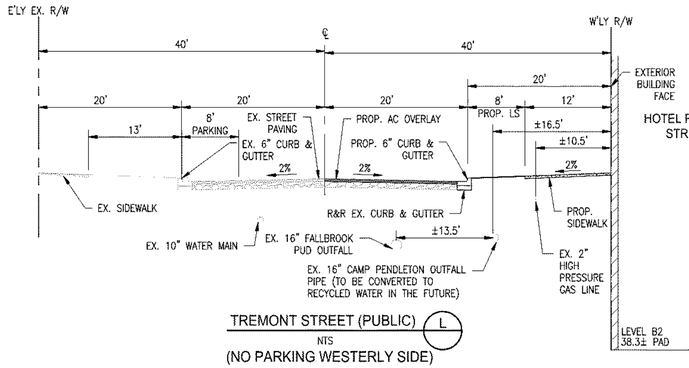
S. CLEVELAND STREET (PUBLIC) I
NTS
(NO PARKING EITHER SIDE)



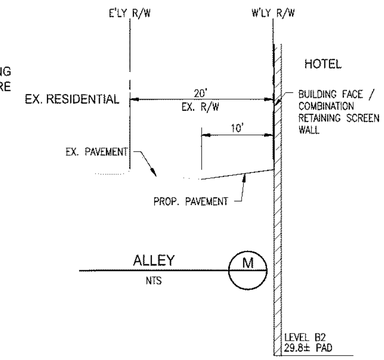
SEAGAZE DRIVE (PUBLIC) J
NTS
(NO PARKING EITHER SIDE)



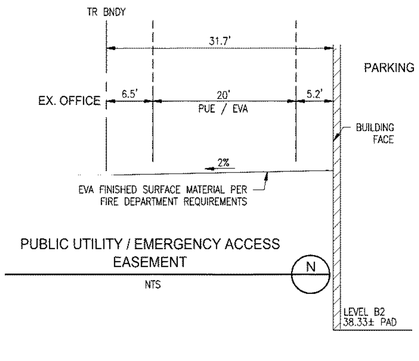
TREMONT STREET (PUBLIC) K
NTS
(PARKING BOTH SIDES)



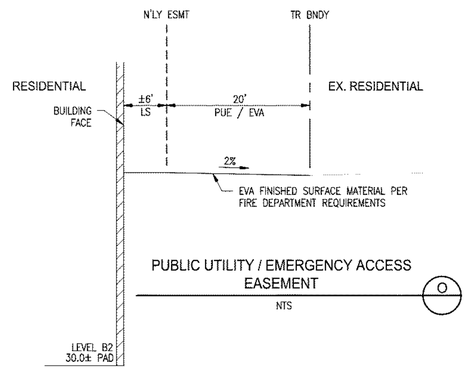
TREMONT STREET (PUBLIC) L
NTS
(NO PARKING WESTERLY SIDE)



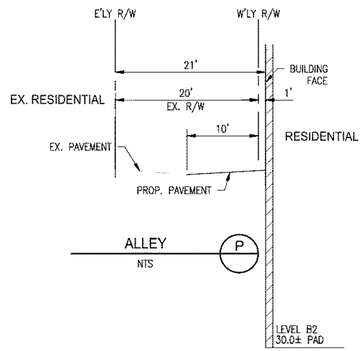
ALLEY M
NTS



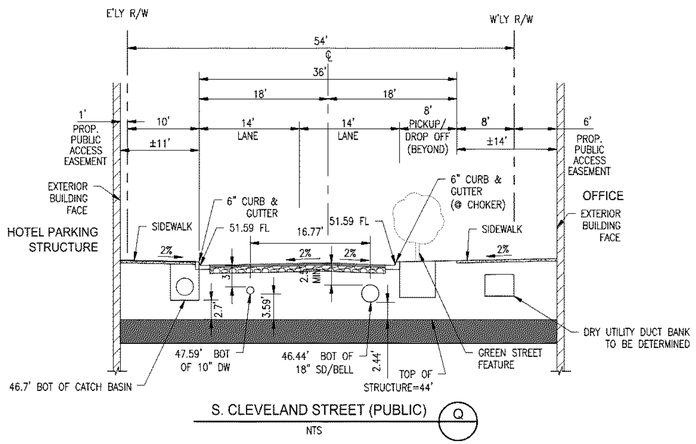
PUBLIC UTILITY / EMERGENCY ACCESS EASEMENT N
NTS



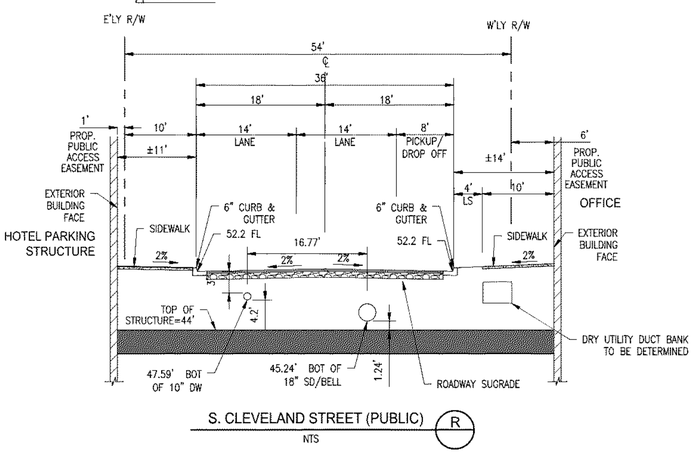
PUBLIC UTILITY / EMERGENCY ACCESS EASEMENT O
NTS



ALLEY P
NTS



S. CLEVELAND STREET (PUBLIC) Q
NTS



S. CLEVELAND STREET (PUBLIC) R
NTS

LEGEND:

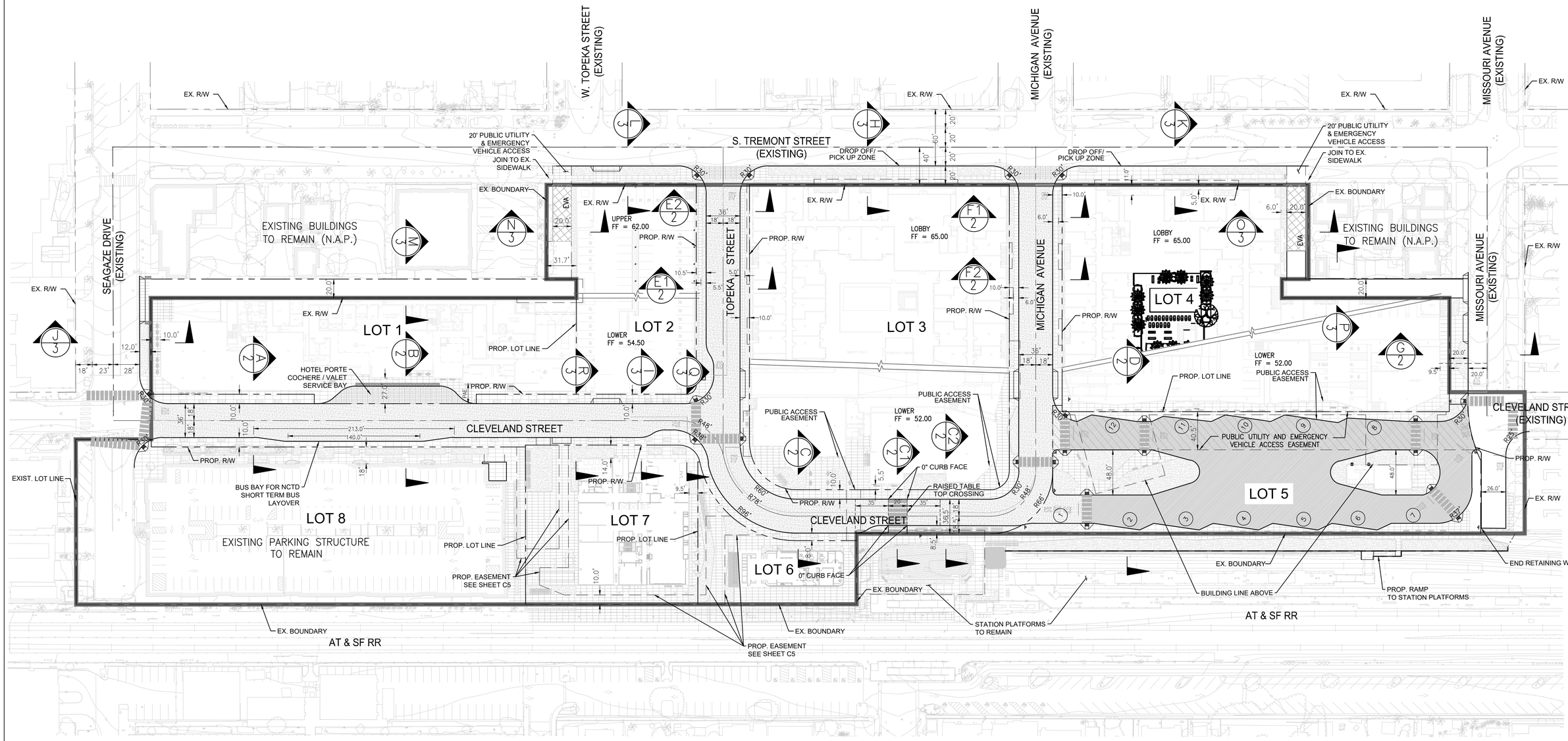
EASEMENT LINE

PREPARED BY:
Stantec
38 Technology Drive
Irvine, CA 92618
949-923-6000 stantec.com

VESTING TENTATIVE MAP AND DEVELOPMENT PLAN
SITE SECTIONS AND DETAILS
NCTD OCEANSIDE TRANSIT CENTER, SOUTH TREMONT STREET
CITY OF OCEANSIDE, CALIFORNIA

SHEET C3 OF C13

DRAWING: o:\204221790\drawing\sheet_files\217900--1003tmc.dwg PLOTTED: 8/22/2022 10:25 AM BY: Elizondo, Christian



LEGEND:

- R/W/ BOUNDARY LINE / CENTER LINE
- CURB AND GUTTER
- PROP. DRIVEWAY
- EXIST. CONTOUR
- PROP. CONTOUR
- EASEMENT LINE
- PROP. RETAINING WALL
- EXIST. SEWER
- EXIST. WATER
- EXIST. STORM DRAIN
- EXIST. GAS
- EXIST. OVERHEAD POWER
- PROP. SEWER
- PROP. WATER
- PROP. PUBLIC STORM DRAIN
- PROP. RECYCLE WATER
- PROP. GAS
- PEDESTRIAN CROSSING
- PROP. ADA RAMP
- EXIST. FIRE HYDRANT
- PROP. PUBLIC FIRE HYDRANT
- PROJECT BOUNDARY
- PAE — PUBLIC ACCESS EASEMENT
- FH — FIRE HYDRANT
- FIRE DEPARTMENT APPROVED EVA FINISHED SURFACE
- BUS TRANSFER PARKING STALL NUMBER

GRAPHIC SCALE

50 0 25 50 100 200

(IN FEET)
1 inch = 50 ft.

PREPARED BY:

Stantec
38 Technology Drive
Irvine, CA 92618
949-923-6000 stantec.com

VESTING TENTATIVE MAP AND DEVELOPMENT PLAN
MASTER TECHNICAL SITE PLAN
NCTD OCEANSIDE TRANSIT CENTER, SOUTH TREMONT STREET
CITY OF OCEANSIDE, CALIFORNIA

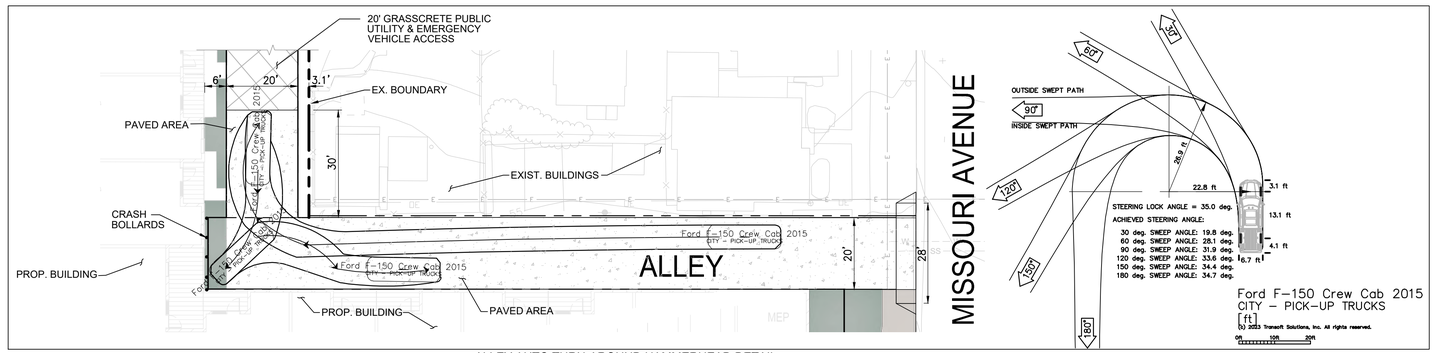
SHEET C4 OF C13

DRAWING: u:\204217900\drawing\sheet_files\217900-10048m.dwg PLOTTED: 8/22/2022 10:25 AM BY: Elizondo, Christian

EX. R/W
EX. 10" WATER MAIN
EX. 16" FALLBROOK PUD OUTFALL
PROP. DRIVEWAY
PUBLIC UTILITY/ EVA ACCESS
W. TOPEKA STREET
EX. OVERHEAD POWER LINE
S. TREMONT STREET
DROP OFF / PICKUP ZONE
EX. 2" HIGH PRESSURE GAS LINE
MICHIGAN AVENUE
MISSOURI AVENUE
EX. 8" WATER MAIN
EX. 10" SEWER LINE
EX. 16" CAMP PENDLETON OUTFALL
EX. BOUNDARY
EXISTING BUILDINGS TO REMAIN (N.A.P.)
EX. 6" VCP SEWER LINE
EX. 6" WATER MAIN
ALLEY
SEAGAZE DRIVE
PUBLIC ACCESS EASEMENT
LOT 1
LOT 2
LOWER FF = 54.50
UPPER FF = 62.00
PROP. R/W
PROP. 15"SD
TOPEKA STREET
LOT 3
LOBBY FF = 65.00
PROP. FH
SEE ALLEY AUTO TURN-AROUND HAMMERHEAD DETAIL HEREON
LOT 4
PROP. 18"SD
LOWER FF = 52.00
PROP. LOT LINE
PROP. 30"SD
PROP. 12"SD
CLEVELAND STREET
4" DEPRESSED UTILITY CURB
PROP. 24"SD
PROP. 18"SD
PLANTER (TYP.)
EXIST. LOT LINE
LOT 8
EXISTING PARKING STRUCTURE TO REMAIN
LOT 7
LOT 6
LOT 5
PRIVATE SD CROSSING ROW
PROP. 15" SD
"WALK BICYCLES AT TRANSIT CENTER" & "DO NOT ENTER" SIGNS
"DO NOT ENTER" SIGN
"WALK BICYCLES AT TRANSIT CENTER" SIGN
FOR CHAMBERS MAINTENANCE
PROJECT BOUNDARY
EX. BOUNDARY
AT & SF RR

LEGEND:

- R/W/ BOUNDARY LINE
- CENTER LINE
- CURB AND GUTTER
- PROP. DRIVEWAY
- EXIST. CONTOUR
- PROP. CONTOUR
- EASEMENT LINE
- PROP. RETAINING WALL
- EXIST. SEWER
- EXIST. WATER
- EXIST. STORM DRAIN
- EXIST. GAS
- EXIST. OVERHEAD POWER
- PROP. SEWER
- PROP. WATER
- PROP. PUBLIC STORM DRAIN
- PROP. RECYCLE WATER
- PROP. GAS
- EXIST. FIRE HYDRANT
- PROP. PUBLIC FIRE HYDRANT
- PROJECT BOUNDARY
- PA — LANDSCAPE PLANTERS
- PAE — PUBLIC ACCESS EASEMENT
- FH — FIRE HYDRANT
- PRIVATE UNDERGROUND PEAK REDUCTOIN DETENTION CHAMBER



ALLEY AUTO TURN-AROUND HAMMERHEAD DETAIL
SCALE: 1"=20'

SEE ENCUMBRANCE MAP SHEET C12 FOR EXISTING EASEMENTS AND RIGHT OF WAY TO BE QUITCLAIMED, OR ABANDONED

PROPOSED EASEMENTS

1. PUBLIC UTILITY AND EMERGENCY VEHICLE ACCESS
2. ENCROACHMENT EASEMENT IN FAVOR OF LOT 4
3. PUBLIC UTILITY EASEMENT
4. PUBLIC ACCESS EASEMENT
4. PROPOSED ENCROACHMENT REMOVAL AGREEMENT

GRAPHIC SCALE
50 0 25 50 100 200
(IN FEET)
1 inch = 50 ft.

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38 Technology Drive
Irvine, CA 92618
949-923-6000 stantec.com

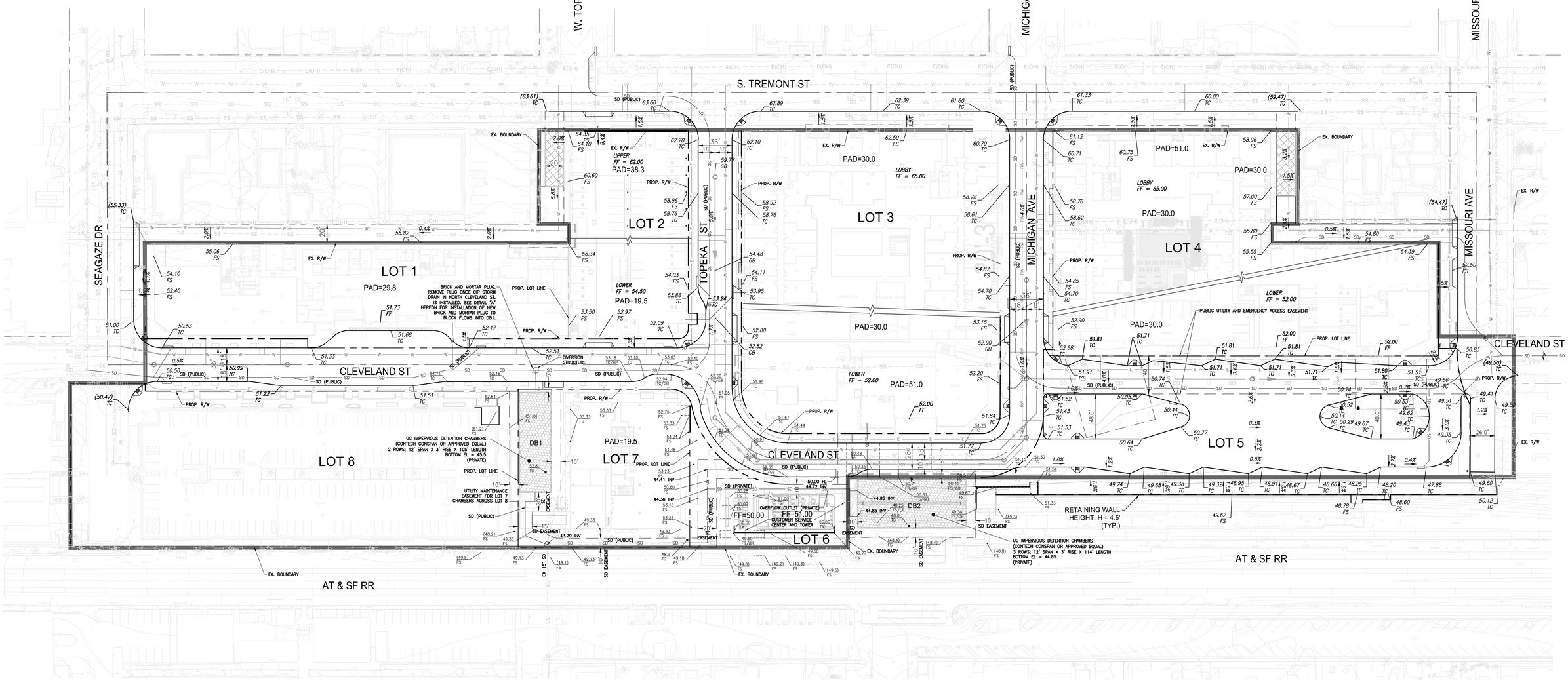
VESTING TENTATIVE MAP AND DEVELOPMENT PLAN

NCTD OCEANSIDE TRANSIT CENTER, SOUTH TREMONT STREET

CITY OF OCEANSIDE, CALIFORNIA

SHEET C5 OF C13

DRAWING: ...\\2042217900\drawing\sheet_files\2179000--1005tm.dwg PLOTTED: 8/22/2022 10:25 AM BY: Elizondo, Christian

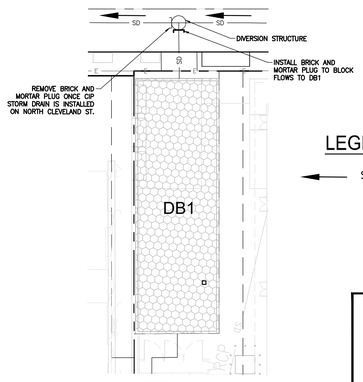


GRADING NOTES:

1. TOTAL AMOUNT OF CUT: 247,000 CY; TOTAL AMOUNT OF FILL: 700 CY
2. RETAINING WALLS: LENGTH: 800 LF; MAX HEIGHT: 7 FT
3. VOLUMES ARE CALCULATED TO ESTIMATED BOTTOM OF FOUNDATION FLOOR FOR BUILDINGS AND SUBGRADE FOR ROAD/HARDSCAPES

LEGEND:

R/W/ BOUNDARY LINE	PROP. SEWER
CENTER LINE	PROP. WATER
CURB AND GUTTER	PROP. PUBLIC STORM DRAIN
PROP. DRIVEWAY	PROP. RECYCLE WATER
EXIST. CONTOUR	PROP. GAS
PROP. CONTOUR	EXIST. FIRE HYDRANT
EASEMENT LINE	PROP. PUBLIC FIRE HYDRANT
PROP. RETAINING WALL	PROJECT BOUNDARY
EXIST. SEWER	PUBLIC ACCESS EASEMENT (PAE)
EXIST. WATER	FIRE HYDRANT (FH)
EXIST. STORM DRAIN	PRIVATE UNDERGROUND PEAK REDUCTION DETENTION CHAMBERS
EXIST. GAS	ESTIMATED LOWEST LEVEL PAD ELEVATION TO BE DETERMINED WITH FINAL CONSTRUCTION DRAWINGS (PAD=29.8)
EXIST. OVERHEAD POWER	



DETAIL "A"
NTS

LEGEND:

SD FLOW DIRECTION

GRAPHIC SCALE

50 0 25 50 100 200

(IN FEET)
1 inch = 50 ft.

PREPARED BY:

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949-923-6000 stantec.com

VESTING TENTATIVE MAP AND DEVELOPMENT PLAN
PRELIMINARY GRADING & DRAINAGE
NCTD OCEANSIDE TRANSIT CENTER, SOUTH TREMONT STREET
CITY OF OCEANSIDE, CALIFORNIA

SHEET C6 OF C13

DRAWING: o:\204217900\drawing\sheet_files\217900c--1006tm.dwg PLOTTED: 8/22/2022 10:25 AM BY: Elizondo, Christian

LEGEND:

IN–GROUND BIOFILTRATION PLANTER (PRIVATE)

RAISED BIOFILTRATION PLANTER (PRIVATE)

BIOFILTRATION PROPRIETARY UNIT (PRIVATE)

TREE WELLS (PUBLIC)

PROJECT BOUNDARY

APN:XXXXXX

W. TOPEKA STREET

S. TREMONT STREET

TOPEKA STREET

SEAGAZE DRIVE

CLEVELAND STREET

CLEVELAND STREET

APN: 147-273-01

APN: 147-273-02

APN: 147-273-03

APN: 147-273-04

APN: 147-273-05

APN: 147-273-06

A2 A3 A4 A5 A6 A7 A8 A9 A10

B1 B2 B3 B4 B6

D1 D2 D3 D4 D5 D6 D7 D8

AT & SF RR

MATCHLINE - SEE SHEET C8

GRAPHIC SCALE

40 0 20 40 80 160

(IN FEET)

1 inch = 40 ft.

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Irvine, CA 92618
949-923-6000 stantec.com

VESTING TENTATIVE MAP AND DEVELOPMENT PLAN
LID BMP FEATURES
NCTD OCEANSIDE TRANSIT CENTER, SOUTH TREMONT STREET
CITY OF OCEANSIDE, CALIFORNIA

SHEET C7 OF C13

DRAWING: u:\2042217900\drawing\sheet_files\217900c--1022lm.dwg PLOTTED: 8/22/2022 10:25 AM BY: Elizondo, Christian

MATCHLINE - SEE SHEET C7

MICHIGAN AVENUE

MICHIGAN AVENUE

MISSOURI AVENUE

MISSOURI AVENUE

APN: 150-046-11

APN: 150-046-10

APN: 150-046-09

APN: 150-182-13

B5

C1

C2

C3

C4

C5

C6

C7

C8

C10

C11

SD

50

CLEVELAND STREET

CLEVELAND STREET

C9 (TYP.)

D10

D9

AT & SF RR

TYSON STREET

LEGEND:

IN-GROUND BIOFILTRATION PLANTER (PRIVATE)

RAISED BIOFILTRATION PLANTER (PRIVATE)

BIOFILTRATION PROPRIETARY UNIT (PRIVATE)

TREE WELLS (PUBLIC)

PROJECT BOUNDARY

GRAPHIC SCALE

40 0 20 40 80 160

(IN FEET)

1 inch = 40 ft

PREPARED BY:

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Irvine, CA 92618
949-923-6000 stantec.com

VESTING TENTATIVE MAP AND DEVELOPMENT PLAN
LID BMP FEATURES
NCTD OCEANSIDE TRANSIT CENTER, SOUTH TREMONT STREET
CITY OF OCEANSIDE, CALIFORNIA

SHEET C8 OF C13

DRAWING: u:\2042217900\drawing\sheet_files\2217900--1022lm.dwg PLOTTED: 8/22/2022 10:25 AM BY: Elzondo, Christian

W. TOPEKA STREET
MICHIGAN AVENUE
MISSOURI AVENUE
S. TREMONT STREET
TOPEKA STREET
SEAGAZE DRIVE
CLEVELAND STREET
AT & SF RR
TYSON STREET
S MYERS STREET
APN:XXXXXX
APN: 147-273-01
APN: 147-273-02
APN: 147-273-03
APN: 147-273-04
APN: 147-273-05
APN: 147-273-06
APN: 150-046-11
APN: 150-046-10
APN: 150-046-09
APN: 150-182-13
EX. R/W
EX. 24" RCP SD
EX. 10" WATER
EX. 8" WATER
EX. 18" RCP SD
EX. BOUNDARY
PUBLIC UTILITY AND EMERGENCY VEHICLE ACCESS EASEMENT
PROP. 8" WATER (TO REPLACE EX. 6" WATER)
PROP. 8" WATER
PROP. IRRIGATION SERVICE LATERALS / METERS
PROP. DOMESTIC SERVICE LATERALS / METERS
PROP. SEWER LATERAL
PROP. 10" WATER
PROP. SEWER MH
PROP. R/W
PROP. 8" SEWER
PROP. LOT LINE
PROP. FH
PROP. DOMESTIC AND IRRIGATION SERVICE LATERALS/METERS
PROP. 4" RECYCLED WATER
EX. 16" FALLBROOK PUD OUTFALL
EX. 16" CAMP PENDLETON OUTFALL PIPE (TO BE CONVERTED TO RECYCLED WATER IN THE FUTURE)
PROPOSED 4" RECYCLED WATER LINE FOR CONNECTION TO FUTURE RECYCLED WATER MAIN ONCE AVAILABLE
FUTURE IRRIGATION SERVICE LATERALS / METERS
BUILDING LINE ABOVE
PUBLIC SD
SEE SHEET C8 FOR SD EXTENSION
EXIST. LOT LINE
UTILITY MAINTENANCE EASEMENT FOR LOT 7 CHAMBERS ACROSS LOT 8
SD EASEMENT (PUBLIC)
15" SD (PUBLIC)
15" SD (PRIVATE)
CDS UNIT (PRIVATE)
PRIVATE SD CROSSING ROW
SD EASEMENT
EX. 15" RCP SD (PUBLIC)
UPSIZE EXISTING CURBFACE CULVERT
EX. SEWER MH
EX. 8" SEWER
PROP. SEWER MH
PROP. R/W

LEGEND:

	BOUNDARY LINE
	CENTER LINE
	CURB AND GUTTER
	PROP. DRIVEWAY
54	EXIST. CONTOUR
54	PROP. CONTOUR
	EASEMENT LINE
	PROP. RETAINING WALL
	SIGHT VISIBILITY LINES
	EXIST. FIRE HYDRANT
	PROP. PUBLIC FIRE HYDRANT
	EXIST. SUBDIVISION BOUNDARY
PAE	PUBLIC ACCESS EASEMENT
FH	FIRE HYDRANT
MH	MANHOLE
SS	EXIST. SEWER
W	EXIST. WATER
SD	EXIST. STORM DRAIN
G	EXIST. GAS
E(OH)	EXIST. OVERHEAD POWER
SS	PROP. SEWER
W	PROP. WATER
SD	PROP. STORM DRAIN
G	PROP. GAS
RW	PROP. RECYCLED WATER
E	PROP. ELEC.
	PEDESTRIAN CROSSING
	PROP. ADA RAMP
	TURF BLOCK BOMANITE GRASSCRETE
	PRIVATE UNDERGROUND PEAK REDUCTION DETENTION CHAMBERS

GRAPHIC SCALE
50 0 25 50 100 200
(IN FEET)
1 inch = 50 ft.

PREPARED BY:
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VESTING TENTATIVE MAP AND DEVELOPMENT PLAN
PRELIMINARY WET UTILITIES
NCTD OCEANSIDE TRANSIT CENTER, SOUTH TREMONT STREET
CITY OF OCEANSIDE, CALIFORNIA

SHEET C9 OF C13

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LEGEND:

54	EXIST. CONTOUR
SS	EXIST. SEWER
W	EXIST. WATER
SD	EXIST. STORM DRAIN
G	EXIST. GAS
E(OH)	EXIST. OVERHEAD POWER
SS	PROP. SEWER
W	PROP. WATER
SD	PROP. STORM DRAIN
G	PROP. GAS
RW	PROP. RECYCLED WATER
E	PROP. ELEC.

GRAPHIC SCALE

50 0 25 50 100 200

(IN FEET)
1 inch = 50 ft.

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Irvine, CA 92618
949-923-6000 stantec.com

VESTING TENTATIVE MAP AND DEVELOPMENT PLAN
S. CLEVELAND ST. PRELIMINARY STORM DRAIN
NCTD OCEANSIDE TRANSIT CENTER, SOUTH TREMONT STREET
CITY OF OCEANSIDE, CALIFORNIA

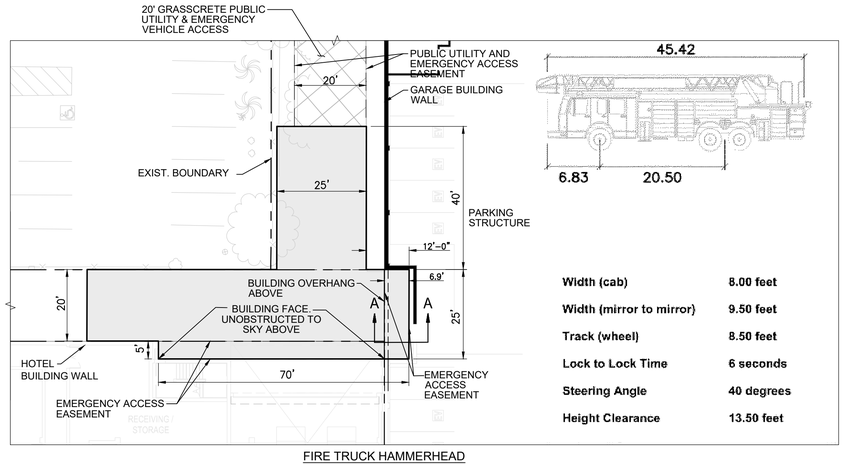
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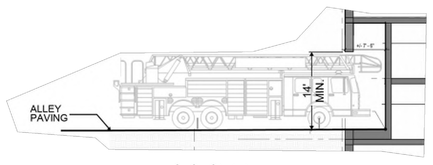
EXIST FIRE HYDRANT
W. TOPEKA STREET
EXIST FIRE HYDRANT
MICHIGAN AVENUE
EXIST FIRE HYDRANT
MISSOURI AVENUE
20' PUBLIC UTILITY & EMERGENCY VEHICLE ACCESS
S. TREMONT STREET
20' PUBLIC UTILITY & EMERGENCY VEHICLE ACCESS
EX. 20' WIDE ALLEY R/W
SEE FIRE TRUCK HAMMERHEAD DETAIL HEREON
150' HOSE PULL
20'
A
A
PROPOSED FIRE HYDRANT
TOPEKA STREET
MICHIGAN AVENUE
20'
150' HOSE PULL
PROPOSED FIRE
TURN-AROUND DETAIL
150' HOSE PULL
SEAGAZE DRIVE
EXIST FIRE HYDRANT
EXIST FIRE HYDRANT
MISSOURI AVENUE
EXIST FIRE HYDRANT
CLEVELAND STREET
PUBLIC UTILITY AND EMERGENCY VEHICLE ACCESS EASEMENT
CLEVELAND STREET
BUILDING OVERHANG CLEAR HEIGHT: 20' ±
BUILDING OVERHANG CLEAR HEIGHT: 20' ±
150' HOSE PULL
150' HOSE PULL
150' HOSE PULL
150' HOSE PULL
AT & SF RR
AT & SF RR

LEGEND:

	R/W/ BOUNDARY LINE
	CENTER LINE
	CURB AND GUTTER
	PROP. DRIVEWAY
54	EXIST. CONTOUR
54	PROP. CONTOUR
	EASEMENT LINE
	PROP. RETAINING WALL
SS	EXIST. SEWER
W	EXIST. WATER
SD	EXIST. STORM DRAIN
G	EXIST. GAS
E(OH)	EXIST. OVERHEAD POWER
SS	PROP. SEWER
W	PROP. WATER
SD	PROP. PUBLIC STORM DRAIN
G	PROP. GAS
	EXIST. FIRE HYDRANT
	PROP. PUBLIC FIRE HYDRANT
	PROJECT BOUNDARY
PAE	PUBLIC ACCESS EASEMENT
FH	FIRE HYDRANT
	TURF BLOCK BOMANITE GRASSCRETE



FIRE TRUCK HAMMERHEAD
SCALE: 1"=20'



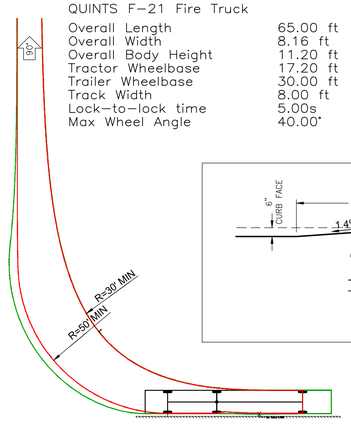
SECTION A-A

Width (cab)	**8.00 feet**
Width (mirror to mirror)	**9.50 feet**
Track (wheel)	**8.50 feet**
Lock to Lock Time	**6 seconds**
Steering Angle	**40 degrees**
Height Clearance	**13.50 feet**

DESIGN VEHICLE

QUINTS F-21 Fire Truck

Overall Length	65.00 ft
Overall Width	8.16 ft
Overall Body Height	11.20 ft
Tractor Wheelbase	17.20 ft
Trailer Wheelbase	30.00 ft
Track Width	8.00 ft
Lock-to-lock time	5.00s
Max Wheel Angle	40.00°



90° TURNING TEMPLATE

FIRE ACCESS NOTES

-A MINIMUM VERTICAL CLEARANCE OF 13 FEET AND 6 INCHES SHALL BE PROVIDED AND MAINTAINED.
-ACCESS ROADWAYS SHALL BE PROVIDED WITH A 50 FOOT OUTSIDE AND 30 FOOT INSIDE TURNING RADIUS.
-THE GRADE FOR FIRE ACCESS ROADWAYS SHALL NOT EXCEED 12%.
-ALL FIRE DEPARTMENT ACCESS ROADWAYS SHALL BE PAINTED/STRIPED AS FIRE LANES.
-EACH FDC SHALL BE LOCATED WITHIN 40' OF A HYDRANT AND BE LOCATED ON THE SAME SIDE OF THE STREET.

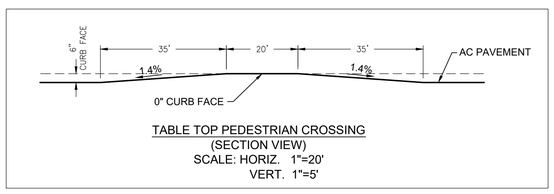
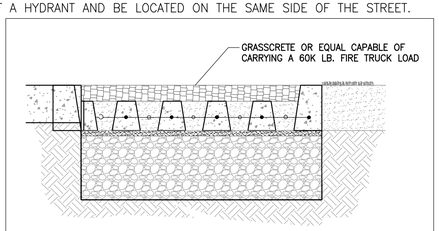


TABLE TOP PEDESTRIAN CROSSING
(SECTION VIEW)
SCALE: HORIZ. 1"=20'
VERT. 1"=5'



TURF BLOCK- BOMANITE GRASSCRETE
N.T.S.

GRAPHIC SCALE
50 0 25 50 100 200
(IN FEET)
1 inch = 50 ft.

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949-923-6000 stantec.com

VESTING TENTATIVE MAP AND DEVELOPMENT PLAN
FIRE ACCESS CIRCULATION PLAN
NCTD OCEANSIDE TRANSIT CENTER, SOUTH TREMONT STREET
CITY OF OCEANSIDE, CALIFORNIA

SHEET
C11
OF
C13

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TITLE DIGEST

TITLE ITEMS REFERRED TO HEREON ARE BASED ON INFORMATION CONTAINED IN FIRST AMERICAN TITLE COMPANY PRELIMINARY REPORT NO. NHSC-6555761, DATED MARCH 30, 2021.

THE FOLLOWING DIGEST OF TITLE ITEMS HAS BEEN PREPARED FOR THE CONVENIENCE OF THE USER. FOR FULL PARTICULARS, PLEASE REFER TO THOSE DOCUMENTS REFERENCED THEREIN.

PLOTTABLE EASEMENTS OF RECORD ARE INDICATED HEREON AND REFER TO THE CORRESPONDING ITEM NUMBER IN THE REFERENCED REPORT.

VESTING INTEREST

THE ESTATE OR INTEREST IN THE LAND DESCRIBED IN THIS REPORT IS:

A FEE.

LEGAL DESCRIPTION

THE LAND REFERRED TO IN THIS REPORT IS SITUATED IN THE CITY OF OCEANSIDE, COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, AND IS DESCRIBED AS FOLLOWS:

TRACT I: (147-350-24-00 AND 147-350-25-00)

PARCEL 1:

LOTS 9 THROUGH 16, BLOCK 7, OCEANSIDE, IN THE CITY OF OCEANSIDE, COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO MAP THEREOF NO. 344, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, JULY 1, 1885, LOT 9, BLOCK 7, BRYAN'S ADDITION, ACCORDING TO MAP THEREOF NO. 219, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, MARCH 10, 1887.

PARCEL 2:

ALL OF BLOCK 8 OF BRYAN'S ADDITION, IN THE CITY OF OCEANSIDE, COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO MAP THEREOF NO. 219, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, MARCH 10, 1887.

TOGETHER WITH THOSE PORTIONS OF CLEVELAND STREET AND MICHIGAN AVENUE VACATED BY DOCUMENT RECORDED MARCH 14, 1994 AS INSTRUMENT NO. 94-0164097 WHICH WOULD REVERT TO SAID LAND BY OPERATION OF LAW.

PARCEL 3:

FRACTIONAL LOT 8 IN BLOCK 9 OF BRYAN'S ADDITION TO OCEANSIDE, IN THE CITY OF OCEANSIDE, COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO MAP THEREOF NO. 219, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, MARCH 10, 1887.

TOGETHER WITH THE NORTHERLY 20 FEET OF TOPEKA STREET AS VACATED AND CLOSED TO PUBLIC USE, LYING SOUTHEASTERLY OF AND ADJACENT TO SAID LOT.

PARCEL 4:

LOTS 1, 2, 3, 4 AND 5 IN BLOCK 10 OF BRYAN'S ADDITION, IN THE CITY OF OCEANSIDE, IN THE CITY OF OCEANSIDE, COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO MAP THEREOF NO. 219, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, MARCH 10, 1887.

ALSO THAT PORTION OF TOPEKA STREET LYING WESTERLY FROM CLEVELAND STREET AND NORTH OF AND ADJACENT TO SAID LOT 1, BLOCK 10, WHICH SAID PORTION OF TOPEKA STREETS WAS CLOSED TO PUBLIC USE BY RESOLUTION NO. 915, IN THE CITY COUNCIL OF THE CITY OF OCEANSIDE, CALIFORNIA.

ALSO TOGETHER WITH THOSE PORTIONS OF CLEVELAND STREET AND TYSON STREET VACATED BY DOCUMENT RECORDED MARCH 14, 1994 AS INSTRUMENT NO. 94-0164097 OF OFFICIAL RECORDS WHICH WOULD REVERT TO SAID LAND BY OPERATION OF LAW.

LEGAL DESCRIPTION (CONTINUED)

PARCEL 5:

THAT PORTION OF A TRACT OF LAND COMMONLY KNOWN AS THE DEPOT GROUNDS IN OCEANSIDE, TOGETHER WITH THAT CERTAIN 200.00 FOOT RIGHT-OF-WAY OF THE ATCHISON, TOPEKA AND SANTA FE RAILWAY COMPANY LYING SOUTHEASTERLY OF SAID DEPOT GROUNDS, ALL IN THE CITY OF OCEANSIDE, COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO MAP THEREOF NO. 313, BY H.P VINCENT, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY, JULY 19,
1886, DESCRIBED AS FOLLOWS:

BEGINNING AT THE MOST WESTERLY CORNER OF LOT 16, BLOCK 7 OF OCEANSIDE, ACCORDING TO MAP THEREOF NO. 344, FILED IN SAID COUNTY RECORDER'S OFFICE ON JULY 1, 1885; THENCE SOUTHEASTERLY ALONG THE SOUTHWESTERLY LINE OF SAID BLOCK 7 AND ITS SOUTHEASTERLY PROLONGATION 443.70 FEET, MORE OR LESS TO THE MOST EASTERLY CORNER OF SAID DEPOT GROUNDS; THENCE SOUTHWESTERLY ALONG THE SOUTHEASTERLY LINE OF SAID DEPOT GROUNDS, 150.00 FEET TO THE NORTHEASTERLY RIGHT-OF-WAY LINE OF THE ATCHISON, TOPEKA AND SANTA FE RAILROAD BEING ALSO THE NORTHWESTERLY PROLONGATION OF THE SOUTHWESTERLY LINE OF BLOCK 10 OF BRYAN'S ADDITION TO OCEANSIDE AS SHOWN ON MAP THEREOF NO. 219, FILED IN SAID COUNTY RECORDER'S OFFICE ON MARCH 10, 1887; THENCE SOUTHEASTERLY ALONG SAID PROLONGATION AND SAID SOUTHWESTERLY LINE TO THE MOST SOUTHERLY CORNER OF LOT 5 IN SAID BLOCK 10; THENCE SOUTHWESTERLY ALONG THE SOUTHWESTERLY PROLONGATION OF THE SOUTHEASTERLY LINE OF SAID LOT 5, A DISTANCE OF 75.00 FEET; THENCE NORTHWESTERLY ALONG A LINE THAT IS PARALLEL WITH AND 75.00 FEET SOUTHWESTERLY OF SAID SOUTHWESTERLY LINE OF BLOCK 10 OF BRYAN'S ADDITION, MAP NO. 219, A DISTANCE OF 371.70 FEET; THENCE AT RIGHT ANGLES, NORTHEASTERLY 47.00 FEET; THENCE ALONG A LINE THAT BEARS LEFT 45°00'00" FROM THE NORTHEASTERLY PROLONGATION OF THE LAST MENTIONED LINE, 181.02 FEET TO A POINT ON A LINE THAT IS PARALLEL WITH AND 50.00 FEET SOUTHWESTERLY OF THE SOUTHWESTERLY LINE OF SAID BLOCK 7 OF OCEANSIDE, MAP NO. 344; THENCE ALONG SAID PARALLEL LINE, NORTHWESTERLY TO A POINT ON THE SOUTHWESTERLY PROLONGATION OF THE NORTHWESTERLY LINE OF SAID LOT 16, BLOCK 7 OF MAP NO. 344; THENCE NORTHEASTERLY

TRACT II:

PARCEL 1: (APN 150-046-17-00)

LOTS 1, 2, 3, 4 AND 5 IN BLOCK 12 OF BRYAN'S ADDITION, IN THE CITY OF OCEANSIDE, COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO MAP THEREOF NO. 219, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, MARCH 10, 1887.

PARCEL 2: (APN 150-046-01-00 THROUGH 150-046-08-00)

LOTS 9 THROUGH 16 INCLUSIVE, IN BLOCK 12 OF BRYAN'S ADDITION, IN THE CITY OF OCEANSIDE, COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO MAP THEREOF NO. 219, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY MARCH 10, 1887.

EXCEPTING THEREFROM, ALL OIL, GAS AND OTHER HYDROCARBON SUBSTANCES IN AND UNDER ALL OF THE ABOVE DESCRIBED REAL PROPERTY, BUT WITHOUT ANY RIGHT TO PENETRATE, USE OR DISTURB THE SURFACE OF SAID PROPERTY OR ANY PORTION OF SAID PROPERTY WITHIN FIVE HUNDRED FEET (500') OF THE SURFACE THEREOF.

TOGETHER WITH PORTIONS OF CLEVELAND STREET AND MICHIGAN AVENUE VACATED BY DOCUMENT RECORDED MARCH 14, 1994 AS INSTRUMENT NO. 94-0164097 OF OFFICIAL RECORDS WHICH WOULD REVERT TO SAID LAND BY OPERATION OF LAW.

TRACT III:

PARCEL 1: (APN 150-043-01-00 THROUGH 150-043-04-00)

ALL OF LOTS 7 AND 8 IN BLOCK 10 AND 11 OF LOTS 1, 2, 3 AND 4 IN BLOCK 11, ALL BEING BYRON'S ADDITION TO OCEANSIDE, IN THE CITY OF OCEANSIDE, COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO MAP THEREOF NO. 219, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, MARCH 10, 1887, TOGETHER WITH THAT PORTION OF MICHIGAN AVENUE (80.00 FEET WIDE) LYING ADJACENT TO AND BETWEEN SAID BLOCKS AS VACATED AND CLOSED TO PUBLIC USE ON DECEMBER 23, 1931 BY RESOLUTION NO. 633 OF THE CITY COUNCIL OF
THE CITY OF OCEANSIDE.

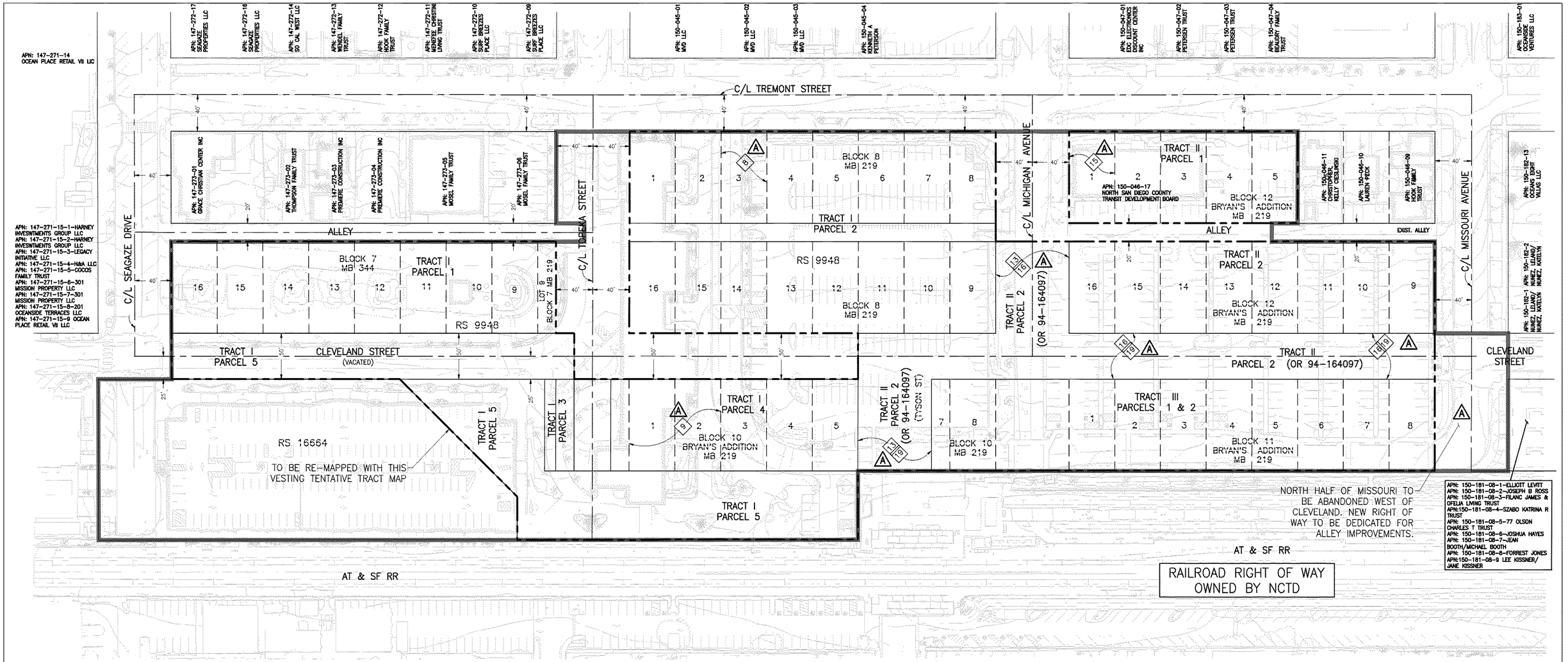
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VESTING TENTATIVE MAP AND DEVELOPMENT PLAN ENCUMBRANCE MAP

NCTD OCEANSIDE TRANSIT CENTER, SOUTH TREMONT STREET

CITY OF OCEANSIDE, CALIFORNIA

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EXCEPTIONS

THE FOLLOWING MATTERS AFFECT TRACT I:

A 4 AN EASEMENT TO THE CITY OF OCEANSIDE FOR HIGHWAY PURPOSES RECORDED JUNE 29, 1922 IN BOOK 751, PAGE 282, DEEDS. (LOCATION OF THE EASEMENT IS INDETERMINATE FROM RECORD INFORMATION)

A 5 RESOLUTION NO. 2507 TO CHANGE STREET NAME TO TRANSIT STREET RECORDED MARCH 22, 1956 IN BOOK 6028, PAGE 360, OFFICIAL RECORDS.

A 6 THE FACT THAT THE LAND LIES WITHIN THE BOUNDARIES OF THE DOWNTOWN REDEVELOPMENT PROJECT AREA, AS DISCLOSED BY THE DOCUMENT RECORDED NOVEMBER 21, 1975 AS INSTRUMENT NO. 75-328187, OFFICIAL RECORDS. A MODIFICATION DOCUMENT RECORDED AUGUST 12, 1982 AS INSTRUMENT NO. 82-0248561, OFFICIAL RECORDS.

A 7 COVENANTS, CONDITIONS AND RESTRICTIONS IN A GRANT DEED RECORDED MAY 8, 1981 AS INSTRUMENT NO. 81-0142429, OFFICIAL RECORDS.

A [8] AN EASEMENT TO SAN DIEGO GAS AND ELECTRIC COMPANY FOR AN UNDERGROUND ELECTRICAL SYSTEM RECORDED FEBRUARY 16, 1983 AS INSTRUMENT NO. 83-050385, OFFICIAL RECORDS. (AFFECTS LOT 3, BLOCK 8, BRYAN'S ADDITION. EXACT LOCATION IS INDETERMINATE FROM RECORD INFORMATION)

A [9] A "MEMORANDUM OF LEASE" RECORDED MARCH 23, 1984 AS INSTRUMENT NO. 84-107078, OFFICIAL RECORDS. (AFFECTS LOTS 1 & 2, BLOCK 10, BRYAN'S ADDITION).

A 10 AN ORDER FOR POSSESSION, CASE NO. N18999, RECORDED AUGUST 2, 1984 AS INSTRUMENT NO. 84-294906, OFFICIAL RECORDS.

A 11 THE EFFECT OF RECORD OF SURVEY NO. 9948.

EXCEPTIONS (CONTINUED)

A 12 RESERVATIONS FROM RESOLUTION NO. 85-67 OVER PORTIONS OF VACATED TYSON STREET RECORDED MAY 31, 1985 AS INSTRUMENT NO. 85-193545, OFFICIAL RECORDS. (PORTION OVER AT & SF RR).

A [13] RESERVATION OF PUBLIC UTILITY EASEMENTS FROM RESOLUTION NO. R94-23 OVER PORTIONS OF VACATED TYSON STREET, CLEVELAND STREET AND MICHIGAN AVENUE RECORDED MARCH 14, 1994 AS INSTRUMENT NO. 94-164097, OFFICIAL RECORDS.

A 14 RIGHTS OF THE PUBLIC IN AND TO THAT PORTION OF THE LAND LYING WITHIN ANY ROAD, STREET, ALLEY OR HIGHWAY.

THE FOLLOWING MATTERS AFFECT TRACT II:

A [15] AN EASEMENT TO SAN DIEGO GAS AND ELECTRIC COMPANY FOR AN ELECTRICAL SYSTEM RECORDED JUNE 28, 1977 AS INSTRUMENT NO. 256810, OFFICIAL RECORDS. (AFFECTS LOT 1, BLOCK 12, BRYAN'S ADDITION. LOCATION OF THE EASEMENT IS INDETERMINATE FROM RECORD INFORMATION)

A [16] RESERVATION OF PUBLIC UTILITY EASEMENTS FROM RESOLUTION NO. R94-23 OVER PORTIONS OF VACATED TYSON STREET, CLEVELAND STREET AND MICHIGAN AVENUE RECORDED MARCH 14, 1994 AS INSTRUMENT NO. 94-164097, OFFICIAL RECORDS.

A 17 A "NOTICE OF COMPLETION FOR IFP# 19022-27890" RECORDED OCTOBER 4, 2019 AS INSTRUMENT NO. 2019-0443481, OFFICIAL RECORDS.

THE FOLLOWING MATTERS AFFECT TRACT III:

A 18 THE FACT THAT THE LAND LIES WITHIN THE BOUNDARIES OF THE DOWNTOWN REDEVELOPMENT PROJECT AREA, AS DISCLOSED BY THE DOCUMENT RECORDED JULY 6, 1978 AS INSTRUMENT NO. 78-282288, OFFICIAL RECORDS.

A [19] RESERVATION OF PUBLIC UTILITY EASEMENTS FROM RESOLUTION NO. R94-23 OVER PORTIONS OF VACATED TYSON STREET, CLEVELAND STREET AND MICHIGAN AVENUE RECORDED MARCH 14, 1994 AS INSTRUMENT NO. 94-164097, OFFICIAL RECORDS.

A 20 RIGHTS OF PARTIES IN POSSESSION.

EASEMENT / RIGHT OF WAY DISPOSITION NOTES

A EXISTING EASEMENTS AND RIGHT OF WAY TO BE QUITCLAIMED, OR ABANDONED

LEGEND:

- BOUNDARY LINE
- CENTER LINE
- CURB AND GUTTER
- PROP. DRIVEWAY
- EXIST. CONTOUR
- PROP. CONTOUR (54)
- EASEMENT LINE
- PROP. RETAINING WALL
- EXIST. SEWER
- EXIST. WATER
- EXIST. STORM DRAIN
- EXIST. GAS
- EXIST. OVERHEAD POWER
- PROP. SEWER (S)
- PROP. WATER
- PROP. STORM DRAIN (SD)
- PROP. GAS (G)
- EXIST. FIRE HYDRANT
- EXIST. SUBDIVISION BOUNDARY

GRAPHIC SCALE

50 0 25 50 100 200

(IN FEET)
1 inch = 50 ft.

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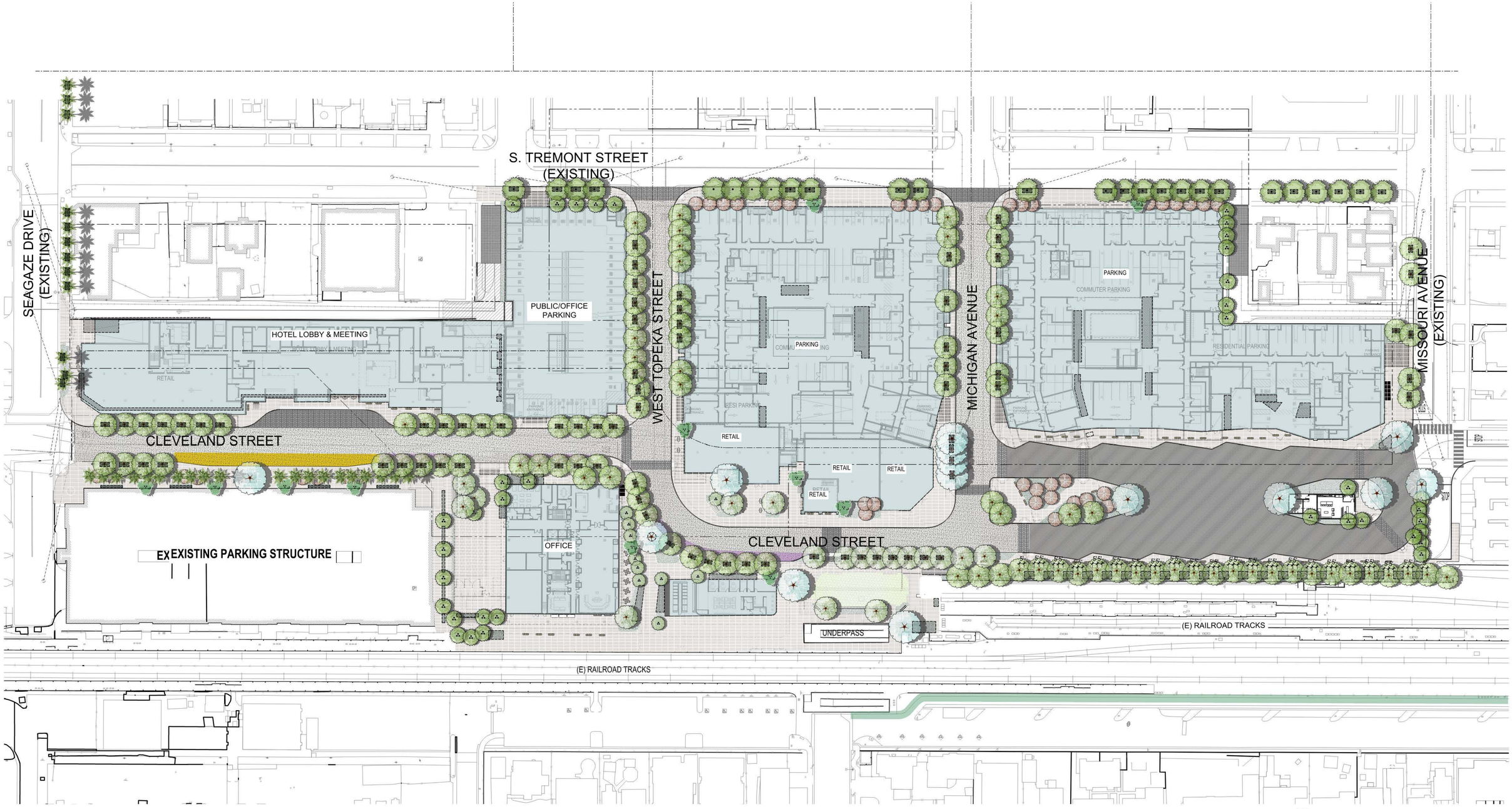
VESTING TENTATIVE MAP AND DEVELOPMENT PLAN ENCUMBRANCE MAP

NCTD OCEANSIDE TRANSIT CENTER, SOUTH TREMONT STREET

CITY OF OCEANSIDE, CALIFORNIA

SHEET C13 OF C13

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ILLUSTRATIVE SITE PLAN

NCTD OCEANSIDE TRANSIT CENTER

AUGUST 9, 2024

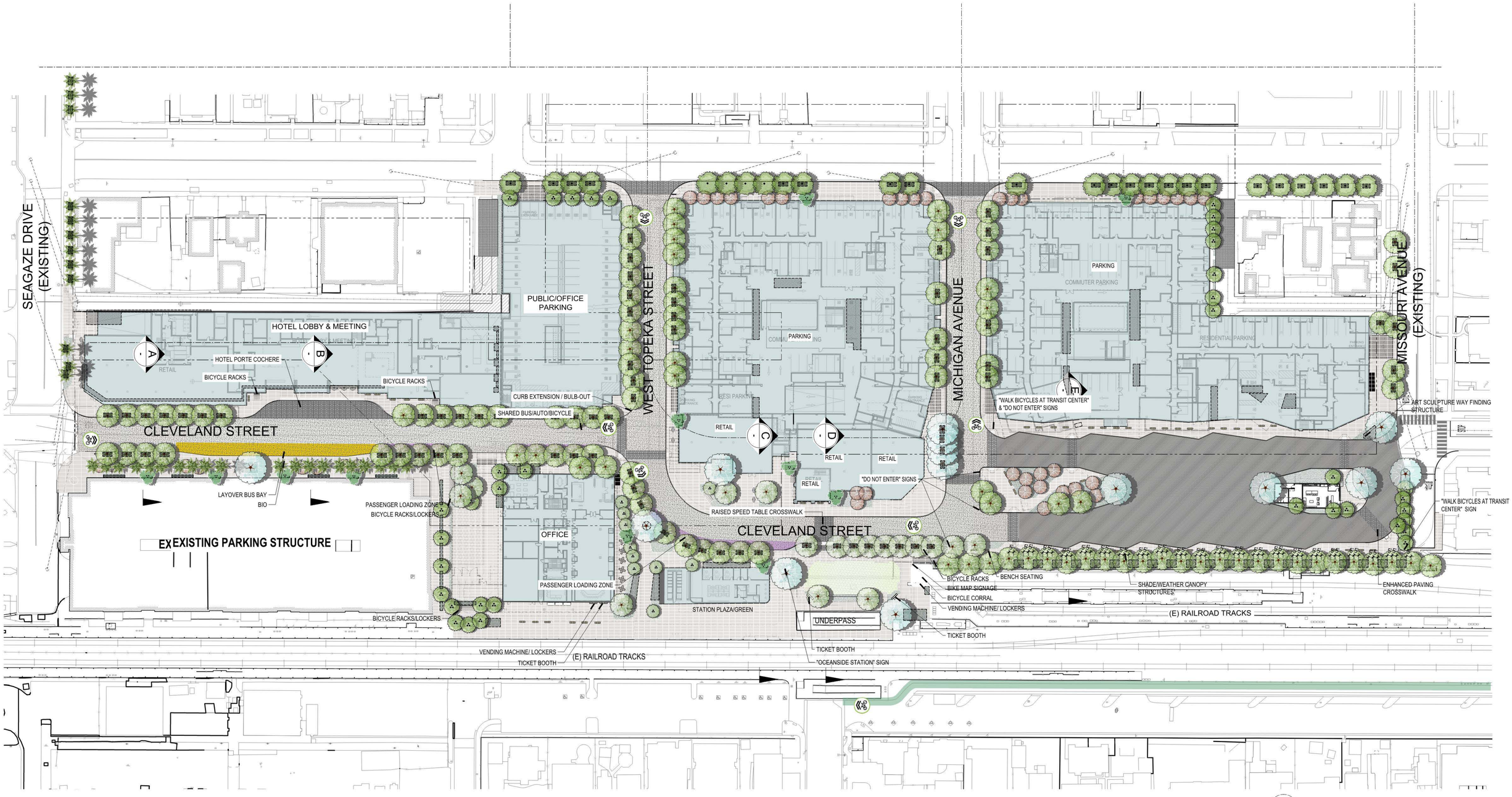
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23422 Mill Creek Drive
Suite 105
Laguna Hills, CA 92653

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STORM WATER QUALITY LEGEND

- IN GROUND BIO FILTRATION PLANTER
- RAISED BIO FILTRATION PLANTER, ON GRADE
- RAISED BIO FILTRATION PLANTER, OVER STRUCTURE
- TREE WELL
- PROPOSED GRASSCRETE OR PERMEABLE PAVERS

NORTH

0 40 80 120 160 feet

1" = 40'

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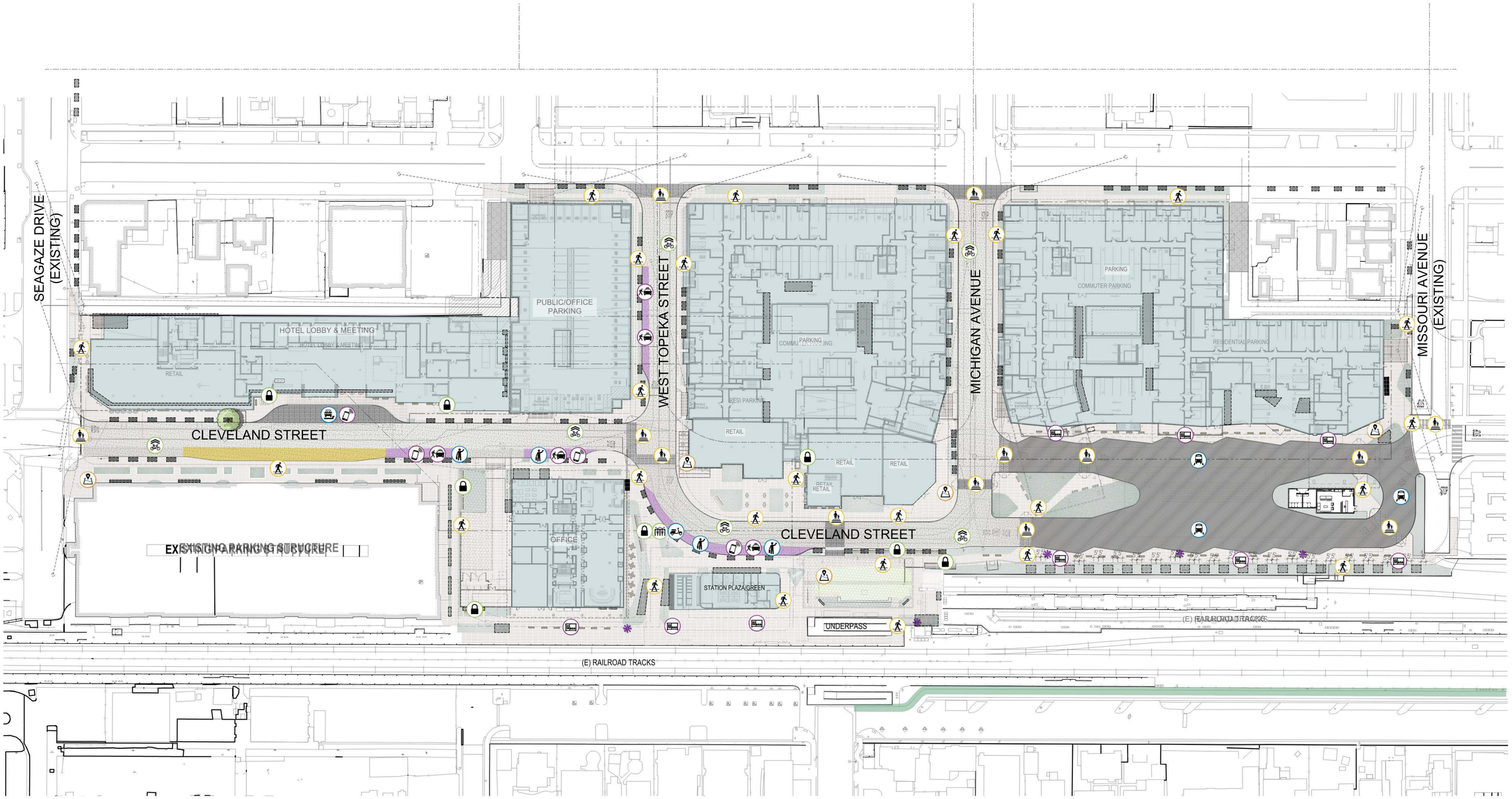
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SITE PLAN

NCTD OCEANSIDE TRANSIT CENTER

AUGUST 9, 2024

CITY OF OCEANSIDE, CALIFORNIA



LEGEND

- SHARED BUS/AUTO/BICYCLE
- PEDESTRIAN- ACCESSIBLE ROUTE
- CONNECTION TO RAIL TRAIL, VIA EXISTING TUNNEL
- VEHICLE BUILDING GARAGE ENTRANCE
- DRINKING FOUNTAIN / BOTTLE FILLING STATION *QUANTITY: 3*
- RECYCLE/WASTE CONTAINERS *QUANTITY: 27*
- ART SCULPTURE WAY FINDING *QUANTITY: 5*
- MOBILE DEVICE CHARGING STATION *QUANTITY: 8*

TRANSIT AMENITIES

- ENHANCED TRANSIT WAITING AREAS
- PASSENGER LOADING ZONES
- REAL-TIME TRAVEL INFORMATION

PEDESTRIAN AMENITIES

- WALKWAYS
- CROSSINGS

BIKE AMENITIES

- BIKEWAYS
- BIKE PARKING
- BIKE SHARE

MOTORIZED SERVICE & AMENITIES

- DEDICATED TRANSIT LANES
- ELECTRIC BIKE & SCOOTERSHARE
- ON-DEMAND RIDESHARE
- FLEXIBLE CURB SPACE

SUPPORT SERVICES & AMENITIES

- WAYFINDING
- PACKAGE DELIVERY

NORTH

0 40 80 120 160 feet

1" = 40'

Toll Brothers Apartment Living
23422 Mill Creek Drive
Suite 105
Laguna Hills, CA 92653

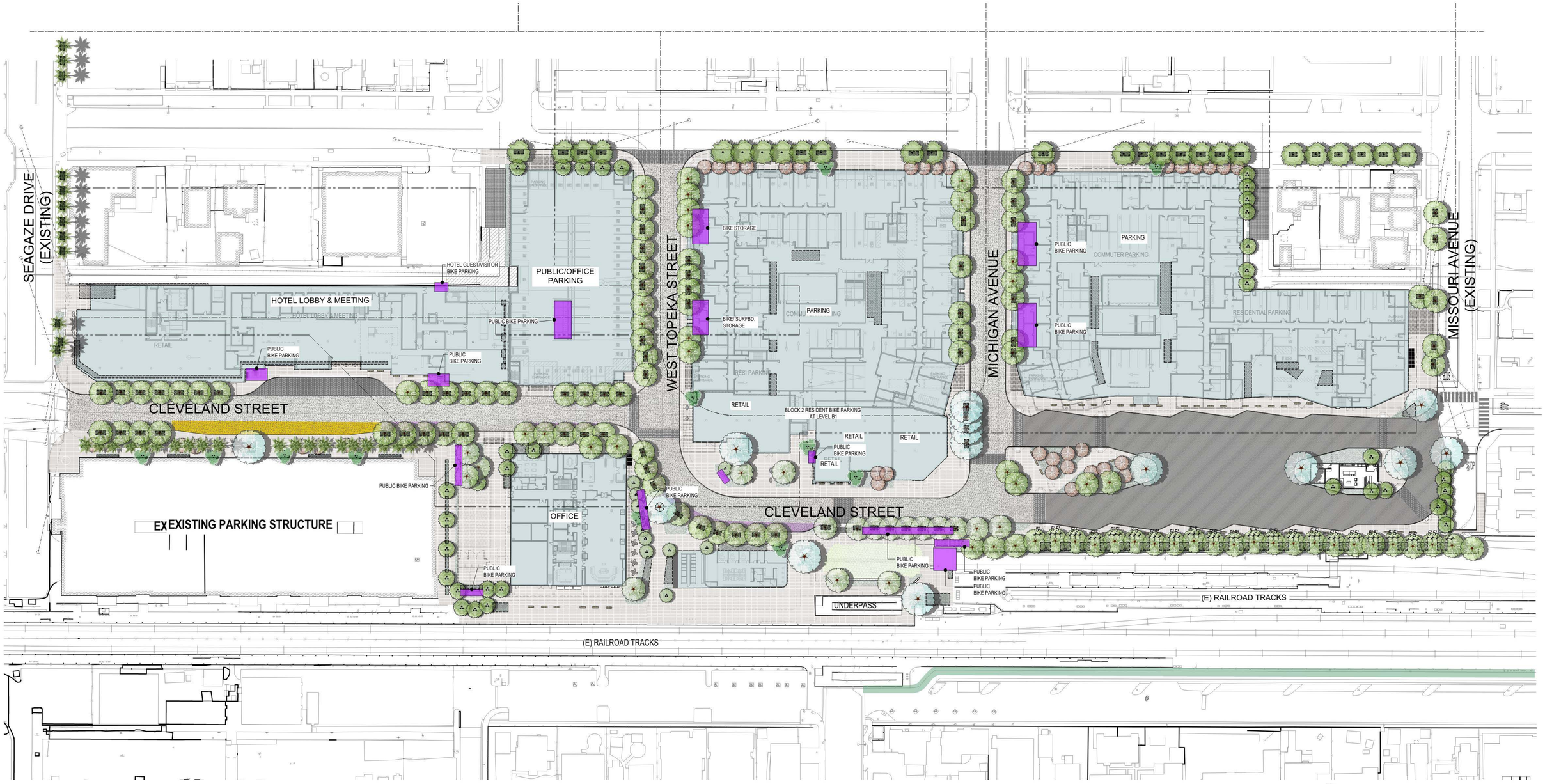
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MOBILITY PLAN
NCTD OCEANSIDE TRANSIT CENTER

AUGUST 9, 2024

CITY OF OCEANSIDE, CALIFORNIA



BIKE CIRCULATION AND BIKE AMENITIES PLAN

NCTD OCEANSIDE TRANSIT CENTER

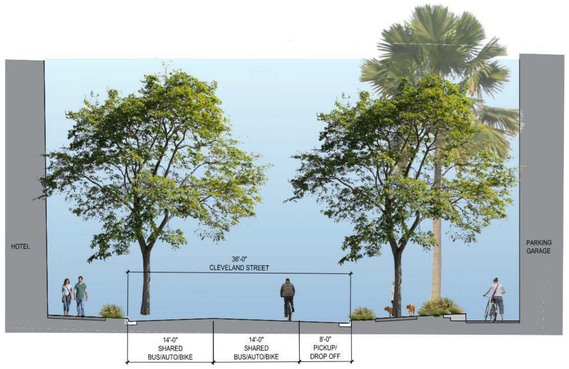
CITY OF OCEANSIDE, CALIFORNIA

AUGUST 9, 2024

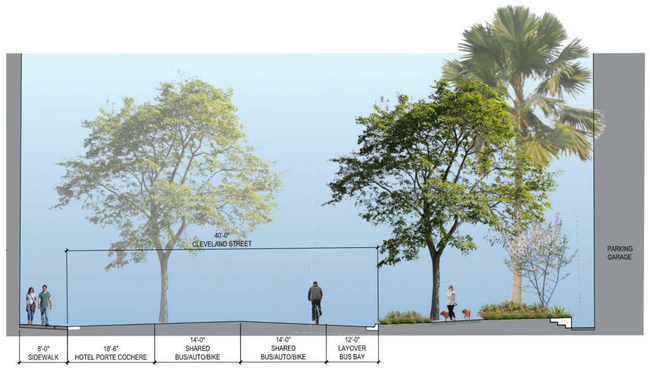
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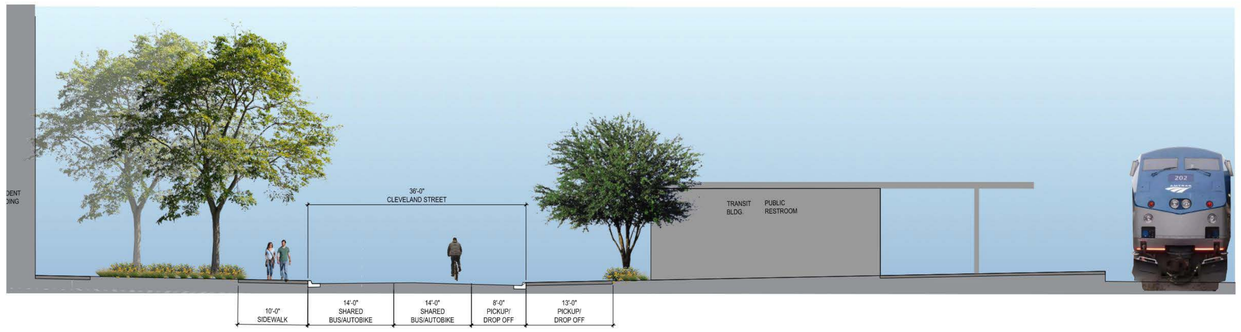
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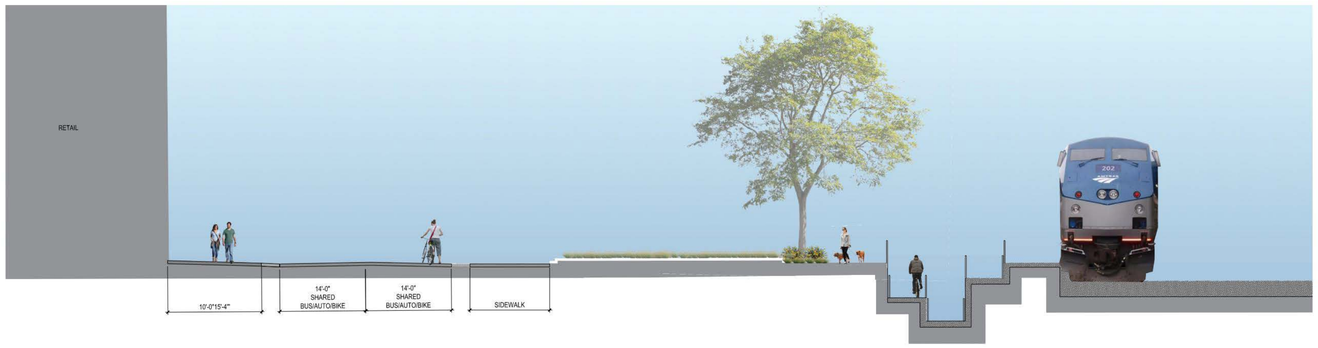
STREET SECTION - A
SCALE: 1=10'-0"



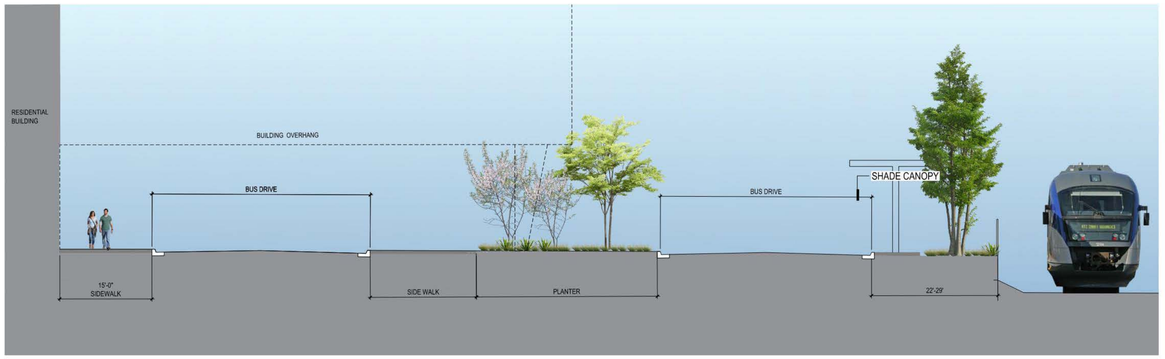
STREET SECTION - B
SCALE: 1=10'-0"



STREET SECTION -C
SCALE: 1=10'-0"



STREET SECTION -D
SCALE: 1=10'-0"



STREET SECTION -E
SCALE: 1=10'-0"



KEY MAP
SCALE: 1=100'-0"

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NCTD OCEANSIDE TRANSIT CENTER

AUGUST 9, 2024

CITY OF OCEANSIDE, CALIFORNIA

CONCEPT_PLANT_SCHEDULE

GENERAL STREET TREE	213	
ARBUTUS X `MARINA` / MARINA STRAWBERRY TREE STANDARD		24" BOX
BAUHINIA PURPUREA / PURPLE ORCHID TREE		15 GAL
CASSIA LEPTOPHYLLA / GOLD MEDALLION TREE		24" BOX
CHILOPSIS LINEARIS / DESERT WILLOW		24" BOX
LAURUS NOBILIS / SWEET BAY		15 GAL
METROSIDEROS EXCELSA / NEW ZEALAND CHRISTMAS TREE		24" BOX
TABEBUIA IMPETIGINOSA / PINK TRUMPET TREE		24" BOX
TREMONT STREET TREE	46	
ALBIZIA JULIBRISSIN / SILK TREE		24" BOX
GEUERA PARVIFLORA / AUSTRALIAN WILLOW		24" BOX
JACARANDA MIMOSIFOLIA / JACARANDA MULTI-TRUNK		24" BOX
PLATANUS MEXICANA 'ALAMO' / MEXICAN SYCAMORE		24" BOX
SEARSIA LANCEA / AFRICAN SUMAC		24" BOX
DUNE TREE	33	
AGONIS FLEXUOSA / PEPPERMINT TREE		24" BOX
GEUERA PARVIFLORA / AUSTRALIAN WILLOW		24" BOX
MELALEUCA QUINQUENERVIA / CAJEPUT TREE MULTI-TRUNK		24" BOX
PROSOPIS CHILENSIS 'THORNLESS' / THORNLESS CHILEAN MESQUITE		24" BOX
TABEBUIA IMPETIGINOSA / PINK TRUMPET TREE		24" BOX
FEATURE TREE	28	
CERCIS OCCIDENTALIS / WESTERN REDBUD MULTI-TRUNK		15 GAL
CHIONANTHUS RETUSUS / CHINESE FRINGE TREE		15 GAL
PITTOSPORUM PHILLYRAEOIDES / DESERT WILLOW PITTOSPORUM		15 GAL
SCHINUS MOLLE / CALIFORNIA PEPPER		24" BOX
TABEBUIA CHRYSOTRICHA / GOLDEN TRUMPET TREE		15 GAL
TIPUANA TIPU / TIPU TREE		24" BOX
TRISTANIOPSIS LAURINA / WATER GUM		15 GAL
SMALL FLOWERING TREE	20	
ACACIA BAILEYANA / BAILEY ACACIA		24" BOX
ACACIA COVENYI / BLUE BUSH ACACIA		15 GAL
ACACIA CULTRIFORMIS / KNIFE ACACIA		15 GAL
ACACIA DEALBATA / SILVER WATTLE		15 GAL
ALBIZIA JULIBRISSIN / SILK TREE		24" BOX
CERCIS OCCIDENTALIS / WESTERN REDBUD MULTI-TRUNK		24" BOX
LAGERSTROEMIA INDICA / CRAPE MYRTLE		15 GAL
LEPTOSPERMUM LAEVIGATUM / AUSTRALIAN TEA TREE		15 GAL
MELALEUCA NESOPHILA / PINK MELALEUCA MULTI-TRUNK		15 GAL
PLUMERIA RUBRA / RED FRANGIPANI		15 GAL
TABEBUIA IMPETIGINOSA / PINK TRUMPET TREE		24" BOX
SMALL FEATURE TREE	89	
ALOE `HERCULES` / HERCULES ALOE		15 GAL
ALOE BAINESII / TREE ALOE		15 GAL
CORDYLINE AUSTRALIS / GRASS PALM		15 GAL
DRACAENA DRACO / DRAGON TREE		15 GAL
DRACAENA MARGINATA / DRACAENA		15 GAL
FICUS ELASTICA / RUBBER TREE		15 GAL
FICUS LYRATA / FIDDLE LEAF FIG		15 GAL
JUNIPERUS CHINENSIS 'TORULOSA' / HOLLYWOOD JUNIPER		15 GAL
YUCCA ALOIFOLIA / ALOE YUCCA		15 GAL
YUCCA AUSTRALIS / YUCCA		15 GAL
YUCCA RIGIDA / MEXICAN BLUE YUCCA		15 GAL
YUCCA ROSTRATA / BEAKED YUCCA		15 GAL
STREET PALM	82	
WASHINGTONIA ROBUSTA / MEXICAN FAN PALM		12` BTH
WASHINGTONIA X FILIBUSTA / HYBRID FAN PALM		12` BTH
ACCENT TREE	25	
BEAUCARNEA RECURVATA / PONY TAIL PALM		24" BOX
CUPRESSUS MACROCARPA / MONTEREY CYPRESS		24" BOX
DRACAENA DRACO / DRAGON TREE		24" BOX
YUCCA BREVIFOLIA / JOSHUA TREE		24" BOX
YUCCA ELEPHANTIPES / GIANT YUCCA		24" BOX
VERTICAL SCREENING TREE	71	
ELAEOCARPUS DECIPIENS / JAPANESE BLUEBERRY TREE		15 GAL
HETEROMELES ARBUTIFOLIA / TOYON		15 GAL
LAURUS NOBILIS / SWEET BAY		15 GAL
MYRICA CALIFORNICA 'BUXIFOLIA' / PACIFIC WAX MYRTLE		15 GAL
PODOCARPUS GRACILIOR / FERN PINE		15 GAL

GENERAL STREETSCAPE	11,048 SF	
2`-3` O.C.		
ACACIA COGNATA 'ACCOG01' / COUSIN ITT LITTLE RIVER WATTLE		1 GAL. - 5 GAL.
AEONIUM ARBOREUM / TREE AEONIUM		1 GAL. - 5 GAL.
AGAVE ATTENUATA / FOXTAIL AGAVE		1 GAL. - 5 GAL.
ARISTIDA PURPUREA / PURPLE THREEAWN		1 GAL. - 5 GAL.
CARISSA MACROCARPA `TUTTLE` / `TUTTLE NATAL PLUM		1 GAL. - 5 GAL.
DIANELLA TASMANICA 'TR20' TM / TASRED FLAX LILY		1 GAL. - 5 GAL.
ERIOGONUM FASCICULATUM / CALIFORNIA BUCKWHEAT		1 GAL. - 5 GAL.
GREVILLEA ROSMARINIFOLIA 'DWARF FORM' / DWARF ROSEMARY GREVILLEA		1 GAL. - 5 GAL.
GREVILLEA X 'CANBERRA GEM' / CANBERRA GEM GREVILLEA		1 GAL. - 5 GAL.
LIGUSTRUM JAPONICUM 'TEXANUM' / TEXAS JAPANESE PRIVET		1 GAL. - 5 GAL.
LOMANDRA CONFERTIFOLIA 'SEASCAPE' / SEASCAPE MAT RUSH		1 GAL. - 5 GAL.
MUHLENBERGIA LINDHEIMERI / LINDHEIMER`S MUHLY		1 GAL. - 5 GAL.
MYRSINE AFRICANA / AFRICAN BOXWOOD		1 GAL. - 5 GAL.
PEDILANTHUS MACROCARPUS / LADY`S SLIPPER		1 GAL. - 5 GAL.
SENECIO SERPENS / BLUE CHALKSTICKS		1 GAL. - 5 GAL.
TRACHELOSPERMUM JASMINOIDES / CHINESE STAR JASMINE		1 GAL. - 5 GAL.
RAISED PLANTER MIX	196 SF	
2`-3` O.C.		
ACHILLEA MILLEFOLIUM / COMMON YARROW		1 GAL. - 5 GAL.
CAREX TESTACEA / ORANGE SEDGE		1 GAL. - 5 GAL.
DUDLEYA BRITTONII / GIANT CHALK DUDLEYA		1 GAL.
ERIOGONUM GIGANTEUM COMPACTUM / COMPACT SAINT CATHERINE'S LACE		1 GAL. - 5 GAL.
MISCANTHUS SINENSIS 'ADAGIO' / ADAGIO EULALIA GRASS		1 GAL. - 5 GAL.
PENNISETUM ALOPECUROIDES / FOUNTAIN GRASS		1 GAL. - 5 GAL.
PENSTEMON SPECTABILIS / SHOWY PENSTEMON		1 GAL. - 5 GAL.
PORTULACARIA AFRA / ELEPHANT BUSH		1 GAL.
SALVIA X 'BEE'S BLISS' / BEE'S BLISS SAGE		1 GAL. - 5 GAL.
SENECIO ANTEUPHORBIUM / SWIZZLE STICKS		1 GAL. - 5 GAL.
SENECIO CRASSISSIMUS / VERTICAL LEAF SENECIO		1 GAL.
SENECIO VITALIS / BLUE CHALK FINGERS		1 GAL.
SESLERIA AUTUMNALIS / AUTUMN MOOR GRASS		1 GAL. - 5 GAL.
VERBENA LILACINA 'DE LA MINA' / DE LA MINA LILAC VERBENA		1 GAL. - 5 GAL.
DUNE MIX	17,881 SF	
2`-3` O.C.		
ABRONIA VILLOSA / DESERT SAND VERBENA		1 GAL.
AGAVE SHAWII / COASTAL AGAVE		1 GAL. - 5 GAL.
ARISTIDA PURPUREA / PURPLE THREEAWN		1 GAL. - 5 GAL.
BOUTELOUA GRACILIS 'BLONDE AMBITION' / BLONDE AMBITION BLUE GRAMA		1 GAL. - 5 GAL.
CAREX BUCHANANII / LEATHER LEAF SEDGE		1 GAL. - 5 GAL.
DUDLEYA BRITTONII / GIANT CHALK DUDLEYA		1 GAL. - 5 GAL.
LIMONIUM PEREZII / STATICE		1 GAL. - 5 GAL.
MUHLENBERGIA DUBIA / PINE MUHLY		1 GAL. - 5 GAL.
OPUNTIA SANTA-RITA 'TUBAC' TM / SANTA RITA PRICKLYPEAR		1 GAL. - 5 GAL.
SALICORNIA PACIFICA / PICKLEWEED		1 GAL. - 5 GAL.
SPHAERALCEA AMBIGUA / DESERT GLOBEMALLOW		1 GAL. - 5 GAL.
XEROSICYOS DANGUYI / SILVER DOLLAR VINE		1 GAL.

TREMONT STREETSCAPE	6,111 SF	
2`-3` O.C.		
AEONIUM X 'ZWARTKOP' / ZWARTKOP AEONIUM		1 GAL. - 5 GAL.
DIANELLA REVOLUTA / SPREADING FLAX LILY		1 GAL. - 5 GAL.
DURANTA ERECTA 'GOLD MOUND' / GOLD MOUND DEWDROPS		1 GAL. - 5 GAL.
GREVILLEA KILAUEA / GREVILLEA		1 GAL. - 5 GAL.
HAKEA SUAVEOLENS / SWEET HAKEA		1 GAL. - 5 GAL.
LEUCADENDRON LAXUM / BREDASDORP CONEBUSH		1 GAL. - 5 GAL.
LIGUSTRUM JAPONICUM 'TEXANUM' / TEXAS JAPANESE PRIVET		1 GAL. - 5 GAL.
LIGUSTRUM SINENSE 'SUNSHINE' / SUNSHINE CHINESE PRIVET		1 GAL. - 5 GAL.
LOMANDRA CONFERTIFOLIA 'SEASCAPE' / SEASCAPE MAT RUSH		1 GAL. - 5 GAL.
LOMANDRA LONGIFOLIA 'TANIKA' / TANIKA DWARF MAT RUSH		1 GAL. - 5 GAL.
PENNISETUM X 'FAIRY TAILS' / FAIRY TAILS FOUNTAIN GRASS		1 GAL.
PENSTEMON EATONII / FIRECRACKER PENSTEMON		1 GAL.
POLYGALA MYRTIFOLIA / SWEET PEA SHRUB		1 GAL. - 5 GAL.
SALVIA LEUCANTHA 'SANTA BARBARA' / SANTA BARBARA MEXICAN BUSH SAGE		1 GAL. - 5 GAL.
SALVIA X 'ALLEN CHICKERING' / ALLEN CHICKERING SAGE		1 GAL. - 5 GAL.
TEUCRIUM CHAMAEDRYS / GERMANDER		1 GAL. - 5 GAL.
TEUCRIUM X LUCIDRYS / HEDGE GERMANDER		1 GAL. - 5 GAL.
VERBENA LILACINA 'DE LA MINA' / DE LA MINA LILAC VERBENA		1 GAL. - 5 GAL.
ALLEY MIX	1,272 SF	
2`-3` O.C.		
ACHILLEA MILLEFOLIUM / COMMON YARROW		1 GAL.
DIANELLA REVOLUTA 'BLUE TWIST' TM / BLUE TWIST FLAX LILY		1 GAL.
DIANELLA TASMANICA / FLAX LILY		1 GAL.
DIETES IRIDIOIDES / FORTNIGHT LILY		1 GAL.
LOMANDRA CONFERTIFOLIA / SMALL MAT RUSH		1 GAL.
LOMANDRA LONGIFOLIA / MAT RUSH		1 GAL.
LOMANDRA X 'LOMLON' TM / LIME TUFF DWARF MAT RUSH		1 GAL.
MUHLENBERGIA CAPILLARIS / PINK MUHLY GRASS		1 GAL.
PHORMIUM COOKIANUM / MOUNTAIN FLAX		1 GAL.
SESLERIA AUTUMNALIS / AUTUMN MOOR GRASS		1 GAL.
BIO FILTRATION PLANTER	19,758 SF	
2`-3` O.C.		
ACHILLEA MILLEFOLIUM / COMMON YARROW		4" POT
AGROSTIS PALLENS / THINGRASS		1 GAL.
ANEMOPSIS CALIFORNICA / YERBA MANSA		1 GAL.
CAREX SPISSA / SAN DIEGO SEDGE		1 GAL.
CAREX SUBFUSCA / BROWN SEDGE		1 GAL.
CAREX TUMULICOLA / FOOTHILL SEDGE		1 GAL.
DISTICHLIS SPICATA / SALTGRASS		1 GAL.
ELEOCHARIS MACROSTACHYA / COMMON SPIKERUSH		1 GAL.
FESTUCA CALIFORNICA / CALIFORNIA FESCUE		1 GAL.
FESTUCA RUBRA / RED FESCUE		1 GAL.
IVA HAYESIANA / SAN DIEGO POVERTY WEED		1 GAL.
JUNCUS PATENS / CALIFORNIA GRAY RUSH		1 GAL.
MAHONIA NEVINII / NEVIN MAHONIA		1 GAL.
MUHLENBERGIA RIGENS / DEER GRASS		1 GAL.
RIBES SPECIOSUM / FUCHSIA FLOWERING GOOSEBERRY		1 GAL.
ROSA CALIFORNICA / CALIFORNIA WILD ROSE		1 GAL.
SCIRPUS CERNUUS / LOW BULRUSH		1 GAL.
HARDY TURF	5,129 SF	
FESTUCA ARUNDINACEA 'MARATHON II' / MARATHON II FESCUE		SOD

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NCTD OCEANSIDE TRANSIT CENTER

AUGUST 9, 2024

CITY OF OCEANSIDE, CALIFORNIA



EXISTING TREE PLAN

SCALE: 1" = 50'-0"

0 25 50 100
SCALE: 1"=50'-0"

PLANT SCHEDULE

TREES	BOTANICAL / COMMON NAME
(10)	EXISTING ARBUTUS X 'MARINA' TO BE REMOVED
8	EXISTING ARECASTRUM ROMANZOFFIANUM TO BE REMOVED
9	EXISTING CUPANIOPSIS ANACARDIOIDES TO BE REMOVED
11	EXISTING ERYTHRINA CAFFRA TO BE REMOVED
19	EXISTING EUCALYPTUS CAMALDULENSIS TO BE REMOVED
14	EXISTING EUCALYPTUS ROSACEA TO BE REMOVED
17	EXISTING MELALEUCA NESOPHILA TO BE REMOVED
16	EXISTING MELALEUCA QUINQUENERVIA TO BE REMOVED
15	EXISTING PHOENIX CANARIENSIS TO BE REMOVED
5	EXISTING PINUS CANARIENSIS TO BE REMOVED
13	EXISTING PLATANUS RACEMOSA TO BE REMOVED
12	EXISTING TRISTANIA CONFERTA TO BE REMOVED
18	EXISTING ULMUS PARVIFOLIA TO BE REMOVED
6	EXISTING WASHINGTONIA ROBUSTA TO BE REMOVED

TREE REPLACEMENT TABLE

	PROPOSED PLANTING	CURRENT PLANTING
DBH	2772"	888"
BTH	768'	950'

TREE PROTECTION NOTES:

1. A ROOT PROTECTION ZONE SHALL BE DEFINED BY A FOUR-FOOT HIGH TWO-BY-FOUR BARRIER CONSTRUCTED AROUND ANY POTENTIALLY IMPACTED TREE. THIS BARRIER SHALL BE AT THE DRIP LINE OR AT A DISTANCE FROM THE TRUNK EQUAL TO 6 INCHES FOR EACH INCH OF TRUNK DIAMETER 4 1/2 FEET ABOVE THE GROUND IF THIS METHOD DEFINES A LARGER AREA.
2. SHOULD IT BE NECESSARY TO TRENCH WITHIN THE 8 FT RADIUS OF TREE, TRENCHES SHALL BE HAND DUG. NO ROOTS LARGER THAN ONE INCH SHALL BE CUT UNLESS NO OTHER ALTERNATIVE IS FEASIBLE. ALL SMALLER ROOTS THAT MUST BE CUT SHALL BE SAW CUT (NO TRENCHERS) FLUSH WITH THE SIDE OF THE TRENCH. IF AT ANY TIME 25 PERCENT OF THE AREA WITHIN THE ROOT PROTECTION ZONE IS BEING SEPARATED FROM THE TREES BY A TRENCH, THE LINE SHALL BE LOCATED BY BORING OR AN ALTERNATIVE LOCATION FOR THE TRENCH ESTABLISHED. THE MINIMUM CLEARANCE BETWEEN AN OPEN TRENCH AND A STREET TREE SHALL BE ONE (1) FOOT, OR SIX (6) INCHES FOR EACH INCH OF TRUNK DIAMETER MEASURED AT 4.5 FEET ABOVE EXISTING GRADE IF THIS METHOD DEFINES A LARGER DISTANCE. THE MAXIMUM CLEARANCE SHALL BE TEN (10) FEET. THE CONTRACTOR SHALL CONFORM TO THESE PROVISIONS UNLESS OTHERWISE DIRECTED OTHERWISE.
3. AT NO TIME SHALL ANY EQUIPMENT, MATERIALS, SUPPLIES OR FILL BE ALLOWED WITHIN THE PRESCRIBED ROOT PROTECTION ZONE UNLESS OTHERWISE DIRECTED. THE ROOT PROTECTION ZONE IS DEFINED AS THE LARGER OF THE DRIP LINE OF THE TREE OR THE DISTANCE FROM THE TRUNK EQUAL TO SIX (6) INCHES FOR EACH INCH OF TRUNK DIAMETER MEASURED AT 4.5 FEET ABOVE EXISTING GRADE.
4. WHEN DEALING WITH COLUMNAR TREE SPECIES THE DRIP LINE AND ROOT PROTECTION ZONE IS INADEQUATE AND MUST BE ADJUSTED TO REFLECT A ROOT PROTECTION RADIUS OF 40% OF THE OVERALL TREE HEIGHT.

3049 Urban Forestry Program

All new development that requires administrative or discretionary review shall comply with the urban forestry standards outlined in Table 1.

Table 1
Minimum Tree Canopy and Permeable Surface Area Requirements

Project Site Area	Minimum Tree Canopy Area	Minimum Permeable Surface Area
1 acre or more	12%	22%
1/3 acre to 1 acre	9%	16%
Less than 1/3 acre	7%	10%

Permeable surfaces should allow water to pass through it, with pores or openings, and may include gravel, pervious concrete, porous asphalt, paving stone, or similar materials.

Tree canopy area shall be measured using the projected maximum growth of selected tree species, based on planting location.

Projects must also provide a Landscape and Tree Canopy Management Plan (LTCMP). The LTCMP shall include information regarding regular, seasonal, and emergency maintenance, trash abatement, irrigation, tree/plant care, tree replacement, insect and disease infestation prevention, integrated pest management, and appropriate response process etc. Projects that do not maintain landscape in a manner consistent with the approved LTCMP shall be subject to code enforcement action.

In the event a project site cannot feasibly accommodate the minimum permeable surface area required, additional tree canopy, in excess of the minimum requirement, can be credited to meet the minimum permeable surface area requirement.

In the event a project site cannot feasibly accommodate the minimum tree canopy area, the project may plant in the public right-of-way (e.g., parkway) adjacent to the project site or on an alternative site within the City, as approved by the Director of the Public Works Department. Should the City establish a Tree Fund or similar in-lieu fee program, projects that cannot meet minimum requirements may contribute to said program as an alternative means of compliance.

ARCADIS
OCEANSIDE TRANSIT CENTER
235 South Tremont Avenue
Oceanside, CA 92054

McCulloughLA.com

Toll Brothers Apartment Living
23422 Mill Creek Drive
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Laguna Hills, CA 92653
CONTACT - Michael McCann
PHONE - (949) 370-8155

Disclaimer

Signature & Seal

NOT FOR CONSTRUCTION

Issue Drawing Log

REV	DATE	DESCRIPTION
1	08-26-2022	DP SUBMITTAL 1
2	02-13-2023	DP SUBMITTAL 2
3	10-09-2023	DP SUBMITTAL 3
4	04-10-2024	DP SUBMITTAL 4
5	06-20-2024	DP SUBMITTAL 5
6	08-19-2024	DP SUBMITTAL 6

Schematic Design

EXISTING TREE PLAN

L-001

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GENERAL STREET TREE	213	
ARBUTUS X `MARINA` / MARINA STRAWBERRY TREE STANDARD		24" BOX
BAUHINIA PURPUREA / PURPLE ORCHID TREE		15 GAL
CASSIA LEPTOPHYLLA / GOLD MEDALLION TREE		24" BOX
CHILOPSIS LINEARIS / DESERT WILLOW		24" BOX
LAURUS NOBILIS / SWEET BAY		15 GAL
METROSIDEROS EXCELSA / NEW ZEALAND CHRISTMAS TREE		24" BOX
TABEBUIA IMPETIGINOSA / PINK TRUMPET TREE		24" BOX

TREMONT STREET TREE	46	
ALBIZIA JULIBRISSIN / SILK TREE		24" BOX
GEIJERA PARVIFLORA / AUSTRALIAN WILLOW		24" BOX
JACARANDA MIMOSIFOLIA / JACARANDA MULTI-TRUNK		24" BOX
PLATANUS MEXICANA 'ALAMO' / MEXICAN SYCAMORE		24" BOX
SEARSIA LANCEA / AFRICAN SUMAC		24" BOX

DUNE TREE	33	
AGONIS FLEXUOSA / PEPPERMINT TREE		24" BOX
GEIJERA PARVIFLORA / AUSTRALIAN WILLOW		24" BOX
MELALEUCA QUINQUENERVIA / CAJEPUT TREE MULTI-TRUNK		24" BOX
PROSOPIS CHILENSIS 'THORNLESS' / THORNLESS CHILEAN MESQUITE		24" BOX
TABEBUIA IMPETIGINOSA / PINK TRUMPET TREE		24" BOX

FEATURE TREE	28	
CERCIS OCCIDENTALIS / WESTERN REDBUD MULTI-TRUNK		15 GAL
CHIONANTHUS RETUSUS / CHINESE FRINGE TREE		15 GAL
PITTOSPORUM PHILLYRAEOIDES / DESERT WILLOW PITTOSPORUM		15 GAL
SCHINUS MOLLE / CALIFORNIA PEPPER		24" BOX
TABEBUIA CHRYSOTRICHA / GOLDEN TRUMPET TREE		15 GAL
TIPUANA TIPU / TIPU TREE		24" BOX
TRISTANIOPSIS LAURINA / WATER GUM		15 GAL

SMALL FLOWERING TREE	20	
ACACIA BAILEYANA / BAILEY ACACIA		24" BOX
ACACIA COVENYI / BLUE BUSH ACACIA		15 GAL
ACACIA CULTRIFORMIS / KNIFE ACACIA		15 GAL
ACACIA DEALBATA / SILVER WATTLE		15 GAL
ALBIZIA JULIBRISSIN / SILK TREE		24" BOX
CERCIS OCCIDENTALIS / WESTERN REDBUD MULTI-TRUNK		24" BOX
LAGERSTROEMIA INDICA / CRAPE MYRTLE		15 GAL
LEPTOSPERMUM LAEVIGATUM / AUSTRALIAN TEA TREE		15 GAL
MELALEUCA NESOPHILA / PINK MELALEUCA MULTI-TRUNK		15 GAL
PLUMERIA RUBRA / RED FRANGIPANI		15 GAL
TABEBUIA IMPETIGINOSA / PINK TRUMPET TREE		24" BOX

SMALL FEATURE TREE	89	
ALOE `HERCULES` / HERCULES ALOE		15 GAL
ALOE BAINESII / TREE ALOE		15 GAL
CORDYLINE AUSTRALIS / GRASS PALM		15 GAL
DRACAENA DRACO / DRAGON TREE		15 GAL
DRACAENA MARGINATA / DRACAENA		15 GAL
FICUS ELASTICA / RUBBER TREE		15 GAL
FICUS LYRATA / FIDDLE LEAF FIG		15 GAL
JUNIPERUS CHINENSIS 'TORULOSA' / HOLLYWOOD JUNIPER		15 GAL
YUCCA ALOIFOLIA / ALOE YUCCA		15 GAL
YUCCA AUSTRALIS / YUCCA		15 GAL
YUCCA RIGIDA / MEXICAN BLUE YUCCA		15 GAL
YUCCA ROSTRATA / BEAKED YUCCA		15 GAL

STREET PALM	82	
WASHINGTONIA ROBUSTA / MEXICAN FAN PALM		12` BTH
WASHINGTONIA X FILIBUSTA / HYBRID FAN PALM		12` BTH

ACCENT TREE	25	
BEAUCARNEA RECURVATA / PONY TAIL PALM		24" BOX
CUPRESSUS MACROCARPA / MONTEREY CYPRESS		24" BOX
DRACAENA DRACO / DRAGON TREE		24" BOX
YUCCA BREVIFOLIA / JOSHUA TREE		24" BOX
YUCCA ELEPHANTIPES / GIANT YUCCA		24" BOX

VERTICAL SCREENING TREE	71	
ELAEOCARPUS DECIPIENS / JAPANESE BLUEBERRY TREE		15 GAL
HETEROMELES ARBUTIFOLIA / TOYON		15 GAL
LAURUS NOBILIS / SWEET BAY		15 GAL
MYRICA CALIFORNICA 'BUXIFOLIA' / PACIFIC WAX MYRTLE		15 GAL
PODOCARPUS GRACILIOR / FERN PINE		15 GAL

GENERAL STREETSCAPE	11,048 SF	
2`-3` O.C.		
ACACIA COGNATA 'ACCOG01' / COUSIN ITT LITTLE RIVER WATTLE		1 GAL. - 5 GAL.
AEONIUM ARBOREUM / TREE AEONIUM		1 GAL. - 5 GAL.
AGAVE ATTENUATA / FOXTAIL AGAVE		1 GAL. - 5 GAL.
ARISTIDA PURPUREA / PURPLE THREEAWN		1 GAL. - 5 GAL.
CARISSA MACROCARPA `TUTTLEI` / TUTTLE NATAL PLUM		1 GAL. - 5 GAL.
DIANELLA TASMANICA 'TR20' TM / TASRED FLAX LILY		1 GAL. - 5 GAL.
ERIOGONUM FASCICULATUM / CALIFORNIA BUCKWHEAT		1 GAL. - 5 GAL.
GREVILLEA ROSMARINIFOLIA 'DWARF FORM' / DWARF ROSEMARY GREVILLEA		1 GAL. - 5 GAL.
GREVILLEA X 'CANBERRA GEM' / CANBERRA GEM GREVILLEA		1 GAL. - 5 GAL.
LIGUSTRUM JAPONICUM 'TEXANUM' / TEXAS JAPANESE PRIVET		1 GAL. - 5 GAL.
LOMANDRA CONFERTIFOLIA 'SEASCAPE' / SEASCAPE MAT RUSH		1 GAL. - 5 GAL.
MUHLENBERGIA LINDHEIMERI / LINDHEIMER`S MUHLY		1 GAL. - 5 GAL.
MYRSINE AFRICANA / AFRICAN BOXWOOD		1 GAL. - 5 GAL.
PEDILANTHUS MACROCARPUS / LADY'S SLIPPER		1 GAL. - 5 GAL.
SENECIO SERPENS / BLUE CHALKSTICKS		1 GAL. - 5 GAL.
TRACHELOSPERMUM JASMINOIDES / CHINESE STAR JASMINE		1 GAL. - 5 GAL.

RAISED PLANTER MIX	196 SF	
2`-3` O.C.		
ACHILLEA MILLEFOLIUM / COMMON YARROW		1 GAL. - 5 GAL.
CAREX TESTACEA / ORANGE SEDGE		1 GAL. - 5 GAL.
DUDLEYA BRITTONII / GIANT CHALK DUDLEYA		1 GAL.
ERIOGONUM GIGANTEUM COMPACTUM / COMPACT SAINT CATHERINE'S LACE		1 GAL. - 5 GAL.
MISCANTHUS SINENSIS 'ADAGIO' / ADAGIO EULALIA GRASS		1 GAL. - 5 GAL.
PENNISETUM ALOPECUROIDES / FOUNTAIN GRASS		1 GAL. - 5 GAL.
PENSTEMON SPECTABILIS / SHOWY PENSTEMON		1 GAL. - 5 GAL.
PORTULACARIA AFRA / ELEPHANT BUSH		1 GAL.
SALVIA X 'BEE'S BLISS' / BEES BLISS SAGE		1 GAL. - 5 GAL.
SENECIO ANTEUPHORBIUM / SWIZZLE STICKS		1 GAL. - 5 GAL.
SENECIO CRASSISSIMUS / VERTICAL LEAF SENECIO		1 GAL.
SENECIO VITALIS / BLUE CHALK FINGERS		1 GAL.
SESLERIA AUTUMNALIS / AUTUMN MOOR GRASS		1 GAL. - 5 GAL.
VERBENA LILACINA 'DE LA MINA' / DE LA MINA LILAC VERBENA		1 GAL. - 5 GAL.

DUNE MIX	17,881 SF	
2`-3` O.C.		
ABRONIA VILLOSA / DESERT SAND VERBENA		1 GAL.
AGAVE SHAWII / COASTAL AGAVE		1 GAL. - 5 GAL.
ARISTIDA PURPUREA / PURPLE THREEAWN		1 GAL. - 5 GAL.
BOUTELOUA GRACILIS 'BLONDE AMBITION' / BLONDE AMBITION BLUE GRAMA		1 GAL. - 5 GAL.
CAREX BUCHANANII / LEATHER LEAF SEDGE		1 GAL. - 5 GAL.
DUDLEYA BRITTONII / GIANT CHALK DUDLEYA		1 GAL. - 5 GAL.
LIMONIUM PEREZII / STATICE		1 GAL. - 5 GAL.
MUHLENBERGIA DUBIA / PINE MUHLY		1 GAL. - 5 GAL.
OPUNTIA SANTA-RITA 'TUBAC' TM / SANTA RITA PRICKLYPEAR		1 GAL. - 5 GAL.
SALICORNIA PACIFICA / PICKLEWEED		1 GAL. - 5 GAL.
SPHAERALCEA AMBIGUA / DESERT GLOBEMALLOW		1 GAL. - 5 GAL.
XEROSICYOS DANGUYI / SILVER DOLLAR VINE		1 GAL.

TREMONT STREETSCAPE	6,111 SF	
2`-3` O.C.		
AEONIUM X 'ZWARTKOP' / ZWARTKOP AEONIUM		1 GAL. - 5 GAL.
DIANELLA REVOLUTA / SPREADING FLAX LILY		1 GAL. - 5 GAL.
DURANTA ERECTA 'GOLD MOUND' / GOLD MOUND DEWDROPS		1 GAL. - 5 GAL.
GREVILLEA KILAUEA / GREVILLEA		1 GAL. - 5 GAL.
HAKEA SUAVEOLENS / SWEET HAKEA		1 GAL. - 5 GAL.
LEUCADENDRON LAXUM / BREDASDORP CONEBUSH		1 GAL. - 5 GAL.
LIGUSTRUM JAPONICUM 'TEXANUM' / TEXAS JAPANESE PRIVET		1 GAL. - 5 GAL.
LIGUSTRUM SINENSE 'SUNSHINE' / SUNSHINE CHINESE PRIVET		1 GAL. - 5 GAL.
LOMANDRA CONFERTIFOLIA 'SEASCAPE' / SEASCAPE MAT RUSH		1 GAL. - 5 GAL.
LOMANDRA LONGIFOLIA 'TANIKA' / TANIKA DWARF MAT RUSH		1 GAL. - 5 GAL.
PENNISETUM X 'FAIRY TAILS' / FAIRY TAILS FOUNTAIN GRASS		1 GAL.
PENSTEMON EATONII / FIRECRACKER PENSTEMON		1 GAL.
POLYGALA MYRTIFOLIA / SWEET PEA SHRUB		1 GAL. - 5 GAL.
SALVIA LEUCANTHA 'SANTA BARBARA' / SANTA BARBARA MEXICAN BUSH SAGE		1 GAL. - 5 GAL.
SALVIA X 'ALLEN CHICKERING' / ALLEN CHICKERING SAGE		1 GAL. - 5 GAL.
TEUCRIUM CHAMAEDRYS / GERMANDER		1 GAL. - 5 GAL.
TEUCRIUM X LUCIDRYS / HEDGE GERMANDER		1 GAL. - 5 GAL.
VERBENA LILACINA 'DE LA MINA' / DE LA MINA LILAC VERBENA		1 GAL. - 5 GAL.

ALLEY MIX	1,272 SF	
2`-3` O.C.		
ACHILLEA MILLEFOLIUM / COMMON YARROW		1 GAL.
DIANELLA REVOLUTA 'BLUE TWIST' TM / BLUE TWIST FLAX LILY		1 GAL.
DIANELLA TASMANICA / FLAX LILY		1 GAL.
DIETES IRIDIOIDES / FORTNIGHT LILY		1 GAL.
LOMANDRA CONFERTIFOLIA / SMALL MAT RUSH		1 GAL.
LOMANDRA LONGIFOLIA / MAT RUSH		1 GAL.
LOMANDRA X 'LOMLON' TM / LIME TUFF DWARF MAT RUSH		1 GAL.
MUHLENBERGIA CAPILLARIS / PINK MUHLY GRASS		1 GAL.
PHORMIUM COOKIANUM / MOUNTAIN FLAX		1 GAL.
SESLERIA AUTUMNALIS / AUTUMN MOOR GRASS		1 GAL.

BIO FILTRATION PLANTER	19,758 SF	
2`-3` O.C.		
ACHILLEA MILLEFOLIUM / COMMON YARROW		4" POT
AGROSTIS PALLENS / THINGRASS		1 GAL.
ANEMOPSIS CALIFORNICA / YERBA MANSA		1 GAL.
CAREX SPISSA / SAN DIEGO SEDGE		1 GAL.
CAREX SUBFUSCA / BROWN SEDGE		1 GAL.
CAREX TUMULICOLA / FOOTHILL SEDGE		1 GAL.
DISTICHLIS SPICATA / SALTGRASS		1 GAL.
ELEOCHARIS MACROSTACHYA / COMMON SPIKERUSH		1 GAL.
FESTUCA CALIFORNICA / CALIFORNIA FESCUE		1 GAL.
FESTUCA RUBRA / RED FESCUE		1 GAL.
IVA HAYESIANA / SAN DIEGO POVERTY WEED		1 GAL.
JUNCUS PATENS / CALIFORNIA GRAY RUSH		1 GAL.
MAHONIA NEVINII / NEVIN MAHONIA		1 GAL.
MUHLENBERGIA RIGENS / DEER GRASS		1 GAL.
RIBES SPECIOSUM / FUCHSIA FLOWERING GOOSEBERRY		1 GAL.
ROSA CALIFORNICA / CALIFORNIA WILD ROSE		1 GAL.
SCIRPUS CERNUUS / LOW BULRUSH		1 GAL.

HARDY TURF	5,129 SF	
FESTUCA ARUNDINACEA 'MARATHON II' / MARATHON II FESCUE		SOD

LONGTERM MAINTENANCE:
ALL REQUIRED LANDSCAPE AREAS TO BE MAINTAINED BY OWNER, INCLUDING ROW PLANTING. THE LANDSCAPED AREAS SHALL BE MAINTAINED FREE OFF DEBRIS AND LITTER AND ALL PLANT MATERIAL SHALL BE MAINTAINED IN A HEALTHY GROWING CONDITION. LANDSCAPE AS PART OF THE PROJECT SHALL BE MAINTAINED AND IRRIGATED FOR THE LIFE OF THE PERMIT.

TRASH
TRASH IS TO BE STORED IN INTERNAL TRASH ROOMS AND WILL BE ROLLED OUT TO THE STREET AND COLLECTED TWICE A WEEK.

INVASIVE PLANT NOTE:
ALL EXISTING, INVASIVE PLANT SPECIES, INCLUDING VEGETATIVE PARTS AND ROOT SYSTEMS, SHALL BE COMPLETELY REMOVED FROM THE PREMISES WHEN THE COMBINATION OF SPECIES, TYPE, LOCATION, AND SURROUNDING ENVIRONMENTAL CONDITIONS PROVIDES A MEANS FOR THE SPECIES TO INVADE OTHER AREAS OF NATIVE PLANT MATERIAL THAT ARE ON OR OFF OF THE PREMISES.

ROOT BARRIER:
NON-BIODEGRADEABLE ROOT BARRIERS SHALL BE INSTALLED AROUND ALL NEW STREET TREES WITHIN 5' OF HARDSCAPE SURFACES.

PLANTING NOTES:
A. FINAL LANDSCAPE PLANS SHALL ACCURATELY SHOW PLACEMENT OF TREES, SHRUBS, AND GROUNDCOVERS.
B. LANDSCAPE ARCHITECT SHALL BE AWARE OF UTILITY, SEWER, STORM DRAIN EASEMENT AND PLACE PLANTING LOCATIONS ACCORDINGLY TO MEET CITY OF OCEANSIDE REQUIREMENTS.
C. ALL REQUIRED LANDSCAPE AREA (INCLUDING THE R.O.W.) SHALL BE MAINTAINED BY OWNER OR AS STATED IN ANY LEGAL DOCUMENT SUCH AS, BUT NOT LIMITED TO A LEASE AGREEMENT. THE LANDSCAPE AREAS SHALL BE MAINTAINED PER CITY OF OCEANSIDE REQUIREMENTS.
D. AN AUTOMATIC IRRIGATION SYSTEM SHALL BE INSTALLED TO PROVIDE COVERAGE FOR ALL PLANTING AREAS SHOWN ON THE PLAN. LOW VOLUME EQUIPMENT SHALL PROVIDE SUFFICIENT WATER FOR PLANT GROWTH WITH A MINIMUM WATER LOSS DUE TO WATER RUN-OFF. IRRIGATION SYSTEMS SHALL USE HIGH QUALITY, AUTOMATIC CONTROL VALVES, CONTROLLERS AND OTHER NECESSARY IRRIGATION EQUIPMENT. ALL COMPONENTS SHALL BE OF NON-CORROSIVE MATERIAL. ALL DRIP SYSTEMS SHALL BE ADEQUATELY FILTERED AND REGULATED PER THE MANUFACTURER'S RECOMMENDED DESIGN PARAMETERS. ALL IRRIGATION IMPROVEMENTS SHALL FOLLOW THE CITY OF OCEANSIDE GUIDELINES AND WATER CONSERVATION ORDINANCE.
E. THE SELECTION OF PLANT MATERIAL IS BASED ON CULTURAL AESTHETIC, AND MAINTENANCE CONSIDERATIONS. ALL PLANTING AREAS SHALL BE PREPARED WITH APPROPRIATE SOIL AMENDMENTS, FERTILIZERS, AND APPROPRIATE SUPPLEMENTS BASED UPON A SOILS REPORT FROM AN AGRICULTURAL SUITABILITY SOIL SAMPLE TAKEN FROM THE SITE. GROUND COVERS OR BARK MULCH SHALL FILL IN BETWEEN THE SHRUBS TO SHIELD THE SOIL FROM THE SUN, EVAPOTRANSPORATION AND RUN-OFF. ALL THE FLOWER AND SHRUB BEDS SHALL BE MULCHED TO A 3" DEPTH TO HELP CONSERVE WATER, LOWER THE SOIL TEMPERATURE AND REDUCE WEED GROWTH. THE SHRUBS SHALL BE ALLOWED TO GROW IN THEIR NATURAL FORMS. ALL LANDSCAPE IMPROVEMENTS SHALL FOLLOW THE CITY OF OCEANSIDE GUIDELINES.

STREET TREE NOTES:
STREET TREES AND OTHER TREES SHALL BE SPACED:
A. 8 FEET (PREVIOUSLY 3 FEET) FROM TRANSFORMERS, CABLE, AND PULL BOXES.
B. 5 FEET FROM MAILBOXES
C. 5 FEET FROM FIRE HYDRANTS (ALL SIDES)
D. 10 FEET FROM CENTERLINE (PREVIOUSLY 7 FEET) OF ALL UTILITY LINES (WITHOUT EASEMENT) (SEWER, WATER, STORM DRAINS, DOUBLE CHECK DETECTORS, AIR RELIEF VALVES AND GAS)
E. 10 FEET FROM EASEMENT BOUNDARIES (SEWER, WATER, STORM DRAINS, ACCESS OR OTHER UTILITIES)
F. 10 FEET FROM DRIVEWAYS (UNLESS A LINE OF SIGHT IS DETERMINED BY THE TRAFFIC DIVISION TO BE OTHERWISE)
G. 10 FEET FROM TRAFFIC AND DIRECTIONAL SIGNS
H. 15 FEET (MINIMUM) FROM STREETLIGHTS, OTHER UTILITY POLES, (DETERMINED BY SPECIFICATIONS)
I. STREET TREES SHALL BE PLANTED 3' OUTSIDE RIGHT-OF-WAY IF THE RIGHT-OF-WAY DOES NOT ALLOW SPACE, SUBJECT TO THE CITY ENGINEER'S APPROVAL.
J. LINE OF SIGHT AT ARTERIALS, COLLECTOR AND LOCAL STREETS SHALL BE REVIEWED AND DETERMINED BY TRAFFIC ENGINEER. A MINIMUM OF TWENTY-FIVE FEET (25') FROM STREET INTERSECTION OR AS APPROVED BY THE TRAFFIC ENGINEER.
K. MINIMUM FIFTEEN FEET (15') STREETLIGHT AND STOP SIGN OR CLEARANCE DETERMINED BY SPECIFICATIONS.
L. SCREEN ALL UTILITIES ACCORDING TO SPECIFIC AGENCY REQUIREMENTS.

ROOT BARRIER NOTES:
ROOT BARRIERS SHALL BE INSTALLED ADJACENT TO ALL PAVING SURFACES WHERE A PAVING SURFACE IS LOCATED WITHIN 6 FEET OF A TREE TRUNK ON SITE (PRIVATE) AND WITHIN 10 FEET OF A TREE TRUNK IN THE RIGHT-OF-WAY (PUBLIC). ROOT BARRIERS SHALL EXTEND 5 FEET IN EACH DIRECTION FROM THE CENTERLINE OF THE TRUNK, FOR A TOTAL DISTANCE OF 10 FEET. ROOT BARRIERS SHALL BE A MINIMUM 24 INCHES IN DEPTH. INSTALLING A ROOT BARRIER AROUND THE TREE'S ROOT BALL IS UNACCEPTABLE.

FIRE NOTES:
A. LANDSCAPE IMPROVEMENT PLAN SET AND INSTALLATION ARE REQUIRED TO IMPLEMENT APPROVED FIRE DEPT. REGULATIONS, CODES, AND STANDARDS AT THE TIME OF PROJECT APPROVAL.
B. ALL FIRE HYDRANTS, DOUBLE CHECK DETECTORS, POST INDICATING VALVES, AND FIRE DEPARTMENT CONNECTIONS SHALL BE PROVIDED WITH A 3-FOOT CLEARANCE AROUND ALL FIRE APPARATUSES.
C. ALL TREES AT MATURITY SHALL MEET A HORIZONTAL CLEARANCE ALONG ALL ROADWAYS FROM CURB TO CURB. HORIZONTAL ROADWAY CLEARANCE FOR A ONE-STORY BUILDING IS 28-FEET WIDE.
D. ALL TREES AT MATURITY SHALL MEET A VERTICAL CLEARANCE OF 14-FEET FROM THE TOP OF THE ROADWAY TO THE LOWEST BRANCHES.

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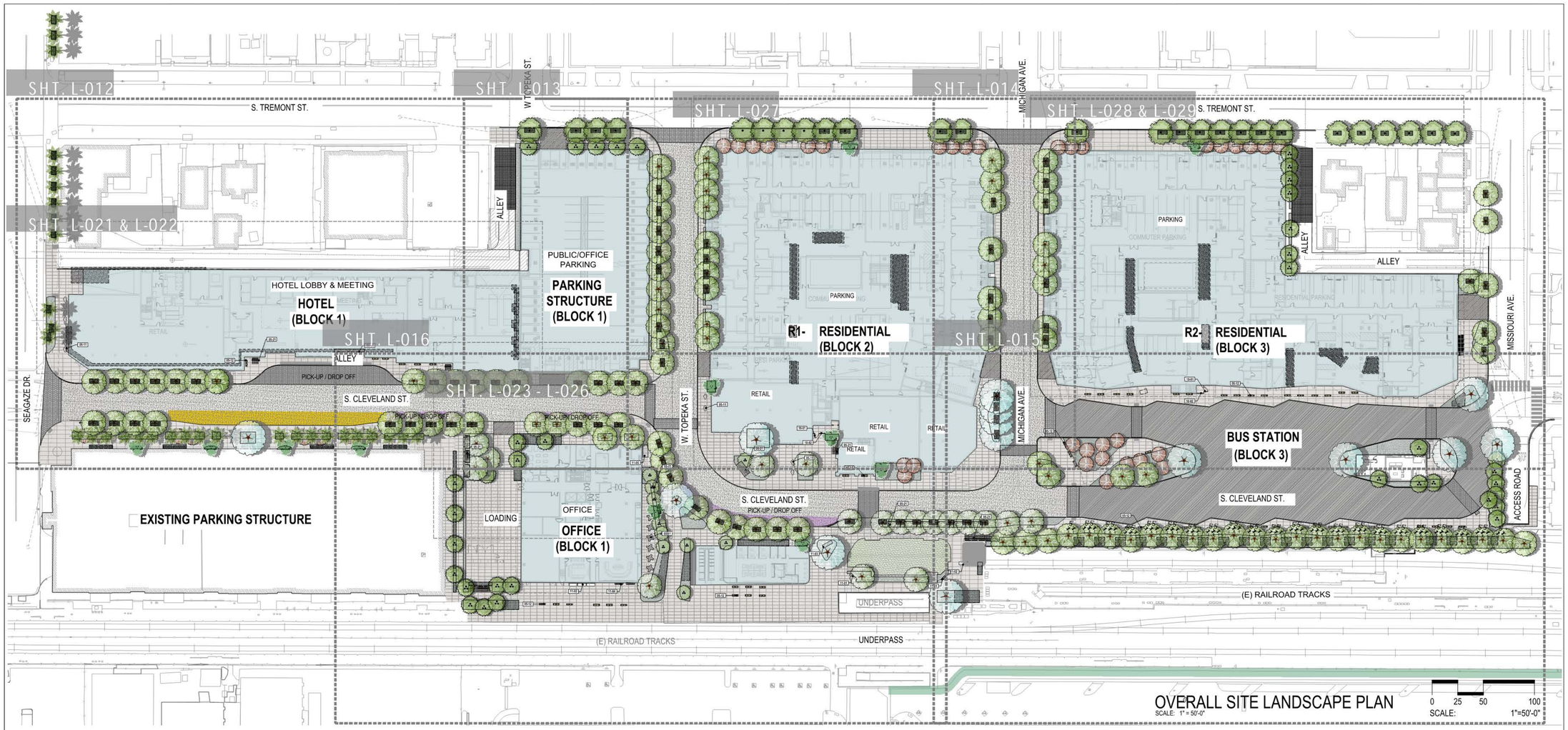
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2	02-13-2023	DP SUBMITTAL 2
3	10-09-2023	DP SUBMITTAL 3
4	04-10-2024	DP SUBMITTAL 4
5	06-20-2024	DP SUBMITTAL 5
6	08-19-2024	DP SUBMITTAL 6

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LEGEND & NOTES

L-002

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SYMBOL	01 PAVEMENTS, RAMPS, CURBS DESCRIPTION	QTY
01-01	CONCRETE SIDEWALK, NATURAL GREY	96,215 SF
01-05	BELGARD HARDSCAPES MODULINE N 51.4% 18X12 RECTANGLES 34.3% 12X12 SQUARES 11.4% 6X12 RECTANGLES 2.9% 6X6 SQUARES	8,500 SF
01-07	ASPHALT CONCRETE PAVING	66,984 SF
01-12	TRUNCATED DOME TILES	673 SF
01-13	SIDEWALK PAVING TEXTURE/COLOR VARIATION AT DRIVEWAY ENTRANCES	2,500 SF
01-14	CONCRETE PAVING AT BUS TERMINAL	32,000 SF

SYMBOL	05 SITE FURNISHINGS DESCRIPTION	QTY
05-11	BISTRO TABLE (BY TENANT)	23
05-12	BENCH - TYPE I	74
05-21	BIKE RACK	18

SYMBOL	09 PLANTING AND LANDSCAPE DESCRIPTION	QTY
09-01	PLANTING AREA	44,213 SF

SYMBOL	10 WALL/FENCE DESCRIPTION	QTY
10-01	IRON SECURITY FENCE (SEE DETAIL SHEET L031)	15 LF
10-02	IRON SECURITY GATE (SEE DETAIL SHEET L031)	2 EA

SYMBOL	11 TRANSIT AMENITIES DESCRIPTION	QTY
11-01	TICKET KIOSK	4 EA
11-02	VENDING MACHINE	4 EA
11-03	INFORMATION / WAY FINDING SIGN	1 EA
11-04	LOCKERS	2 EA
11-05	POTENTIAL BIKE SHARE DOCKS	2 EA

STORM WATER SCHEDULE

IN GROUND BIO FILTRATION PLANTER

RAISED BIO FILTRATION PLANTER, ON GRADE

RAISED BIO FILTRATION PLANTER, OVER STRUCTURE

TREE WELL

PROPOSED GRASSCRETE OR PERMEABLE PAVERS

PLEASE REFER TO L002 FOR PLANT MATERIAL SCHEDULE

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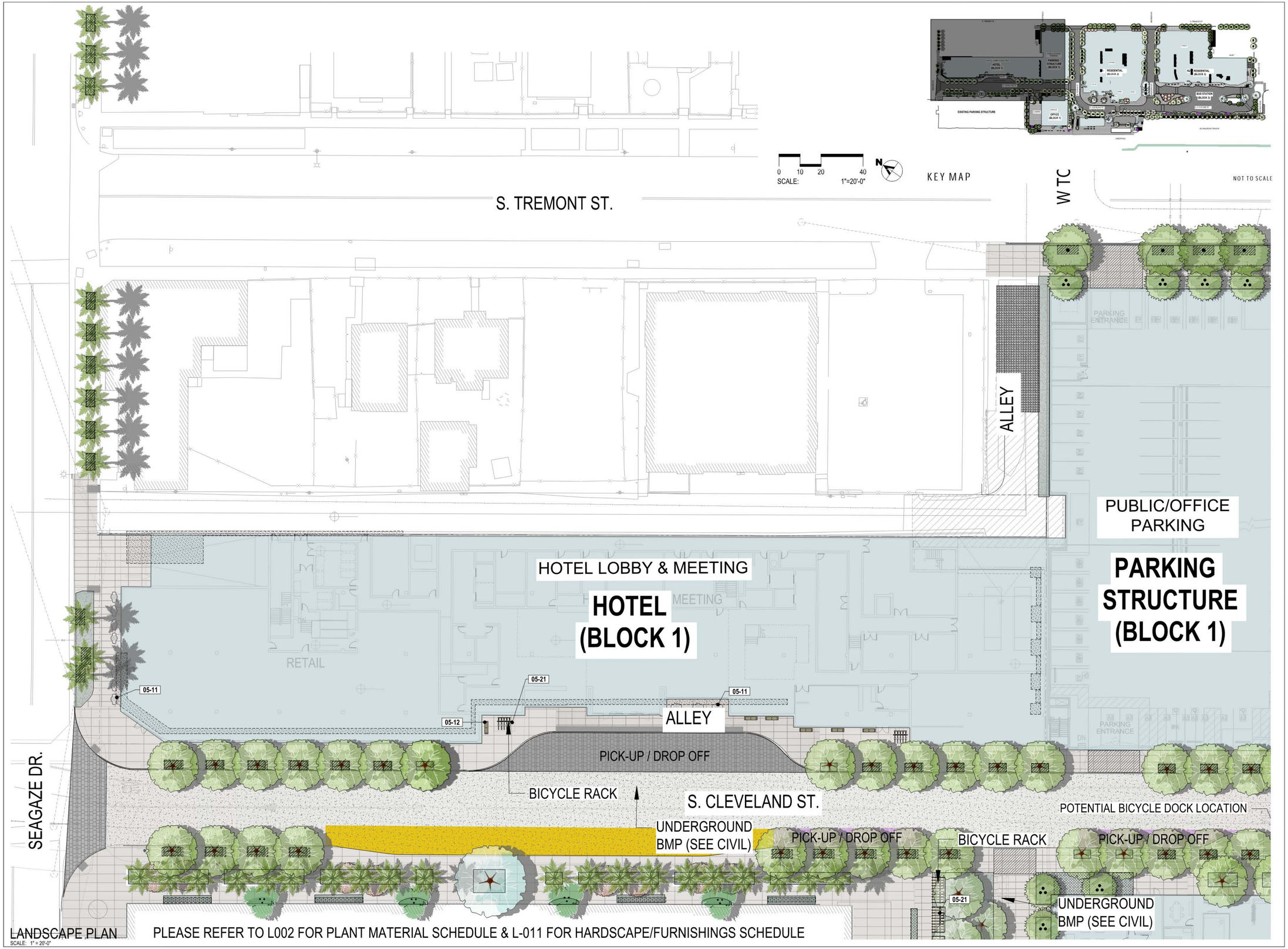
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6	08-19-2024	DP SUBMITTAL 6

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OVERALL SITE LANDSCAPE PLAN

L-011

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LANDSCAPE PLAN
SCALE: 1" = 20'-0"

PLEASE REFER TO L002 FOR PLANT MATERIAL SCHEDULE & L-011 FOR HARDSCAPE/FURNISHINGS SCHEDULE

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LANDSCAPE PLAN

L-012

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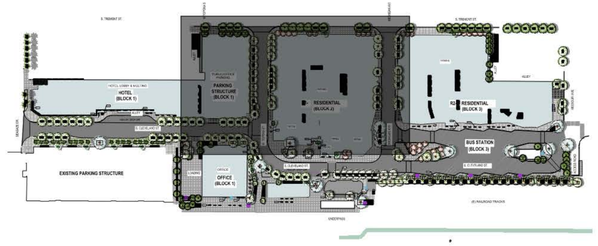
LANDSCAPE PLAN

SCALE: 1" = 20'-0"

0 10 20 40

SCALE: 1"=20'-0"

N



KEY MAP

NOT TO SCALE

PLEASE REFER TO L002 FOR PLANT MATERIAL SCHEDULE & L-011 FOR HARDSCAPE/FURNISHINGS SCHEDULE

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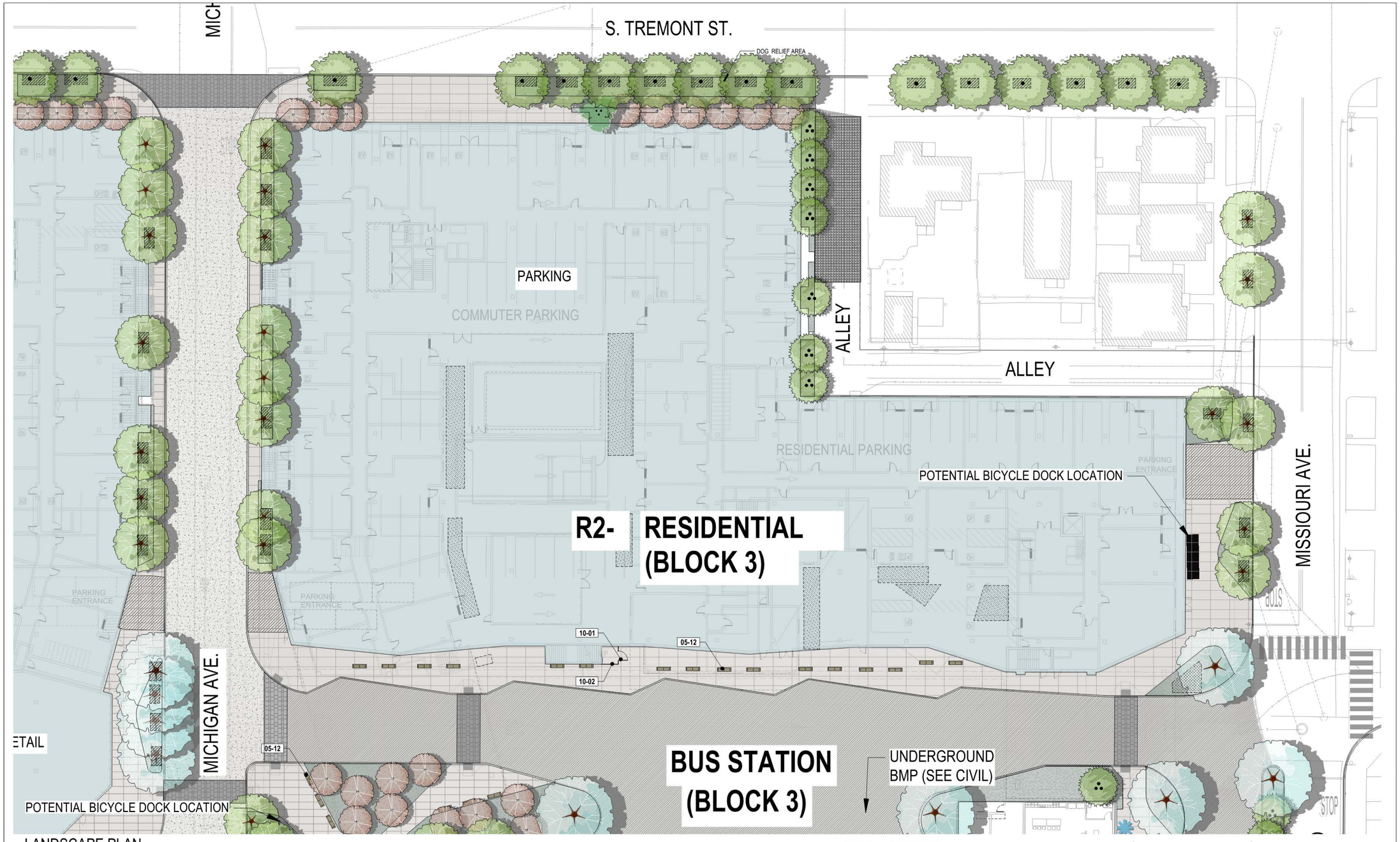
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LANDSCAPE PLAN

L-013

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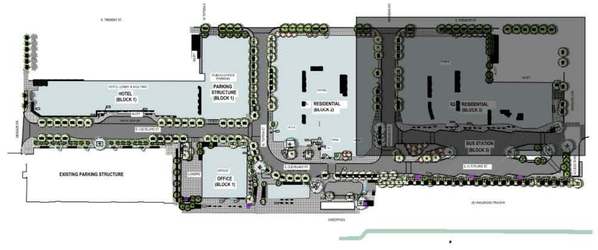


LANDSCAPE PLAN

SCALE: 1" = 20'-0"

0 10 20 40

SCALE: 1"=20'-0"



KEY MAP

NOT TO SCALE

PLEASE REFER TO L002 FOR PLANT MATERIAL SCHEDULE & L-011 FOR HARDSCAPE/FURNISHINGS SCHEDULE

ARCADIS

OCEANSIDE TRANSIT CENTER

235 South Tremont Avenue
Oceanside, CA 92054

McCulloughLA.com

Toll Brothers Apartment Living
23422 Mill Creek Drive
Suite 105
Laguna Hills, CA 92653
CONTACT - Michael McCann
PHONE - (949) 370-8155

Disclaimer

Signature & Seal

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Issue Drawing Log

REV	DATE	DESCRIPTION
1	08-26-2022	DP SUBMITTAL 1
2	02-13-2023	DP SUBMITTAL 2
3	10-09-2023	DP SUBMITTAL 3
4	04-10-2024	DP SUBMITTAL 4
5	06-20-2024	DP SUBMITTAL 5
6	08-19-2024	DP SUBMITTAL 6

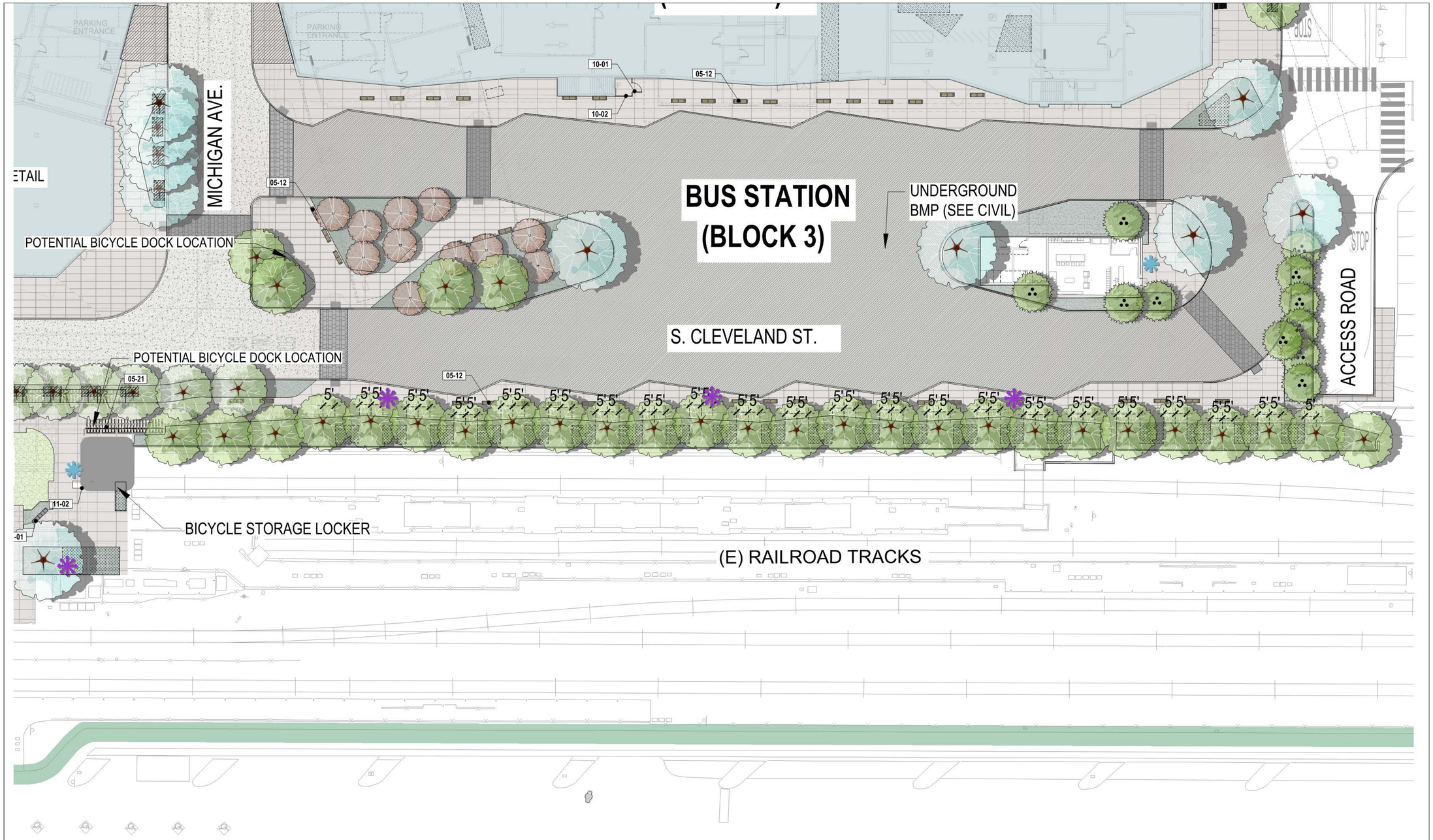
Schematic Design

LANDSCAPE PLAN

L-014

Autodesk Docs://CRTKL-LA - Toll Brothers - OTC/A_CRTKL_OTC_Office.rvt

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LANDSCAPE PLAN

SCALE: 1" = 20'-0"

0 10 20 40
SCALE: 1"=20'-0"

N



KEY MAP

NOT TO SCALE

PLEASE REFER TO L002 FOR PLANT MATERIAL SCHEDULE & L-011 FOR HARDSCAPE/FURNISHINGS SCHEDULE

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4	04-10-2024	DP SUBMITTAL 4
5	06-20-2024	DP SUBMITTAL 5
6	08-19-2024	DP SUBMITTAL 6

Schematic Design

LANDSCAPE PLAN

L-015

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ALLEY

OP OFF

S. CLEVELAND ST.

NDERGROUND
MP (SEE CIVIL)

PICK-UP / DROP OFF

BICYCLE RACK

POTENTIAL BICYCLE DOCK LOCATION

PICK-UP / DROP OFF

UNDERGROUND
BMP (SEE CIVIL)

05-21

11-05

05-21

BICYCLE RACK

W. TOPEKA ST.

PARKING ENTRANCE

RESI PARKING

RETAIL

05-11

BICYCLE RACK

10-01

10-02

05-21

RETAIL

RETAIL

05-21

RETAIL

05-11

05-12

POT

S. CLEVELAND ST.

PICK-UP / DROP OFF

BICYCLE RACK

05-21

OFFICE

LOADING

**OFFICE
(BLOCK 1)**

05-11

11-03

UNDERGROUND
BMP (SEE CIVIL)

11-01

11-01

11-02

11-04

05-12

05-12

UNDERPASS

RETAIL KIOSKS

(E) RAILROAD TRACKS

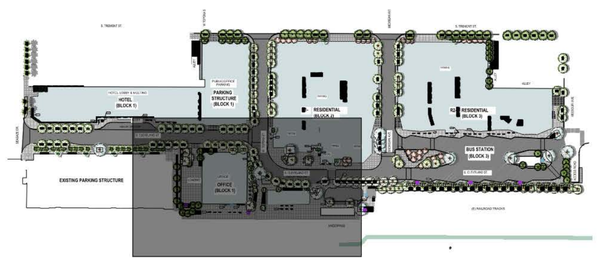
UNDERPASS

LANDSCAPE PLAN

SCALE: 1" = 20'-0"

0 10 20 40
SCALE: 1"=20'-0"

N



KEY MAP

NOT TO SCALE

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Issue Drawing Log

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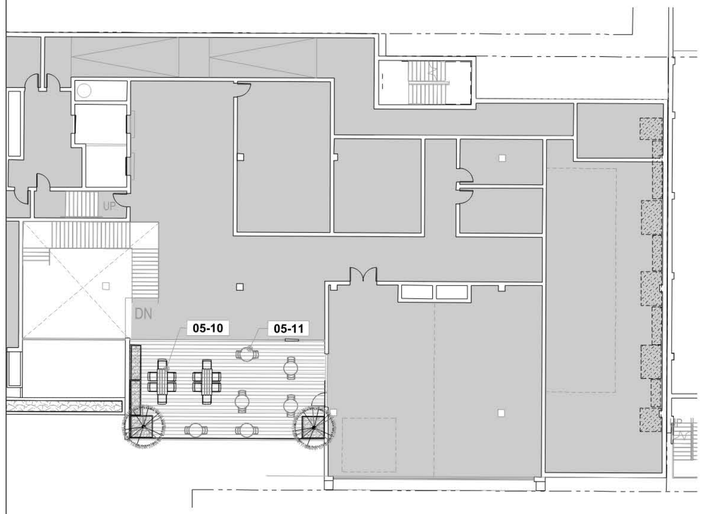
Schematic Design

LANDSCAPE PLAN

L-016

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SCALE: 1" = 16'-0"

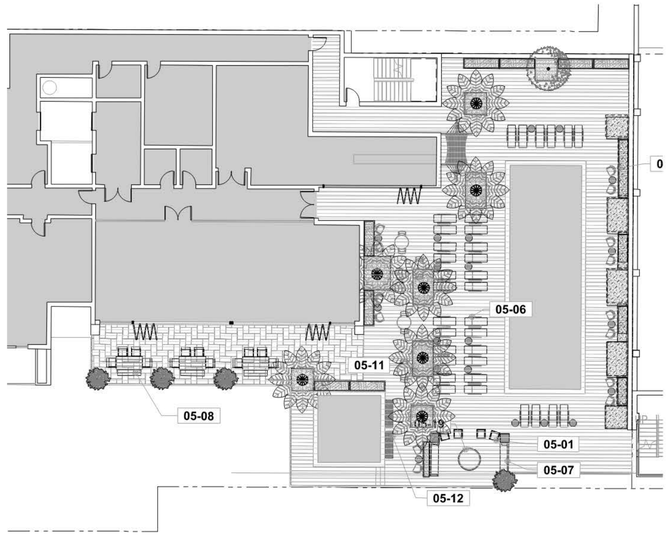
LEVEL 2 AMENITY

CONCEPT PLANT SCHEDULE

	SMALL FEATURE TREE	9	
	ALOE "HERCULES" / HERCULES ALOE		15 GAL
	ALOE BAINESII / TREE ALOE		15 GAL
	CORDYLINE AUSTRALIS / GRASS PALM		15 GAL
	DRACAENA DRACO / DRAGON TREE		15 GAL
	DRACAENA MARGINATA / DRACAENA		15 GAL
	FICUS ELASTICA / RUBBER TREE		15 GAL
	FICUS LYRATA / FIDDLE LEAF FIG		15 GAL
	JUNIPERUS CHINENSIS 'TORULOSA' / HOLLYWOOD JUNIPER		15 GAL
	YUCCA ALOIFOLIA / ALOE YUCCA		15 GAL
	YUCCA AUSTRALIS / YUCCA		15 GAL
	YUCCA RIGIDA / MEXICAN BLUE YUCCA		15 GAL
	YUCCA ROSTRATA / BEAKED YUCCA		15 GAL
	RAISED PLANTER MIX	74 SF	
	2`-3` O.C.		
	ACHILLEA MILLEFOLIUM / COMMON YARROW		1 GAL. - 5 GAL.
	CAREX TESTACEA / ORANGE SEDGE		1 GAL. - 5 GAL.
	DUDLEYA BRITTONII / GIANT CHALK DUDLEYA		1 GAL.
	ERIOGONUM GIGANTEUM COMPACTUM / COMPACT SAINT CATHERINE'S LACE		1 GAL. - 5 GAL.
	MISCANTHUS SINENSIS 'ADAGIO' / ADAGIO EULALIA GRASS		1 GAL. - 5 GAL.
	PENNISETUM ALOPECUROIDES / FOUNTAIN GRASS		1 GAL. - 5 GAL.
	PENSTEMON SPECTABILIS / SHOWY PENSTEMON		1 GAL. - 5 GAL.
	PORTULACARIA AFRA / ELEPHANT BUSH		1 GAL.
	SALVIA X 'BEE'S BLISS' / BEE'S BLISS SAGE		1 GAL. - 5 GAL.
	SENECIO ANTEUPHORBIUM / SWIZZLE STICKS		1 GAL. - 5 GAL.
	SENECIO CRASSISSIMUS / VERTICAL LEAF SENECIO		1 GAL.
	SENECIO VITALIS / BLUE CHALK FINGERS		1 GAL.
	SESLERIA AUTUMNALIS / AUTUMN MOOR GRASS		1 GAL. - 5 GAL.
	VERBENA LILACINA 'DE LA MINA' / DE LA MINA LILAC VERBENA		1 GAL. - 5 GAL.
	SKYDECK MIX	1,847 SF	
	2`-3` O.C.		
	ABUTILON PALMERI / INDIAN MALLOW		1 GAL. - 5 GAL.
	ADENANTHOS SERICEUS / COASTAL WOOLLYBUSH		1 GAL. - 5 GAL.
	AEONIUM ARBOREUM / TREE AEONIUM		1 GAL. - 5 GAL.
	AEONIUM X 'CYCLOPS' / CYCLOPS AEONIUM		1 GAL. - 5 GAL.
	AEONIUM X 'ZWARTKOP' / ZWARTKOP AEONIUM		1 GAL. - 5 GAL.
	CALLISTEMON X 'CANE'S HYBRID' / CANE'S HYBRID BOTTLEBRUSH		1 GAL. - 5 GAL.
	COTYLEDON ORBICULATA / COTYLEDON		1 GAL. - 5 GAL.
	CRASSULA ARBORESCENS / SILVER DOLLAR JADE		1 GAL. - 5 GAL.
	CRASSULA MULTICAVA / CAPE PROVENCE PYGMYWEED		1 GAL. - 5 GAL.
	CRASSULA OVATA 'GOLLUM' / CORAL JADE PLANT		1 GAL. - 5 GAL.
	DIANELLA REVOLUTA 'BIG REV' / BIG REV FLAX LILY		1 GAL. - 5 GAL.
	DICHONDRA ARGENTEA 'SILVER FALLS' / SILVER FALLS DICHONDRA		1 GAL. - 5 GAL.
	ECHEVERIA AGAVOIDES 'LIPSTICK' / LIPSTICK ECHEVERIA		1 GAL. - 5 GAL.
	EUPHORBIA INGENS / CANDELABRA TREE		1 GAL. - 5 GAL.
	FURCRAEA MACDOUGALII / MACDOUGALL'S CENTURY PLANT		1 GAL. - 5 GAL.
	GAMBELIA SPECIOSA / SHOWY ISLAND SNAP DRAGON		1 GAL. - 5 GAL.
	GREVILLEA X 'PEACHES AND CREAM' / PEACHES AND CREAM GREVILLEA		1 GAL. - 5 GAL.
	HESPERALOE PARVIFLORA 'PERPA' / BRAKELIGHTS® RED YUCCA		1 GAL. - 5 GAL.
	KALANCHOE BRACTEATA / SILVER TEASPOONS		1 GAL. - 5 GAL.
	PENNISETUM X 'FAIRY TAILS' / FAIRY TAILS FOUNTAIN GRASS		1 GAL. - 5 GAL.
	PORTULACARIA AFRA 'VARIEGATA' / VARIEGATED ELEPHANT BUSH		1 GAL. - 5 GAL.
	SENECIO CRASSISSIMUS / VERTICAL LEAF SENECIO		1 GAL. - 5 GAL.
	TEUCRIUM CANADENSE / CANADA GERMANDER		1 GAL. - 5 GAL.

REFERENCE NOTES SCHEDULE

	01 PAVEMENTS, RAMPS, CURBS	
SYMBOL	DESCRIPTION	QTY
01-11	DECK	956 SF
	05 SITE FURNISHINGS	
SYMBOL	DESCRIPTION	QTY
05-10	DINING TABLE - TYPE III	2
05-11	BISTRO TABLE	6
	09 PLANTING AND LANDSCAPE	
SYMBOL	DESCRIPTION	QTY
09-01	PLANTING AREA	1,921 SF



SCALE: 1" = 16'-0"

POOL DECK

REFERENCE NOTES SCHEDULE

	01 PAVEMENTS, RAMPS, CURBS	
SYMBOL	DESCRIPTION	QTY
01-09	PEDESTAL PAVERS	754 SF
01-11	DECK	4,316 SF
	05 SITE FURNISHINGS	
SYMBOL	DESCRIPTION	QTY
05-01	LOUNGE CHAIR - TYPE I	4
05-02	LOUNGE CHAIR - TYPE II	14
05-06	CHAISE LOUNGE	34
05-07	OUTDOOR SOFA	2
05-08	DINING TABLE - TYPE I	3
05-11	BISTRO TABLE	4
05-12	BENCH - TYPE I	2
05-19	FIRE BOWL	1
05-20	HAMMOCK	1
	09 PLANTING AND LANDSCAPE	
SYMBOL	DESCRIPTION	QTY
09-01	PLANTING AREA	474 SF

CONCEPT PLANT SCHEDULE

	SMALL FLOWERING TREE	1	
	ACACIA BAILEYANA / BAILEY ACACIA		24" BOX
	ACACIA COVENYI / BLUE BUSH ACACIA		15 GAL
	ACACIA CULTRIFORMIS / KNIFE ACACIA		15 GAL
	ACACIA DEALBATA / SILVER WATTLE		15 GAL
	ALBIZIA JULIBRISSIN / SILK TREE		24" BOX
	CERCIS OCCIDENTALIS / WESTERN REDBUD MULTI-TRUNK		24" BOX
	LAGERSTROEMIA INDICA / CRAPE MYRTLE		15 GAL
	LEPTOSPERMUM LAEVIGATUM / AUSTRALIAN TEA TREE		15 GAL
	MELALEUCA NESOPHILA / PINK MELALEUCA MULTI-TRUNK		15 GAL
	PLUMERIA RUBRA / RED FRANGIPANI		15 GAL
	TABEBUIA IMPETIGINOSA / PINK TRUMPET TREE		24" BOX
	POOL AREA TREE/PALM	7	
	BRAHEA ARMATA / MEXICAN BLUE PALM		24" BOX
	CARYOTA MITIS / CLUMPING FISHTAIL PALM		24" BOX
	CHAMAEROPS HUMILIS / MEDITERRANEAN FAN PALM		24" BOX
	DYPSIS LUTESCENS / ARECA PALM		15 GAL
	HOWEA FORSTERIANA / KENTIA PALM		24" BOX
	PANDANUS UTILIS / SCREW PINE		24" BOX
	PHOENIX DACTYLIFERA 'MEDJOOL' / MEDJOOL DATE PALM		10` BTH
	LARGE FLOWERING SHRUB	4	
	BRUNFELSIA PAUCIFLORA / YESTERDAY, TODAY AND TOMORROW		15 GAL
	CALLISTEMON CITRINUS / LEMON BOTTLEBRUSH SHRUB		15 GAL
	ERIOGONUM GIGANTEUM / ST. CATHERINE'S LACE		15 GAL
	HIBISCUS ROSA-SINENSIS 'CALIFORNIA GOLD' / CALIFORNIA GOLD CHINESE HIBISCUS		15 GAL
	LEUCADENDRON X 'SAFARI SUNSET' / SAFARI SUNSET CONEBUSH		15 GAL
	LEUCOPHYLLUM FRUTESCENS / TEXAS SAGE		15 GAL
	RHAPHIOLEPIS INDICA / INDIAN HAWTHORN		15 GAL
	ROMNEYA COULTERI / MATILIJA POPPY		15 GAL
	POOLSIDE MIX	230 SF	
	2`-3` O.C.		
	AECHMEA BLANCHETIANA / ORANGE BROMELIAD		1 GAL. - 5 GAL.
	ALOE FEROX / BITTER TREE ALOE		1 GAL. - 5 GAL.
	ALOE RAMOSISSIMA / MAIDEN'S QUIVER TREE		1 GAL. - 5 GAL.
	ALOE REITZII / REITZ'S ALOE		1 GAL. - 5 GAL.
	ALOE RUDIKOPPE / LITTLE RED RIDING HOOD ALOE		1 GAL. - 5 GAL.
	ALOE VERA / MEDICINAL ALOE		1 GAL. - 5 GAL.
	ALOE X 'ALWAYS RED' / ALWAYS RED ALOE		1 GAL. - 5 GAL.
	ALOE X 'BLUE ELF' / BLUE ELF ALOE		1 GAL. - 5 GAL.
	ALPINIA ZERUMBET 'VARIEGATA' / VARIEGATED SHELL GINGER		1 GAL. - 5 GAL.
	ARBUTUS UNEDO / STRAWBERRY TREE SHRUB		1 GAL. - 5 GAL.
	ASPARAGUS RETROFRACTUS / MING ASPARAGUS FERN		1 GAL. - 5 GAL.
	ASPARAGUS SETACEUS / ASPARAGUS FERN		1 GAL. - 5 GAL.
	BESCHORNERIA YUCCOIDES / AMOLE		1 GAL. - 5 GAL.
	CORDYLINE AUSTRALIS / GRASS PALM		1 GAL. - 5 GAL.
	CORDYLINE FRUTICOSA 'RED SISTER' / RED SISTER TI PLANT		1 GAL. - 5 GAL.
	CORDYLINE FRUTICOSA 'SOLEDAD PURPLE' / SOLEDAD PURPLE TI PLANT		1 GAL. - 5 GAL.
	COTYLEDON ORBICULATA / COTYLEDON		1 GAL. - 5 GAL.
	CUPHEA IGNEA / CIGAR PLANT		1 GAL. - 5 GAL.
	DIETES VEGETA / AFRICAN IRIS		1 GAL. - 5 GAL.
	DIETES VEGETA 'VARIEGATA' / VARIEGATED AFRICAN IRIS		1 GAL. - 5 GAL.
	DIPLADENIA X 'DEEP RED' TM / MANDINIA DEEP RED MANDEVILLA		1 GAL. - 5 GAL.
	DORYANTHES PALMERI / SPEAR LILY		1 GAL. - 5 GAL.
	DRACAENA MARGINATA / DRACAENA		1 GAL. - 5 GAL.
	EPIDENDRUM RADICANS 'ORANGE' / ORANGE REED STEM ORCHID		1 GAL. - 5 GAL.
	EPIDENDRUM RADICANS 'PURPLE' / PURPLE REED STEM ORCHID		1 GAL. - 5 GAL.
	MONSTERA DELICIOSA / SPLIT-LEAF PHILODENDRON		1 GAL. - 5 GAL.
	MYRICA CALIFORNICA / PACIFIC WAX MYRTLE		1 GAL. - 5 GAL.
	NEOREGELIA COMPACTA VARIEGATA / VARIEGATED COMPACT BROMELIAD		1 GAL. - 5 GAL.
	PACHYPODIUM LAMEREI / MADAGASCAR PALM		1 GAL. - 5 GAL.
	PHILODENDRON SELLOUM / TREE PHILODENDRON		1 GAL. - 5 GAL.
	STRELITZIA NICOLAI / GIANT BIRD OF PARADISE		1 GAL. - 5 GAL.
	STRELITZIA REGINAE / BIRD OF PARADISE		1 GAL. - 5 GAL.
	WOODWARDIA FIMBRIATA / GIANT CHAIN FERN		1 GAL. - 5 GAL.
	ZAMIA FURFURACEA / CARDBOARD PALM		1 GAL. - 5 GAL.
	BIO FILTRATION PLANTER	19,758 SF	
	2`-3` O.C.		
	ACHILLEA MILLEFOLIUM / COMMON YARROW		4" POT
	AGROSTIS PALLENS / THINGRASS		1 GAL.
	ANEMOPSIS CALIFORNICA / YERBA MANSA		1 GAL.
	CAREX SPISSA / SAN DIEGO SEDGE		1 GAL.
	CAREX SUBFUSCA / BROWN SEDGE		1 GAL.
	CAREX TUMULICOLA / FOOTHILL SEDGE		1 GAL.
	DISTICHLIS SPICATA / SALTGRASS		1 GAL.
	ELEOCHARIS MACROSTACHYA / COMMON SPIKERUSH		1 GAL.
	FESTUCA CALIFORNICA / CALIFORNIA FESCUE		1 GAL.
	FESTUCA RUBRA / RED FESCUE		1 GAL.
	IVA HAYESIANA / SAN DIEGO POVERTY WEED		1 GAL.
	JUNCUS PATENS / CALIFORNIA GRAY RUSH		1 GAL.
	MAHONIA NEVINII / NEVIN MAHONIA		1 GAL.
	MUHLENBERGIA RIGENS / DEER GRASS		1 GAL.
	RIBES SPECIOSUM / FUCHSIA FLOWERING GOOSEBERRY		1 GAL.
	ROSA CALIFORNICA / CALIFORNIA WILD ROSE		1 GAL.
	SCIRPUS CERNUUS / LOW BULRUSH		1 GAL.

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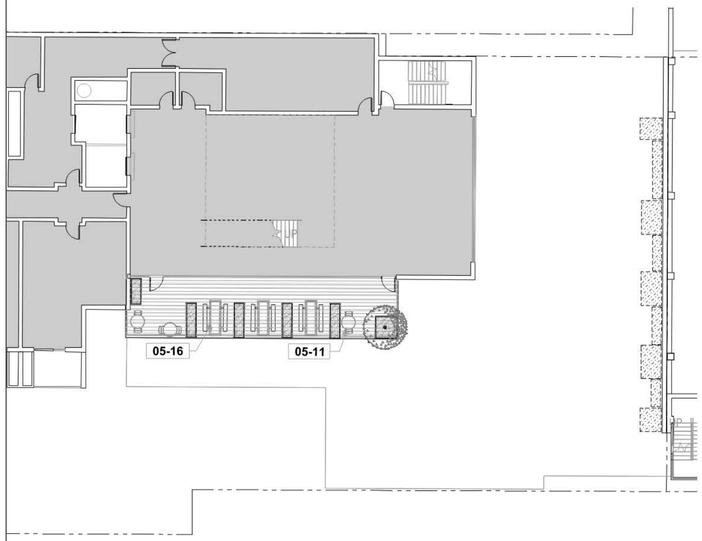
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5	06-20-2024	DP SUBMITTAL 5
6	08-19-2024	DP SUBMITTAL 6

Schematic Design

HOTEL LANDSCAPE PLAN

L-021

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SCALE: 1" = 16'-0"

LEVEL 4 AMENITY

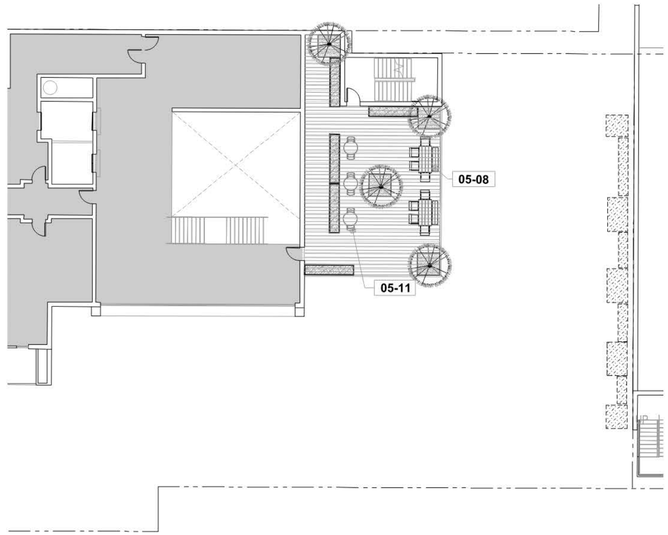
CONCEPT PLANT SCHEDULE

SMALL FLOWERING TREE	1	
ACACIA BAILEYANA / BAILEY ACACIA		24" BOX
ACACIA COVENYI / BLUE BUSH ACACIA		15 GAL
ACACIA CULTRIFORMIS / KNIFE ACACIA		15 GAL
ACACIA DEALBATA / SILVER WATTLE		15 GAL
ALBIZIA JULIBRISSIN / SILK TREE		24" BOX
CERCIS OCCIDENTALIS / WESTERN REDBUD MULTI-TRUNK		24" BOX
LAGERSTROEMIA INDICA / CRAPE MYRTLE		15 GAL
LEPTOSPERMUM LAEVIGATUM / AUSTRALIAN TEA TREE		15 GAL
MELALEUCA NESOPHILA / PINK MELALEUCA MULTI-TRUNK		15 GAL
PLUMERIA RUBRA / RED FRANGIPANI		15 GAL
TABEBUIA IMPETIGINOSA / PINK TRUMPET TREE		24" BOX

RAISED PLANTER MIX	93 SF	
2`-3` O.C.		
ACHILLEA MILLEFOLIUM / COMMON YARROW		1 GAL. - 5 GAL.
CAREX TESTACEA / ORANGE SEDGE		1 GAL. - 5 GAL.
DUDLEYA BRITTONII / GIANT CHALK DUDLEYA		1 GAL.
ERIOGONUM GIGANTEUM COMPACTUM / COMPACT SAINT CATHERINE'S LACE		1 GAL. - 5 GAL.
MISCANTHUS SINENSIS 'ADAGIO' / ADAGIO EULALIA GRASS		1 GAL. - 5 GAL.
PENNISETUM ALOPECUROIDES / FOUNTAIN GRASS		1 GAL. - 5 GAL.
PENSTEMON SPECTABILIS / SHOWY PENSTEMON		1 GAL. - 5 GAL.
PORTULACARIA AFRA / ELEPHANT BUSH		1 GAL.
SALVIA X 'BEE'S BLISS' / BEE'S BLISS SAGE		1 GAL. - 5 GAL.
SENECIO ANTEUPHORBIUM / SWIZZLE STICKS		1 GAL. - 5 GAL.
SENECIO CRASSISSIMUS / VERTICAL LEAF SENECIO		1 GAL.
SENECIO VITALIS / BLUE CHALK FINGERS		1 GAL.
SESLERIA AUTUMNALIS / AUTUMN MOOR GRASS		1 GAL. - 5 GAL.
VERBENA LILACINA 'DE LA MINA' / DE LA MINA LILAC VERBENA		1 GAL. - 5 GAL.

REFERENCE NOTES SCHEDULE

	01 PAVEMENTS, RAMPS, CURBS	
SYMBOL	DESCRIPTION	QTY
01-11	DECK	812 SF
	05 SITE FURNISHINGS	
SYMBOL	DESCRIPTION	QTY
05-11	BISTRO TABLE	3
05-16	FIRE TABLE	3
	09 PLANTING AND LANDSCAPE	
SYMBOL	DESCRIPTION	QTY
09-01	PLANTING AREA	93 SF



SCALE: 1" = 16'-0"

LEVEL 5 AMENITY

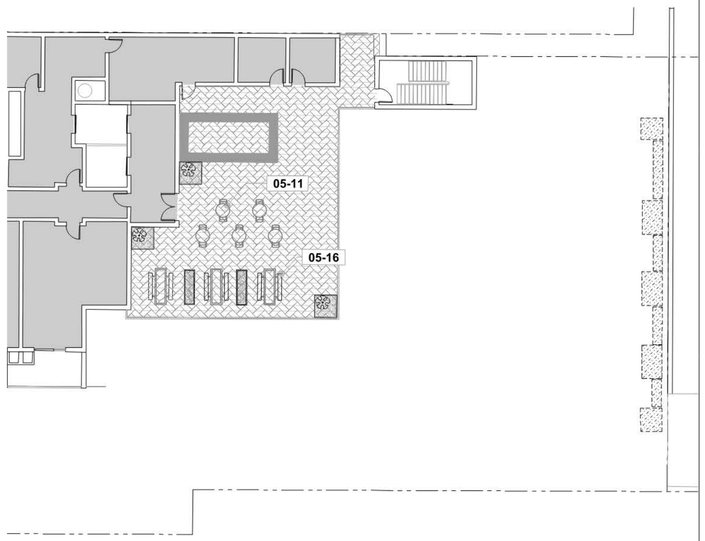
CONCEPT PLANT SCHEDULE

SMALL FEATURE TREE	4	
ALOE `HERCULES` / HERCULES ALOE		15 GAL
ALOE BAINESII / TREE ALOE		15 GAL
CORDYLINE AUSTRALIS / GRASS PALM		15 GAL
DRACAENA DRACO / DRAGON TREE		15 GAL
DRACAENA MARGINATA / DRACAENA		15 GAL
FICUS ELASTICA / RUBBER TREE		15 GAL
FICUS LYRATA / FIDDLE LEAF FIG		15 GAL
JUNIPERUS CHINENSIS 'TORULOSA' / HOLLYWOOD JUNIPER		15 GAL
YUCCA ALOIFOLIA / ALOE YUCCA		15 GAL
YUCCA AUSTRALIS / YUCCA		15 GAL
YUCCA RIGIDA / MEXICAN BLUE YUCCA		15 GAL
YUCCA ROSTRATA / BEAKED YUCCA		15 GAL

RAISED PLANTER MIX	108 SF	
2`-3` O.C.		
ACHILLEA MILLEFOLIUM / COMMON YARROW		1 GAL. - 5 GAL.
CAREX TESTACEA / ORANGE SEDGE		1 GAL. - 5 GAL.
DUDLEYA BRITTONII / GIANT CHALK DUDLEYA		1 GAL.
ERIOGONUM GIGANTEUM COMPACTUM / COMPACT SAINT CATHERINE'S LACE		1 GAL. - 5 GAL.
MISCANTHUS SINENSIS 'ADAGIO' / ADAGIO EULALIA GRASS		1 GAL. - 5 GAL.
PENNISETUM ALOPECUROIDES / FOUNTAIN GRASS		1 GAL. - 5 GAL.
PENSTEMON SPECTABILIS / SHOWY PENSTEMON		1 GAL. - 5 GAL.
PORTULACARIA AFRA / ELEPHANT BUSH		1 GAL.
SALVIA X 'BEE'S BLISS' / BEE'S BLISS SAGE		1 GAL. - 5 GAL.
SENECIO ANTEUPHORBIUM / SWIZZLE STICKS		1 GAL. - 5 GAL.
SENECIO CRASSISSIMUS / VERTICAL LEAF SENECIO		1 GAL.
SENECIO VITALIS / BLUE CHALK FINGERS		1 GAL.
SESLERIA AUTUMNALIS / AUTUMN MOOR GRASS		1 GAL. - 5 GAL.
VERBENA LILACINA 'DE LA MINA' / DE LA MINA LILAC VERBENA		1 GAL. - 5 GAL.

REFERENCE NOTES SCHEDULE

	01 PAVEMENTS, RAMPS, CURBS	
SYMBOL	DESCRIPTION	QTY
01-11	DECK	1,266 SF
	05 SITE FURNISHINGS	
SYMBOL	DESCRIPTION	QTY
05-08	DINING TABLE - TYPE I	2
05-11	BISTRO TABLE	3
	09 PLANTING AND LANDSCAPE	
SYMBOL	DESCRIPTION	QTY
09-01	PLANTING AREA	195 SF



SCALE: 1" = 16'-0"

LEVEL 6 AMENITY

CONCEPT PLANT SCHEDULE

TALL SUCCULENT	3	
ALOE BARBADENSIS / BARBADOS ALOE		15 GAL
ALOE FEROX / BITTER TREE ALOE		15 GAL
BEAUCARNEA RECURVATA / PONY TAIL PALM		15 GAL
EUPHORBIA AMMAK / CANDELABRA SPURGE		15 GAL
EUPHORBIA INGENS / CANDELABRA TREE		15 GAL
EUPHORBIA TRIANGULARIS / TREE EUPHORBIA		15 GAL
YUCCA ALOIFOLIA / ALOE YUCCA		15 GAL
YUCCA ELEPHANTIPES / GIANT YUCCA		15 GAL

DUNE MIX	30 SF	
2`-3` O.C.		
ABRONIA VILLOSA / DESERT SAND VERBENA		1 GAL.
AGAVE SHAWII / COASTAL AGAVE		1 GAL. - 5 GAL.
ARISTIDA PURPUREA / PURPLE THREEAWN		1 GAL. - 5 GAL.
BOUTELOUA GRACILIS 'BLONDE AMBITION' / BLONDE AMBITION BLUE GRAMA		1 GAL. - 5 GAL.
CAREX BUCHANANII / LEATHER LEAF SEDGE		1 GAL. - 5 GAL.
DUDLEYA BRITTONII / GIANT CHALK DUDLEYA		1 GAL. - 5 GAL.
LIMONIUM PEREZII / STATICE		1 GAL. - 5 GAL.
MUHLENBERGIA DUBIA / PINE MUHLY		1 GAL. - 5 GAL.
OPUNTIA SANTA-RITA 'TUBAC' TM / SANTA RITA PRICKLYPEAR		1 GAL. - 5 GAL.
SALICORNIA PACIFICA / PICKLEWEED		1 GAL. - 5 GAL.
SPHAERALCEA AMBIGUA / DESERT GLOBEMALLOW		1 GAL. - 5 GAL.
XEROSICYOS DANGUYI / SILVER DOLLAR VINE		1 GAL.

REFERENCE NOTES SCHEDULE

	01 PAVEMENTS, RAMPS, CURBS	
SYMBOL	DESCRIPTION	QTY
01-09	PEDESTAL PAVERS	2,074 SF
	05 SITE FURNISHINGS	
SYMBOL	DESCRIPTION	QTY
05-11	BISTRO TABLE	5
05-16	FIRE TABLE	3
	09 PLANTING AND LANDSCAPE	
SYMBOL	DESCRIPTION	QTY
09-01	PLANTING AREA	95 SF

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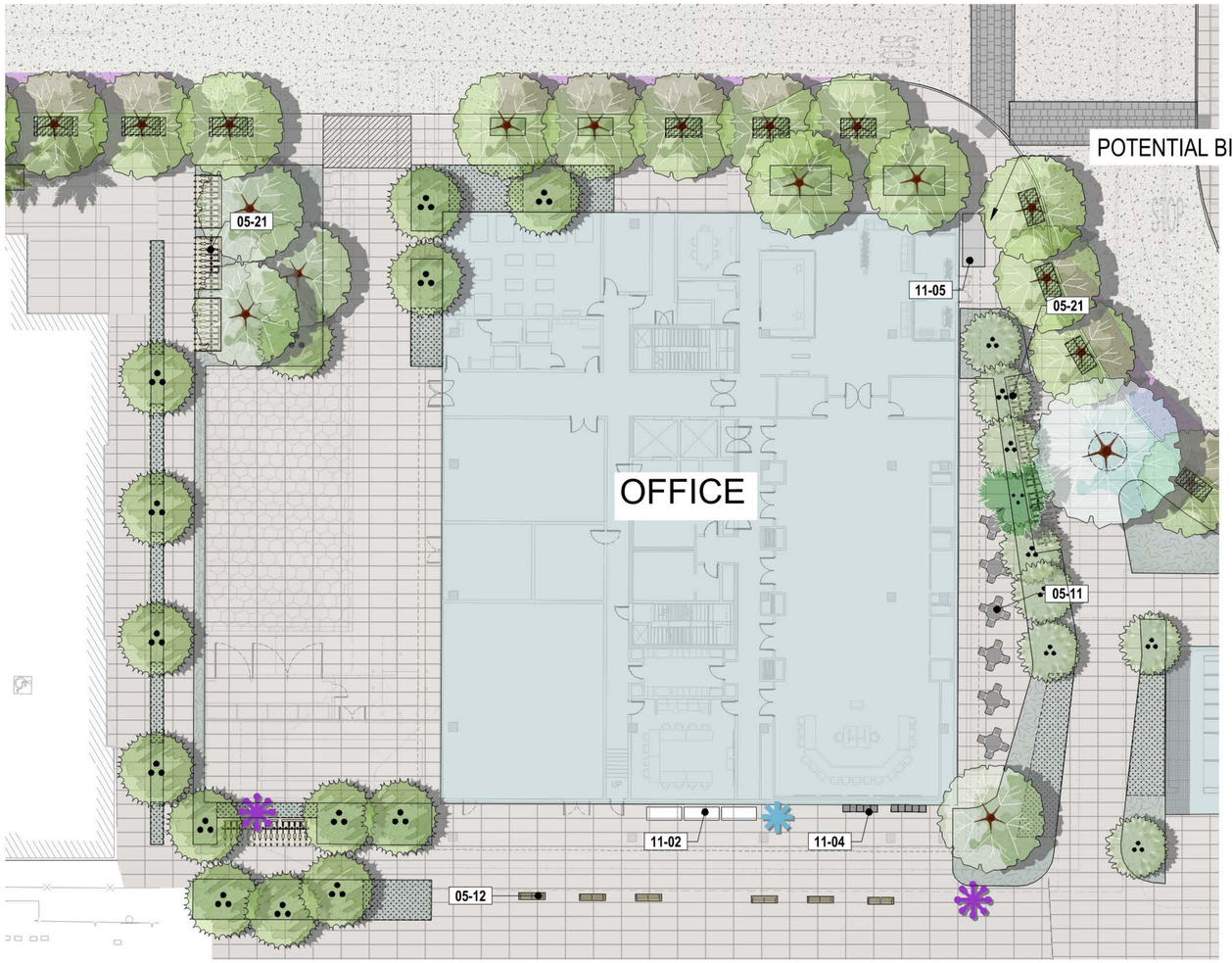
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2	02-13-2023	DP SUBMITTAL 2
3	10-09-2023	DP SUBMITTAL 3
4	04-10-2024	DP SUBMITTAL 4
5	06-20-2024	DP SUBMITTAL 5
6	08-19-2024	DP SUBMITTAL 6

Schematic Design

HOTEL LANDSCAPE PLAN

L-022

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OFFICE (LEVEL 1) LANDSCAPE PLAN

SCALE: 1" = 16'-0"

0 8 16 32

SCALE: 1/16"=1'-0"

FOR GROUND LEVEL SCHEDULES, SEPLEASE REFER TO L002 FOR PLANT MATERIAL SCHEDULE & L-011 FOR HARDSCAPE/FURNISHINGS SCHEDULEE L-011

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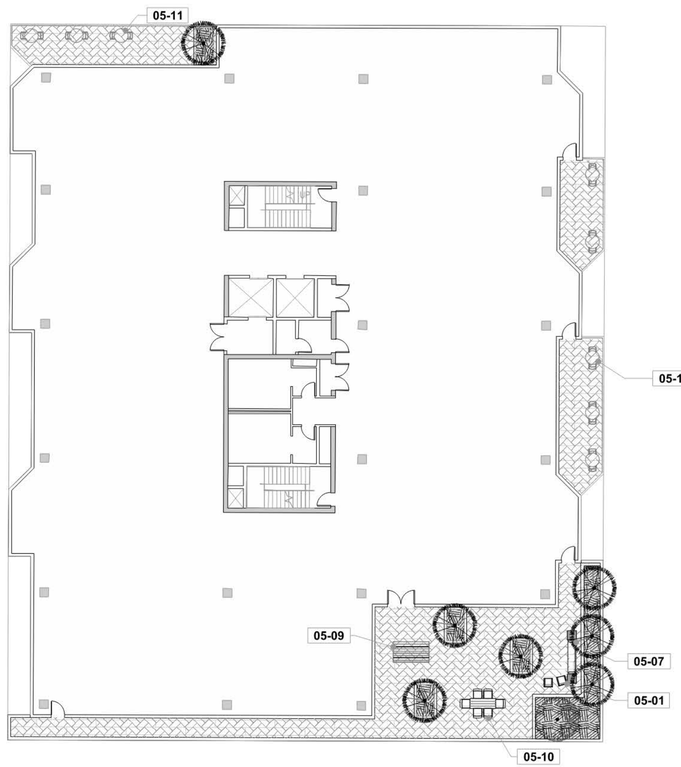
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2	02-13-2023	DP SUBMITTAL 2
3	10-09-2023	DP SUBMITTAL 3
4	04-10-2024	DP SUBMITTAL 4
5	06-20-2024	DP SUBMITTAL 5
6	08-19-2024	DP SUBMITTAL 6

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OFFICE (LEVEL 1) LANDSCAPE PLAN

L-023

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OFFICE (LEVEL 2) LANDSCAPE PLAN

SCALE: 1" = 16'-0"

0 8 16 32

SCALE: 1/16"=1'-0"

CONCEPT PLANT SCHEDULE 2ND FLOOR

SMALL FLOWERING TREE	1	
ACACIA BAILEYANA / BAILEY ACACIA		24" BOX
ACACIA COVENYI / BLUE BUSH ACACIA		15 GAL
ACACIA CULTRIFORMIS / KNIFE ACACIA		15 GAL
ACACIA DEALBATA / SILVER WATTLE		15 GAL
ALBIZIA JULIBRISSIN / SILK TREE		24" BOX
CERCIS OCCIDENTALIS / WESTERN REDBUD MULTI-TRUNK		24" BOX
LAGERSTROEMIA INDICA / CRAPE MYRTLE		15 GAL
LEPTOSPERMUM LAEVIGATUM / AUSTRALIAN TEA TREE		15 GAL
MELALEUCA NESOPHILA / PINK MELALEUCA MULTI-TRUNK		15 GAL
PLUMERIA RUBRA / RED FRANGIPANI		15 GAL
TABEBUIA IMPETIGINOSA / PINK TRUMPET TREE		24" BOX
SMALL FEATURE TREE	7	
ALOE `HERCULES` / HERCULES ALOE		15 GAL
ALOE BAINESII / TREE ALOE		15 GAL
CORDYLINE AUSTRALIS / GRASS PALM		15 GAL
DRACAENA DRACO / DRAGON TREE		15 GAL
DRACAENA MARGINATA / DRACAENA		15 GAL
FICUS ELASTICA / RUBBER TREE		15 GAL
FICUS LYRATA / FIDDLE LEAF FIG		15 GAL
JUNIPERUS CHINENSIS 'TORULOSA' / HOLLYWOOD JUNIPER		15 GAL
YUCCA ALOIFOLIA / ALOE YUCCA		15 GAL
YUCCA AUSTRALIS / YUCCA		15 GAL
YUCCA RIGIDA / MEXICAN BLUE YUCCA		15 GAL
YUCCA ROSTRATA / BEAKED YUCCA		15 GAL
POOLSIDE MIX	353 SF	
2`-3` O.C.		
AECHMEA BLANCHETIANA / ORANGE BROMELIAD		1 GAL. - 5 GAL.
ALOE FEROX / BITTER TREE ALOE		1 GAL. - 5 GAL.
ALOE RAMOSISSIMA / MAIDEN'S QUIVER TREE		1 GAL. - 5 GAL.
ALOE REITZII / REITZ'S ALOE		1 GAL. - 5 GAL.
ALOE RUDIKOPPE / LITTLE RED RIDING HOOD ALOE		1 GAL. - 5 GAL.
ALOE VERA / MEDICINAL ALOE		1 GAL. - 5 GAL.
ALOE X 'ALWAYS RED' / ALWAYS RED ALOE		1 GAL. - 5 GAL.
ALOE X 'BLUE ELF' / BLUE ELF ALOE		1 GAL. - 5 GAL.
ALPINIA ZERUMBET 'VARIEGATA' / VARIEGATED SHELL GINGER		1 GAL. - 5 GAL.
ARBUTUS UNEDO / STRAWBERRY TREE SHRUB		1 GAL. - 5 GAL.
ASPARAGUS RETROFRACTUS / MING ASPARAGUS FERN		1 GAL. - 5 GAL.
ASPARAGUS SETACEUS / ASPARAGUS FERN		1 GAL. - 5 GAL.
BESCHORNERIA YUCCOIDES / AMOLE		1 GAL. - 5 GAL.
CORDYLINE AUSTRALIS / GRASS PALM		1 GAL. - 5 GAL.
CORDYLINE FRUTICOSA 'RED SISTER' / RED SISTER TI PLANT		1 GAL. - 5 GAL.
CORDYLINE FRUTICOSA 'SOLEDAD PURPLE' / SOLEDAD PURPLE TI PLANT		1 GAL. - 5 GAL.
COTYLEDON ORBICULATA / COTYLEDON		1 GAL. - 5 GAL.
CUPHEA IGNEA / CIGAR PLANT		1 GAL. - 5 GAL.
DIETES VEGETA / AFRICAN IRIS		1 GAL. - 5 GAL.
DIETES VEGETA 'VARIEGATA' / VARIEGATED AFRICAN IRIS		1 GAL. - 5 GAL.
DIPLADENIA X 'DEEP RED' TM / MANDINIA DEEP RED MANDEVILLA		1 GAL. - 5 GAL.
DORYANTHES PALMERI / SPEAR LILY		1 GAL. - 5 GAL.
DRACAENA MARGINATA / DRACAENA		1 GAL. - 5 GAL.
EPIDENDRUM RADICANS 'ORANGE' / ORANGE REED STEM ORCHID		1 GAL. - 5 GAL.
EPIDENDRUM RADICANS 'PURPLE' / PURPLE REED STEM ORCHID		1 GAL. - 5 GAL.
MONSTERA DELICIOSA / SPLIT-LEAF PHILODENDRON		1 GAL. - 5 GAL.
MYRICA CALIFORNICA / PACIFIC WAX MYRTLE		1 GAL. - 5 GAL.
NEOREGELIA COMPACTA VARIEGATA / VARIEGATED COMPACT BROMELIAD		1 GAL. - 5 GAL.
PACHYPODIUM LAMEREI / MADAGASCAR PALM		1 GAL. - 5 GAL.
PHILODENDRON SELLOUM / TREE PHILODENDRON		1 GAL. - 5 GAL.
STRELITZIA NICOLAI / GIANT BIRD OF PARADISE		1 GAL. - 5 GAL.
STRELITZIA REGINAE / BIRD OF PARADISE		1 GAL. - 5 GAL.
WOODWARDIA FIMBRIATA / GIANT CHAIN FERN		1 GAL. - 5 GAL.
ZAMIA FURFURACEA / CARDBOARD PALM		1 GAL. - 5 GAL.

REFERENCE NOTES SCHEDULE 2ND FLOOR

	01 PAVEMENTS, RAMPS, CURBS	
SYMBOL	DESCRIPTION	QTY
01-09	PEDESTAL PAVERS	2,565 SF
	05 SITE FURNISHINGS	
SYMBOL	DESCRIPTION	QTY
05-01	LOUNGE CHAIR - TYPE I	2
05-07	OUTDOOR SOFA	1
05-09	DINING TABLE - TYPE II	1
05-10	DINING TABLE - TYPE III	1
05-11	BISTRO TABLE	8
	09 PLANTING AND LANDSCAPE	
SYMBOL	DESCRIPTION	QTY
09-01	PLANTING AREA	354 SF

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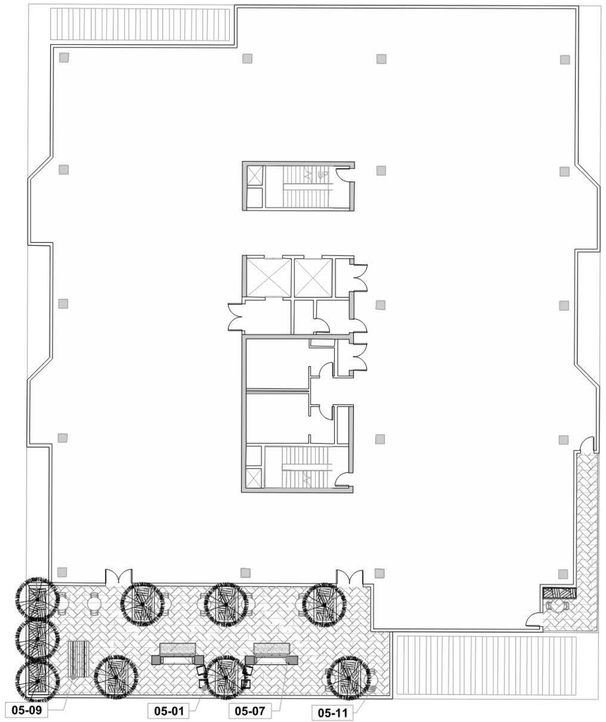
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3	10-09-2023	DP SUBMITTAL 3
4	04-10-2024	DP SUBMITTAL 4
5	06-20-2024	DP SUBMITTAL 5
6	08-19-2024	DP SUBMITTAL 6

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OFFICE (LEVEL 2) LANDSCAPE PLAN

L-024

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CONCEPT PLANT SCHEDULE 3RD FLOOR

SMALL FEATURE TREE	9	
ALOE 'HERCULES' / HERCULES ALOE		15 GAL
ALOE BAINESII / TREE ALOE		15 GAL
CORDYLINE AUSTRALIS / GRASS PALM		15 GAL
DRACAENA DRACO / DRAGON TREE		15 GAL
DRACAENA MARGINATA / DRACAENA		15 GAL
FICUS ELASTICA / RUBBER TREE		15 GAL
FICUS LYRATA / FIDDLE LEAF FIG		15 GAL
JUNIPERUS CHINENSIS 'TORULOSA' / HOLLYWOOD JUNIPER		15 GAL
YUCCA ALOIFOLIA / ALOE YUCCA		15 GAL
YUCCA AUSTRALIS / YUCCA		15 GAL
YUCCA RIGIDA / MEXICAN BLUE YUCCA		15 GAL
YUCCA ROSTRATA / BEAKED YUCCA		15 GAL

POOLSIDE MIX	269 SF	
2'-3' O.C.		
AECHMEA BLANCHETIANA / ORANGE BROMELIAD		1 GAL. - 5 GAL.
ALOE FEROX / BITTER TREE ALOE		1 GAL. - 5 GAL.
ALOE RAMOSISSIMA / MAIDEN'S QUIVER TREE		1 GAL. - 5 GAL.
ALOE REITZII / REITZ'S ALOE		1 GAL. - 5 GAL.
ALOE RUDIKOPPE / LITTLE RED RIDING HOOD ALOE		1 GAL. - 5 GAL.
ALOE VERA / MEDICINAL ALOE		1 GAL. - 5 GAL.
ALOE X 'ALWAYS RED' / ALWAYS RED ALOE		1 GAL. - 5 GAL.
ALOE X 'BLUE ELF' / BLUE ELF ALOE		1 GAL. - 5 GAL.
ALPINIA ZERUMBET 'VARIEGATA' / VARIEGATED SHELL GINGER		1 GAL. - 5 GAL.
ARBUTUS UNEDO / STRAWBERRY TREE SHRUB		1 GAL. - 5 GAL.
ASPARAGUS RETROFRACTUS / MING ASPARAGUS FERN		1 GAL. - 5 GAL.
ASPARAGUS SETACEUS / ASPARAGUS FERN		1 GAL. - 5 GAL.
BESCHORNERIA YUCCOIDES / AMOLE		1 GAL. - 5 GAL.
CORDYLINE AUSTRALIS / GRASS PALM		1 GAL. - 5 GAL.
CORDYLINE FRUTICOSA 'RED SISTER' / RED SISTER TI PLANT		1 GAL. - 5 GAL.
CORDYLINE FRUTICOSA 'SOLEDAD PURPLE' / SOLEDAD PURPLE TI PLANT		1 GAL. - 5 GAL.
COTYLEDON ORBICULATA / COTYLEDON		1 GAL. - 5 GAL.
CUPHEA IGNEA / CIGAR PLANT		1 GAL. - 5 GAL.
DIETES VEGETA / AFRICAN IRIS		1 GAL. - 5 GAL.
DIETES VEGETA 'VARIEGATA' / VARIEGATED AFRICAN IRIS		1 GAL. - 5 GAL.
DIPLADENIA X 'DEEP RED' TM / MANDINIA DEEP RED MANDEVILLA		1 GAL. - 5 GAL.
DORYANTHES PALMERI / SPEAR LILY		1 GAL. - 5 GAL.
DRACAENA MARGINATA / DRACAENA		1 GAL. - 5 GAL.
EPIDENDRUM RADICANS 'ORANGE' / ORANGE REED STEM ORCHID		1 GAL. - 5 GAL.
EPIDENDRUM RADICANS 'PURPLE' / PURPLE REED STEM ORCHID		1 GAL. - 5 GAL.
MONSTERA DELICIOSA / SPLIT-LEAF PHILODENDRON		1 GAL. - 5 GAL.
MYRICA CALIFORNICA / PACIFIC WAX MYRTLE		1 GAL. - 5 GAL.
NEOREGELIA COMPACTA VARIEGATA / VARIEGATED COMPACT BROMELIAD		1 GAL. - 5 GAL.
PACHYPODIUM LAMEREI / MADAGASCAR PALM		1 GAL. - 5 GAL.
PHILODENDRON SELLOUM / TREE PHILODENDRON		1 GAL. - 5 GAL.
STRELITZIA NICOLAI / GIANT BIRD OF PARADISE		1 GAL. - 5 GAL.
STRELITZIA REGINAE / BIRD OF PARADISE		1 GAL. - 5 GAL.
WOODWARDIA FIMBRIATA / GIANT CHAIN FERN		1 GAL. - 5 GAL.
ZAMIA FURFURACEA / CARDBOARD PALM		1 GAL. - 5 GAL.

SCHEDULE 3RD FLOOR

	01 PAVEMENTS, RAMPS, CURBS	
SYMBOL	DESCRIPTION	QTY
01-09	PEDESTAL PAVERS	2,050 SF
	05 SITE FURNISHINGS	
SYMBOL	DESCRIPTION	QTY
05-01	LOUNGE CHAIR - TYPE I	4
05-07	OUTDOOR SOFA	2
05-09	DINING TABLE - TYPE II	1
05-11	BISTRO TABLE	9
	09 PLANTING AND LANDSCAPE	
SYMBOL	DESCRIPTION	QTY
09-01	PLANTING AREA	304 SF

OFFICE (LEVEL 3) LANDSCAPE PLAN

SCALE: 1" = 16'-0"

0 8 16 32
SCALE: 1/16"=1'-0"

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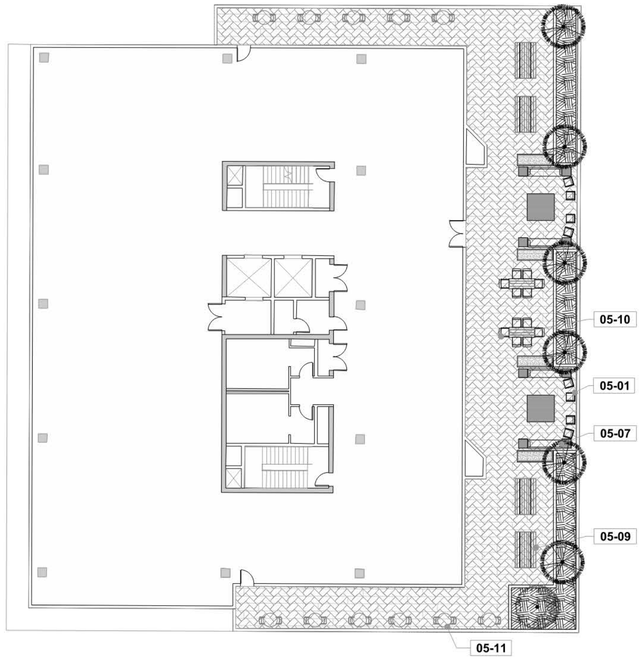
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4	04-10-2024	DP SUBMITTAL 4
5	06-20-2024	DP SUBMITTAL 5
6	08-19-2024	DP SUBMITTAL 6

Schematic Design

OFFICE (LEVEL 3) LANDSCAPE PLAN

L-025

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CONCEPT PLANT SCHEDULE 4TH FLOOR

SMALL FLOWERING TREE	1	
ACACIA BAILEYANA / BAILEY ACACIA		24" BOX
ACACIA COVENYI / BLUE BUSH ACACIA		15 GAL
ACACIA CULTRIFORMIS / KNIFE ACACIA		15 GAL
ACACIA DEALBATA / SILVER WATTLE		15 GAL
ALBIZIA JULIBRISSIN / SILK TREE		24" BOX
CERCIS OCCIDENTALIS / WESTERN REDBUD MULTI-TRUNK		24" BOX
LAGERSTROEMIA INDICA / CRAPE MYRTLE		15 GAL
LEPTOSPERMUM LAEVIGATUM / AUSTRALIAN TEA TREE		15 GAL
MELALEUCA NESOPHILA / PINK MELALEUCA MULTI-TRUNK		15 GAL
PLUMERIA RUBRA / RED FRANGIPANI		15 GAL
TABEBUIA IMPETIGINOSA / PINK TRUMPET TREE		24" BOX
SMALL FEATURE TREE	6	
ALOE `HERCULES` / HERCULES ALOE		15 GAL
ALOE BAINESII / TREE ALOE		15 GAL
CORDYLINE AUSTRALIS / GRASS PALM		15 GAL
DRACAENA DRACO / DRAGON TREE		15 GAL
DRACAENA MARGINATA / DRACAENA		15 GAL
FICUS ELASTICA / RUBBER TREE		15 GAL
FICUS LYRATA / FIDDLE LEAF FIG		15 GAL
JUNIPERUS CHINENSIS 'TORULOSA' / HOLLYWOOD JUNIPER		15 GAL
YUCCA ALOIFOLIA / ALOE YUCCA		15 GAL
YUCCA AUSTRALIS / YUCCA		15 GAL
YUCCA RIGIDA / MEXICAN BLUE YUCCA		15 GAL
YUCCA ROSTRATA / BEAKED YUCCA		15 GAL
POOLSIDE MIX	521 SF	
2`-3` O.C.		
AECHMEA BLANCHETIANA / ORANGE BROMELIAD		1 GAL. - 5 GAL.
ALOE FEROX / BITTER TREE ALOE		1 GAL. - 5 GAL.
ALOE RAMOSISSIMA / MAIDEN'S QUIVER TREE		1 GAL. - 5 GAL.
ALOE REITZII / REITZ'S ALOE		1 GAL. - 5 GAL.
ALOE RUDIKOPPE / LITTLE RED RIDING HOOD ALOE		1 GAL. - 5 GAL.
ALOE VERA / MEDICINAL ALOE		1 GAL. - 5 GAL.
ALOE X 'ALWAYS RED' / ALWAYS RED ALOE		1 GAL. - 5 GAL.
ALOE X 'BLUE ELF' / BLUE ELF ALOE		1 GAL. - 5 GAL.
ALPINIA ZERUMBET 'VARIEGATA' / VARIEGATED SHELL GINGER		1 GAL. - 5 GAL.
ARBUTUS UNEDO / STRAWBERRY TREE SHRUB		1 GAL. - 5 GAL.
ASPARAGUS RETROFRACTUS / MING ASPARAGUS FERN		1 GAL. - 5 GAL.
ASPARAGUS SETACEUS / ASPARAGUS FERN		1 GAL. - 5 GAL.
BESCHORNERIA YUCCOIDES / AMOLE		1 GAL. - 5 GAL.
CORDYLINE AUSTRALIS / GRASS PALM		1 GAL. - 5 GAL.
CORDYLINE FRUTICOSA 'RED SISTER' / RED SISTER TI PLANT		1 GAL. - 5 GAL.
CORDYLINE FRUTICOSA 'SOLEDAD PURPLE' / SOLEDAD PURPLE TI PLANT		1 GAL. - 5 GAL.
COTYLEDON ORBICULATA / COTYLEDON		1 GAL. - 5 GAL.
CUPHEA IGNEA / CIGAR PLANT		1 GAL. - 5 GAL.
DIETES VEGETA / AFRICAN IRIS		1 GAL. - 5 GAL.
DIETES VEGETA 'VARIEGATA' / VARIEGATED AFRICAN IRIS		1 GAL. - 5 GAL.
DIPLADENIA X 'DEEP RED' TM / MANDINIA DEEP RED MANDEVILLA		1 GAL. - 5 GAL.
DORYANTHES PALMERI / SPEAR LILY		1 GAL. - 5 GAL.
DRACAENA MARGINATA / DRACAENA		1 GAL. - 5 GAL.
EPIDENDRUM RADICANS 'ORANGE' / ORANGE REED STEM ORCHID		1 GAL. - 5 GAL.
EPIDENDRUM RADICANS 'PURPLE' / PURPLE REED STEM ORCHID		1 GAL. - 5 GAL.
MONSTERA DELICIOSA / SPLIT-LEAF PHILODENDRON		1 GAL. - 5 GAL.
MYRICA CALIFORNICA / PACIFIC WAX MYRTLE		1 GAL. - 5 GAL.
NEOREGELIA COMPACTA VARIEGATA / VARIEGATED COMPACT BROMELIAD		1 GAL. - 5 GAL.
PACHYPODIUM LAMEREI / MADAGASCAR PALM		1 GAL. - 5 GAL.
PHILODENDRON SELLOUM / TREE PHILODENDRON		1 GAL. - 5 GAL.
STRELITZIA NICOLAI / GIANT BIRD OF PARADISE		1 GAL. - 5 GAL.
STRELITZIA REGINAE / BIRD OF PARADISE		1 GAL. - 5 GAL.
WOODWARDIA FIMBRIATA / GIANT CHAIN FERN		1 GAL. - 5 GAL.
ZAMIA FURFURACEA / CARDBOARD PALM		1 GAL. - 5 GAL.

OFFICE (LEVEL 4) LANDSCAPE PLAN

SCALE: 1" = 16'-0"

0 8 16 32
SCALE: 1/16"=1'-0"

SCHEDULE 4TH FLOOR

	01 PAVEMENTS, RAMPS, CURBS	
SYMBOL	DESCRIPTION	QTY
01-02	ENHANCED PAVING - TYPE I	3,599 SF
	05 SITE FURNISHINGS	
SYMBOL	DESCRIPTION	QTY
05-01	LOUNGE CHAIR - TYPE I	8
05-07	OUTDOOR SOFA	4
05-09	DINING TABLE - TYPE II	4
05-10	DINING TABLE - TYPE III	2
05-11	BISTRO TABLE	11
	09 PLANTING AND LANDSCAPE	
SYMBOL	DESCRIPTION	QTY
09-01	PLANTING AREA	66 SF

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OCEANSIDE TRANSIT CENTER

235 South Tremont Avenue
Oceanside, CA 92054

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Suite 105
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CONTACT - Michael McCann
PHONE - (949) 370-8155

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Issue Drawing Log

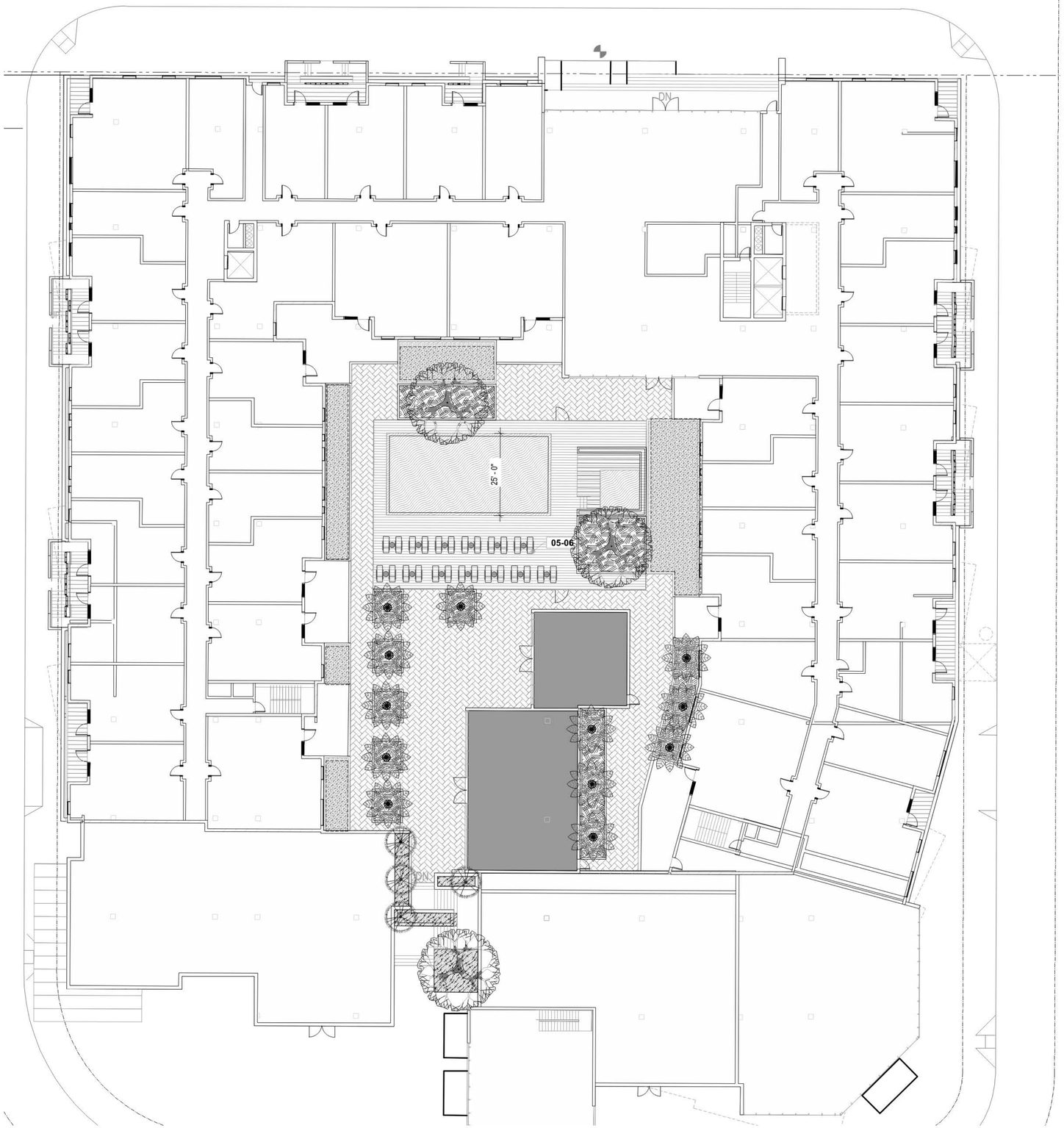
REV	DATE	DESCRIPTION
1	08-26-2022	DP SUBMITTAL 1
2	02-13-2023	DP SUBMITTAL 2
3	10-09-2023	DP SUBMITTAL 3
4	04-10-2024	DP SUBMITTAL 4
5	06-20-2024	DP SUBMITTAL 5
6	08-19-2024	DP SUBMITTAL 6

Schematic Design

OFFICE (LEVEL 4) LANDSCAPE PLAN

L-026

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R1 - RESIDENTIAL (BLOCK 2) LEVEL 2 AMENITY PLAN

SCALE: 1" = 16'-0"

0 8 16 32

SCALE: 1/16"=1'-0"

REFERENCE NOTES SCHEDULE

	SYMBOL	DESCRIPTION	QTY	DETAIL
		01 PAVEMENTS, RAMPS, CURBS		
	01-09	PEDESTAL PAVERS	6,894 SF	
	01-11	DECK	2,877 SF	
		05 SITE FURNISHINGS		
	05-06	CHAISE LOUNGE	26	
		09 PLANTING AND LANDSCAPE		
	09-01	PLANTING AREA	2,356 SF	
		12 WATER FEATURES		
	12-01	POOL/SPA	1,394 SF	

CONCEPT PLANT SCHEDULE

FEATURE TREE 3

AGONIS FLEXUOSA / PEPPERMINT TREE	24" BOX
CINNAMOMUM CAMPHORA / CAMPHOR TREE MULTI-TRUNK	24" BOX
QUERCUS AGRIFOLIA / COAST LIVE OAK MULTI-TRUNK	24" BOX
QUERCUS ENGELMANNII / ENGELMANN OAK	24" BOX
QUERCUS SUBER / CORK OAK	24" BOX
SCHINUS MOLLE / CALIFORNIA PEPPER	24" BOX
TIPUANA TIPU / TIPU TREE	24" BOX

SMALL FEATURE TREE 4

ALOE 'HERCULES' / HERCULES ALOE	15 GAL
ALOE BAINESII / TREE ALOE	15 GAL
CORDYLINE AUSTRALIS / GRASS PALM	15 GAL
DRACAENA DRACO / DRAGON TREE	15 GAL
DRACAENA MARGINATA / DRACAENA	15 GAL
FICUS ELASTICA / RUBBER TREE	15 GAL
FICUS LYRATA / FIDDLE LEAF FIG	15 GAL
JUNIPERUS CHINENSIS 'TORULOSA' / HOLLYWOOD JUNIPER	15 GAL
YUCCA ALOIFOLIA / ALOE YUCCA	15 GAL
YUCCA AUSTRALIS / YUCCA	15 GAL
YUCCA RIGIDA / MEXICAN BLUE YUCCA	15 GAL
YUCCA ROSTRATA / BEAKED YUCCA	15 GAL

POOL AREA TREE/PALM 12

BRAHEA ARMATA / MEXICAN BLUE PALM	24" BOX
CARYOTA MITIS / CLUMPING FISHTAIL PALM	24" BOX
CHAMAEROPS HUMILIS / MEDITERRANEAN FAN PALM	24" BOX
DYPSIS LUTESCENS / ARECA PALM	15 GAL
HOWEA FORSTERIANA / KENTIA PALM	24" BOX
PANDANUS UTILIS / SCREW PINE	24" BOX
PHOENIX DACTYLIFERA 'MEDJOOL' / MEDJOOL DATE PALM	10` BTH

RAISED PLANTER MIX 383 SF

2`-3` O.C.

ACHILLEA MILLEFOLIUM / COMMON YARROW	1 GAL. - 5 GAL.
CAREX TESTACEA / ORANGE SEDGE	1 GAL. - 5 GAL.
DUDLEYA BRITTONII / GIANT CHALK DUDLEYA	1 GAL.
ERIOGONUM GIGANTEUM COMPACTUM / COMPACT SAINT CATHERINE'S LACE	1 GAL. - 5 GAL.
MISCANTHUS SINENSIS 'ADAGIO' / ADAGIO EULALIA GRASS	1 GAL. - 5 GAL.
PENNISETUM ALOPECUROIDES / FOUNTAIN GRASS	1 GAL. - 5 GAL.
PENSTEMON SPECTABILIS / SHOWY PENSTEMON	1 GAL. - 5 GAL.
PORTULACARIA AFRA / ELEPHANT BUSH	1 GAL.
SALVIA X 'BEE'S BLISS' / BEE'S BLISS SAGE	1 GAL. - 5 GAL.
SENECIO ANTEUPHORBIUM / SWIZZLE STICKS	1 GAL. - 5 GAL.
SENECIO CRASSISSIMUS / VERTICAL LEAF SENECIO	1 GAL.
SENECIO VITALIS / BLUE CHALK FINGERS	1 GAL.
SESLERIA AUTUMNALIS / AUTUMN MOOR GRASS	1 GAL. - 5 GAL.
VERBENA LILACINA 'DE LA MINA' / DE LA MINA LILAC VERBENA	1 GAL. - 5 GAL.

POOLSIDE MIX 1,969 SF

2`-3` O.C.

AECHMEA BLANCHETIANA / ORANGE BROMELIAD	1 GAL. - 5 GAL.
ALOE FEROX / BITTER TREE ALOE	1 GAL. - 5 GAL.
ALOE RAMOSISSIMA / MAIDEN'S QUIVER TREE	1 GAL. - 5 GAL.
ALOE REITZII / REITZ'S ALOE	1 GAL. - 5 GAL.
ALOE RUDIKOPPE / LITTLE RED RIDING HOOD ALOE	1 GAL. - 5 GAL.
ALOE VERA / MEDICINAL ALOE	1 GAL. - 5 GAL.
ALOE X 'ALWAYS RED' / ALWAYS RED ALOE	1 GAL. - 5 GAL.
ALOE X 'BLUE ELF' / BLUE ELF ALOE	1 GAL. - 5 GAL.
ALPINIA ZERUMBET 'VARIEGATA' / VARIEGATED SHELL GINGER	1 GAL. - 5 GAL.
ARBUTUS UNEDO / STRAWBERRY TREE SHRUB	1 GAL. - 5 GAL.
ASPARAGUS RETROFRACTUS / MING ASPARAGUS FERN	1 GAL. - 5 GAL.
ASPARAGUS SETACEUS / ASPARAGUS FERN	1 GAL. - 5 GAL.
BESCHORNERIA YUCCOIDES / AMOLE	1 GAL. - 5 GAL.
CORDYLINE AUSTRALIS / GRASS PALM	1 GAL. - 5 GAL.
CORDYLINE FRUTICOSA 'RED SISTER' / RED SISTER TI PLANT	1 GAL. - 5 GAL.
CORDYLINE FRUTICOSA 'SOLEDAD PURPLE' / SOLEDAD PURPLE TI PLANT	1 GAL. - 5 GAL.
COTYLEDON ORBICULATA / COTYLEDON	1 GAL. - 5 GAL.
CUPHEA IGNEA / CIGAR PLANT	1 GAL. - 5 GAL.
DIETES VEGETA / AFRICAN IRIS	1 GAL. - 5 GAL.
DIETES VEGETA 'VARIEGATA' / VARIEGATED AFRICAN IRIS	1 GAL. - 5 GAL.
DIPLADENIA X 'DEEP RED' TM / MANDINIA DEEP RED MANDEVILLA	1 GAL. - 5 GAL.
DORYANTHES PALMERI / SPEAR LILY	1 GAL. - 5 GAL.
DRACAENA MARGINATA / DRACAENA	1 GAL. - 5 GAL.
EPIDENDRUM RADICANS 'ORANGE' / ORANGE REED STEM ORCHID	1 GAL. - 5 GAL.
EPIDENDRUM RADICANS 'PURPLE' / PURPLE REED STEM ORCHID	1 GAL. - 5 GAL.
MONSTERA DELICIOSA / SPLIT-LEAF PHILODENDRON	1 GAL. - 5 GAL.
MYRICA CALIFORNICA / PACIFIC WAX MYRTLE	1 GAL. - 5 GAL.
NEOREGELIA COMPACTA VARIEGATA / VARIEGATED COMPACT BROMELIAD	1 GAL. - 5 GAL.
PACHYPODIUM LAMEREI / MADAGASCAR PALM	1 GAL. - 5 GAL.
PHILODENDRON SELLOUM / TREE PHILODENDRON	1 GAL. - 5 GAL.
STRELITZIA NICOLAI / GIANT BIRD OF PARADISE	1 GAL. - 5 GAL.
STRELITZIA REGINAE / BIRD OF PARADISE	1 GAL. - 5 GAL.
WOODWARDIA FIMBRIATA / GIANT CHAIN FERN	1 GAL. - 5 GAL.
ZAMIA FURFURACEA / CARDBOARD PALM	1 GAL. - 5 GAL.

BIO FILTRATION PLANTER 19,758 SF

2`-3` O.C.

ACHILLEA MILLEFOLIUM / COMMON YARROW	4" POT
AGROSTIS PALLENS / THINGRASS	1 GAL.
ANEMOPSIS CALIFORNICA / YERBA MANSA	1 GAL.
CAREX SPISSA / SAN DIEGO SEDGE	1 GAL.
CAREX SUBFUSCA / BROWN SEDGE	1 GAL.
CAREX TUMULICOLA / FOOTHILL SEDGE	1 GAL.
DISTICHLIS SPICATA / SALTGRASS	1 GAL.
ELEOCHARIS MACROSTACHYA / COMMON SPIKERUSH	1 GAL.
FESTUCA CALIFORNICA / CALIFORNIA FESCUE	1 GAL.
FESTUCA RUBRA / RED FESCUE	1 GAL.
IVA HAYESIANA / SAN DIEGO POVERTY WEED	1 GAL.
JUNCUS PATENS / CALIFORNIA GRAY RUSH	1 GAL.
MAHONIA NEVINII / NEVIN MAHONIA	1 GAL.
MUHLENBERGIA RIGENS / DEER GRASS	1 GAL.
RIBES SPECIOSUM / FUCHSIA FLOWERING GOOSEBERRY	1 GAL.
ROSA CALIFORNICA / CALIFORNIA WILD ROSE	1 GAL.
SCIRPUS CERNUUS / LOW BULRUSH	1 GAL.

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5	06-20-2024	DP SUBMITTAL 5
6	08-19-2024	DP SUBMITTAL 6

Schematic Design

R1 - RESIDENTIAL (BLOCK 2) LEVEL 2 AMENITY PLAN

L-027

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CONCEPT PLANT SCHEDULE POOL DECK

FEATURE TREE	2	
AGONIS FLEXUOSA / PEPPERMINT TREE		24" BOX
CINNAMOMUM CAMPHORA / CAMPHOR TREE MULTI-TRUNK		24" BOX
QUERCUS AGRIFOLIA / COAST LIVE OAK MULTI-TRUNK		24" BOX
QUERCUS ENGELMANNII / ENGELMANN OAK		24" BOX
QUERCUS SUBER / CORK OAK		24" BOX
SCHINUS MOLLE / CALIFORNIA PEPPER		24" BOX
TIPUANA TIPU / TIPU TREE		24" BOX

SMALL FLOWERING TREE	11	
ACACIA BAILEYANA / BAILEY ACACIA		24" BOX
ACACIA COVENYI / BLUE BUSH ACACIA		15 GAL
ACACIA CULTRIFORMIS / KNIFE ACACIA		15 GAL
ACACIA DEALBATA / SILVER WATTLE		15 GAL
ALBIZIA JULIBRISSIN / SILK TREE		24" BOX
CERCIS OCCIDENTALIS / WESTERN REDBUD MULTI-TRUNK		24" BOX
LAGERSTROEMIA INDICA / CRAPE MYRTLE		15 GAL
LEPTOSPERMUM LAEVIGATUM / AUSTRALIAN TEA TREE		15 GAL
MELALEUCA NESOPHILA / PINK MELALEUCA MULTI-TRUNK		15 GAL
PLUMERIA RUBRA / RED FRANGIPANI		15 GAL
TABEBUIA IMPETIGINOSA / PINK TRUMPET TREE		24" BOX

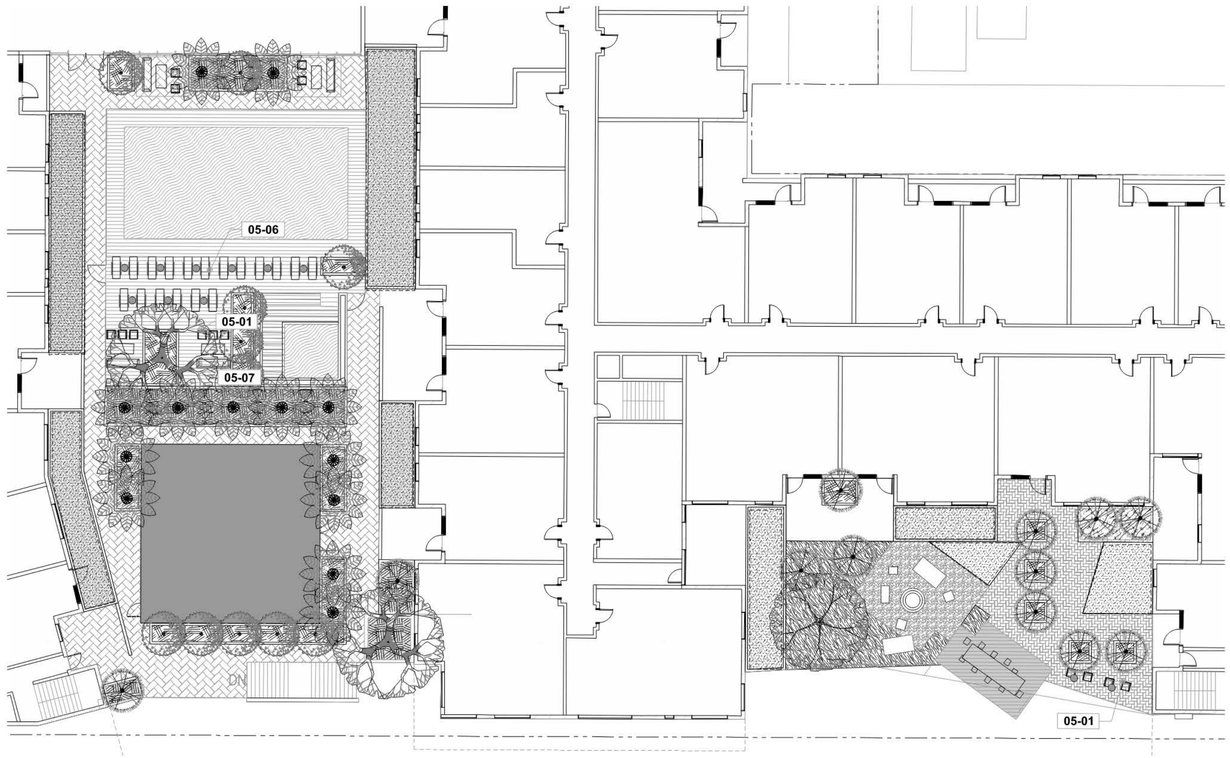
SMALL FEATURE TREE	1	
ALOE `HERCULES` / HERCULES ALOE		15 GAL
ALOE BAINESII / TREE ALOE		15 GAL
CORDYLINE AUSTRALIS / GRASS PALM		15 GAL
DRACAENA DRACO / DRAGON TREE		15 GAL
DRACAENA MARGINATA / DRACAENA		15 GAL
FICUS ELASTICA / RUBBER TREE		15 GAL
FICUS LYRATA / FIDDLE LEAF FIG		15 GAL
JUNIPERUS CHINENSIS 'TORULOSA' / HOLLYWOOD JUNIPER		15 GAL
YUCCA ALOIFOLIA / ALOE YUCCA		15 GAL
YUCCA AUSTRALIS / YUCCA		15 GAL
YUCCA RIGIDA / MEXICAN BLUE YUCCA		15 GAL
YUCCA ROSTRATA / BEAKED YUCCA		15 GAL

POOLSIDE MIX	2,151 SF	
2`-3` O.C.		
AECHMEA BLANCHETIANA / ORANGE BROMELIAD		1 GAL. - 5 GAL.
ALOE FEROX / BITTER TREE ALOE		1 GAL. - 5 GAL.
ALOE RAMOSISSIMA / MAIDEN'S QUIVER TREE		1 GAL. - 5 GAL.
ALOE REITZII / REITZ'S ALOE		1 GAL. - 5 GAL.
ALOE RUDIKOPPE / LITTLE RED RIDING HOOD ALOE		1 GAL. - 5 GAL.
ALOE VERA / MEDICINAL ALOE		1 GAL. - 5 GAL.
ALOE X 'ALWAYS RED' / ALWAYS RED ALOE		1 GAL. - 5 GAL.
ALOE X 'BLUE ELF' / BLUE ELF ALOE		1 GAL. - 5 GAL.
ALPINIA ZERUMBET 'VARIEGATA' / VARIEGATED SHELL GINGER		1 GAL. - 5 GAL.
ARBUTUS UNEDO / STRAWBERRY TREE SHRUB		1 GAL. - 5 GAL.
ASPARAGUS RETROFRACTUS / MING ASPARAGUS FERN		1 GAL. - 5 GAL.
ASPARAGUS SETACEUS / ASPARAGUS FERN		1 GAL. - 5 GAL.
BESCHORNERIA YUCCOIDES / AMOLE		1 GAL. - 5 GAL.
CORDYLINE AUSTRALIS / GRASS PALM		1 GAL. - 5 GAL.
CORDYLINE FRUTICOSA 'RED SISTER' / RED SISTER TI PLANT		1 GAL. - 5 GAL.
CORDYLINE FRUTICOSA 'SOLEDAD PURPLE' / SOLEDAD PURPLE TI PLANT		1 GAL. - 5 GAL.
COTYLEDON ORBICULATA / COTYLEDON		1 GAL. - 5 GAL.
CUPHEA IGNEA / CIGAR PLANT		1 GAL. - 5 GAL.
DIETES VEGETA / AFRICAN IRIS		1 GAL. - 5 GAL.
DIETES VEGETA 'VARIEGATA' / VARIEGATED AFRICAN IRIS		1 GAL. - 5 GAL.
DIPLADENIA X 'DEEP RED' TM / MANDINIA DEEP RED MANDEVILLA		1 GAL. - 5 GAL.
DORYANTHES PALMERI / SPEAR LILY		1 GAL. - 5 GAL.
DRACAENA MARGINATA / DRACAENA		1 GAL. - 5 GAL.
EPIDENDRUM RADICANS 'ORANGE' / ORANGE REED STEM ORCHID		1 GAL. - 5 GAL.
EPIDENDRUM RADICANS 'PURPLE' / PURPLE REED STEM ORCHID		1 GAL. - 5 GAL.
MONSTERA DELICIOSA / SPLIT-LEAF PHILODENDRON		1 GAL. - 5 GAL.
MYRICA CALIFORNICA / PACIFIC WAX MYRTLE		1 GAL. - 5 GAL.
NEOREGELIA COMPACTA VARIEGATA / VARIEGATED COMPACT BROMELIAD		1 GAL. - 5 GAL.
PACHYPODIUM LAMEREI / MADAGASCAR PALM		1 GAL. - 5 GAL.
PHILODENDRON SELLOUM / TREE PHILODENDRON		1 GAL. - 5 GAL.
STRELITZIA NICOLAI / GIANT BIRD OF PARADISE		1 GAL. - 5 GAL.
STRELITZIA REGINAE / BIRD OF PARADISE		1 GAL. - 5 GAL.
WOODWARDIA FIMBRIATA / GIANT CHAIN FERN		1 GAL. - 5 GAL.
ZAMIA FURFURACEA / CARDBOARD PALM		1 GAL. - 5 GAL.

POOL AREA TREE/PALM	13	
BRAHEA ARMATA / MEXICAN BLUE PALM		24" BOX
CARYOTA MITIS / CLUMPING FISHTAIL PALM		24" BOX
CHAMAEROPS HUMILIS / MEDITERRANEAN FAN PALM		24" BOX
DYPSIS LUTESCENS / ARECA PALM		15 GAL
HOWEA FORSTERIANA / KENTIA PALM		24" BOX
PANDANUS UTILIS / SCREW PINE		24" BOX
PHOENIX DACTYLIFERA 'MEDJOOL' / MEDJOOL DATE PALM		10` BTH

REFERENCE NOTES SCHEDULE POOL DECK

	01 PAVEMENTS, RAMPS, CURBS	
SYMBOL	DESCRIPTION	QTY
01-09	PEDESTAL PAVERS	3,229 SF
01-11	DECK	1,973 SF
	05 SITE FURNISHINGS	
SYMBOL	DESCRIPTION	QTY
05-01	LOUNGE CHAIR - TYPE I	10
05-06	CHAISE LOUNGE	18
05-07	OUTDOOR SOFA	4
	09 PLANTING AND LANDSCAPE	
SYMBOL	DESCRIPTION	QTY
09-01	PLANTING AREA	2,151 SF
	12 WATER FEATURES	
SYMBOL	DESCRIPTION	QTY
12-01	POOL/SPA	1,394 SF



R2 - RESIDENTIAL (BLOCK 3) LEVEL 2 AMENITY PLAN

SCALE: 1" = 16'-0"

0 8 16 32

SCALE: 1/16"=1'-0"

CONCEPT PLANT SCHEDULE AMENITY SPACE

DUNE TREE	1	
AGONIS FLEXUOSA / PEPPERMINT TREE		24" BOX
GEIJERA PARVIFLORA / AUSTRALIAN WILLOW		24" BOX
MELALEUCA QUINQUENERVIA / CAJEPUT TREE MULTI-TRUNK		24" BOX
PROSOPIS CHILENSIS 'THORNLESS' / THORNLESS CHILEAN MESQUITE		24" BOX
TABEBUIA IMPETIGINOSA / PINK TRUMPET TREE		24" BOX

SMALL FEATURE TREE	11	
ALOE `HERCULES` / HERCULES ALOE		15 GAL
ALOE BAINESII / TREE ALOE		15 GAL
CORDYLINE AUSTRALIS / GRASS PALM		15 GAL
DRACAENA DRACO / DRAGON TREE		15 GAL
DRACAENA MARGINATA / DRACAENA		15 GAL
FICUS ELASTICA / RUBBER TREE		15 GAL
FICUS LYRATA / FIDDLE LEAF FIG		15 GAL
JUNIPERUS CHINENSIS 'TORULOSA' / HOLLYWOOD JUNIPER		15 GAL
YUCCA ALOIFOLIA / ALOE YUCCA		15 GAL
YUCCA AUSTRALIS / YUCCA		15 GAL
YUCCA RIGIDA / MEXICAN BLUE YUCCA		15 GAL
YUCCA ROSTRATA / BEAKED YUCCA		15 GAL

RAISED PLANTER MIX	669 SF	
2`-3` O.C.		
ACHILLEA MILLEFOLIUM / COMMON YARROW		1 GAL. - 5 GAL.
CAREX TESTACEA / ORANGE SEDGE		1 GAL. - 5 GAL.
DUDLEYA BRITTONII / GIANT CHALK DUDLEYA		1 GAL.
ERIOGONUM GIGANTEUM COMPACTUM / COMPACT SAINT CATHERINE'S LACE		1 GAL. - 5 GAL.
MISCANTHUS SINENSIS 'ADAGIO' / ADAGIO EULALIA GRASS		1 GAL. - 5 GAL.
PENNISETUM ALOPECUROIDES / FOUNTAIN GRASS		1 GAL. - 5 GAL.
PENSTEMON SPECTABILIS / SHOWY PENSTEMON		1 GAL. - 5 GAL.
PORTULACARIA AFRA / ELEPHANT BUSH		1 GAL.
SALVIA X 'BEE'S BLISS' / BEE'S BLISS SAGE		1 GAL. - 5 GAL.
SENECIO ANTEUPHORBIUM / SWIZZLE STICKS		1 GAL. - 5 GAL.
SENECIO CRASSISSIMUS / VERTICAL LEAF SENECIO		1 GAL.
SENECIO VITALIS / BLUE CHALK FINGERS		1 GAL.
SESLERIA AUTUMNALIS / AUTUMN MOOR GRASS		1 GAL. - 5 GAL.
VERBENA LILACINA 'DE LA MINA' / DE LA MINA LILAC VERBENA		1 GAL. - 5 GAL.

DUNE MIX	749 SF	
2`-3` O.C.		
ABRONIA VILLOSA / DESERT SAND VERBENA		1 GAL.
AGAVE SHAWII / COASTAL AGAVE		1 GAL. - 5 GAL.
ARISTIDA PURPUREA / PURPLE THREEAWN		1 GAL. - 5 GAL.
BOUTELOUA GRACILIS 'BLONDE AMBITION' / BLONDE AMBITION BLUE GRAMA		1 GAL. - 5 GAL.
CAREX BUCHANANII / LEATHER LEAF SEDGE		1 GAL. - 5 GAL.
DUDLEYA BRITTONII / GIANT CHALK DUDLEYA		1 GAL. - 5 GAL.
LIMONIUM PEREZII / STATICE		1 GAL. - 5 GAL.
MUHLENBERGIA DUBIA / PINE MUHLY		1 GAL. - 5 GAL.
OPUNTIA SANTA-RITA 'TUBAC' TM / SANTA RITA PRICKLYPEAR		1 GAL. - 5 GAL.
SALICORNIA PACIFICA / PICKLEWEED		1 GAL. - 5 GAL.
SPHAERALCEA AMBIGUA / DESERT GLOBEMALLOW		1 GAL. - 5 GAL.
XEROSICYOS DANGUYI / SILVER DOLLAR VINE		1 GAL.

BIO FILTRATION PLANTER	19,758 SF	
2`-3` O.C.		
ACHILLEA MILLEFOLIUM / COMMON YARROW		4" POT
AGROSTIS PALLENS / THINGRASS		1 GAL.
ANEMOPSIS CALIFORNICA / YERBA MANSA		1 GAL.
CAREX SPISSA / SAN DIEGO SEDGE		1 GAL.
CAREX SUBFUSCA / BROWN SEDGE		1 GAL.
CAREX TUMULICOLA / FOOTHILL SEDGE		1 GAL.
DISTICHLIS SPICATA / SALTGRASS		1 GAL.
ELEOCHARIS MACROSTACHYA / COMMON SPIKERUSH		1 GAL.
FESTUCA CALIFORNICA / CALIFORNIA FESCUE		1 GAL.
FESTUCA RUBRA / RED FESCUE		1 GAL.
IVA HAYESIANA / SAN DIEGO POVERTY WEED		1 GAL.
JUNCUS PATENS / CALIFORNIA GRAY RUSH		1 GAL.
MAHONIA NEVINII / NEVIN MAHONIA		1 GAL.
MUHLENBERGIA RIGENS / DEER GRASS		1 GAL.
RIBES SPECIOSUM / FUCHSIA FLOWERING GOOSEBERRY		1 GAL.
ROSA CALIFORNICA / CALIFORNIA WILD ROSE		1 GAL.
SCIRPUS CERNUUS / LOW BULRUSH		1 GAL.

REFERENCE NOTES SCHEDULE AMENITY SPACE

	01 PAVEMENTS, RAMPS, CURBS	
SYMBOL	DESCRIPTION	QTY
01-09	PEDESTAL PAVERS	1,094 SF
01-10	DECOMPOSED GRANITE: SOUTHWEST BOULDER `DESERT GOLD` W/ STABILIZER	380 SF
01-11	DECK	295 SF
	05 SITE FURNISHINGS	
SYMBOL	DESCRIPTION	QTY
05-01	LOUNGE CHAIR - TYPE I	4
	09 PLANTING AND LANDSCAPE	
SYMBOL	DESCRIPTION	QTY
09-01	PLANTING AREA	1,548 SF

ARCADIS

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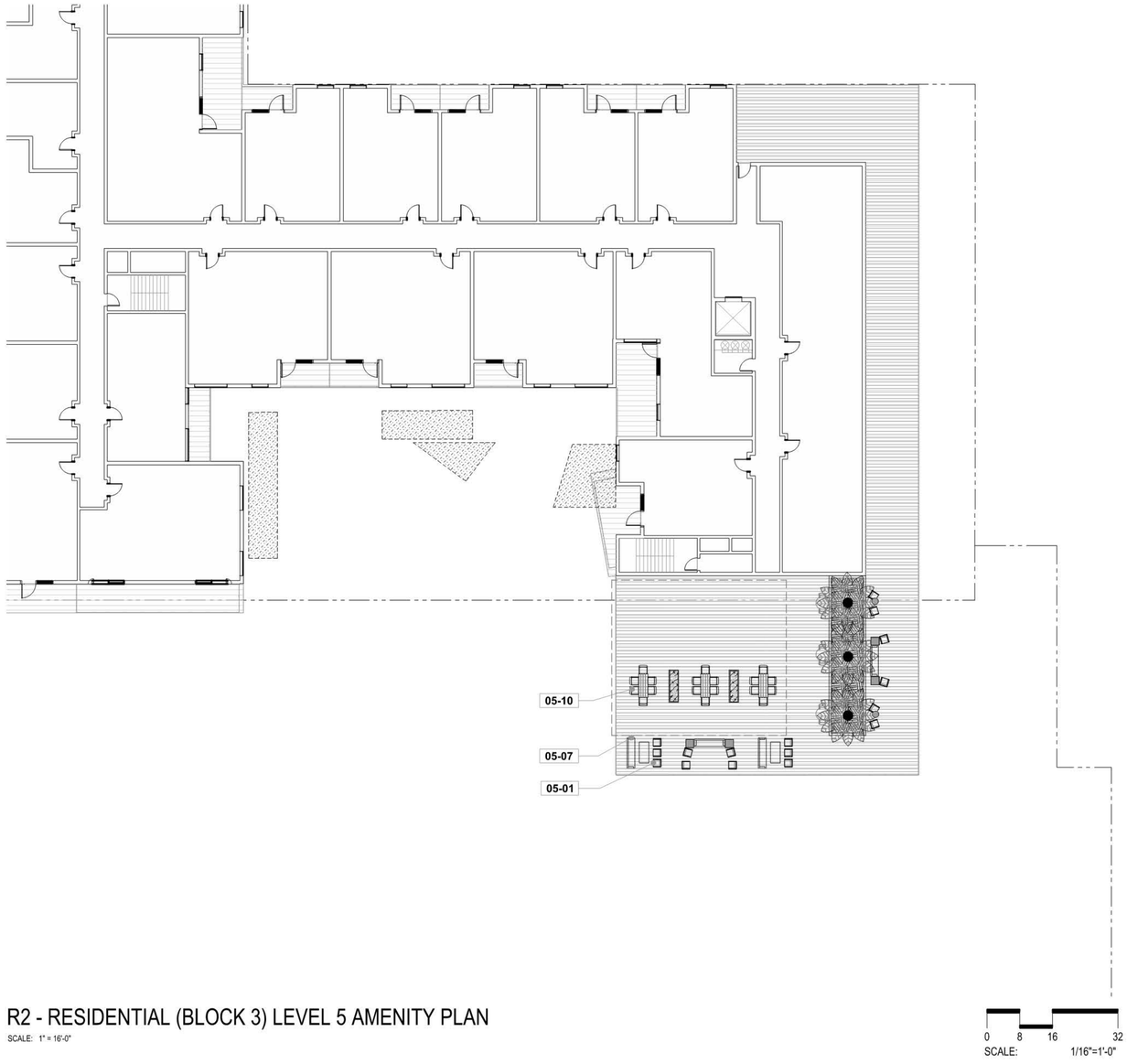
REV	DATE	DESCRIPTION
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4	04-10-2024	DP SUBMITTAL 4
5	06-20-2024	DP SUBMITTAL 5
6	08-19-2024	DP SUBMITTAL 6

Schematic Design

R2 - RESIDENTIAL (BLOCK 3) LEVEL 2 AMENITY PLAN

L-028

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CONCEPT PLANT SCHEDULE

POOL AREA TREE/PALM	3	
BRAHEA ARMATA / MEXICAN BLUE PALM		24" BOX
CARYOTA MITIS / CLUMPING FISHTAIL PALM		24" BOX
CHAMAEROPS HUMILIS / MEDITERRANEAN FAN PALM		24" BOX
DYPSIS LUTESCENS / ARECA PALM		15 GAL
HOWEA FORSTERIANA / KENTIA PALM		24" BOX
PANDANUS UTILIS / SCREW PINE		24" BOX
PHOENIX DACTYLIFERA 'MEDJOOL' / MEDJOOL DATE PALM		10` BTH
RAISED PLANTER MIX	30 SF	
2`-3` O.C.		
ACHILLEA MILLEFOLIUM / COMMON YARROW		1 GAL. - 5 GAL.
CAREX TESTACEA / ORANGE SEDGE		1 GAL. - 5 GAL.
DUDLEYA BRITTONII / GIANT CHALK DUDLEYA		1 GAL.
ERIOGONUM GIGANTEUM COMPACTUM / COMPACT SAINT CATHERINE'S LACE		1 GAL. - 5 GAL.
MISCANTHUS SINENSIS 'ADAGIO' / ADAGIO EULALIA GRASS		1 GAL. - 5 GAL.
PENNISETUM ALOPECUROIDES / FOUNTAIN GRASS		1 GAL. - 5 GAL.
PENSTEMON SPECTABILIS / SHOWY PENSTEMON		1 GAL. - 5 GAL.
PORTULACARIA AFRA / ELEPHANT BUSH		1 GAL.
SALVIA X 'BEE'S BLISS' / BEE'S BLISS SAGE		1 GAL. - 5 GAL.
SENECIO ANTEUPHORBIUM / SWIZZLE STICKS		1 GAL. - 5 GAL.
SENECIO CRASSISSIMUS / VERTICAL LEAF SENECIO		1 GAL.
SENECIO VITALIS / BLUE CHALK FINGERS		1 GAL.
SESLERIA AUTUMNALIS / AUTUMN MOOR GRASS		1 GAL. - 5 GAL.
VERBENA LILACINA 'DE LA MINA' / DE LA MINA LILAC VERBENA		1 GAL. - 5 GAL.
POOLSIDE MIX	302 SF	
2`-3` O.C.		
AECHMEA BLANCHETIANA / ORANGE BROMELIAD		1 GAL. - 5 GAL.
ALOE FEROX / BITTER TREE ALOE		1 GAL. - 5 GAL.
ALOE RAMOSISSIMA / MAIDEN'S QUIVER TREE		1 GAL. - 5 GAL.
ALOE REITZII / REITZ'S ALOE		1 GAL. - 5 GAL.
ALOE RUDIKOPPE / LITTLE RED RIDING HOOD ALOE		1 GAL. - 5 GAL.
ALOE VERA / MEDICINAL ALOE		1 GAL. - 5 GAL.
ALOE X 'ALWAYS RED' / ALWAYS RED ALOE		1 GAL. - 5 GAL.
ALOE X 'BLUE ELF' / BLUE ELF ALOE		1 GAL. - 5 GAL.
ALPINIA ZERUMBET 'VARIEGATA' / VARIEGATED SHELL GINGER		1 GAL. - 5 GAL.
ARBUTUS UNEDO / STRAWBERRY TREE SHRUB		1 GAL. - 5 GAL.
ASPARAGUS RETROFRACTUS / MING ASPARAGUS FERN		1 GAL. - 5 GAL.
ASPARAGUS SETACEUS / ASPARAGUS FERN		1 GAL. - 5 GAL.
BESCHORNERIA YUCCOIDES / AMOLE		1 GAL. - 5 GAL.
CORDYLINE AUSTRALIS / GRASS PALM		1 GAL. - 5 GAL.
CORDYLINE FRUTICOSA 'RED SISTER' / RED SISTER TI PLANT		1 GAL. - 5 GAL.
CORDYLINE FRUTICOSA 'SOLEDAD PURPLE' / SOLEDAD PURPLE TI PLANT		1 GAL. - 5 GAL.
COTYLEDON ORBICULATA / COTYLEDON		1 GAL. - 5 GAL.
CUPHEA IGNEA / CIGAR PLANT		1 GAL. - 5 GAL.
DIETES VEGETA / AFRICAN IRIS		1 GAL. - 5 GAL.
DIETES VEGETA 'VARIEGATA' / VARIEGATED AFRICAN IRIS		1 GAL. - 5 GAL.
DIPLADENIA X 'DEEP RED' TM / MANDINIA DEEP RED MANDEVILLA		1 GAL. - 5 GAL.
DORYANTHES PALMERI / SPEAR LILY		1 GAL. - 5 GAL.
DRACAENA MARGINATA / DRACAENA		1 GAL. - 5 GAL.
EPIDENDRUM RADICANS 'ORANGE' / ORANGE REED STEM ORCHID		1 GAL. - 5 GAL.
EPIDENDRUM RADICANS 'PURPLE' / PURPLE REED STEM ORCHID		1 GAL. - 5 GAL.
MONSTERA DELICIOSA / SPLIT-LEAF PHILODENDRON		1 GAL. - 5 GAL.
MYRICA CALIFORNICA / PACIFIC WAX MYRTLE		1 GAL. - 5 GAL.
NEOREGELIA COMPACTA VARIEGATA / VARIEGATED COMPACT BROMELIAD		1 GAL. - 5 GAL.
PACHYPODIUM LAMEREI / MADAGASCAR PALM		1 GAL. - 5 GAL.
PHILODENDRON SELLOUM / TREE PHILODENDRON		1 GAL. - 5 GAL.
STRELITZIA NICOLAI / GIANT BIRD OF PARADISE		1 GAL. - 5 GAL.
STRELITZIA REGINAE / BIRD OF PARADISE		1 GAL. - 5 GAL.
WOODWARDIA FIMBRIATA / GIANT CHAIN FERN		1 GAL. - 5 GAL.
ZAMIA FURFURACEA / CARDBOARD PALM		1 GAL. - 5 GAL.

REFERENCE NOTES SCHEDULE

	01 PAVEMENTS, RAMPS, CURBS	
SYMBOL	DESCRIPTION	QTY
01-11	DECK	5,747 SF
	05 SITE FURNISHINGS	
SYMBOL	DESCRIPTION	QTY
05-01	LOUNGE CHAIR - TYPE I	16
05-07	OUTDOOR SOFA	4
05-10	DINING TABLE - TYPE III	3
05-11	BISTRO TABLE	3
	09 PLANTING AND LANDSCAPE	
SYMBOL	DESCRIPTION	QTY
09-01	PLANTING AREA	332 SF

R2 - RESIDENTIAL (BLOCK 3) LEVEL 5 AMENITY PLAN

SCALE: 1" = 16'-0"

0 8 16 32
SCALE: 1/16"=1'-0"

ARCADIS
OCEANSIDE TRANSIT CENTER
235 South Tremont Avenue
Oceanside, CA 92054

McCullough
landscape architecture | environmental planning | urban design
McCulloughLA.com

Toll Brothers Apartment Living
23422 Mill Creek Drive
Suite 105
Laguna Hills, CA 92653
CONTACT - Michael McCann
PHONE - (949) 370-8155

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Signature & Seal

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Issue Drawing Log

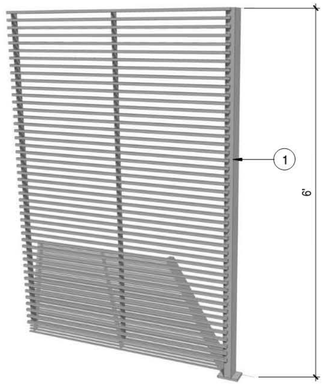
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2	02-13-2023	DP SUBMITTAL 2
3	10-09-2023	DP SUBMITTAL 3
4	04-10-2024	DP SUBMITTAL 4
5	06-20-2024	DP SUBMITTAL 5
6	08-19-2024	DP SUBMITTAL 6

Schematic Design

R2 - RESIDENTIAL (BLOCK 3) LEVEL 5 AMENITY PLAN

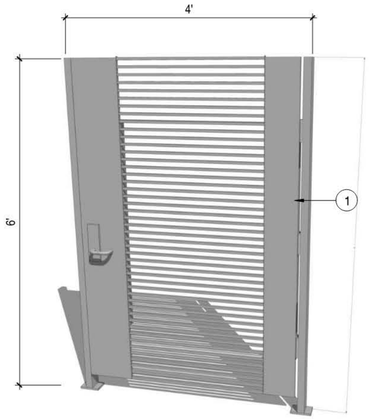
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1 POWDER COATED TUBE STEEL GATE

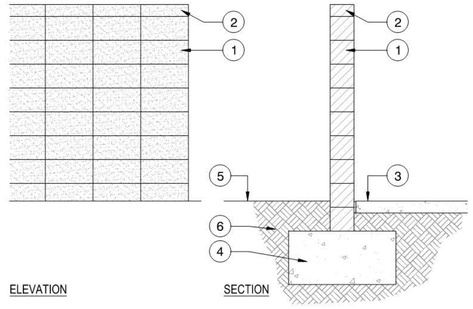
FENCE



1 POWDER COATED TUBE STEEL GATE
2 STAINLESS STEEL GATE LATCH AND HARDWARE

GATE

1 8x8x16 CMU WALL IN STACKED BOND PATTERN. SOLID GROUT FILL.
2 8x4x16 CMU WALL CAP. FLUSH WITH WALL.
3 ADJACENT FINISH PER PLAN.
4 CONCRETE FOOTING AND REINFORCEMENT PER STRUCTURAL ENGINEER.
5 FINISH GRADE.
6 COMPACTED SUBGRADE PER SOILS REPORT.



ELEVATION SECTION

CMU FREE STANDING WALL

ARCADIS
OCEANSIDE TRANSIT CENTER
235 South Tremont Avenue
Oceanside, CA 92054

McCulloughLA.com

Toll Brothers Apartment Living
23422 Mill Creek Drive
Suite 105
Laguna Hills, CA 92653
CONTACT - Michael McCann
PHONE - (949) 370-8155

Disclaimer

Signature & Seal

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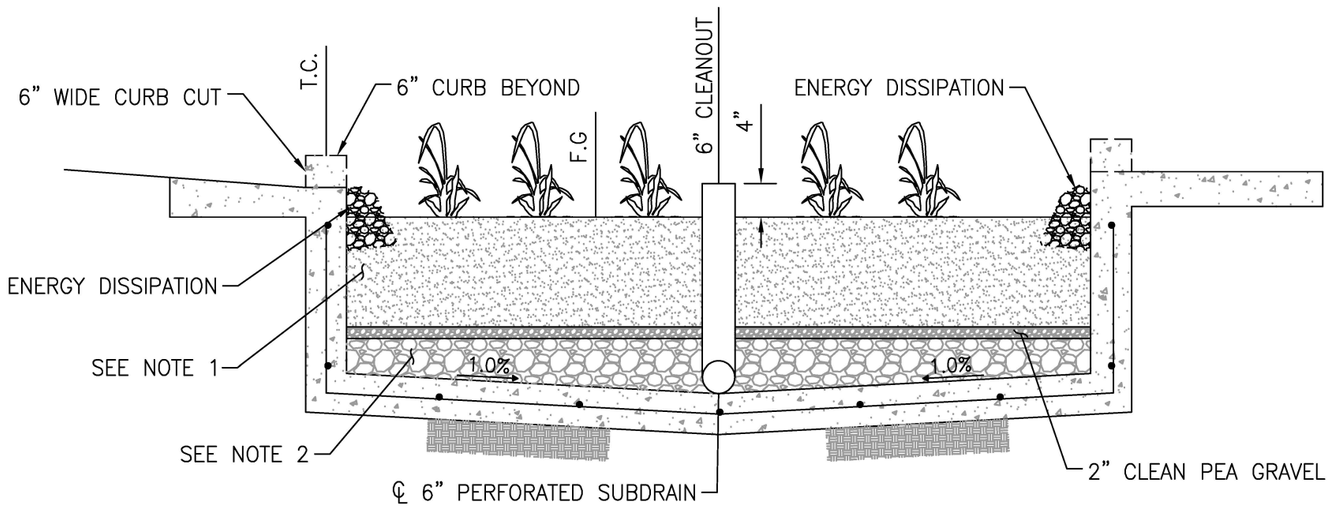
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2	02-13-2023	DP SUBMITTAL 2
3	10-09-2023	DP SUBMITTAL 3
4	04-10-2024	DP SUBMITTAL 4
5	06-20-2024	DP SUBMITTAL 5
6	08-19-2024	DP SUBMITTAL 6

Schematic Design

WALL & FENCE DETAILS

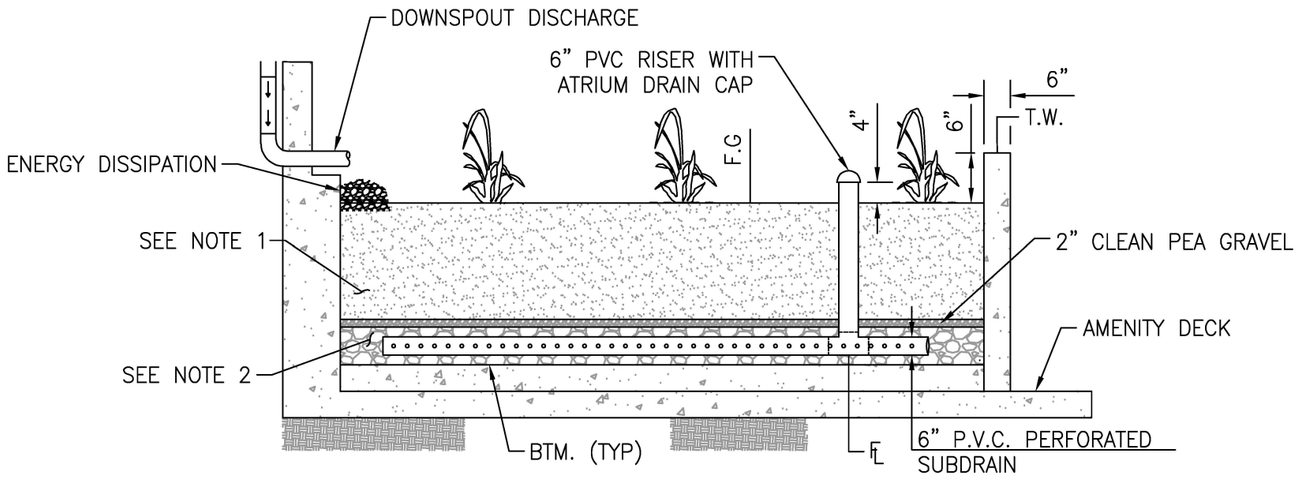
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IN-GROUND BIO-FILTRATION PLANTER

NOT TO SCALE

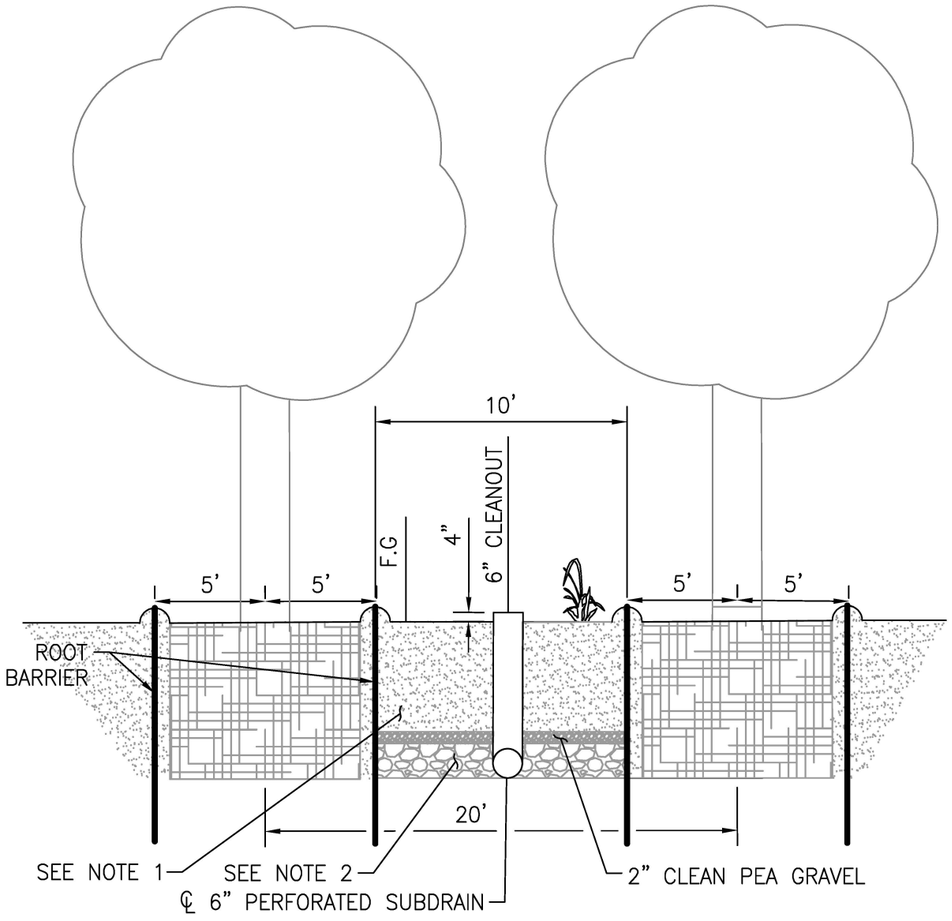


RAISED BIO-FILTRATION PLANTER BOX

NOT TO SCALE

NOTES

1. 2' SOIL MEDIA INFILTRATION = 5 IN./HR. MIN., 50–60% SAND, 20–30% TOPSOIL, 20–30% COMPOST. PARTICLE SIZE: 3/8 INCH MINUS
2. 6" OF 3/4" CRUSHED WASHED STONES, RECYCLED MATERIAL NOT PERMISSIBLE
3. ALL PENETRATION THROUGH PLANTER BOX SHALL BE SEALED WATER TIGHT



IN-GROUND BIO-FILTRATION PLANTER (ALTERNATE DESIGN)

NOT TO SCALE

PREPARED BY:
Stantec
38 TECHNOLOGY DRIVE
IRVINE, CA 92618
949.923.6000 stantec.com

PREPARED FOR:
Toll Brothers
APARTMENT LIVING

NCTD OCEANSIDE TRANSIT CENTER
235 S. TREMONT AVENUE
CITY OF OCEANSIDE, CALIFORNIA

BIO-FILTRATION PLANTER EXHIBIT

DATE: **08/09/2024**

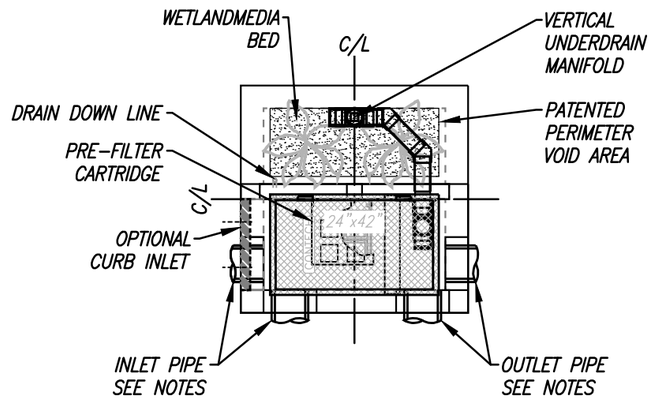
SHEET 1 OF 1

JOB NO. **2042577600**

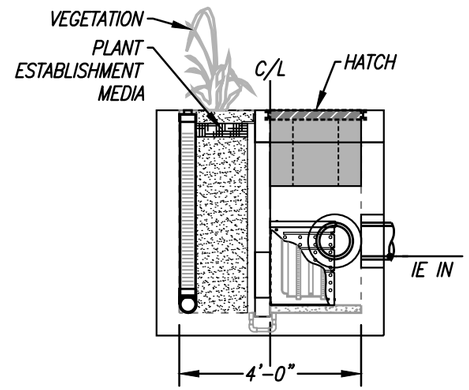
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SITE SPECIFIC DATA			
PROJECT NUMBER		2042217900	
PROJECT NAME		Oceanside TOD	
PROJECT LOCATION		Tremont Site	
STRUCTURE ID		C11	
TREATMENT REQUIRED			
TREATMENT FLOW (CFS)			0.021
PRETREATMENT LOADING RATE (GPM/SF)			2.1 GPM/SF
WETLAND MEDIA LOADING RATE (GPM/SF)			1.0
PEAK BYPASS REQUIRED (CFS) – IF APPLICABLE			_____ (CFS)
PIPE DATA	I.E.	MATERIAL	DIAMETER
INLET PIPE 1			
INLET PIPE 2			
OUTLET PIPE			
	PRETREATMENT	BIOFILTRATION	DISCHARGE
RIM ELEVATION			
SURFACE LOAD	PEDESTRIAN		
NOTES: INTERNAL BYPASS REQUIRED.			

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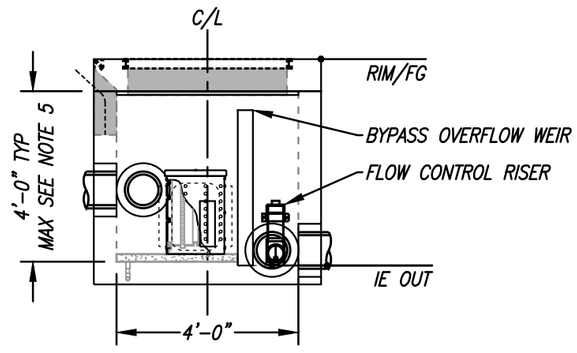
PLAN VIEW



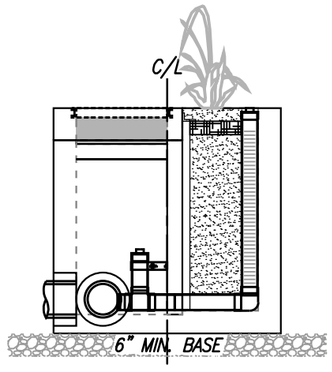
LEFT END VIEW

INSTALLATION NOTES

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5. VERTICAL HEIGHT VARIES BASED ON SITE SPECIFIC REQUIREMENTS.



ELEVATION VIEW



RIGHT END VIEW

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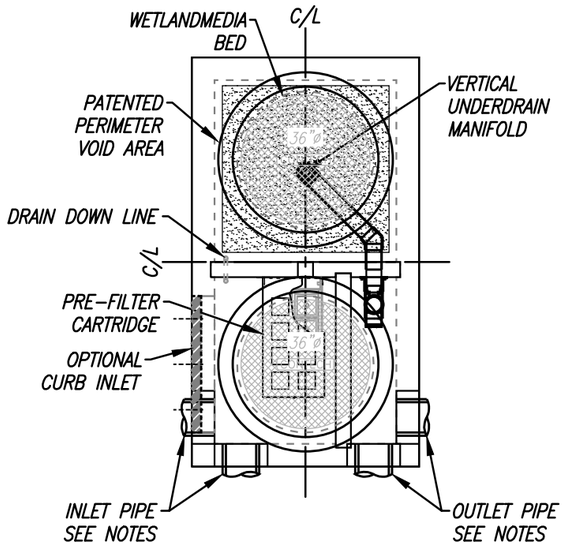
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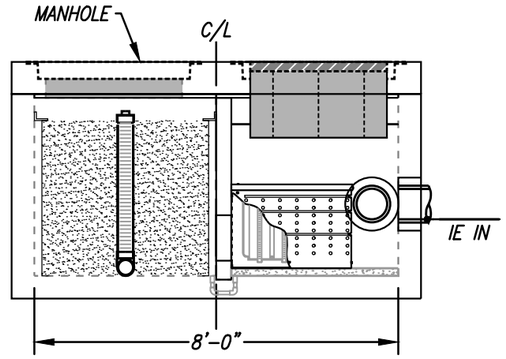
MWS-L-4-4-V
STORMWATER BIOFILTRATION SYSTEM
STANDARD DETAIL

SITE SPECIFIC DATA			
PROJECT NUMBER		2042217900	
PROJECT NAME		Oceanside TOD	
PROJECT LOCATION		Tremont Site	
STRUCTURE ID		A6	
TREATMENT REQUIRED			
TREATMENT FLOW (CFS)			0.078
PRETREATMENT LOADING RATE (GPM/SF)			2.1 GPM/SF
WETLAND MEDIA LOADING RATE (GPM/SF)			1.0
PEAK BYPASS REQUIRED (CFS) – IF APPLICABLE			_____ (CFS)
PIPE DATA	I.E.	MATERIAL	DIAMETER
INLET PIPE 1			
INLET PIPE 2			
OUTLET PIPE			
	PRETREATMENT	BIOFILTRATION	DISCHARGE
RIM ELEVATION			
SURFACE LOAD	HS-20		
NOTES: INTERNAL BYPASS REQUIRED.			

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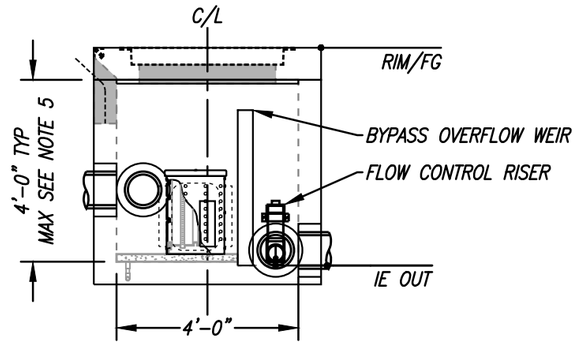
PLAN VIEW



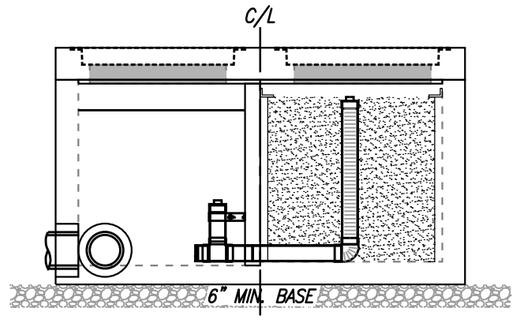
LEFT END VIEW

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ELEVATION VIEW



RIGHT END VIEW

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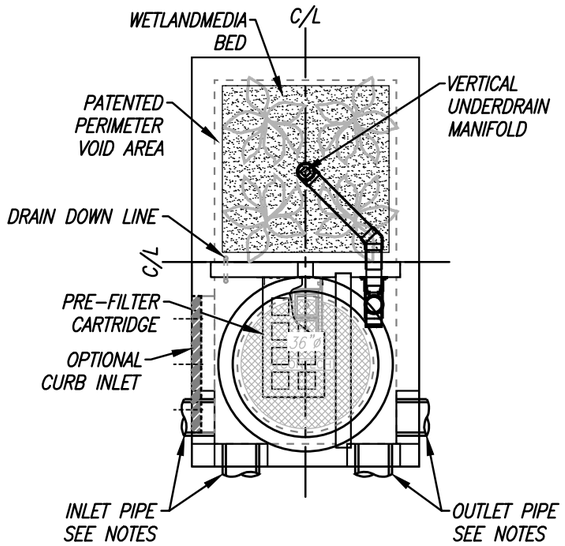
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MWS-L-4-8-V-UG
STORMWATER BIOFILTRATION SYSTEM
STANDARD DETAIL

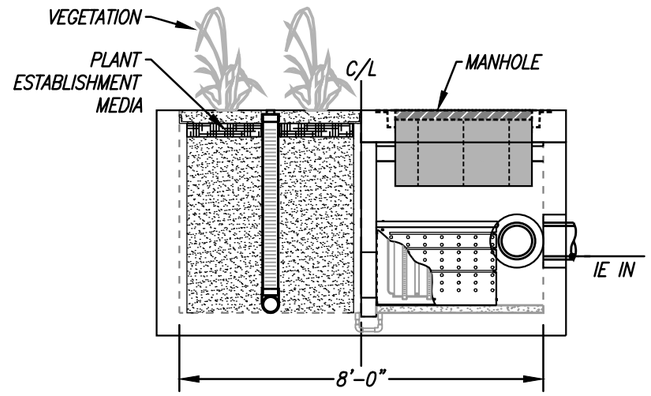
8/15/23SCOTT.SERTICH

SITE SPECIFIC DATA			
PROJECT NUMBER		2042217900	
PROJECT NAME		Oceanside TOD	
PROJECT LOCATION		Tremont Site	
STRUCTURE ID		B6	
TREATMENT REQUIRED			
TREATMENT FLOW (CFS)			0.088
PRETREATMENT LOADING RATE (GPM/SF)			2.1 GPM/SF
WETLAND MEDIA LOADING RATE (GPM/SF)			1.0
PEAK BYPASS REQUIRED (CFS) – IF APPLICABLE			_____ (CFS)
PIPE DATA	I.E.	MATERIAL	DIAMETER
INLET PIPE 1			
INLET PIPE 2			
OUTLET PIPE			
	PRETREATMENT	BIOFILTRATION	DISCHARGE
RIM ELEVATION			
SURFACE LOAD	PEDESTRIAN		
NOTES: INTERNAL BYPASS REQUIRED.			

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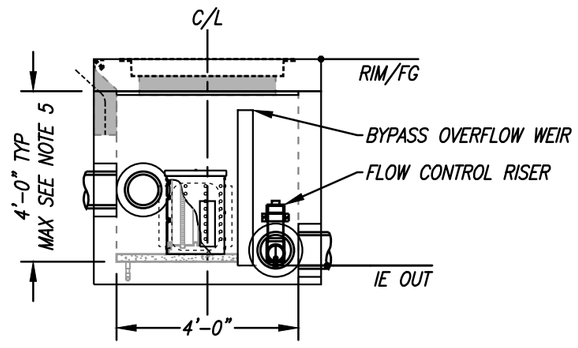
PLAN VIEW



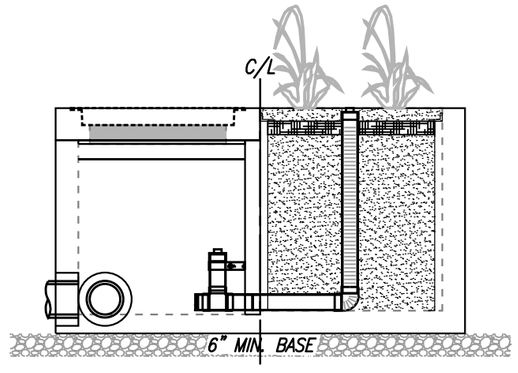
LEFT END VIEW

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ELEVATION VIEW



RIGHT END VIEW

MODULAR WETLANDS
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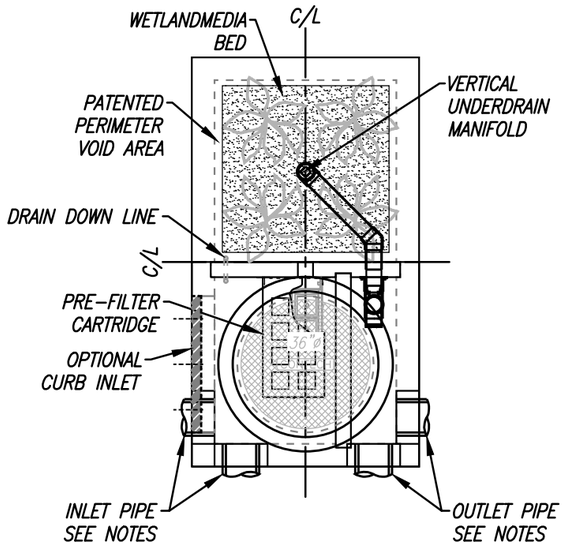
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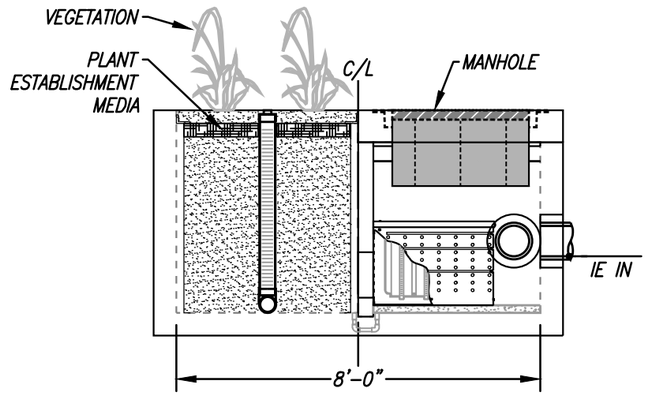
MWS-L-4-8-V
STORMWATER BIOFILTRATION SYSTEM
STANDARD DETAIL

SITE SPECIFIC DATA			
PROJECT NUMBER		2042217900	
PROJECT NAME		Oceanside TOD	
PROJECT LOCATION		Tremont Site	
STRUCTURE ID		C3	
TREATMENT REQUIRED			
TREATMENT FLOW (CFS)			0.076
PRETREATMENT LOADING RATE (GPM/SF)			2.1 GPM/SF
WETLAND MEDIA LOADING RATE (GPM/SF)			1.0
PEAK BYPASS REQUIRED (CFS) – IF APPLICABLE			_____ (CFS)
PIPE DATA	I.E.	MATERIAL	DIAMETER
INLET PIPE 1			
INLET PIPE 2			
OUTLET PIPE			
	PRETREATMENT	BIOFILTRATION	DISCHARGE
RIM ELEVATION			
SURFACE LOAD	PEDESTRIAN		
NOTES: INTERNAL BYPASS REQUIRED.			

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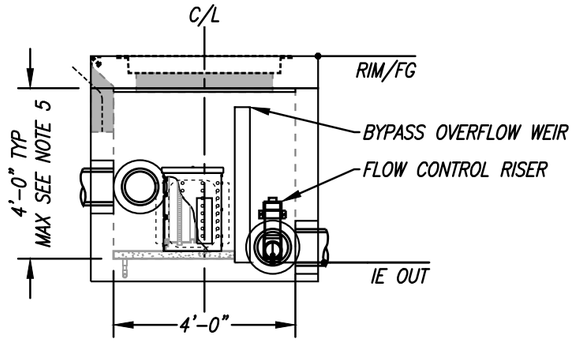
PLAN VIEW



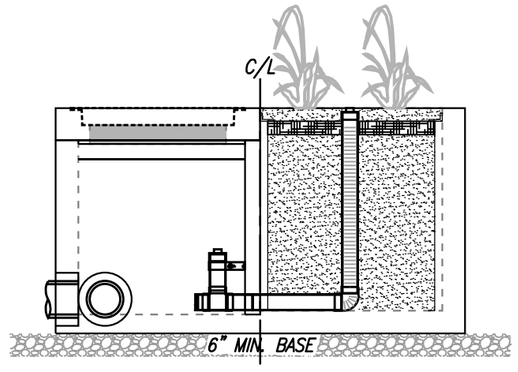
LEFT END VIEW

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5. VERTICAL HEIGHT VARIES BASED ON SITE SPECIFIC REQUIREMENTS.



ELEVATION VIEW



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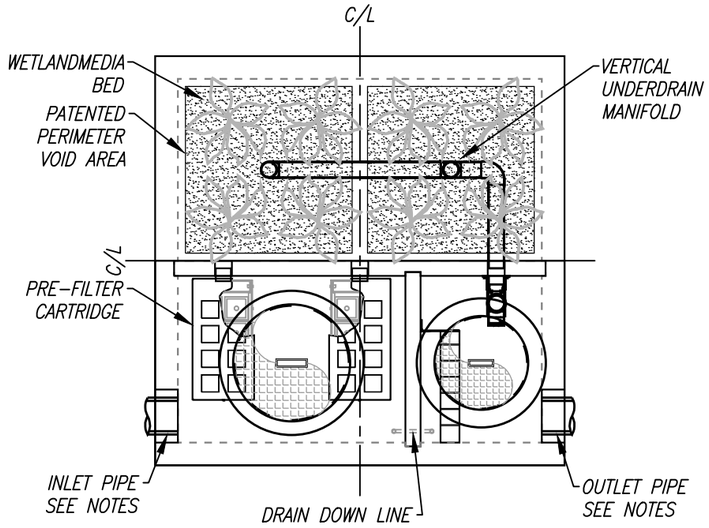
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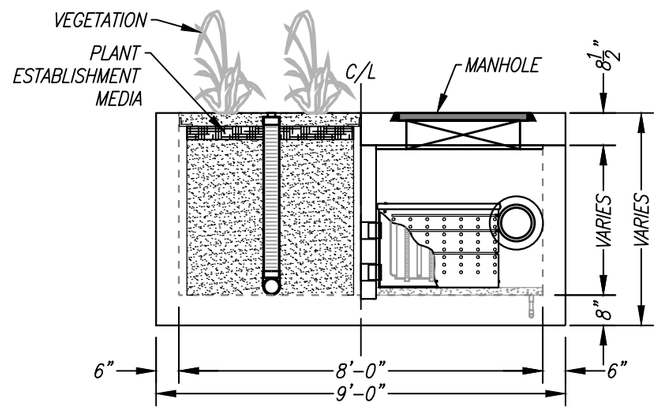
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SITE SPECIFIC DATA			
PROJECT NUMBER		2042217900	
PROJECT NAME		Oceanside TOD	
PROJECT LOCATION		Tremont Site	
STRUCTURE ID		D12	
TREATMENT REQUIRED			
VOLUME BASED (CF)		FLOW BASED (CFS)	
N/A		0.175	
PEAK BYPASS REQUIRED (CFS) – IF APPLICABLE			OFFLINE
PIPE DATA	I.E.	MATERIAL	DIAMETER
INLET PIPE 1			
INLET PIPE 2	N/A	N/A	N/A
OUTLET PIPE			
	PRETREATMENT	BIOFILTRATION	DISCHARGE
RIM ELEVATION			
SURFACE LOAD	PEDESTRIAN		
FRAME & COVER	ø30"	OPEN PLANTER	ø24"
NOTES: INTERNAL BYPASS REQUIRED.			

* PRELIMINARY NOT FOR CONSTRUCTION



PLAN VIEW



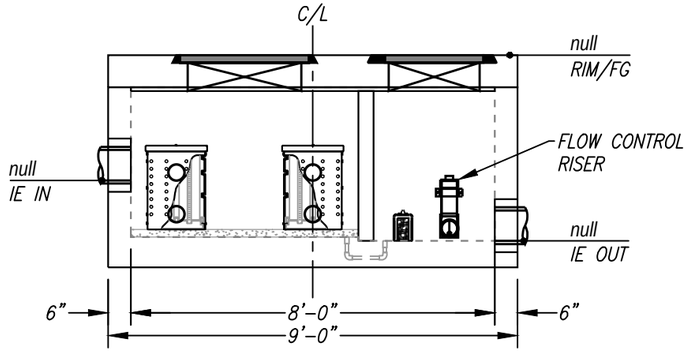
LEFT END VIEW

INSTALLATION NOTES

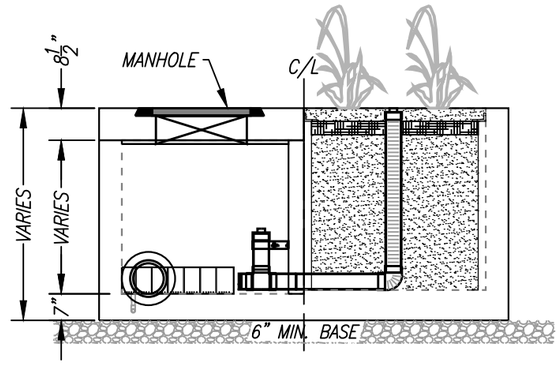
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5. CONTRACTOR RESPONSIBLE FOR INSTALLATION OF ALL RISERS, MANHOLES, AND HATCHES. CONTRACTOR TO GROUT ALL MANHOLES AND HATCHES TO MATCH FINISHED SURFACE UNLESS SPECIFIED OTHERWISE.
6. VEGETATION SUPPLIED AND INSTALLED BY OTHERS. ALL UNITS WITH VEGETATION MUST HAVE DRIP OR SPRAY IRRIGATION SUPPLIED AND INSTALLED BY OTHERS.
7. CONTRACTOR RESPONSIBLE FOR CONTACTING BIO CLEAN FOR ACTIVATION OF UNIT. MANUFACTURERS WARRANTY IS VOID WITH OUT PROPER ACTIVATION BY A BIO CLEAN REPRESENTATIVE.

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2. ALL DIMENSIONS, ELEVATIONS, SPECIFICATIONS AND CAPACITIES ARE SUBJECT TO CHANGE. FOR PROJECT SPECIFIC DRAWINGS DETAILING EXACT DIMENSIONS, WEIGHTS AND ACCESSORIES PLEASE CONTACT BIO CLEAN.



ELEVATION VIEW



RIGHT END VIEW

TREATMENT FLOW (CFS)	0.231
OPERATING HEAD (FT)	3.4
PRETREATMENT LOADING RATE (GPM/SF)	2.0
WETLAND MEDIA LOADING RATE (GPM/SF)	1.0

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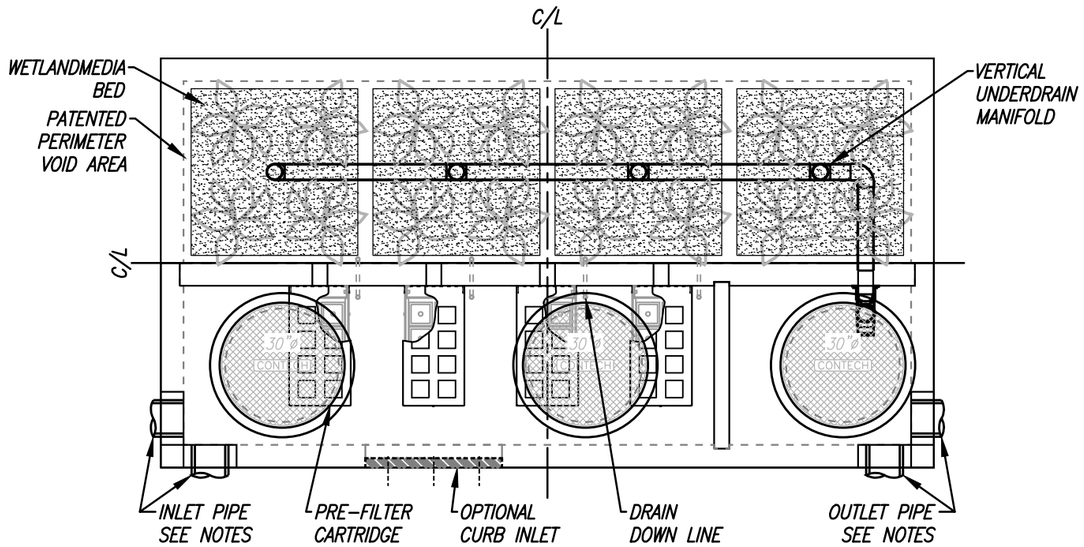
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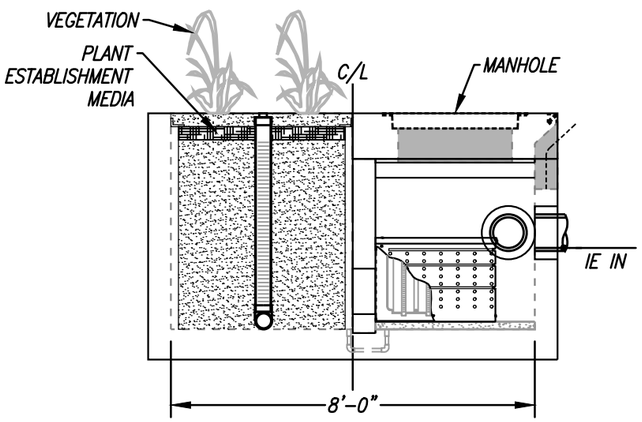
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SITE SPECIFIC DATA			
PROJECT NUMBER		2042217900	
PROJECT NAME		Oceanside TOD	
PROJECT LOCATION		Tremont Site	
STRUCTURE ID		D1	
TREATMENT REQUIRED			
TREATMENT FLOW (CFS)			0.348
PRETREATMENT LOADING RATE (GPM/SF)			2.1 GPM/SF
WETLAND MEDIA LOADING RATE (GPM/SF)			1.0
PEAK BYPASS REQUIRED (CFS) – IF APPLICABLE			_____ (CFS)
PIPE DATA	I.E.	MATERIAL	DIAMETER
INLET PIPE 1			
INLET PIPE 2			
OUTLET PIPE			
	PRETREATMENT	BIOFILTRATION	DISCHARGE
RIM ELEVATION			
SURFACE LOAD	PEDESTRIAN		
NOTES: INTERNAL BYPASS REQUIRED.			

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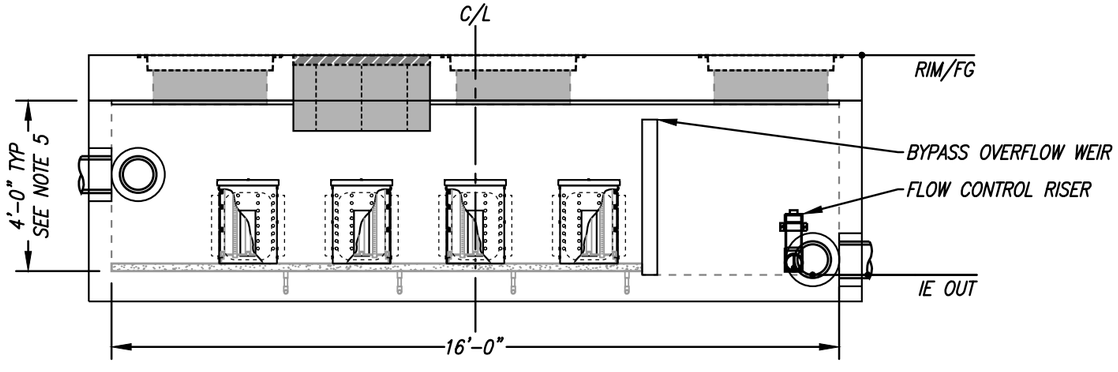
PLAN VIEW



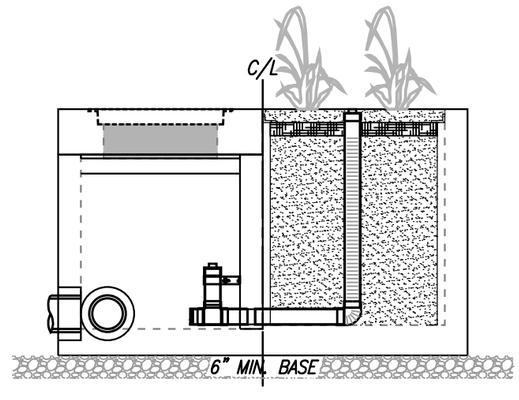
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STANDARD DETAIL

ATTACHMENT 5
Drainage Report

Preliminary Hydrology Report for:

NCTD Oceanside Transit Center
235 Tremont St.
Oceanside, California 92054

Report Date:

July 19, 2024

Prepared for:

Toll Bros., Inc.
23422 Mill Creek Drive, Suite 105
Laguna Hills, CA 92653
949.573.7300

Prepared by:



Brandon Wong
Vahina Li
Vince Delgado Jr.
Under supervision of: Edward S. Perez
JN: 2042217900

Edward S. Perez, PE
Stantec Consulting, Inc.
38 Technology Drive, Suite 200
Irvine, CA 92618

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1.0 PURPOSE

The purpose of this report is to prepare preliminary hydrologic calculations for the proposed land development of the mixed used transit-oriented project at 235 S. Tremont Street, Oceanside, CA 92054, herein referred to as the "Site". This report is prepared at the request of the client (Toll Brothers Apartment Living) as a component of the submittal application for the proposed Vesting Tentative Map and Development Plan.

This preliminary study examines drainage characteristics and patterns of the onsite and offsite watersheds in regard to distribution and management of storm water run-off. The study investigates the watershed for two scenarios: (1) pre-project condition which analyzes the property in its' current state and (2) post-project condition which analyzes the watershed with the proposed design and infrastructure improvements.

The following items were completed for the purpose of this study and in accordance with applicable agency requirements:

- Delineation of existing tributary areas to each concentrated flow line intersecting the project boundaries.
- Delineation of the proposed tributary areas to each concentrated flow line intersecting the project boundaries in compliance with Agency standards.
- Determination of the 25 and 100-year storm peak runoff using the Agency criteria for existing and developed conditions. The determination of storm peak runoff will be based on a site plan approved by the client.
- Conduct preliminary volumetric storage calculations (using criteria from the San Diego Hydrology Manual Section 6-1) to attenuate discharge so as not to exceed capacity of the downstream conveyance system. The project is exempt from hydromodification requirements (i.e. increased discharge from pre-project to post-project conditions).
- Provide a preliminary analysis of the type, locations, and size of the proposed mainline (backbone) drainage facilities, underground detention facilities, and downstream offsite municipal storm drain infrastructure.
- Coordinate proposed storm drain facilities with proposed Best Management Practice (BMP) devices as shown in corresponding Storm Water Quality Management Plan report.

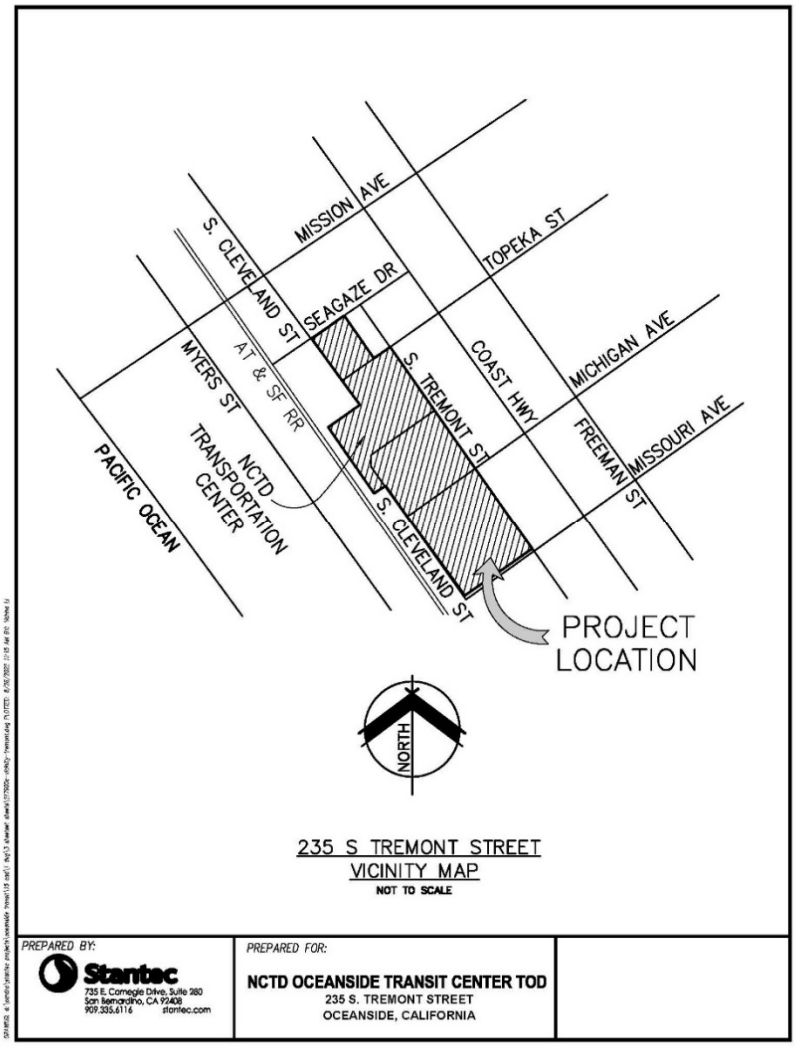
2.0 PROJECT DESCRIPTION

The site, located at 235 South Tremont Street, consists of approximately 10.2 acres located in Oceanside, California and is enclosed within South Tremont Street, Missouri Avenue, AT&SF Railway, and Seagaze Drive. See **Figure 1** below. The site will be developed as a transit-oriented development (TOD) with a mixed-use program generally consisting of approximately 547 residential apartment units with associated indoor and outdoor amenities, a boutique hotel

with amenities, a 50,000 square feet (SF) office building for the new NCTD headquarters location, 4,000 SF replacement intermodal transportation center for train and bus travelers, a 12 bus exterior transfer center, approximately 22,000 SF of retail store front, and parking structures on each block to accommodate the needs of the proposed land use mix.

Upon review of the National Flood Hazard Layer, it was determined that the Site is not within a Federal Emergency Management Agency (FEMA) regulated Special Flood Hazard Area (SFHA) such that flooding does not occur during the 1% (100-year) or 0.2% (500-year) annual chance flood event. See A**ppendix VIII** for FEMA map.

Figure 1 – Vicinity Map



3.0 HYDROLOGIC ANALYSIS

This hydrologic study utilizes the Rational Method (RM) approach from the 2016 HydroWin software, Advanced Engineering Software (AES). AES's HydroWin software package is preferred by the San Diego County to perform hydrologic analysis as the software is pre-installed with RM parameters that reference the 2003 San Diego County Hydrology Manual, herein referred to as the "2003 Hydrology Manual" (County, 2003 San Diego County hydrology Manual, 2003). The RM methodology and parameters are discussed in detail in the sub-sections below.

3.1 METHODOLOGY

3.1.1 Rational Method

Following the set standards in the 2003 Hydrology Manual, the Rational Method was chosen for this hydrologic analysis due to two factors: (1) its reliable success in estimating surface discharges in applicable dense urban drainage systems and (2) recommended approach for drainage areas less than 1 square mile (total tributary area = 48.5 acres or 0.08 square miles). This empirical equation estimates peak runoff during specified storm events for small urban and rural watersheds and is a function of drainage area (A), runoff coefficient (C), and rainfall intensity (I) for a duration equal to the time of concentration (Tc). Time of concentration is a function of the longest flow length and hydraulic velocities from street, pipe, channel/ditch, or a combination of all three. The formula is expressed as:

$$Q = CIA$$

Where 'Q' is the peak discharge (cubic feet per second [cfs]), 'C' is the runoff coefficient (unitless), 'I' is the average rainfall intensity (inches per hour), and 'A' is the drainage area contributing to the design location (acres). A minimum of 5 minutes is used for the Tc. See **Section 3.2.3** and **Appendix V** for additional information.

To convey the post-project storm volumes and discharges, the site was analyzed for two storm events (25-year, 6-hour and 100-year, 6-hour events) as required by local ordinance.

3.1.2 Detention Volume Calculation

The detention volume calculations are based on criteria outlined in the 2003 Hydrology Manual (Section 6-1), so that the central tributary discharge offsite for the 100-year, 6-hour storm event does not exceed the existing peak flows at the point of connection with the existing 15-inch RCP. The underground detention basin volumes are determined using the AES Flood Routing application that allows for a storm inflow hydrograph to be routed through a detention basin with an outlet control structure.

3.2 SITE CHARACTERISTICS

Localized onsite runoff for existing and proposed development conditions concentrate at three locations: (1) northerly end of the property at the intersection of Seagaze Drive and S.

Cleveland Street, (2) a culvert located to the west underneath the AT&SF railway that discharges directly onto S. Myers Street through a curb outlet, and (3) southerly end of the property at the intersection of Missouri Avenue and S. Cleveland Street through a curb outlet. Under pre-project and post-project conditions, runoff generally flows east to west towards the railroad tracks and to each outlet location (i.e. concentration points). The proposed storm drain design includes a new underground pipe network with catch basins throughout the Site. Underground detention basins are also proposed to attenuate discharges so as not worsen the drainage conditions with the existing facility under the railway and discharge point into Myers Street.

3.2.1 Watersheds and Sub-Watersheds

3.2.1.1 Existing Conditions

Onsite sub-watersheds for the existing conditions were delineated following field surveyed ground points and photogrammetric base-maps that show distinct topographic features (low-points, ridgelines, etc.), right-of-way (ROW) boundaries, and roadway crowns. Watersheds for the proposed conditions were derived from the proposed site-grading plan and architectural layouts. The offsite watersheds were derived using 2014 United States Geological Survey (USGS) LiDAR, Digital Elevation Models (DEM), alongside algorithms from the ArcGIS Hydro tools suite. Offsite runoff originates from several drainage basins located east of South Tremont Street.

For existing conditions, the site is modeled as six watersheds. See Existing Condition Hydrology Map in **Appendix II**. Watersheds A, B, C, D, E, F, and G have total watershed areas of 4.9, 1.5, 21.6. 4.5, 7.1, 5.9 and 3.0 acres, respectively. Flows in A, B and C watersheds travel southeast to northwest towards existing storm drain systems in S. Cleveland Street and Seagaze Drive. A portion of watershed D drains to a detention basin comprised of double 36” RCP. The system continues downstream combining with other flows from watershed D until it connects with a 15-inch RCP below the railroad tracks that discharges onto S. Myers Street via a sidewalk underdrain. Watershed G is an offsite area located west of the railroad that flows in a westerly direction as surface flow until it discharges into South Myers Street. Flow in South Myers Street travels south until it combines with flows from the sidewalk underdrain conveying flow from watershed D. The flow paths in watersheds E and F drain to the south and outlet onto S. Cleveland Street at Missouri Avenue as surface flow via a sidewalk underdrain.

3.2.1.2 Proposed Conditions

Onsite watersheds

The proposed drainage design maintains the three prominent onsite watersheds (A, B, and C) that outlet at the same discharge points as the existing conditions: (1) one located on the northerly end of the project at the intersection of Seagaze Drive and S. Cleveland Street (watershed A), (2) a 15-inch RCP below the railroad tracks that outlets onto S. Myers Street (watershed B) via a sidewalk underdrain, and (3) the other on the southerly end of the project at the intersection of Missouri Avenue and S. Cleveland Street (watershed C) to a proposed offsite storm drain extension that will connect to the existing storm drain at the intersection of

Cleveland Street and Wisconsin Avenue. See Proposed Condition Hydrology Map in **Appendix II**. Watershed A, B, and C have total areas of 6.9, 5.0, and 34.0 acres, respectively.

Furthermore, the watersheds were divided into sub-watersheds that isolate individual flow paths following proposed grading plans, distinct topographic features, and backbone storm-drain layout. It was assumed that runoff from rooftop buildings would drain equally from the center in opposite directions (i.e. a 50/50 split following the rooftop centerline would flow in opposite directions). Sub-watershed A1 flows follow an existing path from south to north towards Seagaze Drive, while A2 drains north from an existing parking structure into an existing storm drain system that eventually confluences with A1 near the intersection of S. Cleveland Street and Seagaze Drive. Watershed B was divided into two sub-watersheds (B1 and B2) that discharges into two proposed underground detention basins located just east of the existing railroad tracks. Basin outlet pipes will connect to a proposed public storm drain that ultimately connects with the existing 15-inch storm drain under the railroad. Watershed C was split into two sub-watersheds (C1 and C2) that follow similar flow paths from north to south towards the intersection of Missouri Avenue and S. Cleveland Street. C1 and C2 is captured by the proposed onsite and offsite storm drain system that includes an extension that connects to the existing storm drain at the intersection of Cleveland Street and Wisconsin Avenue.

Offsite watersheds

Sub-watersheds located east of S. Tremont Street and south of Missouri Avenue are considered offsite drainage. See **Table 1** below for summary of onsite and offsite watershed areas.

Table 1 – Summary of Sub-Watershed Areas

	Watershed	Sub-Watershed	Area (Ac)	Total Area (Ac)	Watershed Type
Existing	A	A1	0.3	4.9	Offsite
		A2	1.3		Offsite
		A3	3.4		Offsite/Onsite
	B	B1	0.8	1.5	Offsite
		B2	0.7		Offsite
		B3	0.1		Offsite
	C	C1	0.4	21.6	Onsite
		C3-1	3.1		Offsite
		C3-2	2.4		Offsite
		C4-1	0.8		Offsite
		C5-1	3.4		Offsite
		C5-2	2.4		Offsite
		C6-1	0.7		Offsite
		C7-1	1.1		Offsite
		C7-2	1.7		Offsite
		C7-3	1.7		Offsite
		C8-1	2.6		Offsite
		C8-2	1.3		Offsite
	D	D1	0.2	4.5	Offsite
		D2	0.5		Onsite
		D3	0.9		Onsite

		D4	0.3		Onsite
		D5	0.6		Onsite
		D6	1.3		Onsite
		D7	0.2		Offsite
		D8	0.4		Onsite
	E	E1	0.5	7.1	Offsite
		E2	2.4		Offsite
		E3	0.4		Onsite
		E4	1.7		Onsite
		E5	1.7		Onsite
		E6	0.4		Onsite
	F	F1	0.4	5.9	Offsite
		F2	1.4		Offsite
		F3	1.5		Offsite
		F4	0.5		Onsite
		F5	1.4		Onsite
		F6	0.4		Onsite
		F7	0.4		Offsite
	G	G1	0.3	3.0	Offsite
		G2	0.6		Offsite
		G3	2.1		Offsite
SUM OF ALL WATERSHEDS				**48.5**	
Proposed	**A**	A1-1	0.3	6.9	Offsite
		A1-2	1.3		Offsite
		A1-3	2.0		Onsite
		A1-4	1.5		Onsite
		A2-1	0.8		Offsite
		A2-2	0.1		Offsite
		A2-3	0.7		Offsite
		A3	0.4		Onsite
	B	B1-1	0.2	5.0	Offsite
		B1-2	0.5		Onsite
		B1-3	0.1		Onsite
		B1-4	0.6		Onsite
		B1-5	0.9		Onsite
		B2-1	1.7		Onsite
		B2-2	0.5		Onsite
		B2-3	0.7		Onsite
	C	C1-1	0.5	34.0	Offsite
		C1-2	2.5		Offsite
		C1-3	0.3		Onsite
		C1-4	0.6		Onsite
		C1-5	0.5		Onsite
		C1-6	2.6		Onsite
		C1-7	0.2		Onsite
		C2-1	0.4		Offsite
		C2-2	1.4		Offsite
		C2-3	1.5		Offsite

		C2-4	1.7		Onsite
		C4-1	0.4		Offsite
		C4-2	0.8		Offsite
		C3-1	3.1		Offsite
		C3-2	2.4		Offsite
		C5-1	3.4		Offsite
		C5-2	2.4		Offsite
		C6-1	0.7		Offsite
		C7-1	1.7		Offsite
		C7-2	2.8		Offsite
		C8-1	0.2		Offsite
		C8-2	2.6		Offsite
		C8-3	1.3		Offsite
	G	G-1	0.3	3.0	Offsite
		G-2	0.6		Offsite
		G-3	2.1		Offsite
SUM OF ALL WATERSHEDS				**48.5**	

3.2.2 Soils and Topography

The Site has an underlying soils classification of Hydrological Group "A" as indicated by the United Stated Department of Agriculture (USDA) web soil survey database. See **Appendix VII** for USDA soils report. In the existing condition, the Site is comprised of asphalt parking lots, office buildings, and sparse vegetation characterized by low runoff potential and high infiltration rates when thoroughly wet (USDA).

Topographic information for the Site was obtained from two sources:

- 2014 USGS San Diego CA QL2 LIDAR
- Field surveys and photogrammetric methods conducted by Robert J. Lung & Associates on April 2nd, 2021

Horizontal and vertical references are relative to the North American Datum of 1983 (NAD83) State Planes California Zone 6 and North American Vertical Datum of 1988 (NAVD88), respectively.

The watershed sits at a maximum elevation of 70 feet near S. Coast Highway to the east with a decreasing slope towards the west at an elevation of 47.5 feet near the intersection of S. Cleveland Street and Missouri Avenue.

3.2.3 Rainfall and Climatic Data

Rainfall (precipitation) data expressed as rainfall intensity for a duration equal to the Tc for a specific storm duration was acquired from NOAA Atlas 14, a statistical database with precipitation frequency estimates for the 1-year to 1000-year average recurrence intervals. See **Appendix V** for rainfall data sheets. Rainfall intensities, in inches per hour, of 2.02 and 2.60 for the 6-hour duration were used for the 25-year and 100-year storm events, respectively.

3.2.4 Land Use

The Site was delineated based on two classifications: impervious and pervious. Impervious areas include streets, sidewalks and building rooftops. In the existing condition, a majority of the site is impervious (i.e. areas where zero ground infiltration occurs) making up 85% of the total project area and the remaining 15% pervious surfaces.

Based on this impervious to pervious analysis for the existing conditions, a "Neighborhood Commercial" classification was identified from Table 3-1 of the 2003 San Diego Hydrology Manual to closely resemble our hydrologic land cover condition. See **Table 2** below. Neighborhood Commercial represents an 80% imperviousness and runoff coefficients of 0.76 for HSC/G A soil conditions.

Much of the impervious features identified in the proposed design will be characterized as buildings (office space, residential uses, etc.), parking structures, roadways, and sidewalks. Landscape planting is planned within residential building amenities and dispersed throughout the site along pedestrian walkways and streets. County element classifications, specified in **Table 2** below, for the onsite proposed development area range from "Office Professional/Commercial" to "General Industrial". This represents impervious values from 90% to 95% with runoff coefficients of 0.83 to 0.87, respectively. The increase in impervious percentage and runoff coefficients is attributed to the reduction in pervious land cover in the proposed condition.

Table 2 – Runoff Coefficients (2003 Hydrology Manual)

San Diego County Hydrology Manual
Date: June 2003

Section: 3
Page: 6 of 26

Table 3-1
RUNOFF COEFFICIENTS FOR URBAN AREAS

Land Use		Runoff Coefficient "C"				
			Soil Type			
NRCS Elements	County Elements	% IMPER.	A	B	C	D
Undisturbed Natural Terrain (Natural)	Permanent Open Space	0*	0.20	0.25	0.30	0.35
Low Density Residential (LDR)	Residential, 1.0 DU/A or less	10	0.27	0.32	0.36	0.41
Low Density Residential (LDR)	Residential, 2.0 DU/A or less	20	0.34	0.38	0.42	0.46
Low Density Residential (LDR)	Residential, 2.9 DU/A or less	25	0.38	0.41	0.45	0.49
Medium Density Residential (MDR)	Residential, 4.3 DU/A or less	30	0.41	0.45	0.48	0.52
Medium Density Residential (MDR)	Residential, 7.3 DU/A or less	40	0.48	0.51	0.54	0.57
Medium Density Residential (MDR)	Residential, 10.9 DU/A or less	45	0.52	0.54	0.57	0.60
Medium Density Residential (MDR)	Residential, 14.5 DU/A or less	50	0.55	0.58	0.60	0.63
High Density Residential (HDR)	Residential, 24.0 DU/A or less	65	0.66	0.67	0.69	0.71
High Density Residential (HDR)	Residential, 43.0 DU/A or less	80	0.76	0.77	0.78	0.79
Commercial/Industrial (N. Com)	Neighborhood Commercial	80	0.76	0.77	0.78	0.79
Commercial/Industrial (G. Com)	General Commercial	85	0.80	0.80	0.81	0.82
Commercial/Industrial (O.P. Com)	Office Professional/Commercial	90	0.83	0.84	0.84	0.85
Commercial/Industrial (Limited I.)	Limited Industrial	90	0.83	0.84	0.84	0.85
Commercial/Industrial (General I.)	General Industrial	95	0.87	0.87	0.87	0.87

*The values associated with 0% impervious may be used for direct calculation of the runoff coefficient as described in Section 3.1.2 (representing the pervious runoff coefficient, Cp, for the soil type), or for areas that will remain undisturbed in perpetuity. Justification must be given that the area will remain natural forever (e.g., the area is located in Cleveland National Forest).
DU/A = dwelling units per acre
NRCS = National Resources Conservation Service

3.2.5 Proposed Backbone Storm Drain and Detention Basin Layout

Three disconnected mainline storm-drain systems (one for each watershed) are proposed to help convey surface runoff to three existing outlet locations as described in the previous sub-sections. A storm drain pipe is proposed along S. Cleveland Street, perpendicular to the street corridor, located within watershed A of the project area. This system will convey runoff produced from sub-watershed A1, as discussed in the above sub-section, to the existing northern storm-drain systems.

Watershed B proposes a storm drain system that runs parallel to the Topeka Street alignment from the upstream offsite watershed along S. Tremont Street to the point of connection with the upstream end of the existing 15-inch reinforced concrete pipe (RCP) under the railroad. A second mainline storm drain under South Cleveland Street between Topeka Street and Michigan Avenue connects to the same point of connection with the existing 15-inch RCP. A separate private storm drain system will convey all areas outside of the public right-of-way and discharge flows to two underground detention basins. One of the underground detention basins (DB1) is located north of the proposed office building. The second underground detention basin (DB2) is located south of the proposed office building. Both detention basins will connect to the proposed storm drain facilities described previously. There is a flow constraint with the existing storm drain due to the undersized 15-inch RCP culvert with a maximum capacity of 8.0 cfs. Detention basins are required to attenuate the 100-year storm event so as not to worsen the drainage condition with the existing 15-inch RCP. See **Appendix IV** for calculations. The underground detention basins are closed systems as it was determined by geotechnical engineer that infiltration is not feasible due to bluff failure concerns downstream of the project. See project's Storm Water Quality Management Plan for additional details. See also **Appendix VI** for copy of geotechnical study and **Appendix IX** for hydraulic calculations and map to show inundation limits for both the existing and proposed conditions. The exhibit also shows overland flow paths.

Watershed C proposes a storm drain system that conveys runoff from S. Tremont Street, Michigan Avenue, and the proposed transit station located on the southerly end of the project. A secondary storm drain system intercepts runoff north of S. Cleveland Street along Missouri Avenue. Both systems combine with one another at the intersection of Missouri Avenue and S. Cleveland Street and continues south under S. Cleveland Street through a proposed storm drain extension. The extension eventually connects with the existing storm drain system located in the intersection of S. Cleveland Street and Wisconsin Avenue.

Proposed pipe slopes and invert elevations for the preliminary storm drain layout were derived based on the following assumptions: (1) depth approximately 6 feet below top of finish grade and (2) pipe slopes following the existing ground topography. Pipe sizes and slopes are restricted as a result of the street slope which is approximately 0.3% in South Cleveland Street. See **Appendix IX** for WSPG hydraulic calculations to determine the capacity of the proposed storm drain extension.

3.2.6 Alternate Drainage Configuration

As requested by the City engineering staff, an assessment was completed to determine how much of the central tributary can be diverted to the north towards Seagaze Drive into a new CIP

storm drain system to be designed and constructed by the City's Public Works Department. The alternate drainage assessment assumes a 24-inch pipe at a slope of 0.5% extending further into the central tributary. The assessment for this alternate drainage configuration includes an analysis of the area in the central tributary that is physically able to drain to the extended storm drain system in South Cleveland Street. A portion of the central tributary is too low in elevation and is physically unable to connect to the extended storm drain in South Cleveland Street. It is our understanding that detention to attenuate peak flows to the storm drain connection at South Cleveland Street and Seagaze Drive will not be required. Further, we understand hydraulic modeling is being completed by the City's design consultant working on the CIP storm drain project and is therefore not a part of this assessment. As requested by the City engineering staff, Stantec has only completed a hydrologic analysis of the area that can potentially be diverted to the South Cleveland Street and Seagaze Drive intersection. See **Appendix X** for Central Tributary Diversion Exhibit and rational method calculations. It is estimated that 3.7 acres could be diverted which results in the total peak flow rates of 27.9 cfs, 33.2 cfs, and 36.3 cfs for the 25-year, 50-year, and 100-year storms, respectively.

3.3 RESULTS

The post-project peak runoff flow rates are observed to be equal and lower than the pre-project conditions. Generally, it is common for time of concentrations to reduce during urbanization; thus, increasing surface runoff. However, due to an increase in the quantity of stormwater conveyance infrastructures (i.e. storm drain pipes) as displayed in the proposed storm drain layout and gentle pipe slopes, time of concentrations have increased resulting in an attenuation of peak flows. See **Table 3 and 4** below for a summary and comparison of time of concentrations and peak flow rates.

Discharge differential between pre-project and post-project conditions for watershed A were relatively the same such that mitigation is not required.

As discussed in the above sections, watershed C will discharge to a proposed storm drain pipe under S. Cleveland Street that extends from the project to the existing storm drain system at the intersection of S. Cleveland Street and Wisconsin Avenue. The project does not increase peak flows to the existing system as shown in the summary tables below. See **Appendix III** for rational method calculations.

Table 3 – Summary of Existing and Proposed Condition Time of Concentrations

TIME OF CONCENTRATION (TC) - EXISTING VS PROPOSED (25-YEAR)			
TRIBUTARY	EXISTING TC (MIN)	PROPOSED TC (MIN)	TC DIFFERENCE (MIN)
1	7.4	7.8	0.4
2	4.4	7.9	3.5
3	17.3	16.1	-1.2

TIME OF CONCENTRATION (TC) - EXISTING VS PROPOSED (100-YEAR)			
TRIBUTARY	EXISTING TC (MIN)	PROPOSED TC (MIN)	TC DIFFERENCE (MIN)
1	7.1	7.5	0.4
2	4.3	7.7	3.4
3	16.5	15.5	-1.0

Table 4 – Summary of Existing and Proposed Condition Peak Flow Rates

PRELIMINARY PEAK RUNOFF FLOW RATES - EXISTING VS PROPOSED (25-YEAR)			
TRIBUTARY	EXISTING Q (CFS)	PROPOSED Q (CFS)	Q DIFFERENCE (CFS)
1	24.0	23.8	-0.2
2	9.5	8.4	-1.1
3	76.3	74.7	-1.6

PRELIMINARY PEAK RUNOFF FLOW RATES - EXISTING VS PROPOSED (100-YEAR)			
TRIBUTARY	EXISTING Q (CFS)	PROPOSED Q (CFS)	Q DIFFERENCE (CFS)
1	31.6	31.3	-0.3
2	12.1	10.7	-1.4
3	99.7	98.2	-1.5

4.0 SUMMARY AND CONCLUSIONS

This preliminary report is intended for planning purposes in preparation of Vesting Tentative Map and Development Plan. With construction of the proposed drainage system and underground storage basins, adequate flood protection will be provided for a 25-year and 100-year storm event.

Low Impact Development (LID) BMPs and treatment control BMPs are also incorporated into the drainage design and is discussed in more detail in the SWQMP report. LID principles will be implemented to recreate natural flow characteristics and promote natural movement of storm water run-off. The underground detention basins are closed systems and will not be used for infiltration. The basins are designed without dead storage.

Increases in peak runoff from the pre-project conditions in watershed A were not observed and, as such, mitigation efforts are not required.

Reducing the peak flows from watershed B so as worsen the conditions with the existing 15-inch RCP constraint, will be accomplished with the use of the two proposed underground detention basins fitted with outlet control structures. Hydrologic analyses indicate that the proposed project flows for the 25-year and 100-year storm events are lower than the existing condition.

Peak flows from watershed C will discharge offsite via a proposed storm drain extension in S. Cleveland Street that extends from the project to the intersection of S. Cleveland Street and Wisconsin Avenue. Hydrologic analyses indicate that the proposed project flows for the 25-year and 100-year storm events are lower than the existing condition.

The hydraulic and volumetric storage calculations included in this report are completed for planning purposes. All storm-drain pipes, slot drains, drainage inlets, and detention basin sizing shall be value engineered in the final engineering phase based on the required design storm as described in the 2003 San Diego County Hydrology Manual.

5.0 REFERENCES

County, S. D. (2003). *2003 San Diego County hydrology Manual.* Retrieved from https://www.sandiegocounty.gov/content/dam/sdc/dpw/FLOOD_CONTROL/floodcontroldocuments/hydro-hydrologymanual.pdf

County, S. D. (2014). *San Diego County Hydraulic Manual.* Oceanside: San Diego County.

USDA. (n.d.). *Updated Hydrologic Soils Group (HSG).* Retrieved from https://www.nrcs.usda.gov/wps/PA_NRCSConsumption/download/?cid=stelprdb1262857&ext=pdf

6.0 APPENDICES

I. VESTING TENTATIVE MAP AND DEVELOPMENT PLAN

II. EXISTING AND PROPOSED CONDITION HYDROLOGY MAPS

III. HYDROLOGIC CALCULATIONS

IV. DETENTION CALCULATIONS

a) Rathydro Hydrographs

b) Stage-Storage-Discharge Calculations

c) Existing Detention (Double 36” RCP)

d) Proposed Detention Basin 1 (Double 3’x12’ Contech Con/Span)

e) Proposed Detention Basin 2 (Triple 3’x12’ Contech Con/Span)

V. NOAA RAINFALL DATA

VI. GEOTECHNICAL STUDY

VII. NRCS SOILS REPORT

VIII. FEMA FIRMETTE

IX. WSPG ANALYSIS

a) Existing Condition - Central Tributary Connection with 15” RCP

b) Proposed Condition - Central Tributary Connection with 15” RCP

c) Proposed Condition - South Cleveland Street Storm Drain Extension

d) Inundation Assessment and Exhibit

X. CENTRAL TRIBUTARY DIVERSION HYDROLOGY & EXHIBIT

I. VESTING TENTATIVE MAP AND DEVELOPMENT PLAN

VESTING TENTATIVE MAP AND DEVELOPMENT PLAN

NCTD OCEANSIDE TRANSIT CENTER, 235 SOUTH TREMONT STREET
CITY OF OCEANSIDE, CALIFORNIA

GENERAL NOTES:

1.	TOTAL AREA:	GROSS: 438,912 SF (10.06 ACRES)
2.	EXISTING ZONING:	D-5, D-14, OP, PUT, R-3, D-5
3.	PROPOSED ZONING:	D-1
4.	NUMBER OF EXISTING PARCELS:	8
5.	FEMA FLOOD INSURANCE RATE MAP NO.:	06073C0734J eff. 12/20/2019, ZONE X, WITH BFE ZONE AE, AO, AH, VE, AR
6.	CONTOUR INTERVAL:	1 FT
7.	MAX. SLOPE GRADIENT:	10% MAX
8.	PERCENT OF PROJECT IN STREETS:	19.20% (1.93 ACRES)
9.	AMOUNT OF GRADING:	286,000 CY CUT; 1,000 CY FILL
10.	ASSESSORS PARCEL NUMBERS:	SEE SHEET C9

DESIGN NOTES:

1. ALL STREET DESIGN SHALL CONFORM TO THE CITY OF OCEANSIDE DESIGN STANDARDS AS REQUIRED BY THE CITY ENGINEER.
2. EASEMENTS SHALL BE PROVIDED, REMOVED OR RELOCATED AS REQUIRED BY THE CITY ENGINEER.
3. ALL PROPOSED UTILITIES SHALL BE UNDERGROUNDED AND EASEMENTS PROVIDED.
4. GEOTECHNICAL INVESTIGATION PREPARED BY: NOVA
5. THE DEVELOPER SHALL INSTALL STREET LIGHTS PER THE CITY OF OCEANSIDE ENGINEERING DEPARTMENT TRAFFIC DIVISION, THE STREET LIGHT DESIGN MANUAL AND THE CITY OF OCEANSIDE STANDARD DRAWING NO. M-4. STREET LIGHT LOCATIONS MAY VARY IN FINAL DESIGN.
6. ALL RETAINING WALLS IN EXCESS OF 4 FEET SHALL BE PLANTABLE.
7. ALL PROPOSED SEWER IS PUBLIC AND SHALL BE INSTALLED PER CITY OF OCEANSIDE STANDARDS.
8. ALL PROPOSED WATER IS PUBLIC AND SHALL BE INSTALLED PER CITY OF OCEANSIDE STANDARDS.
9. FINISH GRADES ARE APPROXIMATE AND SUBJECT TO CHANGE IN FINAL DESIGN, AS ALLOWED PER SUBSTANTIAL CONFORMITY.
10. ALL FUTURE DRIVEWAYS AND GEOMETRIC DESIGN SHALL BE DESIGNED IN COMPLIANCE WITH THE CITY OF OCEANSIDE ENGINEERS DESIGN STANDARDS.

BENCHMARK:

NATIONAL GEODETIC SURVEY DX3234, STAMPED PIER NO 2 1933

ELEVATION 28.65' (NAVD88)

AT THE END OF THE PIER EXTENDING WEST FROM THE WEST END OF THIRD STREET, APPROXIMATELY 420' WEST OF THE CENTER LINE OF PACIFIC STREET, SET IN THE TOP OF THE SOUTH CONCRETE CURBING ON THE PIER, 25.9' EAST OF THE STATION MARK

BASIS OF BEARINGS:

THE BASIS OF COORDINATES FOR THIS SURVEY IS THE CALIFORNIA COORDINATE SYSTEM (CCS83) ZONE VI, NAD 83 (2011.00 EPOCH), AS PER RECORD OF SURVEY 21787, FILED 8/21/2014 BY RBF CONSULTING, AS DETERMINED BY THE FOLLOWING CONTROL STATIONS:

3002 (DSME), 3004 (P474), 3005 (P478), 3006 (SBCC), 1004, 1005, 1006 AND 2102 (DX3432)

TOPOGRAPHY SOURCE:

THIS SURVEY IS BASED UPON AERIAL PHOTOGRAPHY FLOWN ON APRIL 2, 2021 BY R.J. LUNG AND ASSOCIATES.

LEGAL DESCRIPTION:

SEE SHEET C9

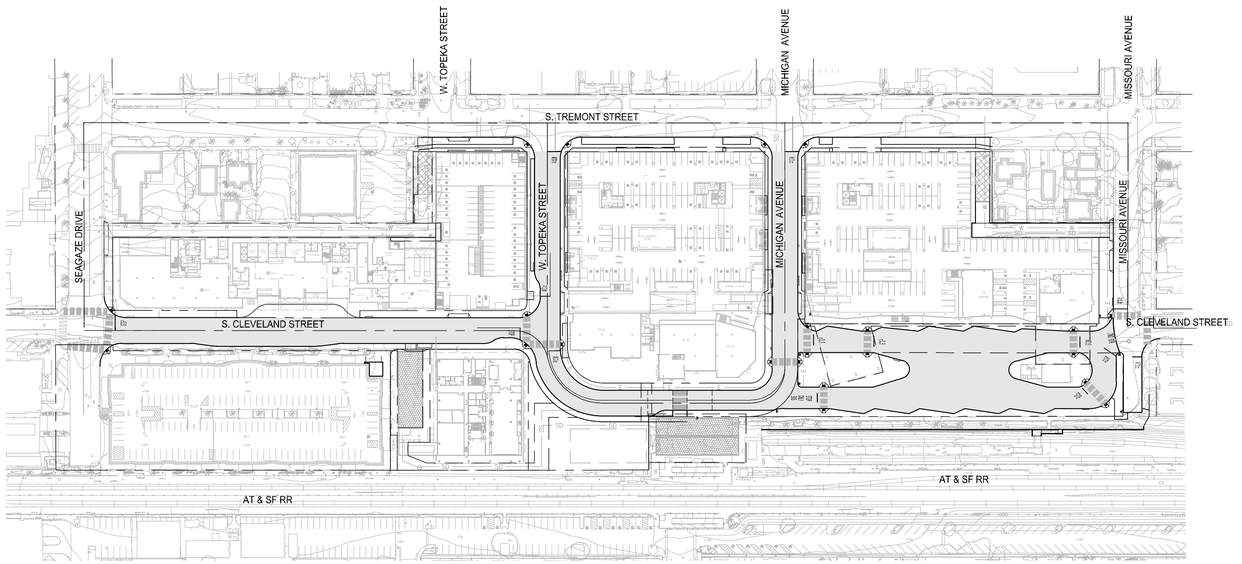
EASEMENTS:

SEE SHEET C10

SITE DATA:

1. SETBACKS:
   - BACKYARD: NONE
   - FRONT YARD: NONE
   - SIDE YARD: NONE
2. LANDSCAPE COVERAGE: 43,891 SF

LOT #	DESCRIPTION	AREA (ACRES)
1	HOTEL	1.10
2	PARKING STRUCTURE	0.72
3	RESIDENTIAL MIXED USE	2.03
4	RESIDENTIAL	1.85
5	NCTD BUS STATION (PUBLIC ACCESS)	1.37
6	NCTD TRAIN PLATFORM PLAZA (PUBLIC ACCESS)	0.31
7	NCTD OFFICE	0.71
TOTAL		8.09
PUBLIC R.O.W.		2.06
SUBTOTAL SUBDIVISION BOUNDARY		10.15
LOT 8	CITY OF OCEANSIDE PARKING STRUCTURE	1.84
TRACT MAP PROJECT AREA		12.00

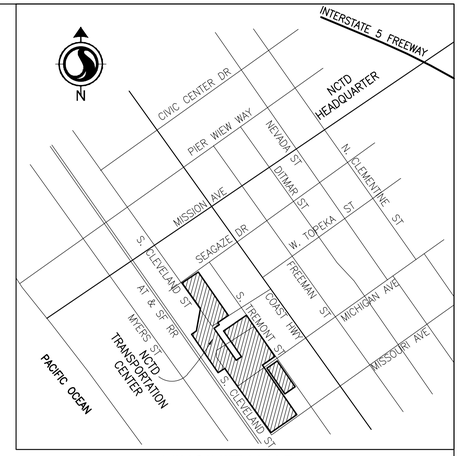


LOCATION MAP

GRAPHIC SCALE

100 0 50 100 200 400

(IN FEET)
1 inch = 100 ft.



VINCINITY MAP

NOT TO SCALE

OWNER:

NORTH SAN DIEGO COUNTY TRANSIT DEVELOPMENT BOARD, AS TO TRACTS I, III AND PARCEL 2 OF TRACT II.
NORTH SAN DIEGO COUNTY TRANSIT BOARD, AS TO PARCEL 1 OF TRACT II.

DEVELOPER:

TOLL BROTHERS APARTMENT LIVING
MICHAEL MCCANN
23422 MILL CREEK DRIVE, SUITE 105
LAGUNA HILLS, CA 92653
(949) 370-8155

CIVIL ENGINEER:

STANTEC
EDWARD DAWSON GROVE
801 SOUTH FIGUEROA STREET, #300
LOS ANGELES, CA 90017-3007
TED.GROVE@STANTEC.COM

08.23.24

EDWARD DAWSON GROVE RCE 61374 DATE

REGISTERED PROFESSIONAL ENGINEER EDWARD DAWSON GROVE No. C61374 STATE OF CALIFORNIA

ARCHITECT:

CALLISONRTKL INC
333 SOUTH HOPE STREET, SUITE C-200
LOS ANGELES, CA 90034

GEOTECHNICAL:

NOVA SERVICES
4373 VIEWRIDGE AVENUE, SUITE B
SAN DIEGO, CA 92123

SHEET INDEX:

SHEET C1 - TITLE SHEET
SHEET C2 - SITE SECTIONS AND DETAILS
SHEET C3 - SITE SECTIONS AND DETAILS
SHEET C4 - MASTER TECHNICAL SITE PLAN
SHEET C5 - VESTING TENTATIVE TRACT MAP
SHEET C6 - PRELIMINARY GRADING & DRAINAGE
SHEET C7 - LID BMP FEATURES
SHEET C8 - LID BMP FEATURES
SHEET C9 - PRELIMINARY WET UTILITIES
SHEET C10 - S. CLEVELAND ST. PRELIMINARY STORM DRAIN
SHEET C11 - FIRE ACCESS CIRCULATION PLAN
SHEET C12 - ENCUMBRANCE MAP
SHEET C13 - ENCUMBRANCE MAP

LEGEND:

- BOUNDARY LINE
- CENTER LINE
- CURB AND GUTTER
- PROP. DRIVEWAY
- EXIST. CONTOUR (54)
- PROP. CONTOUR (54)
- EASEMENT LINE
- PROP. RETAINING WALL
- EXIST. SEWER (SS)
- EXIST. WATER (W)
- EXIST. STORM DRAIN (SD)
- EXIST. GAS (G)
- EXIST. OVERHEAD POWER (E(OH))
- PROP. SEWER (SS)
- PROP. WATER (W)
- PROP. STORM DRAIN (SD)
- PROP. GAS (G)
- EXIST. FIRE HYDRANT
- PROP. FIRE HYDRANT
- EXIST. SUBDIVISION BOUNDARY
- FH FIRE HYDRANT
- MH MANHOLE
- PA LANDSCAPE PLANTERS
- PAE PUBLIC ACCESS EASEMENT
- TURF BLOCK BOMANITE GRASSCRETE
- UNDERGROUND WATER QUALITY BMP CHAMBERS
- PROP. ADA RAMP

DEVELOPMENT PLAN - D22-00016
TENTATIVE MAP - T22-00006
GENERAL PLAN AMENDMENT - GPA22-00002
REGULAR COASTAL PERMIT - RC22-00011

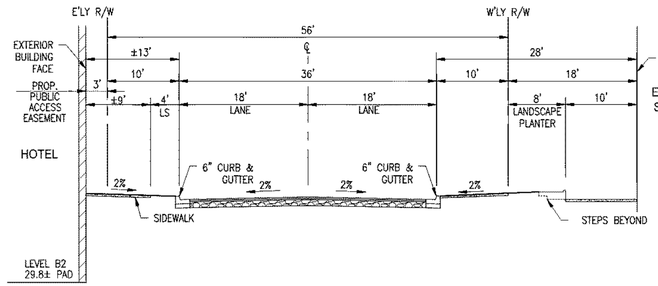
PREPARED BY:

Stantec
38 Technology Drive
Irvine, CA 92618
949-923-6000 stantec.com

VESTING TENTATIVE MAP AND DEVELOPMENT PLAN
TITLE SHEET
NCTD OCEANSIDE TRANSIT CENTER, SOUTH TREMONT STREET
CITY OF OCEANSIDE, CALIFORNIA

SHEET C1 OF C13

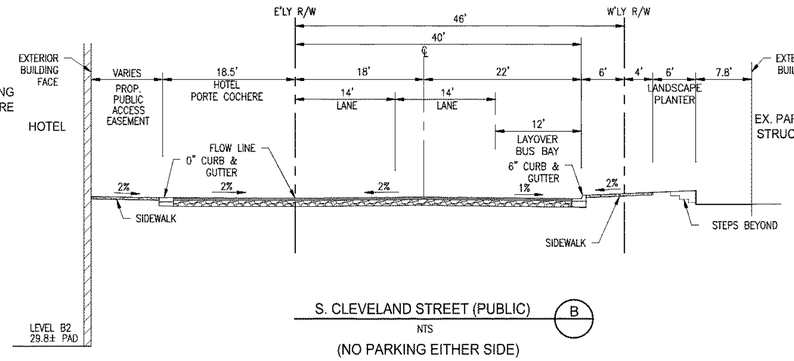
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S. CLEVELAND STREET (PUBLIC) A

NTS

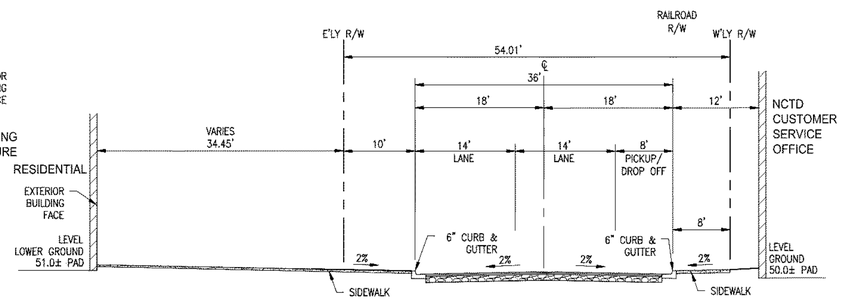
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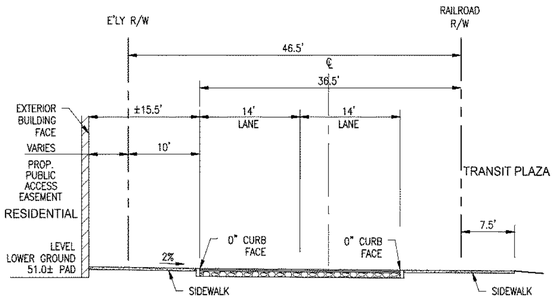
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S. CLEVELAND STREET (PUBLIC) C

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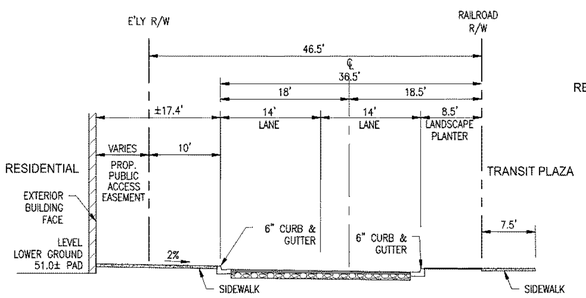
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S. CLEVELAND STREET (PUBLIC) C1

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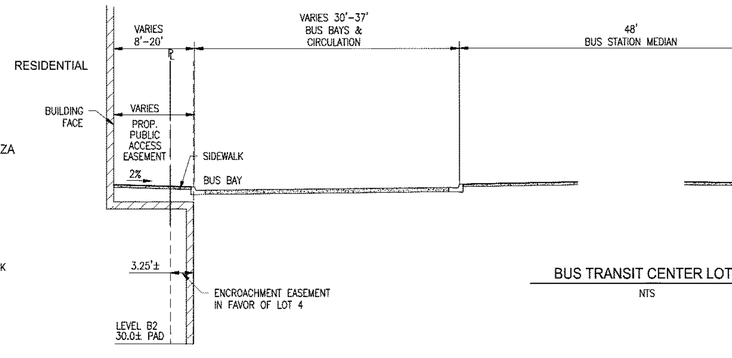
(NO PARKING EITHER SIDE)



S. CLEVELAND STREET (PUBLIC) C2

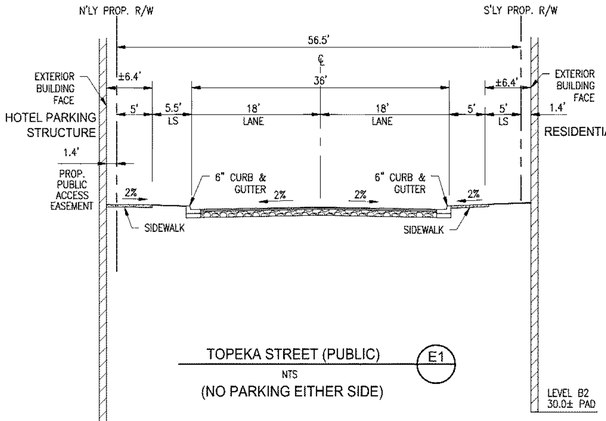
NTS

(NO PARKING EITHER SIDE)



BUS TRANSIT CENTER LOT D

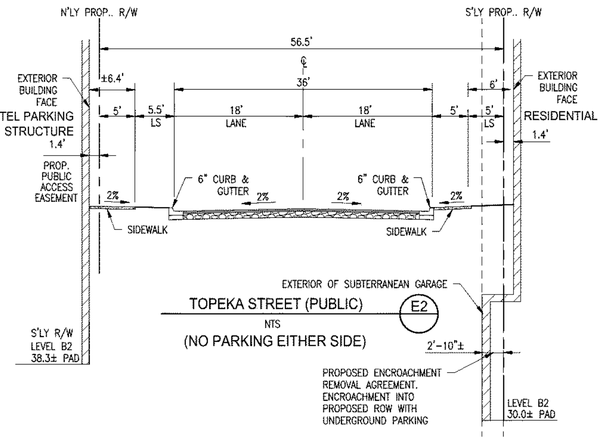
NTS



TOPEKA STREET (PUBLIC) E1

NTS

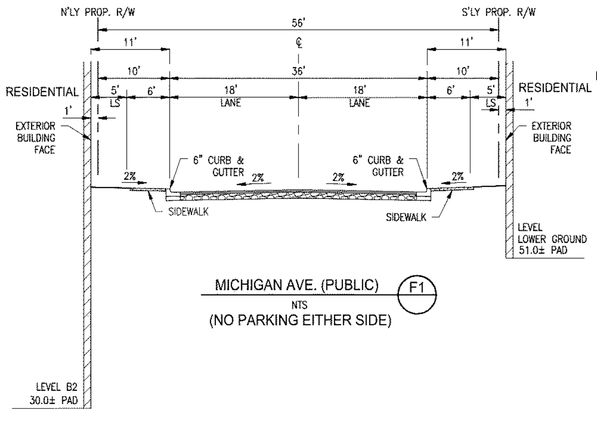
(NO PARKING EITHER SIDE)



TOPEKA STREET (PUBLIC) E2

NTS

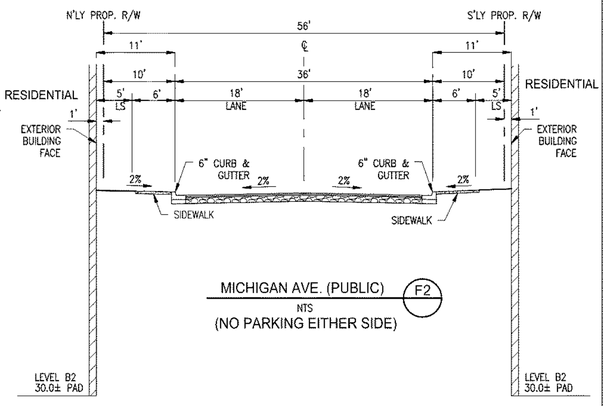
(NO PARKING EITHER SIDE)



MICHIGAN AVE. (PUBLIC) F1

NTS

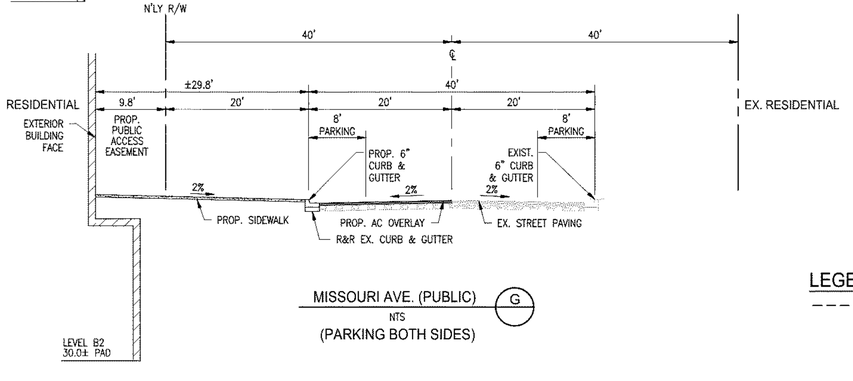
(NO PARKING EITHER SIDE)



MICHIGAN AVE. (PUBLIC) F2

NTS

(NO PARKING EITHER SIDE)



MISSOURI AVE. (PUBLIC) G

NTS

(PARKING BOTH SIDES)

LEGEND:

EASEMENT LINE

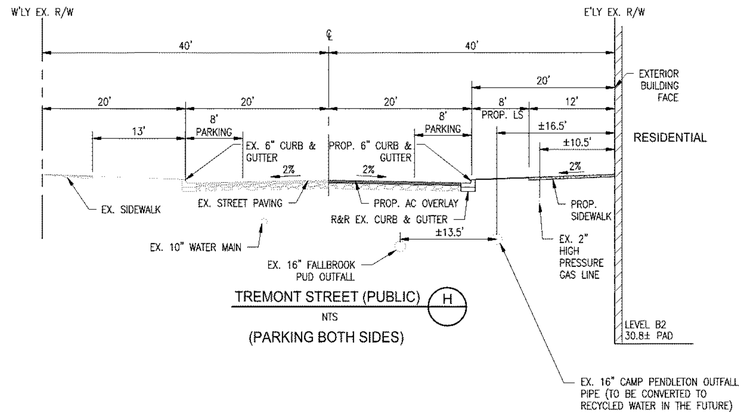
PREPARED BY:

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38 Technology Drive
Irvine, CA 92618
949-923-6000 stantec.com

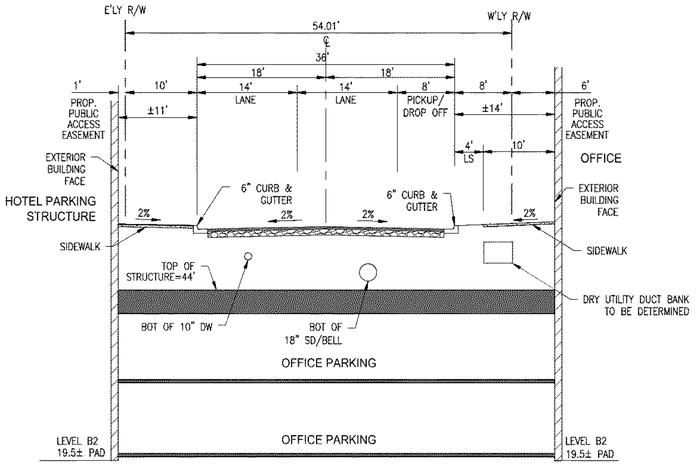
VESTING TENTATIVE MAP AND DEVELOPMENT PLAN
SITE SECTIONS AND DETAILS
NCTD OCEANSIDE TRANSIT CENTER, SOUTH TREMONT STREET
CITY OF OCEANSIDE, CALIFORNIA

SHEET C2 OF C13

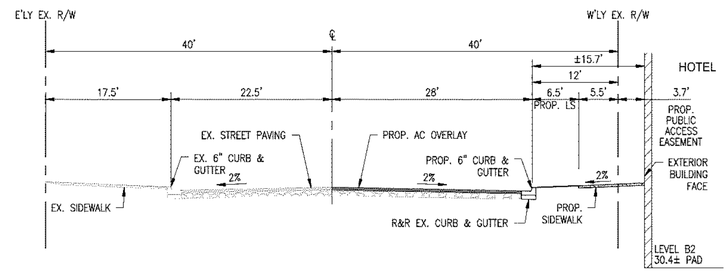
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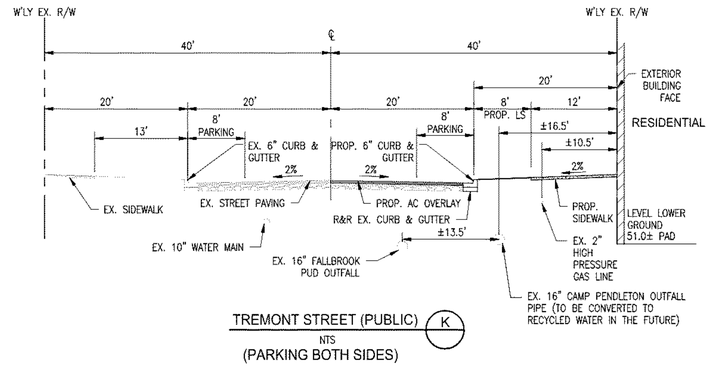
TREMONT STREET (PUBLIC) H
NTS
(PARKING BOTH SIDES)



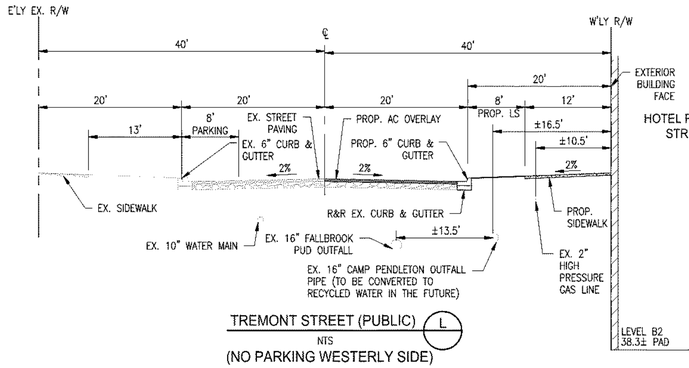
S. CLEVELAND STREET (PUBLIC) I
NTS
(NO PARKING EITHER SIDE)



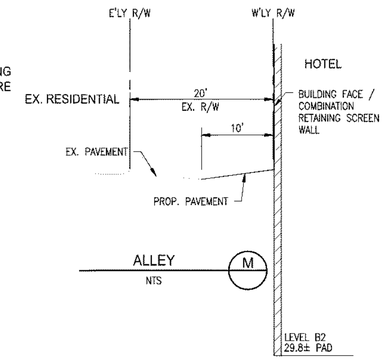
SEAGAZE DRIVE (PUBLIC) J
NTS
(NO PARKING EITHER SIDE)



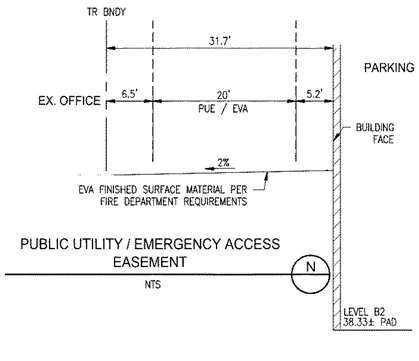
TREMONT STREET (PUBLIC) K
NTS
(PARKING BOTH SIDES)



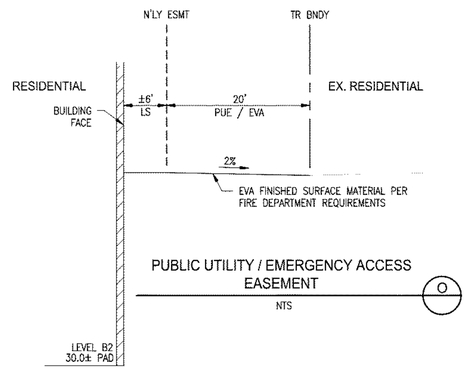
TREMONT STREET (PUBLIC) L
NTS
(NO PARKING WESTERLY SIDE)



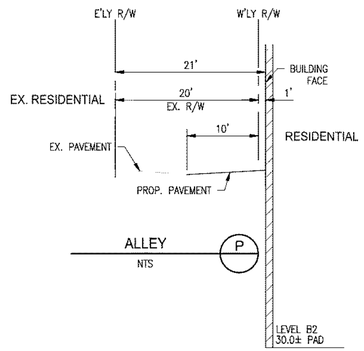
ALLEY M
NTS



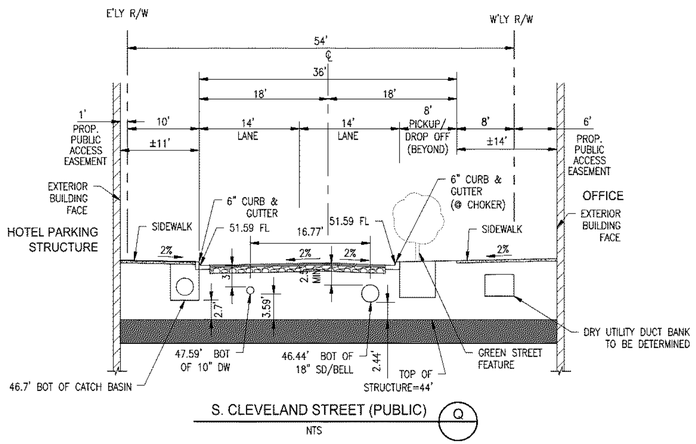
PUBLIC UTILITY / EMERGENCY ACCESS EASEMENT N
NTS



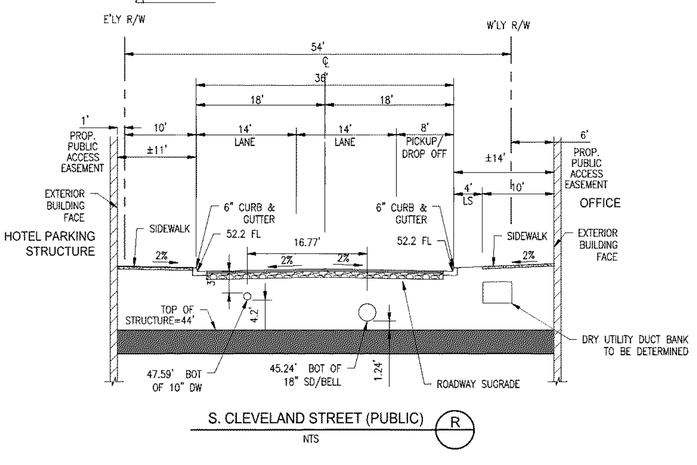
PUBLIC UTILITY / EMERGENCY ACCESS EASEMENT O
NTS



ALLEY P
NTS



S. CLEVELAND STREET (PUBLIC) Q
NTS



S. CLEVELAND STREET (PUBLIC) R
NTS

LEGEND:

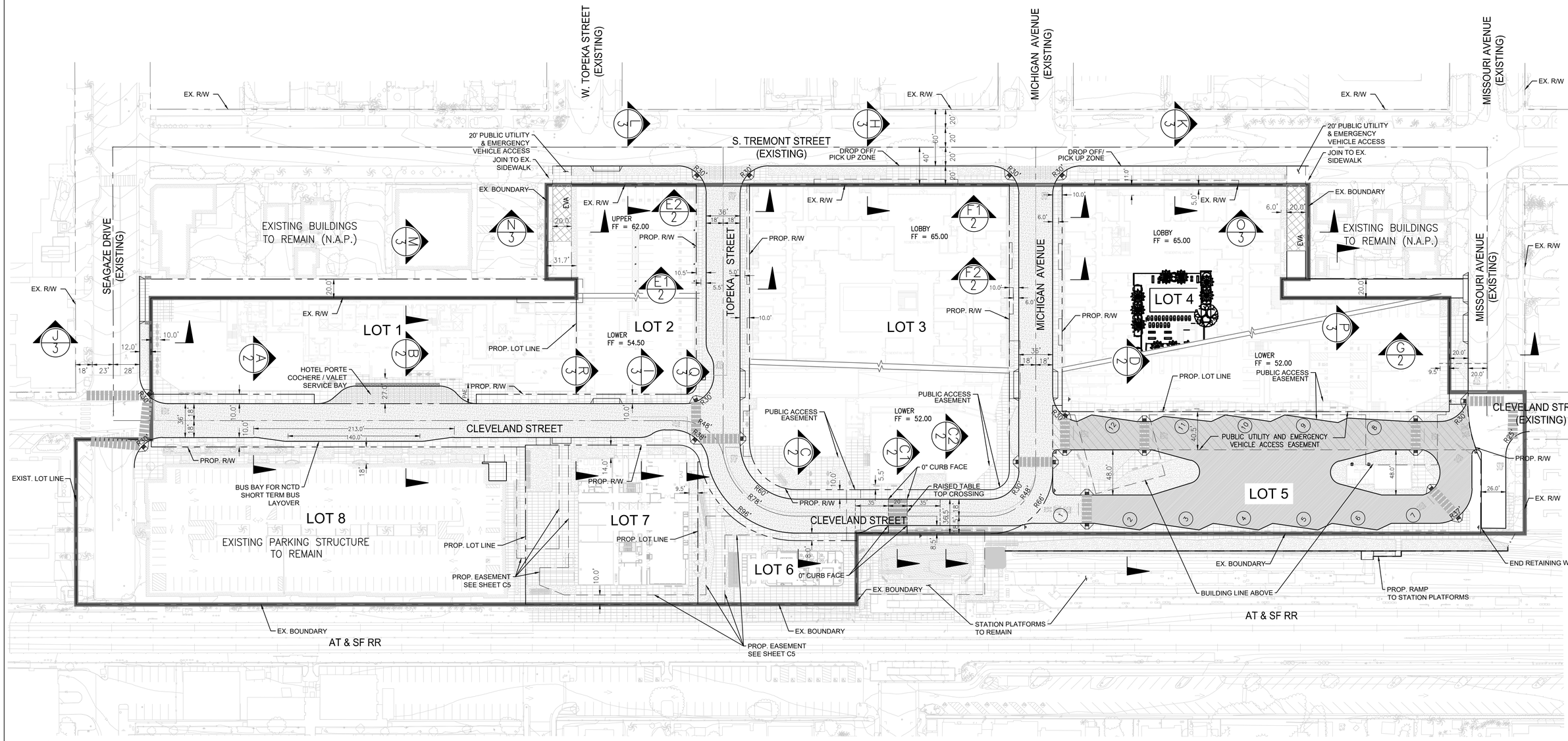
EASEMENT LINE

PREPARED BY:
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Irvine, CA 92618
949-923-6000 stantec.com

VESTING TENTATIVE MAP AND DEVELOPMENT PLAN
SITE SECTIONS AND DETAILS
NCTD OCEANSIDE TRANSIT CENTER, SOUTH TREMONT STREET
CITY OF OCEANSIDE, CALIFORNIA

SHEET C3 OF C13

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LEGEND:

- R/W/ BOUNDARY LINE / CENTER LINE
- CURB AND GUTTER
- PROP. DRIVEWAY
- EXIST. CONTOUR
- PROP. CONTOUR
- EASEMENT LINE
- PROP. RETAINING WALL
- EXIST. SEWER
- EXIST. WATER
- EXIST. STORM DRAIN
- EXIST. GAS
- EXIST. OVERHEAD POWER
- PROP. SEWER
- PROP. WATER
- PROP. PUBLIC STORM DRAIN
- PROP. RECYCLE WATER
- PROP. GAS
- PEDESTRIAN CROSSING
- PROP. ADA RAMP
- EXIST. FIRE HYDRANT
- PROP. PUBLIC FIRE HYDRANT
- PROJECT BOUNDARY
- PAE — PUBLIC ACCESS EASEMENT
- FH — FIRE HYDRANT
- FIRE DEPARTMENT APPROVED EVA FINISHED SURFACE
- BUS TRANSFER PARKING STALL NUMBER

GRAPHIC SCALE

50 0 25 50 100 200

(IN FEET)
1 inch = 50 ft.

PREPARED BY:

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949-923-6000 stantec.com

VESTING TENTATIVE MAP AND DEVELOPMENT PLAN
MASTER TECHNICAL SITE PLAN
NCTD OCEANSIDE TRANSIT CENTER, SOUTH TREMONT STREET
CITY OF OCEANSIDE, CALIFORNIA

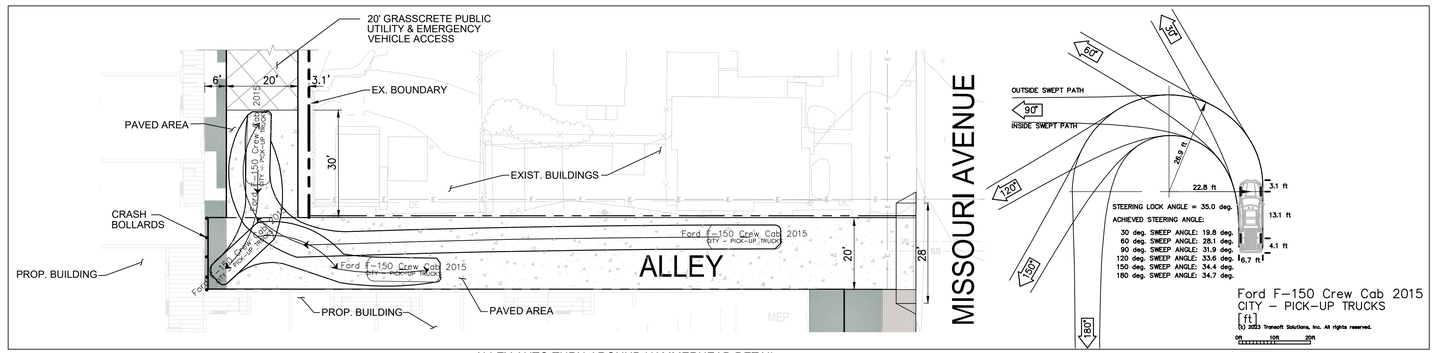
SHEET C4 OF C13

DRAWING: u:\204217900\drawing\sheet_files\217900-10048m.dwg PLOTTED: 8/22/2022 10:25 AM BY: Elizondo, Christian

EX. R/W
EX. 10" WATER MAIN
EX. 16" FALLBROOK PUD OUTFALL
PROP. DRIVEWAY
PUBLIC UTILITY/ EVA ACCESS
W. TOPEKA STREET
EX. OVERHEAD POWER LINE
S. TREMONT STREET
DROP OFF / PICKUP ZONE
EX. 2" HIGH PRESSURE GAS LINE
MICHIGAN AVENUE
MISSOURI AVENUE
EX. 8" WATER MAIN
EX. 10" SEWER LINE
EX. 16" CAMP PENDLETON OUTFALL
EX. BOUNDARY
EXISTING BUILDINGS TO REMAIN (N.A.P.)
EX. 6" VCP SEWER LINE
EX. 6" WATER MAIN
ALLEY
SEAGAZE DRIVE
PUBLIC ACCESS EASEMENT
LOT 1
LOT 2
LOWER FF = 54.50
UPPER FF = 62.00
PROP. R/W
PROP. 15"SD
TOPEKA STREET
LOT 3
LOBBY FF = 65.00
PROP. FH
SEE ALLEY AUTO TURN-AROUND HAMMERHEAD DETAIL HEREON
LOT 4
PROP. 18"SD
LOWER FF = 52.00
PROP. LOT LINE
PROP. 30"SD
PROP. 12"SD
CLEVELAND STREET
4" DEPRESSED UTILITY CURB
PROP. 24"SD
PROP. 18"SD
PLANTER (TYP.)
EXIST. LOT LINE
LOT 8
EXISTING PARKING STRUCTURE TO REMAIN
LOT 7
LOT 6
LOT 5
PRIVATE SD CROSSING ROW
PROP. 15" SD
"WALK BICYCLES AT TRANSIT CENTER" & "DO NOT ENTER" SIGNS
"DO NOT ENTER" SIGN
"WALK BICYCLES AT TRANSIT CENTER" SIGN
FOR CHAMBERS MAINTENANCE
PROJECT BOUNDARY
EX. BOUNDARY
AT & SF RR

LEGEND:

- R/W/ BOUNDARY LINE
- CENTER LINE
- CURB AND GUTTER
- PROP. DRIVEWAY
- EXIST. CONTOUR
- PROP. CONTOUR
- EASEMENT LINE
- PROP. RETAINING WALL
- EXIST. SEWER
- EXIST. WATER
- EXIST. STORM DRAIN
- EXIST. GAS
- EXIST. OVERHEAD POWER
- PROP. SEWER
- PROP. WATER
- PROP. PUBLIC STORM DRAIN
- PROP. RECYCLE WATER
- PROP. GAS
- EXIST. FIRE HYDRANT
- PROP. PUBLIC FIRE HYDRANT
- PROJECT BOUNDARY
- PA — LANDSCAPE PLANTERS
- PAE — PUBLIC ACCESS EASEMENT
- FH — FIRE HYDRANT
- PRIVATE UNDERGROUND PEAK REDUCTOIN DETENTION CHAMBER



ALLEY AUTO TURN-AROUND HAMMERHEAD DETAIL
SCALE: 1"=20'

SEE ENCUMBRANCE MAP SHEET C12 FOR EXISTING EASEMENTS AND RIGHT OF WAY TO BE QUITCLAIMED, OR ABANDONED

PROPOSED EASEMENTS

1. PUBLIC UTILITY AND EMERGENCY VEHICLE ACCESS
2. ENCROACHMENT EASEMENT IN FAVOR OF LOT 4
3. PUBLIC UTILITY EASEMENT
4. PUBLIC ACCESS EASEMENT
4. PROPOSED ENCROACHMENT REMOVAL AGREEMENT

GRAPHIC SCALE
50 0 25 50 100 200
(IN FEET)
1 inch = 50 ft.

PREPARED BY:
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Irvine, CA 92618
949-923-6000 stantec.com

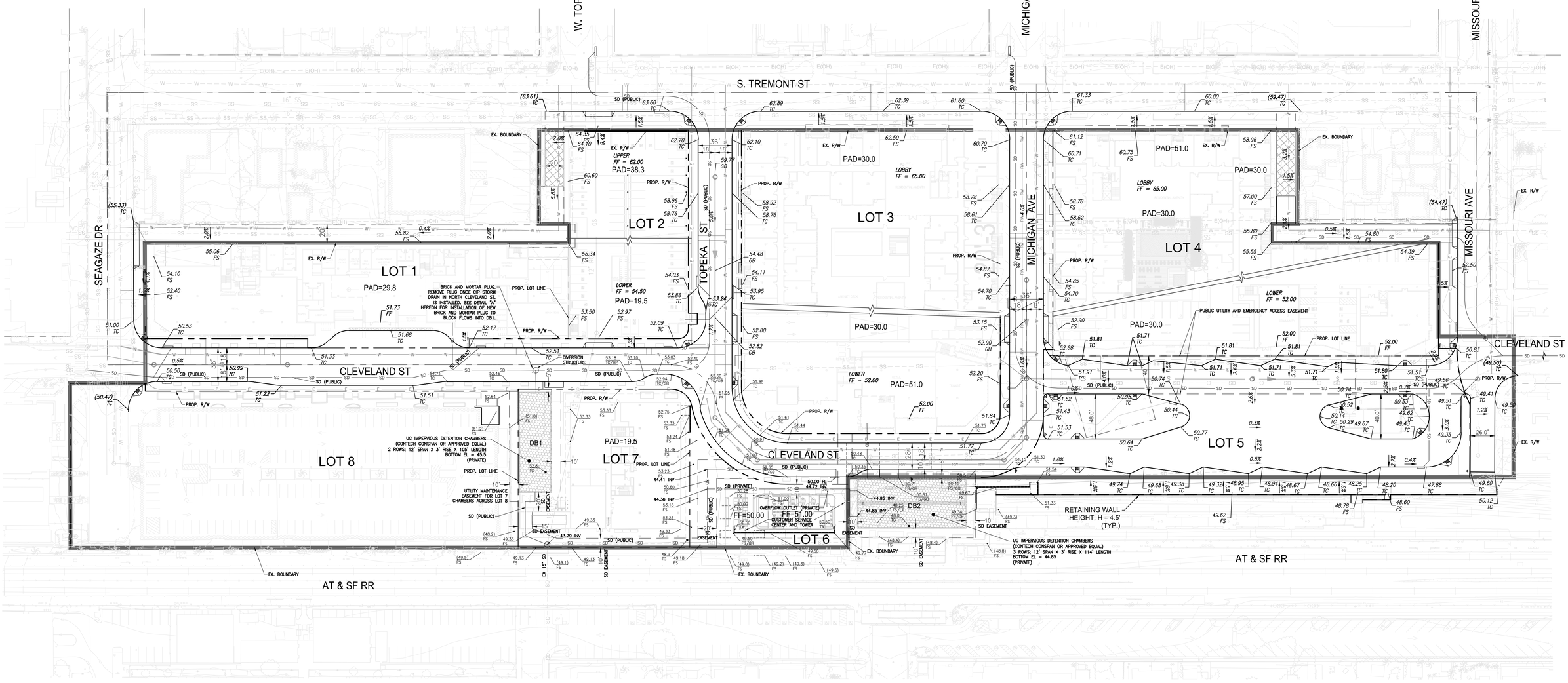
VESTING TENTATIVE MAP AND DEVELOPMENT PLAN

NCTD OCEANSIDE TRANSIT CENTER, SOUTH TREMONT STREET

CITY OF OCEANSIDE, CALIFORNIA

SHEET C5 OF C13

DRAWING: ...\\2042217900\drawing\sheet_files\2179000--1005tm.dwg PLOTTED: 8/22/2022 10:25 AM BY: Elizondo, Christian

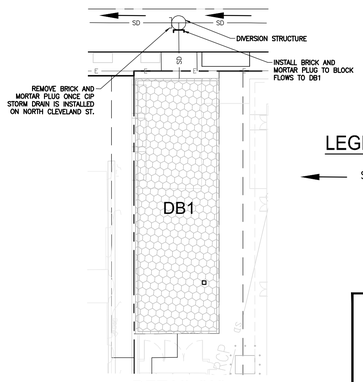


GRADING NOTES:

1. TOTAL AMOUNT OF CUT: 247,000 CY; TOTAL AMOUNT OF FILL: 700 CY
2. RETAINING WALLS: LENGTH: 800 LF; MAX HEIGHT: 7 FT
3. VOLUMES ARE CALCULATED TO ESTIMATED BOTTOM OF FOUNDATION FLOOR FOR BUILDINGS AND SUBGRADE FOR ROAD/HARDSCAPES

LEGEND:

R/W/ BOUNDARY LINE	PROP. SEWER
CENTER LINE	PROP. WATER
CURB AND GUTTER	PROP. PUBLIC STORM DRAIN
PROP. DRIVEWAY	PROP. RECYCLE WATER
EXIST. CONTOUR	PROP. GAS
PROP. CONTOUR	EXIST. FIRE HYDRANT
EASEMENT LINE	PROP. PUBLIC FIRE HYDRANT
PROP. RETAINING WALL	PROJECT BOUNDARY
EXIST. SEWER	PUBLIC ACCESS EASEMENT (PAE)
EXIST. WATER	FIRE HYDRANT (FH)
EXIST. STORM DRAIN	PRIVATE UNDERGROUND PEAK REDUCTION DETENTION CHAMBERS
EXIST. GAS	ESTIMATED LOWEST LEVEL PAD ELEVATION TO BE DETERMINED WITH FINAL CONSTRUCTION DRAWINGS (PAD=29.8)
EXIST. OVERHEAD POWER	



DETAIL "A"
NTS

LEGEND:

SD FLOW DIRECTION

GRAPHIC SCALE

50 0 25 50 100 200

(IN FEET)
1 inch = 50 ft.

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VESTING TENTATIVE MAP AND DEVELOPMENT PLAN
PRELIMINARY GRADING & DRAINAGE
NCTD OCEANSIDE TRANSIT CENTER, SOUTH TREMONT STREET
CITY OF OCEANSIDE, CALIFORNIA

SHEET C6 OF C13

DRAWING: o:\204217900\drawing\sheet_files\217900c--1006tm.dwg PLOTTED: 8/22/2022 10:25 AM BY: Elizondo, Christian

LEGEND:

IN–GROUND BIOFILTRATION PLANTER (PRIVATE)

RAISED BIOFILTRATION PLANTER (PRIVATE)

BIOFILTRATION PROPRIETARY UNIT (PRIVATE)

TREE WELLS (PUBLIC)

PROJECT BOUNDARY

APN:XXXXXX

W. TOPEKA STREET

S. TREMONT STREET

TOPEKA STREET

SEAGAZE DRIVE

CLEVELAND STREET

CLEVELAND STREET

APN: 147-273-01

APN: 147-273-02

APN: 147-273-03

APN: 147-273-04

APN: 147-273-05

APN: 147-273-06

A2 A3 A4 A5 A6 A7 A8 A9 A10

B1 B2 B3 B4 B6

D1 D2 D3 D4 D5 D6 D7 D8

AT & SF RR

MATCHLINE - SEE SHEET C8

GRAPHIC SCALE

40 0 20 40 80 160

(IN FEET)

1 inch = 40 ft.

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VESTING TENTATIVE MAP AND DEVELOPMENT PLAN
LID BMP FEATURES
NCTD OCEANSIDE TRANSIT CENTER, SOUTH TREMONT STREET
CITY OF OCEANSIDE, CALIFORNIA

SHEET C7 OF C13

DRAWING: u:\2042217900\drawing\sheet_files\217900c--1022lm.dwg PLOTTED: 8/22/2022 10:25 AM BY: Elizondo, Christian

MATCHLINE - SEE SHEET C7

MICHIGAN AVENUE

MICHIGAN AVENUE

MISSOURI AVENUE

MISSOURI AVENUE

APN: 150-046-11

APN: 150-046-10

APN: 150-046-09

APN: 150-182-13

B5

C1

C2

C3

C4

C5

C6

C7

C8

C10

C11

SD

50

CLEVELAND STREET

CLEVELAND STREET

C9 (TYP.)

D10

D9

AT & SF RR

TYSON STREET

LEGEND:

IN-GROUND BIOFILTRATION PLANTER (PRIVATE)

RAISED BIOFILTRATION PLANTER (PRIVATE)

BIOFILTRATION PROPRIETARY UNIT (PRIVATE)

TREE WELLS (PUBLIC)

PROJECT BOUNDARY

GRAPHIC SCALE

40 0 20 40 80 160

(IN FEET)

1 inch = 40 ft

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VESTING TENTATIVE MAP AND DEVELOPMENT PLAN
LID BMP FEATURES
NCTD OCEANSIDE TRANSIT CENTER, SOUTH TREMONT STREET
CITY OF OCEANSIDE, CALIFORNIA

SHEET C8 OF C13

DRAWING: u:\2042217900\drawing\sheet_files\2217900--1022lm.dwg PLOTTED: 8/22/2022 10:25 AM BY: Elzondo, Christian

W. TOPEKA STREET
MICHIGAN AVENUE
MISSOURI AVENUE
S. TREMONT STREET
TOPEKA STREET
SEAGAZE DRIVE
CLEVELAND STREET
AT & SF RR
TYSON STREET
S MYERS STREET
APN:XXXXXX
APN: 147-273-01
APN: 147-273-02
APN: 147-273-03
APN: 147-273-04
APN: 147-273-05
APN: 147-273-06
APN: 150-046-11
APN: 150-046-10
APN: 150-046-09
APN: 150-182-13
EX. R/W
EX. 24" RCP SD
EX. 10" WATER
EX. 8" WATER
EX. 18" RCP SD
EX. BOUNDARY
PUBLIC UTILITY AND EMERGENCY VEHICLE ACCESS EASEMENT
PROP. 8" WATER (TO REPLACE EX. 6" WATER)
PROP. 8" WATER
PROP. IRRIGATION SERVICE LATERALS / METERS
PROP. DOMESTIC SERVICE LATERALS / METERS
PROP. SEWER LATERAL
PROP. 10" WATER
PROP. SEWER MH
PROP. R/W
PROP. 8" SEWER
PROP. LOT LINE
PROP. FH
PROP. DOMESTIC AND IRRIGATION SERVICE LATERALS/METERS
PROP. 4" RECYCLED WATER
EX. 16" FALLBROOK PUD OUTFALL
EX. 16" CAMP PENDLETON OUTFALL PIPE (TO BE CONVERTED TO RECYCLED WATER IN THE FUTURE)
PROPOSED 4" RECYCLED WATER LINE FOR CONNECTION TO FUTURE RECYCLED WATER MAIN ONCE AVAILABLE
FUTURE IRRIGATION SERVICE LATERALS / METERS
BUILDING LINE ABOVE
PUBLIC SD
SEE SHEET C8 FOR SD EXTENSION
EXIST. LOT LINE
UTILITY MAINTENANCE EASEMENT FOR LOT 7 CHAMBERS ACROSS LOT 8
SD EASEMENT (PUBLIC)
15" SD (PUBLIC)
15" SD (PRIVATE)
CDS UNIT (PRIVATE)
PRIVATE SD CROSSING ROW
SD EASEMENT
EX. 15" RCP SD (PUBLIC)
UPSIZE EXISTING CURBFACE CULVERT
EX. SEWER MH
EX. 8" SEWER
PROP. SEWER MH
PROP. R/W

LEGEND:

	BOUNDARY LINE
	CENTER LINE
	CURB AND GUTTER
	PROP. DRIVEWAY
54	EXIST. CONTOUR
54	PROP. CONTOUR
	EASEMENT LINE
	PROP. RETAINING WALL
	SIGHT VISIBILITY LINES
	EXIST. FIRE HYDRANT
	PROP. PUBLIC FIRE HYDRANT
	EXIST. SUBDIVISION BOUNDARY
PAE	PUBLIC ACCESS EASEMENT
FH	FIRE HYDRANT
MH	MANHOLE
SS	EXIST. SEWER
W	EXIST. WATER
SD	EXIST. STORM DRAIN
G	EXIST. GAS
E(OH)	EXIST. OVERHEAD POWER
SS	PROP. SEWER
W	PROP. WATER
SD	PROP. STORM DRAIN
G	PROP. GAS
RW	PROP. RECYCLED WATER
E	PROP. ELEC.
	PEDESTRIAN CROSSING
	PROP. ADA RAMP
	TURF BLOCK BOMANITE GRASSCRETE
	PRIVATE UNDERGROUND PEAK REDUCTION DETENTION CHAMBERS

GRAPHIC SCALE
50 0 25 50 100 200
(IN FEET)
1 inch = 50 ft.

PREPARED BY:
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VESTING TENTATIVE MAP AND DEVELOPMENT PLAN
PRELIMINARY WET UTILITIES
NCTD OCEANSIDE TRANSIT CENTER, SOUTH TREMONT STREET
CITY OF OCEANSIDE, CALIFORNIA

SHEET C9 OF C13

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LEGEND:

54	EXIST. CONTOUR
SS	EXIST. SEWER
W	EXIST. WATER
SD	EXIST. STORM DRAIN
G	EXIST. GAS
E(OH)	EXIST. OVERHEAD POWER
SS	PROP. SEWER
W	PROP. WATER
SD	PROP. STORM DRAIN
G	PROP. GAS
RW	PROP. RECYCLED WATER
E	PROP. ELEC.

GRAPHIC SCALE

50 0 25 50 100 200

(IN FEET)
1 inch = 50 ft.

PREPARED BY:

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38 Technology Drive
Irvine, CA 92618
949-923-6000 stantec.com

VESTING TENTATIVE MAP AND DEVELOPMENT PLAN
S. CLEVELAND ST. PRELIMINARY STORM DRAIN
NCTD OCEANSIDE TRANSIT CENTER, SOUTH TREMONT STREET
CITY OF OCEANSIDE, CALIFORNIA

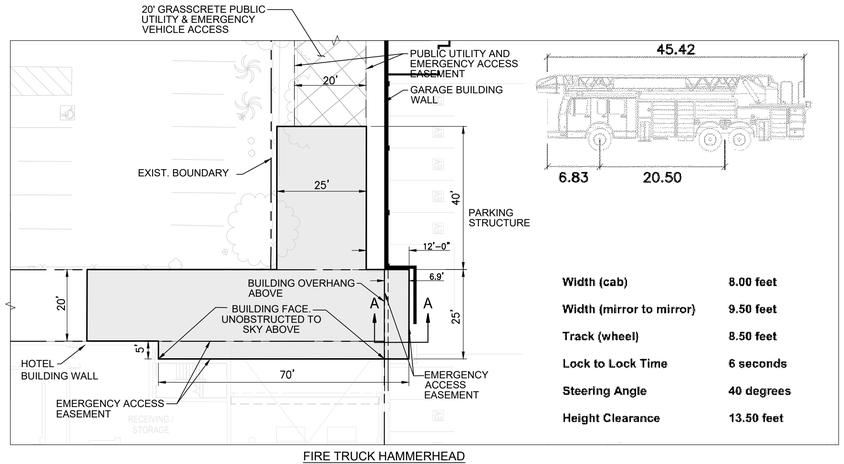
SHEET
C10
OF
C13

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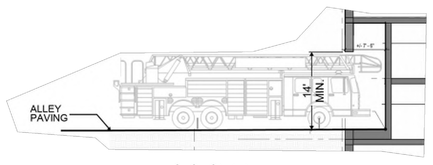
EXIST FIRE HYDRANT
W. TOPEKA STREET
EXIST FIRE HYDRANT
MICHIGAN AVENUE
EXIST FIRE HYDRANT
MISSOURI AVENUE
20' PUBLIC UTILITY & EMERGENCY VEHICLE ACCESS
S. TREMONT STREET
20' PUBLIC UTILITY & EMERGENCY VEHICLE ACCESS
EX. 20' WIDE ALLEY R/W
SEE FIRE TRUCK HAMMERHEAD DETAIL HEREON
150' HOSE PULL
20'
A
A
PROPOSED FIRE HYDRANT
TOPEKA STREET
MICHIGAN AVENUE
20'
150' HOSE PULL
PROPOSED FIRE
TURN-AROUND DETAIL
150' HOSE PULL
SEAGAZE DRIVE
EXIST FIRE HYDRANT
EXIST FIRE HYDRANT
MISSOURI AVENUE
EXIST FIRE HYDRANT
CLEVELAND STREET
PUBLIC UTILITY AND EMERGENCY VEHICLE ACCESS EASEMENT
CLEVELAND STREET
BUILDING OVERHANG CLEAR HEIGHT: 20' ±
BUILDING OVERHANG CLEAR HEIGHT: 20' ±
150' HOSE PULL
150' HOSE PULL
150' HOSE PULL
150' HOSE PULL
AT & SF RR
AT & SF RR

LEGEND:

	R/W/ BOUNDARY LINE
	CENTER LINE
	CURB AND GUTTER
	PROP. DRIVEWAY
54	EXIST. CONTOUR
54	PROP. CONTOUR
	EASEMENT LINE
	PROP. RETAINING WALL
SS	EXIST. SEWER
W	EXIST. WATER
SD	EXIST. STORM DRAIN
G	EXIST. GAS
E(OH)	EXIST. OVERHEAD POWER
SS	PROP. SEWER
W	PROP. WATER
SD	PROP. PUBLIC STORM DRAIN
G	PROP. GAS
	EXIST. FIRE HYDRANT
	PROP. PUBLIC FIRE HYDRANT
	PROJECT BOUNDARY
PAE	PUBLIC ACCESS EASEMENT
FH	FIRE HYDRANT
	TURF BLOCK BOMANITE GRASSCRETE



FIRE TRUCK HAMMERHEAD
SCALE: 1"=20'



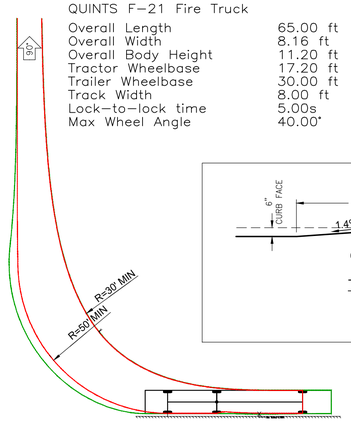
SECTION A-A

Width (cab)	**8.00 feet**
Width (mirror to mirror)	**9.50 feet**
Track (wheel)	**8.50 feet**
Lock to Lock Time	**6 seconds**
Steering Angle	**40 degrees**
Height Clearance	**13.50 feet**

DESIGN VEHICLE

QUINTS F-21 Fire Truck

Overall Length	65.00 ft
Overall Width	8.16 ft
Overall Body Height	11.20 ft
Tractor Wheelbase	17.20 ft
Trailer Wheelbase	30.00 ft
Track Width	8.00 ft
Lock-to-lock time	5.00s
Max Wheel Angle	40.00°



90° TURNING TEMPLATE

FIRE ACCESS NOTES

-A MINIMUM VERTICAL CLEARANCE OF 13 FEET AND 6 INCHES SHALL BE PROVIDED AND MAINTAINED.
-ACCESS ROADWAYS SHALL BE PROVIDED WITH A 50 FOOT OUTSIDE AND 30 FOOT INSIDE TURNING RADIUS.
-THE GRADE FOR FIRE ACCESS ROADWAYS SHALL NOT EXCEED 12%.
-ALL FIRE DEPARTMENT ACCESS ROADWAYS SHALL BE PAINTED/STRIPED AS FIRE LANES.
-EACH FDC SHALL BE LOCATED WITHIN 40' OF A HYDRANT AND BE LOCATED ON THE SAME SIDE OF THE STREET.

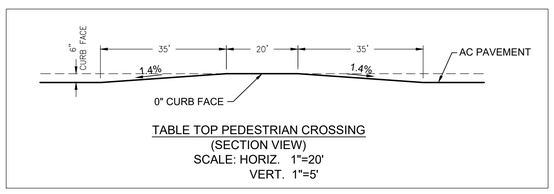
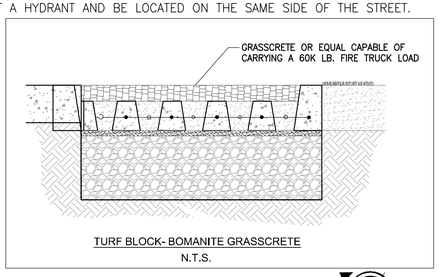


TABLE TOP PEDESTRIAN CROSSING
(SECTION VIEW)
SCALE: HORIZ. 1"=20'
VERT. 1"=5'



TURF BLOCK- BOMANITE GRASSCRETE
N.T.S.

GRAPHIC SCALE
50 0 25 50 100 200
(IN FEET)
1 inch = 50 ft.

PREPARED BY:
Stantec
38 Technology Drive
Irvine, CA 92618
949-923-6000 stantec.com

VESTING TENTATIVE MAP AND DEVELOPMENT PLAN
FIRE ACCESS CIRCULATION PLAN
NCTD OCEANSIDE TRANSIT CENTER, SOUTH TREMONT STREET
CITY OF OCEANSIDE, CALIFORNIA

SHEET C11 OF C13

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TITLE DIGEST

TITLE ITEMS REFERRED TO HEREON ARE BASED ON INFORMATION CONTAINED IN FIRST AMERICAN TITLE COMPANY PRELIMINARY REPORT NO. NHSC-6555761, DATED MARCH 30, 2021.

THE FOLLOWING DIGEST OF TITLE ITEMS HAS BEEN PREPARED FOR THE CONVENIENCE OF THE USER. FOR FULL PARTICULARS, PLEASE REFER TO THOSE DOCUMENTS REFERENCED THEREIN.

PLOTTABLE EASEMENTS OF RECORD ARE INDICATED HEREON AND REFER TO THE CORRESPONDING ITEM NUMBER IN THE REFERENCED REPORT.

VESTING INTEREST

THE ESTATE OR INTEREST IN THE LAND DESCRIBED IN THIS REPORT IS:

A FEE.

LEGAL DESCRIPTION

THE LAND REFERRED TO IN THIS REPORT IS SITUATED IN THE CITY OF OCEANSIDE, COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, AND IS DESCRIBED AS FOLLOWS:

TRACT I: (147-350-24-00 AND 147-350-25-00)

PARCEL 1:

LOTS 9 THROUGH 16, BLOCK 7, OCEANSIDE, IN THE CITY OF OCEANSIDE, COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO MAP THEREOF NO. 344, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, JULY 1, 1885, LOT 9, BLOCK 7, BRYAN'S ADDITION, ACCORDING TO MAP THEREOF NO. 219, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, MARCH 10, 1887.

PARCEL 2:

ALL OF BLOCK 8 OF BRYAN'S ADDITION, IN THE CITY OF OCEANSIDE, COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO MAP THEREOF NO. 219, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, MARCH 10, 1887.

TOGETHER WITH THOSE PORTIONS OF CLEVELAND STREET AND MICHIGAN AVENUE VACATED BY DOCUMENT RECORDED MARCH 14, 1994 AS INSTRUMENT NO. 94-0164097 WHICH WOULD REVERT TO SAID LAND BY OPERATION OF LAW.

PARCEL 3:

FRACTIONAL LOT 8 IN BLOCK 9 OF BRYAN'S ADDITION TO OCEANSIDE, IN THE CITY OF OCEANSIDE, COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO MAP THEREOF NO. 219, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, MARCH 10, 1887.

TOGETHER WITH THE NORTHERLY 20 FEET OF TOPEKA STREET AS VACATED AND CLOSED TO PUBLIC USE, LYING SOUTHEASTERLY OF AND ADJACENT TO SAID LOT.

PARCEL 4:

LOTS 1, 2, 3, 4 AND 5 IN BLOCK 10 OF BRYAN'S ADDITION, IN THE CITY OF OCEANSIDE, IN THE CITY OF OCEANSIDE, COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO MAP THEREOF NO. 219, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, MARCH 10, 1887.

ALSO THAT PORTION OF TOPEKA STREET LYING WESTERLY FROM CLEVELAND STREET AND NORTH OF AND ADJACENT TO SAID LOT 1, BLOCK 10, WHICH SAID PORTION OF TOPEKA STREETS WAS CLOSED TO PUBLIC USE BY RESOLUTION NO. 915, IN THE CITY COUNCIL OF THE CITY OF OCEANSIDE, CALIFORNIA.

ALSO TOGETHER WITH THOSE PORTIONS OF CLEVELAND STREET AND TYSON STREET VACATED BY DOCUMENT RECORDED MARCH 14, 1994 AS INSTRUMENT NO. 94-0164097 OF OFFICIAL RECORDS WHICH WOULD REVERT TO SAID LAND BY OPERATION OF LAW.

LEGAL DESCRIPTION (CONTINUED)

PARCEL 5:

THAT PORTION OF A TRACT OF LAND COMMONLY KNOWN AS THE DEPOT GROUNDS IN OCEANSIDE, TOGETHER WITH THAT CERTAIN 200.00 FOOT RIGHT-OF-WAY OF THE ATCHISON, TOPEKA AND SANTA FE RAILWAY COMPANY LYING SOUTHEASTERLY OF SAID DEPOT GROUNDS, ALL IN THE CITY OF OCEANSIDE, COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO MAP THEREOF NO. 313, BY H.P VINCENT, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY, JULY 19,
1886, DESCRIBED AS FOLLOWS:

BEGINNING AT THE MOST WESTERLY CORNER OF LOT 16, BLOCK 7 OF OCEANSIDE, ACCORDING TO MAP THEREOF NO. 344, FILED IN SAID COUNTY RECORDER'S OFFICE ON JULY 1, 1885; THENCE SOUTHEASTERLY ALONG THE SOUTHWESTERLY LINE OF SAID BLOCK 7 AND ITS SOUTHEASTERLY PROLONGATION 443.70 FEET, MORE OR LESS TO THE MOST EASTERLY CORNER OF SAID DEPOT GROUNDS; THENCE SOUTHWESTERLY ALONG THE SOUTHEASTERLY LINE OF SAID DEPOT GROUNDS, 150.00 FEET TO THE NORTHEASTERLY RIGHT-OF-WAY LINE OF THE ATCHISON, TOPEKA AND SANTA FE RAILROAD BEING ALSO THE NORTHWESTERLY PROLONGATION OF THE SOUTHWESTERLY LINE OF BLOCK 10 OF BRYAN'S ADDITION TO OCEANSIDE AS SHOWN ON MAP THEREOF NO. 219, FILED IN SAID COUNTY RECORDER'S OFFICE ON MARCH 10, 1887; THENCE SOUTHEASTERLY ALONG SAID PROLONGATION AND SAID SOUTHWESTERLY LINE TO THE MOST SOUTHERLY CORNER OF LOT 5 IN SAID BLOCK 10; THENCE SOUTHWESTERLY ALONG THE SOUTHWESTERLY PROLONGATION OF THE SOUTHEASTERLY LINE OF SAID LOT 5, A DISTANCE OF 75.00 FEET; THENCE NORTHWESTERLY ALONG A LINE THAT IS PARALLEL WITH AND 75.00 FEET SOUTHWESTERLY OF SAID SOUTHWESTERLY LINE OF BLOCK 10 OF BRYAN'S ADDITION, MAP NO. 219, A DISTANCE OF 371.70 FEET; THENCE AT RIGHT ANGLES, NORTHEASTERLY 47.00 FEET; THENCE ALONG A LINE THAT BEARS LEFT 45°00'00" FROM THE NORTHEASTERLY PROLONGATION OF THE LAST MENTIONED LINE, 181.02 FEET TO A POINT ON A LINE THAT IS PARALLEL WITH AND 50.00 FEET SOUTHWESTERLY OF THE SOUTHWESTERLY LINE OF SAID BLOCK 7 OF OCEANSIDE, MAP NO. 344; THENCE ALONG SAID PARALLEL LINE, NORTHWESTERLY TO A POINT ON THE SOUTHWESTERLY PROLONGATION OF THE NORTHWESTERLY LINE OF SAID LOT 16, BLOCK 7 OF MAP NO. 344; THENCE NORTHEASTERLY

TRACT II:

PARCEL 1: (APN 150-046-17-00)

LOTS 1, 2, 3, 4 AND 5 IN BLOCK 12 OF BRYAN'S ADDITION, IN THE CITY OF OCEANSIDE, COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO MAP THEREOF NO. 219, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, MARCH 10, 1887.

PARCEL 2: (APN 150-046-01-00 THROUGH 150-046-08-00)

LOTS 9 THROUGH 16 INCLUSIVE, IN BLOCK 12 OF BRYAN'S ADDITION, IN THE CITY OF OCEANSIDE, COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO MAP THEREOF NO. 219, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY MARCH 10, 1887.

EXCEPTING THEREFROM, ALL OIL, GAS AND OTHER HYDROCARBON SUBSTANCES IN AND UNDER ALL OF THE ABOVE DESCRIBED REAL PROPERTY, BUT WITHOUT ANY RIGHT TO PENETRATE, USE OR DISTURB THE SURFACE OF SAID PROPERTY OR ANY PORTION OF SAID PROPERTY WITHIN FIVE HUNDRED FEET (500') OF THE SURFACE THEREOF.

TOGETHER WITH PORTIONS OF CLEVELAND STREET AND MICHIGAN AVENUE VACATED BY DOCUMENT RECORDED MARCH 14, 1994 AS INSTRUMENT NO. 94-0164097 OF OFFICIAL RECORDS WHICH WOULD REVERT TO SAID LAND BY OPERATION OF LAW.

TRACT III:

PARCEL 1: (APN 150-043-01-00 THROUGH 150-043-04-00)

ALL OF LOTS 7 AND 8 IN BLOCK 10 AND 11 OF LOTS 1, 2, 3 AND 4 IN BLOCK 11, ALL BEING BYRON'S ADDITION TO OCEANSIDE, IN THE CITY OF OCEANSIDE, COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO MAP THEREOF NO. 219, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, MARCH 10, 1887, TOGETHER WITH THAT PORTION OF MICHIGAN AVENUE (80.00 FEET WIDE) LYING ADJACENT TO AND BETWEEN SAID BLOCKS AS VACATED AND CLOSED TO PUBLIC USE ON DECEMBER 23, 1931 BY RESOLUTION NO. 633 OF THE CITY COUNCIL OF
THE CITY OF OCEANSIDE.

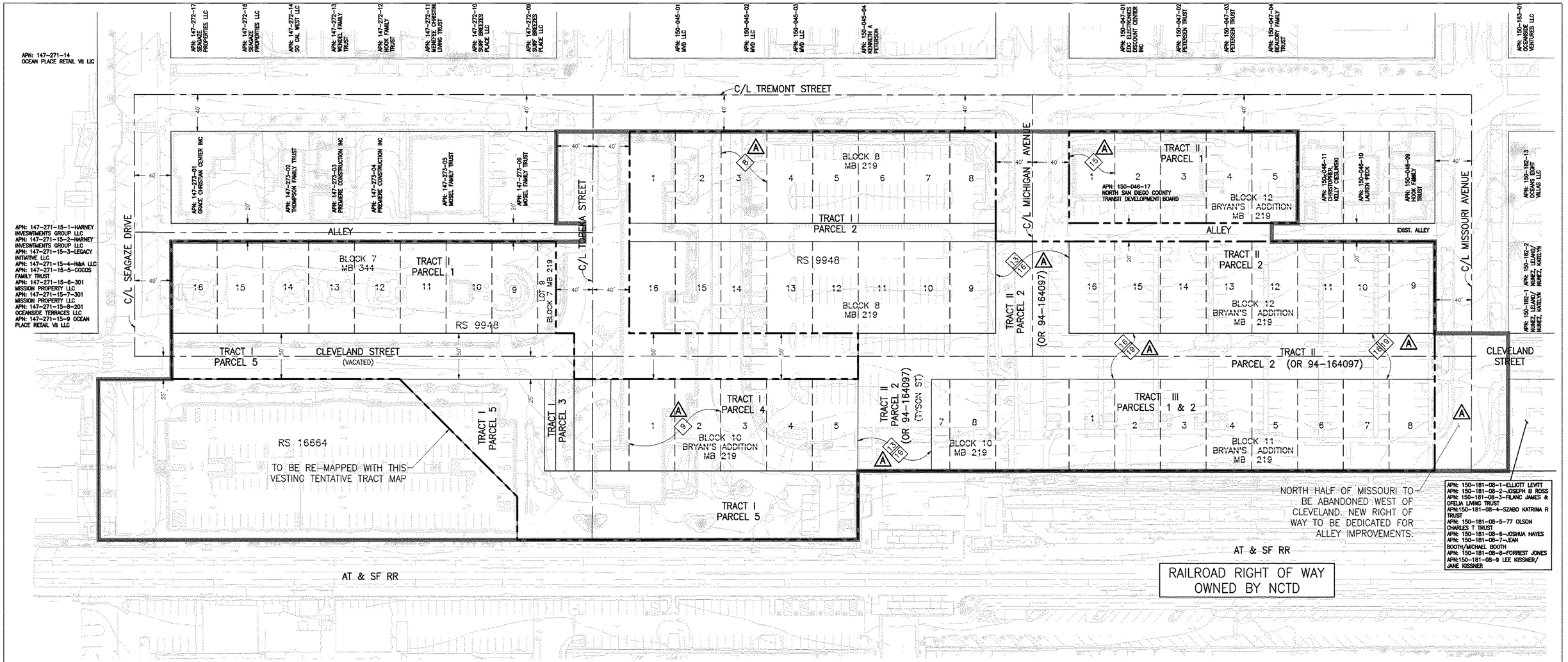
PREPARED BY:
Stantec
38 Technology Drive
Irvine, CA 92618
949-923-6000 stantec.com

VESTING TENTATIVE MAP AND DEVELOPMENT PLAN ENCUMBRANCE MAP

NCTD OCEANSIDE TRANSIT CENTER, SOUTH TREMONT STREET

CITY OF OCEANSIDE, CALIFORNIA

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EXCEPTIONS

THE FOLLOWING MATTERS AFFECT TRACT I:

A 4 AN EASEMENT TO THE CITY OF OCEANSIDE FOR HIGHWAY PURPOSES RECORDED JUNE 29, 1922 IN BOOK 751, PAGE 282, DEEDS. (LOCATION OF THE EASEMENT IS INDETERMINATE FROM RECORD INFORMATION)

A 5 RESOLUTION NO. 2507 TO CHANGE STREET NAME TO TRANSIT STREET RECORDED MARCH 22, 1956 IN BOOK 6028, PAGE 360, OFFICIAL RECORDS.

A 6 THE FACT THAT THE LAND LIES WITHIN THE BOUNDARIES OF THE DOWNTOWN REDEVELOPMENT PROJECT AREA, AS DISCLOSED BY THE DOCUMENT RECORDED NOVEMBER 21, 1975 AS INSTRUMENT NO. 75-328187, OFFICIAL RECORDS. A MODIFICATION DOCUMENT RECORDED AUGUST 12, 1982 AS INSTRUMENT NO. 82-0248561, OFFICIAL RECORDS.

A 7 COVENANTS, CONDITIONS AND RESTRICTIONS IN A GRANT DEED RECORDED MAY 8, 1981 AS INSTRUMENT NO. 81-0142429, OFFICIAL RECORDS.

A [8] AN EASEMENT TO SAN DIEGO GAS AND ELECTRIC COMPANY FOR AN UNDERGROUND ELECTRICAL SYSTEM RECORDED FEBRUARY 16, 1983 AS INSTRUMENT NO. 83-050385, OFFICIAL RECORDS. (AFFECTS LOT 3, BLOCK 8, BRYAN'S ADDITION. EXACT LOCATION IS INDETERMINATE FROM RECORD INFORMATION)

A [9] A "MEMORANDUM OF LEASE" RECORDED MARCH 23, 1984 AS INSTRUMENT NO. 84-107078, OFFICIAL RECORDS. (AFFECTS LOTS 1 & 2, BLOCK 10, BRYAN'S ADDITION).

A 10 AN ORDER FOR POSSESSION, CASE NO. N18999, RECORDED AUGUST 2, 1984 AS INSTRUMENT NO. 84-294906, OFFICIAL RECORDS.

A 11 THE EFFECT OF RECORD OF SURVEY NO. 9948.

EXCEPTIONS (CONTINUED)

A 12 RESERVATIONS FROM RESOLUTION NO. 85-67 OVER PORTIONS OF VACATED TYSON STREET RECORDED MAY 31, 1985 AS INSTRUMENT NO. 85-193545, OFFICIAL RECORDS. (PORTION OVER AT & SF RR).

A [13] RESERVATION OF PUBLIC UTILITY EASEMENTS FROM RESOLUTION NO. R94-23 OVER PORTIONS OF VACATED TYSON STREET, CLEVELAND STREET AND MICHIGAN AVENUE RECORDED MARCH 14, 1994 AS INSTRUMENT NO. 94-164097, OFFICIAL RECORDS.

A 14 RIGHTS OF THE PUBLIC IN AND TO THAT PORTION OF THE LAND LYING WITHIN ANY ROAD, STREET, ALLEY OR HIGHWAY.

THE FOLLOWING MATTERS AFFECT TRACT II:

A [15] AN EASEMENT TO SAN DIEGO GAS AND ELECTRIC COMPANY FOR AN ELECTRICAL SYSTEM RECORDED JUNE 28, 1977 AS INSTRUMENT NO. 256810, OFFICIAL RECORDS. (AFFECTS LOT 1, BLOCK 12, BRYAN'S ADDITION. LOCATION OF THE EASEMENT IS INDETERMINATE FROM RECORD INFORMATION)

A [16] RESERVATION OF PUBLIC UTILITY EASEMENTS FROM RESOLUTION NO. R94-23 OVER PORTIONS OF VACATED TYSON STREET, CLEVELAND STREET AND MICHIGAN AVENUE RECORDED MARCH 14, 1994 AS INSTRUMENT NO. 94-164097, OFFICIAL RECORDS.

A 17 A "NOTICE OF COMPLETION FOR IFP# 19022-27890" RECORDED OCTOBER 4, 2019 AS INSTRUMENT NO. 2019-0443481, OFFICIAL RECORDS.

THE FOLLOWING MATTERS AFFECT TRACT III:

A 18 THE FACT THAT THE LAND LIES WITHIN THE BOUNDARIES OF THE DOWNTOWN REDEVELOPMENT PROJECT AREA, AS DISCLOSED BY THE DOCUMENT RECORDED JULY 6, 1978 AS INSTRUMENT NO. 78-282288, OFFICIAL RECORDS.

A [19] RESERVATION OF PUBLIC UTILITY EASEMENTS FROM RESOLUTION NO. R94-23 OVER PORTIONS OF VACATED TYSON STREET, CLEVELAND STREET AND MICHIGAN AVENUE RECORDED MARCH 14, 1994 AS INSTRUMENT NO. 94-164097, OFFICIAL RECORDS.

A 20 RIGHTS OF PARTIES IN POSSESSION.

EASEMENT / RIGHT OF WAY DISPOSITION NOTES

A EXISTING EASEMENTS AND RIGHT OF WAY TO BE QUITCLAIMED, OR ABANDONED

LEGEND:

- BOUNDARY LINE
- CENTER LINE
- CURB AND GUTTER
- PROP. DRIVEWAY
- EXIST. CONTOUR
- PROP. CONTOUR (54)
- EASEMENT LINE
- PROP. RETAINING WALL
- EXIST. SEWER
- EXIST. WATER
- EXIST. STORM DRAIN
- EXIST. GAS
- EXIST. OVERHEAD POWER
- PROP. SEWER (S)
- PROP. WATER
- PROP. STORM DRAIN (SD)
- PROP. GAS (G)
- EXIST. FIRE HYDRANT
- EXIST. SUBDIVISION BOUNDARY

GRAPHIC SCALE

50 0 25 50 100 200

(IN FEET)
1 inch = 50 ft.

PREPARED BY:
Stantec
38 Technology Drive
Irvine, CA 92618
949-923-6000 stantec.com

VESTING TENTATIVE MAP AND DEVELOPMENT PLAN ENCUMBRANCE MAP

NCTD OCEANSIDE TRANSIT CENTER, SOUTH TREMONT STREET

CITY OF OCEANSIDE, CALIFORNIA

SHEET C13 OF C13

DRAWING: u:\2042217600\drawing\sheet_files\217600-1010nw.dwg PLOTTED: 8/22/2022 10:25 AM BY: Elizondo, Christian

II. EXISTING AND PROPOSED CONDITION HYDROLOGY MAPS

S. COAST HIGHWAY

SEAGAZE DR.

TOPEKA ST.

MICHIGAN AVE.

MISSOURI AVE.

S. TREMONT ST.

S. CLEVELAND ST.

AT&SF RAILWAY

S. MYERS ST.

1ST ST.

TYSON ST.

FIR ST.

TRIBUTARY OUTFALL #1

TRIBUTARY OUTFALL #2

TRIBUTARY OUTFALL #3

MATCHLINE - SEE SHEET 1 OF 2

A1 0.27
A2 1.26
A3 3.39
B1 0.80
B2 0.68
B3 0.06
C1 0.42
D1 0.24
D2 0.54
D3 0.86
D4 0.29
D5 0.60
D6 1.31
D7 0.23
D8 0.41
E1 0.48
E2 2.41
E3 0.36
E4 1.71
E5 1.74
E6 0.44
F1 0.43
F2 1.38
F3 1.48
F4 0.52
F5 1.35
F6 0.36
F7 0.41
G1 0.28
G2 0.60
G3 2.12

10 70.0 FS
40 70.0 FS
50 70.0 FS
51 69.0 FS
61 69 FL
62 66.6 FL
63 59.0 FL
64 58.8 FL
65 57.3 FL
66 49.8 FL
67 48.76 FL
Q_{25}=20.3 CFS
Q_{100}=26.7 CFS
A=5.9 AC
58 48.76 FL
Q_{25}=22.2 CFS
Q_{100}=29.4 CFS
A=7.1 AC
900 LF
57 49.0 FL
56 51.2 FL
3'X1.2' RCB
44 51.5 FS
45 50.6 FL
48.67 INV
47 47.35 INV
46 47.51 INV
36" RCP
48 46.54 INV
55 52.4 FL
54 55.0 FL
DIP SIZE UNK
53 60.0 FL
52 61.0 FL
41 63.0 FS
54.5 INV
42 46.2 INV
30 52.8 FS
12" RCP
18" CMP
24" RCP
30" RCP
18" RCP
18" CONC. CHAN.
12 60.9 FL
11 64 FS
13 50.0 FL
Q_{25}=16.9 CFS
Q_{100}=22.3 CFS
A=4.9 AC
23 43.91 INV
31 49.7 FL
Q_{25}=1.9 CFS
Q_{100}=2.5 CFS
A=0.4 AC
21 71.05 FS
Q_{25}=7.1CFS
Q_{100}=9.2 CFS
A=1.5 AC
22 44.00 INV
20 73.0 FS
49.3 47.80 FS
49.3 45.20 FS
49.3 43.25 FS
43 48.2 FL
43.78 INV
HGL_{25}= 47.64
HGL_{100}= 48.94
Q_{25}=9.49 CFS
Q_{100}=12.11 CFS
A=4.5 AC
9 EX. CURB OUTLET
42.62 FL
$Q_{25-CURB\ OUTLET}$=9.49 CFS
$Q_{100-CURB\ OUTLET}$=12.11 CFS
$Q_{25-UPSTREAM\ ST\ FLOW}$=8.3 CFS
$Q_{100-UPSTREAM\ ST\ FLOW}$=11.18 CFS
$Q_{25-TOTAL\ ST\ FLOW}$=17.79 CFS
$Q_{100-TOTAL\ ST\ FLOW}$=23.29 CFS
49 49.00 FL
46.05 INV
HGL_{25}= 49.05
HGL_{100}= 50.71

LEGEND

- EXISTING STORM DRAIN
- NODE (XX)
- SUBAREA / ACREAGE (XX / X.XX)
- MAJOR HYDROLOGY BOUNDARY
- MINOR HYDROLOGY SUB-BOUNDARY
- FLOW LINE
- CATCH BASIN
- PROPERTY LINE
- TRIBUTARY AREA TO OUTFALL #1
- TRIBUTARY AREA TO OUTFALL #2
- TRIBUTARY AREA TO OUTFALL #3
- TRIBUTARY AREA UPSTREAM OF SIDEWALK UNDER DRAIN IN MYERS STREET

GRAPHIC SCALE
50 0 25 50 100 400
(IN FEET)
1 inch = 50 ft.

Stantec

Toll Brothers APARTMENT LIVING

NCTD OCEANSIDE TRANSIT CENTER TOD
235 S. TREMONT AVENUE
EXISTING HYDROLOGY MAP

PROJECT NO. 2042217900

SHEET 1 OF 2

MARCH 26, 2024

DRAWING: ...\2042217900\Drawing\exhibit_files\21790Dc-ex7011.dwg PLOTTED: 6/16/2024 11:56 PM BY: Perez, Edward

S. COAST HWY.

TREMONT AVE.

S. CLEVELAND ST.

AT & SF RAILWAY

S. MYERS STREET

S. MYERS STREET

MISSOURI AVE.

WASHINGTON AVE.

MINNESOTA AVE.

WISCONSIN AVE.

PINE ST.

ELM ST.

ASH ST.

OAK ST.

C3-1 3.06

C5-1 3.35

C7-2 1.67

C3-2 2.42

C5-2 2.44

C7-3 1.68

C4-1 0.76

C6-1 0.68

C7-1 1.13

C8-1 2.62

C8-2 1.25

F7 0.41

F6 0.36

E6 0.44

60.0 FS 700 LF 69

60.0 FS 700 LF 72

62.0 FS 250 LF 75

59.0 FL 62

54.0 FS 235 LF 70

52.0 FS 235 LF 73

51.0 FS 265 LF 76

58.8 FL 63

57.3 FL 64

49.8 FL 65

48.76 FL Q_{25}=20.3 CFS Q_{100}=26.7 CFS A=5.9 AC 490 LF 67

45.0 FS 39.5 INV 74

49.0 FL 57

48.76 FL Q_{25}=22.2 CFS Q_{100}=29.4 CFS A=7.1 AC 900 LF 58

47.0 FS 480 LF 68

45.0 FS 414 LF 59

46.0 FS 365 LF 71

44.0 FS 39.5 INV Q_{25}=76.3 CFS Q_{100}=99.6 CFS A=34.1 60

51.2 FL 56

3'X1.2' RCB

TRIBUTARY OUTFALL #3

48" RCP

30" RCP

45" RCP

27" RCP

24" RCP

18" RCP

12" RCP

LEGEND

- EXISTING STORM DRAIN
- NODE (XX)
- SUBAREA XX / ACREAGE X.XX
- MAJOR HYDROLOGY BOUNDARY
- MINOR HYDROLOGY SUB-BOUNDARY
- FLOW LINE
- CATCH BASIN
- PROPERTY LINE
- TRIBUTARY AREA TO OUTFALL #1
- TRIBUTARY AREA TO OUTFALL #2
- TRIBUTARY AREA TO OUTFALL #3

GRAPHIC SCALE

50 0 25 50 100 400

(IN FEET)
1 inch = 50 ft.

Stantec

Toll Brothers APARTMENT LIVING

NCTD OCEANSIDE TRANSIT CENTER TOD
235 S. TREMONT AVENUE
EXISTING HYDROLOGY MAP

PROJECT NO. 2042217900

SHEET 2 OF 2

MARCH 26, 2024

DRAWING: u:\2042217900\drawing\exhibit_files\2179000-ex1024.dwg PLOTTED: 6/17/2024 12:31 AM BY: Perez, Edward

S. COAST HIGHWAY

SEAGAZE DR.

TOPEKA ST.

MICHIGAN AVE.

MISSOURI AVE.

S. TREMONT ST.

S. CLEVELAND ST.

1ST ST.

TYSON ST.

FIR ST.

S. MYERS ST.

AT&SF RAILWAY

MATCHLINE - SEE SHEET 2 OF 2

TRIBUTARY OUTFALL #1

TRIBUTARY OUTFALL #2

TRIBUTARY OUTFALL #3

A1-1 0.27
A1-2 1.26
A1-3 1.97
A1-4 1.46
A2-1 0.80
A2-2 0.06
A2-3 0.73
A3 0.35
B1-1 0.18
B1-2 0.49
B1-3 0.11
B1-4 0.64
B1-5 0.86
B2-1 1.66
B2-2 0.54
B2-3 0.66
C1-1 0.48
C1-2 2.48
C1-3 0.27
C1-4 0.38
C1-5 0.40
C1-6 2.69
C1-6 0.19
C2-1 0.43
C2-2 1.38
C2-3 1.48
C2-4 1.73
C2-5 0.40
C8-1 0.22
G1 0.28
G2 0.60
G3 2.12
DB1
DB2

20 70.0 FS 258.6 LF
40 70.0 FS 710 LF
70.0 FS 301.4 LF
70.0 FS 254.7 LF 30
10
69.0 FS 479.2 LF 31
69.0 FS 239.4 LF 36
66.6 FS 482.7 LF 37
41 61.9 FS 54.5 INV
60.9 FS 173.5 LF 12
11 64.0 FS 418.6 LF
65.0 FS 59.0 INV 375.9 LF 21
32 62.34 FL 57.34 INV 275 LF
38 58.9 FS 10 LF
39 58.4 FS 255.8 LF
25 122.76 FS 235 LF
123.31 FL 342 LF 27
13 54.9 FS 133 LF
14 50.5 FS 44.5 INV 31 LF
17 48.2 FL 43.91 INV Q_{25}=23.8 CFS Q_{100}=31.3 CFS A=6.9 AC
22 52.8 FS 47.56 INV 36 LF
23 52.6 FS 47.16 INV 328 LF
26 121.60 FS 46.80 INV 255 LF
44.00 INV 75 LF 14
15 52.4 FS 470.2 LF
121.60 FS 45.99 INV 53 LF 28
52.93 FS 49.19 INV 72 LF 32
40 50.1 FS 44.1 INV 55.9 LF
48.8 FS 500 LF 51.2
16 50.1 FS 44.2 INV 10 LF
53.18 FS 303 LF 31
52.15 FS 47.15 INV 431 LF 33
34 50.16 FS 44.91 INV 89 LF
49.27 FS 43.00 INV Q_{25}=30.1 CFS Q_{100}=39.5 CFS A=11.9 AC 35
48.8 FS 910 LF 71
52 71.05 FS 44.5 INV Q_{25}=7.4 CFS Q_{100}=9.5 CFS A=1.6 AC
51 71.05 FS 44.6 INV 15.3 LF
24 52.8 FS 45.52 INV 73 LF
50 73.0 FS 344.3 LF
32 50.0 FL 46.0 INV 166 LF
27 48.2 FL 43.79 INV Q_{25}=8.36 CFS Q_{100}=10.66 CFS A=5.1 AC
30 44.92 INV 227 LF
29 45.72 INV 161 LF
47.80 FS 49.3
45.20 FS 49.4
49.5 43.25 FS
EX. 15" RCP
EX CURB OUTLET 42.62 FL $Q_{25-CURB\ OUTLET}$=8.36 CFS $Q_{100-CURB\ OUTLET}$=10.66 CFS $Q_{25-UPSTREAM\ ST\ FLOW}$=8.3 CFS $Q_{100-UPSTREAM\ ST\ FLOW}$=11.18 CFS $Q_{25-TOTAL\ ST\ FLOW}$=16.66 CFS $Q_{100-TOTAL\ ST\ FLOW}$=21.84 CFS 49.2

LEGEND

- EXISTING STORM DRAIN
- FINISH SURFACE ELEVATION — XX.XX FS — (XX) NODE
- FLOW LINE LENGTH — XX.XX LF
- SUBAREA — XX
- ACREAGE — X.XX
- MAJOR HYDROLOGY BOUNDARY
- MINOR HYDROLOGY SUB-BOUNDARY
- CATCH BASIN
- PROPERTY LINE
- TRIBUTARY AREA TO OUTFALL #1
- TRIBUTARY AREA TO OUTFALL #2
- TRIBUTARY AREA TO OUTFALL #3
- TRIBUTARY AREA UPSTREAM OF SIDEWALK UNDER DRAIN IN MYERS STREET
- DRAINAGE FLOW DIRECTION

NOTES:

1. PIPE ELEVATIONS SHOWN HEREIN ARE BASED ON GIS METADATA AND AS-BUILT DRAWINGS. THE VERTICAL DATUM HAS NOT BEEN VERIFIED BY DESIGN ENGINEER.
2. FUTURE DESIGN SURVEYS SHALL INCLUDE DATA COLLECTION OF PIPE SIZES AND INVERT ELEVATIONS

GRAPHIC SCALE
50 0 25 50 100 400
(IN FEET)
1 inch = 50 ft.

Stantec

Toll Brothers APARTMENT LIVING

NCTD OCEANSIDE TRANSIT CENTER TOD
235 S. TREMONT AVENUE
PROPOSED HYDROLOGY MAP

PROJECT NO. 2042217900

SHEET 1 OF 2

JULY 19, 2024

DRAWING: c:\2042217900\drawing\exhibit_files\2179000--exh010.dwg PLOTTED: 7/19/2024 1:47 PM BY: Ramirez, Nayid

S. COAST HWY.

TREMONT AVE.

S. CLEVELAND ST.

AT & SF RAILWAY

S. MYERS STREET

S. MYERS STREET

MISSOURI AVE.

WASHINGTON AVE.

MINNESOTA AVE.

WISCONSIN AVE.

PINE ST.

ELM ST.

ASH ST.

OAK ST.

TRIBUTARY OUTFALL #3

C3-1 3.06

C5-1 3.35

C7-1 1.67

C4-1 0.40

C3-2 2.42

C5-2 2.44

C7-2 2.81

C4-2 0.76

C6-1 0.68

C8-1 0.22

C8-2 2.62

C8-3 1.25

60.0 FS 700 LF 60

59.9 FS 521 LF 61

58.9 FS 10 LF 38

58.4 FS 255.8 LF 39

54.0 FS 239 LF 61

60.0 FS 700 LF 63

52.0 FS 235 LF 64

62.0 FS 250 LF 66

51.0 FS 265 LF 67

50.1 FS 44.1 INV 55.9 LF 40

50.46 FS 44.91 INV 89 LF 34

48.8 FS 500 LF 31

49.27 FS 43.00 INV Q_{25}=30.1 CFS Q_{100}=39.5 CFS A=11.9 AC 35

48.8 FS 910 LF 71

50.0 FS 131 LF 70

50.0 FS 42.00 INV 50 LF 62

41.60 INV 50 LF 50

47.4 FS 41.46 INV 434 LF 51

46.0 FS 41.29 INV 50 LF 65

46.3 FS 435 LF 72

40.29 INV 50 LF 52

46.1 FS 40.17 INV 414 LF 53

45.0 FS 39.5 INV 50 LF 68

45.0 FS 39.0 INV Q_{25}=74.7 CFS Q_{100}=98.2 CFS A=33.6 54

LEGEND

- EXISTING STORM DRAIN
- FINISH SURFACE ELEVATION XX.XFS
- FLOW LINE LENGTH XX.XLF
- NODE XX
- SUBAREA XX
- ACREAGE X.XX
- MAJOR HYDROLOGY BOUNDARY
- MINOR HYDROLOGY SUB-BOUNDARY
- CATCH BASIN
- PROPERTY LINE
- TRIBUTARY AREA TO OUTFALL #1
- TRIBUTARY AREA TO OUTFALL #2
- TRIBUTARY AREA TO OUTFALL #3
- DRAINAGE FLOW DIRECTION

NOTES:

1. PIPE ELEVATIONS SHOWN HEREIN ARE BASED ON GIS METADATA AND AS-BUILT DRAWINGS. THE VERTICAL DATUM HAS NOT BEEN VERIFIED BY DESIGN ENGINEER.
2. FUTURE DESIGN SURVEYS SHALL INCLUDE DATA COLLECTION OF PIPE SIZES AND INVERT ELEVATIONS

GRAPHIC SCALE

50 0 25 50 100 400

(IN FEET)
1 inch = 50 ft.

Stantec

Toll Brothers APARTMENT LIVING

NCTD OCEANSIDE TRANSIT CENTER TOD
235 S. TREMONT AVENUE
PROPOSED HYDROLOGY MAP

PROJECT NO. 2042217900

SHEET 2 OF 2

JULY 19, 2024

DRAWING: c:\2042217900\Drawing\exhibit_files\2179006-ex2021.dwg PLOTTED: 7/19/2024 10:05 AM BY: Ramirez, Nayid

III. HYDROLOGIC CALCULATIONS

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******************************************************************************

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2016 Advanced Engineering Software (aes)
              Ver. 23.0 Release Date: 07/01/2016  License ID 1535

                              Analysis prepared by:

                                     Stantec



 ************************** DESCRIPTION OF STUDY **************************
* TREMONT SITE - NORTHERLY TRIBUTARY AREA                                  *
* EXISTING CONDITION 25-YEAR RATIONAL METHOD                               *
*                                                                          *
 **************************************************************************

  FILE NAME: E25_10.DAT
  TIME/DATE OF STUDY: 14:16 06/16/2024
------------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) =  25.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.020
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  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     10.00 TO NODE     11.00 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==============================================================================
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  UPSTREAM ELEVATION(FEET) =     70.00
  DOWNSTREAM ELEVATION(FEET) =     64.30
  ELEVATION DIFFERENCE(FEET) =      5.70
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.217
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    70.36
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.322
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      1.19
  TOTAL AREA(ACRES) =      0.27   TOTAL RUNOFF(CFS) =      1.19

******************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  62
------------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
==============================================================================
  UPSTREAM ELEVATION(FEET) =   64.30  DOWNSTREAM ELEVATION(FEET) =   61.20
  STREET LENGTH(FEET) =   420.00   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) =       3.56
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.39
    HALFSTREET FLOOD WIDTH(FEET) =   12.85
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.14
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.84
  STREET FLOW TRAVEL TIME(MIN.) =   3.28   Tc(MIN.) =    6.50
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.496
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
  SUBAREA AREA(ACRES) =    1.26      SUBAREA RUNOFF(CFS) =    4.70
  TOTAL AREA(ACRES) =        1.5        PEAK FLOW RATE(CFS) =       5.71

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.44   HALFSTREET FLOOD WIDTH(FEET) =  15.74
  FLOW VELOCITY(FEET/SEC.) =  2.37   DEPTH*VELOCITY(FT*FT/SEC.) =   1.05
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     12.00 =     700.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     13.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   61.20  DOWNSTREAM ELEVATION(FEET) =   50.00
  STREET LENGTH(FEET) =   280.00   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) =      11.55
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.43
    HALFSTREET FLOOD WIDTH(FEET) =   14.80
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.37
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.29
  STREET FLOW TRAVEL TIME(MIN.) =   0.87   Tc(MIN.) =    7.36
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.146
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
  SUBAREA AREA(ACRES) =    3.39      SUBAREA RUNOFF(CFS) =   11.67
  TOTAL AREA(ACRES) =        4.9        PEAK FLOW RATE(CFS) =      16.93

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.47   HALFSTREET FLOOD WIDTH(FEET) =  17.38
  FLOW VELOCITY(FEET/SEC.) =  5.85   DEPTH*VELOCITY(FT*FT/SEC.) =   2.77
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     13.00 =     980.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     21.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  95
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   390.00
  UPSTREAM ELEVATION(FEET) =     73.00
  DOWNSTREAM ELEVATION(FEET) =     71.05
  ELEVATION DIFFERENCE(FEET) =      1.95
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.688
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    50.00
```

```
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.322
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      3.70
  TOTAL AREA(ACRES) =      0.80   TOTAL RUNOFF(CFS) =      3.70

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     21.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.322
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  95
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
  SUBAREA AREA(ACRES) =    0.68   SUBAREA RUNOFF(CFS) =    3.15
  TOTAL AREA(ACRES) =        1.5   TOTAL RUNOFF(CFS) =       6.85
  TC(MIN.) =    3.69

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     21.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.322
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  95
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
  SUBAREA AREA(ACRES) =    0.06   SUBAREA RUNOFF(CFS) =    0.28
  TOTAL AREA(ACRES) =        1.5   TOTAL RUNOFF(CFS) =       7.13
  TC(MIN.) =    3.69

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     22.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    44.01  DOWNSTREAM(FEET) =    44.00
  FLOW LENGTH(FEET) =    15.32   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.04
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.13
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =    3.75
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     22.00 =     405.32 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     23.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    44.01  DOWNSTREAM(FEET) =    43.91
  FLOW LENGTH(FEET) =   112.61   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   2.27
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.13
  PIPE TRAVEL TIME(MIN.) =   0.83    Tc(MIN.) =    4.58
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     23.00 =     517.93 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     31.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  95
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   500.00
  UPSTREAM ELEVATION(FEET) =     52.80
```

```
  DOWNSTREAM ELEVATION(FEET) =     49.70
  ELEVATION DIFFERENCE(FEET) =      3.10
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.514
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    52.40
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.322
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      1.94
  TOTAL AREA(ACRES) =      0.42   TOTAL RUNOFF(CFS) =      1.94

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     31.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc       INTENSITY     AREA
  NUMBER       (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1         1.94     3.51        5.322        0.42
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     31.00 =     500.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc       INTENSITY     AREA
  NUMBER       (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        16.93     7.36        4.146        4.92
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     31.00 =     980.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc       INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      10.02       3.51        5.322
      2      18.45       7.36        4.146

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      18.45   Tc(MIN.) =    7.36
  TOTAL AREA(ACRES) =        5.3

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     31.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc       INTENSITY     AREA
  NUMBER       (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        18.45     7.36        4.146        5.34
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     31.00 =     980.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc       INTENSITY     AREA
  NUMBER       (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1         7.13     4.58        5.322        1.54
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     31.00 =     517.93 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc       INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      18.60       4.58        5.322
      2      24.00       7.36        4.146

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      24.00   Tc(MIN.) =    7.36
  TOTAL AREA(ACRES) =        6.9

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     31.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     31.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        6.9  TC(MIN.) =      7.36
  PEAK FLOW RATE(CFS)   =      24.00
============================================================================
============================================================================
```

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 1982-2016 Advanced Engineering Software (aes)
              Ver. 23.0 Release Date: 07/01/2016  License ID 1535

                              Analysis prepared by:

                                     Stantec



 ************************** DESCRIPTION OF STUDY **************************
* TREMONT SITE - NORTHERLY TRIBUTARY AREA                                  *
* EXISTING CONDITION 100-YEAR RATIONAL METHOD                              *
*                                                                          *
 **************************************************************************

  FILE NAME: E100_10.DAT
  TIME/DATE OF STUDY: 14:19 06/16/2024
------------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.600
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  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     10.00 TO NODE     11.00 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==============================================================================
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  UPSTREAM ELEVATION(FEET) =     70.00
  DOWNSTREAM ELEVATION(FEET) =     64.30
  ELEVATION DIFFERENCE(FEET) =      5.70
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.217
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    70.36
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.850
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      1.54
  TOTAL AREA(ACRES) =      0.27   TOTAL RUNOFF(CFS) =      1.54

******************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  62
------------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
==============================================================================
  UPSTREAM ELEVATION(FEET) =   64.30  DOWNSTREAM ELEVATION(FEET) =   61.20
  STREET LENGTH(FEET) =   420.00   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) =       4.64
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.42
    HALFSTREET FLOOD WIDTH(FEET) =   14.41
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.26
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.95
  STREET FLOW TRAVEL TIME(MIN.) =   3.09   Tc(MIN.) =    6.31
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.896
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
  SUBAREA AREA(ACRES) =    1.26      SUBAREA RUNOFF(CFS) =    6.17
  TOTAL AREA(ACRES) =        1.5        PEAK FLOW RATE(CFS) =       7.49

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.48   HALFSTREET FLOOD WIDTH(FEET) =  17.54
  FLOW VELOCITY(FEET/SEC.) =  2.55   DEPTH*VELOCITY(FT*FT/SEC.) =   1.21
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     12.00 =     700.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     13.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   61.20  DOWNSTREAM ELEVATION(FEET) =   50.00
  STREET LENGTH(FEET) =   280.00   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) =      15.16
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.46
    HALFSTREET FLOOD WIDTH(FEET) =   16.60
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.71
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.62
  STREET FLOW TRAVEL TIME(MIN.) =   0.82   Tc(MIN.) =    7.13
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.451
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
  SUBAREA AREA(ACRES) =    3.39      SUBAREA RUNOFF(CFS) =   15.34
  TOTAL AREA(ACRES) =        4.9        PEAK FLOW RATE(CFS) =      22.26

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.51   HALFSTREET FLOOD WIDTH(FEET) =  19.41
  FLOW VELOCITY(FEET/SEC.) =  6.25   DEPTH*VELOCITY(FT*FT/SEC.) =   3.18
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     13.00 =     980.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     21.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  95
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   390.00
  UPSTREAM ELEVATION(FEET) =     73.00
  DOWNSTREAM ELEVATION(FEET) =     71.05
  ELEVATION DIFFERENCE(FEET) =      1.95
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.688
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    50.00
```

```
           (Reference: Table 3-1B of Hydrology Manual)
          THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.850
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      4.77
  TOTAL AREA(ACRES) =      0.80   TOTAL RUNOFF(CFS) =      4.77

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     21.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.850
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  95
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
  SUBAREA AREA(ACRES) =    0.68   SUBAREA RUNOFF(CFS) =    4.05
  TOTAL AREA(ACRES) =        1.5   TOTAL RUNOFF(CFS) =       8.82
  TC(MIN.) =    3.69

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     21.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.850
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  95
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
  SUBAREA AREA(ACRES) =    0.06   SUBAREA RUNOFF(CFS) =    0.36
  TOTAL AREA(ACRES) =        1.5   TOTAL RUNOFF(CFS) =       9.18
  TC(MIN.) =    3.69

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     22.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    44.01  DOWNSTREAM(FEET) =    44.00
  FLOW LENGTH(FEET) =    15.32   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.19
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.18
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    3.74
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     22.00 =     405.32 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     23.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    44.01  DOWNSTREAM(FEET) =    43.91
  FLOW LENGTH(FEET) =   112.61   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   2.92
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.18
  PIPE TRAVEL TIME(MIN.) =   0.64    Tc(MIN.) =    4.38
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     23.00 =     517.93 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     31.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  95
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   500.00
  UPSTREAM ELEVATION(FEET) =     52.80
```

```
  DOWNSTREAM ELEVATION(FEET) =     49.70
  ELEVATION DIFFERENCE(FEET) =      3.10
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.514
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    52.40
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.850
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      2.50
  TOTAL AREA(ACRES) =      0.42   TOTAL RUNOFF(CFS) =      2.50

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     31.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc       INTENSITY     AREA
  NUMBER       (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1         2.50     3.51        6.850        0.42
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     31.00 =     500.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc       INTENSITY     AREA
  NUMBER       (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        22.26     7.13        5.451        4.92
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     31.00 =     980.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc       INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      13.48        3.51        6.850
      2      24.25        7.13        5.451

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      24.25   Tc(MIN.) =    7.13
  TOTAL AREA(ACRES) =        5.3

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     31.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc       INTENSITY     AREA
  NUMBER       (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        24.25     7.13        5.451        5.34
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     31.00 =     980.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc       INTENSITY     AREA
  NUMBER       (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1         9.18     4.38        6.850        1.54
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     31.00 =     517.93 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc       INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      24.08        4.38        6.850
      2      31.55        7.13        5.451

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      31.55   Tc(MIN.) =    7.13
  TOTAL AREA(ACRES) =        6.9

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     31.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     31.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        6.9  TC(MIN.) =      7.13
  PEAK FLOW RATE(CFS)   =      31.55
============================================================================
============================================================================
```

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 1982-2016 Advanced Engineering Software (aes)
              Ver. 23.0 Release Date: 07/01/2016  License ID 1535

                            Analysis prepared by:

                                    Stantec



 ************************** DESCRIPTION OF STUDY **************************
* TREMONT SITE - CENTRAL TRIBUTARY AREA                                    *
* EXISTING CONDITION 25-YEAR RATIONAL METHOD (UNDETAINED)                  *
* THIS RM MODEL USED TO DETERMINE TC AND Q FOR RATHYDRO. SEE RM DETAINED.  *
 ************************************************************************

  FILE NAME: E25_40.DAT
  TIME/DATE OF STUDY: 14:25 06/16/2024
------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) =  25.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.020
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  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     40.00 TO NODE     41.00 IS CODE =  21
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
========================================================================
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  UPSTREAM ELEVATION(FEET) =     70.00
  DOWNSTREAM ELEVATION(FEET) =     63.00
  ELEVATION DIFFERENCE(FEET) =      7.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.192
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    71.21
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.322
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      1.06
  TOTAL AREA(ACRES) =      0.24   TOTAL RUNOFF(CFS) =      1.06

************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     42.00 IS CODE =  41
------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    54.50  DOWNSTREAM(FEET) =    46.20
  FLOW LENGTH(FEET) =   230.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   3.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.17
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.06
  PIPE TRAVEL TIME(MIN.) =   0.62    Tc(MIN.) =    3.81
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     42.00 =     560.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     42.00 TO NODE     42.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.322
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8300
  SUBAREA AREA(ACRES) =    0.54   SUBAREA RUNOFF(CFS) =    2.39
  TOTAL AREA(ACRES) =        0.8   TOTAL RUNOFF(CFS) =       3.45
  TC(MIN.) =    3.81

****************************************************************************
  FLOW PROCESS FROM NODE     42.00 TO NODE     43.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    46.20  DOWNSTREAM(FEET) =    41.22
  FLOW LENGTH(FEET) =   230.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   7.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.98
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.45
  PIPE TRAVEL TIME(MIN.) =   0.55    Tc(MIN.) =    4.36
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     43.00 =     790.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     43.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.322
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8300
  SUBAREA AREA(ACRES) =    0.86   SUBAREA RUNOFF(CFS) =    3.80
  TOTAL AREA(ACRES) =        1.6   TOTAL RUNOFF(CFS) =       7.24
  TC(MIN.) =    4.36

****************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     43.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     44.00 TO NODE     45.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   130.00
  UPSTREAM ELEVATION(FEET) =     51.50
  DOWNSTREAM ELEVATION(FEET) =     50.60
  ELEVATION DIFFERENCE(FEET) =      0.90
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.031
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    53.85
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.322
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      1.28
  TOTAL AREA(ACRES) =      0.29   TOTAL RUNOFF(CFS) =      1.28

****************************************************************************
  FLOW PROCESS FROM NODE     45.00 TO NODE     46.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    46.30  DOWNSTREAM(FEET) =    45.11
  FLOW LENGTH(FEET) =   240.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   6.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.14
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
```

```
  PIPE-FLOW(CFS) =       1.28
  PIPE TRAVEL TIME(MIN.) =   1.27    Tc(MIN.) =    5.30
  LONGEST FLOWPATH FROM NODE     44.00 TO NODE     46.00 =     370.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     46.00 TO NODE     46.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.123
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8300
  SUBAREA AREA(ACRES) =    0.60   SUBAREA RUNOFF(CFS) =    2.55
  TOTAL AREA(ACRES) =        0.9   TOTAL RUNOFF(CFS) =       3.78
  TC(MIN.) =    5.30

****************************************************************************
  FLOW PROCESS FROM NODE     46.00 TO NODE     47.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    45.11  DOWNSTREAM(FEET) =    44.95
  FLOW LENGTH(FEET) =    20.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.82
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.78
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    5.37
  LONGEST FLOWPATH FROM NODE     44.00 TO NODE     47.00 =     390.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     47.00 TO NODE     48.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    44.95  DOWNSTREAM(FEET) =    44.24
  FLOW LENGTH(FEET) =   110.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS   4.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.49
  GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   2
  PIPE-FLOW(CFS) =       3.78
  PIPE TRAVEL TIME(MIN.) =   0.52    Tc(MIN.) =    5.90
  LONGEST FLOWPATH FROM NODE     44.00 TO NODE     48.00 =     500.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     48.00 TO NODE     49.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    44.24  DOWNSTREAM(FEET) =    44.10
  FLOW LENGTH(FEET) =    20.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.82
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.78
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    5.97
  LONGEST FLOWPATH FROM NODE     44.00 TO NODE     49.00 =     520.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     49.00 TO NODE     49.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.748
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8300
  SUBAREA AREA(ACRES) =    1.31   SUBAREA RUNOFF(CFS) =    5.16
  TOTAL AREA(ACRES) =        2.2   TOTAL RUNOFF(CFS) =       8.67
  TC(MIN.) =    5.97

****************************************************************************
  FLOW PROCESS FROM NODE     49.00 TO NODE     49.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.748
```

```
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8300
  SUBAREA AREA(ACRES) =    0.23   SUBAREA RUNOFF(CFS) =    0.91
  TOTAL AREA(ACRES) =        2.4   TOTAL RUNOFF(CFS) =       9.58
  TC(MIN.) =    5.97

****************************************************************************
  FLOW PROCESS FROM NODE     49.00 TO NODE     49.10 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    44.10  DOWNSTREAM(FEET) =    43.58
  FLOW LENGTH(FEET) =    70.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.19
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.58
  PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =    6.06
  LONGEST FLOWPATH FROM NODE     44.00 TO NODE     49.10 =     590.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     49.10 TO NODE     49.10 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.700
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8300
  SUBAREA AREA(ACRES) =    0.41   SUBAREA RUNOFF(CFS) =    1.60
  TOTAL AREA(ACRES) =        2.8   TOTAL RUNOFF(CFS) =      11.08
  TC(MIN.) =    6.06

****************************************************************************
  FLOW PROCESS FROM NODE     49.10 TO NODE     43.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    43.58  DOWNSTREAM(FEET) =    41.22
  FLOW LENGTH(FEET) =   320.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.11
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.08
  PIPE TRAVEL TIME(MIN.) =   0.38    Tc(MIN.) =    6.44
  LONGEST FLOWPATH FROM NODE     44.00 TO NODE     43.00 =     910.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     43.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc       INTENSITY     AREA
  NUMBER      (CFS)     (MIN.)    (INCH/HOUR)   (ACRE)
      1       11.08     6.44        4.520        2.84
  LONGEST FLOWPATH FROM NODE     44.00 TO NODE     43.00 =     910.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc       INTENSITY     AREA
  NUMBER      (CFS)     (MIN.)    (INCH/HOUR)   (ACRE)
      1        7.24     4.36        5.322        1.64
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     43.00 =     790.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc       INTENSITY
  NUMBER     (CFS)      (MIN.)    (INCH/HOUR)
      1      14.75       4.36        5.322
      2      17.23       6.44        4.520

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      17.23   Tc(MIN.) =    6.44
  TOTAL AREA(ACRES) =        4.5

****************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     43.00 IS CODE =  12
----------------------------------------------------------------------------
```

```
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
================================================================================
================================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =         4.5  TC(MIN.) =      6.44
  PEAK FLOW RATE(CFS)   =       17.23
================================================================================
================================================================================
  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 1982-2016 Advanced Engineering Software (aes)
              Ver. 23.0 Release Date: 07/01/2016  License ID 1535

                            Analysis prepared by:

                                    Stantec



 ************************** DESCRIPTION OF STUDY **************************
* TREMONT SITE - CENTRAL TRIBUTARY AREA                                    *
* EXISTING CONDITION 100-YEAR RATIONAL METHOD (UNDETAINED)                 *
* THIS RM MODEL USED TO DETERMINE TC AND Q FOR RATHYDRO. SEE RM DETAINED.  *
 ************************************************************************

  FILE NAME: E100_40.DAT
  TIME/DATE OF STUDY: 14:28 06/16/2024
------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.600
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  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     40.00 TO NODE     41.00 IS CODE =  21
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
========================================================================
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  UPSTREAM ELEVATION(FEET) =     70.00
  DOWNSTREAM ELEVATION(FEET) =     63.00
  ELEVATION DIFFERENCE(FEET) =      7.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.192
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    71.21
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.850
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      1.36
  TOTAL AREA(ACRES) =      0.24   TOTAL RUNOFF(CFS) =      1.36

************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     42.00 IS CODE =  41
------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    54.50  DOWNSTREAM(FEET) =    46.20
  FLOW LENGTH(FEET) =   230.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   3.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.61
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.36
  PIPE TRAVEL TIME(MIN.) =   0.58    Tc(MIN.) =    3.77
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     42.00 =     560.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     42.00 TO NODE     42.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.850
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8300
  SUBAREA AREA(ACRES) =    0.54   SUBAREA RUNOFF(CFS) =    3.07
  TOTAL AREA(ACRES) =        0.8   TOTAL RUNOFF(CFS) =       4.43
  TC(MIN.) =    3.77

****************************************************************************
  FLOW PROCESS FROM NODE     42.00 TO NODE     43.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    46.20  DOWNSTREAM(FEET) =    41.22
  FLOW LENGTH(FEET) =   230.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   8.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.33
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.43
  PIPE TRAVEL TIME(MIN.) =   0.52    Tc(MIN.) =    4.29
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     43.00 =     790.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     43.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.850
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8300
  SUBAREA AREA(ACRES) =    0.86   SUBAREA RUNOFF(CFS) =    4.89
  TOTAL AREA(ACRES) =        1.6   TOTAL RUNOFF(CFS) =       9.32
  TC(MIN.) =    4.29

****************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     43.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     44.00 TO NODE     45.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   130.00
  UPSTREAM ELEVATION(FEET) =     51.50
  DOWNSTREAM ELEVATION(FEET) =     50.60
  ELEVATION DIFFERENCE(FEET) =      0.90
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.031
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    53.85
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.850
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      1.65
  TOTAL AREA(ACRES) =      0.29   TOTAL RUNOFF(CFS) =      1.65

****************************************************************************
  FLOW PROCESS FROM NODE     45.00 TO NODE     46.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    46.30  DOWNSTREAM(FEET) =    45.11
  FLOW LENGTH(FEET) =   240.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   7.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.35
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
```

```
  PIPE-FLOW(CFS) =       1.65
  PIPE TRAVEL TIME(MIN.) =   1.20    Tc(MIN.) =    5.23
  LONGEST FLOWPATH FROM NODE     44.00 TO NODE     46.00 =     370.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     46.00 TO NODE     46.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.657
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8300
  SUBAREA AREA(ACRES) =    0.60   SUBAREA RUNOFF(CFS) =    3.32
  TOTAL AREA(ACRES) =        0.9   TOTAL RUNOFF(CFS) =       4.92
  TC(MIN.) =    5.23

****************************************************************************
  FLOW PROCESS FROM NODE     46.00 TO NODE     47.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    45.11  DOWNSTREAM(FEET) =    44.95
  FLOW LENGTH(FEET) =    20.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.26
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.92
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    5.28
  LONGEST FLOWPATH FROM NODE     44.00 TO NODE     47.00 =     390.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     47.00 TO NODE     48.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    44.95  DOWNSTREAM(FEET) =    44.24
  FLOW LENGTH(FEET) =   110.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS   5.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.78
  GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   2
  PIPE-FLOW(CFS) =       4.92
  PIPE TRAVEL TIME(MIN.) =   0.48    Tc(MIN.) =    5.76
  LONGEST FLOWPATH FROM NODE     44.00 TO NODE     48.00 =     500.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     48.00 TO NODE     49.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    44.24  DOWNSTREAM(FEET) =    44.10
  FLOW LENGTH(FEET) =    20.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.26
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.92
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    5.82
  LONGEST FLOWPATH FROM NODE     44.00 TO NODE     49.00 =     520.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     49.00 TO NODE     49.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.213
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8300
  SUBAREA AREA(ACRES) =    1.31   SUBAREA RUNOFF(CFS) =    6.76
  TOTAL AREA(ACRES) =        2.2   TOTAL RUNOFF(CFS) =      11.34
  TC(MIN.) =    5.82

****************************************************************************
  FLOW PROCESS FROM NODE     49.00 TO NODE     49.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.213
```

```
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8300
  SUBAREA AREA(ACRES) =    0.23   SUBAREA RUNOFF(CFS) =    1.19
  TOTAL AREA(ACRES) =        2.4   TOTAL RUNOFF(CFS) =      12.53
  TC(MIN.) =    5.82

****************************************************************************
  FLOW PROCESS FROM NODE     49.00 TO NODE     49.10 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    44.10  DOWNSTREAM(FEET) =    43.58
  FLOW LENGTH(FEET) =    70.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.95
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.53
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    5.89
  LONGEST FLOWPATH FROM NODE     44.00 TO NODE     49.10 =     590.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     49.10 TO NODE     49.10 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.163
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8300
  SUBAREA AREA(ACRES) =    0.41   SUBAREA RUNOFF(CFS) =    2.10
  TOTAL AREA(ACRES) =        2.8   TOTAL RUNOFF(CFS) =      14.53
  TC(MIN.) =    5.89

****************************************************************************
  FLOW PROCESS FROM NODE     49.10 TO NODE     43.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    43.58  DOWNSTREAM(FEET) =    41.22
  FLOW LENGTH(FEET) =   320.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.50
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      14.53
  PIPE TRAVEL TIME(MIN.) =   0.29    Tc(MIN.) =    6.18
  LONGEST FLOWPATH FROM NODE     44.00 TO NODE     43.00 =     910.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     43.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc       INTENSITY     AREA
  NUMBER       (CFS)     (MIN.)   (INCH/HOUR)   (ACRE)
      1       14.53      6.18        5.976        2.84
  LONGEST FLOWPATH FROM NODE     44.00 TO NODE     43.00 =     910.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc       INTENSITY     AREA
  NUMBER       (CFS)     (MIN.)   (INCH/HOUR)   (ACRE)
      1        9.32      4.29        6.850        1.64
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     43.00 =     790.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc       INTENSITY
  NUMBER     (CFS)      (MIN.)   (INCH/HOUR)
      1      19.42        4.29        6.850
      2      22.66        6.18        5.976

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      22.66   Tc(MIN.) =    6.18
  TOTAL AREA(ACRES) =        4.5

****************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     43.00 IS CODE =  12
----------------------------------------------------------------------------
```

```
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
================================================================================
================================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =         4.5  TC(MIN.) =      6.18
  PEAK FLOW RATE(CFS)   =       22.66
================================================================================
================================================================================
  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 1982-2016 Advanced Engineering Software (aes)
              Ver. 23.0 Release Date: 07/01/2016  License ID 1535

                            Analysis prepared by:

                                    Stantec



 ************************** DESCRIPTION OF STUDY **************************
* OCEANSIDE TOD - TREMONT SITE                                            *
* EX CONDITION RATIONAL METHOD FOR 25-YR STORM TO INCLUDE EX DETENTION    *
* SEE RATHYDRO AND FLOW-THROUGH DETENTION BASIN MODEL                     *
 *************************************************************************

  FILE NAME: EX25DET.DAT
  TIME/DATE OF STUDY: 18:50 06/12/2024
------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) =  25.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.020
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  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     40.00 TO NODE     41.00 IS CODE =  21
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
========================================================================
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  UPSTREAM ELEVATION(FEET) =     70.00
  DOWNSTREAM ELEVATION(FEET) =     63.00
  ELEVATION DIFFERENCE(FEET) =      7.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.192
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    71.21
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.322
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      1.06
  TOTAL AREA(ACRES) =      0.24   TOTAL RUNOFF(CFS) =      1.06

************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     42.00 IS CODE =  41
------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    54.50  DOWNSTREAM(FEET) =    46.20
  FLOW LENGTH(FEET) =   230.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   3.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.17
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.06
  PIPE TRAVEL TIME(MIN.) =   0.62    Tc(MIN.) =    3.81
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     42.00 =     560.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     42.00 TO NODE     42.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.322
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8300
  SUBAREA AREA(ACRES) =    0.54   SUBAREA RUNOFF(CFS) =    2.39
  TOTAL AREA(ACRES) =        0.8   TOTAL RUNOFF(CFS) =       3.45
  TC(MIN.) =    3.81

****************************************************************************
  FLOW PROCESS FROM NODE     42.00 TO NODE     43.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    46.20  DOWNSTREAM(FEET) =    41.22
  FLOW LENGTH(FEET) =   230.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   7.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.98
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.45
  PIPE TRAVEL TIME(MIN.) =   0.55    Tc(MIN.) =    4.36
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     43.00 =     790.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     43.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.322
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8300
  SUBAREA AREA(ACRES) =    0.86   SUBAREA RUNOFF(CFS) =    3.80
  TOTAL AREA(ACRES) =        1.6   TOTAL RUNOFF(CFS) =       7.24
  TC(MIN.) =    4.36

****************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     43.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     49.00 TO NODE     49.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =   5.97   RAIN INTENSITY(INCH/HOUR) =  4.75
  TOTAL AREA(ACRES) =     2.20   TOTAL RUNOFF(CFS) =      1.38

****************************************************************************
  FLOW PROCESS FROM NODE     49.00 TO NODE     49.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.747
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.1982
  SUBAREA AREA(ACRES) =    0.23   SUBAREA RUNOFF(CFS) =    0.91
  TOTAL AREA(ACRES) =        2.4   TOTAL RUNOFF(CFS) =       2.29
  TC(MIN.) =    5.97

****************************************************************************
  FLOW PROCESS FROM NODE     49.00 TO NODE     49.10 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    44.10  DOWNSTREAM(FEET) =    43.58
  FLOW LENGTH(FEET) =    70.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   7.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.20
```

```
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.29
  PIPE TRAVEL TIME(MIN.) =   0.28    Tc(MIN.) =    6.25
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     49.10 =     860.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     49.10 TO NODE     49.10 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.610
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.2894
  SUBAREA AREA(ACRES) =    0.41   SUBAREA RUNOFF(CFS) =    1.57
  TOTAL AREA(ACRES) =        2.8   TOTAL RUNOFF(CFS) =       3.79
  TC(MIN.) =    6.25

****************************************************************************
  FLOW PROCESS FROM NODE     49.10 TO NODE     43.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    43.58  DOWNSTREAM(FEET) =    41.22
  FLOW LENGTH(FEET) =   320.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.82
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.79
  PIPE TRAVEL TIME(MIN.) =   1.11    Tc(MIN.) =    7.35
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     43.00 =    1180.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     43.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER       (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1         3.79     7.35       4.150        2.84
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     43.00 =    1180.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER       (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1         7.24     4.36       5.322        1.64
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     43.00 =     790.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1       9.49       4.36        5.322
      2       9.44       7.35        4.150

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       9.49   Tc(MIN.) =    4.36
  TOTAL AREA(ACRES) =        4.5
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        4.5  TC(MIN.) =      4.36
  PEAK FLOW RATE(CFS)   =       9.49
============================================================================
============================================================================
  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 1982-2016 Advanced Engineering Software (aes)
              Ver. 23.0 Release Date: 07/01/2016  License ID 1535

                            Analysis prepared by:

                                   Stantec



 ************************* DESCRIPTION OF STUDY *************************
* OCEANSIDE TOD - TREMONT SITE                                          *
* EX CONDITION RATIONAL METHOD FOR 100-YEAR STORM TO INCLUDE EX DETENTION  *
* SEE RATHYDRO AND FLOW-THROUGH DETENTION BASIN MODEL                   *
 ************************************************************************

  FILE NAME: EX100DET.DAT
  TIME/DATE OF STUDY: 09:22 06/13/2024
------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.600
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  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     40.00 TO NODE     41.00 IS CODE =  21
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
========================================================================
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  UPSTREAM ELEVATION(FEET) =     70.00
  DOWNSTREAM ELEVATION(FEET) =     63.00
  ELEVATION DIFFERENCE(FEET) =      7.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.192
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    71.21
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.850
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      1.36
  TOTAL AREA(ACRES) =      0.24   TOTAL RUNOFF(CFS) =      1.36

************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     42.00 IS CODE =  41
------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    54.50  DOWNSTREAM(FEET) =    46.20
  FLOW LENGTH(FEET) =   230.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   3.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.61
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.36
  PIPE TRAVEL TIME(MIN.) =   0.58    Tc(MIN.) =    3.77
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     42.00 =     560.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     42.00 TO NODE     42.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.850
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8300
  SUBAREA AREA(ACRES) =    0.54   SUBAREA RUNOFF(CFS) =    3.07
  TOTAL AREA(ACRES) =        0.8   TOTAL RUNOFF(CFS) =       4.43
  TC(MIN.) =    3.77

****************************************************************************
  FLOW PROCESS FROM NODE     42.00 TO NODE     43.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    46.20  DOWNSTREAM(FEET) =    41.22
  FLOW LENGTH(FEET) =   230.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   8.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.33
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.43
  PIPE TRAVEL TIME(MIN.) =   0.52    Tc(MIN.) =    4.29
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     43.00 =     790.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     43.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.850
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8300
  SUBAREA AREA(ACRES) =    0.86   SUBAREA RUNOFF(CFS) =    4.89
  TOTAL AREA(ACRES) =        1.6   TOTAL RUNOFF(CFS) =       9.32
  TC(MIN.) =    4.29

****************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     43.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     49.00 TO NODE     49.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =   5.82   RAIN INTENSITY(INCH/HOUR) =  6.21
  TOTAL AREA(ACRES) =     2.20   TOTAL RUNOFF(CFS) =      1.38

****************************************************************************
  FLOW PROCESS FROM NODE     49.00 TO NODE     49.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.211
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.1700
  SUBAREA AREA(ACRES) =    0.23   SUBAREA RUNOFF(CFS) =    1.19
  TOTAL AREA(ACRES) =        2.4   TOTAL RUNOFF(CFS) =       2.57
  TC(MIN.) =    5.82

****************************************************************************
  FLOW PROCESS FROM NODE     49.00 TO NODE     49.10 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    44.10  DOWNSTREAM(FEET) =    43.58
  FLOW LENGTH(FEET) =    70.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   8.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.28
```

```
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.57
  PIPE TRAVEL TIME(MIN.) =   0.27    Tc(MIN.) =    6.09
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     49.10 =     860.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     49.10 TO NODE     49.10 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.030
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.2653
  SUBAREA AREA(ACRES) =    0.41   SUBAREA RUNOFF(CFS) =    2.05
  TOTAL AREA(ACRES) =        2.8   TOTAL RUNOFF(CFS) =       4.54
  TC(MIN.) =    6.09

****************************************************************************
  FLOW PROCESS FROM NODE     49.10 TO NODE     43.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    43.58  DOWNSTREAM(FEET) =    41.22
  FLOW LENGTH(FEET) =   320.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.78
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.54
  PIPE TRAVEL TIME(MIN.) =   0.92    Tc(MIN.) =    7.01
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     43.00 =    1180.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     43.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER       (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1         4.54     7.01       5.506        2.84
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     43.00 =    1180.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER       (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1         9.32     4.29       6.850        1.64
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     43.00 =     790.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      12.11       4.29        6.850
      2      12.04       7.01        5.506

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      12.11   Tc(MIN.) =    4.29
  TOTAL AREA(ACRES) =        4.5
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        4.5  TC(MIN.) =      4.29
  PEAK FLOW RATE(CFS)   =      12.11
============================================================================
============================================================================
  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 1982-2016 Advanced Engineering Software (aes)
              Ver. 23.0 Release Date: 07/01/2016  License ID 1535

                              Analysis prepared by:

                                     Stantec



 ************************* DESCRIPTION OF STUDY *************************
* TREMONT SITE - SOUTHERLY TRIBUTARY AREA                                *
* EXISTING CONDITION 25-YEAR RATIONAL METHOD                             *
*                                                                        *
 ************************************************************************

  FILE NAME: E25_50.DAT
  TIME/DATE OF STUDY: 14:03 06/16/2024
------------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) =  25.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.020
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  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     50.00 TO NODE     51.00 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==============================================================================
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   254.70
  UPSTREAM ELEVATION(FEET) =     70.00
  DOWNSTREAM ELEVATION(FEET) =     69.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.330
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    50.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.322
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      2.12
  TOTAL AREA(ACRES) =      0.48   TOTAL RUNOFF(CFS) =      2.12

******************************************************************************
  FLOW PROCESS FROM NODE     51.00 TO NODE     52.00 IS CODE =  62
------------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
==============================================================================
  UPSTREAM ELEVATION(FEET) =   69.00  DOWNSTREAM ELEVATION(FEET) =   61.00
  STREET LENGTH(FEET) =   479.20   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) =       6.55
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.41
    HALFSTREET FLOOD WIDTH(FEET) =   14.02
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.36
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.39
  STREET FLOW TRAVEL TIME(MIN.) =   2.38   Tc(MIN.) =    6.71
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.404
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
  SUBAREA AREA(ACRES) =    2.41      SUBAREA RUNOFF(CFS) =    8.81
  TOTAL AREA(ACRES) =        2.9        PEAK FLOW RATE(CFS) =      10.56

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.47   HALFSTREET FLOOD WIDTH(FEET) =  17.07
  FLOW VELOCITY(FEET/SEC.) =  3.78   DEPTH*VELOCITY(FT*FT/SEC.) =   1.77
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     52.00 =     733.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     52.00 TO NODE     53.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    61.00  DOWNSTREAM(FEET) =    60.00
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.45
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.56
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =    6.76
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     53.00 =     778.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     53.00 TO NODE     53.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.381
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8300
  SUBAREA AREA(ACRES) =    0.36   SUBAREA RUNOFF(CFS) =    1.31
  TOTAL AREA(ACRES) =        3.2   TOTAL RUNOFF(CFS) =      11.82
  TC(MIN.) =    6.76

****************************************************************************
  FLOW PROCESS FROM NODE     53.00 TO NODE     54.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    60.00  DOWNSTREAM(FEET) =    55.00
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.05
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.82
  PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =    6.87
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     54.00 =     878.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     55.00 IS CODE =  91
----------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
  UPSTREAM NODE ELEVATION(FEET) =     55.00
```

```
  DOWNSTREAM NODE ELEVATION(FEET) =     52.40
  CHANNEL LENGTH THRU SUBAREA(FEET) =   200.00
  "V" GUTTER WIDTH(FEET) =   4.00   GUTTER HIKE(FEET) =  0.060
  PAVEMENT LIP(FEET) =  0.010   MANNING'S N = .0150
  PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.02000
  MAXIMUM DEPTH(FEET) =   0.50
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.977
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     14.64
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.39
  AVERAGE FLOW DEPTH(FEET) =   0.32   FLOOD WIDTH(FEET) =   29.11
  "V" GUTTER FLOW TRAVEL TIME(MIN.) =   0.98   Tc(MIN.) =    7.86
  SUBAREA AREA(ACRES) =    1.71       SUBAREA RUNOFF(CFS) =    5.64
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
  TOTAL AREA(ACRES) =        5.0         PEAK FLOW RATE(CFS) =      16.37

  END OF SUBAREA "V" GUTTER HYDRAULICS:
  DEPTH(FEET) =  0.33   FLOOD WIDTH(FEET) =   30.46
  FLOW VELOCITY(FEET/SEC.) =   3.47   DEPTH*VELOCITY(FT*FT/SEC) =   1.16
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     55.00 =    1078.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     56.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    52.40  DOWNSTREAM(FEET) =    51.20
  FLOW LENGTH(FEET) =   480.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.32
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.80    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      16.37
  PIPE TRAVEL TIME(MIN.) =   0.44    Tc(MIN.) =    8.29
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     56.00 =    1558.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     56.00 TO NODE     56.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.841
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8300
  SUBAREA AREA(ACRES) =    1.74   SUBAREA RUNOFF(CFS) =    5.55
  TOTAL AREA(ACRES) =        6.7   TOTAL RUNOFF(CFS) =      21.36
  TC(MIN.) =    8.29

****************************************************************************
  FLOW PROCESS FROM NODE     56.00 TO NODE     57.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    51.20  DOWNSTREAM(FEET) =    49.00
  FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  23.90
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.80    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      21.36
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =    8.31
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     57.00 =    1588.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     57.00 TO NODE     58.00 IS CODE =  91
----------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
  UPSTREAM NODE ELEVATION(FEET) =     49.00
  DOWNSTREAM NODE ELEVATION(FEET) =     48.60
  CHANNEL LENGTH THRU SUBAREA(FEET) =    55.00
  "V" GUTTER WIDTH(FEET) =   5.00   GUTTER HIKE(FEET) =  0.060
  PAVEMENT LIP(FEET) =  0.010   MANNING'S N = .0150
  PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.02000
  MAXIMUM DEPTH(FEET) =   0.50
```

```
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.746
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     22.04
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.99
  AVERAGE FLOW DEPTH(FEET) =   0.40   FLOOD WIDTH(FEET) =   38.17
  "V" GUTTER FLOW TRAVEL TIME(MIN.) =   0.31   Tc(MIN.) =    8.62
  SUBAREA AREA(ACRES) =    0.44       SUBAREA RUNOFF(CFS) =    1.37
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
  TOTAL AREA(ACRES) =        7.1         PEAK FLOW RATE(CFS) =      22.20

  END OF SUBAREA "V" GUTTER HYDRAULICS:
  DEPTH(FEET) =  0.40   FLOOD WIDTH(FEET) =   38.17
  FLOW VELOCITY(FEET/SEC.) =   3.02   DEPTH*VELOCITY(FT*FT/SEC) =   1.21
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     58.00 =    1643.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     58.00 TO NODE     59.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   48.76  DOWNSTREAM ELEVATION(FEET) =   45.00
  STREET LENGTH(FEET) =   900.00   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) =      25.14
    ***STREET FLOW SPLITS OVER STREET-CROWN***
    FULL DEPTH(FEET) =    0.70   FLOOD WIDTH(FEET) =   31.58
    FULL HALF-STREET VELOCITY(FEET/SEC.) =    2.65
    SPLIT DEPTH(FEET) =    0.41   SPLIT FLOOD WIDTH(FEET) =   13.95
    SPLIT FLOW(CFS) =    3.23   SPLIT VELOCITY(FEET/SEC.) =    1.67
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.70
    HALFSTREET FLOOD WIDTH(FEET) =   31.58
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.65
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.85
  STREET FLOW TRAVEL TIME(MIN.) =   5.65   Tc(MIN.) =   14.27
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.706
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
  SUBAREA AREA(ACRES) =    2.62      SUBAREA RUNOFF(CFS) =    5.88
  TOTAL AREA(ACRES) =        9.8        PEAK FLOW RATE(CFS) =      22.20

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.70   HALFSTREET FLOOD WIDTH(FEET) =  31.58
  FLOW VELOCITY(FEET/SEC.) =  2.65   DEPTH*VELOCITY(FT*FT/SEC.) =   1.85
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     59.00 =    2543.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     59.00 TO NODE     60.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   45.00  DOWNSTREAM ELEVATION(FEET) =   44.00
  STREET LENGTH(FEET) =   414.00   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) =      23.42
```

```
    ***STREET FLOW SPLITS OVER STREET-CROWN***
    FULL DEPTH(FEET) =    0.70   FLOOD WIDTH(FEET) =   31.58
    FULL HALF-STREET VELOCITY(FEET/SEC.) =    2.02
    SPLIT DEPTH(FEET) =    0.54   SPLIT FLOOD WIDTH(FEET) =   21.05
    SPLIT FLOW(CFS) =    6.76   SPLIT VELOCITY(FEET/SEC.) =    1.63
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.70
    HALFSTREET FLOOD WIDTH(FEET) =   31.58
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.02
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.41
  STREET FLOW TRAVEL TIME(MIN.) =   3.42   Tc(MIN.) =   17.69
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.356
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
  SUBAREA AREA(ACRES) =    1.25      SUBAREA RUNOFF(CFS) =    2.44
  TOTAL AREA(ACRES) =       11.0        PEAK FLOW RATE(CFS) =      22.20

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.70   HALFSTREET FLOOD WIDTH(FEET) =  31.58
  FLOW VELOCITY(FEET/SEC.) =  2.02   DEPTH*VELOCITY(FT*FT/SEC.) =   1.41
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     60.00 =    2957.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     60.00 TO NODE     60.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     61.00 TO NODE     62.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   239.40
  UPSTREAM ELEVATION(FEET) =     69.00
  DOWNSTREAM ELEVATION(FEET) =     66.60
  ELEVATION DIFFERENCE(FEET) =      2.40
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.762
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    60.03
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.322
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      1.90
  TOTAL AREA(ACRES) =      0.43   TOTAL RUNOFF(CFS) =      1.90

****************************************************************************
  FLOW PROCESS FROM NODE     62.00 TO NODE     63.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   66.60  DOWNSTREAM ELEVATION(FEET) =   58.90
  STREET LENGTH(FEET) =   482.70   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) =       4.51
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.38
    HALFSTREET FLOOD WIDTH(FEET) =   11.99
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.05
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.15
  STREET FLOW TRAVEL TIME(MIN.) =   2.64   Tc(MIN.) =    6.40
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.539
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
```

```
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
  SUBAREA AREA(ACRES) =    1.38      SUBAREA RUNOFF(CFS) =    5.20
  TOTAL AREA(ACRES) =        1.8        PEAK FLOW RATE(CFS) =       6.82

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.42   HALFSTREET FLOOD WIDTH(FEET) =  14.41
  FLOW VELOCITY(FEET/SEC.) =  3.33   DEPTH*VELOCITY(FT*FT/SEC.) =   1.40
  LONGEST FLOWPATH FROM NODE     61.00 TO NODE     63.00 =     722.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     63.00 TO NODE     64.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    59.00  DOWNSTREAM(FEET) =    58.80
  FLOW LENGTH(FEET) =    10.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.68
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.82
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =    6.42
  LONGEST FLOWPATH FROM NODE     61.00 TO NODE     64.00 =     732.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     64.00 TO NODE     64.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.530
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8300
  SUBAREA AREA(ACRES) =    1.48   SUBAREA RUNOFF(CFS) =    5.57
  TOTAL AREA(ACRES) =        3.3   TOTAL RUNOFF(CFS) =      12.37
  TC(MIN.) =    6.42

****************************************************************************
  FLOW PROCESS FROM NODE     64.00 TO NODE     65.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    58.80  DOWNSTREAM(FEET) =    57.30
  FLOW LENGTH(FEET) =    35.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.75
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.37
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =    6.46
  LONGEST FLOWPATH FROM NODE     61.00 TO NODE     65.00 =     767.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     65.00 TO NODE     65.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.514
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8300
  SUBAREA AREA(ACRES) =    0.52   SUBAREA RUNOFF(CFS) =    1.95
  TOTAL AREA(ACRES) =        3.8   TOTAL RUNOFF(CFS) =      14.27
  TC(MIN.) =    6.46

****************************************************************************
  FLOW PROCESS FROM NODE     65.00 TO NODE     66.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   57.30  DOWNSTREAM ELEVATION(FEET) =   49.80
  STREET LENGTH(FEET) =   230.00   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) =      16.64
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.48
    HALFSTREET FLOOD WIDTH(FEET) =   17.93
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.43
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.62
  STREET FLOW TRAVEL TIME(MIN.) =   0.71   Tc(MIN.) =    7.16
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.221
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
  SUBAREA AREA(ACRES) =    1.35      SUBAREA RUNOFF(CFS) =    4.73
  TOTAL AREA(ACRES) =        5.2        PEAK FLOW RATE(CFS) =      18.08

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.49   HALFSTREET FLOOD WIDTH(FEET) =  18.55
  FLOW VELOCITY(FEET/SEC.) =  5.53   DEPTH*VELOCITY(FT*FT/SEC.) =   2.73
  LONGEST FLOWPATH FROM NODE     61.00 TO NODE     66.00 =     997.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     66.00 TO NODE     66.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.221
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8300
  SUBAREA AREA(ACRES) =    0.36   SUBAREA RUNOFF(CFS) =    1.26
  TOTAL AREA(ACRES) =        5.5   TOTAL RUNOFF(CFS) =      19.34
  TC(MIN.) =    7.16

****************************************************************************
  FLOW PROCESS FROM NODE     66.00 TO NODE     67.00 IS CODE =  91
----------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
  UPSTREAM NODE ELEVATION(FEET) =     49.80
  DOWNSTREAM NODE ELEVATION(FEET) =     49.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    55.00
  "V" GUTTER WIDTH(FEET) =   5.00   GUTTER HIKE(FEET) =  0.060
  PAVEMENT LIP(FEET) =  0.010   MANNING'S N = .0150
  PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.02000
  MAXIMUM DEPTH(FEET) =   0.50
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.133
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     20.04
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.83
  AVERAGE FLOW DEPTH(FEET) =   0.34   FLOOD WIDTH(FEET) =   32.13
  "V" GUTTER FLOW TRAVEL TIME(MIN.) =   0.24   Tc(MIN.) =    7.40
  SUBAREA AREA(ACRES) =    0.41       SUBAREA RUNOFF(CFS) =    1.41
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
  TOTAL AREA(ACRES) =        5.9         PEAK FLOW RATE(CFS) =      20.34

  END OF SUBAREA "V" GUTTER HYDRAULICS:
  DEPTH(FEET) =  0.34   FLOOD WIDTH(FEET) =   32.29
  FLOW VELOCITY(FEET/SEC.) =   3.85   DEPTH*VELOCITY(FT*FT/SEC) =   1.32
  LONGEST FLOWPATH FROM NODE     61.00 TO NODE     67.00 =    1052.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     67.00 TO NODE     68.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   48.76  DOWNSTREAM ELEVATION(FEET) =   47.00
  STREET LENGTH(FEET) =   490.00   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) =      21.37
    ***STREET FLOW SPLITS OVER STREET-CROWN***
    FULL DEPTH(FEET) =    0.70   FLOOD WIDTH(FEET) =   31.58
    FULL HALF-STREET VELOCITY(FEET/SEC.) =    2.46
    SPLIT DEPTH(FEET) =    0.31   SPLIT FLOOD WIDTH(FEET) =    8.53
    SPLIT FLOW(CFS) =    1.05   SPLIT VELOCITY(FEET/SEC.) =    1.24
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.70
    HALFSTREET FLOOD WIDTH(FEET) =   31.58
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.46
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.72
  STREET FLOW TRAVEL TIME(MIN.) =   3.32   Tc(MIN.) =   10.72
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.254
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
  SUBAREA AREA(ACRES) =    0.76      SUBAREA RUNOFF(CFS) =    2.05
  TOTAL AREA(ACRES) =        6.7        PEAK FLOW RATE(CFS) =      20.34

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.70   HALFSTREET FLOOD WIDTH(FEET) =  31.58
  FLOW VELOCITY(FEET/SEC.) =  2.46   DEPTH*VELOCITY(FT*FT/SEC.) =   1.72
  LONGEST FLOWPATH FROM NODE     61.00 TO NODE     68.00 =    1542.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     68.00 TO NODE     68.00 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.) =   10.72
  RAINFALL INTENSITY(INCH/HR) =   3.25
  TOTAL STREAM AREA(ACRES) =     6.69
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     20.34

****************************************************************************
  FLOW PROCESS FROM NODE     69.00 TO NODE     70.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   700.00
  UPSTREAM ELEVATION(FEET) =     60.00
  DOWNSTREAM ELEVATION(FEET) =     54.00
  ELEVATION DIFFERENCE(FEET) =      6.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.868
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    57.14
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.322
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =     13.52
  TOTAL AREA(ACRES) =      3.06   TOTAL RUNOFF(CFS) =     13.52

****************************************************************************
  FLOW PROCESS FROM NODE     70.00 TO NODE     68.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   54.00  DOWNSTREAM ELEVATION(FEET) =   47.00
  STREET LENGTH(FEET) =   235.00   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) =      18.86
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.51
    HALFSTREET FLOOD WIDTH(FEET) =   19.26
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.38
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.73
  STREET FLOW TRAVEL TIME(MIN.) =   0.73   Tc(MIN.) =    4.60
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.322
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
  SUBAREA AREA(ACRES) =    2.42      SUBAREA RUNOFF(CFS) =   10.69
  TOTAL AREA(ACRES) =        5.5        PEAK FLOW RATE(CFS) =      24.21

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.54   HALFSTREET FLOOD WIDTH(FEET) =  21.29
  FLOW VELOCITY(FEET/SEC.) =  5.71   DEPTH*VELOCITY(FT*FT/SEC.) =   3.10
  LONGEST FLOWPATH FROM NODE     69.00 TO NODE     68.00 =     935.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     68.00 TO NODE     68.00 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.) =    4.60
  RAINFALL INTENSITY(INCH/HR) =   5.32
  TOTAL STREAM AREA(ACRES) =     5.48
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     24.21

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       20.34    10.72        3.254          6.69
      2       24.21     4.60        5.322          5.48

  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       32.93     4.60       5.322
      2       35.14    10.72       3.254

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      35.14   Tc(MIN.) =   10.72
  TOTAL AREA(ACRES) =       12.2
  LONGEST FLOWPATH FROM NODE     61.00 TO NODE     68.00 =    1542.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     68.00 TO NODE     71.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   47.00  DOWNSTREAM ELEVATION(FEET) =   46.00
  STREET LENGTH(FEET) =   480.00   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) =      35.89
    ***STREET FLOWING FULL***
```

```
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.72
    HALFSTREET FLOOD WIDTH(FEET) =   32.83
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.98
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.43
  STREET FLOW TRAVEL TIME(MIN.) =   4.04   Tc(MIN.) =   14.76
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.648
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
  SUBAREA AREA(ACRES) =    0.68      SUBAREA RUNOFF(CFS) =    1.49
  TOTAL AREA(ACRES) =       12.9        PEAK FLOW RATE(CFS) =      35.14

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.72   HALFSTREET FLOOD WIDTH(FEET) =  32.65
  FLOW VELOCITY(FEET/SEC.) =  1.97   DEPTH*VELOCITY(FT*FT/SEC.) =   1.41
  LONGEST FLOWPATH FROM NODE     61.00 TO NODE     71.00 =    2022.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     71.00 TO NODE     71.00 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.) =   14.76
  RAINFALL INTENSITY(INCH/HR) =   2.65
  TOTAL STREAM AREA(ACRES) =    12.85
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     35.14

****************************************************************************
  FLOW PROCESS FROM NODE     72.00 TO NODE     73.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   700.00
  UPSTREAM ELEVATION(FEET) =     60.00
  DOWNSTREAM ELEVATION(FEET) =     52.00
  ELEVATION DIFFERENCE(FEET) =      8.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.643
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    61.43
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.322
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =     14.80
  TOTAL AREA(ACRES) =      3.35   TOTAL RUNOFF(CFS) =     14.80

****************************************************************************
  FLOW PROCESS FROM NODE     73.00 TO NODE     71.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   52.00  DOWNSTREAM ELEVATION(FEET) =   46.00
  STREET LENGTH(FEET) =   235.00   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) =      20.19
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.53
    HALFSTREET FLOOD WIDTH(FEET) =   20.43
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.15
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.72
  STREET FLOW TRAVEL TIME(MIN.) =   0.76   Tc(MIN.) =    4.40
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.322
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
```

```
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
  SUBAREA AREA(ACRES) =    2.44      SUBAREA RUNOFF(CFS) =   10.78
  TOTAL AREA(ACRES) =        5.8        PEAK FLOW RATE(CFS) =      25.58

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.56   HALFSTREET FLOOD WIDTH(FEET) =  22.38
  FLOW VELOCITY(FEET/SEC.) =  5.48   DEPTH*VELOCITY(FT*FT/SEC.) =   3.08
  LONGEST FLOWPATH FROM NODE     72.00 TO NODE     71.00 =     935.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     71.00 TO NODE     71.00 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.) =    4.40
  RAINFALL INTENSITY(INCH/HR) =   5.32
  TOTAL STREAM AREA(ACRES) =     5.79
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     25.58

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       35.14    14.76        2.648         12.85
      2       25.58     4.40        5.322          5.79

  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       43.06     4.40       5.322
      2       47.87    14.76       2.648

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      47.87   Tc(MIN.) =   14.76
  TOTAL AREA(ACRES) =       18.6
  LONGEST FLOWPATH FROM NODE     61.00 TO NODE     71.00 =    2022.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     71.00 TO NODE     74.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   46.00  DOWNSTREAM ELEVATION(FEET) =   45.00
  STREET LENGTH(FEET) =   365.00   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) =      48.99
    ***STREET FLOWING FULL***
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.76
    HALFSTREET FLOOD WIDTH(FEET) =   34.48
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.41
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.82
  STREET FLOW TRAVEL TIME(MIN.) =   2.53   Tc(MIN.) =   17.28
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.391
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
  SUBAREA AREA(ACRES) =    1.13      SUBAREA RUNOFF(CFS) =    2.24
  TOTAL AREA(ACRES) =       19.8        PEAK FLOW RATE(CFS) =      47.87

  END OF SUBAREA STREET FLOW HYDRAULICS:
```

```
  DEPTH(FEET) = 0.75   HALFSTREET FLOOD WIDTH(FEET) =  34.24
  FLOW VELOCITY(FEET/SEC.) =  2.39   DEPTH*VELOCITY(FT*FT/SEC.) =   1.80
  LONGEST FLOWPATH FROM NODE     61.00 TO NODE     74.00 =    2387.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     74.00 TO NODE     74.00 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.) =   17.28
  RAINFALL INTENSITY(INCH/HR) =   2.39
  TOTAL STREAM AREA(ACRES) =    19.77
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     47.87

****************************************************************************
  FLOW PROCESS FROM NODE     75.00 TO NODE     76.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   250.00
  UPSTREAM ELEVATION(FEET) =     62.00
  DOWNSTREAM ELEVATION(FEET) =     51.00
  ELEVATION DIFFERENCE(FEET) =     11.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.767
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    87.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.322
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      7.38
  TOTAL AREA(ACRES) =      1.67   TOTAL RUNOFF(CFS) =      7.38

****************************************************************************
  FLOW PROCESS FROM NODE     76.00 TO NODE     74.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   51.00  DOWNSTREAM ELEVATION(FEET) =   45.00
  STREET LENGTH(FEET) =   265.00   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) =      11.09
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.45
    HALFSTREET FLOOD WIDTH(FEET) =   16.37
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.29
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.95
  STREET FLOW TRAVEL TIME(MIN.) =   1.03   Tc(MIN.) =    3.80
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.322
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
  SUBAREA AREA(ACRES) =    1.68      SUBAREA RUNOFF(CFS) =    7.42
  TOTAL AREA(ACRES) =        3.3        PEAK FLOW RATE(CFS) =      14.80

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.49   HALFSTREET FLOOD WIDTH(FEET) =  18.48
  FLOW VELOCITY(FEET/SEC.) =  4.56   DEPTH*VELOCITY(FT*FT/SEC.) =   2.25
  LONGEST FLOWPATH FROM NODE     75.00 TO NODE     74.00 =     515.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     74.00 TO NODE     74.00 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.) =    3.80
  RAINFALL INTENSITY(INCH/HR) =   5.32
  TOTAL STREAM AREA(ACRES) =     3.35
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     14.80

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       47.87    17.28        2.391        19.77
      2       14.80     3.80        5.322         3.35

  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       36.31     3.80       5.322
      2       54.52    17.28       2.391

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      54.52   Tc(MIN.) =   17.28
  TOTAL AREA(ACRES) =       23.1
  LONGEST FLOWPATH FROM NODE     61.00 TO NODE     74.00 =    2387.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     74.00 TO NODE     60.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    39.50  DOWNSTREAM(FEET) =    39.00
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.35
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      54.52
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =   17.33
  LONGEST FLOWPATH FROM NODE     61.00 TO NODE     60.00 =    2437.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     60.00 TO NODE     60.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       54.52    17.33       2.387       23.12
  LONGEST FLOWPATH FROM NODE     61.00 TO NODE     60.00 =    2437.10 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       22.20    17.69       2.356       11.01
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     60.00 =    2957.90 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      76.27      17.33        2.387
      2      76.01      17.69        2.356

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      76.27   Tc(MIN.) =   17.33
  TOTAL AREA(ACRES) =       34.1

****************************************************************************
  FLOW PROCESS FROM NODE     60.00 TO NODE     60.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================
============================================================================
  END OF STUDY SUMMARY:
```

```
  TOTAL AREA(ACRES)      =       34.1  TC(MIN.) =     17.33
  PEAK FLOW RATE(CFS)    =      76.27
================================================================================
================================================================================
  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 1982-2016 Advanced Engineering Software (aes)
              Ver. 23.0 Release Date: 07/01/2016  License ID 1535

                            Analysis prepared by:

                                   Stantec



 ************************* DESCRIPTION OF STUDY *************************
* TREMONT SITE - SOUTHERLY TRIBUTARY AREA                                *
* EXISTING CONDITION 100-YEAR RATIONAL METHOD                            *
*                                                                        *
 ************************************************************************

  FILE NAME: E100_50.DAT
  TIME/DATE OF STUDY: 14:05 06/16/2024
------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.600
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  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     50.00 TO NODE     51.00 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==============================================================================
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   254.70
  UPSTREAM ELEVATION(FEET) =     70.00
  DOWNSTREAM ELEVATION(FEET) =     69.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.330
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    50.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.850
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      2.73
  TOTAL AREA(ACRES) =      0.48   TOTAL RUNOFF(CFS) =      2.73

******************************************************************************
  FLOW PROCESS FROM NODE     51.00 TO NODE     52.00 IS CODE =  62
------------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
==============================================================================
  UPSTREAM ELEVATION(FEET) =   69.00  DOWNSTREAM ELEVATION(FEET) =   61.00
  STREET LENGTH(FEET) =   479.20   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) =       8.51
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.44
    HALFSTREET FLOOD WIDTH(FEET) =   15.66
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.57
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.58
  STREET FLOW TRAVEL TIME(MIN.) =   2.24   Tc(MIN.) =    6.57
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.745
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
  SUBAREA AREA(ACRES) =    2.41      SUBAREA RUNOFF(CFS) =   11.49
  TOTAL AREA(ACRES) =        2.9        PEAK FLOW RATE(CFS) =      13.78

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.50   HALFSTREET FLOOD WIDTH(FEET) =  19.02
  FLOW VELOCITY(FEET/SEC.) =  4.02   DEPTH*VELOCITY(FT*FT/SEC.) =   2.02
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     52.00 =     733.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     52.00 TO NODE     53.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    61.00  DOWNSTREAM(FEET) =    60.00
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.55
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.78
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =    6.61
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     53.00 =     778.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     53.00 TO NODE     53.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.721
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8300
  SUBAREA AREA(ACRES) =    0.36   SUBAREA RUNOFF(CFS) =    1.71
  TOTAL AREA(ACRES) =        3.2   TOTAL RUNOFF(CFS) =      15.43
  TC(MIN.) =    6.61

****************************************************************************
  FLOW PROCESS FROM NODE     53.00 TO NODE     54.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    60.00  DOWNSTREAM(FEET) =    55.00
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.65
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      15.43
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    6.70
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     54.00 =     878.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     55.00 IS CODE =  91
----------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
  UPSTREAM NODE ELEVATION(FEET) =     55.00
```

```
  DOWNSTREAM NODE ELEVATION(FEET) =     52.40
  CHANNEL LENGTH THRU SUBAREA(FEET) =   200.00
  "V" GUTTER WIDTH(FEET) =   4.00   GUTTER HIKE(FEET) =  0.060
  PAVEMENT LIP(FEET) =  0.010   MANNING'S N = .0150
  PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.02000
  MAXIMUM DEPTH(FEET) =   0.50
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.221
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     19.14
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.61
  AVERAGE FLOW DEPTH(FEET) =   0.35   FLOOD WIDTH(FEET) =   32.30
  "V" GUTTER FLOW TRAVEL TIME(MIN.) =   0.92   Tc(MIN.) =    7.62
  SUBAREA AREA(ACRES) =    1.71       SUBAREA RUNOFF(CFS) =    7.41
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
  TOTAL AREA(ACRES) =        5.0         PEAK FLOW RATE(CFS) =      21.49

  END OF SUBAREA "V" GUTTER HYDRAULICS:
  DEPTH(FEET) =  0.37   FLOOD WIDTH(FEET) =   33.81
  FLOW VELOCITY(FEET/SEC.) =   3.71   DEPTH*VELOCITY(FT*FT/SEC) =   1.37
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     55.00 =    1078.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     56.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    52.40  DOWNSTREAM(FEET) =    51.20
  FLOW LENGTH(FEET) =   480.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  24.05
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.80    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      21.49
  PIPE TRAVEL TIME(MIN.) =   0.33    Tc(MIN.) =    7.95
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     56.00 =    1558.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     56.00 TO NODE     56.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.079
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8300
  SUBAREA AREA(ACRES) =    1.74   SUBAREA RUNOFF(CFS) =    7.34
  TOTAL AREA(ACRES) =        6.7   TOTAL RUNOFF(CFS) =      28.25
  TC(MIN.) =    7.95

****************************************************************************
  FLOW PROCESS FROM NODE     56.00 TO NODE     57.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    51.20  DOWNSTREAM(FEET) =    49.00
  FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  31.61
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.80    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      28.25
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =    7.97
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     57.00 =    1588.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     57.00 TO NODE     58.00 IS CODE =  91
----------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
  UPSTREAM NODE ELEVATION(FEET) =     49.00
  DOWNSTREAM NODE ELEVATION(FEET) =     48.60
  CHANNEL LENGTH THRU SUBAREA(FEET) =    55.00
  "V" GUTTER WIDTH(FEET) =   5.00   GUTTER HIKE(FEET) =  0.060
  PAVEMENT LIP(FEET) =  0.010   MANNING'S N = .0150
  PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.02000
  MAXIMUM DEPTH(FEET) =   0.50
```

```
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.958
OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
SOIL CLASSIFICATION IS "A"
S.C.S. CURVE NUMBER (AMC II) =  92
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     29.15
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.20
AVERAGE FLOW DEPTH(FEET) =   0.45   FLOOD WIDTH(FEET) =   42.54
"V" GUTTER FLOW TRAVEL TIME(MIN.) =   0.29   Tc(MIN.) =    8.25
SUBAREA AREA(ACRES) =    0.44       SUBAREA RUNOFF(CFS) =    1.81
AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
TOTAL AREA(ACRES) =        7.1         PEAK FLOW RATE(CFS) =      29.38

END OF SUBAREA "V" GUTTER HYDRAULICS:
DEPTH(FEET) =  0.45   FLOOD WIDTH(FEET) =   42.54
FLOW VELOCITY(FEET/SEC.) =   3.22   DEPTH*VELOCITY(FT*FT/SEC) =   1.43
LONGEST FLOWPATH FROM NODE     50.00 TO NODE     58.00 =    1643.90 FEET.

****************************************************************************
FLOW PROCESS FROM NODE     58.00 TO NODE     59.00 IS CODE =  62
----------------------------------------------------------------------------
>>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
UPSTREAM ELEVATION(FEET) =   48.76  DOWNSTREAM ELEVATION(FEET) =   45.00
STREET LENGTH(FEET) =   900.00   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) =      33.24
  ***STREET FLOW SPLITS OVER STREET-CROWN***
  FULL DEPTH(FEET) =    0.70   FLOOD WIDTH(FEET) =   31.58
  FULL HALF-STREET VELOCITY(FEET/SEC.) =    2.65
  SPLIT DEPTH(FEET) =    0.58   SPLIT FLOOD WIDTH(FEET) =   23.24
  SPLIT FLOW(CFS) =   11.32   SPLIT VELOCITY(FEET/SEC.) =    2.26
  STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
  STREET FLOW DEPTH(FEET) =  0.70
  HALFSTREET FLOOD WIDTH(FEET) =   31.58
  AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.65
  PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.85
STREET FLOW TRAVEL TIME(MIN.) =   5.65   Tc(MIN.) =   13.90
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.542
OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
SOIL CLASSIFICATION IS "A"
S.C.S. CURVE NUMBER (AMC II) =  92
AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
SUBAREA AREA(ACRES) =    2.62      SUBAREA RUNOFF(CFS) =    7.70
TOTAL AREA(ACRES) =        9.8        PEAK FLOW RATE(CFS) =      29.38

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.70   HALFSTREET FLOOD WIDTH(FEET) =  31.58
FLOW VELOCITY(FEET/SEC.) =  2.65   DEPTH*VELOCITY(FT*FT/SEC.) =   1.85
LONGEST FLOWPATH FROM NODE     50.00 TO NODE     59.00 =    2543.90 FEET.

****************************************************************************
FLOW PROCESS FROM NODE     59.00 TO NODE     60.00 IS CODE =  62
----------------------------------------------------------------------------
>>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
UPSTREAM ELEVATION(FEET) =   45.00  DOWNSTREAM ELEVATION(FEET) =   44.00
STREET LENGTH(FEET) =   414.00   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) =      30.98
```

```
    ***STREET FLOW SPLITS OVER STREET-CROWN***
    FULL DEPTH(FEET) =    0.70   FLOOD WIDTH(FEET) =   31.58
    FULL HALF-STREET VELOCITY(FEET/SEC.) =    2.02
    SPLIT DEPTH(FEET) =    0.67   SPLIT FLOOD WIDTH(FEET) =   28.40
    SPLIT FLOW(CFS) =   14.31   SPLIT VELOCITY(FEET/SEC.) =    1.95
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.70
    HALFSTREET FLOOD WIDTH(FEET) =   31.58
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.02
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.41
  STREET FLOW TRAVEL TIME(MIN.) =   3.42   Tc(MIN.) =   17.32
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.074
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
  SUBAREA AREA(ACRES) =    1.25      SUBAREA RUNOFF(CFS) =    3.19
  TOTAL AREA(ACRES) =       11.0        PEAK FLOW RATE(CFS) =      29.38

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.70   HALFSTREET FLOOD WIDTH(FEET) =  31.58
  FLOW VELOCITY(FEET/SEC.) =  2.02   DEPTH*VELOCITY(FT*FT/SEC.) =   1.41
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     60.00 =    2957.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     60.00 TO NODE     60.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     61.00 TO NODE     62.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   239.40
  UPSTREAM ELEVATION(FEET) =     69.00
  DOWNSTREAM ELEVATION(FEET) =     66.60
  ELEVATION DIFFERENCE(FEET) =      2.40
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.762
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    60.03
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.850
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      2.44
  TOTAL AREA(ACRES) =      0.43   TOTAL RUNOFF(CFS) =      2.44

****************************************************************************
  FLOW PROCESS FROM NODE     62.00 TO NODE     63.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   66.60  DOWNSTREAM ELEVATION(FEET) =   58.90
  STREET LENGTH(FEET) =   482.70   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) =       5.86
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.40
    HALFSTREET FLOOD WIDTH(FEET) =   13.48
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.23
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.30
  STREET FLOW TRAVEL TIME(MIN.) =   2.49   Tc(MIN.) =    6.26
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.929
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
```

```
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
  SUBAREA AREA(ACRES) =    1.38      SUBAREA RUNOFF(CFS) =    6.79
  TOTAL AREA(ACRES) =        1.8        PEAK FLOW RATE(CFS) =       8.91

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.45   HALFSTREET FLOOD WIDTH(FEET) =  16.13
  FLOW VELOCITY(FEET/SEC.) =  3.54   DEPTH*VELOCITY(FT*FT/SEC.) =   1.59
  LONGEST FLOWPATH FROM NODE     61.00 TO NODE     63.00 =     722.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     63.00 TO NODE     64.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    59.00  DOWNSTREAM(FEET) =    58.80
  FLOW LENGTH(FEET) =    10.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.34
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.91
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =    6.27
  LONGEST FLOWPATH FROM NODE     61.00 TO NODE     64.00 =     732.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     64.00 TO NODE     64.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.920
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8300
  SUBAREA AREA(ACRES) =    1.48   SUBAREA RUNOFF(CFS) =    7.27
  TOTAL AREA(ACRES) =        3.3   TOTAL RUNOFF(CFS) =      16.17
  TC(MIN.) =    6.27

****************************************************************************
  FLOW PROCESS FROM NODE     64.00 TO NODE     65.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    58.80  DOWNSTREAM(FEET) =    57.30
  FLOW LENGTH(FEET) =    35.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  20.58
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      16.17
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =    6.30
  LONGEST FLOWPATH FROM NODE     61.00 TO NODE     65.00 =     767.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     65.00 TO NODE     65.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.903
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8300
  SUBAREA AREA(ACRES) =    0.52   SUBAREA RUNOFF(CFS) =    2.55
  TOTAL AREA(ACRES) =        3.8   TOTAL RUNOFF(CFS) =      18.67
  TC(MIN.) =    6.30

****************************************************************************
  FLOW PROCESS FROM NODE     65.00 TO NODE     66.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   57.30  DOWNSTREAM ELEVATION(FEET) =   49.80
  STREET LENGTH(FEET) =   230.00   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) =      21.77
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.52
    HALFSTREET FLOOD WIDTH(FEET) =   20.04
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.76
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    3.00
  STREET FLOW TRAVEL TIME(MIN.) =   0.67   Tc(MIN.) =    6.96
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.532
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
  SUBAREA AREA(ACRES) =    1.35      SUBAREA RUNOFF(CFS) =    6.20
  TOTAL AREA(ACRES) =        5.2        PEAK FLOW RATE(CFS) =      23.69

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.53   HALFSTREET FLOOD WIDTH(FEET) =  20.74
  FLOW VELOCITY(FEET/SEC.) =  5.87   DEPTH*VELOCITY(FT*FT/SEC.) =   3.13
  LONGEST FLOWPATH FROM NODE     61.00 TO NODE     66.00 =     997.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     66.00 TO NODE     66.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.532
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8300
  SUBAREA AREA(ACRES) =    0.36   SUBAREA RUNOFF(CFS) =    1.65
  TOTAL AREA(ACRES) =        5.5   TOTAL RUNOFF(CFS) =      25.35
  TC(MIN.) =    6.96

****************************************************************************
  FLOW PROCESS FROM NODE     66.00 TO NODE     67.00 IS CODE =  91
----------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
  UPSTREAM NODE ELEVATION(FEET) =     49.80
  DOWNSTREAM NODE ELEVATION(FEET) =     49.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    55.00
  "V" GUTTER WIDTH(FEET) =   5.00   GUTTER HIKE(FEET) =  0.060
  PAVEMENT LIP(FEET) =  0.010   MANNING'S N = .0150
  PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.02000
  MAXIMUM DEPTH(FEET) =   0.50
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.420
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     26.27
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.08
  AVERAGE FLOW DEPTH(FEET) =   0.38   FLOOD WIDTH(FEET) =   35.65
  "V" GUTTER FLOW TRAVEL TIME(MIN.) =   0.22   Tc(MIN.) =    7.19
  SUBAREA AREA(ACRES) =    0.41       SUBAREA RUNOFF(CFS) =    1.84
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
  TOTAL AREA(ACRES) =        5.9         PEAK FLOW RATE(CFS) =      26.68

  END OF SUBAREA "V" GUTTER HYDRAULICS:
  DEPTH(FEET) =  0.38   FLOOD WIDTH(FEET) =   35.82
  FLOW VELOCITY(FEET/SEC.) =   4.11   DEPTH*VELOCITY(FT*FT/SEC) =   1.55
  LONGEST FLOWPATH FROM NODE     61.00 TO NODE     67.00 =    1052.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     67.00 TO NODE     68.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   48.76  DOWNSTREAM ELEVATION(FEET) =   47.00
  STREET LENGTH(FEET) =   490.00   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) =      28.02
    ***STREET FLOW SPLITS OVER STREET-CROWN***
    FULL DEPTH(FEET) =    0.70   FLOOD WIDTH(FEET) =   31.58
    FULL HALF-STREET VELOCITY(FEET/SEC.) =    2.46
    SPLIT DEPTH(FEET) =    0.53   SPLIT FLOOD WIDTH(FEET) =   20.51
    SPLIT FLOW(CFS) =    7.70   SPLIT VELOCITY(FEET/SEC.) =    1.95
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.70
    HALFSTREET FLOOD WIDTH(FEET) =   31.58
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.46
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.72
  STREET FLOW TRAVEL TIME(MIN.) =   3.32   Tc(MIN.) =   10.51
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.243
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
  SUBAREA AREA(ACRES) =    0.76      SUBAREA RUNOFF(CFS) =    2.68
  TOTAL AREA(ACRES) =        6.7        PEAK FLOW RATE(CFS) =      26.68

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.70   HALFSTREET FLOOD WIDTH(FEET) =  31.58
  FLOW VELOCITY(FEET/SEC.) =  2.46   DEPTH*VELOCITY(FT*FT/SEC.) =   1.72
  LONGEST FLOWPATH FROM NODE     61.00 TO NODE     68.00 =    1542.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     68.00 TO NODE     68.00 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.) =   10.51
  RAINFALL INTENSITY(INCH/HR) =   4.24
  TOTAL STREAM AREA(ACRES) =     6.69
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     26.68

****************************************************************************
  FLOW PROCESS FROM NODE     69.00 TO NODE     70.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   700.00
  UPSTREAM ELEVATION(FEET) =     60.00
  DOWNSTREAM ELEVATION(FEET) =     54.00
  ELEVATION DIFFERENCE(FEET) =      6.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.868
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    57.14
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.850
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =     17.40
  TOTAL AREA(ACRES) =      3.06   TOTAL RUNOFF(CFS) =     17.40

****************************************************************************
  FLOW PROCESS FROM NODE     70.00 TO NODE     68.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   54.00  DOWNSTREAM ELEVATION(FEET) =   47.00
  STREET LENGTH(FEET) =   235.00   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) =      24.28
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.54
    HALFSTREET FLOOD WIDTH(FEET) =   21.29
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.72
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    3.11
  STREET FLOW TRAVEL TIME(MIN.) =   0.68   Tc(MIN.) =    4.55
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.850
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
  SUBAREA AREA(ACRES) =    2.42      SUBAREA RUNOFF(CFS) =   13.76
  TOTAL AREA(ACRES) =        5.5        PEAK FLOW RATE(CFS) =      31.16

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.58   HALFSTREET FLOOD WIDTH(FEET) =  23.48
  FLOW VELOCITY(FEET/SEC.) =  6.09   DEPTH*VELOCITY(FT*FT/SEC.) =   3.54
  LONGEST FLOWPATH FROM NODE     69.00 TO NODE     68.00 =     935.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     68.00 TO NODE     68.00 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.) =    4.55
  RAINFALL INTENSITY(INCH/HR) =   6.85
  TOTAL STREAM AREA(ACRES) =     5.48
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     31.16

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       26.68    10.51        4.243          6.69
      2       31.16     4.55        6.850          5.48

  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       42.72     4.55       6.850
      2       45.98    10.51       4.243

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      45.98   Tc(MIN.) =   10.51
  TOTAL AREA(ACRES) =       12.2
  LONGEST FLOWPATH FROM NODE     61.00 TO NODE     68.00 =    1542.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     68.00 TO NODE     71.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   47.00  DOWNSTREAM ELEVATION(FEET) =   46.00
  STREET LENGTH(FEET) =   480.00   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) =      46.97
    ***STREET FLOWING FULL***
```

```
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.77
    HALFSTREET FLOOD WIDTH(FEET) =   35.40
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.17
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.68
  STREET FLOW TRAVEL TIME(MIN.) =   3.68   Tc(MIN.) =   14.19
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.496
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
  SUBAREA AREA(ACRES) =    0.68      SUBAREA RUNOFF(CFS) =    1.97
  TOTAL AREA(ACRES) =       12.9        PEAK FLOW RATE(CFS) =      45.98

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.77   HALFSTREET FLOOD WIDTH(FEET) =  35.21
  FLOW VELOCITY(FEET/SEC.) =  2.15   DEPTH*VELOCITY(FT*FT/SEC.) =   1.66
  LONGEST FLOWPATH FROM NODE     61.00 TO NODE     71.00 =    2022.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     71.00 TO NODE     71.00 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.) =   14.19
  RAINFALL INTENSITY(INCH/HR) =   3.50
  TOTAL STREAM AREA(ACRES) =    12.85
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     45.98

****************************************************************************
  FLOW PROCESS FROM NODE     72.00 TO NODE     73.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   700.00
  UPSTREAM ELEVATION(FEET) =     60.00
  DOWNSTREAM ELEVATION(FEET) =     52.00
  ELEVATION DIFFERENCE(FEET) =      8.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.643
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    61.43
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.850
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =     19.05
  TOTAL AREA(ACRES) =      3.35   TOTAL RUNOFF(CFS) =     19.05

****************************************************************************
  FLOW PROCESS FROM NODE     73.00 TO NODE     71.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   52.00  DOWNSTREAM ELEVATION(FEET) =   46.00
  STREET LENGTH(FEET) =   235.00   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) =      25.98
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.57
    HALFSTREET FLOOD WIDTH(FEET) =   22.54
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.49
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    3.10
  STREET FLOW TRAVEL TIME(MIN.) =   0.71   Tc(MIN.) =    4.36
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.850
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
```

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  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
  SUBAREA AREA(ACRES) =    2.44      SUBAREA RUNOFF(CFS) =   13.87
  TOTAL AREA(ACRES) =        5.8        PEAK FLOW RATE(CFS) =      32.92

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.60   HALFSTREET FLOOD WIDTH(FEET) =  24.73
  FLOW VELOCITY(FEET/SEC.) =  5.82   DEPTH*VELOCITY(FT*FT/SEC.) =   3.52
  LONGEST FLOWPATH FROM NODE     72.00 TO NODE     71.00 =     935.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     71.00 TO NODE     71.00 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.) =    4.36
  RAINFALL INTENSITY(INCH/HR) =   6.85
  TOTAL STREAM AREA(ACRES) =     5.79
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     32.92

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       45.98    14.19        3.496         12.85
      2       32.92     4.36        6.850          5.79

  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       56.38     4.36       6.850
      2       62.78    14.19       3.496

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      62.78   Tc(MIN.) =   14.19
  TOTAL AREA(ACRES) =       18.6
  LONGEST FLOWPATH FROM NODE     61.00 TO NODE     71.00 =    2022.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     71.00 TO NODE     74.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   46.00  DOWNSTREAM ELEVATION(FEET) =   45.00
  STREET LENGTH(FEET) =   365.00   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) =      64.27
    ***STREET FLOWING FULL***
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.81
    HALFSTREET FLOOD WIDTH(FEET) =   37.35
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.63
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.14
  STREET FLOW TRAVEL TIME(MIN.) =   2.32   Tc(MIN.) =   16.50
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.171
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
  SUBAREA AREA(ACRES) =    1.13      SUBAREA RUNOFF(CFS) =    2.97
  TOTAL AREA(ACRES) =       19.8        PEAK FLOW RATE(CFS) =      62.78

  END OF SUBAREA STREET FLOW HYDRAULICS:
```

```
  DEPTH(FEET) = 0.81   HALFSTREET FLOOD WIDTH(FEET) =  37.05
  FLOW VELOCITY(FEET/SEC.) =  2.61   DEPTH*VELOCITY(FT*FT/SEC.) =   2.11
  LONGEST FLOWPATH FROM NODE     61.00 TO NODE     74.00 =    2387.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     74.00 TO NODE     74.00 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.) =   16.50
  RAINFALL INTENSITY(INCH/HR) =   3.17
  TOTAL STREAM AREA(ACRES) =    19.77
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     62.78

****************************************************************************
  FLOW PROCESS FROM NODE     75.00 TO NODE     76.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   250.00
  UPSTREAM ELEVATION(FEET) =     62.00
  DOWNSTREAM ELEVATION(FEET) =     51.00
  ELEVATION DIFFERENCE(FEET) =     11.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.767
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    87.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.850
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      9.50
  TOTAL AREA(ACRES) =      1.67   TOTAL RUNOFF(CFS) =      9.50

****************************************************************************
  FLOW PROCESS FROM NODE     76.00 TO NODE     74.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   51.00  DOWNSTREAM ELEVATION(FEET) =   45.00
  STREET LENGTH(FEET) =   265.00   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) =      14.27
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.49
    HALFSTREET FLOOD WIDTH(FEET) =   18.16
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.54
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.21
  STREET FLOW TRAVEL TIME(MIN.) =   0.97   Tc(MIN.) =    3.74
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.850
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
  SUBAREA AREA(ACRES) =    1.68      SUBAREA RUNOFF(CFS) =    9.55
  TOTAL AREA(ACRES) =        3.3        PEAK FLOW RATE(CFS) =      19.05

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.53   HALFSTREET FLOOD WIDTH(FEET) =  20.43
  FLOW VELOCITY(FEET/SEC.) =  4.86   DEPTH*VELOCITY(FT*FT/SEC.) =   2.56
  LONGEST FLOWPATH FROM NODE     75.00 TO NODE     74.00 =     515.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     74.00 TO NODE     74.00 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.) =    3.74
  RAINFALL INTENSITY(INCH/HR) =   6.85
  TOTAL STREAM AREA(ACRES) =     3.35
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     19.05

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       62.78    16.50        3.171         19.77
      2       19.05     3.74        6.850          3.35

  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       48.11     3.74       6.850
      2       71.60    16.50       3.171

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      71.60   Tc(MIN.) =   16.50
  TOTAL AREA(ACRES) =       23.1
  LONGEST FLOWPATH FROM NODE     61.00 TO NODE     74.00 =    2387.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     74.00 TO NODE     60.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    39.50  DOWNSTREAM(FEET) =    39.00
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  22.79
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      71.60
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =   16.54
  LONGEST FLOWPATH FROM NODE     61.00 TO NODE     60.00 =    2437.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     60.00 TO NODE     60.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       71.60    16.54       3.166       23.12
  LONGEST FLOWPATH FROM NODE     61.00 TO NODE     60.00 =    2437.10 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       29.38    17.32       3.074       11.01
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     60.00 =    2957.90 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      99.65      16.54        3.166
      2      98.88      17.32        3.074

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      99.65   Tc(MIN.) =   16.54
  TOTAL AREA(ACRES) =       34.1

****************************************************************************
  FLOW PROCESS FROM NODE     60.00 TO NODE     60.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================
============================================================================
  END OF STUDY SUMMARY:
```

```
  TOTAL AREA(ACRES)      =       34.1  TC(MIN.) =     16.54
  PEAK FLOW RATE(CFS)    =      99.65
================================================================================
================================================================================
  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 1982-2016 Advanced Engineering Software (aes)
              Ver. 23.0 Release Date: 07/01/2016  License ID 1535

                              Analysis prepared by:

                                     Stantec



 ************************** DESCRIPTION OF STUDY **************************
* TREMONT SITE - NORTHERLY TRIBUTARY AREA                                  *
* PROPOSED CONDITION 25-YEAR RATIONAL METHOD                               *
*                                                                          *
 **************************************************************************

  FILE NAME: P25_10.DAT
  TIME/DATE OF STUDY: 11:30 06/16/2024
------------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) =  25.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.020
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  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   18.0      9.0    0.020/0.020/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.63 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.3 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

******************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     11.00 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==============================================================================
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   301.40
  UPSTREAM ELEVATION(FEET) =     70.00
  DOWNSTREAM ELEVATION(FEET) =     64.00
  ELEVATION DIFFERENCE(FEET) =      6.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.230
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    69.91
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.322
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      1.19
  TOTAL AREA(ACRES) =      0.27   TOTAL RUNOFF(CFS) =      1.19

******************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  62
------------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
==============================================================================
  UPSTREAM ELEVATION(FEET) =   64.00  DOWNSTREAM ELEVATION(FEET) =   60.90
  STREET LENGTH(FEET) =   418.60   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   9.00
  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) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.58
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.40
    HALFSTREET FLOOD WIDTH(FEET) =   11.99
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.20
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.88
  STREET FLOW TRAVEL TIME(MIN.) =   3.17   Tc(MIN.) =    6.40
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.540
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
  SUBAREA AREA(ACRES) =    1.26      SUBAREA RUNOFF(CFS) =    4.75
  TOTAL AREA(ACRES) =        1.5        PEAK FLOW RATE(CFS) =       5.77

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.45   HALFSTREET FLOOD WIDTH(FEET) =  14.66
  FLOW VELOCITY(FEET/SEC.) =  2.47   DEPTH*VELOCITY(FT*FT/SEC.) =   1.11
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     12.00 =     720.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     13.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   60.90  DOWNSTREAM ELEVATION(FEET) =   54.90
  STREET LENGTH(FEET) =   173.50   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   9.00
  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) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       9.27
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.42
    HALFSTREET FLOOD WIDTH(FEET) =   12.97
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.95
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.07
  STREET FLOW TRAVEL TIME(MIN.) =   0.58   Tc(MIN.) =    6.98
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.291
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
  SUBAREA AREA(ACRES) =    1.97      SUBAREA RUNOFF(CFS) =    7.02
  TOTAL AREA(ACRES) =        3.5        PEAK FLOW RATE(CFS) =      12.47

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.45   HALFSTREET FLOOD WIDTH(FEET) =  14.66
  FLOW VELOCITY(FEET/SEC.) =  5.33   DEPTH*VELOCITY(FT*FT/SEC.) =   2.41
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     13.00 =     893.50 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     14.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   54.90  DOWNSTREAM ELEVATION(FEET) =   50.50
  STREET LENGTH(FEET) =   133.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   9.00
  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) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      14.97
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
```

```
    STREET FLOW DEPTH(FEET) =  0.48
    HALFSTREET FLOOD WIDTH(FEET) =   16.00
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.45
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.61
  STREET FLOW TRAVEL TIME(MIN.) =   0.41   Tc(MIN.) =    7.39
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.137
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
  SUBAREA AREA(ACRES) =    1.46      SUBAREA RUNOFF(CFS) =    5.01
  TOTAL AREA(ACRES) =        5.0        PEAK FLOW RATE(CFS) =      17.03

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.50   HALFSTREET FLOOD WIDTH(FEET) =  16.84
  FLOW VELOCITY(FEET/SEC.) =  5.63   DEPTH*VELOCITY(FT*FT/SEC.) =   2.79
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     14.00 =    1026.50 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     14.10 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    44.50  DOWNSTREAM(FEET) =    44.00
  FLOW LENGTH(FEET) =    31.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  15.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.18
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      17.03
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =    7.44
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     14.10 =    1057.50 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     14.10 TO NODE     14.10 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.) =    7.44
  RAINFALL INTENSITY(INCH/HR) =   4.12
  TOTAL STREAM AREA(ACRES) =     4.96
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     17.03

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     16.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  95
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   470.20
  UPSTREAM ELEVATION(FEET) =     52.40
  DOWNSTREAM ELEVATION(FEET) =     50.10
  ELEVATION DIFFERENCE(FEET) =      2.30
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.688
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    50.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.322
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      1.62
  TOTAL AREA(ACRES) =      0.35   TOTAL RUNOFF(CFS) =      1.62

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     14.10 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    14.20  DOWNSTREAM(FEET) =    14.00
  FLOW LENGTH(FEET) =    10.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   4.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.61
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.62
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =    3.72
  LONGEST FLOWPATH FROM NODE     15.00 TO NODE     14.10 =     480.20 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     14.10 TO NODE     14.10 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.) =    3.72
  RAINFALL INTENSITY(INCH/HR) =   5.32
  TOTAL STREAM AREA(ACRES) =     0.35
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.62

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       17.03     7.44        4.117          4.96
      2        1.62     3.72        5.322          0.35

  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       10.13     3.72       5.322
      2       18.29     7.44       4.117

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      18.29   Tc(MIN.) =    7.44
  TOTAL AREA(ACRES) =        5.3
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     14.10 =    1057.50 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     14.10 TO NODE     17.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    44.00  DOWNSTREAM(FEET) =    43.91
  FLOW LENGTH(FEET) =    75.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  24.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.55
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      18.29
  PIPE TRAVEL TIME(MIN.) =   0.35    Tc(MIN.) =    7.80
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     17.00 =    1132.50 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     17.00 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.) =    7.80
  RAINFALL INTENSITY(INCH/HR) =   4.00
  TOTAL STREAM AREA(ACRES) =     5.31
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     18.29

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     51.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  95
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   344.30
  UPSTREAM ELEVATION(FEET) =     73.00
  DOWNSTREAM ELEVATION(FEET) =     71.05
  ELEVATION DIFFERENCE(FEET) =      1.95
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.585
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    51.33
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.322
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      3.70
  TOTAL AREA(ACRES) =      0.80   TOTAL RUNOFF(CFS) =      3.70

****************************************************************************
  FLOW PROCESS FROM NODE     51.00 TO NODE     51.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
```

```
  25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.322
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "A"
 S.C.S. CURVE NUMBER (AMC II) =  95
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
 SUBAREA AREA(ACRES) =    0.73   SUBAREA RUNOFF(CFS) =    3.38
 TOTAL AREA(ACRES) =        1.5   TOTAL RUNOFF(CFS) =       7.08
 TC(MIN.) =    3.58

****************************************************************************
 FLOW PROCESS FROM NODE     51.00 TO NODE     51.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.322
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "A"
 S.C.S. CURVE NUMBER (AMC II) =  95
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
 SUBAREA AREA(ACRES) =    0.06   SUBAREA RUNOFF(CFS) =    0.28
 TOTAL AREA(ACRES) =        1.6   TOTAL RUNOFF(CFS) =       7.36
 TC(MIN.) =    3.58

****************************************************************************
 FLOW PROCESS FROM NODE     51.00 TO NODE     52.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    44.60  DOWNSTREAM(FEET) =    44.50
 FLOW LENGTH(FEET) =    15.32   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  13.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.29
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       7.36
 PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    3.63
 LONGEST FLOWPATH FROM NODE     50.00 TO NODE     52.00 =     359.62 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     52.00 TO NODE     17.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    44.50  DOWNSTREAM(FEET) =    43.91
 FLOW LENGTH(FEET) =   112.61   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  11.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.98
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       7.36
 PIPE TRAVEL TIME(MIN.) =   0.38    Tc(MIN.) =    4.01
 LONGEST FLOWPATH FROM NODE     50.00 TO NODE     17.00 =     472.23 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     17.00 TO NODE     17.00 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.) =    4.01
 RAINFALL INTENSITY(INCH/HR) =   5.32
 TOTAL STREAM AREA(ACRES) =     1.59
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      7.36

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1       18.29     7.80        3.996          5.31
     2        7.36     4.01        5.322          1.59

 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       21.09     4.01       5.322
     2       23.81     7.80       3.996

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      23.81   Tc(MIN.) =    7.80
```

```
  TOTAL AREA(ACRES) =        6.9
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     17.00 =    1132.50 FEET.
================================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =         6.9  TC(MIN.) =      7.80
  PEAK FLOW RATE(CFS)   =       23.81
================================================================================
================================================================================
  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 1982-2016 Advanced Engineering Software (aes)
              Ver. 23.0 Release Date: 07/01/2016  License ID 1535

                              Analysis prepared by:

                                     Stantec



 ************************** DESCRIPTION OF STUDY **************************
* TREMONT SITE - NORTHERLY TRIBUTARY AREA                                  *
* PROPOSED CONDITION 100-YEAR RATIONAL METHOD                              *
*                                                                          *
 **************************************************************************

  FILE NAME: P100_10.DAT
  TIME/DATE OF STUDY: 11:33 06/16/2024
------------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.600
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  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   18.0      9.0    0.020/0.020/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.63 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.3 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

******************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     11.00 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==============================================================================
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   301.40
  UPSTREAM ELEVATION(FEET) =     70.00
  DOWNSTREAM ELEVATION(FEET) =     64.00
  ELEVATION DIFFERENCE(FEET) =      6.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.230
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    69.91
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.850
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      1.54
  TOTAL AREA(ACRES) =      0.27   TOTAL RUNOFF(CFS) =      1.54

******************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  62
------------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
==============================================================================
  UPSTREAM ELEVATION(FEET) =   64.00  DOWNSTREAM ELEVATION(FEET) =   60.90
  STREET LENGTH(FEET) =   418.60   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   9.00
  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) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.67
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.43
    HALFSTREET FLOOD WIDTH(FEET) =   13.46
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.33
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.00
  STREET FLOW TRAVEL TIME(MIN.) =   2.99   Tc(MIN.) =    6.22
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.950
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
  SUBAREA AREA(ACRES) =    1.26      SUBAREA RUNOFF(CFS) =    6.22
  TOTAL AREA(ACRES) =        1.5        PEAK FLOW RATE(CFS) =       7.56

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.49   HALFSTREET FLOOD WIDTH(FEET) =  16.42
  FLOW VELOCITY(FEET/SEC.) =  2.62   DEPTH*VELOCITY(FT*FT/SEC.) =   1.27
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     12.00 =     720.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     13.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   60.90  DOWNSTREAM ELEVATION(FEET) =   54.90
  STREET LENGTH(FEET) =   173.50   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   9.00
  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) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      12.16
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.45
    HALFSTREET FLOOD WIDTH(FEET) =   14.52
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.29
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.38
  STREET FLOW TRAVEL TIME(MIN.) =   0.55   Tc(MIN.) =    6.77
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.635
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
  SUBAREA AREA(ACRES) =    1.97      SUBAREA RUNOFF(CFS) =    9.21
  TOTAL AREA(ACRES) =        3.5        PEAK FLOW RATE(CFS) =      16.37

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.49   HALFSTREET FLOOD WIDTH(FEET) =  16.42
  FLOW VELOCITY(FEET/SEC.) =  5.67   DEPTH*VELOCITY(FT*FT/SEC.) =   2.76
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     13.00 =     893.50 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     14.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   54.90  DOWNSTREAM ELEVATION(FEET) =   50.50
  STREET LENGTH(FEET) =   133.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   9.00
  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) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      19.67
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
```

```
    STREET FLOW DEPTH(FEET) =  0.52
    HALFSTREET FLOOD WIDTH(FEET) =   17.89
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.80
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.99
  STREET FLOW TRAVEL TIME(MIN.) =   0.38   Tc(MIN.) =    7.15
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.439
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
  SUBAREA AREA(ACRES) =    1.46      SUBAREA RUNOFF(CFS) =    6.59
  TOTAL AREA(ACRES) =        5.0        PEAK FLOW RATE(CFS) =      22.39

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.52   HALFSTREET FLOOD WIDTH(FEET) =  18.00
  FLOW VELOCITY(FEET/SEC.) =  5.85   DEPTH*VELOCITY(FT*FT/SEC.) =   3.03
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     14.00 =    1026.50 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     14.10 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    44.50  DOWNSTREAM(FEET) =    44.00
  FLOW LENGTH(FEET) =    31.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.90
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      22.39
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    7.20
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     14.10 =    1057.50 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     14.10 TO NODE     14.10 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.) =    7.20
  RAINFALL INTENSITY(INCH/HR) =   5.41
  TOTAL STREAM AREA(ACRES) =     4.96
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     22.39

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     16.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  95
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   470.20
  UPSTREAM ELEVATION(FEET) =     52.40
  DOWNSTREAM ELEVATION(FEET) =     50.10
  ELEVATION DIFFERENCE(FEET) =      2.30
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.688
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    50.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.850
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      2.09
  TOTAL AREA(ACRES) =      0.35   TOTAL RUNOFF(CFS) =      2.09

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     14.10 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    14.20  DOWNSTREAM(FEET) =    14.00
  FLOW LENGTH(FEET) =    10.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   5.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.99
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.09
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =    3.72
  LONGEST FLOWPATH FROM NODE     15.00 TO NODE     14.10 =     480.20 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     14.10 TO NODE     14.10 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.) =    3.72
  RAINFALL INTENSITY(INCH/HR) =   6.85
  TOTAL STREAM AREA(ACRES) =     0.35
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.09

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       22.39     7.20        5.414          4.96
      2        2.09     3.72        6.850          0.35

  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       13.64     3.72       6.850
      2       24.04     7.20       5.414

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      24.04   Tc(MIN.) =    7.20
  TOTAL AREA(ACRES) =        5.3
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     14.10 =    1057.50 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     14.10 TO NODE     17.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    44.00  DOWNSTREAM(FEET) =    43.91
  FLOW LENGTH(FEET) =    75.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  27.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.78
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      24.04
  PIPE TRAVEL TIME(MIN.) =   0.33    Tc(MIN.) =    7.53
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     17.00 =    1132.50 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     17.00 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.) =    7.53
  RAINFALL INTENSITY(INCH/HR) =   5.26
  TOTAL STREAM AREA(ACRES) =     5.31
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     24.04

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     51.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  95
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   344.30
  UPSTREAM ELEVATION(FEET) =     73.00
  DOWNSTREAM ELEVATION(FEET) =     71.05
  ELEVATION DIFFERENCE(FEET) =      1.95
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.585
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    51.33
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.850
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      4.77
  TOTAL AREA(ACRES) =      0.80   TOTAL RUNOFF(CFS) =      4.77

****************************************************************************
  FLOW PROCESS FROM NODE     51.00 TO NODE     51.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
```

```
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.850
NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
SOIL CLASSIFICATION IS "A"
S.C.S. CURVE NUMBER (AMC II) =  95
AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
SUBAREA AREA(ACRES) =    0.73   SUBAREA RUNOFF(CFS) =    4.35
TOTAL AREA(ACRES) =        1.5   TOTAL RUNOFF(CFS) =       9.12
TC(MIN.) =    3.58

****************************************************************************
FLOW PROCESS FROM NODE     51.00 TO NODE     51.00 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.850
NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
SOIL CLASSIFICATION IS "A"
S.C.S. CURVE NUMBER (AMC II) =  95
AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
SUBAREA AREA(ACRES) =    0.06   SUBAREA RUNOFF(CFS) =    0.36
TOTAL AREA(ACRES) =        1.6   TOTAL RUNOFF(CFS) =       9.48
TC(MIN.) =    3.58

****************************************************************************
FLOW PROCESS FROM NODE     51.00 TO NODE     52.00 IS CODE =  41
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =    44.60  DOWNSTREAM(FEET) =    44.50
FLOW LENGTH(FEET) =    15.32   MANNING'S N =  0.013
ASSUME FULL-FLOWING PIPELINE
PIPE-FLOW VELOCITY(FEET/SEC.) =   5.36
PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =       9.48
PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    3.63
LONGEST FLOWPATH FROM NODE     50.00 TO NODE     52.00 =     359.62 FEET.

****************************************************************************
FLOW PROCESS FROM NODE     52.00 TO NODE     17.00 IS CODE =  41
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =    44.50  DOWNSTREAM(FEET) =    43.91
FLOW LENGTH(FEET) =   112.61   MANNING'S N =  0.013
DEPTH OF FLOW IN  24.0 INCH PIPE IS  13.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =   5.30
GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =       9.48
PIPE TRAVEL TIME(MIN.) =   0.35    Tc(MIN.) =    3.99
LONGEST FLOWPATH FROM NODE     50.00 TO NODE     17.00 =     472.23 FEET.

****************************************************************************
FLOW PROCESS FROM NODE     17.00 TO NODE     17.00 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.) =    3.99
RAINFALL INTENSITY(INCH/HR) =   6.85
TOTAL STREAM AREA(ACRES) =     1.59
PEAK FLOW RATE(CFS) AT CONFLUENCE =      9.48

** CONFLUENCE DATA **
STREAM     RUNOFF       Tc      INTENSITY      AREA
NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
    1       24.04     7.53        5.259          5.31
    2        9.48     3.99        6.850          1.59

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       27.93     3.99       6.850
    2       31.32     7.53       5.259

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
```

```
  PEAK FLOW RATE(CFS) =      31.32   Tc(MIN.) =    7.53
  TOTAL AREA(ACRES) =        6.9
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     17.00 =    1132.50 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =         6.9  TC(MIN.) =      7.53
  PEAK FLOW RATE(CFS)   =       31.32
============================================================================
============================================================================
  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 1982-2016 Advanced Engineering Software (aes)
              Ver. 23.0 Release Date: 07/01/2016  License ID 1535

                            Analysis prepared by:

                                    Stantec



 ************************** DESCRIPTION OF STUDY **************************
* TREMONT SITE - CENTRAL TRIBUTARY AREA                                      *
* PROPOSED CONDITION 25-YEAR STORM (UNDETAINED)                              *
* SEE RATHYDRO, DETENTION ROUTING, AND RATIONAL METHOD (DETAINED) CALCS      *
 ******************************************************************************

  FILE NAME: P25_20U.DAT
  TIME/DATE OF STUDY: 10:57 06/15/2024
------------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) =  25.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.020
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  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     20.00 TO NODE     21.00 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==============================================================================
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   259.00
  UPSTREAM ELEVATION(FEET) =     70.00
  DOWNSTREAM ELEVATION(FEET) =     65.00
  ELEVATION DIFFERENCE(FEET) =      5.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.227
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    73.96
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.322
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.73
  TOTAL AREA(ACRES) =      0.18   TOTAL RUNOFF(CFS) =      0.73

******************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     22.00 IS CODE =  31
------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    59.00  DOWNSTREAM(FEET) =    47.56
  FLOW LENGTH(FEET) =   376.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   2.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.23
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.73
  PIPE TRAVEL TIME(MIN.) =   1.20    Tc(MIN.) =    5.43
```

```
 LONGEST FLOWPATH FROM NODE     20.00 TO NODE     22.00 =     635.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     22.00 TO NODE     22.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.049
 NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
 SOIL CLASSIFICATION IS "A"
 S.C.S. CURVE NUMBER (AMC II) =  86
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.7600
 SUBAREA AREA(ACRES) =    0.49   SUBAREA RUNOFF(CFS) =    1.88
 TOTAL AREA(ACRES) =        0.7   TOTAL RUNOFF(CFS) =       2.57
 TC(MIN.) =    5.43

****************************************************************************
 FLOW PROCESS FROM NODE     22.00 TO NODE     23.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    47.56  DOWNSTREAM(FEET) =    47.16
 FLOW LENGTH(FEET) =    36.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  12.0 INCH PIPE IS   7.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.05
 ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       2.57
 PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =    5.54
 LONGEST FLOWPATH FROM NODE     20.00 TO NODE     23.00 =     671.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.979
 NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
 SOIL CLASSIFICATION IS "A"
 S.C.S. CURVE NUMBER (AMC II) =  86
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.7600
 SUBAREA AREA(ACRES) =    0.11   SUBAREA RUNOFF(CFS) =    0.42
 TOTAL AREA(ACRES) =        0.8   TOTAL RUNOFF(CFS) =       2.95
 TC(MIN.) =    5.54

****************************************************************************
 FLOW PROCESS FROM NODE     23.00 TO NODE     24.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    47.16  DOWNSTREAM(FEET) =    45.52
 FLOW LENGTH(FEET) =   328.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  15.0 INCH PIPE IS   8.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   3.88
 ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       2.95
 PIPE TRAVEL TIME(MIN.) =   1.41    Tc(MIN.) =    6.96
 LONGEST FLOWPATH FROM NODE     20.00 TO NODE     24.00 =     999.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     24.00 TO NODE     24.00 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.) =    6.96
 RAINFALL INTENSITY(INCH/HR) =   4.30
 TOTAL STREAM AREA(ACRES) =     0.78
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.95

****************************************************************************
 FLOW PROCESS FROM NODE     25.00 TO NODE     26.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
 SOIL CLASSIFICATION IS "A"
 S.C.S. CURVE NUMBER (AMC II) =  86
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   235.00
 UPSTREAM ELEVATION(FEET) =    122.26
 DOWNSTREAM ELEVATION(FEET) =    121.60
 ELEVATION DIFFERENCE(FEET) =      0.66
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.452
```

```
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    50.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.033
  SUBAREA RUNOFF(CFS) =      2.45
  TOTAL AREA(ACRES) =      0.64   TOTAL RUNOFF(CFS) =      2.45

****************************************************************************
  FLOW PROCESS FROM NODE     26.00 TO NODE     24.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    46.80  DOWNSTREAM(FEET) =    45.52
  FLOW LENGTH(FEET) =   255.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   9.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.57
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.45
  PIPE TRAVEL TIME(MIN.) =   1.19    Tc(MIN.) =    6.64
  LONGEST FLOWPATH FROM NODE     25.00 TO NODE     24.00 =     490.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     24.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.431
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7600
  SUBAREA AREA(ACRES) =    0.86   SUBAREA RUNOFF(CFS) =    2.90
  TOTAL AREA(ACRES) =       1.5   TOTAL RUNOFF(CFS) =       5.05
  TC(MIN.) =    6.64

****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     24.00 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.) =    6.64
  RAINFALL INTENSITY(INCH/HR) =   4.43
  TOTAL STREAM AREA(ACRES) =     1.50
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.05

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        2.95     6.96        4.302          0.78
      2        5.05     6.64        4.431          1.50

  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        7.87     6.64       4.431
      2        7.86     6.96       4.302

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       7.87   Tc(MIN.) =    6.64
  TOTAL AREA(ACRES) =        2.3
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     24.00 =     999.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     27.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    45.52  DOWNSTREAM(FEET) =    43.79
  FLOW LENGTH(FEET) =    73.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS  10.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.80
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.87
  PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =    6.78
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     27.00 =    1072.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     27.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     28.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   342.00
  UPSTREAM ELEVATION(FEET) =    123.31
  DOWNSTREAM ELEVATION(FEET) =    121.60
  ELEVATION DIFFERENCE(FEET) =      1.71
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.452
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    50.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.033
  SUBAREA RUNOFF(CFS) =      6.35
  TOTAL AREA(ACRES) =      1.66   TOTAL RUNOFF(CFS) =      6.35

****************************************************************************
  FLOW PROCESS FROM NODE     28.00 TO NODE     29.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    45.99  DOWNSTREAM(FEET) =    45.72
  FLOW LENGTH(FEET) =    53.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  13.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.66
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.35
  PIPE TRAVEL TIME(MIN.) =   0.19    Tc(MIN.) =    5.64
  LONGEST FLOWPATH FROM NODE     27.00 TO NODE     29.00 =     395.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     29.00 TO NODE     29.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.923
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7600
  SUBAREA AREA(ACRES) =    0.54   SUBAREA RUNOFF(CFS) =    2.02
  TOTAL AREA(ACRES) =        2.2   TOTAL RUNOFF(CFS) =       8.23
  TC(MIN.) =    5.64

****************************************************************************
  FLOW PROCESS FROM NODE     29.00 TO NODE     30.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    45.72  DOWNSTREAM(FEET) =    44.92
  FLOW LENGTH(FEET) =   161.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.98
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.23
  PIPE TRAVEL TIME(MIN.) =   0.54    Tc(MIN.) =    6.18
  LONGEST FLOWPATH FROM NODE     27.00 TO NODE     30.00 =     556.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     30.00 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.) =    6.18
  RAINFALL INTENSITY(INCH/HR) =   4.64
  TOTAL STREAM AREA(ACRES) =     2.20
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      8.23

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     32.00 IS CODE =  21
```

```
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   303.00
  UPSTREAM ELEVATION(FEET) =     53.18
  DOWNSTREAM ELEVATION(FEET) =     50.00
  ELEVATION DIFFERENCE(FEET) =      3.18
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.694
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    60.74
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.322
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      2.67
  TOTAL AREA(ACRES) =      0.66   TOTAL RUNOFF(CFS) =      2.67

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     30.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    46.00  DOWNSTREAM(FEET) =    44.92
  FLOW LENGTH(FEET) =   166.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   9.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.06
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.67
  PIPE TRAVEL TIME(MIN.) =   0.68    Tc(MIN.) =    5.38
  LONGEST FLOWPATH FROM NODE     31.00 TO NODE     30.00 =     469.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     30.00 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.) =    5.38
  RAINFALL INTENSITY(INCH/HR) =   5.08
  TOTAL STREAM AREA(ACRES) =     0.66
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.67

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        8.23     6.18        4.642          2.20
      2        2.67     5.38        5.079          0.66

  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        9.83     5.38       5.079
      2       10.67     6.18       4.642

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      10.67   Tc(MIN.) =    6.18
  TOTAL AREA(ACRES) =        2.9
  LONGEST FLOWPATH FROM NODE     27.00 TO NODE     30.00 =     556.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     27.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    44.92  DOWNSTREAM(FEET) =    43.79
  FLOW LENGTH(FEET) =   227.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  16.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.16
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.67
  PIPE TRAVEL TIME(MIN.) =   0.73    Tc(MIN.) =    6.91
  LONGEST FLOWPATH FROM NODE     27.00 TO NODE     27.00 =     783.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     27.00 IS CODE =  11
```

```
--------------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
================================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       10.67     6.91       4.318        2.86
  LONGEST FLOWPATH FROM NODE     27.00 TO NODE     27.00 =     783.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        7.87     6.78       4.372        2.28
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     27.00 =    1072.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      18.34       6.78        4.372
      2      18.44       6.91        4.318

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      18.44   Tc(MIN.) =    6.91
  TOTAL AREA(ACRES) =        5.1

****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     27.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        5.1  TC(MIN.) =      6.91
  PEAK FLOW RATE(CFS)   =      18.44
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

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

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
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              Ver. 23.0 Release Date: 07/01/2016  License ID 1535

                            Analysis prepared by:

                                    Stantec



 ************************** DESCRIPTION OF STUDY **************************
* TREMONT SITE - CENTRAL TRIBUTARY AREA                                    *
* PROPOSED CONDITION 100-YEAR STORM (UNDETAINED)                           *
* SEE RATHYDRO, DETENTION ROUTING, AND RATIONAL METHOD (DETAINED) CALCS    *
 ************************************************************************

  FILE NAME: P100_20U.DAT
  TIME/DATE OF STUDY: 11:17 06/15/2024
------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.600
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  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     20.00 TO NODE     21.00 IS CODE =  21
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
========================================================================
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   259.00
  UPSTREAM ELEVATION(FEET) =     70.00
  DOWNSTREAM ELEVATION(FEET) =     65.00
  ELEVATION DIFFERENCE(FEET) =      5.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.227
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    73.96
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.850
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.94
  TOTAL AREA(ACRES) =      0.18   TOTAL RUNOFF(CFS) =      0.94

************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     22.00 IS CODE =  31
------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    59.00  DOWNSTREAM(FEET) =    47.56
  FLOW LENGTH(FEET) =   376.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   3.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.60
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.94
  PIPE TRAVEL TIME(MIN.) =   1.12    Tc(MIN.) =    5.35
```

```
 LONGEST FLOWPATH FROM NODE     20.00 TO NODE     22.00 =     635.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     22.00 TO NODE     22.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.560
 NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
 SOIL CLASSIFICATION IS "A"
 S.C.S. CURVE NUMBER (AMC II) =  86
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.7600
 SUBAREA AREA(ACRES) =    0.49   SUBAREA RUNOFF(CFS) =    2.44
 TOTAL AREA(ACRES) =        0.7   TOTAL RUNOFF(CFS) =       3.34
 TC(MIN.) =    5.35

****************************************************************************
 FLOW PROCESS FROM NODE     22.00 TO NODE     23.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    47.56  DOWNSTREAM(FEET) =    47.16
 FLOW LENGTH(FEET) =    36.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  12.0 INCH PIPE IS   9.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.28
 ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       3.34
 PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =    5.46
 LONGEST FLOWPATH FROM NODE     20.00 TO NODE     23.00 =     671.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.472
 NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
 SOIL CLASSIFICATION IS "A"
 S.C.S. CURVE NUMBER (AMC II) =  86
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.7600
 SUBAREA AREA(ACRES) =    0.11   SUBAREA RUNOFF(CFS) =    0.54
 TOTAL AREA(ACRES) =        0.8   TOTAL RUNOFF(CFS) =       3.84
 TC(MIN.) =    5.46

****************************************************************************
 FLOW PROCESS FROM NODE     23.00 TO NODE     24.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    47.16  DOWNSTREAM(FEET) =    45.52
 FLOW LENGTH(FEET) =   328.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  15.0 INCH PIPE IS  10.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.08
 ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       3.84
 PIPE TRAVEL TIME(MIN.) =   1.34    Tc(MIN.) =    6.80
 LONGEST FLOWPATH FROM NODE     20.00 TO NODE     24.00 =     999.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     24.00 TO NODE     24.00 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.) =    6.80
 RAINFALL INTENSITY(INCH/HR) =   5.62
 TOTAL STREAM AREA(ACRES) =     0.78
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.84

****************************************************************************
 FLOW PROCESS FROM NODE     25.00 TO NODE     26.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
 SOIL CLASSIFICATION IS "A"
 S.C.S. CURVE NUMBER (AMC II) =  86
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   235.00
 UPSTREAM ELEVATION(FEET) =    122.26
 DOWNSTREAM ELEVATION(FEET) =    121.60
 ELEVATION DIFFERENCE(FEET) =      0.66
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.452
```

```
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    50.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.478
  SUBAREA RUNOFF(CFS) =      3.15
  TOTAL AREA(ACRES) =      0.64   TOTAL RUNOFF(CFS) =      3.15

****************************************************************************
  FLOW PROCESS FROM NODE     26.00 TO NODE     24.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    46.80  DOWNSTREAM(FEET) =    45.52
  FLOW LENGTH(FEET) =   255.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   9.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.94
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.15
  PIPE TRAVEL TIME(MIN.) =   1.08    Tc(MIN.) =    6.53
  LONGEST FLOWPATH FROM NODE     25.00 TO NODE     24.00 =     490.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     24.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.767
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7600
  SUBAREA AREA(ACRES) =    0.86   SUBAREA RUNOFF(CFS) =    3.77
  TOTAL AREA(ACRES) =        1.5   TOTAL RUNOFF(CFS) =       6.57
  TC(MIN.) =    6.53

****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     24.00 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.) =    6.53
  RAINFALL INTENSITY(INCH/HR) =   5.77
  TOTAL STREAM AREA(ACRES) =     1.50
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      6.57

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        3.84     6.80        5.618          0.78
      2        6.57     6.53        5.767          1.50

  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       10.26     6.53       5.767
      2       10.24     6.80       5.618

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      10.26   Tc(MIN.) =    6.53
  TOTAL AREA(ACRES) =        2.3
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     24.00 =     999.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     27.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    45.52  DOWNSTREAM(FEET) =    43.79
  FLOW LENGTH(FEET) =    73.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.50
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.26
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =    6.66
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     27.00 =    1072.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     27.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     28.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   342.00
  UPSTREAM ELEVATION(FEET) =    123.31
  DOWNSTREAM ELEVATION(FEET) =    121.60
  ELEVATION DIFFERENCE(FEET) =      1.71
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.452
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    50.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.478
  SUBAREA RUNOFF(CFS) =      8.17
  TOTAL AREA(ACRES) =      1.66   TOTAL RUNOFF(CFS) =      8.17

****************************************************************************
  FLOW PROCESS FROM NODE     28.00 TO NODE     29.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    45.99  DOWNSTREAM(FEET) =    45.72
  FLOW LENGTH(FEET) =    53.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.02
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.17
  PIPE TRAVEL TIME(MIN.) =   0.18    Tc(MIN.) =    5.63
  LONGEST FLOWPATH FROM NODE     27.00 TO NODE     29.00 =     395.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     29.00 TO NODE     29.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.347
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7600
  SUBAREA AREA(ACRES) =    0.54   SUBAREA RUNOFF(CFS) =    2.60
  TOTAL AREA(ACRES) =        2.2   TOTAL RUNOFF(CFS) =      10.61
  TC(MIN.) =    5.63

****************************************************************************
  FLOW PROCESS FROM NODE     29.00 TO NODE     30.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    45.72  DOWNSTREAM(FEET) =    44.92
  FLOW LENGTH(FEET) =   161.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  16.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.16
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.61
  PIPE TRAVEL TIME(MIN.) =   0.52    Tc(MIN.) =    6.15
  LONGEST FLOWPATH FROM NODE     27.00 TO NODE     30.00 =     556.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     30.00 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.) =    6.15
  RAINFALL INTENSITY(INCH/HR) =   6.00
  TOTAL STREAM AREA(ACRES) =     2.20
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     10.61

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     32.00 IS CODE =  21
```

```
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   303.00
  UPSTREAM ELEVATION(FEET) =     53.18
  DOWNSTREAM ELEVATION(FEET) =     50.00
  ELEVATION DIFFERENCE(FEET) =      3.18
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.694
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    60.74
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.850
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      3.44
  TOTAL AREA(ACRES) =      0.66   TOTAL RUNOFF(CFS) =      3.44

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     30.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    46.00  DOWNSTREAM(FEET) =    44.92
  FLOW LENGTH(FEET) =   166.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   9.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.44
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.44
  PIPE TRAVEL TIME(MIN.) =   0.62    Tc(MIN.) =    5.32
  LONGEST FLOWPATH FROM NODE     31.00 TO NODE     30.00 =     469.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     30.00 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.) =    5.32
  RAINFALL INTENSITY(INCH/HR) =   6.58
  TOTAL STREAM AREA(ACRES) =     0.66
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.44

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       10.61     6.15        5.995          2.20
      2        3.44     5.32        6.585          0.66

  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       12.61     5.32       6.585
      2       13.74     6.15       5.995

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      13.74   Tc(MIN.) =    6.15
  TOTAL AREA(ACRES) =        2.9
  LONGEST FLOWPATH FROM NODE     27.00 TO NODE     30.00 =     556.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     27.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    44.92  DOWNSTREAM(FEET) =    43.79
  FLOW LENGTH(FEET) =   227.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  17.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.59
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.74
  PIPE TRAVEL TIME(MIN.) =   0.68    Tc(MIN.) =    6.83
  LONGEST FLOWPATH FROM NODE     27.00 TO NODE     27.00 =     783.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     27.00 IS CODE =  11
```

```
--------------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
================================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       13.74     6.83       5.605        2.86
  LONGEST FLOWPATH FROM NODE     27.00 TO NODE     27.00 =     783.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       10.26     6.66       5.695        2.28
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     27.00 =    1072.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      23.66       6.66        5.695
      2      23.84       6.83        5.605

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      23.84   Tc(MIN.) =    6.83
  TOTAL AREA(ACRES) =        5.1

****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     27.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        5.1  TC(MIN.) =      6.83
  PEAK FLOW RATE(CFS)   =      23.84
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

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

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
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              Ver. 23.0 Release Date: 07/01/2016  License ID 1535

                            Analysis prepared by:

                                   Stantec



 ************************* DESCRIPTION OF STUDY *************************
* TREMONT SITE - CENTRAL TRIBUTARY AREA                                  *
* PROPOSED CONDITON 25-YEAR STORM RATIONAL METHOD (DETAINED)             *
* SEE RATHYDRO, DETENTION ROUTING, AND RATIONAL METHOD (UNDETAINED) CALCS  *
 ************************************************************************

  FILE NAME: P25_20D.DAT
  TIME/DATE OF STUDY: 16:47 06/15/2024
------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) =  25.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.020
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  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     20.00 TO NODE     21.00 IS CODE =  21
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
========================================================================
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   259.00
  UPSTREAM ELEVATION(FEET) =     70.00
  DOWNSTREAM ELEVATION(FEET) =     65.00
  ELEVATION DIFFERENCE(FEET) =      5.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.227
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    73.96
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.322
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.73
  TOTAL AREA(ACRES) =      0.18   TOTAL RUNOFF(CFS) =      0.73

************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     22.00 IS CODE =  31
------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    59.00  DOWNSTREAM(FEET) =    47.56
  FLOW LENGTH(FEET) =   376.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   2.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.23
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.73
  PIPE TRAVEL TIME(MIN.) =   1.20    Tc(MIN.) =    5.43
```

```
 LONGEST FLOWPATH FROM NODE     20.00 TO NODE     22.00 =     635.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     22.00 TO NODE     22.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.049
 NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
 SOIL CLASSIFICATION IS "A"
 S.C.S. CURVE NUMBER (AMC II) =  86
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.7600
 SUBAREA AREA(ACRES) =    0.49   SUBAREA RUNOFF(CFS) =    1.88
 TOTAL AREA(ACRES) =        0.7   TOTAL RUNOFF(CFS) =       2.57
 TC(MIN.) =    5.43

****************************************************************************
 FLOW PROCESS FROM NODE     22.00 TO NODE     23.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    47.56  DOWNSTREAM(FEET) =    47.16
 FLOW LENGTH(FEET) =    36.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  12.0 INCH PIPE IS   7.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.05
 ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       2.57
 PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =    5.54
 LONGEST FLOWPATH FROM NODE     20.00 TO NODE     23.00 =     671.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.979
 NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
 SOIL CLASSIFICATION IS "A"
 S.C.S. CURVE NUMBER (AMC II) =  86
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.7600
 SUBAREA AREA(ACRES) =    0.11   SUBAREA RUNOFF(CFS) =    0.42
 TOTAL AREA(ACRES) =        0.8   TOTAL RUNOFF(CFS) =       2.95
 TC(MIN.) =    5.54

****************************************************************************
 FLOW PROCESS FROM NODE     23.00 TO NODE     24.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    47.16  DOWNSTREAM(FEET) =    45.52
 FLOW LENGTH(FEET) =   328.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  15.0 INCH PIPE IS   8.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   3.88
 ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       2.95
 PIPE TRAVEL TIME(MIN.) =   1.41    Tc(MIN.) =    6.96
 LONGEST FLOWPATH FROM NODE     20.00 TO NODE     24.00 =     999.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     24.00 TO NODE     24.00 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.) =    6.96
 RAINFALL INTENSITY(INCH/HR) =   4.30
 TOTAL STREAM AREA(ACRES) =     0.78
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.95

****************************************************************************
 FLOW PROCESS FROM NODE     24.00 TO NODE     24.00 IS CODE =   7
----------------------------------------------------------------------------
 >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
 USER-SPECIFIED VALUES ARE AS FOLLOWS:
 TC(MIN) =   6.64   RAIN INTENSITY(INCH/HOUR) =  4.43
 TOTAL AREA(ACRES) =     1.50   TOTAL RUNOFF(CFS) =      1.28

****************************************************************************
 FLOW PROCESS FROM NODE     24.00 TO NODE     24.00 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.) =    6.64
  RAINFALL INTENSITY(INCH/HR) =   4.43
  TOTAL STREAM AREA(ACRES) =     1.50
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.28

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        2.95     6.96        4.302          0.78
      2        1.28     6.64        4.432          1.50

  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        4.10     6.64       4.432
      2        4.19     6.96       4.302

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       4.19   Tc(MIN.) =    6.96
  TOTAL AREA(ACRES) =        2.3
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     24.00 =     999.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     27.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    45.52  DOWNSTREAM(FEET) =    43.79
  FLOW LENGTH(FEET) =    73.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   8.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.54
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.19
  PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =    7.12
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     27.00 =    1072.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     27.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     29.00 TO NODE     29.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =   6.18   RAIN INTENSITY(INCH/HOUR) =  4.64
  TOTAL AREA(ACRES) =     2.20   TOTAL RUNOFF(CFS) =      2.16

****************************************************************************
  FLOW PROCESS FROM NODE     29.00 TO NODE     30.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    45.72  DOWNSTREAM(FEET) =    44.92
  FLOW LENGTH(FEET) =   161.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   8.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.52
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.16
  PIPE TRAVEL TIME(MIN.) =   0.76    Tc(MIN.) =    6.94
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     30.00 =    1233.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     30.00 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.) =    6.94
  RAINFALL INTENSITY(INCH/HR) =   4.31
  TOTAL STREAM AREA(ACRES) =     2.20
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.16
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     32.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   303.00
  UPSTREAM ELEVATION(FEET) =     53.18
  DOWNSTREAM ELEVATION(FEET) =     50.00
  ELEVATION DIFFERENCE(FEET) =      3.18
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.694
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    60.74
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.322
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      2.67
  TOTAL AREA(ACRES) =      0.66   TOTAL RUNOFF(CFS) =      2.67

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     30.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    46.00  DOWNSTREAM(FEET) =    44.92
  FLOW LENGTH(FEET) =   166.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   9.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.06
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.67
  PIPE TRAVEL TIME(MIN.) =   0.68    Tc(MIN.) =    5.38
  LONGEST FLOWPATH FROM NODE     31.00 TO NODE     30.00 =     469.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     30.00 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.) =    5.38
  RAINFALL INTENSITY(INCH/HR) =   5.08
  TOTAL STREAM AREA(ACRES) =     0.66
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.67

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER       (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        2.16     6.94        4.307          2.20
      2        2.67     5.38        5.079          0.66

  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        4.34     5.38       5.079
      2        4.42     6.94       4.307

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       4.42   Tc(MIN.) =    6.94
  TOTAL AREA(ACRES) =        2.9
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     30.00 =    1233.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     27.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    44.92  DOWNSTREAM(FEET) =    43.79
  FLOW LENGTH(FEET) =   227.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS  12.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.12
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.42
  PIPE TRAVEL TIME(MIN.) =   0.92    Tc(MIN.) =    7.86
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     27.00 =    1460.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     27.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc       INTENSITY     AREA
  NUMBER       (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1         4.42     7.86        3.975        2.86
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     27.00 =    1460.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc       INTENSITY     AREA
  NUMBER       (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1         4.19     7.12        4.238        2.28
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     27.00 =    1072.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc       INTENSITY
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
      1        8.20       7.12        4.238
      2        8.36       7.86        3.975

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       8.36   Tc(MIN.) =    7.86
  TOTAL AREA(ACRES) =        5.1

****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     27.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        5.1  TC(MIN.) =      7.86
  PEAK FLOW RATE(CFS)   =       8.36
============================================================================
============================================================================
  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 1982-2016 Advanced Engineering Software (aes)
              Ver. 23.0 Release Date: 07/01/2016  License ID 1535

                            Analysis prepared by:

                                    Stantec



 ************************** DESCRIPTION OF STUDY **************************
* TREMONT SITE - CENTRAL TRIBUTARY AREA                                      *
* PROPOSED CONDITON 100-YEAR RATIONAL METHOD (DETAINED)                      *
* SEE RATHYDRO, DETENTION ROUTING, AND RATIONAL METHOD (UNDETAINED) CALCS    *
 ****************************************************************************

  FILE NAME: P100_20D.DAT
  TIME/DATE OF STUDY: 16:57 06/15/2024
------------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.600
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  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     20.00 TO NODE     21.00 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==============================================================================
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   259.00
  UPSTREAM ELEVATION(FEET) =     70.00
  DOWNSTREAM ELEVATION(FEET) =     65.00
  ELEVATION DIFFERENCE(FEET) =      5.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.227
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    73.96
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.850
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.94
  TOTAL AREA(ACRES) =      0.18   TOTAL RUNOFF(CFS) =      0.94

******************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     22.00 IS CODE =  31
------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    59.00  DOWNSTREAM(FEET) =    47.56
  FLOW LENGTH(FEET) =   376.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   3.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.60
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.94
  PIPE TRAVEL TIME(MIN.) =   1.12    Tc(MIN.) =    5.35
```

```
 LONGEST FLOWPATH FROM NODE     20.00 TO NODE     22.00 =     635.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     22.00 TO NODE     22.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.560
 NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
 SOIL CLASSIFICATION IS "A"
 S.C.S. CURVE NUMBER (AMC II) =  86
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.7600
 SUBAREA AREA(ACRES) =    0.49   SUBAREA RUNOFF(CFS) =    2.44
 TOTAL AREA(ACRES) =        0.7   TOTAL RUNOFF(CFS) =       3.34
 TC(MIN.) =    5.35

****************************************************************************
 FLOW PROCESS FROM NODE     22.00 TO NODE     23.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    47.56  DOWNSTREAM(FEET) =    47.16
 FLOW LENGTH(FEET) =    36.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  12.0 INCH PIPE IS   9.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.28
 ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       3.34
 PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =    5.46
 LONGEST FLOWPATH FROM NODE     20.00 TO NODE     23.00 =     671.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.472
 NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
 SOIL CLASSIFICATION IS "A"
 S.C.S. CURVE NUMBER (AMC II) =  86
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.7600
 SUBAREA AREA(ACRES) =    0.11   SUBAREA RUNOFF(CFS) =    0.54
 TOTAL AREA(ACRES) =        0.8   TOTAL RUNOFF(CFS) =       3.84
 TC(MIN.) =    5.46

****************************************************************************
 FLOW PROCESS FROM NODE     23.00 TO NODE     24.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    47.16  DOWNSTREAM(FEET) =    45.52
 FLOW LENGTH(FEET) =   328.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  15.0 INCH PIPE IS  10.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.08
 ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       3.84
 PIPE TRAVEL TIME(MIN.) =   1.34    Tc(MIN.) =    6.80
 LONGEST FLOWPATH FROM NODE     20.00 TO NODE     24.00 =     999.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     24.00 TO NODE     24.00 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.) =    6.80
 RAINFALL INTENSITY(INCH/HR) =   5.62
 TOTAL STREAM AREA(ACRES) =     0.78
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.84

****************************************************************************
 FLOW PROCESS FROM NODE     24.00 TO NODE     24.00 IS CODE =   7
----------------------------------------------------------------------------
 >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
 USER-SPECIFIED VALUES ARE AS FOLLOWS:
 TC(MIN) =   6.53   RAIN INTENSITY(INCH/HOUR) =  5.77
 TOTAL AREA(ACRES) =     1.50   TOTAL RUNOFF(CFS) =      1.63

****************************************************************************
 FLOW PROCESS FROM NODE     24.00 TO NODE     24.00 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.) =    6.53
  RAINFALL INTENSITY(INCH/HR) =   5.77
  TOTAL STREAM AREA(ACRES) =     1.50
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.63

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        3.84     6.80        5.618          0.78
      2        1.63     6.53        5.767          1.50

  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        5.31     6.53       5.767
      2        5.42     6.80       5.618

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       5.42   Tc(MIN.) =    6.80
  TOTAL AREA(ACRES) =        2.3
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     24.00 =     999.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     27.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    45.52  DOWNSTREAM(FEET) =    43.79
  FLOW LENGTH(FEET) =    73.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   8.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.12
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.42
  PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =    6.95
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     27.00 =    1072.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     27.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     29.00 TO NODE     29.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =   6.15   RAIN INTENSITY(INCH/HOUR) =  5.99
  TOTAL AREA(ACRES) =     2.20   TOTAL RUNOFF(CFS) =      2.67

****************************************************************************
  FLOW PROCESS FROM NODE     29.00 TO NODE     30.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    45.72  DOWNSTREAM(FEET) =    44.92
  FLOW LENGTH(FEET) =   161.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   8.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.78
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.67
  PIPE TRAVEL TIME(MIN.) =   0.71    Tc(MIN.) =    6.86
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     30.00 =    1233.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     30.00 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.) =    6.86
  RAINFALL INTENSITY(INCH/HR) =   5.59
  TOTAL STREAM AREA(ACRES) =     2.20
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.67
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     32.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   303.00
  UPSTREAM ELEVATION(FEET) =     53.18
  DOWNSTREAM ELEVATION(FEET) =     50.00
  ELEVATION DIFFERENCE(FEET) =      3.18
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.694
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    60.74
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.850
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      3.44
  TOTAL AREA(ACRES) =      0.66   TOTAL RUNOFF(CFS) =      3.44

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     30.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    46.00  DOWNSTREAM(FEET) =    44.92
  FLOW LENGTH(FEET) =   166.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   9.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.44
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.44
  PIPE TRAVEL TIME(MIN.) =   0.62    Tc(MIN.) =    5.32
  LONGEST FLOWPATH FROM NODE     31.00 TO NODE     30.00 =     469.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     30.00 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.) =    5.32
  RAINFALL INTENSITY(INCH/HR) =   6.58
  TOTAL STREAM AREA(ACRES) =     0.66
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.44

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER       (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        2.67     6.86        5.587          2.20
      2        3.44     5.32        6.585          0.66

  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        5.51     5.32       6.585
      2        5.59     6.86       5.587

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       5.59   Tc(MIN.) =    6.86
  TOTAL AREA(ACRES) =        2.9
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     30.00 =    1233.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     27.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    44.92  DOWNSTREAM(FEET) =    43.79
  FLOW LENGTH(FEET) =   227.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.51
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.59
  PIPE TRAVEL TIME(MIN.) =   0.84    Tc(MIN.) =    7.70
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     27.00 =    1460.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     27.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc       INTENSITY     AREA
  NUMBER       (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1         5.59     7.70        5.186        2.86
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     27.00 =    1460.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc       INTENSITY     AREA
  NUMBER       (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1         5.42     6.95        5.540        2.28
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     27.00 =    1072.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc       INTENSITY
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
      1       10.47       6.95        5.540
      2       10.66       7.70        5.186

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       10.66   Tc(MIN.) =     7.70
  TOTAL AREA(ACRES) =         5.1

****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     27.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =         5.1  TC(MIN.) =      7.70
  PEAK FLOW RATE(CFS)   =       10.66
============================================================================
============================================================================
  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 1982-2016 Advanced Engineering Software (aes)
              Ver. 23.0 Release Date: 07/01/2016  License ID 1535

                              Analysis prepared by:

                                     Stantec



 ************************* DESCRIPTION OF STUDY *************************
* TREMONT SITE - SOUTHERLY TRIBUTARY AREA                                *
* PROPOSED CONDITION 25-YEAR RATIONAL METHOD                             *
*                                                                        *
 ************************************************************************

  FILE NAME: P25_30.DAT
  TIME/DATE OF STUDY: 14:14 07/19/2024
------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) =  25.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.020
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  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   18.0      9.0    0.020/0.020/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.63 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.3 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     31.00 IS CODE =  21
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
========================================================================
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   254.70
  UPSTREAM ELEVATION(FEET) =     70.00
  DOWNSTREAM ELEVATION(FEET) =     69.00
  ELEVATION DIFFERENCE(FEET) =      1.00
```

```
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.452
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    50.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.033
  SUBAREA RUNOFF(CFS) =      1.84
  TOTAL AREA(ACRES) =      0.48   TOTAL RUNOFF(CFS) =      1.84

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     32.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   69.00  DOWNSTREAM ELEVATION(FEET) =   62.34
  STREET LENGTH(FEET) =   479.20   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   9.00
  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) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.56
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.41
    HALFSTREET FLOOD WIDTH(FEET) =   12.69
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.09
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.27
  STREET FLOW TRAVEL TIME(MIN.) =   2.59   Tc(MIN.) =    8.04
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.919
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.760
  SUBAREA AREA(ACRES) =    2.48      SUBAREA RUNOFF(CFS) =    7.39
  TOTAL AREA(ACRES) =        3.0        PEAK FLOW RATE(CFS) =       8.82

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.47   HALFSTREET FLOOD WIDTH(FEET) =  15.36
  FLOW VELOCITY(FEET/SEC.) =  3.46   DEPTH*VELOCITY(FT*FT/SEC.) =   1.61
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     32.00 =     733.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     32.10 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    57.34  DOWNSTREAM(FEET) =    49.19
  FLOW LENGTH(FEET) =   275.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS  10.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.84
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.82
  PIPE TRAVEL TIME(MIN.) =   0.47    Tc(MIN.) =    8.50
```

```
 LONGEST FLOWPATH FROM NODE     30.00 TO NODE     32.10 =    1008.90 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     32.10 TO NODE     32.10 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.779
 NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
 SOIL CLASSIFICATION IS "A"
 S.C.S. CURVE NUMBER (AMC II) =  86
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.7600
 SUBAREA AREA(ACRES) =    0.27   SUBAREA RUNOFF(CFS) =    0.78
 TOTAL AREA(ACRES) =        3.2   TOTAL RUNOFF(CFS) =       9.28
 TC(MIN.) =    8.50

****************************************************************************
 FLOW PROCESS FROM NODE     32.10 TO NODE     32.10 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.779
 NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
 SOIL CLASSIFICATION IS "A"
 S.C.S. CURVE NUMBER (AMC II) =  86
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.7600
 SUBAREA AREA(ACRES) =    0.38   SUBAREA RUNOFF(CFS) =    1.09
 TOTAL AREA(ACRES) =        3.6   TOTAL RUNOFF(CFS) =      10.37
 TC(MIN.) =    8.50

****************************************************************************
 FLOW PROCESS FROM NODE     32.10 TO NODE     32.10 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.779
 NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
 SOIL CLASSIFICATION IS "A"
 S.C.S. CURVE NUMBER (AMC II) =  86
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.7600
 SUBAREA AREA(ACRES) =    0.40   SUBAREA RUNOFF(CFS) =    1.15
 TOTAL AREA(ACRES) =        4.0   TOTAL RUNOFF(CFS) =      11.52
 TC(MIN.) =    8.50

****************************************************************************
 FLOW PROCESS FROM NODE     32.10 TO NODE     33.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    49.19  DOWNSTREAM(FEET) =    47.15
 FLOW LENGTH(FEET) =    71.77   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  10.46
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      11.52
 PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =    8.62
 LONGEST FLOWPATH FROM NODE     30.00 TO NODE     33.00 =    1080.67 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     33.00 TO NODE     33.00 IS CODE =  81
```

```
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.746
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7600
  SUBAREA AREA(ACRES) =    0.19   SUBAREA RUNOFF(CFS) =    0.54
  TOTAL AREA(ACRES) =        4.2   TOTAL RUNOFF(CFS) =      11.96
  TC(MIN.) =    8.62

****************************************************************************
  FLOW PROCESS FROM NODE     33.00 TO NODE     34.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    47.15  DOWNSTREAM(FEET) =    44.91
  FLOW LENGTH(FEET) =   430.85   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.56
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.96
  PIPE TRAVEL TIME(MIN.) =   1.29    Tc(MIN.) =    9.91
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     34.00 =    1511.52 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     34.00 TO NODE     34.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.423
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7600
  SUBAREA AREA(ACRES) =    2.69   SUBAREA RUNOFF(CFS) =    7.00
  TOTAL AREA(ACRES) =        6.9   TOTAL RUNOFF(CFS) =      17.93
  TC(MIN.) =    9.91

****************************************************************************
  FLOW PROCESS FROM NODE     34.00 TO NODE     35.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    44.91  DOWNSTREAM(FEET) =    43.00
  FLOW LENGTH(FEET) =    89.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.43
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      17.93
  PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =   10.05
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     35.00 =    1600.52 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     35.00 TO NODE     35.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     36.00 TO NODE     37.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   239.40
  UPSTREAM ELEVATION(FEET) =     69.00
  DOWNSTREAM ELEVATION(FEET) =     66.60
  ELEVATION DIFFERENCE(FEET) =      2.40
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.738
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    60.04
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.322
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      1.74
  TOTAL AREA(ACRES) =      0.43   TOTAL RUNOFF(CFS) =      1.74

****************************************************************************
  FLOW PROCESS FROM NODE     37.00 TO NODE     38.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   66.60  DOWNSTREAM ELEVATION(FEET) =   58.90
  STREET LENGTH(FEET) =   482.70   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   9.00
  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) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.92
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.37
    HALFSTREET FLOOD WIDTH(FEET) =   10.51
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.03
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.12
  STREET FLOW TRAVEL TIME(MIN.) =   2.65   Tc(MIN.) =    7.39
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.136
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.760
  SUBAREA AREA(ACRES) =    1.38      SUBAREA RUNOFF(CFS) =    4.34
  TOTAL AREA(ACRES) =        1.8        PEAK FLOW RATE(CFS) =       5.69

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.41   HALFSTREET FLOOD WIDTH(FEET) =  12.41
  FLOW VELOCITY(FEET/SEC.) =  3.29   DEPTH*VELOCITY(FT*FT/SEC.) =   1.34
  LONGEST FLOWPATH FROM NODE     36.00 TO NODE     38.00 =     722.10 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     38.00 TO NODE     39.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    58.90  DOWNSTREAM(FEET) =    58.40
  FLOW LENGTH(FEET) =    10.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   7.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.79
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.69
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =    7.41
  LONGEST FLOWPATH FROM NODE     36.00 TO NODE     39.00 =     732.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     39.00 TO NODE     39.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.130
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7600
  SUBAREA AREA(ACRES) =    1.48   SUBAREA RUNOFF(CFS) =    4.65
  TOTAL AREA(ACRES) =        3.3   TOTAL RUNOFF(CFS) =      10.33
  TC(MIN.) =    7.41

****************************************************************************
  FLOW PROCESS FROM NODE     39.00 TO NODE     40.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   58.40  DOWNSTREAM ELEVATION(FEET) =   50.10
  STREET LENGTH(FEET) =   255.80   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   9.00
  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) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      12.87
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.46
    HALFSTREET FLOOD WIDTH(FEET) =   15.08
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.22
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.40
  STREET FLOW TRAVEL TIME(MIN.) =   0.82   Tc(MIN.) =    8.22
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.861
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.760
```

```
  SUBAREA AREA(ACRES) =    1.73      SUBAREA RUNOFF(CFS) =    5.08
  TOTAL AREA(ACRES) =        5.0        PEAK FLOW RATE(CFS) =      14.73

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.48   HALFSTREET FLOOD WIDTH(FEET) =  15.93
  FLOW VELOCITY(FEET/SEC.) =  5.40   DEPTH*VELOCITY(FT*FT/SEC.) =   2.58
  LONGEST FLOWPATH FROM NODE     36.00 TO NODE     40.00 =     987.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     40.00 TO NODE     35.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    44.10  DOWNSTREAM(FEET) =    42.98
  FLOW LENGTH(FEET) =    55.90   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  12.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.75
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      14.73
  PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =    8.32
  LONGEST FLOWPATH FROM NODE     36.00 TO NODE     35.00 =    1043.80 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     35.00 TO NODE     35.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF       Tc       INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       14.73     8.32        3.832        5.02
  LONGEST FLOWPATH FROM NODE     36.00 TO NODE     35.00 =    1043.80 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF       Tc       INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       17.93    10.05        3.392        6.89
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     35.00 =    1600.52 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc       INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      29.57       8.32        3.832
      2      30.96      10.05        3.392

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      30.96   Tc(MIN.) =   10.05
  TOTAL AREA(ACRES) =       11.9

****************************************************************************
  FLOW PROCESS FROM NODE     35.00 TO NODE     50.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    43.00  DOWNSTREAM(FEET) =    41.60
  FLOW LENGTH(FEET) =   700.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  27.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.88
```

```
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      30.96
  PIPE TRAVEL TIME(MIN.) =   2.39    Tc(MIN.) =   12.44
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     50.00 =    2300.52 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     50.00 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.) =   12.44
  RAINFALL INTENSITY(INCH/HR) =   2.96
  TOTAL STREAM AREA(ACRES) =    11.91
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     30.96

****************************************************************************
  FLOW PROCESS FROM NODE     60.00 TO NODE     61.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   700.00
  UPSTREAM ELEVATION(FEET) =     64.00
  DOWNSTREAM ELEVATION(FEET) =     54.00
  ELEVATION DIFFERENCE(FEET) =     10.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.460
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    64.29
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.322
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =     13.52
  TOTAL AREA(ACRES) =      3.06   TOTAL RUNOFF(CFS) =     13.52

****************************************************************************
  FLOW PROCESS FROM NODE     61.00 TO NODE     62.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   54.00  DOWNSTREAM ELEVATION(FEET) =   50.00
  STREET LENGTH(FEET) =   235.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   9.00
  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) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      18.86
    ***STREET FLOW SPLITS OVER STREET-CROWN***
    FULL DEPTH(FEET) =    0.52   FLOOD WIDTH(FEET) =   18.00
```

```
    FULL HALF-STREET VELOCITY(FEET/SEC.) =    4.19
    SPLIT DEPTH(FEET) =    0.38   SPLIT FLOOD WIDTH(FEET) =   11.00
    SPLIT FLOW(CFS) =    4.48   SPLIT VELOCITY(FEET/SEC.) =    3.20
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.52
    HALFSTREET FLOOD WIDTH(FEET) =   18.00
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.19
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.17
  STREET FLOW TRAVEL TIME(MIN.) =   0.93   Tc(MIN.) =    4.39
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.322
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
  SUBAREA AREA(ACRES) =    2.42      SUBAREA RUNOFF(CFS) =   10.69
  TOTAL AREA(ACRES) =        5.5        PEAK FLOW RATE(CFS) =      24.21

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.52   HALFSTREET FLOOD WIDTH(FEET) =  18.00
  FLOW VELOCITY(FEET/SEC.) =  4.19   DEPTH*VELOCITY(FT*FT/SEC.) =   2.17
  LONGEST FLOWPATH FROM NODE     60.00 TO NODE     62.00 =     935.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     62.00 TO NODE     50.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    42.00  DOWNSTREAM(FEET) =    41.60
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  20.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.68
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      24.21
  PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =    4.50
  LONGEST FLOWPATH FROM NODE     60.00 TO NODE     50.00 =     985.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     50.00 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.) =    4.50
  RAINFALL INTENSITY(INCH/HR) =   5.32
  TOTAL STREAM AREA(ACRES) =     5.48
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     24.21

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       30.96    12.44        2.956         11.91
      2       24.21     4.50        5.322          5.48

  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       35.41     4.50       5.322
      2       44.41    12.44       2.956

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      44.41   Tc(MIN.) =   12.44
  TOTAL AREA(ACRES) =       17.4
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     50.00 =    2300.52 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     51.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    41.60  DOWNSTREAM(FEET) =    41.46
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  29.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.06
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      44.41
  PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =   12.58
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     51.00 =    2350.52 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     51.00 TO NODE     51.00 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.) =   12.58
  RAINFALL INTENSITY(INCH/HR) =   2.94
  TOTAL STREAM AREA(ACRES) =    17.39
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     44.41

****************************************************************************
  FLOW PROCESS FROM NODE     51.10 TO NODE     51.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   521.00
  UPSTREAM ELEVATION(FEET) =     60.00
  DOWNSTREAM ELEVATION(FEET) =     48.76
  ELEVATION DIFFERENCE(FEET) =     11.24
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.182
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    71.57
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.322
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      1.77
  TOTAL AREA(ACRES) =      0.40   TOTAL RUNOFF(CFS) =      1.77

****************************************************************************
  FLOW PROCESS FROM NODE     51.20 TO NODE     51.00 IS CODE =  62
```

```
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   48.76  DOWNSTREAM ELEVATION(FEET) =   47.40
  STREET LENGTH(FEET) =   500.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   9.00
  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) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.93
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.43
    HALFSTREET FLOOD WIDTH(FEET) =   13.68
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.42
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.61
  STREET FLOW TRAVEL TIME(MIN.) =   5.85   Tc(MIN.) =    9.03
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.634
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
  SUBAREA AREA(ACRES) =    0.76      SUBAREA RUNOFF(CFS) =    2.29
  TOTAL AREA(ACRES) =        1.2        PEAK FLOW RATE(CFS) =       3.50

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.45   HALFSTREET FLOOD WIDTH(FEET) =  14.73
  FLOW VELOCITY(FEET/SEC.) =  1.48   DEPTH*VELOCITY(FT*FT/SEC.) =   0.67
  LONGEST FLOWPATH FROM NODE     51.10 TO NODE     51.00 =    1021.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     51.00 TO NODE     51.00 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.) =    9.03
  RAINFALL INTENSITY(INCH/HR) =   3.63
  TOTAL STREAM AREA(ACRES) =     1.16
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.50

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       44.41    12.58        2.935         17.39
      2        3.50     9.03        3.634          1.16

  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       39.36     9.03       3.634
      2       47.24    12.58       2.935

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      47.24   Tc(MIN.) =   12.58
  TOTAL AREA(ACRES) =       18.5
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     51.00 =    2350.52 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     51.00 TO NODE     52.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    41.46  DOWNSTREAM(FEET) =    40.29
  FLOW LENGTH(FEET) =   434.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  32.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.01
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      47.24
  PIPE TRAVEL TIME(MIN.) =   1.20    Tc(MIN.) =   13.78
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     52.00 =    2784.52 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     52.00 TO NODE     52.00 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.) =   13.78
  RAINFALL INTENSITY(INCH/HR) =   2.77
  TOTAL STREAM AREA(ACRES) =    18.55
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     47.24

****************************************************************************
  FLOW PROCESS FROM NODE     63.00 TO NODE     64.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   700.00
  UPSTREAM ELEVATION(FEET) =     60.00
  DOWNSTREAM ELEVATION(FEET) =     52.00
  ELEVATION DIFFERENCE(FEET) =      8.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.643
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    61.43
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.322
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =     14.80
  TOTAL AREA(ACRES) =      3.35   TOTAL RUNOFF(CFS) =     14.80

****************************************************************************
  FLOW PROCESS FROM NODE     64.00 TO NODE     65.00 IS CODE =  62
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
================================================================================
  UPSTREAM ELEVATION(FEET) =   52.00  DOWNSTREAM ELEVATION(FEET) =   46.00
  STREET LENGTH(FEET) =   235.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   9.00
  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) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      20.19
    ***STREET FLOW SPLITS OVER STREET-CROWN***
    FULL DEPTH(FEET) =    0.52   FLOOD WIDTH(FEET) =   18.00
    FULL HALF-STREET VELOCITY(FEET/SEC.) =    5.14
    SPLIT DEPTH(FEET) =    0.31   SPLIT FLOOD WIDTH(FEET) =    7.66
    SPLIT FLOW(CFS) =    2.58   SPLIT VELOCITY(FEET/SEC.) =    3.32
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.52
    HALFSTREET FLOOD WIDTH(FEET) =   18.00
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.14
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.66
  STREET FLOW TRAVEL TIME(MIN.) =   0.76   Tc(MIN.) =    4.41
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.322
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
  SUBAREA AREA(ACRES) =    2.44      SUBAREA RUNOFF(CFS) =   10.78
  TOTAL AREA(ACRES) =        5.8        PEAK FLOW RATE(CFS) =      25.58

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.52   HALFSTREET FLOOD WIDTH(FEET) =  18.00
  FLOW VELOCITY(FEET/SEC.) =  5.14   DEPTH*VELOCITY(FT*FT/SEC.) =   2.66
  LONGEST FLOWPATH FROM NODE     63.00 TO NODE     65.00 =     935.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     65.00 TO NODE     52.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    41.29  DOWNSTREAM(FEET) =    40.29
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.08
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      25.58
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    4.48
  LONGEST FLOWPATH FROM NODE     63.00 TO NODE     52.00 =     985.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     52.00 TO NODE     52.00 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.) =    4.48
  RAINFALL INTENSITY(INCH/HR) =   5.32
  TOTAL STREAM AREA(ACRES) =     5.79
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     25.58

  ** CONFLUENCE DATA **
  STREAM     RUNOFF        Tc       INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       47.24    13.78        2.767         18.55
      2       25.58     4.48        5.322          5.79

  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       50.13     4.48       5.322
      2       60.53    13.78       2.767

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      60.53   Tc(MIN.) =   13.78
  TOTAL AREA(ACRES) =       24.3
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     52.00 =    2784.52 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     52.00 TO NODE     53.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    40.29  DOWNSTREAM(FEET) =    40.17
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  48.0 INCH PIPE IS  35.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.16
  ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      60.53
  PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =   13.92
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     53.00 =    2834.52 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     53.00 TO NODE     53.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.750
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7967
  SUBAREA AREA(ACRES) =    0.68   SUBAREA RUNOFF(CFS) =    1.55
  TOTAL AREA(ACRES) =       25.0   TOTAL RUNOFF(CFS) =      60.53
  TC(MIN.) =   13.92
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE     53.00 TO NODE     54.00 IS CODE =  31
```

```
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    40.17  DOWNSTREAM(FEET) =    39.00
  FLOW LENGTH(FEET) =   414.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  45.0 INCH PIPE IS  35.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.46
  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      60.53
  PIPE TRAVEL TIME(MIN.) =   1.07    Tc(MIN.) =   14.99
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     54.00 =    3248.52 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     54.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   14.99
  RAINFALL INTENSITY(INCH/HR) =   2.62
  TOTAL STREAM AREA(ACRES) =    25.02
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     60.53

****************************************************************************
  FLOW PROCESS FROM NODE     66.00 TO NODE     67.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   250.00
  UPSTREAM ELEVATION(FEET) =     62.00
  DOWNSTREAM ELEVATION(FEET) =     51.00
  ELEVATION DIFFERENCE(FEET) =     11.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.767
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    87.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.322
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      7.38
  TOTAL AREA(ACRES) =      1.67   TOTAL RUNOFF(CFS) =      7.38

****************************************************************************
  FLOW PROCESS FROM NODE     67.00 TO NODE     68.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   51.00  DOWNSTREAM ELEVATION(FEET) =   45.00
  STREET LENGTH(FEET) =   265.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   9.00
  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) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      13.58
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.49
    HALFSTREET FLOOD WIDTH(FEET) =   16.63
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.60
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.26
  STREET FLOW TRAVEL TIME(MIN.) =   0.96   Tc(MIN.) =    3.73
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.322
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
  SUBAREA AREA(ACRES) =    2.81      SUBAREA RUNOFF(CFS) =   12.41
  TOTAL AREA(ACRES) =        4.5        PEAK FLOW RATE(CFS) =      19.79

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.52   HALFSTREET FLOOD WIDTH(FEET) =  18.00
  FLOW VELOCITY(FEET/SEC.) =  4.84   DEPTH*VELOCITY(FT*FT/SEC.) =   2.51
  LONGEST FLOWPATH FROM NODE     66.00 TO NODE     68.00 =     515.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     68.00 TO NODE     54.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    39.50  DOWNSTREAM(FEET) =    39.00
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  17.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.94
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      19.79
  PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =    3.83
  LONGEST FLOWPATH FROM NODE     66.00 TO NODE     54.00 =     565.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     54.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    3.83
  RAINFALL INTENSITY(INCH/HR) =   5.32
  TOTAL STREAM AREA(ACRES) =     4.48
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     19.79

****************************************************************************
  FLOW PROCESS FROM NODE     70.00 TO NODE     71.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
```

```
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   131.00
  UPSTREAM ELEVATION(FEET) =     50.00
  DOWNSTREAM ELEVATION(FEET) =     48.80
  ELEVATION DIFFERENCE(FEET) =      1.20
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.822
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    58.32
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.322
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.97
  TOTAL AREA(ACRES) =      0.22   TOTAL RUNOFF(CFS) =      0.97

****************************************************************************
  FLOW PROCESS FROM NODE     71.00 TO NODE     72.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   48.80  DOWNSTREAM ELEVATION(FEET) =   46.30
  STREET LENGTH(FEET) =   910.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   9.00
  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) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.12
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.47
    HALFSTREET FLOOD WIDTH(FEET) =   15.71
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.55
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.73
  STREET FLOW TRAVEL TIME(MIN.) =   9.78   Tc(MIN.) =   13.60
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.791
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
  SUBAREA AREA(ACRES) =    2.62      SUBAREA RUNOFF(CFS) =    6.07
  TOTAL AREA(ACRES) =        2.8        PEAK FLOW RATE(CFS) =       6.58

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.52   HALFSTREET FLOOD WIDTH(FEET) =  18.00
  FLOW VELOCITY(FEET/SEC.) =  1.68   DEPTH*VELOCITY(FT*FT/SEC.) =   0.87
  LONGEST FLOWPATH FROM NODE     70.00 TO NODE     72.00 =    1041.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     72.00 TO NODE     54.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   46.30  DOWNSTREAM ELEVATION(FEET) =   45.00
  STREET LENGTH(FEET) =   435.00   CURB HEIGHT(INCHES) =  8.0
```

```
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   9.00
  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) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       7.80
    ***STREET FLOW SPLITS OVER STREET-CROWN***
    FULL DEPTH(FEET) =    0.52   FLOOD WIDTH(FEET) =   18.00
    FULL HALF-STREET VELOCITY(FEET/SEC.) =    1.76
    SPLIT DEPTH(FEET) =    0.37   SPLIT FLOOD WIDTH(FEET) =   10.72
    SPLIT FLOW(CFS) =    1.77   SPLIT VELOCITY(FEET/SEC.) =    1.32
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.52
    HALFSTREET FLOOD WIDTH(FEET) =   18.00
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.76
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.91
  STREET FLOW TRAVEL TIME(MIN.) =   4.13   Tc(MIN.) =   17.73
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.353
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
  SUBAREA AREA(ACRES) =    1.25      SUBAREA RUNOFF(CFS) =    2.44
  TOTAL AREA(ACRES) =        4.1        PEAK FLOW RATE(CFS) =       7.99

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.52   HALFSTREET FLOOD WIDTH(FEET) =  18.00
  FLOW VELOCITY(FEET/SEC.) =  1.76   DEPTH*VELOCITY(FT*FT/SEC.) =   0.91
  LONGEST FLOWPATH FROM NODE     70.00 TO NODE     54.00 =    1476.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     54.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =   17.73
  RAINFALL INTENSITY(INCH/HR) =   2.35
  TOTAL STREAM AREA(ACRES) =     4.09
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      7.99

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       60.53    14.99        2.622         25.02
      2       19.79     3.83        5.322          4.48
      3        7.99    17.73        2.353          4.09

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
```

```
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       51.33     3.83       5.322
      2       77.03    14.99       2.622
      3       71.05    17.73       2.353

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      77.03   Tc(MIN.) =   14.99
  TOTAL AREA(ACRES) =       33.6
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     54.00 =    3248.52 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       33.6  TC(MIN.) =     14.99
  PEAK FLOW RATE(CFS)   =      77.03
============================================================================
============================================================================
  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 1982-2016 Advanced Engineering Software (aes)
              Ver. 23.0 Release Date: 07/01/2016  License ID 1535

                              Analysis prepared by:

                                     Stantec



 ************************* DESCRIPTION OF STUDY *************************
* TREMONT SITE - SOUTHERLY TRIBUTARY AREA                                *
* PROPOSED CONDITION 100-YEAR RATIONAL METHOD                            *
*                                                                        *
 **************************************************************************

  FILE NAME: P100_30.DAT
  TIME/DATE OF STUDY: 12:57 07/19/2024
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.600
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  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   18.0      9.0    0.020/0.020/0.020   0.67    2.00 0.0312 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.63 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.3 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

**************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     31.00 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   254.70
  UPSTREAM ELEVATION(FEET) =     70.00
  DOWNSTREAM ELEVATION(FEET) =     69.00
  ELEVATION DIFFERENCE(FEET) =      1.00
```

```
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.452
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    50.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.478
  SUBAREA RUNOFF(CFS) =      2.36
  TOTAL AREA(ACRES) =      0.48   TOTAL RUNOFF(CFS) =      2.36

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     32.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   69.00  DOWNSTREAM ELEVATION(FEET) =   62.34
  STREET LENGTH(FEET) =   479.20   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   9.00
  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) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       7.21
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.44
    HALFSTREET FLOOD WIDTH(FEET) =   14.17
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.28
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.45
  STREET FLOW TRAVEL TIME(MIN.) =   2.43   Tc(MIN.) =    7.89
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.106
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.760
  SUBAREA AREA(ACRES) =    2.48      SUBAREA RUNOFF(CFS) =    9.62
  TOTAL AREA(ACRES) =        3.0        PEAK FLOW RATE(CFS) =      11.49

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.50   HALFSTREET FLOOD WIDTH(FEET) =  17.12
  FLOW VELOCITY(FEET/SEC.) =  3.68   DEPTH*VELOCITY(FT*FT/SEC.) =   1.84
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     32.00 =     733.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     32.10 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    57.34  DOWNSTREAM(FEET) =    49.19
  FLOW LENGTH(FEET) =   275.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.63
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.49
  PIPE TRAVEL TIME(MIN.) =   0.43    Tc(MIN.) =    8.32
```

```
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     32.10 =    1008.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     32.10 TO NODE     32.10 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.934
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7600
  SUBAREA AREA(ACRES) =    0.27   SUBAREA RUNOFF(CFS) =    1.01
  TOTAL AREA(ACRES) =        3.2   TOTAL RUNOFF(CFS) =      12.11
  TC(MIN.) =    8.32

****************************************************************************
  FLOW PROCESS FROM NODE     32.10 TO NODE     32.10 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.934
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7600
  SUBAREA AREA(ACRES) =    0.38   SUBAREA RUNOFF(CFS) =    1.42
  TOTAL AREA(ACRES) =        3.6   TOTAL RUNOFF(CFS) =      13.54
  TC(MIN.) =    8.32

****************************************************************************
  FLOW PROCESS FROM NODE     32.10 TO NODE     32.10 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.934
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7600
  SUBAREA AREA(ACRES) =    0.40   SUBAREA RUNOFF(CFS) =    1.50
  TOTAL AREA(ACRES) =        4.0   TOTAL RUNOFF(CFS) =      15.04
  TC(MIN.) =    8.32

****************************************************************************
  FLOW PROCESS FROM NODE     32.10 TO NODE     33.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    49.19  DOWNSTREAM(FEET) =    47.15
  FLOW LENGTH(FEET) =    72.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  13.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.99
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      15.04
  PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =    8.43
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     33.00 =    1080.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     33.00 TO NODE     33.00 IS CODE =  81
```

```
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.892
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7600
  SUBAREA AREA(ACRES) =    0.19   SUBAREA RUNOFF(CFS) =    0.71
  TOTAL AREA(ACRES) =        4.2   TOTAL RUNOFF(CFS) =      15.62
  TC(MIN.) =    8.43

****************************************************************************
  FLOW PROCESS FROM NODE     33.00 TO NODE     34.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    47.15  DOWNSTREAM(FEET) =    44.91
  FLOW LENGTH(FEET) =   431.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  19.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.77
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      15.62
  PIPE TRAVEL TIME(MIN.) =   1.25    Tc(MIN.) =    9.67
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     34.00 =    1511.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     34.00 TO NODE     34.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.476
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7600
  SUBAREA AREA(ACRES) =    2.69   SUBAREA RUNOFF(CFS) =    9.15
  TOTAL AREA(ACRES) =        6.9   TOTAL RUNOFF(CFS) =      23.44
  TC(MIN.) =    9.67

****************************************************************************
  FLOW PROCESS FROM NODE     34.00 TO NODE     35.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    44.91  DOWNSTREAM(FEET) =    43.00
  FLOW LENGTH(FEET) =    89.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.21
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      23.44
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =    9.80
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     35.00 =    1600.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     35.00 TO NODE     35.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     36.00 TO NODE     37.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   239.40
  UPSTREAM ELEVATION(FEET) =     69.00
  DOWNSTREAM ELEVATION(FEET) =     66.60
  ELEVATION DIFFERENCE(FEET) =      2.40
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.738
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    60.04
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.850
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      2.24
  TOTAL AREA(ACRES) =      0.43   TOTAL RUNOFF(CFS) =      2.24

****************************************************************************
  FLOW PROCESS FROM NODE     37.00 TO NODE     38.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   66.60  DOWNSTREAM ELEVATION(FEET) =   58.90
  STREET LENGTH(FEET) =   482.70   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   9.00
  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) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.09
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.40
    HALFSTREET FLOOD WIDTH(FEET) =   11.85
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.19
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.26
  STREET FLOW TRAVEL TIME(MIN.) =   2.52   Tc(MIN.) =    7.26
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.386
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.760
  SUBAREA AREA(ACRES) =    1.38      SUBAREA RUNOFF(CFS) =    5.65
  TOTAL AREA(ACRES) =        1.8        PEAK FLOW RATE(CFS) =       7.41

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.44   HALFSTREET FLOOD WIDTH(FEET) =  13.89
  FLOW VELOCITY(FEET/SEC.) =  3.50   DEPTH*VELOCITY(FT*FT/SEC.) =   1.53
  LONGEST FLOWPATH FROM NODE     36.00 TO NODE     38.00 =     722.10 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     38.00 TO NODE     39.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    59.00  DOWNSTREAM(FEET) =    58.80
  FLOW LENGTH(FEET) =    10.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.43
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.41
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =    7.28
  LONGEST FLOWPATH FROM NODE     36.00 TO NODE     39.00 =     732.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     39.00 TO NODE     39.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.378
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7600
  SUBAREA AREA(ACRES) =    1.48   SUBAREA RUNOFF(CFS) =    6.05
  TOTAL AREA(ACRES) =        3.3   TOTAL RUNOFF(CFS) =      13.45
  TC(MIN.) =    7.28

****************************************************************************
  FLOW PROCESS FROM NODE     39.00 TO NODE     40.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   58.40  DOWNSTREAM ELEVATION(FEET) =   50.10
  STREET LENGTH(FEET) =   255.80   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   9.00
  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) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      16.76
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.50
    HALFSTREET FLOOD WIDTH(FEET) =   16.84
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.54
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.74
  STREET FLOW TRAVEL TIME(MIN.) =   0.77   Tc(MIN.) =    8.05
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.040
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
```

```
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.760
  SUBAREA AREA(ACRES) =    1.73      SUBAREA RUNOFF(CFS) =    6.63
  TOTAL AREA(ACRES) =        5.0        PEAK FLOW RATE(CFS) =      19.23

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.51   HALFSTREET FLOOD WIDTH(FEET) =  17.75
  FLOW VELOCITY(FEET/SEC.) =  5.75   DEPTH*VELOCITY(FT*FT/SEC.) =   2.95
  LONGEST FLOWPATH FROM NODE     36.00 TO NODE     40.00 =     987.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     40.00 TO NODE     35.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    44.10  DOWNSTREAM(FEET) =    42.98
  FLOW LENGTH(FEET) =    55.90   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  15.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.25
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      19.23
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =    8.14
  LONGEST FLOWPATH FROM NODE     36.00 TO NODE     35.00 =    1043.80 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     35.00 TO NODE     35.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF       Tc       INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       19.23     8.14        5.004        5.02
  LONGEST FLOWPATH FROM NODE     36.00 TO NODE     35.00 =    1043.80 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF       Tc       INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       23.44     9.80        4.437        6.89
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     35.00 =    1600.90 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc       INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      38.68       8.14        5.004
      2      40.49       9.80        4.437

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      40.49   Tc(MIN.) =    9.80
  TOTAL AREA(ACRES) =       11.9

****************************************************************************
  FLOW PROCESS FROM NODE     35.00 TO NODE     50.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    42.98  DOWNSTREAM(FEET) =    41.60
  FLOW LENGTH(FEET) =   700.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  32.0 INCHES
```

```
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.14
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      40.49
  PIPE TRAVEL TIME(MIN.) =   2.27    Tc(MIN.) =   12.07
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     50.00 =    2300.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     50.00 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.) =   12.07
  RAINFALL INTENSITY(INCH/HR) =   3.88
  TOTAL STREAM AREA(ACRES) =    11.91
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     40.49

****************************************************************************
  FLOW PROCESS FROM NODE     60.00 TO NODE     61.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   700.00
  UPSTREAM ELEVATION(FEET) =     64.00
  DOWNSTREAM ELEVATION(FEET) =     54.00
  ELEVATION DIFFERENCE(FEET) =     10.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.460
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    64.29
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.850
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =     17.40
  TOTAL AREA(ACRES) =      3.06   TOTAL RUNOFF(CFS) =     17.40

****************************************************************************
  FLOW PROCESS FROM NODE     61.00 TO NODE     62.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   54.00  DOWNSTREAM ELEVATION(FEET) =   50.00
  STREET LENGTH(FEET) =   235.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   9.00
  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) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      24.28
    ***STREET FLOW SPLITS OVER STREET-CROWN***
```

```
    FULL DEPTH(FEET) =    0.52   FLOOD WIDTH(FEET) =   18.00
    FULL HALF-STREET VELOCITY(FEET/SEC.) =    4.19
    SPLIT DEPTH(FEET) =    0.47   SPLIT FLOOD WIDTH(FEET) =   15.43
    SPLIT FLOW(CFS) =    9.90   SPLIT VELOCITY(FEET/SEC.) =    3.85
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.52
    HALFSTREET FLOOD WIDTH(FEET) =   18.00
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.19
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.17
  STREET FLOW TRAVEL TIME(MIN.) =   0.93   Tc(MIN.) =    4.39
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.850
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
  SUBAREA AREA(ACRES) =    2.42      SUBAREA RUNOFF(CFS) =   13.76
  TOTAL AREA(ACRES) =        5.5        PEAK FLOW RATE(CFS) =      31.16

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.53   HALFSTREET FLOOD WIDTH(FEET) =  18.00
  FLOW VELOCITY(FEET/SEC.) =  4.33   DEPTH*VELOCITY(FT*FT/SEC.) =   2.29
  LONGEST FLOWPATH FROM NODE     60.00 TO NODE     62.00 =     935.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     62.00 TO NODE     50.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    42.00  DOWNSTREAM(FEET) =    41.60
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  21.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.21
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      31.16
  PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =    4.50
  LONGEST FLOWPATH FROM NODE     60.00 TO NODE     50.00 =     985.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     50.00 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.) =    4.50
  RAINFALL INTENSITY(INCH/HR) =   6.85
  TOTAL STREAM AREA(ACRES) =     5.48
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     31.16

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       40.49    12.07        3.879         11.91
      2       31.16     4.50        6.850          5.48

  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       46.24     4.50       6.850
      2       58.14    12.07       3.879

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      58.14   Tc(MIN.) =   12.07
  TOTAL AREA(ACRES) =       17.4
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     50.00 =    2300.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     51.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    41.60  DOWNSTREAM(FEET) =    41.46
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  45.0 INCH PIPE IS  34.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.42
  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      58.14
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =   12.20
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     51.00 =    2350.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     51.00 TO NODE     51.00 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.) =   12.20
  RAINFALL INTENSITY(INCH/HR) =   3.85
  TOTAL STREAM AREA(ACRES) =    17.39
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     58.14

****************************************************************************
  FLOW PROCESS FROM NODE     51.10 TO NODE     51.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   521.00
  UPSTREAM ELEVATION(FEET) =     60.00
  DOWNSTREAM ELEVATION(FEET) =     48.76
  ELEVATION DIFFERENCE(FEET) =     11.24
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.182
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    71.57
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.850
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      2.27
  TOTAL AREA(ACRES) =      0.40   TOTAL RUNOFF(CFS) =      2.27

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

```
  FLOW PROCESS FROM NODE     51.20 TO NODE     51.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   48.76  DOWNSTREAM ELEVATION(FEET) =   47.40
  STREET LENGTH(FEET) =   500.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   9.00
  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) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.81
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.46
    HALFSTREET FLOOD WIDTH(FEET) =   15.22
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.52
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.70
  STREET FLOW TRAVEL TIME(MIN.) =   5.48   Tc(MIN.) =    8.66
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.806
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
  SUBAREA AREA(ACRES) =    0.76      SUBAREA RUNOFF(CFS) =    3.03
  TOTAL AREA(ACRES) =        1.2        PEAK FLOW RATE(CFS) =       4.63

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.49   HALFSTREET FLOOD WIDTH(FEET) =  16.49
  FLOW VELOCITY(FEET/SEC.) =  1.59   DEPTH*VELOCITY(FT*FT/SEC.) =   0.78
  LONGEST FLOWPATH FROM NODE     51.10 TO NODE     51.00 =    1021.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     51.00 TO NODE     51.00 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.) =    8.66
  RAINFALL INTENSITY(INCH/HR) =   4.81
  TOTAL STREAM AREA(ACRES) =     1.16
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.63

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       58.14    12.20        3.853         17.39
      2        4.63     8.66        4.806          1.16

  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       51.23     8.66       4.806
      2       61.85    12.20       3.853

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      61.85   Tc(MIN.) =   12.20
  TOTAL AREA(ACRES) =       18.5
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     51.00 =    2350.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     51.00 TO NODE     52.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    41.46  DOWNSTREAM(FEET) =    40.29
  FLOW LENGTH(FEET) =   434.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  48.0 INCH PIPE IS  34.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.49
  ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      61.85
  PIPE TRAVEL TIME(MIN.) =   1.11    Tc(MIN.) =   13.32
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     52.00 =    2784.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     52.00 TO NODE     52.00 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.) =   13.32
  RAINFALL INTENSITY(INCH/HR) =   3.64
  TOTAL STREAM AREA(ACRES) =    18.55
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     61.85

****************************************************************************
  FLOW PROCESS FROM NODE     63.00 TO NODE     64.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   700.00
  UPSTREAM ELEVATION(FEET) =     60.00
  DOWNSTREAM ELEVATION(FEET) =     52.00
  ELEVATION DIFFERENCE(FEET) =      8.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.643
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    61.43
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.850
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =     19.05
  TOTAL AREA(ACRES) =      3.35   TOTAL RUNOFF(CFS) =     19.05

****************************************************************************
  FLOW PROCESS FROM NODE     64.00 TO NODE     65.00 IS CODE =  62
```

```
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   52.00  DOWNSTREAM ELEVATION(FEET) =   46.00
  STREET LENGTH(FEET) =   235.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   9.00
  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) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      25.98
    ***STREET FLOW SPLITS OVER STREET-CROWN***
    FULL DEPTH(FEET) =    0.52   FLOOD WIDTH(FEET) =   18.00
    FULL HALF-STREET VELOCITY(FEET/SEC.) =    5.14
    SPLIT DEPTH(FEET) =    0.42   SPLIT FLOOD WIDTH(FEET) =   13.25
    SPLIT FLOW(CFS) =    8.37   SPLIT VELOCITY(FEET/SEC.) =    4.30
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.52
    HALFSTREET FLOOD WIDTH(FEET) =   18.00
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.14
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.66
  STREET FLOW TRAVEL TIME(MIN.) =   0.76   Tc(MIN.) =    4.41
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.850
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
  SUBAREA AREA(ACRES) =    2.44      SUBAREA RUNOFF(CFS) =   13.87
  TOTAL AREA(ACRES) =        5.8        PEAK FLOW RATE(CFS) =      32.92

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.52   HALFSTREET FLOOD WIDTH(FEET) =  18.00
  FLOW VELOCITY(FEET/SEC.) =  5.14   DEPTH*VELOCITY(FT*FT/SEC.) =   2.66
  LONGEST FLOWPATH FROM NODE     63.00 TO NODE     65.00 =     935.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     65.00 TO NODE     52.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    41.29  DOWNSTREAM(FEET) =    40.29
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  17.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.85
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      32.92
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    4.48
  LONGEST FLOWPATH FROM NODE     63.00 TO NODE     52.00 =     985.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     52.00 TO NODE     52.00 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.) =    4.48
  RAINFALL INTENSITY(INCH/HR) =   6.85
  TOTAL STREAM AREA(ACRES) =     5.79
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     32.92

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       61.85    13.32        3.642         18.55
      2       32.92     4.48        6.850          5.79

  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       65.80     4.48       6.850
      2       79.35    13.32       3.642

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      79.35   Tc(MIN.) =   13.32
  TOTAL AREA(ACRES) =       24.3
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     52.00 =    2784.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     52.00 TO NODE     53.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    40.29  DOWNSTREAM(FEET) =    40.17
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  51.0 INCH PIPE IS  41.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.48
  ESTIMATED PIPE DIAMETER(INCH) =  51.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      79.35
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =   13.45
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     53.00 =    2834.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     53.00 TO NODE     53.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.619
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7967
  SUBAREA AREA(ACRES) =    0.68   SUBAREA RUNOFF(CFS) =    2.04
  TOTAL AREA(ACRES) =       25.0   TOTAL RUNOFF(CFS) =      79.35
  TC(MIN.) =   13.45
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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

```
  FLOW PROCESS FROM NODE     53.00 TO NODE     54.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    40.17  DOWNSTREAM(FEET) =    39.00
  FLOW LENGTH(FEET) =   414.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  51.0 INCH PIPE IS  38.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.99
  ESTIMATED PIPE DIAMETER(INCH) =  51.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      79.35
  PIPE TRAVEL TIME(MIN.) =   0.99    Tc(MIN.) =   14.43
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     54.00 =    3248.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     54.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   14.43
  RAINFALL INTENSITY(INCH/HR) =   3.46
  TOTAL STREAM AREA(ACRES) =    25.02
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     79.35

****************************************************************************
  FLOW PROCESS FROM NODE     66.00 TO NODE     67.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   250.00
  UPSTREAM ELEVATION(FEET) =     62.00
  DOWNSTREAM ELEVATION(FEET) =     51.00
  ELEVATION DIFFERENCE(FEET) =     11.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.767
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    87.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.850
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      9.50
  TOTAL AREA(ACRES) =      1.67   TOTAL RUNOFF(CFS) =      9.50

****************************************************************************
  FLOW PROCESS FROM NODE     67.00 TO NODE     68.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   51.00  DOWNSTREAM ELEVATION(FEET) =   45.00
  STREET LENGTH(FEET) =   265.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   9.00
  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) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      17.48
    ***STREET FLOW SPLITS OVER STREET-CROWN***
    FULL DEPTH(FEET) =    0.52   FLOOD WIDTH(FEET) =   18.00
    FULL HALF-STREET VELOCITY(FEET/SEC.) =    4.84
    SPLIT DEPTH(FEET) =    0.23   SPLIT FLOOD WIDTH(FEET) =    3.56
    SPLIT FLOW(CFS) =    0.90   SPLIT VELOCITY(FEET/SEC.) =    2.84
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.52
    HALFSTREET FLOOD WIDTH(FEET) =   18.00
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.84
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.51
  STREET FLOW TRAVEL TIME(MIN.) =   0.91   Tc(MIN.) =    3.68
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.850
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
  SUBAREA AREA(ACRES) =    2.81      SUBAREA RUNOFF(CFS) =   15.98
  TOTAL AREA(ACRES) =        4.5        PEAK FLOW RATE(CFS) =      25.47

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.52   HALFSTREET FLOOD WIDTH(FEET) =  18.00
  FLOW VELOCITY(FEET/SEC.) =  4.84   DEPTH*VELOCITY(FT*FT/SEC.) =   2.51
  LONGEST FLOWPATH FROM NODE     66.00 TO NODE     68.00 =     515.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     68.00 TO NODE     54.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    39.50  DOWNSTREAM(FEET) =    39.00
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  19.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.51
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      25.47
  PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =    3.78
  LONGEST FLOWPATH FROM NODE     66.00 TO NODE     54.00 =     565.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     54.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    3.78
  RAINFALL INTENSITY(INCH/HR) =   6.85
  TOTAL STREAM AREA(ACRES) =     4.48
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     25.47

****************************************************************************
  FLOW PROCESS FROM NODE     70.00 TO NODE     71.00 IS CODE =  21
```

```
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   131.00
  UPSTREAM ELEVATION(FEET) =     50.00
  DOWNSTREAM ELEVATION(FEET) =     48.80
  ELEVATION DIFFERENCE(FEET) =      1.20
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.822
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    58.32
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.850
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      1.25
  TOTAL AREA(ACRES) =      0.22   TOTAL RUNOFF(CFS) =      1.25

****************************************************************************
  FLOW PROCESS FROM NODE     71.00 TO NODE     72.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   48.80  DOWNSTREAM ELEVATION(FEET) =   46.30
  STREET LENGTH(FEET) =   910.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   9.00
  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) =   0.0150
  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) =  0.51
    HALFSTREET FLOOD WIDTH(FEET) =   17.40
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.65
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.84
  STREET FLOW TRAVEL TIME(MIN.) =   9.20   Tc(MIN.) =   13.02
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.696
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
  SUBAREA AREA(ACRES) =    2.62      SUBAREA RUNOFF(CFS) =    8.04
  TOTAL AREA(ACRES) =        2.8        PEAK FLOW RATE(CFS) =       8.71

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.52   HALFSTREET FLOOD WIDTH(FEET) =  18.00
  FLOW VELOCITY(FEET/SEC.) =  1.68   DEPTH*VELOCITY(FT*FT/SEC.) =   0.87
  LONGEST FLOWPATH FROM NODE     70.00 TO NODE     72.00 =    1041.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     72.00 TO NODE     54.00 IS CODE =  62
```

```
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   46.30  DOWNSTREAM ELEVATION(FEET) =   45.00
  STREET LENGTH(FEET) =   435.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   9.00
  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) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      10.32
    ***STREET FLOW SPLITS OVER STREET-CROWN***
    FULL DEPTH(FEET) =    0.52   FLOOD WIDTH(FEET) =   18.00
    FULL HALF-STREET VELOCITY(FEET/SEC.) =    1.76
    SPLIT DEPTH(FEET) =    0.47   SPLIT FLOOD WIDTH(FEET) =   15.71
    SPLIT FLOW(CFS) =    4.29   SPLIT VELOCITY(FEET/SEC.) =    1.61
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.52
    HALFSTREET FLOOD WIDTH(FEET) =   18.00
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.76
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.91
  STREET FLOW TRAVEL TIME(MIN.) =   4.13   Tc(MIN.) =   17.14
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.094
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
  SUBAREA AREA(ACRES) =    1.25      SUBAREA RUNOFF(CFS) =    3.21
  TOTAL AREA(ACRES) =        4.1        PEAK FLOW RATE(CFS) =      10.50

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.52   HALFSTREET FLOOD WIDTH(FEET) =  18.00
  FLOW VELOCITY(FEET/SEC.) =  1.76   DEPTH*VELOCITY(FT*FT/SEC.) =   0.91
  LONGEST FLOWPATH FROM NODE     70.00 TO NODE     54.00 =    1476.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     54.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =   17.14
  RAINFALL INTENSITY(INCH/HR) =   3.09
  TOTAL STREAM AREA(ACRES) =     4.09
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     10.50

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       79.35    14.43        3.457         25.02
      2       25.47     3.78        6.850          4.48
      3       10.50    17.14        3.094          4.09
```

```
  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       67.83     3.78       6.850
      2      101.05    14.43       3.457
      3       93.02    17.14       3.094

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     101.05   Tc(MIN.) =   14.43
  TOTAL AREA(ACRES) =       33.6
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     54.00 =    3248.90 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       33.6  TC(MIN.) =     14.43
  PEAK FLOW RATE(CFS)   =     101.05
============================================================================
============================================================================
  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 1982-2016 Advanced Engineering Software (aes)
              Ver. 23.0 Release Date: 07/01/2016  License ID 1535

                              Analysis prepared by:

                                     Stantec



 ************************* DESCRIPTION OF STUDY *************************
* TREMONT SITE - SOUTHERLY TRIBUTARY AREA                                *
* PROPOSED CONDITION 2-YEAR RATIONAL METHOD                              *
*                                                                        *
 **************************************************************************

  FILE NAME: P2_30.DAT
  TIME/DATE OF STUDY: 13:13 07/19/2024
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) =   2.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   1.200
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  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   18.0      9.0    0.020/0.020/0.020   0.67    2.00 0.0312 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.63 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.3 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

**************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     31.00 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   254.70
  UPSTREAM ELEVATION(FEET) =     70.00
  DOWNSTREAM ELEVATION(FEET) =     69.00
  ELEVATION DIFFERENCE(FEET) =      1.00
```

```
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.452
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    50.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.990
  SUBAREA RUNOFF(CFS) =      1.09
  TOTAL AREA(ACRES) =      0.48   TOTAL RUNOFF(CFS) =      1.09

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     32.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   69.00  DOWNSTREAM ELEVATION(FEET) =   62.34
  STREET LENGTH(FEET) =   479.20   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   9.00
  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) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.25
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.36
    HALFSTREET FLOOD WIDTH(FEET) =    9.95
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.75
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.98
  STREET FLOW TRAVEL TIME(MIN.) =   2.90   Tc(MIN.) =    8.35
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.271
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.760
  SUBAREA AREA(ACRES) =    2.48      SUBAREA RUNOFF(CFS) =    4.28
  TOTAL AREA(ACRES) =        3.0        PEAK FLOW RATE(CFS) =       5.11

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.40   HALFSTREET FLOOD WIDTH(FEET) =  12.20
  FLOW VELOCITY(FEET/SEC.) =  3.04   DEPTH*VELOCITY(FT*FT/SEC.) =   1.22
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     32.00 =     733.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     32.10 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    57.34  DOWNSTREAM(FEET) =    49.19
  FLOW LENGTH(FEET) =   275.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   8.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.54
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.11
  PIPE TRAVEL TIME(MIN.) =   0.54    Tc(MIN.) =    8.89
```

```
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     32.10 =    1008.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     32.10 TO NODE     32.10 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.181
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7600
  SUBAREA AREA(ACRES) =    0.27   SUBAREA RUNOFF(CFS) =    0.45
  TOTAL AREA(ACRES) =        3.2   TOTAL RUNOFF(CFS) =       5.36
  TC(MIN.) =    8.89

****************************************************************************
  FLOW PROCESS FROM NODE     32.10 TO NODE     32.10 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.181
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7600
  SUBAREA AREA(ACRES) =    0.38   SUBAREA RUNOFF(CFS) =    0.63
  TOTAL AREA(ACRES) =        3.6   TOTAL RUNOFF(CFS) =       5.99
  TC(MIN.) =    8.89

****************************************************************************
  FLOW PROCESS FROM NODE     32.10 TO NODE     32.10 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.181
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7600
  SUBAREA AREA(ACRES) =    0.40   SUBAREA RUNOFF(CFS) =    0.66
  TOTAL AREA(ACRES) =        4.0   TOTAL RUNOFF(CFS) =       6.65
  TC(MIN.) =    8.89

****************************************************************************
  FLOW PROCESS FROM NODE     32.10 TO NODE     33.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    49.19  DOWNSTREAM(FEET) =    47.15
  FLOW LENGTH(FEET) =    72.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   8.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.12
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.65
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =    9.02
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     33.00 =    1080.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     33.00 TO NODE     33.00 IS CODE =  81
```

```
------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.161
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7600
  SUBAREA AREA(ACRES) =    0.19   SUBAREA RUNOFF(CFS) =    0.31
  TOTAL AREA(ACRES) =        4.2   TOTAL RUNOFF(CFS) =       6.90
  TC(MIN.) =    9.02

****************************************************************************
  FLOW PROCESS FROM NODE     33.00 TO NODE     34.00 IS CODE =  31
------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    47.15  DOWNSTREAM(FEET) =    44.91
  FLOW LENGTH(FEET) =   431.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  13.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.75
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.90
  PIPE TRAVEL TIME(MIN.) =   1.51    Tc(MIN.) =   10.53
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     34.00 =    1511.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     34.00 TO NODE     34.00 IS CODE =  81
------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.955
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7600
  SUBAREA AREA(ACRES) =    2.69   SUBAREA RUNOFF(CFS) =    4.00
  TOTAL AREA(ACRES) =        6.9   TOTAL RUNOFF(CFS) =      10.24
  TC(MIN.) =   10.53

****************************************************************************
  FLOW PROCESS FROM NODE     34.00 TO NODE     35.00 IS CODE =  31
------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    44.91  DOWNSTREAM(FEET) =    43.00
  FLOW LENGTH(FEET) =    89.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.13
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.24
  PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =   10.70
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     35.00 =    1600.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     35.00 TO NODE     35.00 IS CODE =  10
------------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
==============================================================================
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     36.00 TO NODE     37.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   239.40
  UPSTREAM ELEVATION(FEET) =     69.00
  DOWNSTREAM ELEVATION(FEET) =     66.60
  ELEVATION DIFFERENCE(FEET) =      2.40
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.738
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    60.04
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.162
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      1.03
  TOTAL AREA(ACRES) =      0.43   TOTAL RUNOFF(CFS) =      1.03

****************************************************************************
  FLOW PROCESS FROM NODE     37.00 TO NODE     38.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   66.60  DOWNSTREAM ELEVATION(FEET) =   58.90
  STREET LENGTH(FEET) =   482.70   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   9.00
  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) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.30
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.32
    HALFSTREET FLOOD WIDTH(FEET) =    8.15
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.69
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.86
  STREET FLOW TRAVEL TIME(MIN.) =   2.99   Tc(MIN.) =    7.73
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.387
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.760
  SUBAREA AREA(ACRES) =    1.38      SUBAREA RUNOFF(CFS) =    2.50
  TOTAL AREA(ACRES) =        1.8        PEAK FLOW RATE(CFS) =       3.28

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.35   HALFSTREET FLOOD WIDTH(FEET) =   9.67
  FLOW VELOCITY(FEET/SEC.) =  2.92   DEPTH*VELOCITY(FT*FT/SEC.) =   1.03
  LONGEST FLOWPATH FROM NODE     36.00 TO NODE     38.00 =     722.10 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     38.00 TO NODE     39.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    59.00  DOWNSTREAM(FEET) =    58.80
  FLOW LENGTH(FEET) =    10.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   7.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.69
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.28
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =    7.76
  LONGEST FLOWPATH FROM NODE     36.00 TO NODE     39.00 =     732.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     39.00 TO NODE     39.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.382
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7600
  SUBAREA AREA(ACRES) =    1.48   SUBAREA RUNOFF(CFS) =    2.68
  TOTAL AREA(ACRES) =        3.3   TOTAL RUNOFF(CFS) =       5.96
  TC(MIN.) =    7.76

****************************************************************************
  FLOW PROCESS FROM NODE     39.00 TO NODE     40.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   58.40  DOWNSTREAM ELEVATION(FEET) =   50.10
  STREET LENGTH(FEET) =   255.80   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   9.00
  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) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       7.41
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.40
    HALFSTREET FLOOD WIDTH(FEET) =   11.92
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.60
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.83
  STREET FLOW TRAVEL TIME(MIN.) =   0.93   Tc(MIN.) =    8.68
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.215
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.760
```

```
  SUBAREA AREA(ACRES) =    1.73      SUBAREA RUNOFF(CFS) =    2.91
  TOTAL AREA(ACRES) =        5.0        PEAK FLOW RATE(CFS) =       8.45

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.41   HALFSTREET FLOOD WIDTH(FEET) =  12.62
  FLOW VELOCITY(FEET/SEC.) =  4.74   DEPTH*VELOCITY(FT*FT/SEC.) =   1.95
  LONGEST FLOWPATH FROM NODE     36.00 TO NODE     40.00 =     987.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     40.00 TO NODE     35.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    44.10  DOWNSTREAM(FEET) =    42.98
  FLOW LENGTH(FEET) =    55.90   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS  11.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.26
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.45
  PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =    8.79
  LONGEST FLOWPATH FROM NODE     36.00 TO NODE     35.00 =    1043.80 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     35.00 TO NODE     35.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF       Tc       INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        8.45     8.79       2.197        5.02
  LONGEST FLOWPATH FROM NODE     36.00 TO NODE     35.00 =    1043.80 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF       Tc       INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       10.24    10.70       1.936        6.89
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     35.00 =    1600.90 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc       INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      16.87       8.79        2.197
      2      17.69      10.70        1.936

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      17.69   Tc(MIN.) =   10.70
  TOTAL AREA(ACRES) =       11.9

****************************************************************************
  FLOW PROCESS FROM NODE     35.00 TO NODE     50.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    42.98  DOWNSTREAM(FEET) =    41.60
  FLOW LENGTH(FEET) =   700.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  24.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.12
```

```
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      17.69
  PIPE TRAVEL TIME(MIN.) =   2.83    Tc(MIN.) =   13.53
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     50.00 =    2300.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     50.00 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.) =   13.53
  RAINFALL INTENSITY(INCH/HR) =   1.66
  TOTAL STREAM AREA(ACRES) =    11.91
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     17.69

****************************************************************************
  FLOW PROCESS FROM NODE     60.00 TO NODE     61.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   700.00
  UPSTREAM ELEVATION(FEET) =     64.00
  DOWNSTREAM ELEVATION(FEET) =     54.00
  ELEVATION DIFFERENCE(FEET) =     10.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.460
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    64.29
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.162
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      8.03
  TOTAL AREA(ACRES) =      3.06   TOTAL RUNOFF(CFS) =      8.03

****************************************************************************
  FLOW PROCESS FROM NODE     61.00 TO NODE     62.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   54.00  DOWNSTREAM ELEVATION(FEET) =   50.00
  STREET LENGTH(FEET) =   235.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   9.00
  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) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      11.21
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.48
```

```
    HALFSTREET FLOOD WIDTH(FEET) =   16.28
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.95
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.91
  STREET FLOW TRAVEL TIME(MIN.) =   0.99   Tc(MIN.) =    4.45
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.162
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
  SUBAREA AREA(ACRES) =    2.42      SUBAREA RUNOFF(CFS) =    6.35
  TOTAL AREA(ACRES) =        5.5        PEAK FLOW RATE(CFS) =      14.38

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.52   HALFSTREET FLOOD WIDTH(FEET) =  18.00
  FLOW VELOCITY(FEET/SEC.) =  4.19   DEPTH*VELOCITY(FT*FT/SEC.) =   2.17
  LONGEST FLOWPATH FROM NODE     60.00 TO NODE     62.00 =     935.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     62.00 TO NODE     50.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    42.00  DOWNSTREAM(FEET) =    41.60
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.85
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      14.38
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =    4.57
  LONGEST FLOWPATH FROM NODE     60.00 TO NODE     50.00 =     985.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     50.00 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.) =    4.57
  RAINFALL INTENSITY(INCH/HR) =   3.16
  TOTAL STREAM AREA(ACRES) =     5.48
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     14.38

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       17.69    13.53        1.664         11.91
      2       14.38     4.57        3.162          5.48

  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       20.36     4.57       3.162
      2       25.26    13.53       1.664
```

```
  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      25.26   Tc(MIN.) =   13.53
  TOTAL AREA(ACRES) =       17.4
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     50.00 =    2300.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     51.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    41.60  DOWNSTREAM(FEET) =    41.46
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  25.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.21
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      25.26
  PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =   13.68
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     51.00 =    2350.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     51.00 TO NODE     51.00 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.) =   13.68
  RAINFALL INTENSITY(INCH/HR) =   1.65
  TOTAL STREAM AREA(ACRES) =    17.39
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     25.26

****************************************************************************
  FLOW PROCESS FROM NODE     51.10 TO NODE     51.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   521.00
  UPSTREAM ELEVATION(FEET) =     60.00
  DOWNSTREAM ELEVATION(FEET) =     48.76
  ELEVATION DIFFERENCE(FEET) =     11.24
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.182
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    71.57
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.162
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      1.05
  TOTAL AREA(ACRES) =      0.40   TOTAL RUNOFF(CFS) =      1.05

****************************************************************************
  FLOW PROCESS FROM NODE     51.20 TO NODE     51.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   48.76  DOWNSTREAM ELEVATION(FEET) =   47.40
```

```
  STREET LENGTH(FEET) =   500.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   9.00
  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) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.71
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.37
    HALFSTREET FLOOD WIDTH(FEET) =   10.79
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.26
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.47
  STREET FLOW TRAVEL TIME(MIN.) =   6.61   Tc(MIN.) =    9.79
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.049
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
  SUBAREA AREA(ACRES) =    0.76      SUBAREA RUNOFF(CFS) =    1.29
  TOTAL AREA(ACRES) =        1.2        PEAK FLOW RATE(CFS) =       1.97

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.39   HALFSTREET FLOOD WIDTH(FEET) =  11.50
  FLOW VELOCITY(FEET/SEC.) =  1.31   DEPTH*VELOCITY(FT*FT/SEC.) =   0.51
  LONGEST FLOWPATH FROM NODE     51.10 TO NODE     51.00 =    1021.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     51.00 TO NODE     51.00 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.) =    9.79
  RAINFALL INTENSITY(INCH/HR) =   2.05
  TOTAL STREAM AREA(ACRES) =     1.16
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.97

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       25.26    13.68        1.652         17.39
      2        1.97     9.79        2.049          1.16

  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       22.33     9.79       2.049
      2       26.85    13.68       1.652

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
```

```
  PEAK FLOW RATE(CFS) =      26.85   Tc(MIN.) =   13.68
  TOTAL AREA(ACRES) =       18.5
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     51.00 =    2350.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     51.00 TO NODE     52.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    41.46  DOWNSTREAM(FEET) =    40.29
  FLOW LENGTH(FEET) =   434.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  24.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.30
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      26.85
  PIPE TRAVEL TIME(MIN.) =   1.36    Tc(MIN.) =   15.05
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     52.00 =    2784.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     52.00 TO NODE     52.00 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.) =   15.05
  RAINFALL INTENSITY(INCH/HR) =   1.55
  TOTAL STREAM AREA(ACRES) =    18.55
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     26.85

****************************************************************************
  FLOW PROCESS FROM NODE     63.00 TO NODE     64.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   700.00
  UPSTREAM ELEVATION(FEET) =     60.00
  DOWNSTREAM ELEVATION(FEET) =     52.00
  ELEVATION DIFFERENCE(FEET) =      8.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.643
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    61.43
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.162
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      8.79
  TOTAL AREA(ACRES) =      3.35   TOTAL RUNOFF(CFS) =      8.79

****************************************************************************
  FLOW PROCESS FROM NODE     64.00 TO NODE     65.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   52.00  DOWNSTREAM ELEVATION(FEET) =   46.00
  STREET LENGTH(FEET) =   235.00   CURB HEIGHT(INCHES) =  8.0
```

```
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   9.00
  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) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      11.99
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.47
    HALFSTREET FLOOD WIDTH(FEET) =   15.36
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.70
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.19
  STREET FLOW TRAVEL TIME(MIN.) =   0.83   Tc(MIN.) =    4.48
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.162
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
  SUBAREA AREA(ACRES) =    2.44      SUBAREA RUNOFF(CFS) =    6.40
  TOTAL AREA(ACRES) =        5.8        PEAK FLOW RATE(CFS) =      15.19

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.50   HALFSTREET FLOOD WIDTH(FEET) =  16.98
  FLOW VELOCITY(FEET/SEC.) =  4.94   DEPTH*VELOCITY(FT*FT/SEC.) =   2.46
  LONGEST FLOWPATH FROM NODE     63.00 TO NODE     65.00 =     935.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     65.00 TO NODE     52.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    41.29  DOWNSTREAM(FEET) =    40.29
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  12.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.81
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      15.19
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    4.56
  LONGEST FLOWPATH FROM NODE     63.00 TO NODE     52.00 =     985.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     52.00 TO NODE     52.00 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.) =    4.56
  RAINFALL INTENSITY(INCH/HR) =   3.16
  TOTAL STREAM AREA(ACRES) =     5.79
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     15.19

  ** CONFLUENCE DATA **
```

```
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       26.85    15.05        1.553         18.55
      2       15.19     4.56        3.162          5.79

  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       28.38     4.56       3.162
      2       34.31    15.05       1.553

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      34.31   Tc(MIN.) =   15.05
  TOTAL AREA(ACRES) =       24.3
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     52.00 =    2784.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     52.00 TO NODE     53.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    40.29  DOWNSTREAM(FEET) =    40.17
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  28.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.35
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      34.31
  PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =   15.21
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     53.00 =    2834.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     53.00 TO NODE     53.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.543
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7967
  SUBAREA AREA(ACRES) =    0.68   SUBAREA RUNOFF(CFS) =    0.87
  TOTAL AREA(ACRES) =       25.0   TOTAL RUNOFF(CFS) =      34.31
  TC(MIN.) =   15.21
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE     53.00 TO NODE     54.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    40.17  DOWNSTREAM(FEET) =    39.00
  FLOW LENGTH(FEET) =   414.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  29.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.57
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      34.31
```

```
  PIPE TRAVEL TIME(MIN.) =   1.24    Tc(MIN.) =   16.44
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     54.00 =    3248.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     54.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   16.44
  RAINFALL INTENSITY(INCH/HR) =   1.47
  TOTAL STREAM AREA(ACRES) =    25.02
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     34.31

****************************************************************************
  FLOW PROCESS FROM NODE     66.00 TO NODE     67.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   250.00
  UPSTREAM ELEVATION(FEET) =     62.00
  DOWNSTREAM ELEVATION(FEET) =     51.00
  ELEVATION DIFFERENCE(FEET) =     11.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.767
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    87.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.162
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      4.38
  TOTAL AREA(ACRES) =      1.67   TOTAL RUNOFF(CFS) =      4.38

****************************************************************************
  FLOW PROCESS FROM NODE     67.00 TO NODE     68.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   51.00  DOWNSTREAM ELEVATION(FEET) =   45.00
  STREET LENGTH(FEET) =   265.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   9.00
  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) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       8.07
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.43
    HALFSTREET FLOOD WIDTH(FEET) =   13.39
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.07
```

```
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.73
  STREET FLOW TRAVEL TIME(MIN.) =   1.09   Tc(MIN.) =    3.85
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.162
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
  SUBAREA AREA(ACRES) =    2.81      SUBAREA RUNOFF(CFS) =    7.37
  TOTAL AREA(ACRES) =        4.5        PEAK FLOW RATE(CFS) =      11.76

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.47   HALFSTREET FLOOD WIDTH(FEET) =  15.64
  FLOW VELOCITY(FEET/SEC.) =  4.46   DEPTH*VELOCITY(FT*FT/SEC.) =   2.10
  LONGEST FLOWPATH FROM NODE     66.00 TO NODE     68.00 =     515.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     68.00 TO NODE     54.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    39.50  DOWNSTREAM(FEET) =    39.00
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.07
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.76
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =    3.97
  LONGEST FLOWPATH FROM NODE     66.00 TO NODE     54.00 =     565.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     54.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    3.97
  RAINFALL INTENSITY(INCH/HR) =   3.16
  TOTAL STREAM AREA(ACRES) =     4.48
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     11.76

****************************************************************************
  FLOW PROCESS FROM NODE     70.00 TO NODE     71.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   131.00
  UPSTREAM ELEVATION(FEET) =     50.00
  DOWNSTREAM ELEVATION(FEET) =     48.80
  ELEVATION DIFFERENCE(FEET) =      1.20
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.822
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    58.32
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.162
```

```
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.58
  TOTAL AREA(ACRES) =      0.22   TOTAL RUNOFF(CFS) =      0.58

****************************************************************************
  FLOW PROCESS FROM NODE     71.00 TO NODE     72.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   48.80  DOWNSTREAM ELEVATION(FEET) =   46.30
  STREET LENGTH(FEET) =   910.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   9.00
  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) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.38
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.41
    HALFSTREET FLOOD WIDTH(FEET) =   12.48
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.36
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.56
  STREET FLOW TRAVEL TIME(MIN.) =  11.14   Tc(MIN.) =   14.96
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.559
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
  SUBAREA AREA(ACRES) =    2.62      SUBAREA RUNOFF(CFS) =    3.39
  TOTAL AREA(ACRES) =        2.8        PEAK FLOW RATE(CFS) =       3.68

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.46   HALFSTREET FLOOD WIDTH(FEET) =  14.94
  FLOW VELOCITY(FEET/SEC.) =  1.52   DEPTH*VELOCITY(FT*FT/SEC.) =   0.69
  LONGEST FLOWPATH FROM NODE     70.00 TO NODE     72.00 =    1041.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     72.00 TO NODE     54.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   46.30  DOWNSTREAM ELEVATION(FEET) =   45.00
  STREET LENGTH(FEET) =   435.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   9.00
  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) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200
```

```
    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.36
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.47
    HALFSTREET FLOOD WIDTH(FEET) =   15.79
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.63
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.77
  STREET FLOW TRAVEL TIME(MIN.) =   4.46   Tc(MIN.) =   19.42
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.318
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8300
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.830
  SUBAREA AREA(ACRES) =    1.25      SUBAREA RUNOFF(CFS) =    1.37
  TOTAL AREA(ACRES) =        4.1        PEAK FLOW RATE(CFS) =       4.47

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.48   HALFSTREET FLOOD WIDTH(FEET) =  15.93
  FLOW VELOCITY(FEET/SEC.) =  1.64   DEPTH*VELOCITY(FT*FT/SEC.) =   0.78
  LONGEST FLOWPATH FROM NODE     70.00 TO NODE     54.00 =    1476.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     54.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =   19.42
  RAINFALL INTENSITY(INCH/HR) =   1.32
  TOTAL STREAM AREA(ACRES) =     4.09
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.47

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       34.31    16.44        1.467         25.02
      2       11.76     3.97        3.162          4.48
      3        4.47    19.42        1.318          4.09

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       28.59     3.97       3.162
      2       43.55    16.44       1.467
      3       40.19    19.42       1.318

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      43.55   Tc(MIN.) =   16.44
  TOTAL AREA(ACRES) =       33.6
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     54.00 =    3248.90 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       33.6  TC(MIN.) =     16.44
  PEAK FLOW RATE(CFS)   =      43.55
============================================================================
============================================================================
```

END OF RATIONAL METHOD ANALYSIS

IV. DETENTION CALCULATIONS

a) Rathydro Hydrographs

b) Stage-Storage-Discharge Calculations

c) Existing Detention (Double 36” RCP)

d) Proposed Detention Basin 1 (Double 3’x12’ Contech Con/Span)

e) Proposed Detention Basin 2 (Triple 3’x12’ Contech Con/Span)

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RUN DATE 6/12/2024
HYDROGRAPH FILE NAME Text1
TIME OF CONCENTRATION 8 MIN.
6 HOUR RAINFALL 2.02 INCHES
BASIN AREA 2.2 ACRES
RUNOFF COEFFICIENT 0.83
PEAK DISCHARGE 8.67 CFS

RATHYDRO FOR AREA DRAINING TO EX DETENTION BASIN 25-YEAR STORM

TIME (MIN) = 0	DISCHARGE (CFS) = 0
TIME (MIN) = 8	DISCHARGE (CFS) = 0.2
TIME (MIN) = 16	DISCHARGE (CFS) = 0.2
TIME (MIN) = 24	DISCHARGE (CFS) = 0.2
TIME (MIN) = 32	DISCHARGE (CFS) = 0.2
TIME (MIN) = 40	DISCHARGE (CFS) = 0.2
TIME (MIN) = 48	DISCHARGE (CFS) = 0.2
TIME (MIN) = 56	DISCHARGE (CFS) = 0.3
TIME (MIN) = 64	DISCHARGE (CFS) = 0.3
TIME (MIN) = 72	DISCHARGE (CFS) = 0.3
TIME (MIN) = 80	DISCHARGE (CFS) = 0.3
TIME (MIN) = 88	DISCHARGE (CFS) = 0.3
TIME (MIN) = 96	DISCHARGE (CFS) = 0.3
TIME (MIN) = 104	DISCHARGE (CFS) = 0.3
TIME (MIN) = 112	DISCHARGE (CFS) = 0.3
TIME (MIN) = 120	DISCHARGE (CFS) = 0.3
TIME (MIN) = 128	DISCHARGE (CFS) = 0.3
TIME (MIN) = 136	DISCHARGE (CFS) = 0.4
TIME (MIN) = 144	DISCHARGE (CFS) = 0.4
TIME (MIN) = 152	DISCHARGE (CFS) = 0.4
TIME (MIN) = 160	DISCHARGE (CFS) = 0.4
TIME (MIN) = 168	DISCHARGE (CFS) = 0.5
TIME (MIN) = 176	DISCHARGE (CFS) = 0.5
TIME (MIN) = 184	DISCHARGE (CFS) = 0.5
TIME (MIN) = 192	DISCHARGE (CFS) = 0.6
TIME (MIN) = 200	DISCHARGE (CFS) = 0.6
TIME (MIN) = 208	DISCHARGE (CFS) = 0.7
TIME (MIN) = 216	DISCHARGE (CFS) = 0.8
TIME (MIN) = 224	DISCHARGE (CFS) = 1
TIME (MIN) = 232	DISCHARGE (CFS) = 1.4
TIME (MIN) = 240	DISCHARGE (CFS) = 0.5
TIME (MIN) = 248	DISCHARGE (CFS) = 8.67
TIME (MIN) = 256	DISCHARGE (CFS) = 1.1
TIME (MIN) = 264	DISCHARGE (CFS) = 0.8
TIME (MIN) = 272	DISCHARGE (CFS) = 0.6
TIME (MIN) = 280	DISCHARGE (CFS) = 0.5
TIME (MIN) = 288	DISCHARGE (CFS) = 0.4
TIME (MIN) = 296	DISCHARGE (CFS) = 0.4
TIME (MIN) = 304	DISCHARGE (CFS) = 0.4
TIME (MIN) = 312	DISCHARGE (CFS) = 0.3
TIME (MIN) = 320	DISCHARGE (CFS) = 0.3
TIME (MIN) = 328	DISCHARGE (CFS) = 0.3
TIME (MIN) = 336	DISCHARGE (CFS) = 0.3
TIME (MIN) = 344	DISCHARGE (CFS) = 0.3
TIME (MIN) = 352	DISCHARGE (CFS) = 0.2
TIME (MIN) = 360	DISCHARGE (CFS) = 0.2
TIME (MIN) = 368	DISCHARGE (CFS) = 0

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RUN DATE 6/12/2024
HYDROGRAPH FILE NAME Text1
TIME OF CONCENTRATION 8 MIN.
6 HOUR RAINFALL 2.6 INCHES
BASIN AREA 2.2 ACRES
RUNOFF COEFFICIENT 0.83
PEAK DISCHARGE 11.34 CFS

RATHYDRO FOR AREA DRAINING TO EX DETENTION BASIN
100-YEAR STORM

TIME (MIN) = 0	DISCHARGE (CFS) = 0
TIME (MIN) = 8	DISCHARGE (CFS) = 0.3
TIME (MIN) = 16	DISCHARGE (CFS) = 0.3
TIME (MIN) = 24	DISCHARGE (CFS) = 0.3
TIME (MIN) = 32	DISCHARGE (CFS) = 0.3
TIME (MIN) = 40	DISCHARGE (CFS) = 0.3
TIME (MIN) = 48	DISCHARGE (CFS) = 0.3
TIME (MIN) = 56	DISCHARGE (CFS) = 0.3
TIME (MIN) = 64	DISCHARGE (CFS) = 0.3
TIME (MIN) = 72	DISCHARGE (CFS) = 0.3
TIME (MIN) = 80	DISCHARGE (CFS) = 0.4
TIME (MIN) = 88	DISCHARGE (CFS) = 0.4
TIME (MIN) = 96	DISCHARGE (CFS) = 0.4
TIME (MIN) = 104	DISCHARGE (CFS) = 0.4
TIME (MIN) = 112	DISCHARGE (CFS) = 0.4
TIME (MIN) = 120	DISCHARGE (CFS) = 0.4
TIME (MIN) = 128	DISCHARGE (CFS) = 0.4
TIME (MIN) = 136	DISCHARGE (CFS) = 0.5
TIME (MIN) = 144	DISCHARGE (CFS) = 0.5
TIME (MIN) = 152	DISCHARGE (CFS) = 0.5
TIME (MIN) = 160	DISCHARGE (CFS) = 0.5
TIME (MIN) = 168	DISCHARGE (CFS) = 0.6
TIME (MIN) = 176	DISCHARGE (CFS) = 0.6
TIME (MIN) = 184	DISCHARGE (CFS) = 0.7
TIME (MIN) = 192	DISCHARGE (CFS) = 0.7
TIME (MIN) = 200	DISCHARGE (CFS) = 0.8
TIME (MIN) = 208	DISCHARGE (CFS) = 0.9
TIME (MIN) = 216	DISCHARGE (CFS) = 1.1
TIME (MIN) = 224	DISCHARGE (CFS) = 1.2
TIME (MIN) = 232	DISCHARGE (CFS) = 1.8
TIME (MIN) = 240	DISCHARGE (CFS) = 0.5
TIME (MIN) = 248	DISCHARGE (CFS) = 11.34
TIME (MIN) = 256	DISCHARGE (CFS) = 1.5
TIME (MIN) = 264	DISCHARGE (CFS) = 1
TIME (MIN) = 272	DISCHARGE (CFS) = 0.8
TIME (MIN) = 280	DISCHARGE (CFS) = 0.6
TIME (MIN) = 288	DISCHARGE (CFS) = 0.6
TIME (MIN) = 296	DISCHARGE (CFS) = 0.5
TIME (MIN) = 304	DISCHARGE (CFS) = 0.5
TIME (MIN) = 312	DISCHARGE (CFS) = 0.4
TIME (MIN) = 320	DISCHARGE (CFS) = 0.4
TIME (MIN) = 328	DISCHARGE (CFS) = 0.4
TIME (MIN) = 336	DISCHARGE (CFS) = 0.3
TIME (MIN) = 344	DISCHARGE (CFS) = 0.3
TIME (MIN) = 352	DISCHARGE (CFS) = 0.3
TIME (MIN) = 360	DISCHARGE (CFS) = 0.3
TIME (MIN) = 368	DISCHARGE (CFS) = 0

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RATHYDRO FOR AREA DRAINING TO DETENTION BASIN 1
25-YEAR STORM

RUN DATE 6/15/2024
HYDROGRAPH FILE NAME Text1
TIME OF CONCENTRATION 8 MIN.
6 HOUR RAINFALL 2.02 INCHES
BASIN AREA 1.5 ACRES
RUNOFF COEFFICIENT 0.76
PEAK DISCHARGE 5.05 CFS

TIME (MIN) = 0	DISCHARGE (CFS) = 0
TIME (MIN) = 8	DISCHARGE (CFS) = 0.1
TIME (MIN) = 16	DISCHARGE (CFS) = 0.1
TIME (MIN) = 24	DISCHARGE (CFS) = 0.1
TIME (MIN) = 32	DISCHARGE (CFS) = 0.1
TIME (MIN) = 40	DISCHARGE (CFS) = 0.2
TIME (MIN) = 48	DISCHARGE (CFS) = 0.2
TIME (MIN) = 56	DISCHARGE (CFS) = 0.2
TIME (MIN) = 64	DISCHARGE (CFS) = 0.2
TIME (MIN) = 72	DISCHARGE (CFS) = 0.2
TIME (MIN) = 80	DISCHARGE (CFS) = 0.2
TIME (MIN) = 88	DISCHARGE (CFS) = 0.2
TIME (MIN) = 96	DISCHARGE (CFS) = 0.2
TIME (MIN) = 104	DISCHARGE (CFS) = 0.2
TIME (MIN) = 112	DISCHARGE (CFS) = 0.2
TIME (MIN) = 120	DISCHARGE (CFS) = 0.2
TIME (MIN) = 128	DISCHARGE (CFS) = 0.2
TIME (MIN) = 136	DISCHARGE (CFS) = 0.2
TIME (MIN) = 144	DISCHARGE (CFS) = 0.2
TIME (MIN) = 152	DISCHARGE (CFS) = 0.3
TIME (MIN) = 160	DISCHARGE (CFS) = 0.3
TIME (MIN) = 168	DISCHARGE (CFS) = 0.3
TIME (MIN) = 176	DISCHARGE (CFS) = 0.3
TIME (MIN) = 184	DISCHARGE (CFS) = 0.3
TIME (MIN) = 192	DISCHARGE (CFS) = 0.3
TIME (MIN) = 200	DISCHARGE (CFS) = 0.4
TIME (MIN) = 208	DISCHARGE (CFS) = 0.4
TIME (MIN) = 216	DISCHARGE (CFS) = 0.5
TIME (MIN) = 224	DISCHARGE (CFS) = 0.6
TIME (MIN) = 232	DISCHARGE (CFS) = 0.9
TIME (MIN) = 240	DISCHARGE (CFS) = 0.7
TIME (MIN) = 248	DISCHARGE (CFS) = 5.05
TIME (MIN) = 256	DISCHARGE (CFS) = 0.7
TIME (MIN) = 264	DISCHARGE (CFS) = 0.5
TIME (MIN) = 272	DISCHARGE (CFS) = 0.4
TIME (MIN) = 280	DISCHARGE (CFS) = 0.3
TIME (MIN) = 288	DISCHARGE (CFS) = 0.3
TIME (MIN) = 296	DISCHARGE (CFS) = 0.2
TIME (MIN) = 304	DISCHARGE (CFS) = 0.2
TIME (MIN) = 312	DISCHARGE (CFS) = 0.2
TIME (MIN) = 320	DISCHARGE (CFS) = 0.2
TIME (MIN) = 328	DISCHARGE (CFS) = 0.2
TIME (MIN) = 336	DISCHARGE (CFS) = 0.2
TIME (MIN) = 344	DISCHARGE (CFS) = 0.2
TIME (MIN) = 352	DISCHARGE (CFS) = 0.1
TIME (MIN) = 360	DISCHARGE (CFS) = 0.1
TIME (MIN) = 368	DISCHARGE (CFS) = 0

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RUN DATE 6/15/2024
HYDROGRAPH FILE NAME Text1
TIME OF CONCENTRATION 8 MIN.
6 HOUR RAINFALL 2.6 INCHES
BASIN AREA 1.5 ACRES
RUNOFF COEFFICIENT 0.76
PEAK DISCHARGE 6.57 CFS

RATHYDRO FOR AREA DRAINING TO DETENTION BASIN 1
100-YEAR STORM

TIME (MIN) = 0	DISCHARGE (CFS) = 0
TIME (MIN) = 8	DISCHARGE (CFS) = 0.2
TIME (MIN) = 16	DISCHARGE (CFS) = 0.2
TIME (MIN) = 24	DISCHARGE (CFS) = 0.2
TIME (MIN) = 32	DISCHARGE (CFS) = 0.2
TIME (MIN) = 40	DISCHARGE (CFS) = 0.2
TIME (MIN) = 48	DISCHARGE (CFS) = 0.2
TIME (MIN) = 56	DISCHARGE (CFS) = 0.2
TIME (MIN) = 64	DISCHARGE (CFS) = 0.2
TIME (MIN) = 72	DISCHARGE (CFS) = 0.2
TIME (MIN) = 80	DISCHARGE (CFS) = 0.2
TIME (MIN) = 88	DISCHARGE (CFS) = 0.2
TIME (MIN) = 96	DISCHARGE (CFS) = 0.2
TIME (MIN) = 104	DISCHARGE (CFS) = 0.2
TIME (MIN) = 112	DISCHARGE (CFS) = 0.3
TIME (MIN) = 120	DISCHARGE (CFS) = 0.3
TIME (MIN) = 128	DISCHARGE (CFS) = 0.3
TIME (MIN) = 136	DISCHARGE (CFS) = 0.3
TIME (MIN) = 144	DISCHARGE (CFS) = 0.3
TIME (MIN) = 152	DISCHARGE (CFS) = 0.3
TIME (MIN) = 160	DISCHARGE (CFS) = 0.3
TIME (MIN) = 168	DISCHARGE (CFS) = 0.4
TIME (MIN) = 176	DISCHARGE (CFS) = 0.4
TIME (MIN) = 184	DISCHARGE (CFS) = 0.4
TIME (MIN) = 192	DISCHARGE (CFS) = 0.4
TIME (MIN) = 200	DISCHARGE (CFS) = 0.5
TIME (MIN) = 208	DISCHARGE (CFS) = 0.6
TIME (MIN) = 216	DISCHARGE (CFS) = 0.7
TIME (MIN) = 224	DISCHARGE (CFS) = 0.8
TIME (MIN) = 232	DISCHARGE (CFS) = 1.1
TIME (MIN) = 240	DISCHARGE (CFS) = 0.8
TIME (MIN) = 248	DISCHARGE (CFS) = 6.57
TIME (MIN) = 256	DISCHARGE (CFS) = 0.9
TIME (MIN) = 264	DISCHARGE (CFS) = 0.6
TIME (MIN) = 272	DISCHARGE (CFS) = 0.5
TIME (MIN) = 280	DISCHARGE (CFS) = 0.4
TIME (MIN) = 288	DISCHARGE (CFS) = 0.3
TIME (MIN) = 296	DISCHARGE (CFS) = 0.3
TIME (MIN) = 304	DISCHARGE (CFS) = 0.3
TIME (MIN) = 312	DISCHARGE (CFS) = 0.3
TIME (MIN) = 320	DISCHARGE (CFS) = 0.2
TIME (MIN) = 328	DISCHARGE (CFS) = 0.2
TIME (MIN) = 336	DISCHARGE (CFS) = 0.2
TIME (MIN) = 344	DISCHARGE (CFS) = 0.2
TIME (MIN) = 352	DISCHARGE (CFS) = 0.2
TIME (MIN) = 360	DISCHARGE (CFS) = 0.2
TIME (MIN) = 368	DISCHARGE (CFS) = 0

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RUN DATE 6/15/2024
HYDROGRAPH FILE NAME Text1
TIME OF CONCENTRATION 8 MIN.
6 HOUR RAINFALL 2.02 INCHES
BASIN AREA 2.2 ACRES
RUNOFF COEFFICIENT 0.76
PEAK DISCHARGE 8.23 CFS

RATHYDRO FOR AREA DRAINING TO DETENTION BASIN 2
25-YEAR STORM

TIME (MIN) = 0	DISCHARGE (CFS) = 0
TIME (MIN) = 8	DISCHARGE (CFS) = 0.2
TIME (MIN) = 16	DISCHARGE (CFS) = 0.2
TIME (MIN) = 24	DISCHARGE (CFS) = 0.2
TIME (MIN) = 32	DISCHARGE (CFS) = 0.2
TIME (MIN) = 40	DISCHARGE (CFS) = 0.2
TIME (MIN) = 48	DISCHARGE (CFS) = 0.2
TIME (MIN) = 56	DISCHARGE (CFS) = 0.2
TIME (MIN) = 64	DISCHARGE (CFS) = 0.2
TIME (MIN) = 72	DISCHARGE (CFS) = 0.2
TIME (MIN) = 80	DISCHARGE (CFS) = 0.3
TIME (MIN) = 88	DISCHARGE (CFS) = 0.3
TIME (MIN) = 96	DISCHARGE (CFS) = 0.3
TIME (MIN) = 104	DISCHARGE (CFS) = 0.3
TIME (MIN) = 112	DISCHARGE (CFS) = 0.3
TIME (MIN) = 120	DISCHARGE (CFS) = 0.3
TIME (MIN) = 128	DISCHARGE (CFS) = 0.3
TIME (MIN) = 136	DISCHARGE (CFS) = 0.3
TIME (MIN) = 144	DISCHARGE (CFS) = 0.3
TIME (MIN) = 152	DISCHARGE (CFS) = 0.4
TIME (MIN) = 160	DISCHARGE (CFS) = 0.4
TIME (MIN) = 168	DISCHARGE (CFS) = 0.4
TIME (MIN) = 176	DISCHARGE (CFS) = 0.4
TIME (MIN) = 184	DISCHARGE (CFS) = 0.5
TIME (MIN) = 192	DISCHARGE (CFS) = 0.5
TIME (MIN) = 200	DISCHARGE (CFS) = 0.6
TIME (MIN) = 208	DISCHARGE (CFS) = 0.6
TIME (MIN) = 216	DISCHARGE (CFS) = 0.8
TIME (MIN) = 224	DISCHARGE (CFS) = 0.9
TIME (MIN) = 232	DISCHARGE (CFS) = 1.3
TIME (MIN) = 240	DISCHARGE (CFS) = 0.2
TIME (MIN) = 248	DISCHARGE (CFS) = 8.23
TIME (MIN) = 256	DISCHARGE (CFS) = 1
TIME (MIN) = 264	DISCHARGE (CFS) = 0.7
TIME (MIN) = 272	DISCHARGE (CFS) = 0.5
TIME (MIN) = 280	DISCHARGE (CFS) = 0.5
TIME (MIN) = 288	DISCHARGE (CFS) = 0.4
TIME (MIN) = 296	DISCHARGE (CFS) = 0.4
TIME (MIN) = 304	DISCHARGE (CFS) = 0.3
TIME (MIN) = 312	DISCHARGE (CFS) = 0.3
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TIME (MIN) = 328	DISCHARGE (CFS) = 0.3
TIME (MIN) = 336	DISCHARGE (CFS) = 0.2
TIME (MIN) = 344	DISCHARGE (CFS) = 0.2
TIME (MIN) = 352	DISCHARGE (CFS) = 0.2
TIME (MIN) = 360	DISCHARGE (CFS) = 0.2
TIME (MIN) = 368	DISCHARGE (CFS) = 0

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RUN DATE 6/15/2024
HYDROGRAPH FILE NAME Text1
TIME OF CONCENTRATION 8 MIN.
6 HOUR RAINFALL 2.6 INCHES
BASIN AREA 2.2 ACRES
RUNOFF COEFFICIENT 0.76
PEAK DISCHARGE 10.61 CFS

RATHYDRO FOR AREA DRAINING TO DETENTION BASIN 2
100-YEAR STORM

TIME (MIN) = 0	DISCHARGE (CFS) = 0
TIME (MIN) = 8	DISCHARGE (CFS) = 0.3
TIME (MIN) = 16	DISCHARGE (CFS) = 0.3
TIME (MIN) = 24	DISCHARGE (CFS) = 0.3
TIME (MIN) = 32	DISCHARGE (CFS) = 0.3
TIME (MIN) = 40	DISCHARGE (CFS) = 0.3
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TIME (MIN) = 64	DISCHARGE (CFS) = 0.3
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TIME (MIN) = 80	DISCHARGE (CFS) = 0.3
TIME (MIN) = 88	DISCHARGE (CFS) = 0.3
TIME (MIN) = 96	DISCHARGE (CFS) = 0.3
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TIME (MIN) = 112	DISCHARGE (CFS) = 0.4
TIME (MIN) = 120	DISCHARGE (CFS) = 0.4
TIME (MIN) = 128	DISCHARGE (CFS) = 0.4
TIME (MIN) = 136	DISCHARGE (CFS) = 0.4
TIME (MIN) = 144	DISCHARGE (CFS) = 0.4
TIME (MIN) = 152	DISCHARGE (CFS) = 0.5
TIME (MIN) = 160	DISCHARGE (CFS) = 0.5
TIME (MIN) = 168	DISCHARGE (CFS) = 0.5
TIME (MIN) = 176	DISCHARGE (CFS) = 0.6
TIME (MIN) = 184	DISCHARGE (CFS) = 0.6
TIME (MIN) = 192	DISCHARGE (CFS) = 0.7
TIME (MIN) = 200	DISCHARGE (CFS) = 0.8
TIME (MIN) = 208	DISCHARGE (CFS) = 0.8
TIME (MIN) = 216	DISCHARGE (CFS) = 1
TIME (MIN) = 224	DISCHARGE (CFS) = 1.1
TIME (MIN) = 232	DISCHARGE (CFS) = 1.7
TIME (MIN) = 240	DISCHARGE (CFS) = 0.2
TIME (MIN) = 248	DISCHARGE (CFS) = 10.61
TIME (MIN) = 256	DISCHARGE (CFS) = 1.3
TIME (MIN) = 264	DISCHARGE (CFS) = 0.9
TIME (MIN) = 272	DISCHARGE (CFS) = 0.7
TIME (MIN) = 280	DISCHARGE (CFS) = 0.6
TIME (MIN) = 288	DISCHARGE (CFS) = 0.5
TIME (MIN) = 296	DISCHARGE (CFS) = 0.5
TIME (MIN) = 304	DISCHARGE (CFS) = 0.4
TIME (MIN) = 312	DISCHARGE (CFS) = 0.4
TIME (MIN) = 320	DISCHARGE (CFS) = 0.4
TIME (MIN) = 328	DISCHARGE (CFS) = 0.3
TIME (MIN) = 336	DISCHARGE (CFS) = 0.3
TIME (MIN) = 344	DISCHARGE (CFS) = 0.3
TIME (MIN) = 352	DISCHARGE (CFS) = 0.3
TIME (MIN) = 360	DISCHARGE (CFS) = 0.3
TIME (MIN) = 368	DISCHARGE (CFS) = 0

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OCEANSIDE TOD - TREMONT SITE
STAGE-STORAGE-DISCHARGE RATING CURVE CALCULATIONS

ORIFICE EQUATION = Q=BCA(2gH)^0.5

EXISTING CONDITION DETENTION BASIN (DBL 36" RCP; L=132')
OUTLET CONTROL ORIFICE CALCULATIONS (5"HX8"W)

B	C	A	2	g	H	Q PER ORIFICE (CFS)
0.5	0.66	0.2778	2	32.2	0.00	0.000
0.5	0.66	0.2778	2	32.2	0.50	0.520
0.5	0.66	0.2778	2	32.2	1.00	0.736
0.5	0.66	0.2778	2	32.2	1.50	0.901
0.5	0.66	0.2778	2	32.2	1.75	0.973
0.5	0.66	0.2778	2	32.2	2.00	1.040
0.5	0.66	0.2778	2	32.2	2.25	1.103
0.5	0.66	0.2778	2	32.2	2.50	1.163
0.5	0.66	0.2778	2	32.2	2.75	1.220
0.5	0.66	0.2778	2	32.2	3.00	1.274
0.5	0.66	0.2778	2	32.2	3.49	1.374
0.5	0.66	0.2778	2	32.2	3.99	1.469

STAGE-STORAGE-DISCHARGE RATING CURVE

	DEPTH	ELEV	FLOW AREA (1 PIPE)	FLOW AREA (2 PIPES)	VOLUME (L=132') (CF)	VOLUME (AC-FT)	Q
1	0	44.1	0	0	0	0.0000	0.000
2	0.5	44.6	0.774	1.548	204.336	0.0047	0.520
3	1	45.1	2.063	4.126	544.632	0.0125	0.736
4	1.5	45.6	3.534	7.068	932.976	0.0214	0.901
5	1.75	45.85	4.3	8.6	1135.2	0.0261	0.973
6	2	46.1	5.006	10.012	1321.584	0.0303	1.040
7	2.25	46.35	5.7	11.4	1504.8	0.0345	1.103
8	2.5	46.6	6.294	12.588	1661.616	0.0381	1.163
9	2.75	46.85	6.8	13.6	1795.2	0.0412	1.220
10	3	47.1	7.069	14.138	1866.216	0.0428	1.274
11	3.49	47.59	7.069	14.138	1866.216	0.0428	1.374
12	3.99	47.59	7.069	14.138	1866.216	0.0428	1.469

NORTH DETENTION BASIN (DOUBLE 3'X12' SPAN)
OUTLET CONTROL ORIFICE CALCULATIONS (5"HX12"W)

B	C	A	2	g	H	Q PER ORIFICE (CFS)
0.5	0.66	0.4167	2	32.2	0.00	0.000
0.5	0.66	0.4167	2	32.2	0.50	0.780
0.5	0.66	0.4167	2	32.2	1.00	1.103
0.5	0.66	0.4167	2	32.2	1.50	1.351
0.5	0.66	0.4167	2	32.2	1.75	1.460
0.5	0.66	0.4167	2	32.2	2.00	1.560
0.5	0.66	0.4167	2	32.2	2.25	1.655
0.5	0.66	0.4167	2	32.2	2.50	1.745
0.5	0.66	0.4167	2	32.2	2.75	1.830
0.5	0.66	0.4167	2	32.2	3.00	1.911
0.5	0.66	0.4167	2	32.2	3.50	2.064
0.5	0.66	0.4167	2	32.2	4.00	2.207
0.5	0.66	0.4167	2	32.2	7.30	2.981
0.5	0.66	0.4167	2	32.2	7.80	3.082

STAGE-STORAGE-DISCHARGE RATING CURVE

	DEPTH	ELEV	FLOW AREA (1 ROW)	FLOW AREA (2 ROWS)	VOLUME (L=100') (CF)	VOLUME (AC-FT)	Q
1	0.00	45.5	0	0	0	0.000	0.000
2	0.50	46.00	3.55	7.1	710	0.016	0.780
3	1.00	46.50	7.1	14.2	1420	0.033	1.103
4	1.50	47.00	9.015	18.03	1803	0.041	1.351
5	1.75	47.25	9.9725	19.945	1994.5	0.046	1.460
6	2.00	47.50	10.93	21.86	2186	0.050	1.560
7	2.25	47.75	11.165	22.33	2233	0.051	1.655
8	2.50	48.00	11.4	22.8	2280	0.052	1.745
9	2.75	48.25	11.635	23.27	2327	0.053	1.830
10	3.00	48.50	11.87	23.74	2374	0.054	1.911
11	3.50	49.00	11.87	23.74	2374	0.054	2.064
12	4.00	49.50	11.87	23.74	2374	0.054	2.207
13	7.30	52.80	11.87	23.74	2374	0.054	2.981
14	7.80	53.30	11.87	23.74	2374	1.055	3.082

SOUTH DETENTION BASIN (TRIPLE 3'X12' SPAN)
OUTLET CONTROL ORIFICE CALCULATIONS (6"HX18"W)

B	C	A	2	g	H	Q PER ORIFICE (CFS)
0.5	0.66	0.7500	2	32.2	0.00	0.000
0.5	0.66	0.7500	2	32.2	0.50	1.404
0.5	0.66	0.7500	2	32.2	1.00	1.986
0.5	0.66	0.7500	2	32.2	1.50	2.433
0.5	0.66	0.7500	2	32.2	1.75	2.627
0.5	0.66	0.7500	2	32.2	2.00	2.809
0.5	0.66	0.7500	2	32.2	2.25	2.979
0.5	0.66	0.7500	2	32.2	2.50	3.140
0.5	0.66	0.7500	2	32.2	2.75	3.294
0.5	0.66	0.7500	2	32.2	3.00	3.440
0.5	0.66	0.7500	2	32.2	3.40	3.662
0.5	0.66	0.7500	2	32.2	3.90	3.922

STAGE-STORAGE-DISCHARGE RATING CURVE

	DEPTH	ELEV	FLOW AREA (1 ROW)	FLOW AREA (3 ROWS)	VOLUME (L=100') (CF)	VOLUME (AC-FT)	Q
1	0.00	44.85	0	0	0	0.000	0.000
2	0.50	45.35	3.55	10.65	1065	0.024	1.404
3	1.00	45.85	7.1	21.3	2130	0.049	1.986
4	1.50	46.35	9.015	27.045	2704.5	0.062	2.433
5	1.75	46.60	9.9725	29.9175	2991.75	0.069	2.627
6	2.00	46.85	10.93	32.79	3279	0.075	2.809
7	2.25	47.10	11.165	33.495	3349.5	0.077	2.979
8	2.50	47.35	11.4	34.2	3420	0.079	3.140
9	2.75	47.60	11.635	34.905	3490.5	0.080	3.294
10	3.00	47.85	11.87	35.61	3561	0.082	3.440
11	3.40	48.25	11.87	35.61	3561	0.082	3.662
12	3.90	48.75	11.87	35.61	3561	1.082	3.922

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Analysis prepared by:

Stantec

Problem Descriptions:
Oceanside TOD - Existing Condition Detention Routing Calcs
25-Year; detention includes DBL 36" RCP (L=132') with 5"x8" orifice
6/12/2024

USER SPECIFIED INFLOW HYDROGRAPH

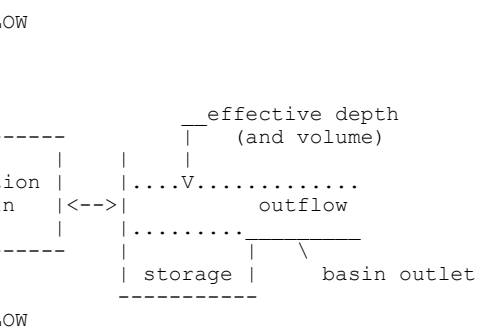
CONSTANT HYDROGRAPH TIME UNIT(MIN.) = 5.00
TOTAL NUMBER OF INFLOW HYDROGRAPH DATA PAIRS = 48

INTERVAL NUMBER	FLOW (CFS)
1	0.00
2	0.20
3	0.20
4	0.20
5	0.20
6	0.20
7	0.20
8	0.30
9	0.30
10	0.30
11	0.30
12	0.30
13	0.30
14	0.30
15	0.30
16	0.30
17	0.30
18	0.40
19	0.40
20	0.40
21	0.40
22	0.50
23	0.50
24	0.50
25	0.60
26	0.60
27	0.70
28	0.80
29	1.00
30	1.40
31	0.50
32	8.67
33	1.10
34	0.80
35	0.60
36	0.50
37	0.40
38	0.40
39	0.40
40	0.30
41	0.30
42	0.30
43	0.30
44	0.20
45	0.20
46	0.00
47	0.00
48	0.00

Problem Descriptions:
Oceanside TOD - Existing Condition Detention Routing Calcs
25-Year; detention includes DBL 36" RCP (L=132') with 5"x8" orifice
6/12/2024

FLOW-THROUGH DETENTION BASIN MODEL

SPECIFIED BASIN CONDITIONS ARE AS FOLLOWS:
CONSTANT HYDROGRAPH TIME UNIT(MINUTES) = 5.000
DEAD STORAGE(AF) = 0.00
SPECIFIED DEAD STORAGE(AF) FILLED = 0.00
ASSUMED INITIAL DEPTH(FEET) IN STORAGE BASIN = 0.00



DEPTH-VS.-STORAGE AND DEPTH-VS.-DISCHARGE INFORMATION:
TOTAL NUMBER OF BASIN DEPTH INFORMATION ENTRIES = 12

*BASIN-DEPTH (FEET)	STORAGE (ACRE-FEET)	OUTFLOW (CFS)	**	**BASIN-DEPTH (FEET)	STORAGE (ACRE-FEET)	OUTFLOW (CFS)	*
0.000	0.000	0.000**		0.500	0.005	0.520	*
1.000	0.013	0.736**		1.500	0.021	0.901	*
1.750	0.026	0.973**		2.000	0.030	1.040	*
2.250	0.034	1.103**		2.500	0.038	1.163	*
2.750	0.041	1.220**		3.000	0.043	1.274	*
3.490	0.043	1.374**		3.990	1.043	1.469	*

BASIN STORAGE, OUTFLOW AND DEPTH ROUTING VALUES:

INTERVAL NUMBER	DEPTH (FEET)	{S-O*DT/2} (ACRE-FEET)	{S+O*DT/2} (ACRE-FEET)
1	0.00	0.00000	0.00000
2	0.50	0.00291	0.00649
3	1.00	0.00997	0.01503
4	1.50	0.01830	0.02450
5	1.75	0.02275	0.02945
6	2.00	0.02672	0.03388
7	2.25	0.03070	0.03830
8	2.50	0.03410	0.04210
9	2.75	0.03700	0.04540
10	3.00	0.03841	0.04719
11	3.49	0.03807	0.04753
12	3.99	1.03774	1.04786

WHERE S=STORAGE(AF);O=OUTFLOW(AF/MIN.);DT=UNIT INTERVAL(MIN.)

DETENTION BASIN ROUTING RESULTS:
NOTE: COMPUTED BASIN DEPTH, OUTFLOW, AND STORAGE QUANTITIES OCCUR AT THE GIVEN TIME. BASIN INFLOW VALUES REPRESENT THE AVERAGE INFLOW DURING THE RECENT HYDROGRAPH UNIT INTERVAL.

TIME (HRS)	DEAD-STORAGE FILLED(AF)	INFLOW (CFS)	EFFECTIVE DEPTH(FT)	OUTFLOW (CFS)	EFFECTIVE VOLUME(AF)
0.083	0.000	0.00	0.00	0.00	0.000
0.167	0.000	0.20	0.11	0.06	0.001
0.250	0.000	0.20	0.15	0.14	0.001
0.333	0.000	0.20	0.17	0.17	0.002
0.417	0.000	0.20	0.18	0.19	0.002
0.500	0.000	0.20	0.19	0.19	0.002
0.583	0.000	0.20	0.19	0.20	0.002
0.667	0.000	0.30	0.24	0.23	0.002
0.750	0.000	0.30	0.27	0.27	0.003
0.833	0.000	0.30	0.28	0.29	0.003
0.917	0.000	0.30	0.28	0.29	0.003
1.000	0.000	0.30	0.29	0.30	0.003
1.083	0.000	0.30	0.29	0.30	0.003
1.167	0.000	0.30	0.29	0.30	0.003
1.250	0.000	0.30	0.29	0.30	0.003
1.333	0.000	0.30	0.29	0.30	0.003
1.417	0.000	0.30	0.29	0.30	0.003
1.500	0.000	0.40	0.34	0.33	0.003
1.583	0.000	0.40	0.37	0.37	0.003
1.667	0.000	0.40	0.38	0.39	0.004
1.750	0.000	0.40	0.38	0.39	0.004
1.833	0.000	0.50	0.44	0.42	0.004
1.917	0.000	0.50	0.46	0.47	0.004
2.000	0.000	0.50	0.47	0.48	0.004

2.083	0.000	0.60	0.52	0.51	0.005
2.167	0.000	0.60	0.55	0.54	0.005
2.250	0.000	0.70	0.61	0.56	0.006
2.333	0.000	0.80	0.71	0.59	0.008
2.417	0.000	1.00	0.86	0.64	0.010
2.500	0.000	1.40	1.14	0.73	0.015
2.583	0.000	0.50	1.04	0.77	0.013
2.667	0.000	8.67	3.50	1.06	0.066
2.750	0.000	1.10	3.50	1.38	0.064
2.833	0.000	0.80	3.50	1.38	0.060
2.917	0.000	0.60	3.50	1.38	0.054
3.000	0.000	0.50	3.49	1.37	0.048
3.083	0.000	0.40	2.88	1.31	0.042
3.167	0.000	0.40	2.40	1.19	0.037
3.250	0.000	0.40	2.09	1.10	0.032
3.333	0.000	0.30	1.79	1.02	0.027
3.417	0.000	0.30	1.55	0.95	0.022
3.500	0.000	0.30	1.33	0.88	0.018
3.583	0.000	0.30	1.13	0.81	0.015
3.667	0.000	0.20	0.91	0.74	0.011
3.750	0.000	0.20	0.71	0.65	0.008
3.833	0.000	0.00	0.45	0.54	0.004
3.917	0.000	0.00	0.20	0.34	0.002
4.000	0.000	0.00	0.09	0.15	0.001
4.083	0.000	0.00	0.04	0.07	0.000

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Analysis prepared by:

Stantec

****

Problem Descriptions:
Oceanside TOD - Existing Condition Detention Routing Calcs
100-Year; detention includes DBL 36" RCP (L=132') with 5"x8" orifice
6/12/2024

****

USER SPECIFIED INFLOW HYDROGRAPH

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CONSTANT HYDROGRAPH TIME UNIT(MIN.) = 5.00
TOTAL NUMBER OF INFLOW HYDROGRAPH DATA PAIRS = 47

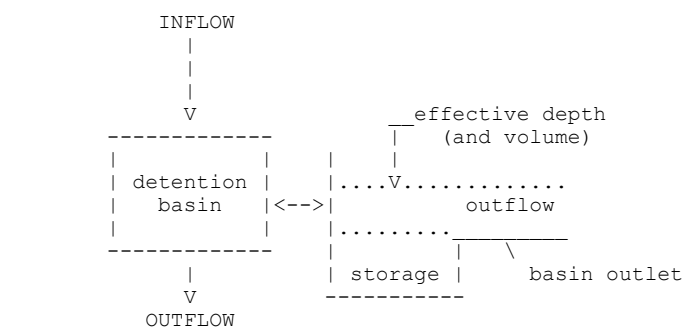
INTERVAL NUMBER	FLOW (CFS)
1	0.00
2	0.30
3	0.30
4	0.30
5	0.30
6	0.30
7	0.30
8	0.30
9	0.30
10	0.30
11	0.40
12	0.40
13	0.40
14	0.40
15	0.40
16	0.40
17	0.40
18	0.50
19	0.50
20	0.50
21	0.50
22	0.60
23	0.60
24	0.70
25	0.70
26	0.80
27	0.90
28	1.10
29	1.20
30	1.80
31	0.50
32	11.34
33	1.50
34	1.00
35	0.80
36	0.60
37	0.60
38	0.50
39	0.50
40	0.40
41	0.40
42	0.40
43	0.30
44	0.30
45	0.30
46	0.30
47	0.00

Problem Descriptions:
Oceanside TOD - Existing Condition Detention Routing Calcs
100-Year; detention includes DBL 36" RCP (L=132') with 5"x8" orifice
6/12/2024

==========

FLOW-THROUGH DETENTION BASIN MODEL

SPECIFIED BASIN CONDITIONS ARE AS FOLLOWS:
CONSTANT HYDROGRAPH TIME UNIT(MINUTES) = 5.000
DEAD STORAGE(AF) = 0.00
SPECIFIED DEAD STORAGE(AF) FILLED = 0.00
ASSUMED INITIAL DEPTH(FEET) IN STORAGE BASIN = 0.00



DEPTH-VS.-STORAGE AND DEPTH-VS.-DISCHARGE INFORMATION:
TOTAL NUMBER OF BASIN DEPTH INFORMATION ENTRIES = 12

*BASIN-DEPTH (FEET)	STORAGE (ACRE-FEET)	OUTFLOW (CFS)	**	**BASIN-DEPTH (FEET)	STORAGE (ACRE-FEET)	OUTFLOW (CFS)	*
0.000	0.000	0.000**		0.500	0.005	0.520	*
1.000	0.013	0.736**		1.500	0.021	0.901	*
1.750	0.026	0.973**		2.000	0.030	1.040	*
2.250	0.034	1.103**		2.500	0.038	1.163	*
2.750	0.041	1.220**		3.000	0.043	1.274	*
3.490	0.043	1.374**		3.990	1.043	1.469	*

BASIN STORAGE, OUTFLOW AND DEPTH ROUTING VALUES:

INTERVAL NUMBER	DEPTH (FEET)	{S-O*DT/2} (ACRE-FEET)	{S+O*DT/2} (ACRE-FEET)
1	0.00	0.00000	0.00000
2	0.50	0.00291	0.00649
3	1.00	0.00997	0.01503
4	1.50	0.01830	0.02450
5	1.75	0.02275	0.02945
6	2.00	0.02672	0.03388
7	2.25	0.03070	0.03830
8	2.50	0.03410	0.04210
9	2.75	0.03700	0.04540
10	3.00	0.03841	0.04719
11	3.49	0.03807	0.04753
12	3.99	1.03774	1.04786

WHERE S=STORAGE(AF);O=OUTFLOW(AF/MIN.);DT=UNIT INTERVAL(MIN.)

DETENTION BASIN ROUTING RESULTS:
NOTE: COMPUTED BASIN DEPTH, OUTFLOW, AND STORAGE QUANTITIES OCCUR AT THE GIVEN TIME. BASIN INFLOW VALUES REPRESENT THE AVERAGE INFLOW DURING THE RECENT HYDROGRAPH UNIT INTERVAL.

TIME (HRS)	DEAD-STORAGE FILLED(AF)	INFLOW (CFS)	EFFECTIVE DEPTH(FT)	OUTFLOW (CFS)	EFFECTIVE VOLUME(AF)
0.083	0.000	0.00	0.00	0.00	0.000
0.167	0.000	0.30	0.16	0.08	0.001
0.250	0.000	0.30	0.23	0.20	0.002
0.333	0.000	0.30	0.26	0.26	0.002
0.417	0.000	0.30	0.28	0.28	0.003
0.500	0.000	0.30	0.28	0.29	0.003
0.583	0.000	0.30	0.29	0.30	0.003
0.667	0.000	0.30	0.29	0.30	0.003
0.750	0.000	0.30	0.29	0.30	0.003
0.833	0.000	0.30	0.29	0.30	0.003
0.917	0.000	0.40	0.34	0.33	0.003
1.000	0.000	0.40	0.37	0.37	0.003
1.083	0.000	0.40	0.38	0.39	0.004
1.167	0.000	0.40	0.38	0.39	0.004
1.250	0.000	0.40	0.38	0.40	0.004
1.333	0.000	0.40	0.38	0.40	0.004
1.417	0.000	0.40	0.38	0.40	0.004
1.500	0.000	0.50	0.44	0.43	0.004
1.583	0.000	0.50	0.46	0.47	0.004
1.667	0.000	0.50	0.47	0.49	0.004
1.750	0.000	0.50	0.48	0.49	0.004
1.833	0.000	0.60	0.52	0.51	0.005
1.917	0.000	0.60	0.55	0.54	0.006
2.000	0.000	0.70	0.62	0.56	0.007

2.083	0.000	0.70	0.67	0.58	0.007
2.167	0.000	0.80	0.75	0.61	0.009
2.250	0.000	0.90	0.86	0.65	0.010
2.333	0.000	1.10	1.03	0.71	0.013
2.417	0.000	1.20	1.19	0.77	0.016
2.500	0.000	1.80	1.56	0.86	0.022
2.583	0.000	0.50	1.41	0.89	0.020
2.667	0.000	11.34	3.51	1.12	0.090
2.750	0.000	1.50	3.51	1.38	0.091
2.833	0.000	1.00	3.51	1.38	0.088
2.917	0.000	0.80	3.51	1.38	0.084
3.000	0.000	0.60	3.51	1.38	0.079
3.083	0.000	0.60	3.51	1.38	0.074
3.167	0.000	0.50	3.50	1.38	0.068
3.250	0.000	0.50	3.50	1.38	0.062
3.333	0.000	0.40	3.50	1.38	0.055
3.417	0.000	0.40	3.49	1.37	0.048
3.500	0.000	0.40	2.85	1.31	0.042
3.583	0.000	0.30	2.34	1.18	0.036
3.667	0.000	0.30	2.01	1.08	0.030
3.750	0.000	0.30	1.72	1.00	0.026
3.833	0.000	0.30	1.49	0.93	0.021
3.917	0.000	0.00	1.16	0.84	0.015
4.000	0.000	0.00	0.86	0.73	0.010
4.083	0.000	0.00	0.59	0.62	0.006
4.167	0.000	0.00	0.32	0.45	0.003
4.250	0.000	0.00	0.14	0.24	0.001

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Analysis prepared by:

Stantec

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Problem Descriptions:
TREMONT SITE - CENTRAL TRIBUTARY
PROPOSED CONDITION 25-YEAR STORM NORTH DETENTION BASIN ROUTING
SEE RATIONAL METHOD (DETAINED) CALCULATIONS

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USER SPECIFIED INFLOW HYDROGRAPH

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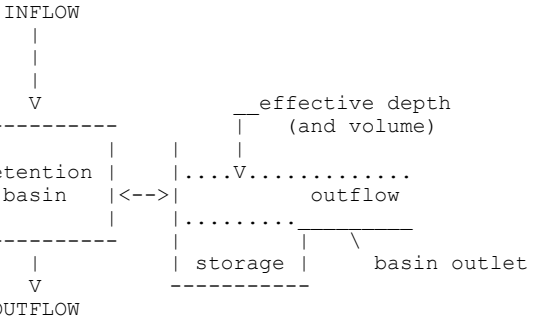
CONSTANT HYDROGRAPH TIME UNIT(MIN.) = 5.00
TOTAL NUMBER OF INFLOW HYDROGRAPH DATA PAIRS = 47

INTERVAL NUMBER	FLOW (CFS)
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2	0.10
3	0.10
4	0.10
5	0.10
6	0.20
7	0.20
8	0.20
9	0.20
10	0.20
11	0.20
12	0.20
13	0.20
14	0.20
15	0.20
16	0.20
17	0.20
18	0.20
19	0.20
20	0.30
21	0.30
22	0.30
23	0.30
24	0.30
25	0.30
26	0.40
27	0.40
28	0.50
29	0.60
30	0.90
31	0.70
32	5.05
33	0.70
34	0.50
35	0.40
36	0.30
37	0.30
38	0.20
39	0.20
40	0.20
41	0.20
42	0.20
43	0.20
44	0.20
45	0.10
46	0.10
47	0.00

Problem Descriptions:
TREMONT SITE - CENTRAL TRIBUTARY
PROPOSED CONDITION 25-YEAR STORM NORTH DETENTION BASIN ROUTING
SEE RATIONAL METHOD (DETAINED) CALCULATIONS

FLOW-THROUGH DETENTION BASIN MODEL

SPECIFIED BASIN CONDITIONS ARE AS FOLLOWS:
CONSTANT HYDROGRAPH TIME UNIT(MINUTES) = 5.000
DEAD STORAGE(AF) = 0.00
SPECIFIED DEAD STORAGE(AF) FILLED = 0.00
ASSUMED INITIAL DEPTH(FEET) IN STORAGE BASIN = 0.00



DEPTH-VS.-STORAGE AND DEPTH-VS.-DISCHARGE INFORMATION:
TOTAL NUMBER OF BASIN DEPTH INFORMATION ENTRIES = 14

*BASIN-DEPTH (FEET)	STORAGE (ACRE-FEET)	OUTFLOW (CFS)	**	**BASIN-DEPTH (FEET)	STORAGE (ACRE-FEET)	OUTFLOW (CFS)	*
0.000	0.000	0.000**		0.500	0.016	0.780	*
1.000	0.033	1.103**		1.500	0.041	1.351	*
1.750	0.046	1.460**		2.000	0.050	1.560	*
2.250	0.051	1.655**		2.500	0.052	1.745	*
2.750	0.053	1.830**		3.000	0.054	1.911	*
3.500	0.054	2.064**		4.000	0.054	2.207	*
7.300	0.054	2.981**		7.800	1.055	3.082	*

BASIN STORAGE, OUTFLOW AND DEPTH ROUTING VALUES:

INTERVAL NUMBER	DEPTH (FEET)	{S-O*DT/2} (ACRE-FEET)	{S+O*DT/2} (ACRE-FEET)
1	0.00	0.00000	0.00000
2	0.50	0.01331	0.01869
3	1.00	0.02920	0.03680
4	1.50	0.03635	0.04565
5	1.75	0.04097	0.05103
6	2.00	0.04463	0.05537
7	2.25	0.04530	0.05670
8	2.50	0.04599	0.05801
9	2.75	0.04670	0.05930
10	3.00	0.04742	0.06058
11	3.50	0.04689	0.06111
12	4.00	0.04640	0.06160
13	7.30	0.04373	0.06427
14	7.80	1.04439	1.06561

WHERE S=STORAGE(AF);O=OUTFLOW(AF/MIN.);DT=UNIT INTERVAL(MIN.)

DETENTION BASIN ROUTING RESULTS:
NOTE: COMPUTED BASIN DEPTH, OUTFLOW, AND STORAGE QUANTITIES OCCUR AT THE GIVEN TIME. BASIN INFLOW VALUES REPRESENT THE AVERAGE INFLOW DURING THE RECENT HYDROGRAPH UNIT INTERVAL.

TIME (HRS)	DEAD-STORAGE FILLED(AF)	INFLOW (CFS)	EFFECTIVE DEPTH(FT)	OUTFLOW (CFS)	EFFECTIVE VOLUME(AF)
0.083	0.000	0.00	0.00	0.00	0.000
0.167	0.000	0.10	0.02	0.01	0.001
0.250	0.000	0.10	0.03	0.04	0.001
0.333	0.000	0.10	0.04	0.06	0.001
0.417	0.000	0.10	0.05	0.07	0.002
0.500	0.000	0.20	0.07	0.09	0.002
0.583	0.000	0.20	0.09	0.12	0.003
0.667	0.000	0.20	0.10	0.15	0.003
0.750	0.000	0.20	0.11	0.16	0.003
0.833	0.000	0.20	0.11	0.17	0.004
0.917	0.000	0.20	0.12	0.18	0.004
1.000	0.000	0.20	0.12	0.19	0.004
1.083	0.000	0.20	0.12	0.19	0.004

1.167	0.000	0.20	0.12	0.19	0.004
1.250	0.000	0.20	0.13	0.19	0.004
1.333	0.000	0.20	0.13	0.20	0.004
1.417	0.000	0.20	0.13	0.20	0.004
1.500	0.000	0.20	0.13	0.20	0.004
1.583	0.000	0.20	0.13	0.20	0.004
1.667	0.000	0.30	0.15	0.21	0.005
1.750	0.000	0.30	0.16	0.24	0.005
1.833	0.000	0.30	0.17	0.26	0.005
1.917	0.000	0.30	0.18	0.27	0.006
2.000	0.000	0.30	0.18	0.28	0.006
2.083	0.000	0.30	0.18	0.28	0.006
2.167	0.000	0.40	0.20	0.30	0.007
2.250	0.000	0.40	0.22	0.33	0.007
2.333	0.000	0.50	0.25	0.37	0.008
2.417	0.000	0.60	0.29	0.42	0.009
2.500	0.000	0.90	0.37	0.51	0.012
2.583	0.000	0.70	0.39	0.60	0.013
2.667	0.000	5.05	1.48	0.98	0.041
2.750	0.000	0.70	1.23	1.28	0.037
2.833	0.000	0.50	0.98	1.15	0.032
2.917	0.000	0.40	0.84	1.04	0.028
3.000	0.000	0.30	0.71	0.96	0.023
3.083	0.000	0.30	0.59	0.88	0.019
3.167	0.000	0.20	0.47	0.79	0.015
3.250	0.000	0.20	0.37	0.66	0.012
3.333	0.000	0.20	0.30	0.53	0.010
3.417	0.000	0.20	0.25	0.43	0.008
3.500	0.000	0.20	0.22	0.37	0.007
3.583	0.000	0.20	0.19	0.32	0.006
3.667	0.000	0.20	0.17	0.28	0.006
3.750	0.000	0.10	0.14	0.25	0.005
3.833	0.000	0.10	0.12	0.20	0.004
3.917	0.000	0.00	0.09	0.16	0.003
4.000	0.000	0.00	0.06	0.11	0.002
4.083	0.000	0.00	0.04	0.08	0.001
4.167	0.000	0.00	0.03	0.06	0.001

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Analysis prepared by:

Stantec

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Problem Descriptions:
TREMONT SITE - CENTRAL TRIBUTARY
PROPOSED CONDITION 100-YEAR STORM NORTH DETENTION BASIN ROUTING
SEE RATIONAL METHOD (DETAINED) CALCULATIONS

****

USER SPECIFIED INFLOW HYDROGRAPH

==========

CONSTANT HYDROGRAPH TIME UNIT(MIN.) = 5.00
TOTAL NUMBER OF INFLOW HYDROGRAPH DATA PAIRS = 47

INTERVAL NUMBER	FLOW (CFS)
1	0.00
2	0.20
3	0.20
4	0.20
5	0.20
6	0.20
7	0.20
8	0.20
9	0.20
10	0.20
11	0.20
12	0.20
13	0.20
14	0.20
15	0.30
16	0.30
17	0.30
18	0.30
19	0.30
20	0.30
21	0.30
22	0.40
23	0.40
24	0.40
25	0.40
26	0.50
27	0.60
28	0.70
29	0.80
30	1.10
31	0.80
32	6.57
33	0.90
34	0.60
35	0.50
36	0.40
37	0.30
38	0.30
39	0.30
40	0.30
41	0.20
42	0.20
43	0.20
44	0.20
45	0.20
46	0.20
47	0.00

Problem Descriptions:
TREMONT SITE - CENTRAL TRIBUTARY
PROPOSED CONDITION 100-YEAR STORM NORTH DETENTION BASIN ROUTING
SEE RATIONAL METHOD (DETAINED) CALCULATIONS

****

USER SPECIFIED INFLOW HYDROGRAPH

==========

CONSTANT HYDROGRAPH TIME UNIT(MIN.) = 5.00
TOTAL NUMBER OF INFLOW HYDROGRAPH DATA PAIRS = 47

INTERVAL NUMBER	FLOW (CFS)
1	0.00
2	0.20
3	0.20
4	0.20
5	0.20
6	0.20
7	0.20
8	0.20
9	0.20
10	0.20
11	0.20
12	0.20
13	0.20
14	0.20
15	0.30
16	0.30
17	0.30
18	0.30
19	0.30
20	0.30
21	0.30
22	0.40
23	0.40
24	0.40
25	0.40
26	0.50
27	0.60
28	0.70
29	0.80
30	1.10
31	0.80
32	6.57
33	0.90
34	0.60
35	0.50
36	0.40
37	0.30
38	0.30
39	0.30
40	0.30
41	0.20
42	0.20
43	0.20
44	0.20
45	0.20
46	0.20
47	0.00

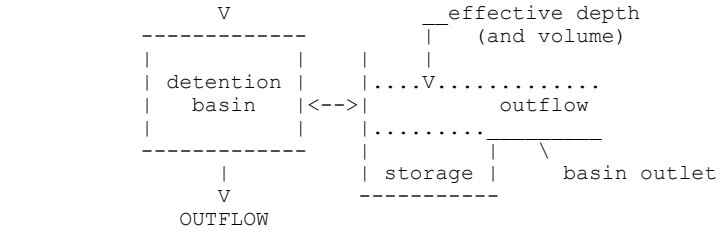
Problem Descriptions:
TREMONT SITE - CENTRAL TRIBUTARY
PROPOSED CONDITION 100-YEAR STORM NORTH DETENTION BASIN ROUTING
SEE RATIONAL METHOD (DETAINED) CALCULATIONS

==========

FLOW-THROUGH DETENTION BASIN MODEL

SPECIFIED BASIN CONDITIONS ARE AS FOLLOWS:
CONSTANT HYDROGRAPH TIME UNIT(MINUTES) = 5.000
DEAD STORAGE(AF) = 0.00
SPECIFIED DEAD STORAGE(AF) FILLED = 0.00
ASSUMED INITIAL DEPTH(FEET) IN STORAGE BASIN = 0.00

INFLOW
|
|
|



DEPTH-VS.-STORAGE AND DEPTH-VS.-DISCHARGE INFORMATION:
TOTAL NUMBER OF BASIN DEPTH INFORMATION ENTRIES = 14

*BASIN-DEPTH (FEET)	STORAGE (ACRE-FEET)	OUTFLOW (CFS)	**	**BASIN-DEPTH (FEET)	STORAGE (ACRE-FEET)	OUTFLOW (CFS)	*
0.000	0.000	0.000	**	0.500	0.016	0.780	*
1.000	0.033	1.103	**	1.500	0.041	1.351	*
1.750	0.046	1.460	**	2.000	0.050	1.560	*
2.250	0.051	1.655	**	2.500	0.052	1.745	*
2.750	0.053	1.830	**	3.000	0.054	1.911	*
3.500	0.054	2.064	**	4.000	0.054	2.207	*
7.300	0.054	2.981	**	7.800	1.055	3.082	*

BASIN STORAGE, OUTFLOW AND DEPTH ROUTING VALUES:

INTERVAL NUMBER	DEPTH (FEET)	{S-O*DT/2} (ACRE-FEET)	{S+O*DT/2} (ACRE-FEET)
1	0.00	0.00000	0.00000
2	0.50	0.01331	0.01869
3	1.00	0.02920	0.03680
4	1.50	0.03635	0.04565
5	1.75	0.04097	0.05103
6	2.00	0.04463	0.05537
7	2.25	0.04530	0.05670
8	2.50	0.04599	0.05801
9	2.75	0.04670	0.05930
10	3.00	0.04742	0.06058
11	3.50	0.04689	0.06111
12	4.00	0.04640	0.06160
13	7.30	0.04373	0.06427
14	7.80	1.04439	1.06561

WHERE S=STORAGE(AF);O=OUTFLOW(AF/MIN.);DT=UNIT INTERVAL(MIN.)

DETENTION BASIN ROUTING RESULTS:
NOTE: COMPUTED BASIN DEPTH, OUTFLOW, AND STORAGE QUANTITIES OCCUR AT THE GIVEN TIME. BASIN INFLOW VALUES REPRESENT THE AVERAGE INFLOW DURING THE RECENT HYDROGRAPH UNIT INTERVAL.

TIME (HRS)	DEAD-STORAGE FILLED(AF)	INFLOW (CFS)	EFFECTIVE DEPTH(FT)	OUTFLOW (CFS)	EFFECTIVE VOLUME(AF)
0.083	0.000	0.00	0.00	0.00	0.000
0.167	0.000	0.20	0.04	0.03	0.001
0.250	0.000	0.20	0.06	0.08	0.002
0.333	0.000	0.20	0.08	0.11	0.003
0.417	0.000	0.20	0.10	0.14	0.003
0.500	0.000	0.20	0.10	0.16	0.003
0.583	0.000	0.20	0.11	0.17	0.004
0.667	0.000	0.20	0.12	0.18	0.004
0.750	0.000	0.20	0.12	0.18	0.004
0.833	0.000	0.20	0.12	0.19	0.004
0.917	0.000	0.20	0.12	0.19	0.004
1.000	0.000	0.20	0.13	0.19	0.004
1.083	0.000	0.20	0.13	0.20	0.004
1.167	0.000	0.20	0.13	0.20	0.004
1.250	0.000	0.30	0.15	0.21	0.005
1.333	0.000	0.30	0.16	0.24	0.005
1.417	0.000	0.30	0.17	0.26	0.005
1.500	0.000	0.30	0.18	0.27	0.006
1.583	0.000	0.30	0.18	0.28	0.006
1.667	0.000	0.30	0.18	0.28	0.006
1.750	0.000	0.30	0.19	0.29	0.006
1.833	0.000	0.40	0.21	0.31	0.007
1.917	0.000	0.40	0.22	0.33	0.007
2.000	0.000	0.40	0.23	0.35	0.007
2.083	0.000	0.40	0.24	0.37	0.008
2.167	0.000	0.50	0.26	0.39	0.008
2.250	0.000	0.60	0.30	0.44	0.010
2.333	0.000	0.70	0.34	0.50	0.011
2.417	0.000	0.80	0.39	0.57	0.012
2.500	0.000	1.10	0.48	0.68	0.015

2.583	0.000	0.80	0.49	0.76	0.016
2.667	0.000	6.57	2.56	1.26	0.052
2.750	0.000	0.90	1.83	1.63	0.047
2.833	0.000	0.60	1.53	1.43	0.042
2.917	0.000	0.50	1.20	1.28	0.036
3.000	0.000	0.40	0.94	1.13	0.031
3.083	0.000	0.30	0.80	1.02	0.026
3.167	0.000	0.30	0.67	0.93	0.022
3.250	0.000	0.30	0.56	0.85	0.018
3.333	0.000	0.30	0.46	0.77	0.015
3.417	0.000	0.20	0.37	0.64	0.012
3.500	0.000	0.20	0.30	0.52	0.010
3.583	0.000	0.20	0.25	0.43	0.008
3.667	0.000	0.20	0.21	0.36	0.007
3.750	0.000	0.20	0.19	0.31	0.006
3.833	0.000	0.20	0.17	0.28	0.005
3.917	0.000	0.00	0.12	0.23	0.004
4.000	0.000	0.00	0.09	0.16	0.003
4.083	0.000	0.00	0.06	0.12	0.002
4.167	0.000	0.00	0.04	0.08	0.001
4.250	0.000	0.00	0.03	0.06	0.001

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Analysis prepared by:

Stantec

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Problem Descriptions:
TREMONT SITE - CENTRAL TRIBUTARY
PROPOSED CONDITION 25-YEAR STORM SOUTH DETENTION BASIN ROUTING
SEE RATIONAL METHOD (DETAINED) CALCULATIONS

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USER SPECIFIED INFLOW HYDROGRAPH

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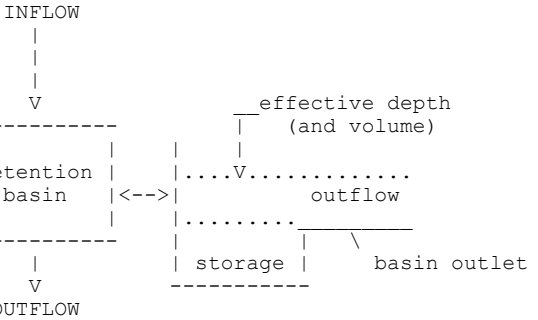
CONSTANT HYDROGRAPH TIME UNIT(MIN.) = 5.00
TOTAL NUMBER OF INFLOW HYDROGRAPH DATA PAIRS = 47

INTERVAL NUMBER	FLOW (CFS)
1	0.00
2	0.20
3	0.20
4	0.20
5	0.20
6	0.20
7	0.20
8	0.20
9	0.20
10	0.20
11	0.30
12	0.30
13	0.30
14	0.30
15	0.30
16	0.30
17	0.30
18	0.30
19	0.30
20	0.40
21	0.40
22	0.40
23	0.40
24	0.50
25	0.50
26	0.60
27	0.60
28	0.80
29	0.90
30	1.30
31	0.20
32	8.23
33	1.00
34	0.70
35	0.50
36	0.50
37	0.40
38	0.40
39	0.30
40	0.30
41	0.30
42	0.30
43	0.20
44	0.20
45	0.20
46	0.20
47	0.00

Problem Descriptions:
TREMONT SITE - CENTRAL TRIBUTARY
PROPOSED CONDITION 25-YEAR STORM SOUTH DETENTION BASIN ROUTING
SEE RATIONAL METHOD (DETAINED) CALCULATIONS

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================================================================================
     FLOW-THROUGH DETENTION BASIN MODEL

     SPECIFIED BASIN CONDITIONS ARE AS FOLLOWS:
     CONSTANT HYDROGRAPH TIME UNIT(MINUTES) =    5.000
     DEAD STORAGE(AF) =       0.00
     SPECIFIED DEAD STORAGE(AF) FILLED =       0.00
     ASSUMED INITIAL DEPTH(FEET) IN STORAGE BASIN =    0.00
```




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     DEPTH-VS.-STORAGE AND DEPTH-VS.-DISCHARGE INFORMATION:
     TOTAL NUMBER OF BASIN DEPTH INFORMATION ENTRIES =  14
     *BASIN-DEPTH  STORAGE    OUTFLOW  **BASIN-DEPTH  STORAGE    OUTFLOW  *
     *   (FEET)  (ACRE-FEET)    (CFS)    **   (FEET)  (ACRE-FEET)    (CFS)   *
     *      0.000      0.000      0.000**      0.500      0.024      1.404*
     *      1.000      0.049      1.986**      1.500      0.062      2.433*
     *      1.750      0.069      2.627**      2.000      0.075      2.809*
     *      2.250      0.077      2.979**      2.500      0.079      3.140*
     *      2.750      0.080      3.294**      3.000      0.082      3.440*
     *      3.400      0.082      3.662**      3.900      1.082      3.922*
     *      7.300      0.054      2.981**      7.800      1.055      3.082*
--------------------------------------------------------------------------------
     BASIN STORAGE, OUTFLOW AND DEPTH ROUTING VALUES:
      INTERVAL   DEPTH   {S-O*DT/2}   {S+O*DT/2}
       NUMBER   (FEET)   (ACRE-FEET)  (ACRE-FEET)
           1     0.00       0.00000      0.00000
           2     0.50       0.01917      0.02883
           3     1.00       0.04216      0.05584
           4     1.50       0.05362      0.07038
           5     1.75       0.05995      0.07805
           6     2.00       0.06533      0.08467
           7     2.25       0.06674      0.08726
           8     2.50       0.06819      0.08981
           9     2.75       0.06866      0.09134
          10     3.00       0.07015      0.09385
          11     3.40       0.06939      0.09461
          12     3.90       1.06849      1.09551
          13     7.30       0.04373      0.06427
          14     7.80       1.04439      1.06561
     WHERE S=STORAGE(AF);O=OUTFLOW(AF/MIN.);DT=UNIT INTERVAL(MIN.)
--------------------------------------------------------------------------------
     DETENTION BASIN ROUTING RESULTS:
     NOTE: COMPUTED BASIN DEPTH, OUTFLOW, AND STORAGE QUANTITIES
           OCCUR AT THE GIVEN TIME. BASIN INFLOW VALUES REPRESENT THE
           AVERAGE INFLOW DURING THE RECENT HYDROGRAPH UNIT INTERVAL.

        TIME  DEAD-STORAGE  INFLOW  EFFECTIVE  OUTFLOW  EFFECTIVE
       (HRS)   FILLED(AF)    (CFS)  DEPTH(FT)   (CFS)   VOLUME(AF)
--------------------------------------------------------------------------------
       0.083        0.000     0.00       0.00     0.00       0.000
       0.167        0.000     0.20       0.02     0.03       0.001
       0.250        0.000     0.20       0.04     0.09       0.002
       0.333        0.000     0.20       0.05     0.13       0.002
       0.417        0.000     0.20       0.06     0.15       0.003
       0.500        0.000     0.20       0.06     0.17       0.003
       0.583        0.000     0.20       0.07     0.18       0.003
       0.667        0.000     0.20       0.07     0.19       0.003
       0.750        0.000     0.20       0.07     0.19       0.003
       0.833        0.000     0.20       0.07     0.19       0.003
       0.917        0.000     0.30       0.08     0.21       0.004
       1.000        0.000     0.30       0.09     0.24       0.004
       1.083        0.000     0.30       0.10     0.26       0.005
```

1.167	0.000	0.30	0.10	0.27	0.005
1.250	0.000	0.30	0.10	0.28	0.005
1.333	0.000	0.30	0.10	0.29	0.005
1.417	0.000	0.30	0.10	0.29	0.005
1.500	0.000	0.30	0.11	0.29	0.005
1.583	0.000	0.30	0.11	0.30	0.005
1.667	0.000	0.40	0.12	0.31	0.006
1.750	0.000	0.40	0.13	0.34	0.006
1.833	0.000	0.40	0.13	0.36	0.006
1.917	0.000	0.40	0.14	0.37	0.006
2.000	0.000	0.50	0.15	0.40	0.007
2.083	0.000	0.50	0.16	0.43	0.008
2.167	0.000	0.60	0.18	0.47	0.009
2.250	0.000	0.60	0.19	0.52	0.009
2.333	0.000	0.80	0.22	0.58	0.011
2.417	0.000	0.90	0.25	0.67	0.012
2.500	0.000	1.30	0.32	0.81	0.016
2.583	0.000	0.20	0.24	0.79	0.012
2.667	0.000	8.23	1.34	1.48	0.058
2.750	0.000	1.00	1.04	2.16	0.050
2.833	0.000	0.70	0.85	1.92	0.042
2.917	0.000	0.50	0.68	1.72	0.033
3.000	0.000	0.50	0.54	1.54	0.026
3.083	0.000	0.40	0.41	1.31	0.020
3.167	0.000	0.40	0.32	1.03	0.015
3.250	0.000	0.30	0.25	0.80	0.012
3.333	0.000	0.30	0.20	0.64	0.010
3.417	0.000	0.30	0.17	0.52	0.008
3.500	0.000	0.30	0.15	0.45	0.007
3.583	0.000	0.20	0.12	0.38	0.006
3.667	0.000	0.20	0.11	0.32	0.005
3.750	0.000	0.20	0.09	0.28	0.005
3.833	0.000	0.20	0.09	0.25	0.004
3.917	0.000	0.00	0.06	0.20	0.003
4.000	0.000	0.00	0.04	0.13	0.002
4.083	0.000	0.00	0.03	0.09	0.001

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Ver. 23.0 Release Date: 07/01/2016 License ID 1535

Analysis prepared by:

Stantec

****

Problem Descriptions:
TREMONT SITE - CENTRAL TRIBUTARY
PROPOSED CONDITION 100-YEAR STORM SOUTH DETENTION BASIN ROUTING
SEE RATIONAL METHOD (DETAINED) CALCULATIONS

****

USER SPECIFIED INFLOW HYDROGRAPH

==========

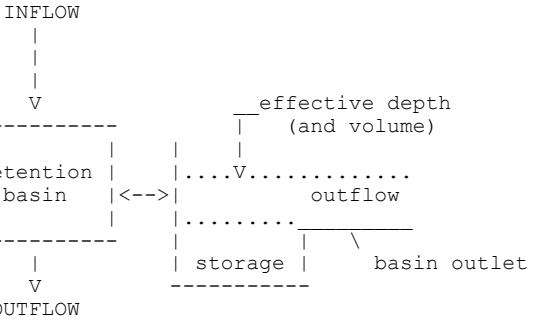
CONSTANT HYDROGRAPH TIME UNIT(MIN.) = 5.00
TOTAL NUMBER OF INFLOW HYDROGRAPH DATA PAIRS = 47

INTERVAL NUMBER	FLOW (CFS)
1	0.00
2	0.30
3	0.30
4	0.30
5	0.30
6	0.30
7	0.30
8	0.30
9	0.30
10	0.30
11	0.30
12	0.30
13	0.30
14	0.40
15	0.40
16	0.40
17	0.40
18	0.40
19	0.40
20	0.50
21	0.50
22	0.50
23	0.60
24	0.60
25	0.70
26	0.80
27	0.80
28	1.00
29	1.10
30	1.70
31	0.20
32	10.61
33	1.30
34	0.90
35	0.70
36	0.60
37	0.50
38	0.50
39	0.40
40	0.40
41	0.40
42	0.30
43	0.30
44	0.30
45	0.30
46	0.30
47	0.30

Problem Descriptions:
TREMONT SITE - CENTRAL TRIBUTARY
PROPOSED CONDITION 100-YEAR STORM SOUTH DETENTION BASIN ROUTING
SEE RATIONAL METHOD (DETAINED) CALCULATIONS

```
================================================================================
     FLOW-THROUGH DETENTION BASIN MODEL

     SPECIFIED BASIN CONDITIONS ARE AS FOLLOWS:
     CONSTANT HYDROGRAPH TIME UNIT(MINUTES) =    5.000
     DEAD STORAGE(AF) =       0.00
     SPECIFIED DEAD STORAGE(AF) FILLED =       0.00
     ASSUMED INITIAL DEPTH(FEET) IN STORAGE BASIN =    0.00
```




```
     DEPTH-VS.-STORAGE AND DEPTH-VS.-DISCHARGE INFORMATION:
     TOTAL NUMBER OF BASIN DEPTH INFORMATION ENTRIES =  12
     *BASIN-DEPTH  STORAGE    OUTFLOW  **BASIN-DEPTH  STORAGE    OUTFLOW  *
     *   (FEET)  (ACRE-FEET)    (CFS)    **   (FEET)  (ACRE-FEET)    (CFS)   *
     *      0.000      0.000      0.000**      0.500      0.024      1.404*
     *      1.000      0.049      1.986**      1.500      0.062      2.433*
     *      1.750      0.069      2.627**      2.000      0.075      2.809*
     *      2.250      0.077      2.979**      2.500      0.079      3.140*
     *      2.750      0.080      3.294**      3.000      0.082      3.440*
     *      3.400      0.082      3.662**      3.900      1.082      3.922*
--------------------------------------------------------------------------------
     BASIN STORAGE, OUTFLOW AND DEPTH ROUTING VALUES:
      INTERVAL   DEPTH   {S-O*DT/2}   {S+O*DT/2}
       NUMBER   (FEET)   (ACRE-FEET)  (ACRE-FEET)
           1     0.00       0.00000      0.00000
           2     0.50       0.01917      0.02883
           3     1.00       0.04216      0.05584
           4     1.50       0.05362      0.07038
           5     1.75       0.05995      0.07805
           6     2.00       0.06533      0.08467
           7     2.25       0.06674      0.08726
           8     2.50       0.06819      0.08981
           9     2.75       0.06866      0.09134
          10     3.00       0.07015      0.09385
          11     3.40       0.06939      0.09461
          12     3.90       1.06849      1.09551
     WHERE S=STORAGE(AF);O=OUTFLOW(AF/MIN.);DT=UNIT INTERVAL(MIN.)
--------------------------------------------------------------------------------
     DETENTION BASIN ROUTING RESULTS:
     NOTE: COMPUTED BASIN DEPTH, OUTFLOW, AND STORAGE QUANTITIES
           OCCUR AT THE GIVEN TIME. BASIN INFLOW VALUES REPRESENT THE
           AVERAGE INFLOW DURING THE RECENT HYDROGRAPH UNIT INTERVAL.

        TIME  DEAD-STORAGE  INFLOW  EFFECTIVE  OUTFLOW  EFFECTIVE
       (HRS)   FILLED(AF)    (CFS)  DEPTH(FT)   (CFS)   VOLUME(AF)
--------------------------------------------------------------------------------
       0.083        0.000     0.00       0.00     0.00       0.000
       0.167        0.000     0.30       0.04     0.05       0.002
       0.250        0.000     0.30       0.06     0.13       0.003
       0.333        0.000     0.30       0.08     0.19       0.004
       0.417        0.000     0.30       0.09     0.23       0.004
       0.500        0.000     0.30       0.09     0.25       0.004
       0.583        0.000     0.30       0.10     0.27       0.005
       0.667        0.000     0.30       0.10     0.28       0.005
       0.750        0.000     0.30       0.10     0.29       0.005
       0.833        0.000     0.30       0.10     0.29       0.005
       0.917        0.000     0.30       0.11     0.29       0.005
       1.000        0.000     0.30       0.11     0.30       0.005
       1.083        0.000     0.30       0.11     0.30       0.005
       1.167        0.000     0.40       0.12     0.31       0.006
       1.250        0.000     0.40       0.13     0.34       0.006
       1.333        0.000     0.40       0.13     0.36       0.006
```

1.417	0.000	0.40	0.14	0.38	0.006
1.500	0.000	0.40	0.14	0.38	0.007
1.583	0.000	0.40	0.14	0.39	0.007
1.667	0.000	0.50	0.15	0.41	0.007
1.750	0.000	0.50	0.16	0.44	0.008
1.833	0.000	0.50	0.17	0.46	0.008
1.917	0.000	0.60	0.18	0.49	0.009
2.000	0.000	0.60	0.19	0.53	0.009
2.083	0.000	0.70	0.21	0.57	0.010
2.167	0.000	0.80	0.24	0.63	0.011
2.250	0.000	0.80	0.25	0.69	0.012
2.333	0.000	1.00	0.29	0.76	0.014
2.417	0.000	1.10	0.32	0.86	0.015
2.500	0.000	1.70	0.42	1.04	0.020
2.583	0.000	0.20	0.30	1.01	0.014
2.667	0.000	10.61	2.00	1.83	0.075
2.750	0.000	1.30	1.63	2.67	0.066
2.833	0.000	0.90	1.25	2.37	0.055
2.917	0.000	0.70	0.94	2.06	0.046
3.000	0.000	0.60	0.77	1.82	0.038
3.083	0.000	0.50	0.62	1.63	0.030
3.167	0.000	0.50	0.49	1.45	0.023
3.250	0.000	0.40	0.37	1.20	0.018
3.333	0.000	0.40	0.29	0.93	0.014
3.417	0.000	0.40	0.24	0.75	0.012
3.500	0.000	0.30	0.20	0.62	0.009
3.583	0.000	0.30	0.17	0.51	0.008
3.667	0.000	0.30	0.15	0.44	0.007
3.750	0.000	0.30	0.13	0.39	0.006
3.833	0.000	0.30	0.12	0.36	0.006
3.917	0.000	0.00	0.08	0.29	0.004
4.000	0.000	0.00	0.06	0.19	0.003
4.083	0.000	0.00	0.04	0.13	0.002
4.167	0.000	0.00	0.02	0.09	0.001

V. NOAA RAINFALL DATA

NOAA Atlas 14, Volume 6, Version 2
Location name: Oceanside, California, USA*
Latitude: 33.193°, Longitude: -117.3784°
Elevation: 62.34 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**0.141** (0.119-0.169)	**0.178** (0.150-0.214)	**0.230** (0.193-0.277)	**0.274** (0.228-0.333)	**0.337** (0.270-0.425)	**0.389** (0.305-0.502)	**0.444** (0.339-0.588)	**0.505** (0.374-0.688)	**0.591** (0.419-0.843)	**0.664** (0.453-0.982)
10-min	**0.202** (0.170-0.243)	**0.256** (0.215-0.307)	**0.329** (0.276-0.397)	**0.393** (0.326-0.478)	**0.484** (0.388-0.610)	**0.558** (0.437-0.719)	**0.637** (0.486-0.843)	**0.723** (0.536-0.986)	**0.848** (0.601-1.21)	**0.951** (0.649-1.41)
15-min	**0.245** (0.206-0.294)	**0.309** (0.260-0.371)	**0.398** (0.334-0.480)	**0.475** (0.395-0.578)	**0.585** (0.469-0.737)	**0.674** (0.529-0.870)	**0.770** (0.588-1.02)	**0.875** (0.648-1.19)	**1.02** (0.726-1.46)	**1.15** (0.785-1.70)
30-min	**0.346** (0.291-0.415)	**0.438** (0.368-0.526)	**0.564** (0.473-0.680)	**0.672** (0.558-0.817)	**0.828** (0.663-1.04)	**0.955** (0.748-1.23)	**1.09** (0.832-1.44)	**1.24** (0.917-1.69)	**1.45** (1.03-2.07)	**1.63** (1.11-2.41)
60-min	**0.456** (0.383-0.547)	**0.576** (0.484-0.692)	**0.742** (0.622-0.894)	**0.885** (0.735-1.08)	**1.09** (0.873-1.37)	**1.26** (0.984-1.62)	**1.44** (1.10-1.90)	**1.63** (1.21-2.22)	**1.91** (1.35-2.72)	**2.14** (1.46-3.17)
2-hr	**0.609** (0.512-0.731)	**0.757** (0.636-0.910)	**0.961** (0.805-1.16)	**1.14** (0.943-1.38)	**1.38** (1.11-1.74)	**1.59** (1.24-2.04)	**1.80** (1.38-2.38)	**2.03** (1.51-2.77)	**2.37** (1.68-3.38)	**2.65** (1.81-3.92)
3-hr	**0.708** (0.596-0.850)	**0.879** (0.739-1.06)	**1.11** (0.932-1.34)	**1.31** (1.09-1.59)	**1.59** (1.28-2.01)	**1.82** (1.43-2.35)	**2.06** (1.57-2.73)	**2.32** (1.72-3.16)	**2.69** (1.90-3.83)	**2.99** (2.04-4.42)
6-hr	**0.895** (0.754-1.07)	**1.12** (0.939-1.34)	**1.42** (1.19-1.71)	**1.67** (1.38-2.03)	**2.02** (1.62-2.54)	**2.30** (1.80-2.96)	**2.59** (1.97-3.42)	**2.89** (2.14-3.95)	**3.32** (2.35-4.74)	**3.67** (2.51-5.43)
12-hr	**1.10** (0.928-1.32)	**1.41** (1.18-1.69)	**1.81** (1.52-2.18)	**2.14** (1.78-2.60)	**2.59** (2.08-3.27)	**2.94** (2.31-3.80)	**3.31** (2.52-4.38)	**3.68** (2.73-5.02)	**4.20** (2.97-5.98)	**4.60** (3.14-6.80)
24-hr	**1.33** (1.17-1.54)	**1.74** (1.53-2.01)	**2.27** (2.00-2.64)	**2.70** (2.36-3.16)	**3.29** (2.78-3.97)	**3.74** (3.10-4.61)	**4.20** (3.40-5.29)	**4.67** (3.69-6.04)	**5.31** (4.03-7.15)	**5.81** (4.27-8.08)
2-day	**1.62** (1.43-1.87)	**2.14** (1.88-2.47)	**2.81** (2.47-3.26)	**3.36** (2.93-3.93)	**4.10** (3.47-4.95)	**4.67** (3.87-5.75)	**5.25** (4.25-6.61)	**5.84** (4.61-7.56)	**6.64** (5.04-8.94)	**7.26** (5.33-10.1)
3-day	**1.81** (1.60-2.09)	**2.39** (2.11-2.77)	**3.16** (2.78-3.67)	**3.78** (3.30-4.43)	**4.63** (3.91-5.59)	**5.28** (4.38-6.50)	**5.94** (4.81-7.49)	**6.63** (5.23-8.57)	**7.55** (5.72-10.2)	**8.27** (6.07-11.5)
4-day	**1.96** (1.73-2.27)	**2.60** (2.29-3.01)	**3.44** (3.03-4.00)	**4.13** (3.60-4.83)	**5.07** (4.28-6.12)	**5.79** (4.80-7.13)	**6.52** (5.28-8.22)	**7.28** (5.74-9.42)	**8.31** (6.30-11.2)	**9.11** (6.69-12.7)
7-day	**2.26** (1.99-2.61)	**3.01** (2.65-3.48)	**4.00** (3.51-4.64)	**4.81** (4.20-5.63)	**5.93** (5.01-7.16)	**6.79** (5.63-8.36)	**7.68** (6.22-9.67)	**8.60** (6.78-11.1)	**9.85** (7.47-13.3)	**10.8** (7.95-15.1)
10-day	**2.51** (2.21-2.90)	**3.35** (2.95-3.88)	**4.47** (3.93-5.19)	**5.40** (4.71-6.31)	**6.67** (5.64-8.05)	**7.67** (6.35-9.44)	**8.69** (7.04-10.9)	**9.75** (7.69-12.6)	**11.2** (8.50-15.1)	**12.4** (9.07-17.2)
20-day	**3.06** (2.70-3.54)	**4.12** (3.63-4.77)	**5.56** (4.89-6.45)	**6.76** (5.90-7.91)	**8.45** (7.14-10.2)	**9.78** (8.11-12.0)	**11.2** (9.05-14.1)	**12.6** (9.97-16.3)	**14.7** (11.1-19.7)	**16.3** (12.0-22.7)
30-day	**3.60** (3.17-4.16)	**4.86** (4.29-5.63)	**6.60** (5.80-7.66)	**8.07** (7.04-9.44)	**10.1** (8.58-12.2)	**11.8** (9.79-14.5)	**13.6** (11.0-17.1)	**15.4** (12.2-20.0)	**18.0** (13.7-24.3)	**20.1** (14.8-28.0)
45-day	**4.24** (3.74-4.90)	**5.73** (5.05-6.64)	**7.81** (6.86-9.06)	**9.58** (8.36-11.2)	**12.1** (10.3-14.6)	**14.2** (11.8-17.5)	**16.4** (13.3-20.7)	**18.8** (14.8-24.3)	**22.1** (16.8-29.8)	**24.9** (18.3-34.6)
60-day	**4.86** (4.29-5.62)	**6.56** (5.78-7.59)	**8.93** (7.85-10.4)	**11.0** (9.58-12.8)	**14.0** (11.8-16.9)	**16.4** (13.6-20.2)	**19.0** (15.4-24.0)	**21.9** (17.3-28.3)	**26.0** (19.7-35.0)	**29.4** (21.5-40.8)

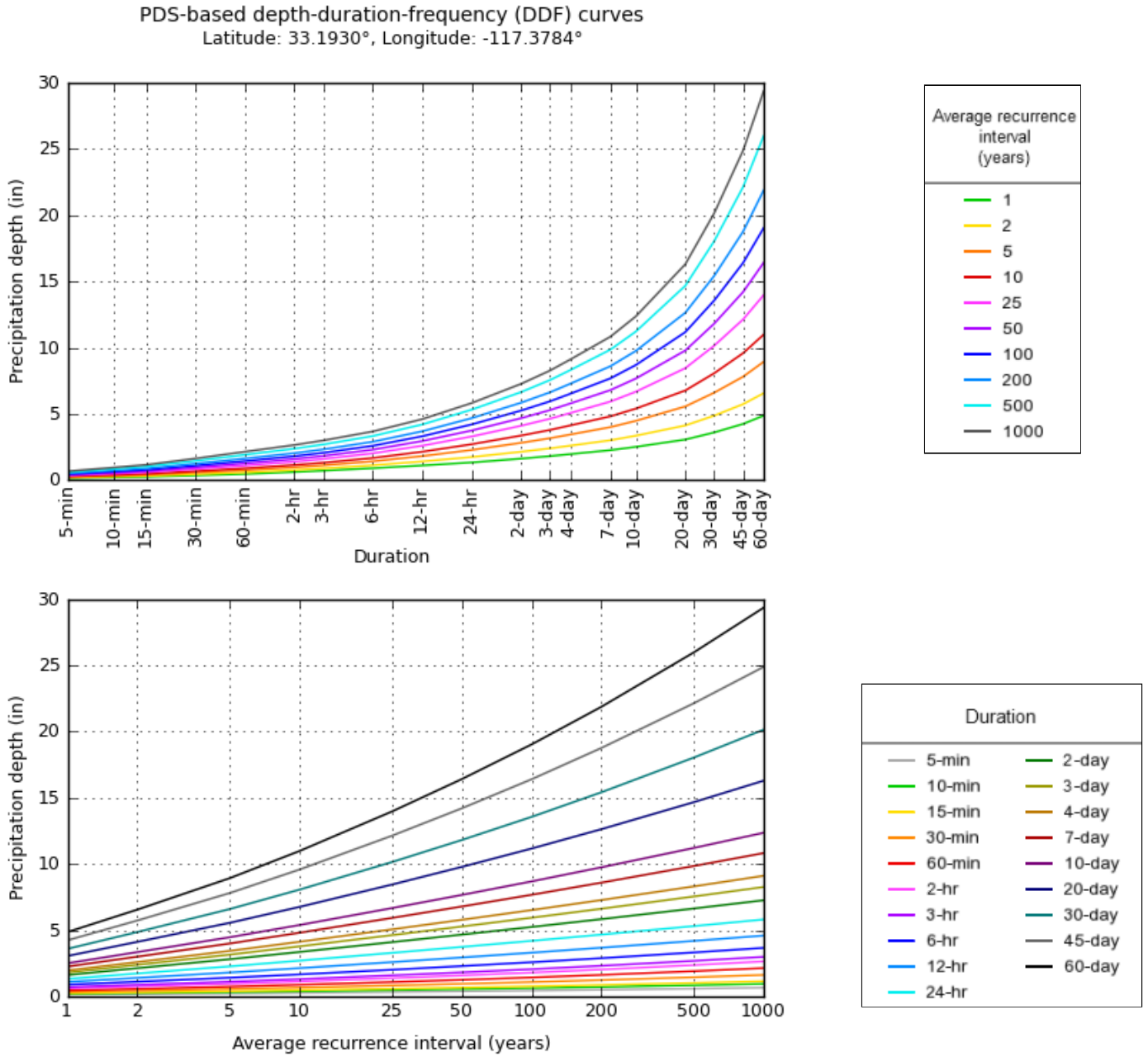
[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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PF graphical



NOAA Atlas 14, Volume 6, Version 2

Created (GMT): Wed Aug 3 22:09:38 2022

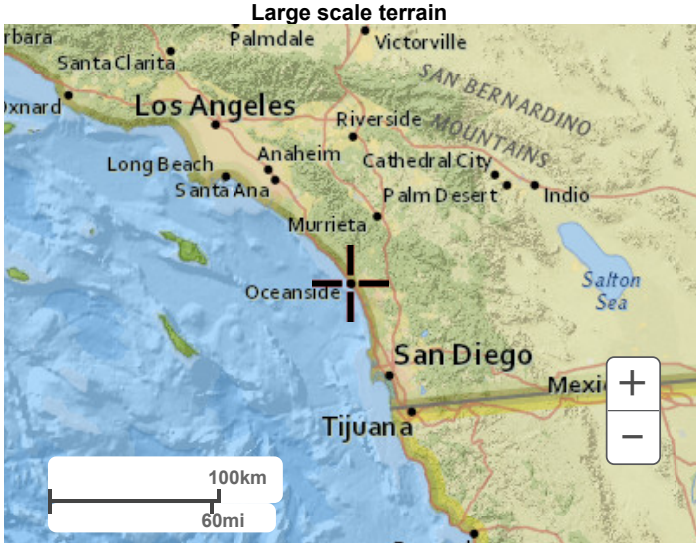
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Maps & aerials

Small scale terrain



Large scale terrain



Large scale map



Large scale aerial



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US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

Disclaimer

VI. GEOTECHNICAL STUDY

Michael Winter, Senior Development Manager
Toll Brothers Apartment Living
23382 Mill Creek Drive, Suite 120
Laguna Hills, CA 92653

January 15, 2024
NOVA Project No. 2021010

Subject: Design Phase Infiltration Feasibility Study
Proposed NCTD Oceanside Transit Center Redevelopment
Oceanside, California

Dear Mr Winter:

NOVA Services, Inc. (NOVA) prepared this report to present the results of our infiltration feasibility study for the subject project. In 2021 NOVA performed a geotechnical investigation for the proposed project that included drilling six geotechnical borings (B-1 through B-6) and two percolation test borings (P-1 and P-2). At the time of that investigation, the stormwater BMP facilities had not been designed. In 2023 the project civil engineer provided us the BMP locations and infiltration depths (Stantec, 2023), and we performed a design-phase infiltration investigation, the results of which are presented herein. Figure 1 presents a site location map.



Figure 1. Site Location Map

SCOPE OF WORK

Field Investigation

We understand four stormwater BMP facilities are proposed in the western portion of the project site. To evaluate infiltration feasibiliy at the BMP locations, we performed a supplemental field investigation consisting of drilling three additional geotechnical borings (B-7 through B-9) to depths between about 3 and 15½ feet below the ground surface (bgs) and eight additional percolation test borings (P-3 through P-10) to depths between about 4½ and 12 feet bgs using a truck-mounted drill rig equipped with a hollow stem auger. Except for Boring B-8, the geotechnical borings were drilled at least about 5 feet below the bottom of the proposed BMP facility in accordance the guidelines in the Oceanside BMP Design Manual (Oceanside, 2022) and Riverside County LID Handbook (Riverside County, 2011). Boring B-8 encountered refusal at a depth of about 3 feet bgs on a buried concrete obstruction. Except for Boring P-8, the percolation test borings were drilled to about the elevation of the bottom of the proposed BMP facility. Boring P-8 was terminated at a depth of about 4½ feet bgs after hitting an unmarked waterline. Figure 2 presents the approximate locations of the geotechnical and percolation test borings to date as well as the proposed BMP locations with their respective identification numbers. This figure is presented in a larger scale on Plate 1.

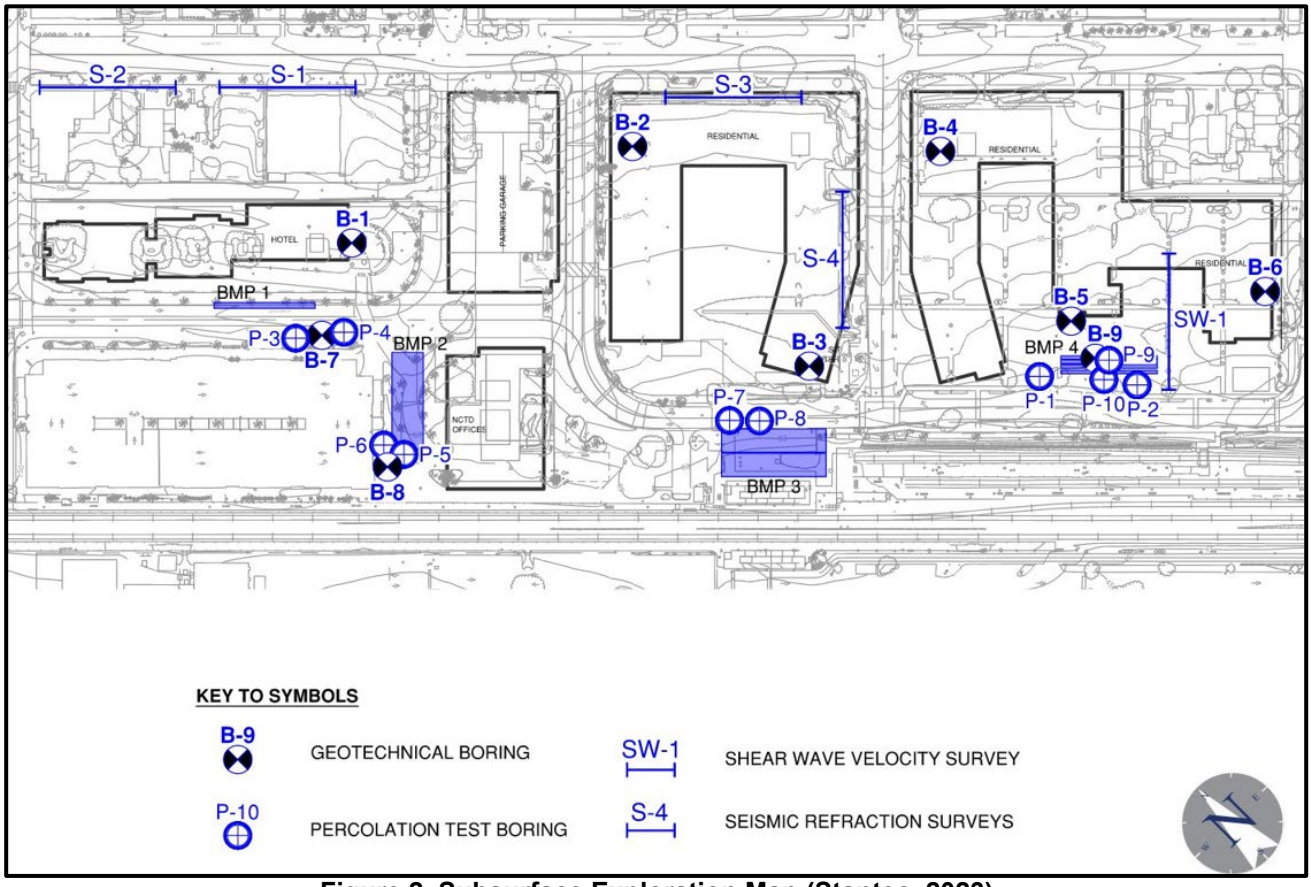


Figure 2. Subsurface Exploration Map (Stantec, 2023)

A NOVA geologist logged the borings and collected samples of the materials encountered for laboratory testing. Standard Penetration Testing (SPT) was performed in the borings using a 2-inch outer diameter and 1⅜-inch inner diameter split tube sampler. For the current borings, the CAL and SPT samplers were driven using an automatic hammer with a calibrated Energy Transfer Ratio (ETR) of 70.6%. The number of blows needed to drive the sampler 18 inches is noted in three, 6-inch intervals on the logs. Sampler refusal was encountered when 50 blows were applied during any one of the three 6-inch intervals, a total of 100 blows was applied, or there was no discernible sampler advancement during the application of ten successive blows. The field blow counts, N, were corrected to a standard hammer (cathead and rope) with a 60% ETR. The corrected blow counts are noted on the boring logs as N_{60}. Disturbed bulk samples were obtained from the SPT sampler and the drill cuttings. Appendix B presents logs of the borings. Soils are classified according to the Unified Soil Classification System.

Laboratory Testing

NOVA tested selected samples obtained from the borings to evaluate soil classification and engineering properties and develop geotechnical conclusions and recommendations. The laboratory tests consisted of in-place moisture and density, particle-size distribution, direct shear, maximum dry density and optimum moisture content, R-value, corrosivity, and expansion index. Appendix C presents the results of the laboratory tests and brief explanations of the test procedures.

Borehole Percolation Testing

NOVA performed borehole percolation testing in accordance with the Oceanside BMP Design Manual to evaluate the feasibility of stormwater infiltration at the site.

GEOLOGY AND SUBSURFACE CONDITIONS

Regional Geology

The site is located within the Peninsular Ranges Geomorphic Province of California, which stretches from the Los Angeles basin to the tip of Baja California in Mexico. This province is characterized as a series of northwest-trending mountain ranges separated by subparallel fault zones, and coastal plains of subdued landforms. The mountain ranges are underlain primarily by Mesozoic metamorphic rocks that were intruded by plutonic rocks of the Peninsular Ranges batholith, while the coastal plains are underlain by subsequently deposited marine and nonmarine sedimentary formations. The site is located within the Coastal Plains portion of the Peninsular Ranges geomorphic province. The geology is mapped as Units 6-7 of the Quaternary old paralic deposits underlain by the Tertiary-aged San Onofre Breccia. Figure 3 presents the regional geology in the vicinity of the site.

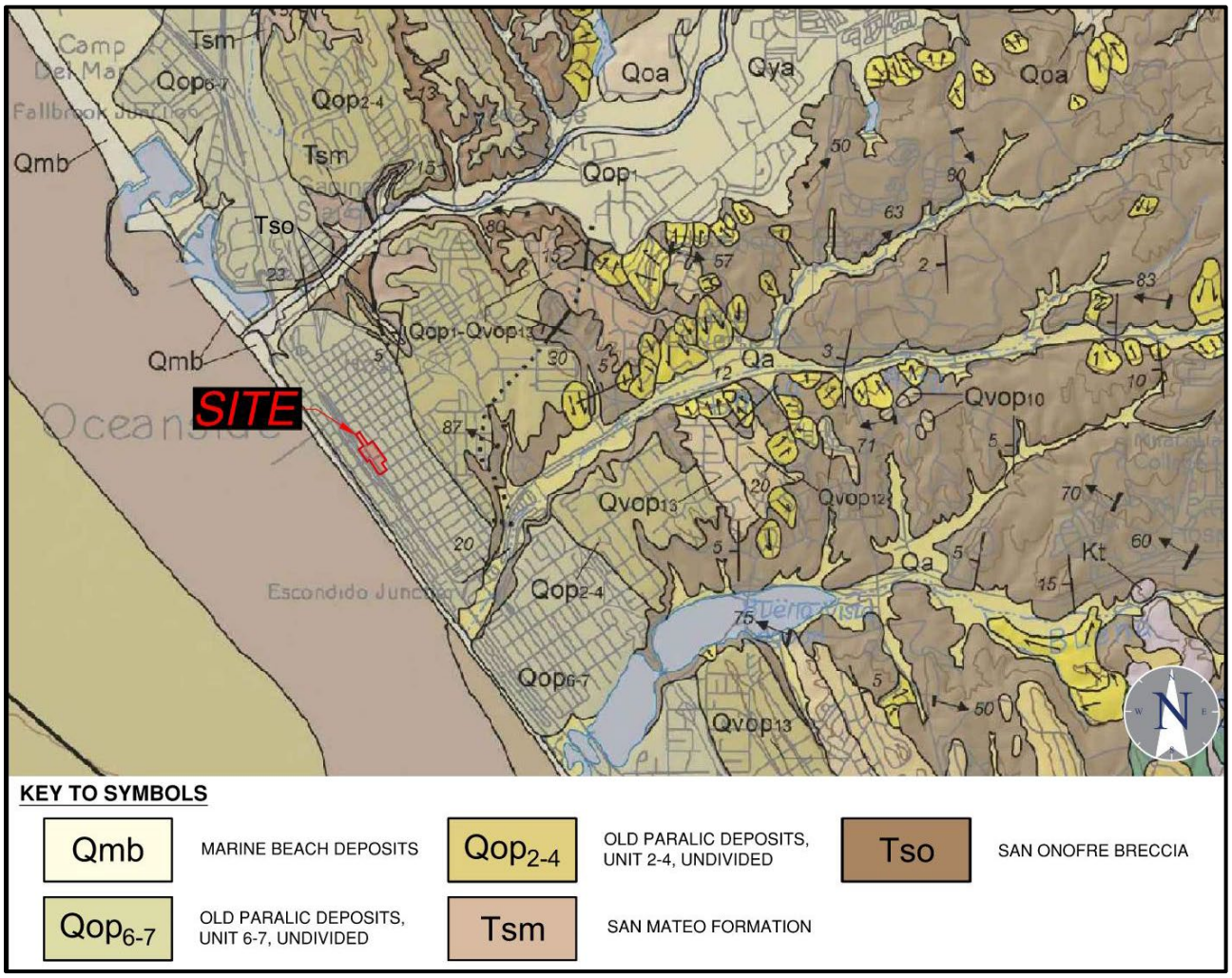


Figure 3. Regional Geology Map

Site-Specific Geology

The site is underlain by fill, Quaternary old paralic deposits and Tertiary San Onofre Breccia. Descriptions of the materials encountered are presented below. Plate 1 presents the site-specific geology. Plate 2 presents the geologic cross-sections.

Fill (af): Fill was encountered in several of the borings. NOVA has no records regarding the placement and compaction of the fill; therefore, the fill is considered undocumented and at risk for wide variations in quality. As encountered in the borings, the fill generally consisted of loose to medium dense silty to clayey sand with varying amounts of gravel, roots, and construction debris. Auger refusal was encountered in Boring B-8 at a depth of about 3 feet bgs on an unknown obstacle that appeared to be concrete. Drilling was reattempted two other times in different locations, and refusal was also encountered at the same depth. In Boring P-5, fill with an unknown, lightweight white mineral was encountered. Figure 4 presents a photo of these soils. These soils are not considered suitable for infiltration or the support of future structures.



Figure 4. Undocumened Fill in P-5

Quaternary Old Paralic Deposits (Qop): Old paralic deposits were encountered beneath the site from the ground surface, extending down to depths ranging from about 6½ feet at the northern east corner of Block 2 parking lot to about 16½ feet at the southwestern end of the same parking lot. At BMPs 1 and 4, the upper portion of these deposits generally consisted of silty to clayey sand to depths about 5½ to 9 feet bgs. Below these depths, the deposits generally consisted of poorly graded sand with silt and silty sand. This lower sand layer is friable and more permeable than the upper layer. Figure 5a presents a photograph of the upper portion of the old paralic deposits. Figure 5b presents a photograph of the lower portion of the old paralic deposits.



Figure 5a. Old Paralic Deposits Upper Portion in B-7



Figure 5b. Old Paralic Deposits Lower Portion in B-7

Tertiary San Onofre Breccia (Tso): The site is underlain by the Eocene San Onofre Breccia, a very dense, cemented silty to clayey sandstone that is matrix-supported with abundant gravel and cobbles. Auger refusal generally encountered within the upper 6 inches to 3 feet of the San Onofre Breccia. Figure 6 presents a photograph of the San Onofre Breccia.



Figure 6. San Onofre Breccia (4/8/21)

Groundwater: Groundwater was not encountered in the borings. Background research into groundwater levels conducted on GeoTracker indicates groundwater is around 4 feet above mean sea level, approximately 40 to 55 feet below existing ground level at this site.

SUMMARY OF INFILTRATION TESTING

At least two percolation test wells were installed for each BMP location presented in Figure 2 and Plate 1. In addition to the test wells, one exploratory boring extending 5 feet below the proposed infiltration surface, or refusal, was drilled and logged to document the soils below the infiltration surface. BMPs 1 and 4 were successfully drilled and tested (B-7, B-9, P-3, P-4, P-9 and P-10). Percolation tests P-1 and P-2 from NOVA, 2021 were retested as P-9 and P-10 during this phase of the investigation to test the correct elevation of the BMP 4 infiltration surface, which was not known at the time of the initial investigation.

Borings for BMP 2 (B-8, P-5, and P-6) encountered undocumented fill within the test zone, and drilling refusal on underground obstructions. As such, testing for P-5 and P-6 was not conducted because fill is considered unsuitable for infiltration. Testing at BMP 3 (P-7 and P-8) was unsuccessful because an unmarked waterline was encountered while drilling P-8, saturating the soils within P-7 and compromising the integrity of the soils within P-8. Table 1 summarizes the infiltration rates of the percolation borings that were tested. Appendix D presents the field logs of the testing.

Test Method

The percolation borings were drilled using a truck-mounted drill rig equipped with a hollow stem auger to the elevation of the bottom of the proposed BMP. Field measurements were taken to confirm that the borings were excavated to approximately 8 inches in diameter. The borings were logged by a NOVA geologist, who observed and recorded exposed soil cuttings and the boring conditions. Boring logs are presented in Appendix B.

Once the borings were drilled to the desired depth, the borings were converted to percolation test wells by placing an approximately 2-inch layer of ¾-inch gravel on the bottom, then extending 3-inch diameter Schedule 40 perforated PVC pipe to the ground surface. The ¾-inch gravel was used to partially fill the annular space around the perforated pipe below the existing finish grade to minimize the potential of soil caving.

In the percolation borings, the pre-soak water percolated over 6 inches into the soil unit within 25 minutes in the two trials. Based on the results of the trials, water levels were recorded every 10 minutes for at least 1 hour or until stabilized. At the beginning of each test interval, the water level was raised to approximately the same level as the previous tests, in order to maintain a near-constant head during all test periods.

The percolation rate of a soil profile is not the same as its infiltration rate (‘I’). Therefore, the field percolation rates were converted to estimated infiltration rates utilizing the Porchet Method in accordance with the guidance contained in the BMP Manual. The table below provides a summary of the infiltration rates determined by the percolation testing. Appendix D presents the field test data.

Table 1. Infiltration Rate Test Results

Test Location	BMP No.	Test Depth (feet)	Material at Test Depth	Tested Infiltration Rate (in/hr, FS=2)[1]
P-1	4	10	Old Paralic Deposits: Silty Sand	1.16
P-2	4	10	Old Paralic Deposits: Silty Sand	1.10
P-3	1	7	Old Paralic Deposits: Poorly Graded Sand with Silt	3.40
P-4	1	7	Old Paralic Deposits: Silty Sand	0.62
***Borehole percolation testing was not performed in P-5 through P-8 ***				
P-9	4	12	Old Paralic Deposits: Silty Sand	4.50
P-10	4	12	Old Paralic Deposits: Silty Sand	1.89

Note 1: FS indicates 'Factor of Safety.'

As shown in the table, a factor of safety (FS) is applied to the infiltration rate (I) determined by the percolation testing. This factor of safety, at least FS = 2 in local practice, considers the nature and variability of subsurface materials, as well as the natural tendency of infiltration structures to become less efficient with time. The calculated infiltration rates after applying FS = 2 are greater than 0.5 inches per hour. Full BMPs are typically acceptable on sites with infiltration rates greater than 0.5 inches per hour, however, not recommended for sites that will significantly increase the geotechnical hazards, as discussed in the following sections.

INFILTRATION RESTRICTIONS

Form 4 from the BMP Design Manual is intended to present the mandatory and optional criteria when considering stormwater infiltration feasibility at a site. NOVA has selected *Restricted* on this form due to the geologic conditions and proximity to the coastal bluff. Form 4 is presented below. Further discussion is presented following the form.

Infiltration Restrictions		Form 4	
Retention is required at the project site to the maximum extent practicable. Complete this form to summarize applicable infiltration restrictions. Supporting documentation must be provided in the Attachments.			
	Restriction Element	**Applicable?**	
Mandatory Considerations	BMP is within 100 feet of contaminated soils	☐ Yes	☒ No
	BMP is within 100 feet of industrial activities lacking source control	☐ Yes	☒ No
	BMP is within 100 feet of well/groundwater basin	☐ Yes	☒ No
	BMP is within 50 feet of septic tanks/leach fields	☐ Yes	☒ No
	BMP is within 10 feet of structures/tanks/walls	☐ Yes	☒ No
	BMP is within 10 feet of sewer utilities	☐ Yes	☒ No
	BMP is within 10 feet of groundwater table	☐ Yes	☒ No
	BMP is within hydric soils	☐ Yes	☒ No
	BMP is within highly liquefiable soils and has connectivity to structures	☐ Yes	☒ No
	BMP is within 1.5 times the height of adjacent steep slopes (≥25%)	☐ Yes	☒ No
	City staff has assigned "Restricted" Infiltration Category	☐ Yes	☒ No
Optional Considerations	BMP is within predominantly Type D soil	☐ Yes	☒ No
	BMP is within 10 feet of property line	☐ Yes	☒ No
	BMP is within fill depths of ≥5 feet (existing or proposed)	☐ Yes	☒ No
	BMP is within 10 feet of underground utilities	☐ Yes	☒ No
	BMP is within 250 feet of ephemeral stream	☐ Yes	☒ No
	Other (provide detailed geotechnical support in Attachment 6)	☒ Yes	☐ No
Result	**Unrestricted** – No restriction elements are applicable	☐	
	Restricted – One or more restriction elements are applicable	☒	

* Note BMP 2 is within fill depths of ≥5 feet. Therefore the "BMP is within fill depths ≥5 feet" consideration is applicable.

Geologic Conditions

The site is underlain by old paralic deposits consisting of silty sand within the upper portion and friable sand with silt and silty sand within the lower portion. The infiltration of the proposed BMP facilities would primarily occur within the lower sand portion, which demonstrated very high infiltration rates. The geologic contact of the underlying cemented Eocene-aged San Onofre Breccia is located about 3 to 6 feet below the infiltration surface of the proposed BMP facilities, which would likely result in water perching on the contact and water mounding in the friable sand unit. Additionally, as shown in our geologic cross-sections (Plate 2), the contact between the friable sand of the old paralic deposits and the underlying cemented San Onofre Breccia slopes/dips westward toward the existing bluff. Therefore, it is our opinion that infiltrated stormwater would likely migrate laterally on top of the breccia contact, through the friable sand layer toward the bluff. Furthermore, BMP 2 is located within undocumented fill and is therefore considered unsuitable for infiltration.

Bluff Stability and Infiltration Concerns

The western edge of the site is located approximately 500 feet from the coastal bluffs. Lateral migration of infiltrated stormwater from the proposed BMP facilities would likely create unintended public health and safety concerns. The geology of the old paralic deposits encountered during our investigation corresponds closely with that observed in the nearby coastal bluff. Figures 7 and 8 are photographs of the coastal bluff, which correlate to the samples of old paralic deposits presented in Figures 4 and 5. The photos indicate that the lower friable sand is susceptible to erosion, sloughing, and potential bluff failure. It is NOVA's opinion that infiltration into the friable and permeable lower sand layer has the potential to contribute to bluff failure over time.



Figure 7. Coastal Bluff (November 2023)



Figure 8. Coastal Bluff Near Playground (November 2023)

CONCLUSIONS AND RECOMMENDATIONS

Based on our infiltration test results and assessment of infiltration feasibility related to the geologic and geotechnical conditions, NOVA recommends an infiltration feasibility category of “No Infiltration.” BMP facilities should be completely lined on the sides and bottom with an impermeable geomembrane with a subdrain system to reduce the potential for water-related distress to adjacent structures and improvements nearby coastal bluffs. A subdrain system should be installed at the bottom of BMP facilities. Additionally, BMP facilities should be kept at least 10 feet from structural foundations.

CLOSURE

NOVA should review project plans and specifications prior to bidding and construction to check that the intent of the recommendations in this report has been incorporated. Observations and tests should be performed during construction. If the conditions encountered during construction differ from those anticipated based on the subsurface exploration program, the presence of personnel from our offices during construction will enable an evaluation of the exposed conditions and modifications of the recommendations in this report or development of additional recommendations in a timely manner.

NOVA should be advised of changes in the project scope so that the recommendations contained in this report can be evaluated with respect to the revised plans. Changes in recommendations will be verified in writing. The findings in this report are valid as of the date of this report. Changes in the condition of the site can, however, occur with the passage of time, whether they are due to natural processes or work on this or adjacent areas. In addition, changes in the standards of practice and government regulations can occur. Thus, the findings in this report may be invalidated wholly or in part by changes beyond our control. This report should not be relied upon after a period of two years without a review by us verifying the suitability of the conclusions and recommendations to site conditions at that time.

In the performance of our professional services, we comply with that level of care and skill ordinarily exercised by members of our profession currently practicing under similar conditions and in the same locality. The client recognizes that subsurface conditions may vary from those encountered at the boring locations and that our data, interpretations, and recommendations are based solely on the information obtained by us. We will be responsible for those data, interpretations, and recommendations, but shall not be responsible for interpretations by others of the information developed. Our services consist of professional consultation and observation only, and no warranty whatsoever, express or implied, is made or intended in connection with the work performed or to be performed by us, or by our proposal for consulting or other services, or by our furnishing of oral or written reports or findings.

NOVA appreciates the opportunity to be of service to Toll Brothers Apartment Living. If you have any questions, please call us at 858.292.7575 x 413.

Respectfully submitted,
NOVA Services, Inc.



Melissa Stayner, PG, CEG
Senior Engineering Geologist



Tom Canady, PE
Principal Engineer

Attachments: Plate 1 – Subsurface Investigation Map
Plate 2 – Geologic Cross-Sections
Appendix A - Use of the Geotechnical Report
Appendix B - Boring Logs
Appendix C - Laboratory Testing
Appendix D - Infiltration Test Results

REFERENCES

City of Oceanside, 2022, City of Oceanside BMP Design Manual, Appendix D, Geotechnical Engineer Analysis, January 2022.

GeoTracker, State Water Resources Control Board, located at https://geotracker.waterboards.ca.gov/, accessed November 2023.

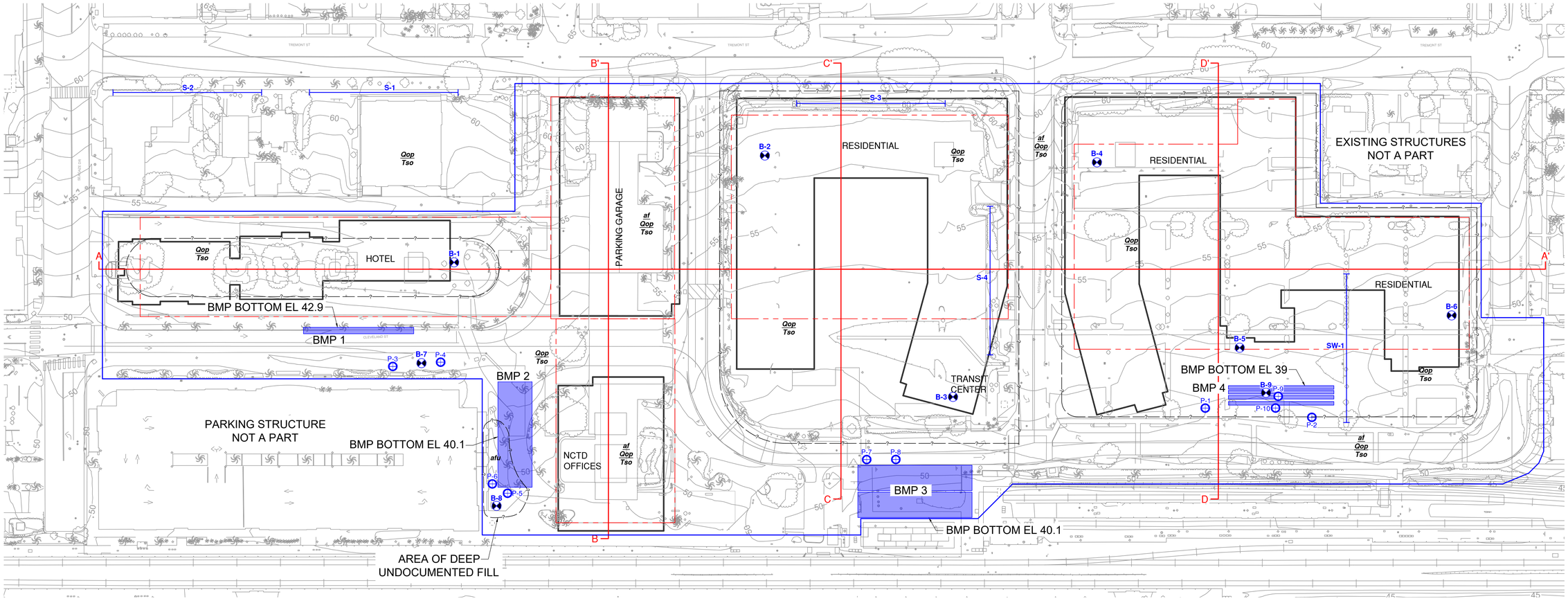
Kennedy, M.P. and Tan, S.S., 2007, Geologic Map of the Oceanside 30' x 60' Quadrangle, California, California Geological Survey, Scale 1:100,000.

NOVA Services (NOVA), 2021, Geotechnical Investigation, Proposed North County Transit District (NCTD) Oceanside Transit Center Redevelopment, Oceanside, CA, NOVA Project No. 2021010, August 11.

Riverside County, 2011, The Riverside County Design Handbook for Low Impact Development Best Management Practices, Appendix A, Infiltration Testing, September 2011.

Stantec, 2023, Vesting Tentative Map and Development Plan, NCTD Oceanside Transit Center, 235 South Tremont Street, City of Oceanside, California.

PLATES



KEY TO SYMBOLS

af	PREVIOUSLY PLACED FILL
afu	UNDOCUMENTED FILL
Qop	OLD PARALIC DEPOSITS
Tso	SAN ONOFRE BRECCIA
	LIMITS OF PROPOSED STRUCTURES BELOW GRADE
	LIMITS OF PROPOSED STRUCTURES ABOVE GRADE
	SITE LIMITS
	GEOLOGIC CONTACT, QUERIED WHERE UNCERTAIN
B-9	GEOTECHNICAL BORING
P-10	PERCOLATION TEST BORING
SW-1	SHEAR WAVE VELOCITY SURVEY
S-4	SEISMIC REFRACTION SURVEYS
D D'	GEOLOGIC CROSS-SECTION

0 50' 100'

NOVA

GEOTECHNICAL
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PROPOSED NCTD OCEANSIDE TRANSIT CENTER REDEVELOPMENT

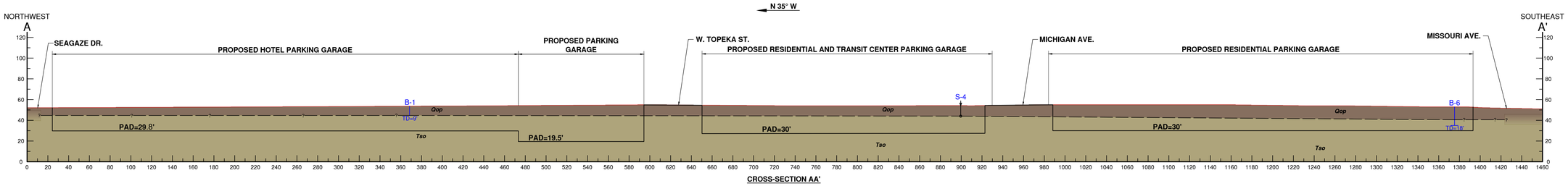
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OCEANSIDE, CA 92054

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REVIEWED BY:	MS
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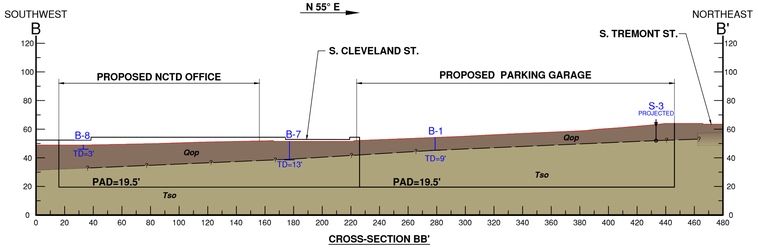
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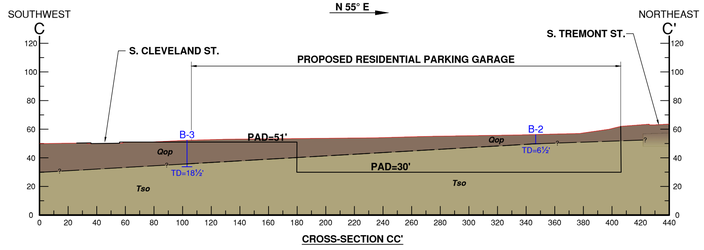
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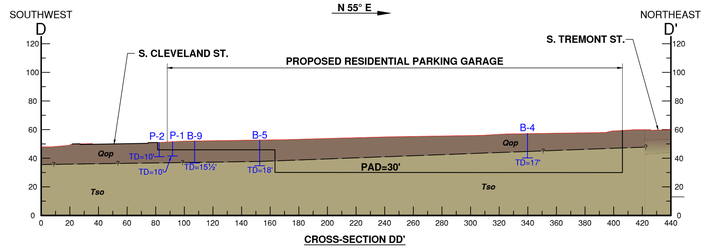
CROSS-SECTION AA'



CROSS-SECTION BB'



CROSS-SECTION CC'



CROSS-SECTION DD'

KEY TO SYMBOLS

Qop	OLD PARALIC DEPOSITS
Tso	SAN ONOFRE BRECCIA
B-9	GEOTECHNICAL BORING
P-2	PERCOLATION TEST BORING
	EXISTING GRADE
	PROPOSED GRADE
—?—	GEOLOGIC CONTACT, QUERIED WHERE UNCERTAIN

0 50' 100'

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GEOLOGIC
CROSS-SECTIONS

APPENDIX A
USE OF THE GEOTECHNICAL REPORT

Important Information About Your

Geotechnical Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

The following information is provided to help you manage your risks.

Geotechnical Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical engineering study conducted for a civil engineer may not fulfill the needs of a construction contractor or even another civil engineer. Because each geotechnical engineering study is unique, each geotechnical engineering report is unique, prepared *solely* for the client. No one except you should rely on your geotechnical engineering report without first conferring with the geotechnical engineer who prepared it. *And no one — not even you* — should apply the report for any purpose or project except the one originally contemplated.

Read the Full Report

Serious problems have occurred because those relying on a geotechnical engineering report did not read it all. Do not rely on an executive summary. Do not read selected elements only.

A Geotechnical Engineering Report Is Based on A Unique Set of Project-Specific Factors

Geotechnical engineers consider a number of unique, project-specific factors when establishing the scope of a study. Typical factors include: the client's goals, objectives, and risk management preferences; the general nature of the structure involved, its size, and configuration; the location of the structure on the site; and other planned or existing site improvements, such as access roads, parking lots, and underground utilities. Unless the geotechnical engineer who conducted the study specifically indicates otherwise, do not rely on a geotechnical engineering report that was:

- not prepared for you,
- not prepared for your project,
- not prepared for the specific site explored, or
- completed before important project changes were made.

Typical changes that can erode the reliability of an existing geotechnical engineering report include those that affect:

- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light industrial plant to a refrigerated warehouse,
- elevation, configuration, location, orientation, or weight of the proposed structure,
- composition of the design team, or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes—even minor ones—and request an assessment of their impact. *Geotechnical engineers cannot accept responsibility or liability for problems that occur because their reports do not consider developments of which they were not informed.*

Subsurface Conditions Can Change

A geotechnical engineering report is based on conditions that existed at the time the study was performed. *Do not rely on a geotechnical engineering report* whose adequacy may have been affected by: the passage of time; by man-made events, such as construction on or adjacent to the site; or by natural events, such as floods, earthquakes, or groundwater fluctuations. *Always* contact the geotechnical engineer before applying the report to determine if it is still reliable. A minor amount of additional testing or analysis could prevent major problems.

Most Geotechnical Findings Are Professional Opinions

Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field and laboratory data and then apply their professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ—sometimes significantly—from those indicated in your report. Retaining the geotechnical engineer who developed your report to provide construction observation is the most effective method of managing the risks associated with unanticipated conditions.

A Report's Recommendations Are *Not* Final

Do not overrely on the construction recommendations included in your report. *Those recommendations are not final,* because geotechnical engineers develop them principally from judgment and opinion. Geotechnical engineers can finalize their recommendations only by observing actual

subsurface conditions revealed during construction. *The geotechnical engineer who developed your report cannot assume responsibility or liability for the report's recommendations if that engineer does not perform construction observation.*

A Geotechnical Engineering Report Is Subject to Misinterpretation

Other design team members' misinterpretation of geotechnical engineering reports has resulted in costly problems. Lower that risk by having your geotechnical engineer confer with appropriate members of the design team after submitting the report. Also retain your geotechnical engineer to review pertinent elements of the design team's plans and specifications. Contractors can also misinterpret a geotechnical engineering report. Reduce that risk by having your geotechnical engineer participate in prebid and preconstruction conferences, and by providing construction observation.

Do Not Redraw the Engineer's Logs

Geotechnical engineers prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical engineering report should *never* be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproduction is acceptable, *but recognize that separating logs from the report can elevate risk.*

Give Contractors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can make contractors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give contractors the complete geotechnical engineering report, *but* preface it with a clearly written letter of transmittal. In that letter, advise contractors that the report was not prepared for purposes of bid development and that the report's accuracy is limited; encourage them to confer with the geotechnical engineer who prepared the report (a modest fee may be required) and/or to conduct additional study to obtain the specific types of information they need or prefer. A prebid conference can also be valuable. *Be sure contractors have sufficient time* to perform additional study. Only then might you be in a position to give contractors the best information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions.

Read Responsibility Provisions Closely

Some clients, design professionals, and contractors do not recognize that geotechnical engineering is far less exact than other engineering disciplines. This lack of understanding has created unrealistic expectations that have led to disappointments, claims, and disputes. To help reduce the risk of such outcomes, geotechnical engineers commonly include a variety of explanatory provisions in their reports. Sometimes labeled "limitations" many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The equipment, techniques, and personnel used to perform a *geoenvironmental* study differ significantly from those used to perform a *geotechnical* study. For that reason, a geotechnical engineering report does not usually relate any geoenvironmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated environmental problems have led to numerous project failures.* If you have not yet obtained your own geoenvironmental information, ask your geotechnical consultant for risk management guidance. *Do not rely on an environmental report prepared for someone else.*

Obtain Professional Assistance To Deal with Mold

Diverse strategies can be applied during building design, construction, operation, and maintenance to prevent significant amounts of mold from growing on indoor surfaces. To be effective, all such strategies should be devised for the *express purpose* of mold prevention, integrated into a comprehensive plan, and executed with diligent oversight by a professional mold prevention consultant. Because just a small amount of water or moisture can lead to the development of severe mold infestations, a number of mold prevention strategies focus on keeping building surfaces dry. While groundwater, water infiltration, and similar issues may have been addressed as part of the geotechnical engineering study whose findings are conveyed in this report, the geotechnical engineer in charge of this project is not a mold prevention consultant; ***none of the services performed in connection with the geotechnical engineer's study were designed or conducted for the purpose of mold prevention. Proper implementation of the recommendations conveyed in this report will not of itself be sufficient to prevent mold from growing in or on the structure involved.***

Rely, on Your ASFE-Member Geotechncial Engineer for Additional Assistance

Membership in ASFE/The Best People on Earth exposes geotechnical engineers to a wide array of risk management techniques that can be of genuine benefit for everyone involved with a construction project. Confer with you ASFE-member geotechnical engineer for more information.

ASFE
The Best People on Earth

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Telephone: 301/565-2733 Facsimile: 301/589-2017
e-mail: info@asfe.org www.asfe.org

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APPENDIX B
BORING LOGS

MAJOR DIVISIONS				TYPICAL NAMES
COARSE-GRAINED SOILS MORE THAN HALF IS COARSER THAN NO. 200 SIEVE	GRAVEL MORE THAN HALF COARSE FRACTION IS LARGER THAN NO. 4 SIEVE	CLEAN GRAVEL WITH LESS THAN 15% FINES	GW	WELL-GRADED GRAVEL WITH OR WITHOUT SAND
			GP	POORLY GRADED GRAVEL WITH OR WITHOUT SAND
		GRAVEL WITH 15% OR MORE FINES	GM	SILTY GRAVEL WITH OR WITHOUT SAND
			GC	CLAYEY GRAVEL WITH OR WITHOUT SAND
	SAND MORE THAN HALF COARSE FRACTION IS FINER THAN NO. 4 SIEVE SIZE	CLEAN SAND WITH LESS THAN 15% FINES	SW	WELL-GRADED SAND WITH OR WITHOUT GRAVEL
			SP	POORLY GRADED SAND WITH OR WITHOUT GRAVEL
		SAND WITH 15% OR MORE FINES	SM	SILTY SAND WITH OR WITHOUT GRAVEL
			SC	CLAYEY SAND WITH OR WITHOUT GRAVEL
FINE-GRAINED SOILS MORE THAN HALF IS FINER THAN NO. 200 SIEVE	SILTS AND CLAYS LIQUID LIMIT 50% OR LESS		ML	SILT WITH OR WITHOUT SAND OR GRAVEL
			CL	LEAN CLAY WITH OR WITHOUT SAND OR GRAVEL
			OL	ORGANIC SILT OR CLAY OF LOW TO MEDIUM PLASTICITY WITH OR WITHOUT SAND OR GRAVEL
	SILTS AND CLAYS LIQUID LIMIT GREATER THAN 50%		MH	ELASTIC SILT WITH OR WITHOUT SAND OR GRAVEL
			CH	FAT CLAY WITH OR WITHOUT SAND OR GRAVEL
			OH	ORGANIC SILT OR CLAY OF HIGH PLASTICITY WITH OR WITHOUT SAND OR GRAVEL
HIGHLY ORGANIC SOILS			PT	PEAT AND OTHER HIGHLY ORGANIC SOILS

- GROUNDWATER / STABILIZED
- GROUNDWATER SEEPAGE
- BULK SAMPLE
- SPT SAMPLE (ASTM D1586)
- MOD. CAL. SAMPLE (ASTM D3550)
- * UNRELIABLE BLOW COUNTS
- GEOLOGIC CONTACT
- SOIL TYPE CHANGE

LAB TEST ABBREVIATIONS

AL	ATTERBERG LIMITS
CN	CONSOLIDATION
CR	CORROSIVITY
DS	DIRECT SHEAR
EI	EXPANSION INDEX
MD	MAXIMUM DENSITY
RV	RESISTANCE VALUE
SA	SIEVE ANALYSIS
SE	SAND EQUIVALENT

LOG ABBREVIATIONS

REF	REFUSAL

RELATIVE DENSITY OF COHESIONLESS SOILS		CONSISTENCY OF COHESIVE SOILS		
RELATIVE DENSITY	SPT N60 BLOWS/FOOT	CONSISTENCY	SPT N60 BLOWS/FOOT	POCKET PENETROMETER MEASUREMENT (TSF)
VERY LOOSE	0 - 4	VERY SOFT	0 - 2	0 - 0.25
LOOSE	4 - 10	SOFT	2 - 4	0.25 - 0.50
MEDIUM DENSE	10 - 30	MEDIUM STIFF	4 - 8	0.50 - 1.0
DENSE	30 - 50	STIFF	8 - 15	1.0 - 2.0
VERY DENSE	OVER 50	VERY STIFF	15 - 30	2.0 - 4.0
		HARD	OVER 30	OVER 4.0

NUMBER OF BLOWS OF 140 LB HAMMER FALLING 30 INCHES TO DRIVE A 2 INCH O.D. (1-3/8 INCH I.D.) SPLIT-BARREL SAMPLER THE LAST 12 INCHES OF AN 18-INCH DRIVE (ASTM-1586 STANDARD PENETRATION TEST).
IF THE SEATING INTERVAL (1st 6 INCH INTERVAL) IS NOT ACHEIVED, N IS REPORTED AS REF.

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SUBSURFACE EXPLORATION LEGEND

LOG OF BORING B-1

DATE DRILLED: 04/08/2021 **DRILLING EQUPMENT:** CME 75 LAR **SAMPLE METHOD:** HAMMER: 140 LBS., DROP: 30 IN (AUTO)

ELEVATION (FT): ± 53 **DRILLING METHOD:** HOLLOW STEM AUGER **LOGGED BY:** GN

GROUNDWATER DEPTH (FT): N/A **NOTES:** ETR~80.8%, $N_{60} \sim \frac{80.8}{60}$*N~1.35*N **REVIEWED BY:** MS

DEPTH (FT)	BULK SAMPLE	CAL/SPT SAMPLE	BLOWS PER 6 IN N	N_{60}	MOISTURE (%)	DRY DENSITY (pcf)	SOIL CLASS. (USCS)	SOIL DESCRIPTION *SUMMARY OF SUBSURFACE CONDITIONS* *(USCS; COLOR, MOISTURE, DENSITY, GRAIN SIZE, OTHER)*	LAB TESTS
0			8 12 17	25	8.1	129.2	SM	**OLD PARALIC DEPOSITS (Qop$_{6-7}$):** *(DISTURBED/REWORKED) SILTY SAND; DARK REDDISH BROWN, MOIST, LOOSE TO MEDIUM DENSE, FINE TO MEDIUM GRAINED, SCATTERED CONCRETE DEBRIS, BRICK, AND GRAVEL*	SA
								(UNDISTURBED) REDDISH BROWN, MOIST, MEDIUM DENSE, FINE TO MEDIUM GRAINED	
5			9 9 10	26				*ORANGE BROWN*	
			6 7 8	13	5.4	114.5		*OLIVE BROWN*	SA
			50/0"	REF				**SAN ONOFRE BRECCIA (Tso):** *NO RECOVERY, VERY DENSE*	
10								*AUGER REFUSAL AT 9 FT ON VERY DENSE SAN ONOFRE BRECCIA. NO GROUNDWATER ENCOUNTERED.*	
15									
20									
25									
30									

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DRAFTED BY: GN	PROJECT: 2021010	FIGURE: B.1

LOG OF BORING B-2

DATE DRILLED: 04/08/2021 **DRILLING EQUPMENT:** CME 75 **SAMPLE METHOD:** HAMMER: 140 LBS., DROP: 30 IN (AUTO)

ELEVATION (FT): ± 54 **DRILLING METHOD:** HOLLOW STEM AUGER **LOGGED BY:** GN

GROUNDWATER DEPTH (FT): N/A **NOTES:** ETR~73.9%, $N_{60} \sim \frac{73.9}{60}$*N~1.23*N **REVIEWED BY:** MS

DEPTH (FT)	BULK SAMPLE	CAL/SPT SAMPLE	BLOWS PER 6 IN N	N_{60}	MOISTURE (%)	DRY DENSITY (pcf)	SOIL CLASS. (USCS)	SOIL DESCRIPTION *SUMMARY OF SUBSURFACE CONDITIONS* *(USCS; COLOR, MOISTURE, DENSITY, GRAIN SIZE, OTHER)*	LAB TESTS
0								*2½ INCHES OF ASPHALT CONCRETE OVER 4½ INCHES OF AGGREGATE BASE*	
			8 6 6	15			SM	**OLD PARALIC DEPOSITS (Qop$_{6-7}$):** *SILTY SAND; REDDISH BROWN, MOIST, MEDIUM DENSE, FINE TO MEDIUM GRAINED, WITH SLIGHT PINHOLE POROSITY*	SA
			6 7 8	18					
5			9 10 11	26					
			50/1"	REF				**SAN ONOFRE BRECCIA (Tso):** *NO RECOVERY, VERY DENSE*	
								AUGER REFUSAL AT 6½ FT ON VERY DENSE SAN ONOFRE BRECCIA. NO GROUNDWATER ENCOUNTERED.	
10									
15									
20									
25									
30									

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DRAFTED BY: GN	PROJECT: 2021010	FIGURE: B.2

LOG OF BORING B-3

DATE DRILLED: 04/08/2021 **DRILLING EQUPMENT:** CME 75 **SAMPLE METHOD:** HAMMER: 140 LBS., DROP: 30 IN (AUTO)

ELEVATION (FT): ± 50 **DRILLING METHOD:** HOLLOW STEM AUGER **LOGGED BY:** GN

GROUNDWATER DEPTH (FT): N/A **NOTES:** ETR~73.9%, $N_{60} \sim \frac{73.9}{60}$*N~1.23*N **REVIEWED BY:** MS

DEPTH (FT)	BULK SAMPLE	CAL/SPT SAMPLE	BLOWS PER 6 IN N	N_{60}	MOISTURE (%)	DRY DENSITY (pcf)	SOIL CLASS. (USCS)	SOIL DESCRIPTION *SUMMARY OF SUBSURFACE CONDITIONS* *(USCS; COLOR, MOISTURE, DENSITY, GRAIN SIZE, OTHER)*	LAB TESTS
0								*2½ INCHES OF ASPHALT CONCRETE OVER 4½ INCHES OF AGGREGATE BASE*	
			8 5 6	14			SM	**OLD PARALIC DEPOSITS (Qop$_{6-7}$):** *SILTY SAND; DARK REDDISH BROWN, MOIST, MEDIUM DENSE, FINE TO MEDIUM GRAINED*	RV
			10 8 4	15				*REDDISH BROWN WITH OLIVE BROWN AND BLACK SAND GRAINS*	SA
5			9 11 10	26				*SOME MINOR CALICHE AND MINOR POROSITY*	
			6 12 15	22					DS
10			9 11* 11*	27*					
			10 12 11	28			SP-SM	*POORLY GRADED SAND WITH SILT; LIGHT ORANGE BROWN AND OLIVE BROWN, MOIST, MEDIUM DENSE, FINE TO MEDIUM GRAINED*	SA
15			10 15 18	41				*DENSE*	SA
			50/5"	REF				**SAN ONOFRE BRECCIA (Tso):** *CLAYEY SANDSTONE MATRIX WITH GRAVEL; GRAYISH BROWN AND ORANGE, MOIST, VERY DENSE, FINE TO COARSE GRAINED, ABUNDANT GRAVEL AND BROKEN ROCK, STRONGLY INDURATED*	CR SA
20								*AUGER REFUSAL AT 18½ FT ON VERY DENSE SAN ONOFRE BRECCIA. NO GROUNDWATER ENCOUNTERED.*	
25									
30									

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DRAFTED BY: GN	PROJECT: 2021010	FIGURE: B.3

LOG OF BORING B-4

DATE DRILLED: 04/08/2021 **DRILLING EQUPMENT:** CME 75 **SAMPLE METHOD:** HAMMER: 140 LBS., DROP: 30 IN (AUTO)

ELEVATION (FT): ± 53 **DRILLING METHOD:** HOLLOW STEM AUGER **LOGGED BY:** GN

GROUNDWATER DEPTH (FT): N/A **NOTES:** ETR~73.9%, $N_{60} \sim \frac{73.9}{60}$*N~1.23*N **REVIEWED BY:** MS

DEPTH (FT)	BULK SAMPLE	CAL/SPT SAMPLE	BLOWS PER 6 IN N	N_{60}	MOISTURE (%)	DRY DENSITY (pcf)	SOIL CLASS. (USCS)	SOIL DESCRIPTION *SUMMARY OF SUBSURFACE CONDITIONS* *(USCS; COLOR, MOISTURE, DENSITY, GRAIN SIZE, OTHER)*	LAB TESTS
0								*2½ INCHES OF ASPHALT CONCRETE OVER 4½ INCHES OF AGGREGATE BASE*	
			6 6 7	16			SM	**OLD PARALIC DEPOSITS (Qop$_{6-7}$):** *(DISTURBED) SILTY SAND; DARK BROWN, MOIST, MEDIUM DENSE, FINE TO MEDIUM GRAINED*	
			6 9 13	27			SM	*(UNDISTURBED) SILTY SAND; REDDISH BROWN, MOIST, MEDIUM DENSE, FINE TO MEDIUM GRAINED, SOME BLACK MINERALIZATION*	SA
5			11 11 9	27			SM	*SILTY SAND WITH GRAVEL; REDDISH BROWN, MOIST, MEDIUM DENSE, FINE TO COARSE GRAINED SAND WITH 25% GRAVEL*	SA
			8 7 7	17			SM	*SILTY SAND; REDDISH BROWN, MOIST, MEDIUM DENSE, FINE TO MEDIUM GRAINED*	SA
10			9 13 21	27				*ORANGE BROWN*	DS
			27 50/2"	REF				**SAN ONOFRE BRECCIA (Tso):** *SILTY SANDSTONE MATRIX WITH GRAVEL; GRAYISH BROWN, DRY, VERY DENSE, FINE TO COARSE GRAINED, SOME ROCK FRAGEMENTS, 41% GRAVEL LIGHT YELLOWISH BROWN, DIFFICULT AUGERING, INDURATED*	SA
15			26 50/3"	REF				*CLAYEY SANDSTONE MATRIX; MOTTLED ORANGE BROWN AND LIGHT GRAYISH BROWN, MOIST, VERY DENSE, FINE GRAINED, WELL INDURATED*	
			11 50/3"	REF					SA
								AUGER REFUSAL AT 17 FT ON VERY DENSE SAN ONOFRE BRECCIA. NO GROUNDWATER ENCOUNTERED.	
20									
25									
30									

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DRAFTED BY: GN	PROJECT: 2021010	FIGURE: B.4

LOG OF BORING B-5

DATE DRILLED: 04/08/2021 **DRILLING EQUPMENT:** CME 75 **SAMPLE METHOD:** HAMMER: 140 LBS., DROP: 30 IN (AUTO)

ELEVATION (FT): ± 49 **DRILLING METHOD:** HOLLOW STEM AUGER **LOGGED BY:** GN

GROUNDWATER DEPTH (FT): N/A **NOTES:** ETR~73.9%, $N_{60} \sim \frac{73.9}{60}$*N~1.23*N **REVIEWED BY:** MS

DEPTH (FT)	BULK SAMPLE	CAL/SPT SAMPLE	BLOWS PER 6 IN N	N_{60}	MOISTURE (%)	DRY DENSITY (pcf)	SOIL CLASS. (USCS)	SOIL DESCRIPTION *SUMMARY OF SUBSURFACE CONDITIONS* *(USCS; COLOR, MOISTURE, DENSITY, GRAIN SIZE, OTHER)*	LAB TESTS
0								*2½ INCHES OF ASPHALT CONCRETE OVER 4½ INCHES OF AGGREGATE BASE*	
			9 18 14 6 5 4	39 11			SM	**OLD PARALIC DEPOSITS (Qop$_{6-7}$):** *(DISTURBED) SILTY SAND; DARK BROWN, SLIGHTLY MOIST TO MOIST, DENSE, FINE TO MEDIUM GRAINED, SCATTERED GRAVEL* *(UNDISTURBED) REDDISH BROWN, MOIST, MEDIUM DENSE, FINE GRAINED*	SA
5			9 11 11	27				*REDDISH BROWN, SLIGHTLY MOIST, MEDIUM DENSE, FINE TO COARSE GRAINED*	SA
			8 8 7	18				*FINE TO MEDIUM GRAINED* *OLIVE BROWN TO ORANGE BROWN* *ORANGE BROWN TO REDDISH BROWN*	SA
10			11 16 24	32				*DENSE* *LIGHT YELLOWISH TO ORANGE BROWN*	DS
			8 11 13	32					MD SA
15			11 22 24	57				**SAN ONOFRE BRECCIA (Tso):** *SILTY SANDSTONE MATRIX WITH GRAVEL; MOTTLED PALE OLIVE BROWN AND LIGHT GRAY, MOIST, VERY DENSE, FINE TO COARSE GRAINED, SCATTERED ROCK FRAGMENTS, WITH BLACK SAND GRAINS, INDURATED, ABUNDANT ROCK FRAGMENTS, REFUSAL ON COBBLE*	MD SA EI CR
			50/3"	REF				*AUGER REFUSAL AT 18 FT ON VERY DENSE SAN ONOFRE BRECCIA. NO GROUNDWATER ENCOUNTERED.*	
20									
25									
30									

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LOG OF BORING B-6

DATE DRILLED: 04/08/2021 **DRILLING EQUPMENT:** CME 75 **SAMPLE METHOD:** HAMMER: 140 LBS., DROP: 30 IN (AUTO)

ELEVATION (FT): ± 46 **DRILLING METHOD:** HOLLOW STEM AUGER **LOGGED BY:** GN

GROUNDWATER DEPTH (FT): N/A **NOTES:** ETR~73.9%, $N_{60} \sim \frac{73.9}{60}$*N~1.23*N **REVIEWED BY:** MS

DEPTH (FT)	BULK SAMPLE	CAL/SPT SAMPLE	BLOWS PER FOOT N	N_{60}	MOISTURE (%)	DRY DENSITY (pcf)	SOIL CLASS. (USCS)	SOIL DESCRIPTION *SUMMARY OF SUBSURFACE CONDITIONS* *(USCS; COLOR, MOISTURE, DENSITY, GRAIN SIZE, OTHER)*	LAB TESTS
0								*2½ INCHES OF ASPHALT CONCRETE OVER 4½ INCHES OF AGGREGATE BASE*	
			12 8 11	23			SM	**OLD PARALIC DEPOSITS (Qop$_{6-7}$):** *SILTY SAND; DARK REDDISH BROWN, MOIST, MEDIUM DENSE, FINE TO MEDIUM GRAINED, SCATTERED GRAVEL*	MD EI CR
			11 13 14	33				*DENSE*	
5			30 21 18	31	5.1	130		*ORANGE BROWN, MOIST, FINE TO MEDIUM GRAINED*	
			9 9 11	25				*MEDIUM DENSE*	SA
10			9 11 12	28			SP-SM	*POORLY GRADED SAND WITH SILT; ORANGE BROWN, MOIST, MEDIUM DENSE, MEDIUM GRAINED, SCATTERED GRAVEL* *DARK BROWN, ABUNDANT BLACK SAND GRAINS*	
			26 28 37	80				**SAN ONOFRE BRECCIA (Tso):** *CLAYEY SANDSTONE MATRIX WITH ABUNDANT GRAVEL AND ROCK FRAGMENTS; PALE OLIVE BROWN, DRY, VERY DENSE, FINE TO COARSE GRAINED, LIGHT GRAYISH BROWN WITH ORANGE AND DARK GRAY STAINING, INDURATED*	MD EI CR
15			11 35 50/5"	REF					
			50/5"	REF				*PALE OLIVE GRAY*	
								AUGER REFUSAL AT 18 FT DUE ON VERY DENSE SAN ONOFRE BRECCIA. NO GROUNDWATER ENCOUNTERED.	
20									
25									
30									

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DRAFTED BY: GN	PROJECT: 2021010	FIGURE: B.6

LOG OF BORING B-7

DATE DRILLED: 11/30/2023 **DRILLING EQUPMENT:** CME 95 **SAMPLE METHOD:** HAMMER: 140 LBS., DROP: 30 IN (AUTO)

ELEVATION (FT): ± 50 **DRILLING METHOD:** HOLLOW STEM AUGER **LOGGED BY:** GN

GROUNDWATER DEPTH (FT): N/A **NOTES:** ETR~70.6%, $N_{60} \sim \frac{70.6}{60}$*N~1.18*N **REVIEWED BY:** MS

DEPTH (FT)	BULK SAMPLE	CAL/SPT SAMPLE	BLOWS PER 6 IN N	N_{60}	MOISTURE (%)	DRY DENSITY (pcf)	SOIL CLASS. (USCS)	SOIL DESCRIPTION *SUMMARY OF SUBSURFACE CONDITIONS* *(USCS; COLOR, MOISTURE, DENSITY, GRAIN SIZE, OTHER)*	LAB TESTS
0								*6 IN CONCRETE*	
							SC	**FILL (af):** *CLAYEY SAND WITH GRAVEL; REDDISH BROWN, MOIST, LOOSE TO MEDIUM DENSE, FINE TO MEDIUM GRAINED, MICACEOUS, ABOUT 15% GRAVEL*	
			8 16 25	48			SM/SC	**OLD PARALIC DEPOSITS (Qop_{6-7}):** *SILTY SAND/CLAYEY SAND; REDDISH BROWN, MOIST, DENSE, FINE TO MEDIUM GRAINED, MICACEOUS* *ORANGE BROWN*	
5			12 9 8	20			SM	*SILTY SAND; ORANGE BROWN, MOIST, MEDIUM DENSE, FINE TO MEDIUM GRAINED, MICACEOUS*	
10			8 10 13	27			SP-SM	*POORLY GRADED SAND WITH SILT; OLIVE BROWN, MOIST, MEDIUM DENSE, FINE TO MEDIUM GRAINED, MICACEOUS*	
			16 30 41	84				**SAN ONOFRE BRECCIA (Tso):** *SILTY SANDSTONE MATRIX WITH GRAVEL AND ROCK FRAGMENTS, GRAYISH BROWN, MOIST, VERY DENSE, FINE TO MEDIUM GRAINED*	
15								*BORING TERMINATED AT 13 FT. NO GROUNDWATER ENCOUNTERED.*	
20									
25									
30									

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LOG OF BORING B-8

DATE DRILLED: 11/30/2023 **DRILLING EQUPMENT:** HAND AUGER **SAMPLE METHOD:** HAMMER: 140 LBS., DROP: 30 IN (AUTO)

ELEVATION (FT): ± 45 **DRILLING METHOD:** HAND AUGER **LOGGED BY:** GN

GROUNDWATER DEPTH (FT): N/A **NOTES:** HAND AUGER **REVIEWED BY:** MS

DEPTH (FT)	BULK SAMPLE	CAL/SPT SAMPLE	BLOWS PER 6 IN N	N_{60}	MOISTURE (%)	DRY DENSITY (pcf)	SOIL CLASS. (USCS)	SOIL DESCRIPTION *SUMMARY OF SUBSURFACE CONDITIONS* *(USCS; COLOR, MOISTURE, DENSITY, GRAIN SIZE, OTHER)*	LAB TESTS
0	X						SC	**FILL (af):** *CLAYEY SAND WITH GRAVEL; BROWN, MOIST, MEDIUM DENSE, FINE TO MEDIUM GRAINED, MICACEOUS, ROOTS, ASPHALT DEBRIS, CONSTRUCTION DEBRIS, ABOUT 20-25% GRAVEL, WITH CLAY BLEBS*	
								AUGER REFUSAL AT 3 FT ON UNDERGROUND OBSTRUCTION. ATTEMPTED ADVANCEMENT AT THREE NEARBY LOCATIONS. NO GROUNDWATER ENCOUNTERED	
5									
10									
15									
20									
25									
30									

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LOG OF BORING B-9

DATE DRILLED: 12/01/2023 **DRILLING EQUPMENT:** CME 95 **SAMPLE METHOD:** HAMMER: 140 LBS., DROP: 30 IN (AUTO)

ELEVATION (FT): ± 50 **DRILLING METHOD:** HOLLOW STEM AUGER **LOGGED BY:** GN

GROUNDWATER DEPTH (FT): N/A **NOTES:** ETR~70.6%, $N_{60} \sim \frac{70.6}{60}$*N~1.18*N **REVIEWED BY:** MS

DEPTH (FT)	BULK SAMPLE	CAL/SPT SAMPLE	BLOWS PER 6 IN N	N_{60}	MOISTURE (%)	DRY DENSITY (pcf)	SOIL CLASS. (USCS)	SOIL DESCRIPTION *SUMMARY OF SUBSURFACE CONDITIONS* *(USCS; COLOR, MOISTURE, DENSITY, GRAIN SIZE, OTHER)*	LAB TESTS
0								*3 IN ASPHALT CONCRETE OVER 20 IN AGGREGATE BASE*	
	X						SM/SC	**OLD PARALIC DEPOSITS (Qop$_{6-7}$):** *SILTY SAND/CLAYEY SAND; REDDISH BROWN, MOIST, MEDIUM DENSE, FINE TO MEDIUM GRAINED, MICACEOUS*	
5	X	/	3 7 9	19				*TRACE BLACK MINERAL PRECIPITATE DEPOSITS*	
		/	10 17 18	41			SM	*SILTY SAND; YELLOW RED/OLIVE BROWN, MOIST, DENSE, FINE TO MEDIUM GRAINED, MICACEOUS*	
15		/	50/6"	REF				**SAN ONOFRE BRECCIA (Tso):** *SILTY SANDSTONE MATRIX, LIGHT GRAY, MOIST, VERY DENSE, FINE TO MEDUM GRAINED, ABOUT 15% GRAVEL*	
								BORING TERMINATED AT 15½ FT. NO GROUNDWATER ENCOUNTERED.	
20									
25									
30									

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DRAFTED BY: GN	PROJECT: 2021010	FIGURE: B.9

LOG OF PERCOLATION BORING P-1

DATE DRILLED: 04/8/2021 **DRILLING EQUPMENT:** CME 75 LAR **SAMPLE METHOD:** HOLLOW STEM AUGER

ELEVATION (FT): ± 47 **DRILLING METHOD:** HOLLOW STEM AUGER **LOGGED BY:** GN

GROUNDWATER DEPTH (FT): N/A **NOTES:** N/A **REVIEWED BY:** MS

DEPTH (FT)	BULK SAMPLE	CAL/SPT SAMPLE	BLOWS PER 6 IN N	N_{60}	MOISTURE (%)	DRY DENSITY (pcf)	SOIL CLASS. (USCS)	SOIL DESCRIPTION *SUMMARY OF SUBSURFACE CONDITIONS* *(USCS; COLOR, MOISTURE, DENSITY, GRAIN SIZE, OTHER)*	LAB TESTS
0								*2½ INCHES OF ASPHALT CONCRETE OVER 4½ INCHES OF AGGREGATE BASE*	
							SM	**OLD PARALIC DEPOSITS (Qop$_{6-7}$):** *SILTY SAND; DARK BROWN, MOIST, MEDIUM DENSE, FINE TO MEDIUM GRAINED, SCATTERED GRAVEL* *REDDISH BROWN*	
5								*OLIVE BROWN, DENSE* *DIFFICULT AUGERING*	
10								*BORING TERMINATED AT 10 FT AND CONVERTED TO A BOREHOLE PERCOLATION TEST. NO GROUNDWATER ENCOUNTERED.*	
15									
20									
25									
30									

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DRAFTED BY: GN	PROJECT: 2021010	FIGURE: B.10

LOG OF PERCOLATION BORING P-2

DATE DRILLED: 04/8/2021 **DRILLING EQUPMENT:** CME 75 LAR **SAMPLE METHOD:** HOLLOW STEM AUGER

ELEVATION (FT): ± 46 **DRILLING METHOD:** HOLLOW STEM AUGER **LOGGED BY:** GN

GROUNDWATER DEPTH (FT): N/A **NOTES:** N/A **REVIEWED BY:** MS

DEPTH (FT)	BULK SAMPLE	CAL/SPT SAMPLE	BLOWS PER 6 IN N	N_{60}	MOISTURE (%)	DRY DENSITY (pcf)	SOIL CLASS. (USCS)	SOIL DESCRIPTION *SUMMARY OF SUBSURFACE CONDITIONS* *(USCS; COLOR, MOISTURE, DENSITY, GRAIN SIZE, OTHER)*	LAB TESTS
0								*2.5 INCHES OF ASPHALT CONCRETE OVER 4.5 INCHES OF AGGREGATE BASE*	
							SM	**OLD PARALIC DEPOSITS (Qop$_{6-7}$):** *SILTY SAND; DARK BROWN, MOIST, MEDIUM DENSE, FINE TO MEDIUM GRAINED, SCATTERED GRAVEL* *REDDISH BROWN*	
5	X							*OLIVE BROWN, DENSE*	SA
10								*BORING TERMINATED AT 10 FT AND CONVERTED TO A BOREHOLE PERCOLATION TEST. NO GROUNDWATER ENCOUNTERED.*	
15									
20									
25									
30									

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DRAFTED BY: GN	PROJECT: 2021010	FIGURE: B.11

LOG OF PERCOLATION BORING P-3

DATE DRILLED: 11/30/2023 **DRILLING EQUPMENT:** CME 95 **SAMPLE METHOD:** HAMMER: 140 LBS., DROP: 30 IN (AUTO)

ELEVATION (FT): ± 50 **DRILLING METHOD:** HOLLOW STEM AUGER **LOGGED BY:** GN

GROUNDWATER DEPTH (FT): N/A **NOTES:** ETR~70.6%, $N_{60} \sim \frac{70.6}{60}$*N~1.18*N **REVIEWED BY:** MS

DEPTH (FT)	BULK SAMPLE	CAL/SPT SAMPLE	BLOWS PER 6 IN N	N_{60}	MOISTURE (%)	DRY DENSITY (pcf)	SOIL CLASS. (USCS)	SOIL DESCRIPTION *SUMMARY OF SUBSURFACE CONDITIONS* *(USCS; COLOR, MOISTURE, DENSITY, GRAIN SIZE, OTHER)*	LAB TESTS
0								*6 IN CONCRETE*	
	X						SM	**FILL (af):** *SILTY SAND; REDDISH BROWN, MOIST, LOOSE, FINE TO MEDIUM GRAINED, MICACEOUS, ROOTS, POROUS*	
	X		2 3 5	9			SC	**OLD PARALIC DEPOSITS (Qop$_{6-7}$):** *CLAYEY SAND; LIGHT REDDISH BROWN, MOIST, LOOSE, FINE TO MEDIUM GRAINED, MICACEOUS*	
5	X		2 4 6	12			SP-SM	*POORLY GRADED SAND WITH SILT; OLIVE BROWN, MOIST, MEDIUM DENSE, FINE TO MEDIUM GRAINED, MICACEOUS*	
								BORING TERMINATED AT 7 FT AND CONVERTED TO A BOREHOLE PERCOLATION TEST. NO GROUNDWATER ENCOUNTERED.	
10									
15									
20									
25									
30									

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DRAFTED BY: GN	PROJECT: 2021010	FIGURE: B.12

LOG OF PERCOLATION BORING P-4

DATE DRILLED: 11/30/2023 **DRILLING EQUPMENT:** CME 95 **SAMPLE METHOD:** HAMMER: 140 LBS., DROP: 30 IN (AUTO)

ELEVATION (FT): ± 50 **DRILLING METHOD:** HOLLOW STEM AUGER **LOGGED BY:** GN

GROUNDWATER DEPTH (FT): N/A **NOTES:** ETR~70.6%, $N_{60} \sim \frac{70.6}{60}$*N~1.18*N **REVIEWED BY:** MS

DEPTH (FT)	BULK SAMPLE	CAL/SPT SAMPLE	BLOWS PER 6 IN N	N_{60}	MOISTURE (%)	DRY DENSITY (pcf)	SOIL CLASS. (USCS)	SOIL DESCRIPTION *SUMMARY OF SUBSURFACE CONDITIONS* *(USCS; COLOR, MOISTURE, DENSITY, GRAIN SIZE, OTHER)*	LAB TESTS
0	X							*6 IN CONCRETE*	
							SM	**FILL (af):** *SILTY SAND WITH GRAVEL; BROWN, MOIST, MEDIUM DENSE, FINE TO MEDIUM GRAINED, MICACEOUS, ROOTS, ABOUT 15-20% GRAVEL*	
			PUSH						
			3 6	9			SM	**OLD PARALIC DEPOSITS (Qop$_{6-7}$):** *SILTY SAND; REDDISH BROWN, MOIST, LOOSE, FINE TO MEDIUM GRAINED, MICACEOUS*	
5			4 4					*REDDISH BROWN, MEDIUM DENSE*	
	X		6	12					
								BORING TERMINATED AT 7 FT AND CONVERTED TO A BOREHOLE PERCOLATION TEST. NO GROUNDWATER ENCOUNTERED.	
10									
15									
20									
25									
30									

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DRAFTED BY: GN	PROJECT: 2021010	FIGURE: B.13

LOG OF PERCOLATION BORING P-5

DATE DRILLED: 11/30/2023 **DRILLING EQUPMENT:** CME 95 **SAMPLE METHOD:** HAMMER: 140 LBS., DROP: 30 IN (AUTO)

ELEVATION (FT): ± 45 **DRILLING METHOD:** HOLLOW STEM AUGER **LOGGED BY:** GN

GROUNDWATER DEPTH (FT): N/A **NOTES:** ETR~70.6%, $N_{60} \sim \frac{70.6}{60}$*N~1.18*N **REVIEWED BY:** MS

DEPTH (FT)	BULK SAMPLE	CAL/SPT SAMPLE	BLOWS PER 6 IN N	N_{60}	MOISTURE (%)	DRY DENSITY (pcf)	SOIL CLASS. (USCS)	SOIL DESCRIPTION *SUMMARY OF SUBSURFACE CONDITIONS* *(USCS; COLOR, MOISTURE, DENSITY, GRAIN SIZE, OTHER)*	LAB TESTS
0	X						SM	**FILL (af):** *SILTY SAND WITH GRAVEL; BROWN, MOIST, MEDIUM DENSE, FINE TO MEDIUM GRAINED, MICACEOUS, ROOTS, ABOUT 15-20% GRAVEL*	
		/	2 2 3	6				*BROWN, SOME ASPHALT DEBRIS*	
5		/	4 5 6	13				*LIGHT REDDISH BROWN, GLASS DEBRIS*	
	X	/	2 PUSH PUSH PUSH PUSH 1				SC	*CLAYEY SAND; BROWN, MOIST, LOOSE, FINE TO MEDIUM GRAINED* *ABUNDANT WHITE MINERAL- GYPSUM, CARBONATE, OR PLASTER*	
10								*BORING TERMINATED AT 10 FT. NO GROUNDWATER ENCOUNTERED.*	
15									
20									
25									
30									

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DRAFTED BY: GN | PROJECT: 2021010 | FIGURE: B.14

LOG OF PERCOLATION BORING P-6

DATE DRILLED: 11/30/2023 **DRILLING EQUPMENT:** CME 95 **SAMPLE METHOD:** HAMMER: 140 LBS., DROP: 30 IN (AUTO)

ELEVATION (FT): ± 45 **DRILLING METHOD:** HOLLOW STEM AUGER **LOGGED BY:** GN

GROUNDWATER DEPTH (FT): N/A **NOTES:** ETR~70.6%, $N_{60} \sim \frac{70.6}{60}$*N~1.18*N **REVIEWED BY:** MS

DEPTH (FT)	BULK SAMPLE	CAL/SPT SAMPLE	BLOWS PER 6 IN N	N_{60}	MOISTURE (%)	DRY DENSITY (pcf)	SOIL CLASS. (USCS)	SOIL DESCRIPTION *SUMMARY OF SUBSURFACE CONDITIONS* *(USCS; COLOR, MOISTURE, DENSITY, GRAIN SIZE, OTHER)*	LAB TESTS
0	X						SM	**FILL (af):** *SILTY SAND WITH GRAVEL; REDDISH BROWN, MOIST, LOOSE TO MEDIUM DENSE, FINE TO MEDIUM GRAINED, MICACEOUS*	
5		X	6 7 6	15				*WITH RED STAINING, TRACE ASPHALT DEBRIS* *SAMPLER BOUNCING ON BURIED OBSTRUCTION*	
								BORING TERMINATED 7 FT. NO GROUNDWATER ENCOUNTERED.	
10									
15									
20									
25									
30									

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DRAFTED BY: GN	PROJECT: 2021010	FIGURE: B.15

LOG OF PERCOLATION BORING P-7

DATE DRILLED: 11/30/2023 **DRILLING EQUPMENT:** CME 95 **SAMPLE METHOD:** HAMMER: 140 LBS., DROP: 30 IN (AUTO)

ELEVATION (FT): ± 46 **DRILLING METHOD:** HOLLOW STEM AUGER **LOGGED BY:** GN

GROUNDWATER DEPTH (FT): N/A **NOTES:** ETR~70.6%, $N_{60} \sim \frac{70.6}{60}$*N~1.18*N **REVIEWED BY:** MS

DEPTH (FT)	BULK SAMPLE	CAL/SPT SAMPLE	BLOWS PER 6 IN N	N_{60}	MOISTURE (%)	DRY DENSITY (pcf)	SOIL CLASS. (USCS)	SOIL DESCRIPTION *SUMMARY OF SUBSURFACE CONDITIONS* *(USCS; COLOR, MOISTURE, DENSITY, GRAIN SIZE, OTHER)*	LAB TESTS
0								*4 IN ASPHALT CONCRETE OVER 6 IN AGGREGATE BASE*	
	X						SM	**FILL (af):** *SILTY SAND WITH GRAVEL; REDDISH BROWN AND BLACK, MOIST, MEDIUM DENSE, FINE TO MEDIUM GRAINED, ABOUT 20-30% GRAVEL AND ASPHALT DEBRIS*	
	X						SM/SC	**OLD PARALIC DEPOSITS (Qop$_{6-7}$):** *SILTY SAND/CLAYEY SAND; REDDISH BROWN, MOIST, MEDIUM DENSE TO DENSE, FINE TO MEDIUM GRAINED*	
5		/	11 10 10	24			SM	*SILTY SAND; OLIVE BROWN, MOIST, MEDIUM DENSE, FINE TO MEDIUM GRAINED, MICACEOUS*	
		/	10 12 14	28					
10		/	10 15 15	35				*DENSE*	
								BORING TERMINATED AT 12 FT AND CONVERTED TO A BOREHOLE PERCOLATION TEST. NO GROUNDWATER ENCOUNTERED.	
15									
20									
25									
30									

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LOG OF PERCOLATION BORING P-8

DATE DRILLED: 11/30/2023 **DRILLING EQUPMENT:** CME 95 **SAMPLE METHOD:** HAMMER: 140 LBS., DROP: 30 IN (AUTO)

ELEVATION (FT): ± 46 **DRILLING METHOD:** HOLLOW STEM AUGER **LOGGED BY:** GN

GROUNDWATER DEPTH (FT): N/A **NOTES:** ETR~70.6%, $N_{60} \sim \frac{70.6}{60}$*N~1.18*N **REVIEWED BY:** MS

DEPTH (FT)	BULK SAMPLE	CAL/SPT SAMPLE	BLOWS PER 6 IN N	N_{60}	MOISTURE (%)	DRY DENSITY (pcf)	SOIL CLASS. (USCS)	SOIL DESCRIPTION *SUMMARY OF SUBSURFACE CONDITIONS* *(USCS; COLOR, MOISTURE, DENSITY, GRAIN SIZE, OTHER)*	LAB TESTS
0								*3 IN ASPHALT CONCRETE OVER 6 IN AGGREGATE BASE*	
		☒	4 5 5	11			SM	**FILL (af):** *SILTY SAND WITH GRAVEL; BROWN, MOIST, MEDIUM DENSE, FINE TO MEDIUM GRAINED, ABOUT 15% GRAVEL* *NO SAMPLE, LOST DURING WATER MAIN ENCOUNTER*	
5								*BORING TERMINATED AT 4½ FT DUE TO UNMARKED 8 IN WATER MAIN.*	
10									
15									
20									
25									
30									

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DRAFTED BY: GN	PROJECT: 2021010	FIGURE: B.17

LOG OF PERCOLATION BORING P-9

DATE DRILLED: 12/01/2023 **DRILLING EQUPMENT:** CME 95 **SAMPLE METHOD:** HAMMER: 140 LBS., DROP: 30 IN (AUTO)

ELEVATION (FT): ± 50 **DRILLING METHOD:** HOLLOW STEM AUGER **LOGGED BY:** GN

GROUNDWATER DEPTH (FT): N/A **NOTES:** ETR~70.6%, $N_{60} \sim \frac{70.6}{60}$*N~1.18*N **REVIEWED BY:** MS

DEPTH (FT)	BULK SAMPLE	CAL/SPT SAMPLE	BLOWS PER 6 IN N	N_{60}	MOISTURE (%)	DRY DENSITY (pcf)	SOIL CLASS. (USCS)	SOIL DESCRIPTION *SUMMARY OF SUBSURFACE CONDITIONS* *(USCS; COLOR, MOISTURE, DENSITY, GRAIN SIZE, OTHER)*	LAB TESTS
0								*2 IN ASPHALT CONCRETE OVER 21 IN AGGREGATE BASE*	
	X						SM/SC	**OLD PARALIC DEPOSITS (Qop$_{6-7}$):** *SILTY SAND/CLAYEY SAND; REDDISH BROWN, MOIST, MEDIUM DENSE, FINE TO MEDIUM GRAINED, MICACEOUS*	
5		/	7 8 10	21					
		/	7 13 10	27			SM	*SILTY SAND; ORANGE BROWN, MOIST, MEDIUM DENSE, FINE TO MEDIUM GRAINED, MICACEOUS*	
10		/	6 10 10	24				*OLIVE BROWN, ABUNDANT BLACK SAND GRAINS*	
	X							*BORING TERMINATED AT 12 FT AND CONVERTED TO A BOREHOLE PERCOLATION TEST. NO GROUNDWATER ENCOUNTERED.*	
15									
20									
25									
30									

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LOG OF PERCOLATION BORING P-10

DATE DRILLED: 12/01/2023 **DRILLING EQUPMENT:** CME 95 **SAMPLE METHOD:** HAMMER: 140 LBS., DROP: 30 IN (AUTO)

ELEVATION (FT): ± 50 **DRILLING METHOD:** HOLLOW STEM AUGER **LOGGED BY:** GN

GROUNDWATER DEPTH (FT): N/A **NOTES:** ETR~70.6%, $N_{60} \sim \frac{70.6}{60}$*N~1.18*N **REVIEWED BY:** MS

DEPTH (FT)	BULK SAMPLE	CAL/SPT SAMPLE	BLOWS PER 6 IN N	N_{60}	MOISTURE (%)	DRY DENSITY (pcf)	SOIL CLASS. (USCS)	SOIL DESCRIPTION *SUMMARY OF SUBSURFACE CONDITIONS* *(USCS; COLOR, MOISTURE, DENSITY, GRAIN SIZE, OTHER)*	LAB TESTS
0								*3 IN ASPHALT CONCRETE OVER 21 IN AGGREGATE BASE*	
	X						SM/SC	**OLD PARALIC DEPOSITS (Qop$_{6-7}$):** *SILTY SAND/CLAYEY SAND; REDDISH BROWN, MOIST, MEDIUM DENSE, FINE TO MEDIUM GRAINED, MICACEOUS*	
5							SC	*CLAYEY SAND; REDDISH BROWN, MOIST, MEDIUM DENSE, FINE TO MEDIUM GRAINED, MICACEOUS* *ORANGE BROWN*	
	X						SM	*SILTY SAND; ORANGE BROWN, MOIST, DENSE, FINE TO MEDIUM GRAINED, MICACEOUS*	
10	X	/	10 17 18	41				*OLIVE BROWN, ABUNDANT BLACK SAND GRAINS*	
								BORING TERMINATED AT 12 FT AND CONVERTED TO A BOREHOLE PERCOLATION TEST. NO GROUNDWATER ENCOUNTERED.	
15									
20									
25									
30									

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APPENDIX C
LABORATORY TESTING

Laboratory tests were performed in accordance with the generally accepted American Society for Testing and Materials (ASTM) test methods or suggested procedures. Brief descriptions of the tests performed are presented below:

- **CLASSIFICATION:** *Field classifications were verified in the laboratory by visual examination. The final soil classifications are in accordance with the Unified Soils Classification System and are presented on the exploration logs in Appendix B.*

- **GRADATION ANALYSIS (ASTM D6913):** *The grain size distribution of selected soil samples was determined in accordance with ASTM D6913. The results of the tests are summarized on Figures C.1 through C.21.*

- **DENSITY OF SOIL IN PLACE (ASTM D2937):** *In-place moisture contents and dry densities were determined for representative soil samples. This information was an aid to classification and permitted recognition of variations in material consistency with depth. The dry unit weight is determined in pounds per cubic foot, and the in-place moisture content is determined as a percentage of the soil's dry weight. The results are summarized in the exploration logs presented in Appendix B.*

- **MAXIMUM DENSITY AND OPTIMUM MOISTURE CONTENT (ASTM D1557 METHOD A,B,C):** *The maximum dry density and optimum moisture content of typical soils were determined in the laboratory in accordance with ASTM Standard Test D1557, Method A, Method B, Method C.*

- **DIRECT SHEAR (ASTM D3080):** *Direct shear tests were performed on remolded and relatively undisturbed samples in general accordance with ASTM D3080 to evaluate the shear strength characteristics of selected materials. The samples were inundated during shearing to represent adverse field conditions. The results of the tests are summarized on Figures C.22 through C.24.*

- **R-VALUE (ASTM D2844):** *The resistance Value, or R-Value, of near-surface site soils was evaluated in general accordance with California Test (CT) 301 and ASTM D2844. Samples were prepared and evaluated for exudation pressure and expansion pressure. The equilibrium R-value is reported as the lesser or more conservative of the two calculated results.*

- **CORROSIVITY (CAL. TEST METHOD 417, 422, 643):** *Soil PH, and minimum resistivity tests were performed on a representative soil sample in general accordance with test method CT 643. The sulfate and chloride content of the selected sample were evaluated in general accordance with CT 417 and CT 422, respectively.*

- **EXPANSION INDEX (ASTM D4829):** *The expansion index of selected materials was evaluated in general accordance with ASTM D4829. Specimens were molded under a specified compactive energy at approximately 50 percent saturation (plus or minus 1 percent). The prepared 1-inch thick by 4-inch diameter specimens were loaded with a surcharge of 144 pounds per square foot and were inundated with tap water. Readings of volumetric swell were made for a period of 24 hours.*

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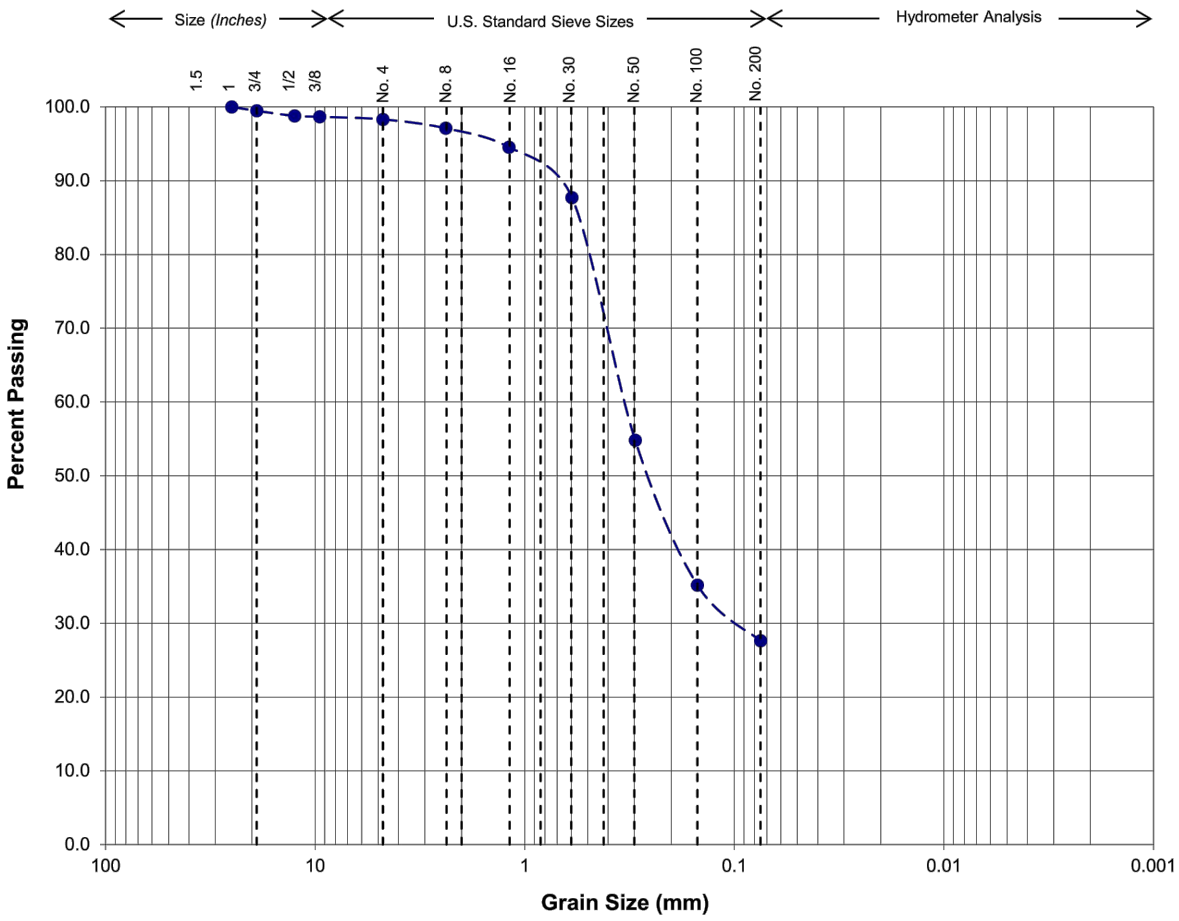
LAB TEST SUMMARY

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BY: GN	DATE: AUGUST 2021	PROJECT: 2021010	FIGURE: C.1



Gravel		Sand			Silt or Clay
Coarse	Fine	Coarse	Medium	Fine	

Sample Location: B - 1

Depth (ft): 0 - 5

USCS Soil Type: SM

Passing No. 200 (%): 28

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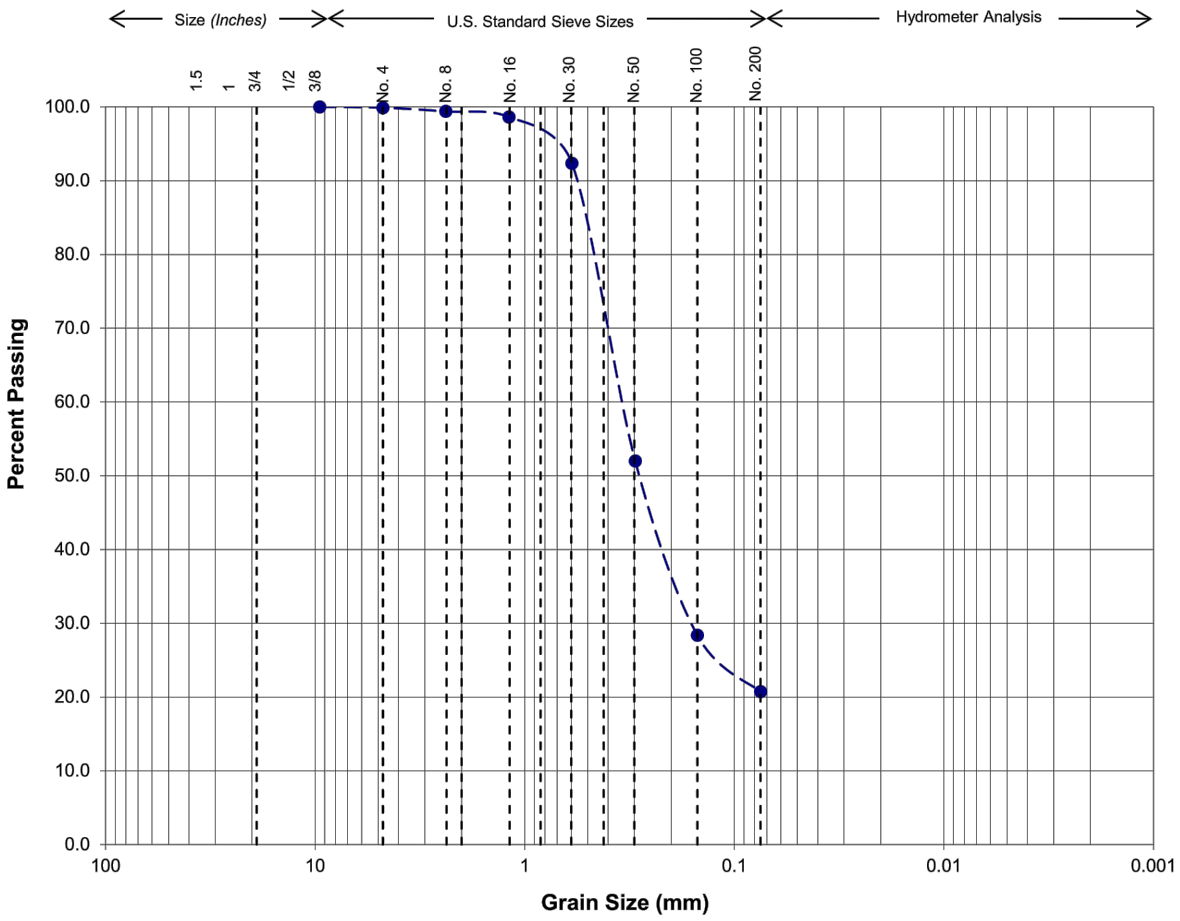
CLASSIFICATION TEST RESULTS

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BY: GN	DATE: AUGUST 2021	PROJECT: 2021010	FIGURE: C.2



Gravel		Sand			Silt or Clay
Coarse	Fine	Coarse	Medium	Fine	

Sample Location: B - 1

Depth (ft): 7 - 8

USCS Soil Type: SM

Passing No. 200 (%): 21

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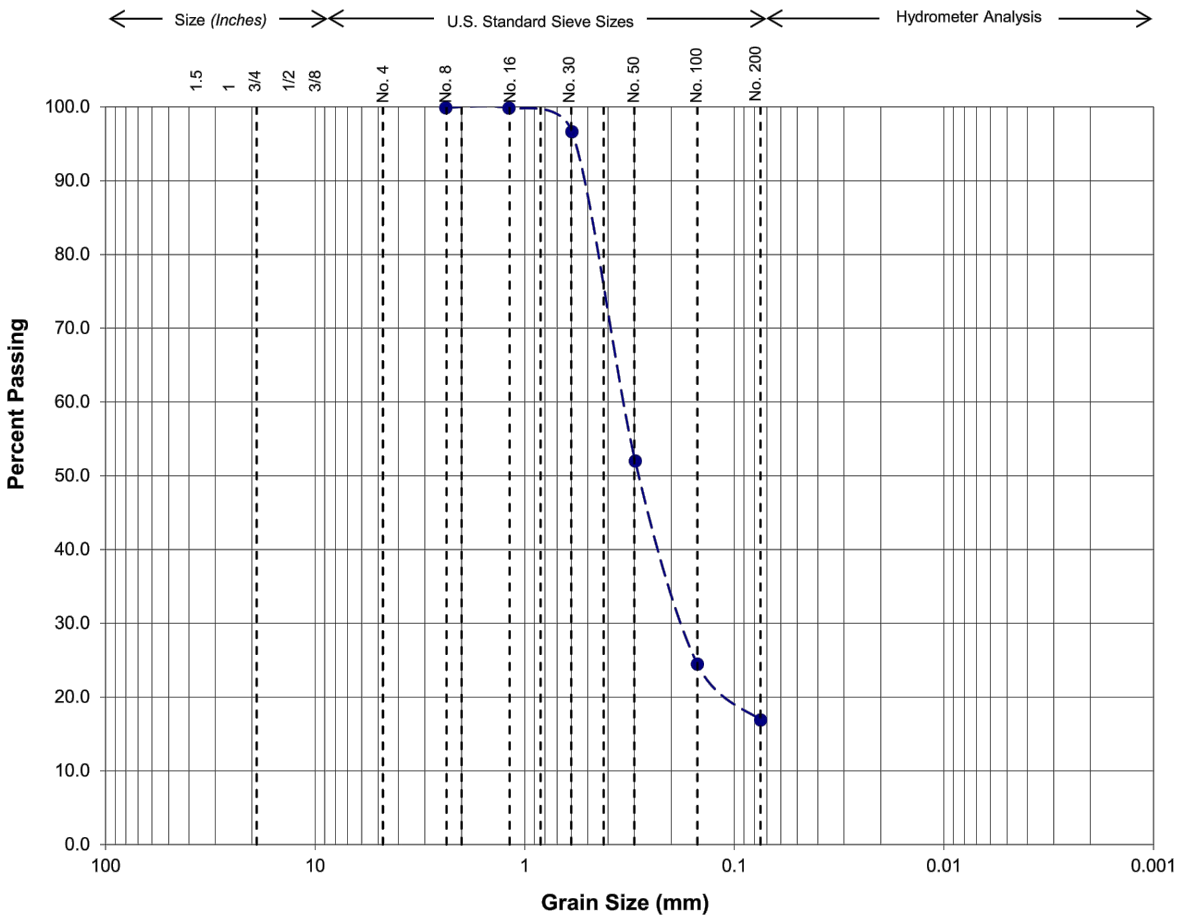
CLASSIFICATION TEST RESULTS

PROPOSED NCTD OCEANSIDE TRANSIT CENTER REDEVELOPMENT

OCEANSIDE TRANSIT CENTER

OCEANSIDE, CA 92054

BY: GN	DATE: AUGUST 2021	PROJECT: 2021010	FIGURE: C.3



Gravel		Sand			Silt or Clay
Coarse	Fine	Coarse	Medium	Fine	

Sample Location: B-2

Depth (ft): 2½ - 4

USCS Soil Type: SM

Passing No. 200 (%): 17

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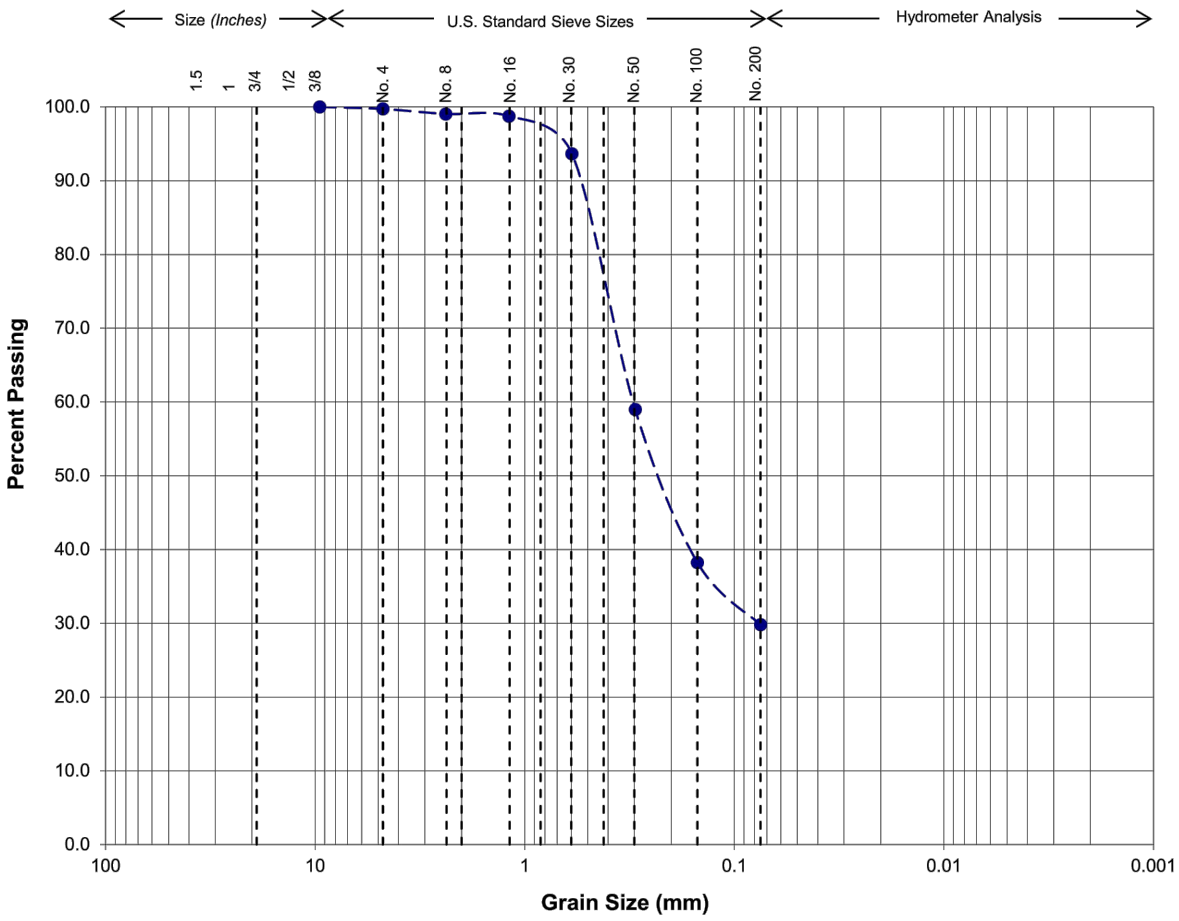
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PROPOSED NCTD OCEANSIDE TRANSIT CENTER REDEVELOPMENT

OCEANSIDE TRANSIT CENTER

OCEANSIDE, CA 92054

BY: GN	DATE: AUGUST 2021	PROJECT: 2021010	FIGURE: C.4



Gravel		Sand			Silt or Clay
Coarse	Fine	Coarse	Medium	Fine	

Sample Location: B-3

Depth (ft): 2½ - 4

USCS Soil Type: SM

Passing No. 200 (%): 30

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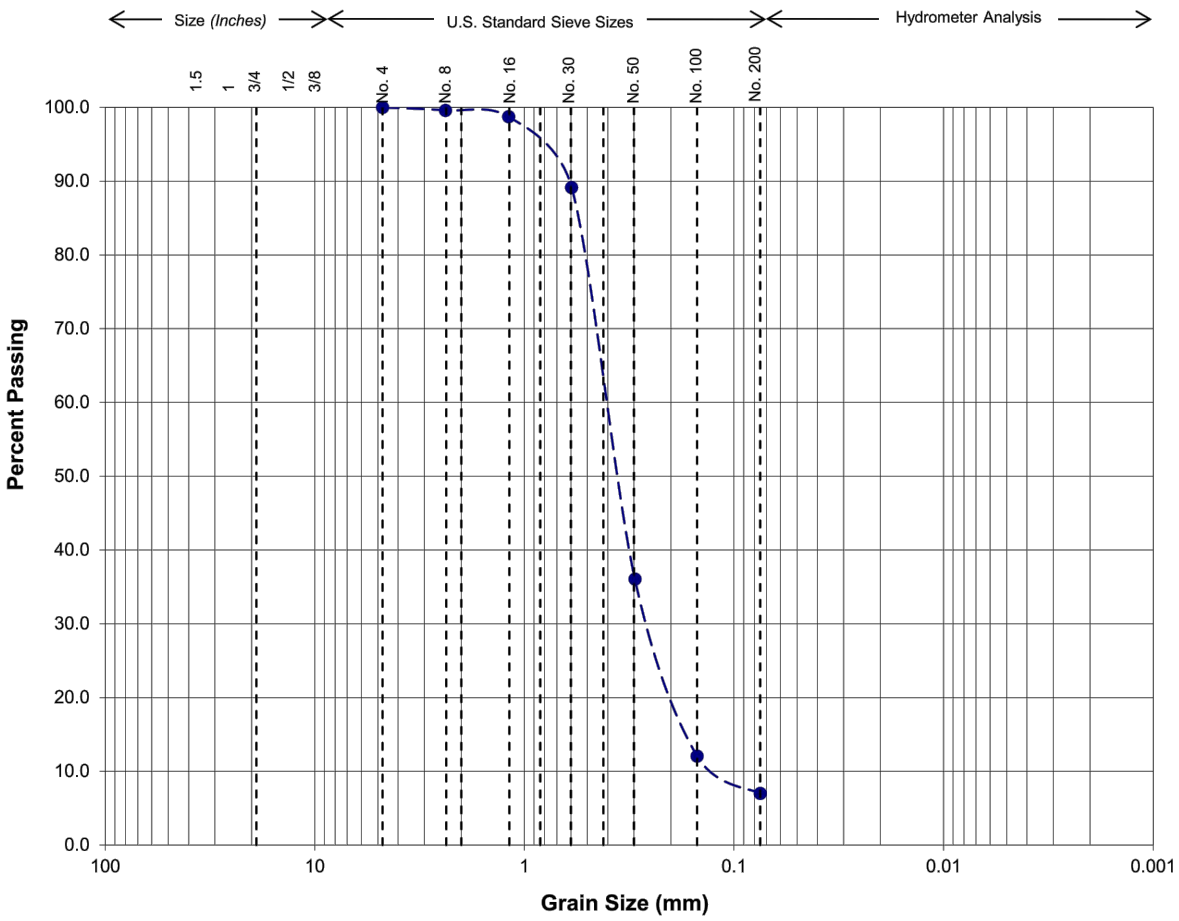
PROPOSED NCTD OCEANSIDE TRANSIT CENTER REDEVELOPMENT

OCEANSIDE TRANSIT CENTER

OCEANSIDE, CA 92054

4

BY: GN	DATE: AUGUST 2021	PROJECT: 2021010	FIGURE: C.5



Gravel		Sand			Silt or Clay
Coarse	Fine	Coarse	Medium	Fine	

Sample Location: B-3

Depth (ft): 12½ - 14

USCS Soil Type: SP-SM

Passing No. 200 (%): 7

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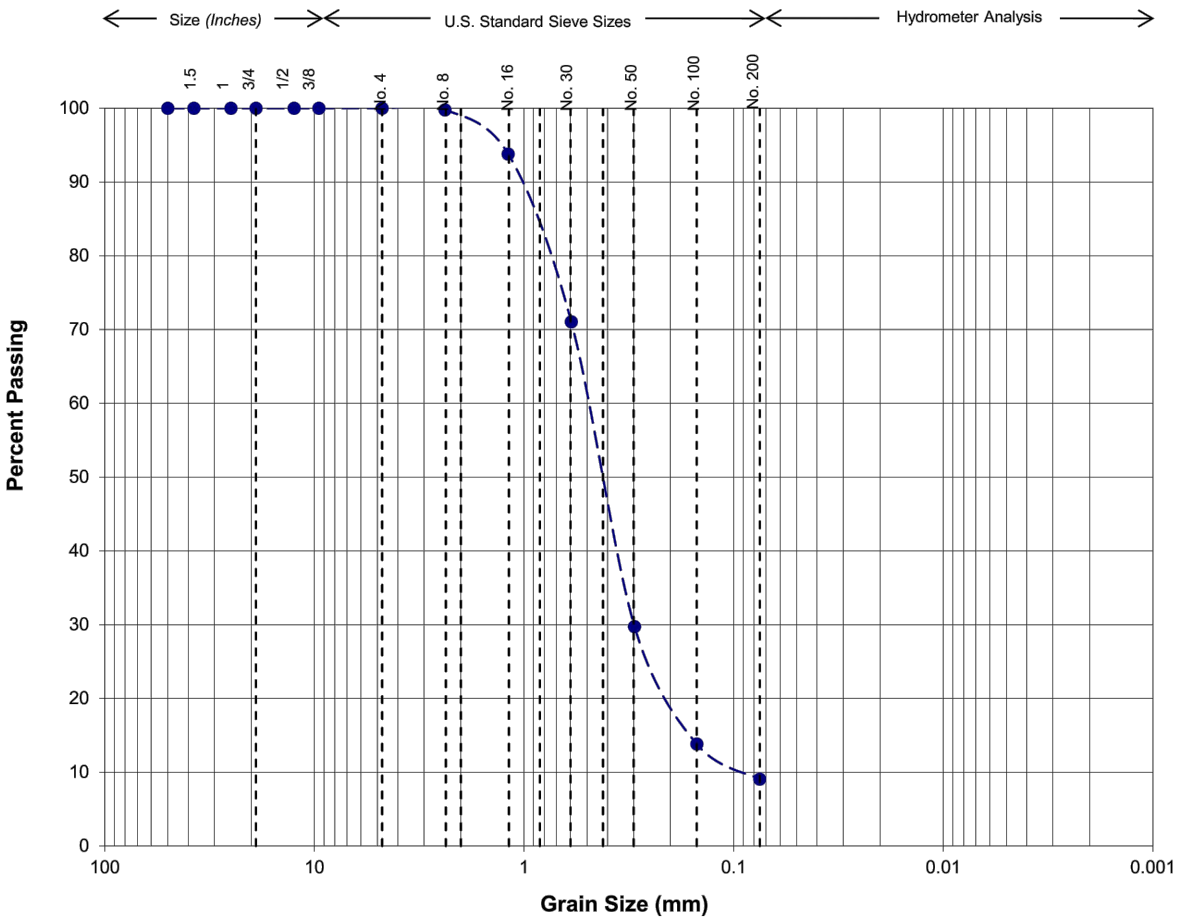
CLASSIFICATION TEST RESULTS

PROPOSED NCTD OCEANSIDE TRANSIT CENTER REDEVELOPMENT

OCEANSIDE TRANSIT CENTER

OCEANSIDE, CA 92054

BY: GN	DATE: AUGUST 2021	PROJECT: 2021010	FIGURE: C.6



Gravel		Sand			Silt or Clay
Coarse	Fine	Coarse	Medium	Fine	

Sample Location: B-3

Depth (ft): 15 - 16½

USCS Soil Type: SP-SM

Passing No. 200 (%): 9

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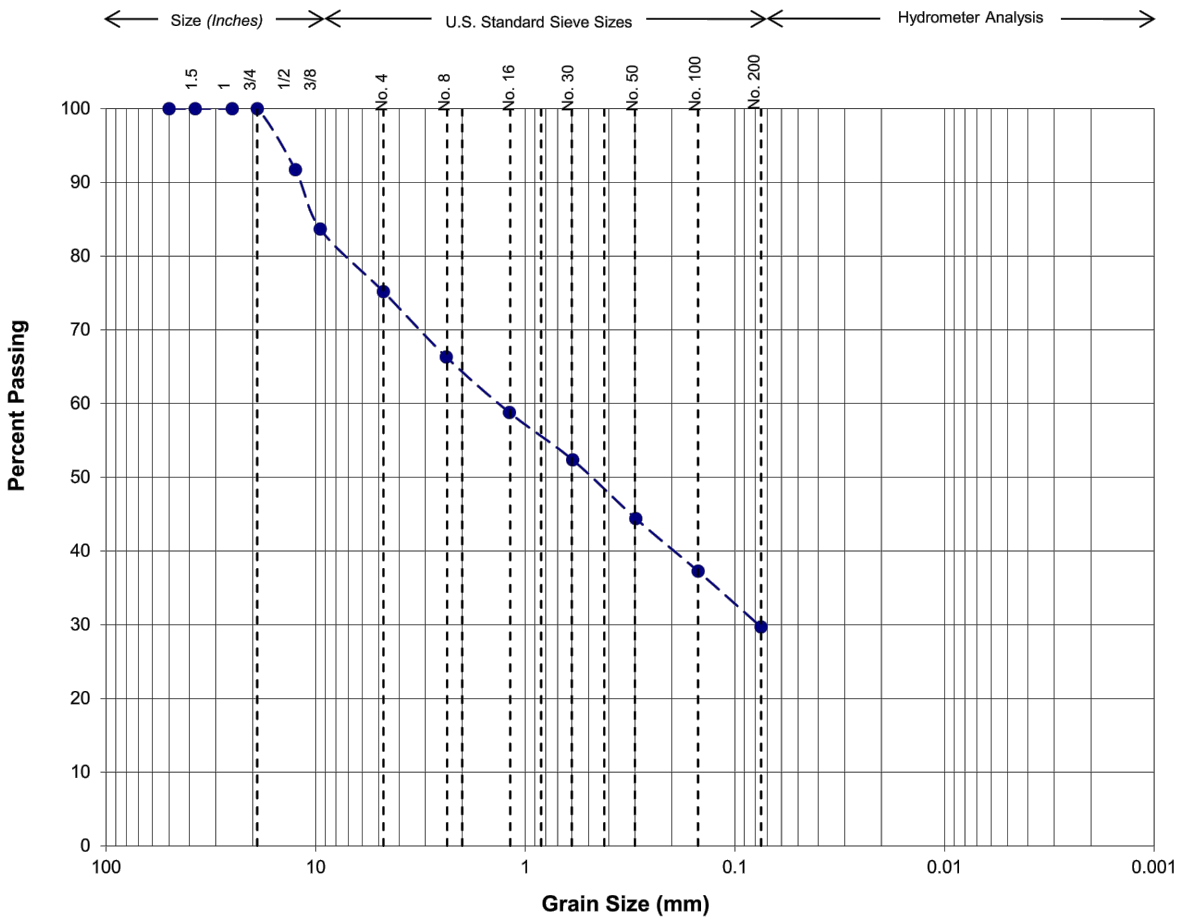
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PROPOSED NCTD OCEANSIDE TRANSIT CENTER REDEVELOPMENT

OCEANSIDE TRANSIT CENTER

OCEANSIDE, CA 92054

BY: GN	DATE: AUGUST 2021	PROJECT: 2021010	FIGURE: C.7



Gravel		Sand			Silt or Clay
Coarse	Fine	Coarse	Medium	Fine	

Sample Location: B-3

Depth (ft): 17½ - 18

USCS Soil Type: SC

Passing No. 200 (%): 30

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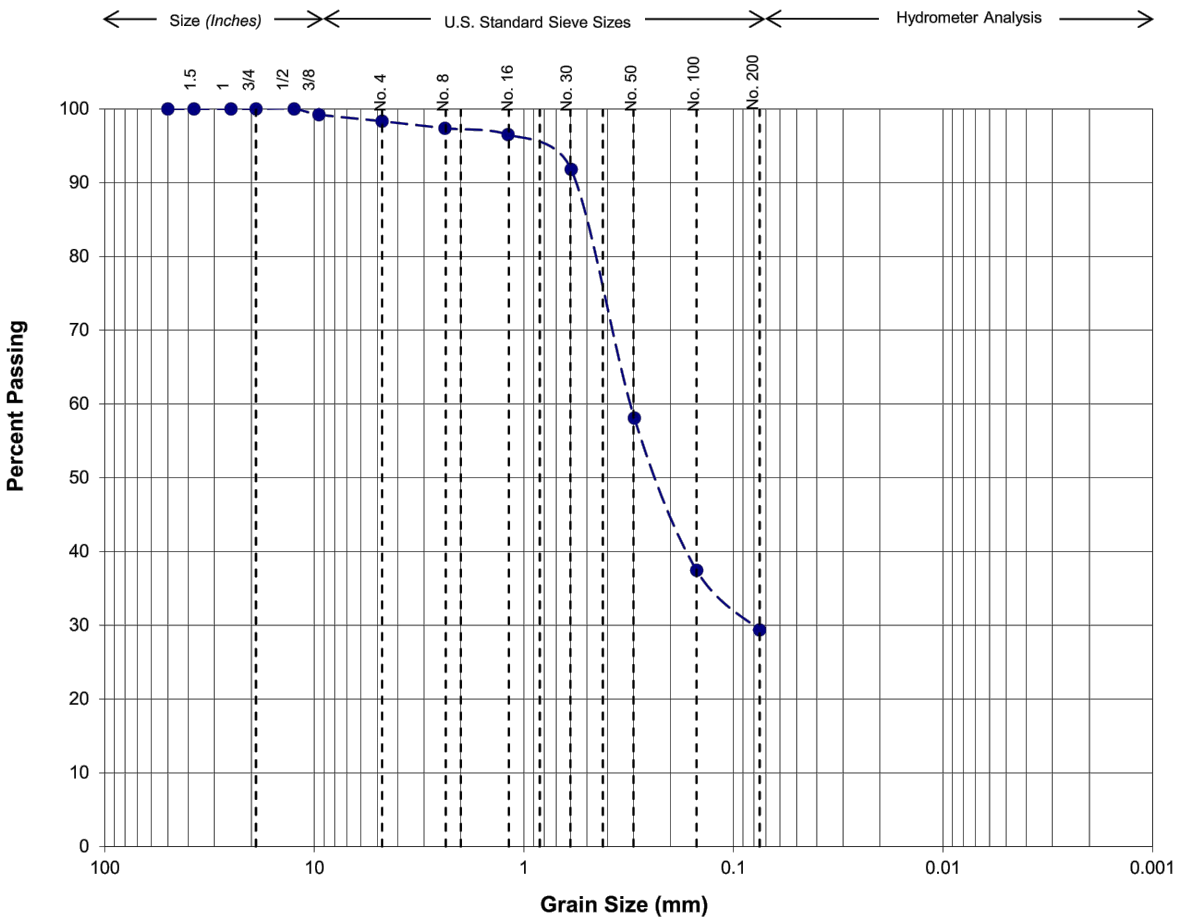
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PROPOSED NCTD OCEANSIDE TRANSIT CENTER REDEVELOPMENT

OCEANSIDE TRANSIT CENTER

OCEANSIDE, CA 92054

BY: GN	DATE: AUGUST 2021	PROJECT: 2021010	FIGURE: C.8



Gravel		Sand			Silt or Clay
Coarse	Fine	Coarse	Medium	Fine	

Sample Location: B-4

Depth (ft): 2 - 3½

USCS Soil Type: SM

Passing No. 200 (%): 29

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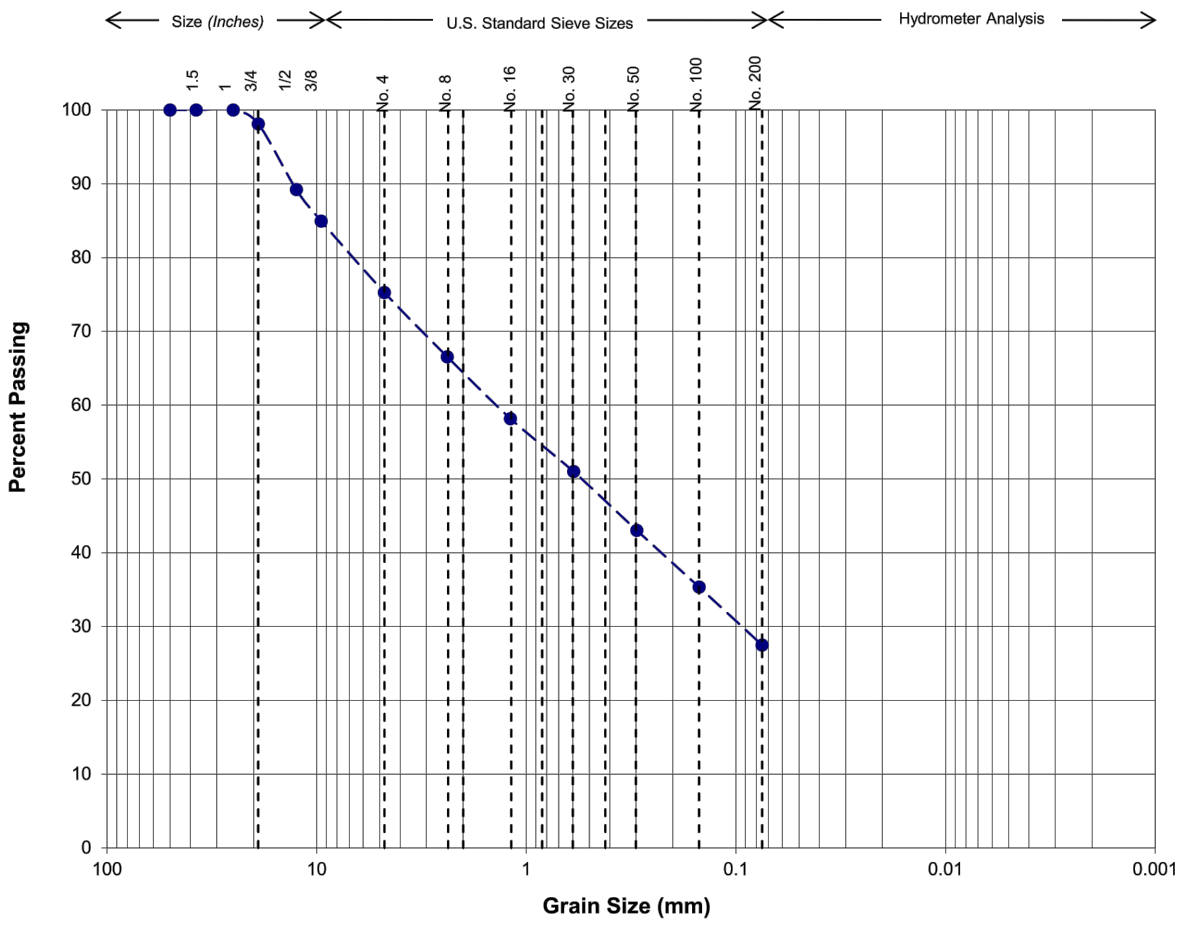
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PROPOSED NCTD OCEANSIDE TRANSIT CENTER REDEVELOPMENT

OCEANSIDE TRANSIT CENTER

OCEANSIDE, CA 92054

BY: GN	DATE: AUGUST 2021	PROJECT: 2021010	FIGURE: C.9



Gravel		Sand			Silt or Clay
Coarse	Fine	Coarse	Medium	Fine	

Sample Location: B-4

Depth (ft): 5 - 6½

USCS Soil Type: SM

Passing No. 200 (%): 27

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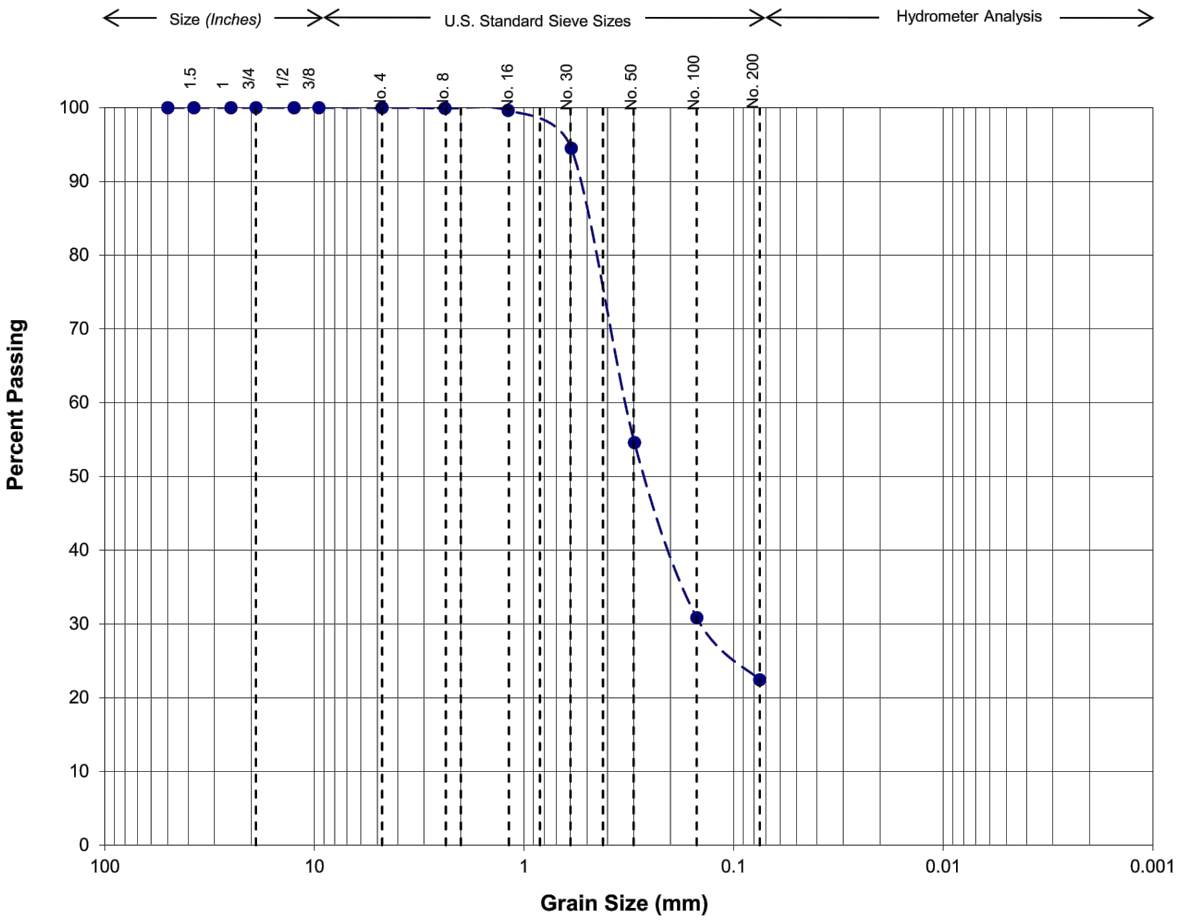
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PROPOSED NCTD OCEANSIDE TRANSIT CENTER REDEVELOPMENT

OCEANSIDE TRANSIT CENTER

OCEANSIDE, CA 92054

BY: GN	DATE: AUGUST 2021	PROJECT: 2021010	FIGURE: C.10



Gravel		Sand			Silt or Clay
Coarse	Fine	Coarse	Medium	Fine	

Sample Location: B-4

Depth (ft): 7½ - 9

USCS Soil Type: SM

Passing No. 200 (%): 22

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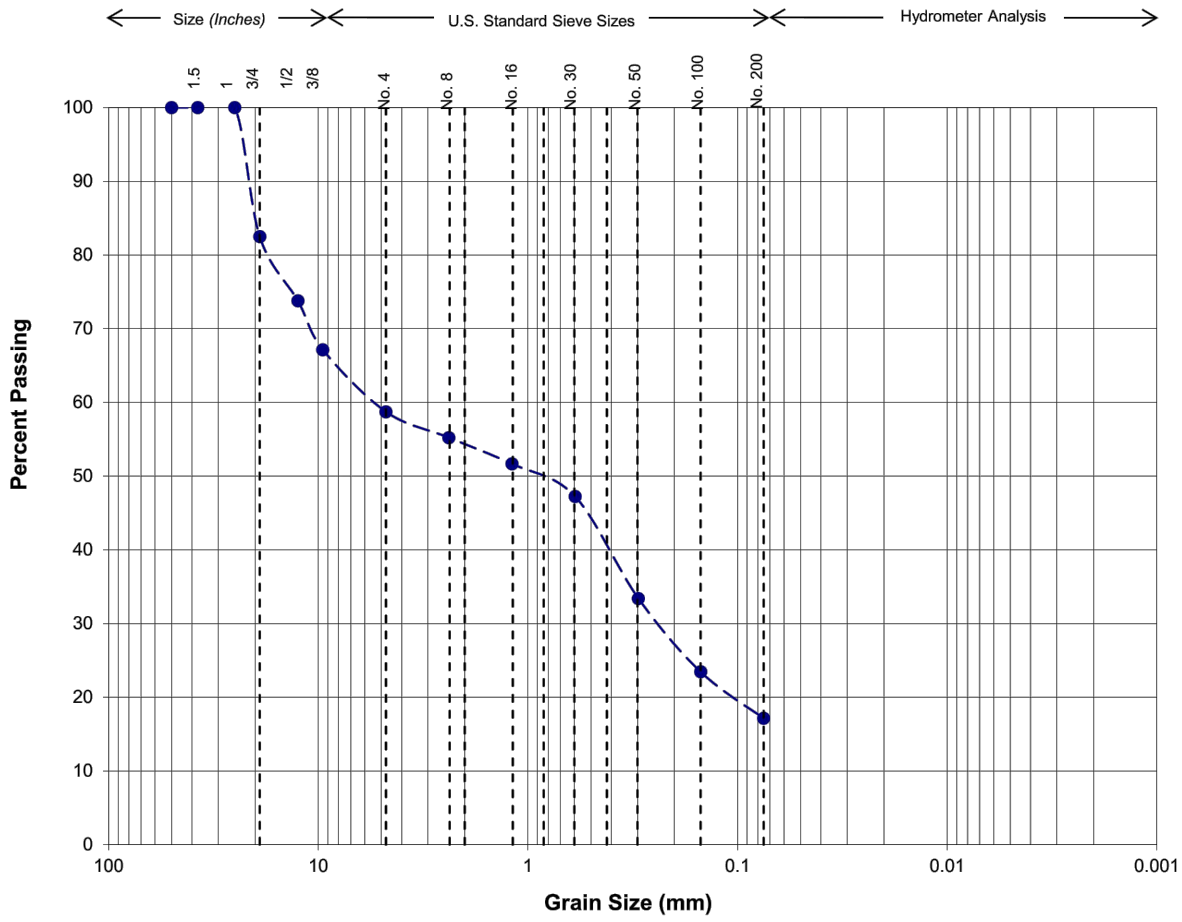
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OCEANSIDE TRANSIT CENTER

OCEANSIDE, CA 92054

BY: GN	DATE: AUGUST 2021	PROJECT: 2021010	FIGURE: C.11



Gravel		Sand			Silt or Clay
Coarse	Fine	Coarse	Medium	Fine	

Sample Location: B-4

Depth (ft): 12½ - 13½

USCS Soil Type: SM

Passing No. 200 (%): 17

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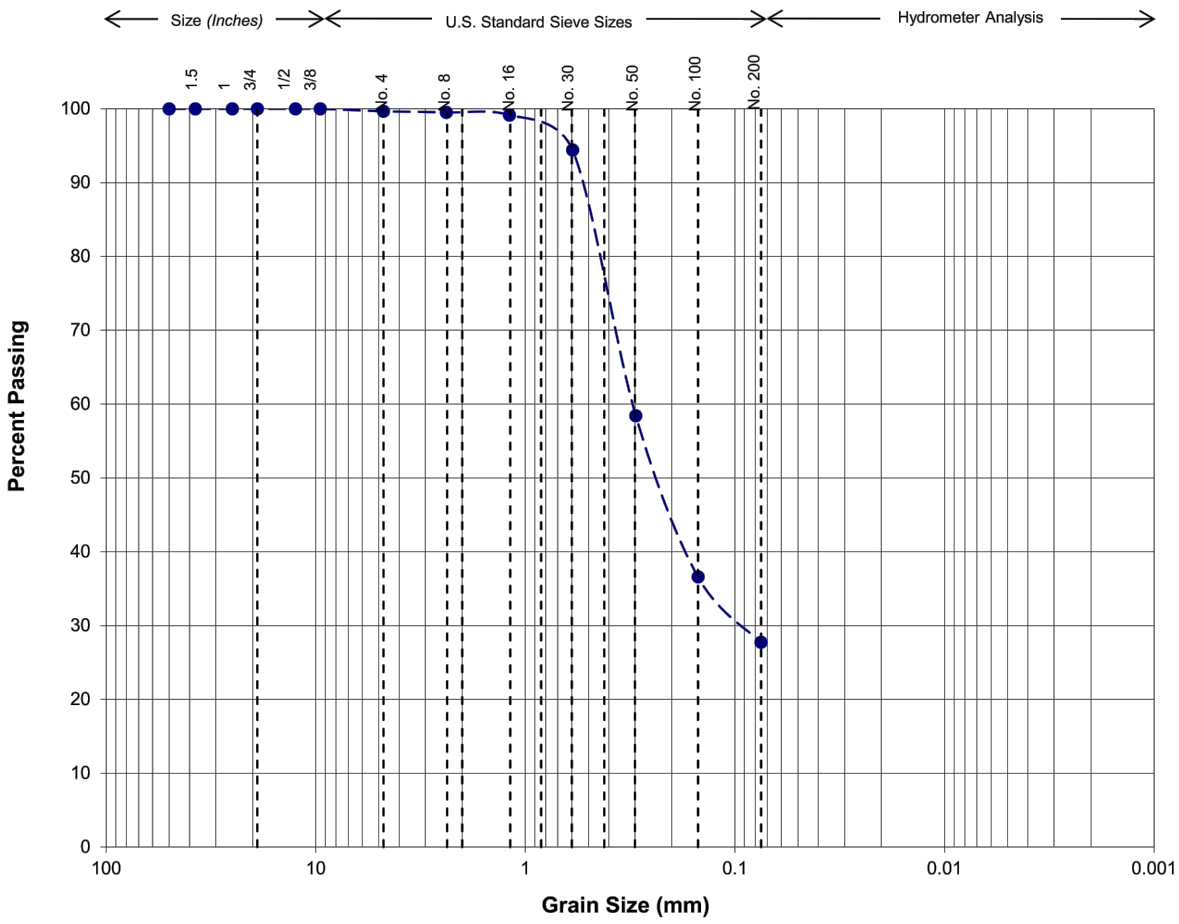
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OCEANSIDE TRANSIT CENTER

OCEANSIDE, CA 92054

BY: GN	DATE: AUGUST 2021	PROJECT: 2021010	FIGURE: C.12



Gravel		Sand			Silt or Clay
Coarse	Fine	Coarse	Medium	Fine	

Sample Location: B-4

Depth (ft): 16 - 17

USCS Soil Type: SC

Passing No. 200 (%): 28

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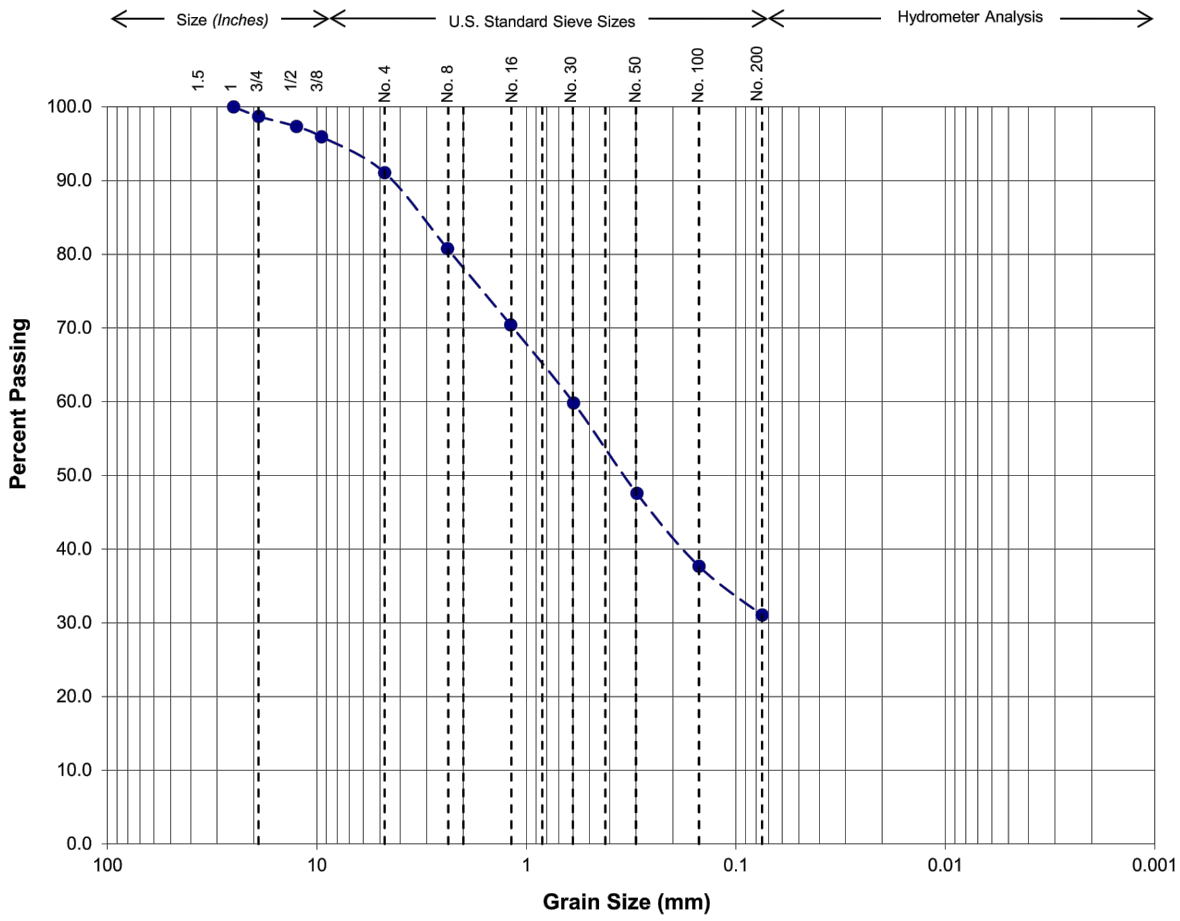
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PROPOSED NCTD OCEANSIDE TRANSIT CENTER REDEVELOPMENT

OCEANSIDE TRANSIT CENTER

OCEANSIDE, CA 92054

BY: GN	DATE: AUGUST 2021	PROJECT: 2021010	FIGURE: C.13



Gravel		Sand			Silt or Clay
Coarse	Fine	Coarse	Medium	Fine	

Sample Location: B-5

Depth (ft): 1 - 2½

USCS Soil Type: SM

Passing No. 200 (%): 31

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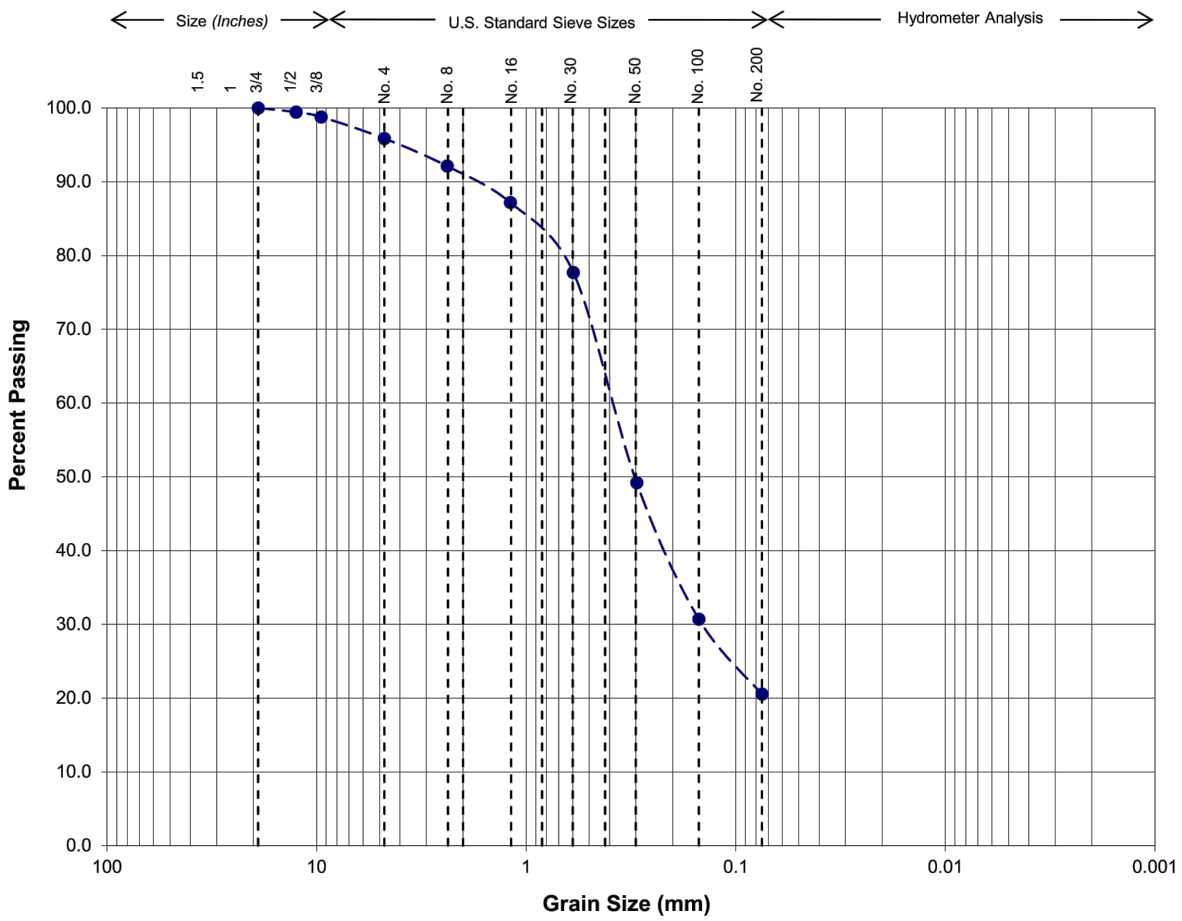
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PROPOSED NCTD OCEANSIDE TRANSIT CENTER REDEVELOPMENT

OCEANSIDE TRANSIT CENTER

OCEANSIDE, CA 92054

BY: GN	DATE: AUGUST 2021	PROJECT: 2021010	FIGURE: C.14



Gravel		Sand			Silt or Clay
Coarse	Fine	Coarse	Medium	Fine	

Sample Location: B-5

Depth (ft): 3½ - 6½

USCS Soil Type: SM

Passing No. 200 (%): 21

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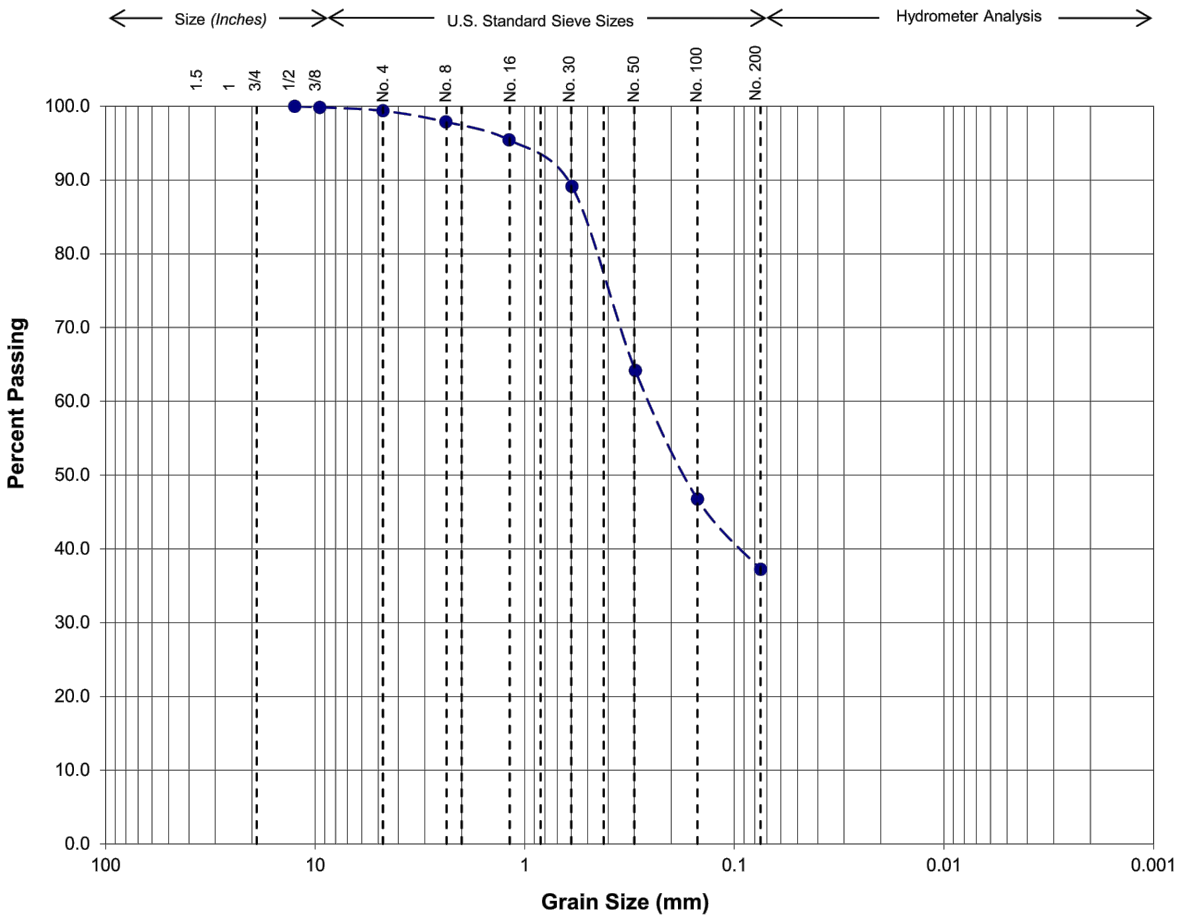
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OCEANSIDE TRANSIT CENTER

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BY: GN	DATE: AUGUST 2021	PROJECT: 2021010	FIGURE: C.15



Gravel		Sand			Silt or Clay
Coarse	Fine	Coarse	Medium	Fine	

Sample Location: B-5

Depth (ft): 6½ - 9

USCS Soil Type: SM

Passing No. 200 (%): 37

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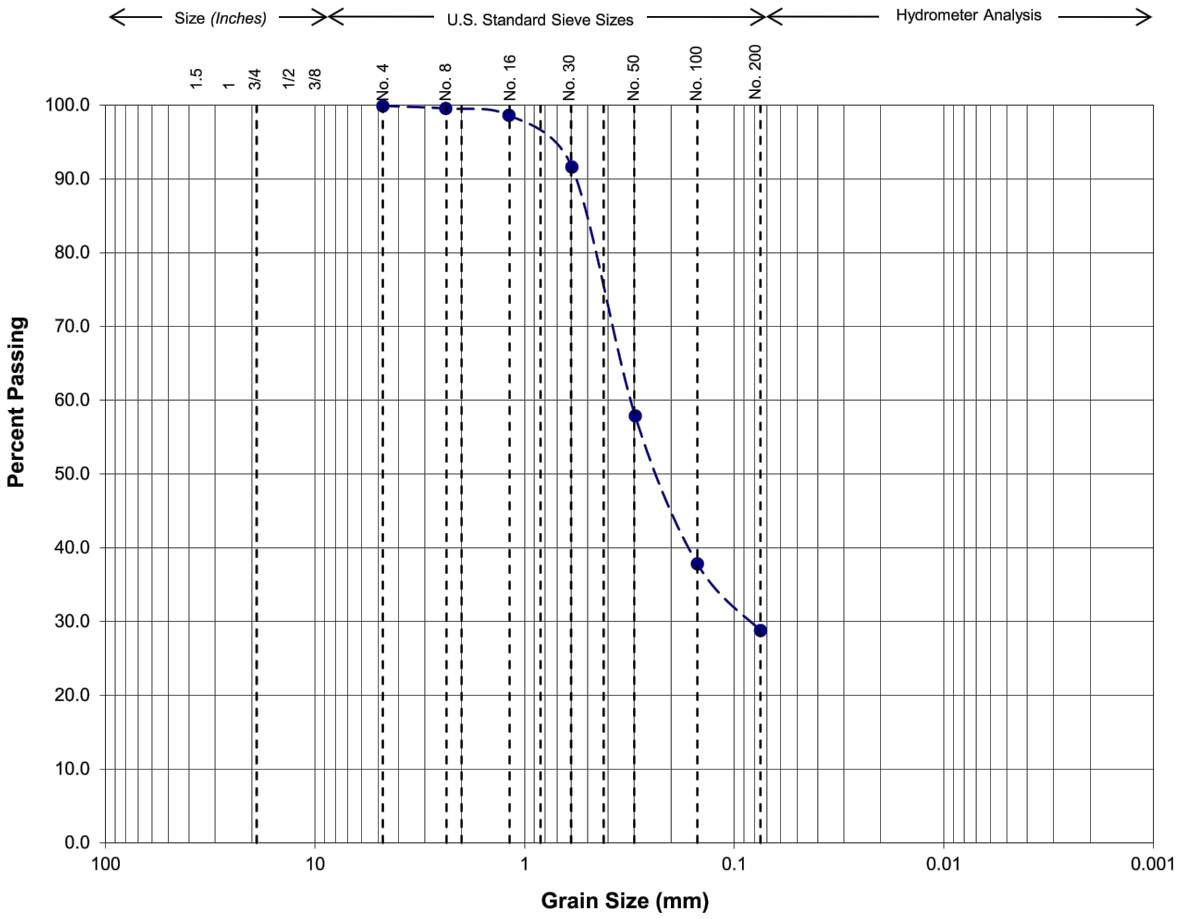
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OCEANSIDE TRANSIT CENTER

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BY: GN	DATE: AUGUST 2021	PROJECT: 2021010	FIGURE: C.16



Gravel		Sand			Silt or Clay
Coarse	Fine	Coarse	Medium	Fine	

Sample Location: B-5

Depth (ft): 9 - 12

USCS Soil Type: SM

Passing No. 200 (%): 29

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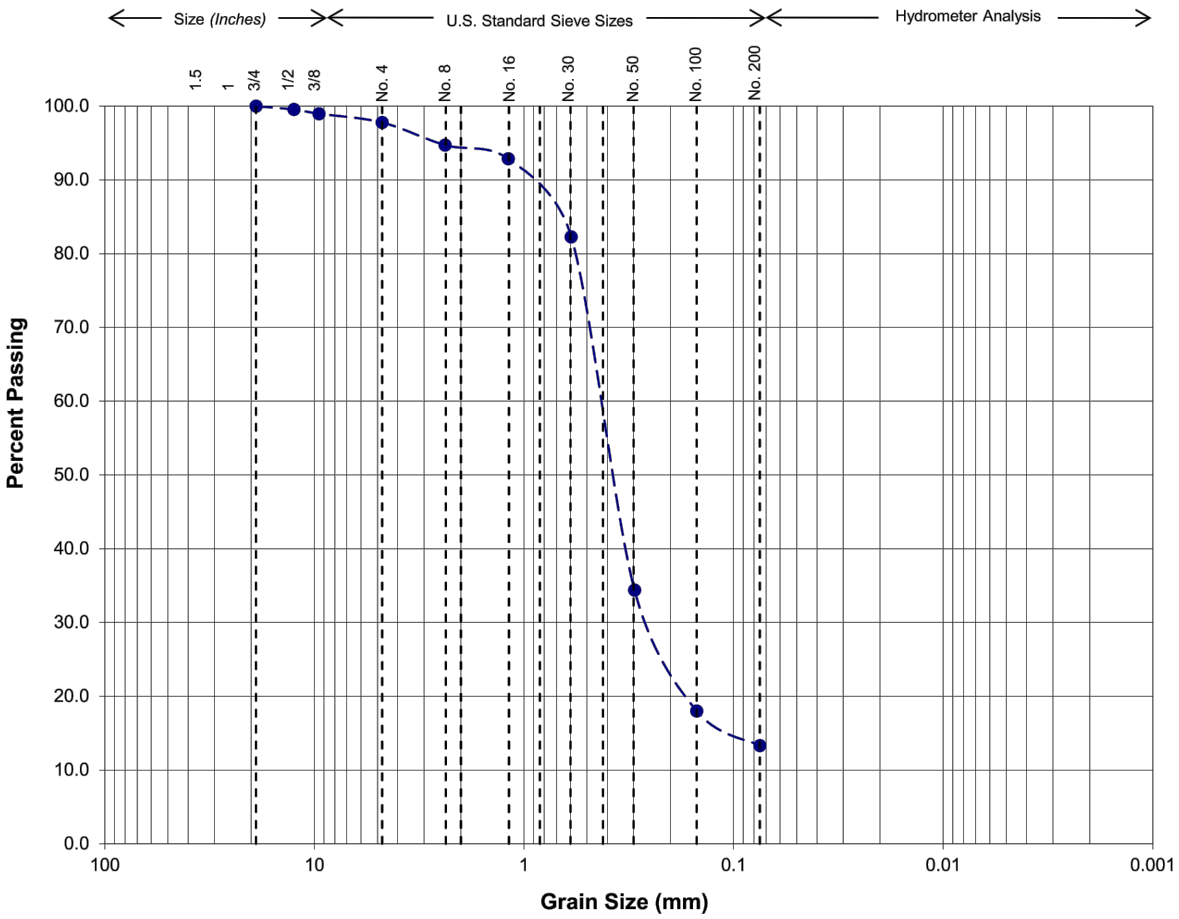
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OCEANSIDE TRANSIT CENTER

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BY: GN	DATE: AUGUST 2021	PROJECT: 2021010	FIGURE: C.17



Gravel		Sand			Silt or Clay
Coarse	Fine	Coarse	Medium	Fine	

Sample Location: B-5

Depth (ft): 12 - 15

USCS Soil Type: SM

Passing No. 200 (%): 13

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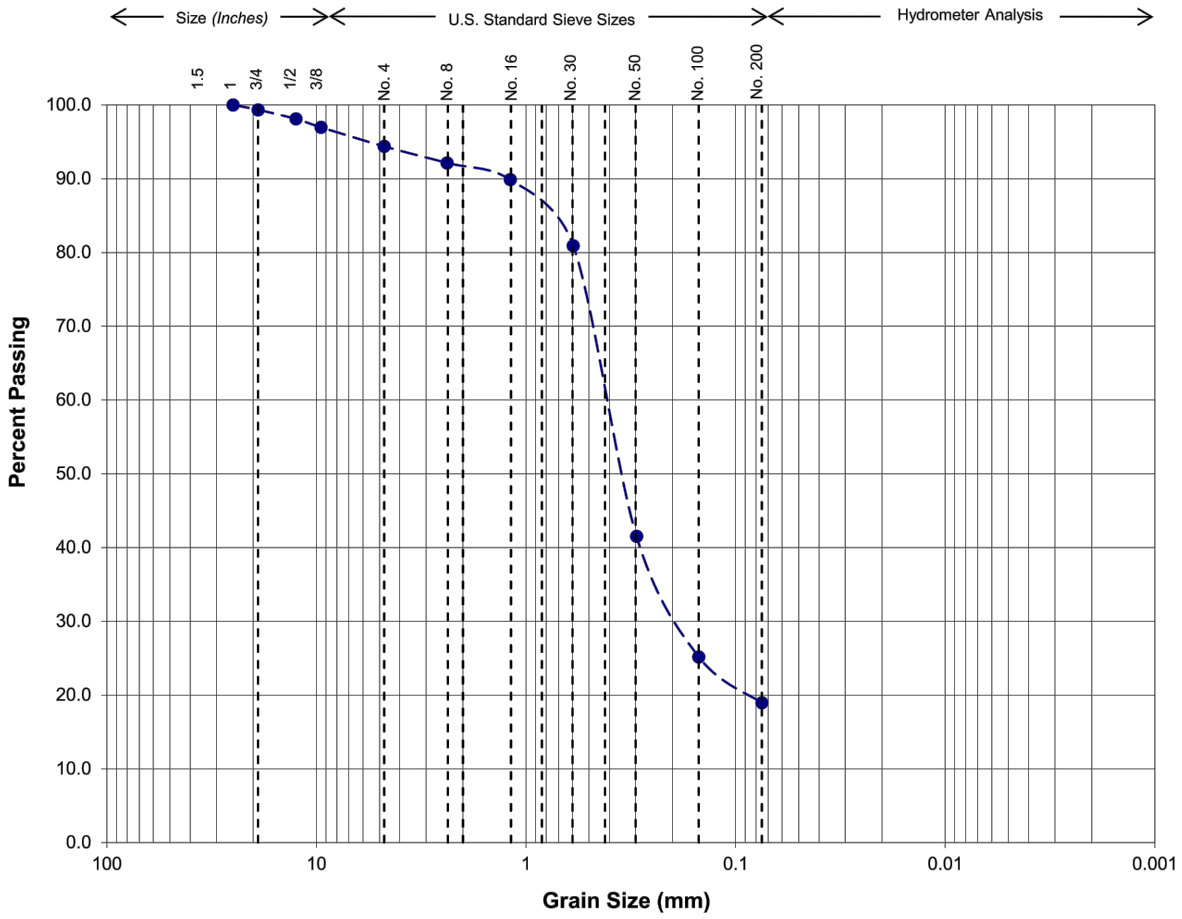
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PROPOSED NCTD OCEANSIDE TRANSIT CENTER REDEVELOPMENT

OCEANSIDE TRANSIT CENTER

OCEANSIDE, CA 92054

BY: GN	DATE: AUGUST 2021	PROJECT: 2021010	FIGURE: C.18



Gravel		Sand			Silt or Clay
Coarse	Fine	Coarse	Medium	Fine	

Sample Location: B-5

Depth (ft): 15½ - 17½

USCS Soil Type: SM

Passing No. 200 (%): 19

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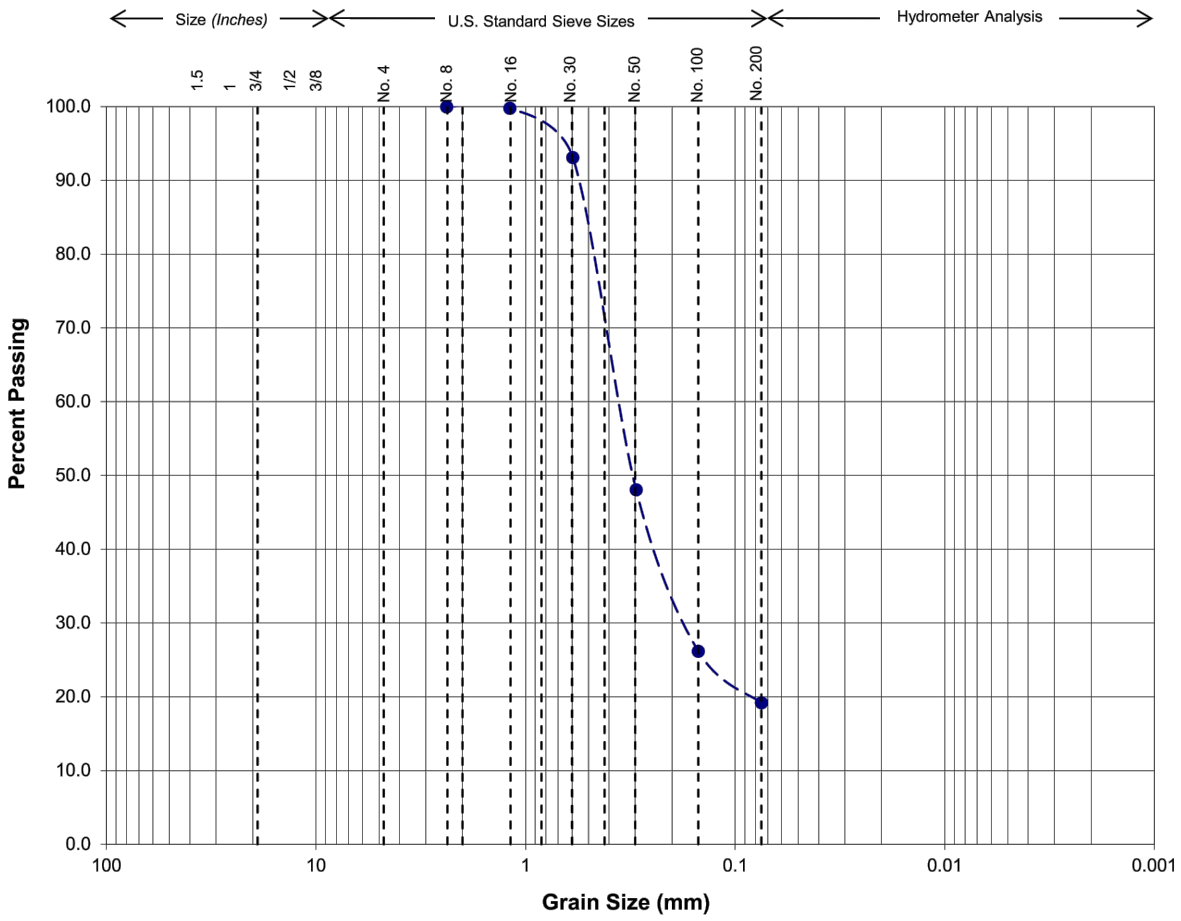
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OCEANSIDE TRANSIT CENTER

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BY: GN	DATE: AUGUST 2021	PROJECT: 2021010	FIGURE: C.19



Gravel		Sand			Silt or Clay
Coarse	Fine	Coarse	Medium	Fine	

Sample Location: B-6

Depth (ft): 7½ - 9

USCS Soil Type: SM

Passing No. 200 (%): 19

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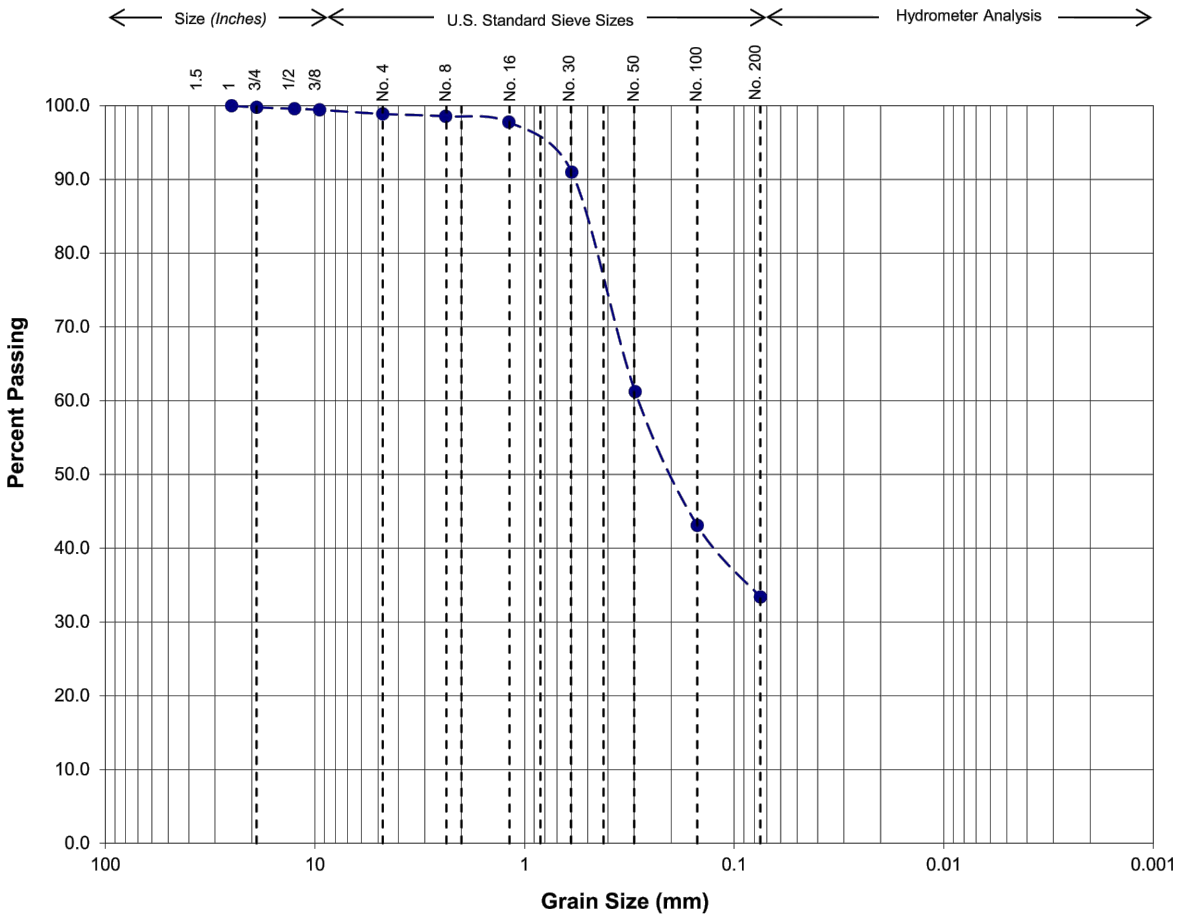
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OCEANSIDE TRANSIT CENTER

OCEANSIDE, CA 92054

BY: GN	DATE: AUGUST 2021	PROJECT: 2021010	FIGURE: C.20



Gravel		Sand			Silt or Clay
Coarse	Fine	Coarse	Medium	Fine	

Sample Location: P-2

Depth (ft): 7 - 10

USCS Soil Type: SM

Passing No. 200 (%): 33

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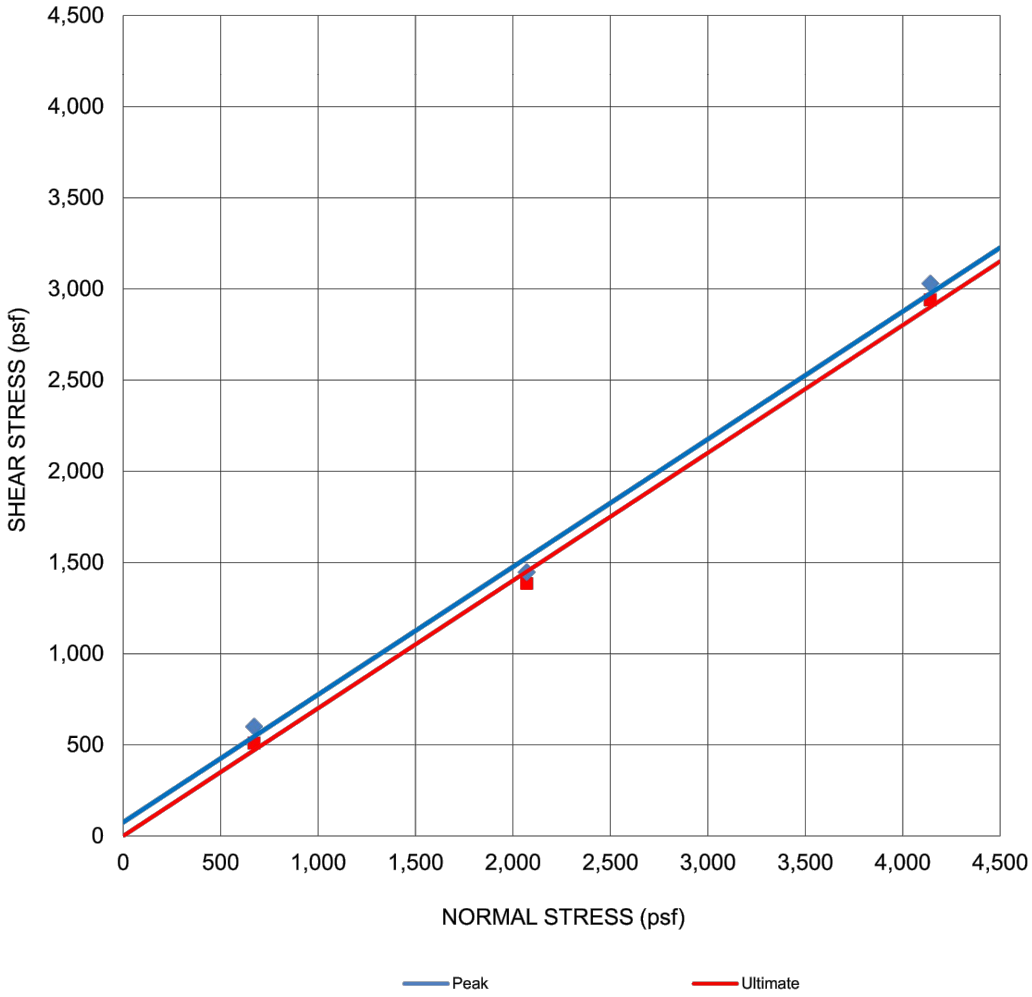
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OCEANSIDE TRANSIT CENTER

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BY: GN	DATE: AUGUST 2021	PROJECT: 2021010	FIGURE: C.21



Friction Angle (Φ):	35 °	35 °
Apparent Cohesion (C):	75 psf	0 psf

Soil Unit:	Quaternary Old Paralic Deposits (Qop)
Sample Location:	B-3
Depth (ft):	7½ - 9
Notes:	In-Situ
USCS Soil Type:	SM

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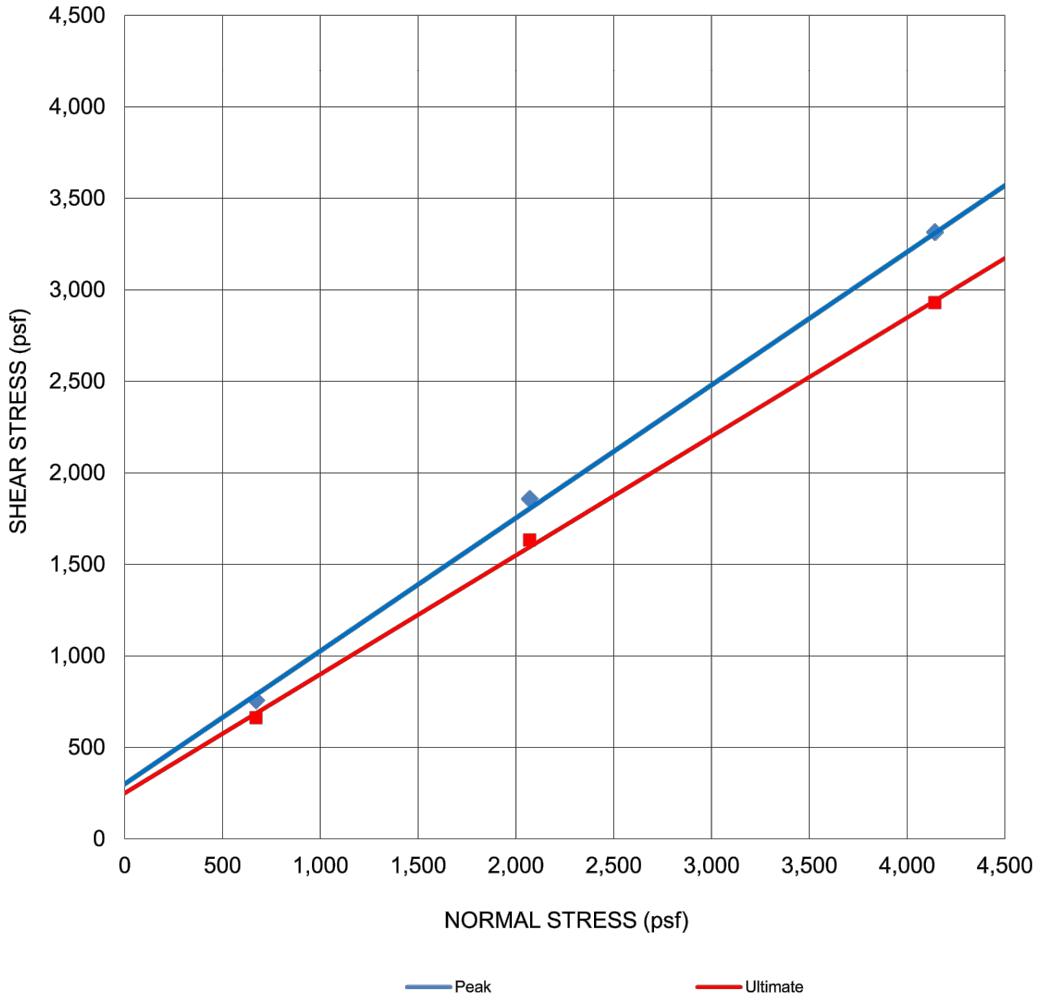
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OCEANSIDE TRANSIT CENTER

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BY: GN	DATE: AUGUST 2021	PROJECT: 2021010	FIGURE: C.22



Friction Angle (Φ):	36 °	33 °
Apparent Cohesion (C):	300 psf	250 psf

Soil Unit:	Quaternary Old Paralic Deposits (Qop)
Sample Location:	B-4
Depth (ft):	10 - 11½
Notes:	In-Situ
USCS Soil Type:	SM

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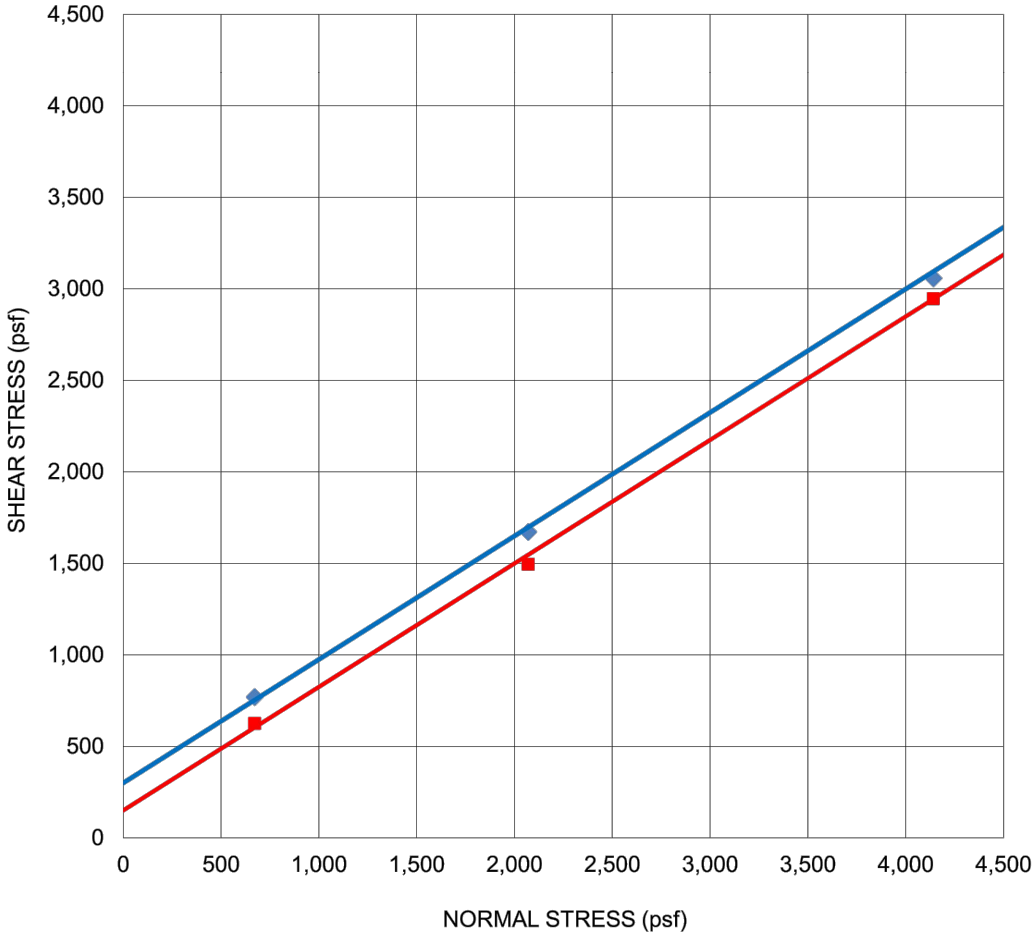
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OCEANSIDE TRANSIT CENTER

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BY: GN	DATE: AUGUST 2021	PROJECT: 2021010	FIGURE: C.23



Friction Angle (Φ):	34 °	34 °
Apparent Cohesion (C):	300 psf	150 psf

Soil Unit:	Quaternary Old Paralic Deposits (Qop)
Sample Location:	B-5
Depth (ft):	10 - 11½
Notes:	In-Situ
USCS Soil Type:	SM

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DIRECT SHEAR TEST RESULTS

PROPOSED NCTD OCEANSIDE TRANSIT CENTER REDEVELOPMENT

OCEANSIDE TRANSIT CENTER

OCEANSIDE, CA 92054

BY: GN	DATE: AUGUST 2021	PROJECT: 2021010	FIGURE: C.24

Density of Soil in Place (ASTM D2937)

Sample Location	Sample Depth (ft)	Soil Description	Moisture (%)	Dry Density (pcf)
B-1	2½ - 4	Dark Brown Silty Sand with Some Clay	8.1	129.2
B-1	8 - 8½	Olive Brown Silty Sand	5.4	114.5
B-6	5 - 6½	Reddish Brown Silty Sand with Clay	5.1	130.0

Maximum Dry Density and Optimum Moisture Content (ASTM D1557)

Sample Location	Sample Depth (ft.)	Soil Description	Maximum Dry Density (pcf)	Optimum Moisture Content (%)
B-5	12 - 15	Yellow/Orange Brown Silty Sand	119.0	8.0
B-5	15 - 17½	Pale Olive Brown Silty Sandstone	129.4	8.0
B-6	½ - 5	Dark Reddish Brown Silty Sand	132.0	8.5
B-6	14 - 17½	Gray Brown with Orange and Dark Gray Clayey Sandstone	146.0	6.7

Resistance Value (Cal. Test Method 301 & ASTM D2844)

Sample Location	Sample Depth (ft.)	Soil Description	R-Value
B-3	1 - 5	Dark Reddish Brown Silty Sand	24

Corrosivity (Cal. Test Method 417,422,643)

Sample Location	Sample Depth (ft.)	pH	Resistivity (Ohm-cm)	Sulfate Content (ppm)	Sulfate Content (%)	Chloride Content (ppm)	Chloride Content (%)
B - 3	16½ - 18	8.7	6700	<30	0.003	53	0.005
B - 5	15½ - 17½	8.7	5700	<30	0.003	64	0.006
B - 6	½ - 5	9.1	2400	90	0.009	53	0.005
B - 6	14 - 17½	9.1	3500	<30	0.003	32	0.003

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LAB TEST RESULTS

PROPOSED NCTD OCEANSIDE TRANSIT CENTER REDEVELOPMENT
OCEANSIDE TRANSIT CENTER
OCEANSIDE, CA 92054

BY: GN	DATE: AUGUST 2021	PROJECT: 2021010	FIGURE: C.25

Expansion Index (ASTM D4829)

Sample Location	Sample Depth (ft.)	Expansion Index	Expansion Potential
B - 3	16½ - 18	1	Very Low
B - 5	15½ - 17½	1	Very Low
B - 6	½ - 5	1	Very Low
B - 6	14 - 17½	3	Very Low

EXPANSION INDEX	EXPANSION POTENTIAL
0 - 20	VERY LOW
21 - 50	LOW
51 - 90	MEDIUM
91 - 130	HIGH
131 AND ABOVE	VERY HIGH

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LAB TEST RESULTS

PROPOSED NCTD OCEANSIDE TRANSIT CENTER REDEVELOPMENT
OCEANSIDE TRANSIT CENTER
OCEANSIDE, CA 92054

BY: GN	DATE: AUGUST 2021	PROJECT: 2021010	FIGURE: C.26

APPENDIX D
INFILTRATION TEST RESULTS

REPORT OF BOREHOLE PERCOLATION TESTING
Storm Water Infiltration

Project Name:	Oceanside Transit Center Redevelopment	Test Number:	**P-1**
Job Number:	2021010	Tested By:	AR
Date Drilled:	4/8/2024	Date Tested:	4/9/2024
Drilling Method:	8-Inch Hollow Stem Auger	Presoak Time:	24 hours
Drilled Depth (feet):	10.00		
Test Hole Diameter (inches):	8.0		
Gravel Pack:	Y		
Pipe Diameter (inches):	3.0		

Trial No.	Time	Time Interval, ΔT (min)	Initial Water Height, H_o (ft)	Final Water Height, H_f (ft)	Change in Water Height, ΔH (in)	Percolation Rate (min/in)
1	10:27 10:37	0:10	2.51	1.79	8.64	1.16
2	10:37 10:47	0:10	2.40	1.90	6.00	1.67
3	10:47 10:47	0:10	2.35	1.80	6.60	1.52
4	10:57 10:57	0:10	2.09	1.61	5.76	1.74
5	11:07 11:07	0:10	2.25	1.70	6.60	1.52
6	11:17 11:27	0:10	2.10	1.70	4.80	2.08
7						
8						
9						
10						
11						
12						

Observed Percolation Rate:	2.08	min/in
	28.8	in/hr
Tested Infiltation Rate Using Porchet Method, I_t:	**2.32**	**in/hr**
Infiltation Rate with Factor of Safety FS=2:	**1.16**	**in/hr**

PORCHET METHOD CALCULATION:

$$I_t = \frac{\Delta H(60r)}{\Delta T(r + 2H_{avg})}$$

	Values from Last Trial	
ΔH = Change in water head height over the time interval:	4.80	in
r = Test hole radius:	4.00	in
ΔT = Time interval:	10	min
H_{avg}= Average water height over time interval=12(H_o + H_f)/2:	22.8	in

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By:	JK	Date:	January 2024
Job No:	2021010	Figure:	D.1

REPORT OF BOREHOLE PERCOLATION TESTING
Storm Water Infiltration

Project Name:	Oceanside Transit Center Redevelopment	Test Number:	**P-2**
Job Number:	2021010	Tested By:	AR
Date Drilled:	4/8/2024	Date Tested:	4/9/2024
Drilling Method:	8-Inch Hollow Stem Auger	Presoak Time:	24 hours
Drilled Depth (feet):	10.00		
Test Hole Diameter (inches):	8.0		
Gravel Pack:	Y		
Pipe Diameter (inches):	3.0		

Trial No.	Time	Time Interval, ΔT (min)	Initial Water Height, H_o (ft)	Final Water Height, H_f (ft)	Change in Water Height, ΔH (in)	Percolation Rate (min/in)
1	10:25 10:35	0:10	2.17	1.37	9.60	1.04
2	10:35 10:45	0:10	2.27	1.67	7.20	1.39
3	10:45 10:55	0:10	2.27	1.47	9.60	1.04
4	10:55 11:05	0:10	2.15	1.56	7.08	1.41
5	11:05 11:15	0:10	2.46	1.87	7.08	1.41
6	11:15 11:25	0:10	2.51	2.06	5.40	1.85
7						
8						
9						
10						
11						
12						

Observed Percolation Rate:	1.85	min/in
	32.4	in/hr
Tested Infiltation Rate Using Porchet Method, I_t:	**2.21**	**in/hr**
Infiltation Rate with Factor of Safety FS=2:	**1.10**	**in/hr**

PORCHET METHOD CALCULATION:

$$I_t = \frac{\Delta H(60r)}{\Delta T(r + 2H_{avg})}$$

	Values from Last Trial	
ΔH = Change in water head height over the time interval:	5.40	in
r = Test hole radius:	4.00	in
ΔT = Time interval:	10	min
H_{avg}= Average water height over time interval=12(H_o + H_f)/2:	27.4	in

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By:	JK	Date:	January 2024
Job No:	2021010	Figure:	D.2

REPORT OF BOREHOLE PERCOLATION TESTING
Storm Water Infiltration

Project Name:	Oceanside Transit Center Redevelopment	Test Number:	**P-3**
Job Number:	2021010	Tested By:	JK
Date Drilled:	11/30/2023	Date Tested:	11/30/2023
Drilling Method:	8-Inch Hollow Stem Auger	Presoak Time:	1 hour
Drilled Depth (feet):	7.00		
Test Hole Diameter (inches):	8.0		
Gravel Pack:	Y		
Pipe Diameter (inches):	3.0		

Trial No.	Time	Time Interval, ΔT (min)	Initial Water Height, H_o (ft)	Final Water Height, H_f (ft)	Change in Water Height, ΔH (in)	Percolation Rate (min/in)
1	9:31 9:41	0:10	3.03	1.69	16.08	0.62
2	9:44 9:54	0:10	3.13	1.63	18.00	0.56
3	9:56 10:06	0:10	3.13	1.64	17.88	0.56
4	10:10 10:20	0:10	3.13	1.63	18.00	0.56
5	10:21 10:31	0:10	3.08	1.65	17.16	0.58
6	10:35 11:45	0:10	3.14	1.68	17.52	0.57
7						
8						
9						
10						
11						
12						

Observed Percolation Rate:	0.57	min/in
	105.1	in/hr
Tested Infiltation Rate Using Porchet Method, I_t:	**6.79**	**in/hr**
Infiltation Rate with Factor of Safety FS=2:	**3.40**	**in/hr**

PORCHET METHOD CALCULATION:

$$I_t = \frac{\Delta H(60r)}{\Delta T(r + 2H_{avg})}$$

	Values from Last Trial	
ΔH = Change in water head height over the time interval:	17.52	in
r = Test hole radius:	4.00	in
ΔT = Time interval:	10	min
H_{avg}= Average water height over time interval=12(H_o + H_f)/2:	29.0	in

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By:	JK	Date:	January 2024
Job No:	2021010	Figure:	D.3

REPORT OF BOREHOLE PERCOLATION TESTING
Storm Water Infiltration

Project Name:	Oceanside Transit Center Redevelopment	Test Number:	**P-4**
Job Number:	2021010	Tested By:	JK
Date Drilled:	11/30/2023	Date Tested:	11/30/2023
Drilling Method:	8-Inch Hollow Stem Auger	Presoak Time:	1 hour
Drilled Depth (feet):	7.00		
Test Hole Diameter (inches):	8.0		
Gravel Pack:	Y		
Pipe Diameter (inches):	3.0		

Trial No.	Time	Time Interval, ΔT (min)	Initial Water Height, H_o (ft)	Final Water Height, H_f (ft)	Change in Water Height, ΔH (in)	Percolation Rate (min/in)
1	12:58 13:08	0:10	3.39	3.06	3.96	2.53
2	13:10 13:20	0:10	3.40	3.10	3.60	2.78
3	13:22 13:32	0:10	3.41	3.11	3.60	2.78
4	13:33 13:43	0:10	3.40	3.11	3.48	2.87
5	13:56 14:06	0:10	3.42	3.11	3.72	2.69
6	14:08 14:18	0:10	3.39	3.04	4.20	2.38
7						
8						
9						
10						
11						
12						
				Observed Percolation Rate:		2.38 min/in 25.2 in/hr
				Tested Infiltation Rate Using Porchet Method, I_t:		**1.24 in/hr**
				Infiltation Rate with Factor of Safety FS=2:		**0.62 in/hr**

PORCHET METHOD CALCULATION:

$$I_t = \frac{\Delta H(60r)}{\Delta T(r + 2H_{avg})}$$

	Values from Last Trial
ΔH = Change in water head height over the time interval:	4.20 in
r = Test hole radius:	4.00 in
ΔT = Time interval:	10 min
H_{avg}= Average water height over time interval=12(H_o + H_f)/2:	38.5 in

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By:	JK	Date:	January 2024
Job No:	2021010	Figure:	D.4

REPORT OF BOREHOLE PERCOLATION TESTING
Storm Water Infiltration

Project Name:	Oceanside Transit Center Redevelopment	Test Number:	**P-9**
Job Number:	2021010	Tested By:	JK
Date Drilled:	12/1/2023	Date Tested:	12/1/2023
Drilling Method:	8-Inch Hollow Stem Auger	Presoak Time:	1 hour
Drilled Depth (feet):	12.00		
Test Hole Diameter (inches):	8.0		
Gravel Pack:	Y		
Pipe Diameter (inches):	3.0		

Trial No.	Time	Time Interval, ΔT (min)	Initial Water Height, H_o (ft)	Final Water Height, H_f (ft)	Change in Water Height, ΔH (in)	Percolation Rate (min/in)
1	9:04 9:14	0:10	2.85	1.34	18.12	0.55
2	9:16 9:26	0:10	2.95	1.40	18.60	0.54
3	9:48 9:58	0:10	2.95	1.80	13.80	0.72
4	10:01 10:11	0:10	2.98	1.42	18.72	0.53
5	10:13 10:23	0:10	2.94	1.63	15.72	0.64
6	10:25 10:35	0:10	3.00	1.33	20.04	0.50
7	10:36 10:46	0:10	3.02	1.31	20.52	0.49
8	10:49 10:59	0:10	2.95	1.25	20.40	0.49
9						
10						
11						
12						

Observed Percolation Rate:	0.49	min/in
	122.4	in/hr
Tested Infiltation Rate Using Porchet Method, I_t:	**9.00**	**in/hr**
Infiltation Rate with Factor of Safety FS=2:	**4.50**	**in/hr**

PORCHET METHOD CALCULATION:

$$I_t = \frac{\Delta H(60r)}{\Delta T(r + 2H_{avg})}$$

	Values from Last Trial	
ΔH = Change in water head height over the time interval:	20.40	in
r = Test hole radius:	4.00	in
ΔT = Time interval:	10	min
H_{avg}= Average water height over time interval=12(H_o + H_f)/2:	25.2	in

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Oceanside, CA

By:	JK	Date:	January 2024
Job No:	2021010	Figure:	D.5

REPORT OF BOREHOLE PERCOLATION TESTING
Storm Water Infiltration

Project Name:	Oceanside Transit Center Redevelopment	Test Number:	**P-10**
Job Number:	2021010	Tested By:	JK
Date Drilled:	12/1/2023	Date Tested:	12/1/2023
Drilling Method:	8-Inch Hollow Stem Auger	Presoak Time:	1 hour
Drilled Depth (feet):	12.00		
Test Hole Diameter (inches):	8.0		
Gravel Pack:	Y		
Pipe Diameter (inches):	3.0		

Trial No.	Time	Time Interval, ΔT (min)	Initial Water Height, H_o (ft)	Final Water Height, H_f (ft)	Change in Water Height, ΔH (in)	Percolation Rate (min/in)
1	9:55 10:05	0:10	3.20	2.26	11.28	0.89
2	10:08 10:18	0:10	3.25	2.27	11.76	0.85
3	10:21 10:31	0:10	3.22	2.29	11.16	0.90
4	10:32 10:42	0:10	3.20	2.30	10.80	0.93
5	10:43 10:53	0:10	3.31	2.40	10.92	0.92
6	10:55 11:05	0:10	3.28	2.34	11.28	0.89

Observed Percolation Rate:	0.89	min/in
	67.7	in/hr
Tested Infiltation Rate Using Porchet Method, I_t:	**3.79**	**in/hr**
Infiltation Rate with Factor of Safety FS=2:	**1.89**	**in/hr**

PORCHET METHOD CALCULATION:

$$I_t = \frac{\Delta H(60r)}{\Delta T(r + 2H_{avg})}$$

	Values from Last Trial	
ΔH = Change in water head height over the time interval:	11.28	in
r = Test hole radius:	4.00	in
ΔT = Time interval:	10	min
H_{avg}= Average water height over time interval=12(H_o + H_f)/2:	33.7	in

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By:	JK	Date:	January 2024
Job No:	2021010	Figure:	D.6

VII. NRCS SOILS REPORT

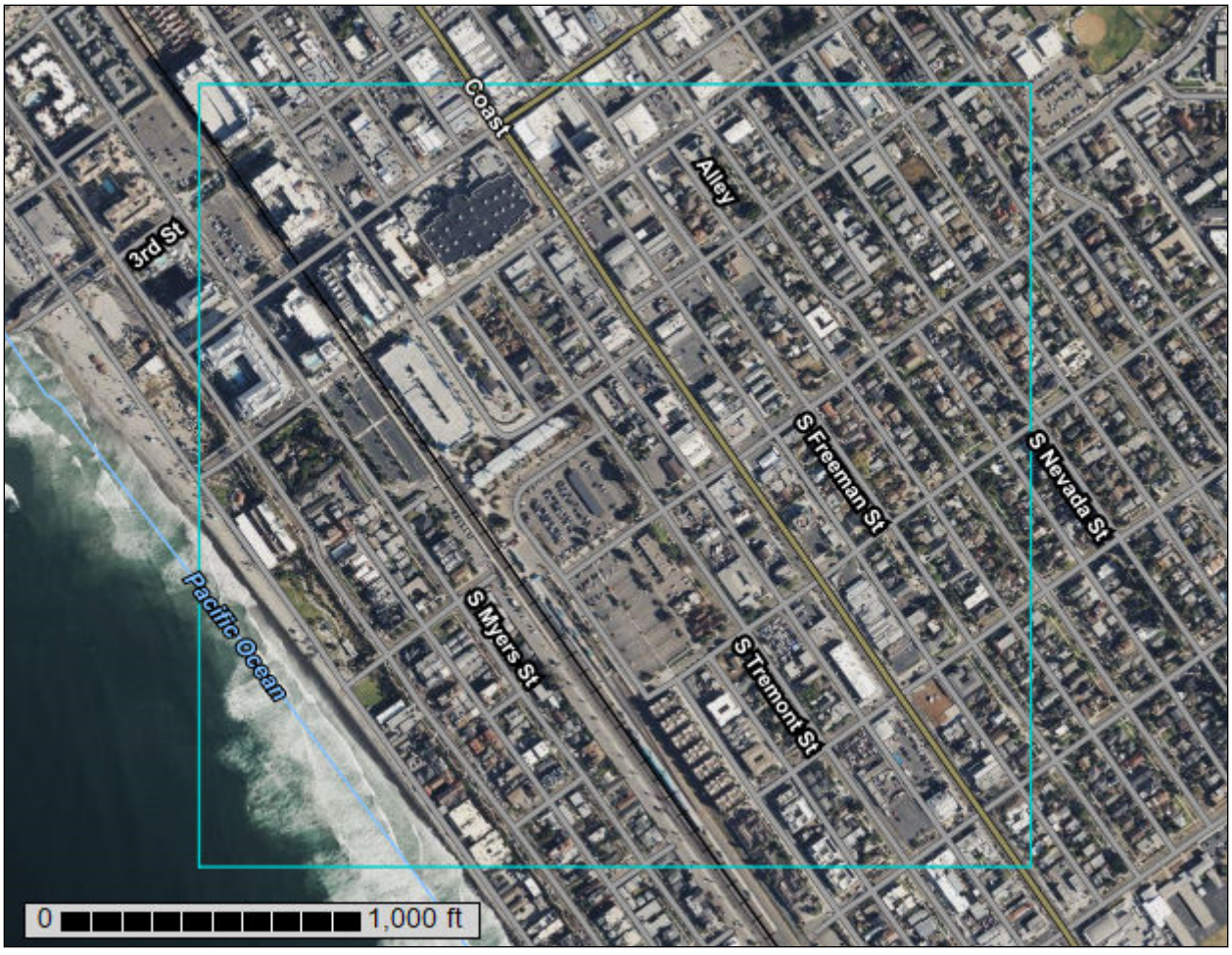
United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for San Diego County Area, California



August 24, 2022

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map



MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

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 16, Sep 13, 2021

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Mar 14, 2022—Mar 17, 2022

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.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
Cr	Coastal beaches	10.7	6.5%
TuB	Tujunga sand, 0 to 5 percent slopes	151.3	91.4%
Totals for Area of Interest		**165.6**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however,

onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

San Diego County Area, California

Cr—Coastal beaches

Map Unit Setting

National map unit symbol: hb9z
Elevation: 0 to 10 feet
Mean annual precipitation: 42 to 48 inches
Mean annual air temperature: 52 to 57 degrees F
Frost-free period: 190 to 210 days
Farmland classification: Not prime farmland

Map Unit Composition

Beaches, coastal: 98 percent
Minor components: 2 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Beaches, Coastal

Setting

Landform: Beaches
Parent material: Beach sand

Typical profile

H1 - 0 to 6 inches: coarse sand
H2 - 6 to 60 inches: coarse sand

Properties and qualities

Slope: 1 to 5 percent
Drainage class: Poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: About 0 to 72 inches
Frequency of flooding: Frequent
Maximum salinity: Slightly saline to strongly saline (4.0 to 16.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very low (about 2.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydrologic Soil Group: D
Ecological site: R019XG902CA - Beaches
Hydric soil rating: Yes

Minor Components

Unnamed

Percent of map unit: 2 percent
Landform: Tidal flats
Hydric soil rating: Yes

TuB—Tujunga sand, 0 to 5 percent slopes

Map Unit Setting

National map unit symbol: hbh0
Elevation: 10 to 2,500 feet
Mean annual precipitation: 10 to 25 inches
Mean annual air temperature: 59 to 64 degrees F
Frost-free period: 280 to 350 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Tujunga and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Tujunga

Setting

Landform: Flood plains
Landform position (three-dimensional): Riser, flat
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from granite

Typical profile

H1 - 0 to 14 inches: sand
H2 - 14 to 34 inches: loamy sand
H3 - 34 to 60 inches: stratified gravelly sand to gravelly loamy sand

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Rare
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.9 inches)

Interpretive groups

Land capability classification (irrigated): 3s
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: A
Ecological site: R019XD035CA - SANDY (1975)
Hydric soil rating: No

Minor Components

Ramona

Percent of map unit: 5 percent
Hydric soil rating: No

Grangeville

Percent of map unit: 5 percent
Hydric soil rating: No

Visalia

Percent of map unit: 2 percent
Hydric soil rating: No

Riverwash

Percent of map unit: 2 percent
Landform: Drainageways
Hydric soil rating: Yes

Unnamed

Percent of map unit: 1 percent
Landform: Flood plains
Hydric soil rating: Yes

Soil Information for All Uses

Soil Properties and Qualities

The Soil Properties and Qualities section includes various soil properties and qualities displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each property or quality.

Soil Qualities and Features

Soil qualities are behavior and performance attributes that are not directly measured, but are inferred from observations of dynamic conditions and from soil properties. Example soil qualities include natural drainage, and frost action. Soil features are attributes that are not directly part of the soil. Example soil features include slope and depth to restrictive layer. These features can greatly impact the use and management of the soil.

Hydrologic Soil Group

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.

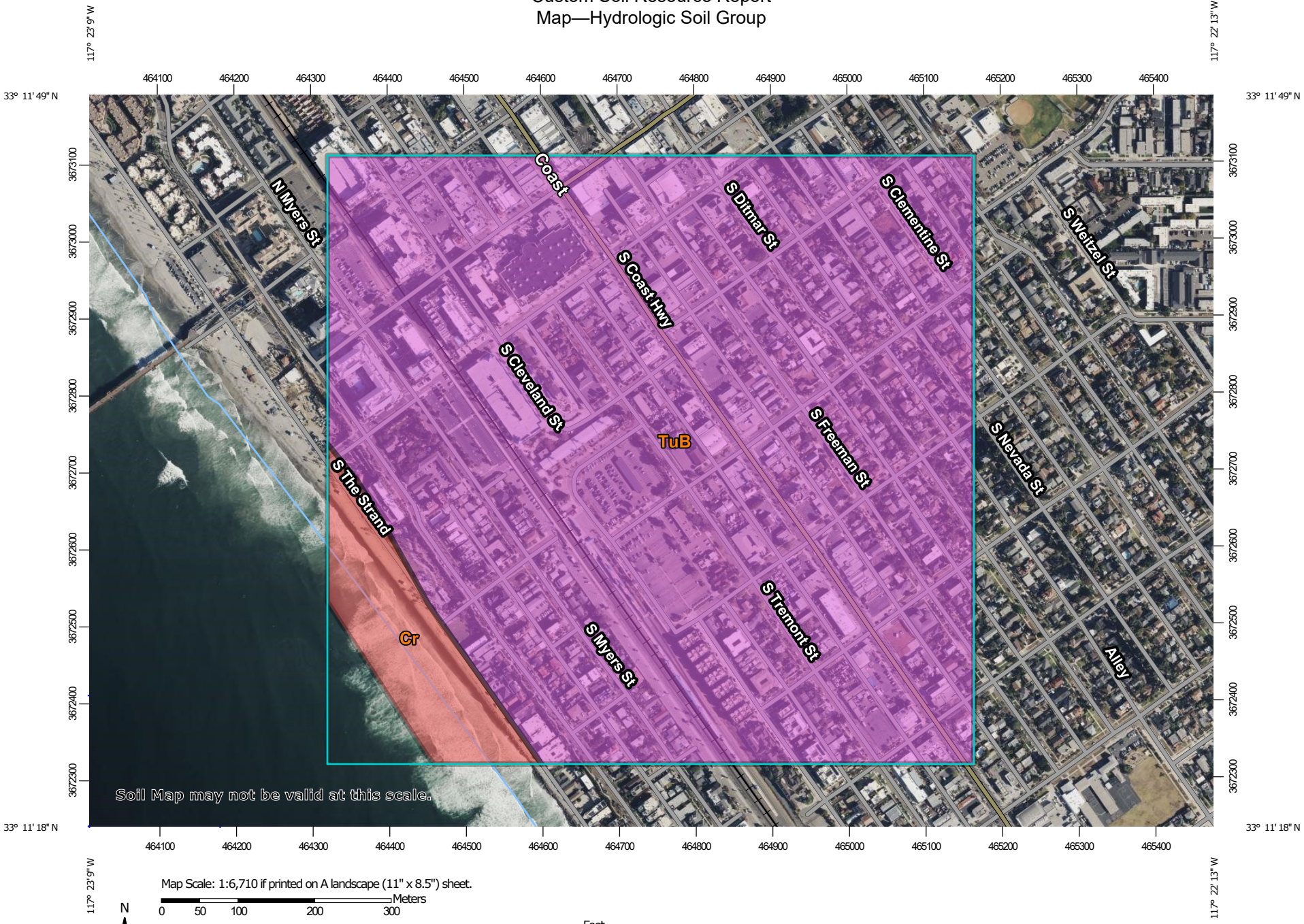
Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

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.

Custom Soil Resource Report
Map—Hydrologic Soil Group



Map Scale: 1:6,710 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 50 100 200 300

Feet
0 300 600 1200 1800

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 16, Sep 13, 2021

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Mar 14, 2022—Mar 17, 2022

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.

Table—Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
Cr	Coastal beaches	D	10.7	6.5%
TuB	Tujunga sand, 0 to 5 percent slopes	A	151.3	91.4%
Totals for Area of Interest			**165.6**	**100.0%**

Rating Options—Hydrologic Soil Group

Aggregation Method: Dominant Condition

Aggregation is the process by which a set of component attribute values is reduced to a single value that represents the map unit as a whole.

A map unit is typically composed of one or more "components". A component is either some type of soil or some nonsoil entity, e.g., rock outcrop. For the attribute being aggregated, the first step of the aggregation process is to derive one attribute value for each of a map unit's components. From this set of component attributes, the next step of the aggregation process derives a single value that represents the map unit as a whole. Once a single value for each map unit is derived, a thematic map for soil map units can be rendered. Aggregation must be done because, on any soil map, map units are delineated but components are not.

For each of a map unit's components, a corresponding percent composition is recorded. A percent composition of 60 indicates that the corresponding component typically makes up approximately 60% of the map unit. Percent composition is a critical factor in some, but not all, aggregation methods.

The aggregation method "Dominant Condition" first groups like attribute values for the components in a map unit. For each group, percent composition is set to the sum of the percent composition of all components participating in that group. These groups now represent "conditions" rather than components. The attribute value associated with the group with the highest cumulative percent composition is returned. If more than one group shares the highest cumulative percent composition, the corresponding "tie-break" rule determines which value should be returned. The "tie-break" rule indicates whether the lower or higher group value should be returned in the case of a percent composition tie. The result returned by this aggregation method represents the dominant condition throughout the map unit only when no tie has occurred.

Component Percent Cutoff: None Specified

Components whose percent composition is below the cutoff value will not be considered. If no cutoff value is specified, all components in the database will be considered. The data for some contrasting soils of minor extent may not be in the database, and therefore are not considered.

Tie-break Rule: Higher

The tie-break rule indicates which value should be selected from a set of multiple candidate values, or which value should be selected in the event of a percent composition tie.

References

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. September 18, 2002. Hydric soils of the United States.

Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.

National Research Council. 1995. Wetlands: Characteristics and boundaries.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_054262

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, U.S. Department of Agriculture Handbook 436. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053577

Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053580

Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.

United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.

United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2_053374

United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelprdb1043084

United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242

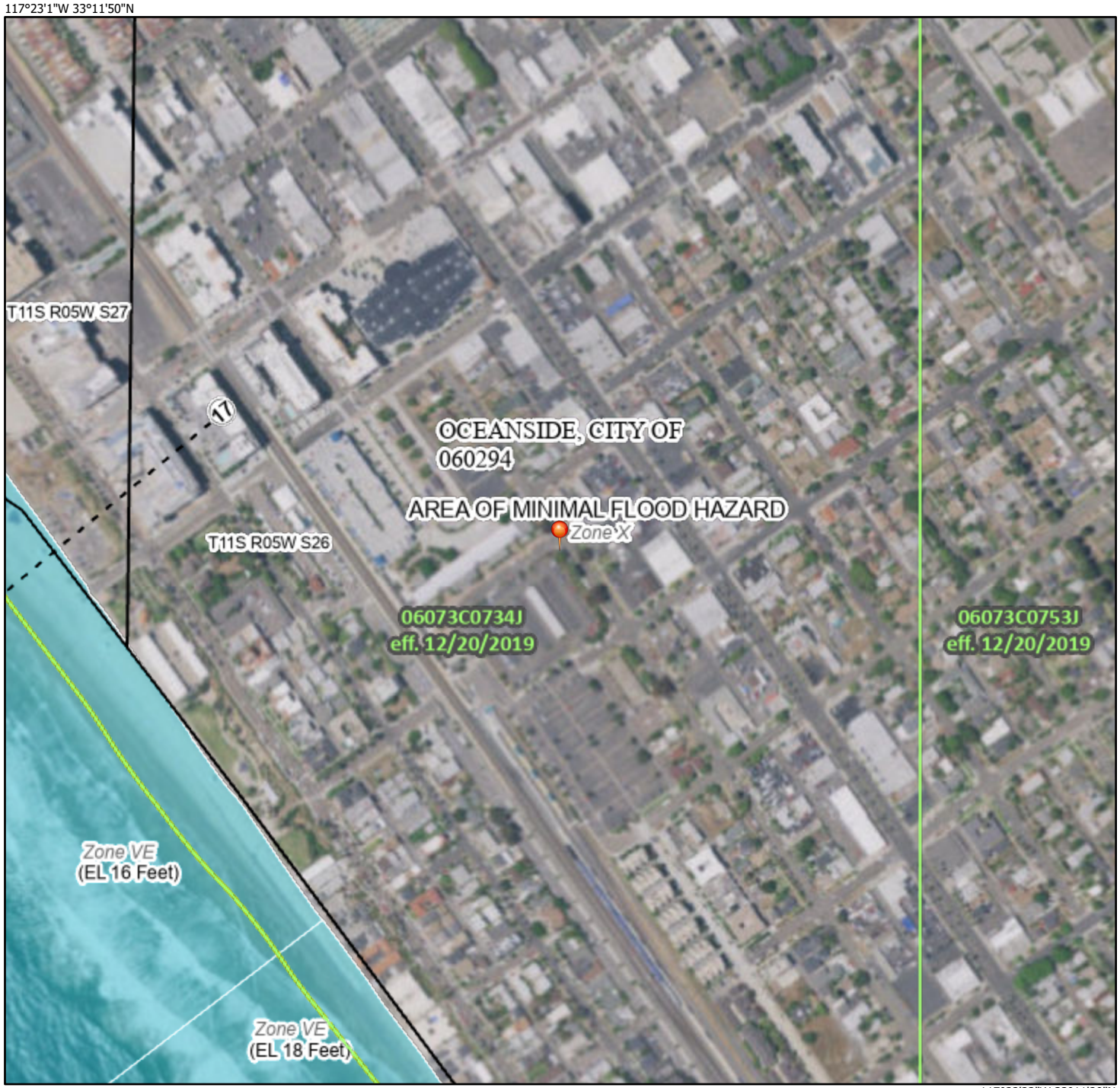
United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf

VIII. FEMA FIRMETTE

National Flood Hazard Layer FIRMette

FEMA



0 250 500 1,000 1,500 2,000 Feet

1:6,000

Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 / 17.5 Cross Sections with 1% Annual Chance / Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 8/24/2022 at 1:51 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

IX. WSPG ANALYSIS

a) Existing Condition - Central Tributary Connection with 15” RCP

b) Proposed Condition - Central Tributary Connection with 15” RCP

c) Proposed Condition - South Cleveland Street Storm Drain Extension

d) Inundation Map

```
T1 NCTD OCEANSIDE TRANSIT CENTER TOD                                          0
T2 EXISTING CONDITION CENTRAL TRIBUTARY AREA ANALYSIS
T3 LINE A WSPG FOR 100-YEAR STORM
SO    -16.000  42.620  1                          43.120
R        .000  42.700  1      .013                                .000    .000 0
TS      4.500  42.720  2      .013                                .000
R     215.500  43.780  2      .013                                .000    .000 0
JX    221.500  43.810  4  3   .013    0.001          43.810       90.0      -68.000
R     245.500  43.930  4      .013                                .000  68.000 0
R     280.500  44.100  4      .013                                .000  90.000 0
R     318.500  44.280  4      .013                                .000 -90.000 0
R     457.500  44.970  4      .013                                .000  90.000 0
R     586.500  45.600  4      .013                                .000 -30.000 0
R     607.125  45.700  4      .013                                .000 -30.000 0
R     627.750  45.810  4      .013                                .000 -30.000 0
JX    631.750  45.990  4  3   .013    0.001          45.990       90.0      -30.000
R     856.750  56.500  4      .013                                .000 -30.000 0
R     885.750  56.870  4      .013                                .000 -30.000 0
R     914.750  57.240  4      .013                                .000 -30.000 0
R     993.750  58.260  4      .013                                .000  30.000 0
R    1001.750  58.360  4      .013                                .000  30.000 0
R    1009.750  58.460  4      .013                                .000  30.000 0
R    1041.750  58.870  4      .013                                .000  45.000 0
R    1051.750  59.000  4      .013                                .000    .000 0
SH   1051.750  59.000  4                          59.000
CD   1  3   0    .000    .250    6.000  .000  .000   .00
CD   2  4   1    .000   1.250     .000  .000  .000   .00
CD   3  4   1    .000   1.250     .000  .000  .000   .00
CD   4  4   1    .000   1.250     .000  .000  .000   .00
Q           12.110   .0
```

Program Package Serial Number: 1540

WATER SURFACE PROFILE LISTING Date: 6-17-2024 Time: 2:22:22

NCTD OCEANSIDE TRANSIT CENTER TOD
EXISTING CONDITION CENTRAL TRIBUTARY AREA ANALYSIS
LINE A WSPG FOR 100-YEAR STORM

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
-16.000	42.620	.500	43.120	12.11	8.07	1.01	44.13	.00	.25	6.00	.250	6.000	.00	0 .0
16.000	.0050					.0843	1.35	.50	2.85	.25	.013	.00	.00	BOX
.000	42.700	1.769	44.469	12.11	8.07	1.01	45.48	.00	.25	6.00	.250	6.000	.00	0 .0
TRANS STR	.0044					.0597	.27	1.77	2.85		.013	.00	.00	BOX
4.500	42.720	1.768	44.488	12.11	9.87	1.51	46.00	.00	1.22	.00	1.250	.000	.00	1 .0
211.000	.0050					.0352	7.42	1.77	.00	1.25	.013	.00	.00	PIPE
215.500	43.780	8.125	51.905	12.11	9.87	1.51	53.42	.00	1.22	.00	1.250	.000	.00	1 .0
JUNCT STR	.0050					.0352	.21	.00	.00		.013	.00	.00	PIPE
221.500	43.810	8.307	52.117	12.11	9.87	1.51	53.63	.00	1.22	.00	1.250	.000	.00	1 .0
24.000	.0050					.0351	.84	8.31	.00	1.25	.013	.00	.00	PIPE
245.500	43.930	9.370	53.300	12.11	9.87	1.51	54.81	.00	1.22	.00	1.250	.000	.00	1 .0
35.000	.0049					.0351	1.23	9.37	.00	1.25	.013	.00	.00	PIPE
280.500	44.100	10.879	54.979	12.11	9.87	1.51	56.49	.00	1.22	.00	1.250	.000	.00	1 .0
38.000	.0047					.0351	1.34	10.88	.00	1.25	.013	.00	.00	PIPE
318.500	44.280	12.484	56.764	12.11	9.87	1.51	58.28	.00	1.22	.00	1.250	.000	.00	1 .0
139.000	.0050					.0351	4.89	12.48	.00	1.25	.013	.00	.00	PIPE
457.500	44.970	17.129	62.099	12.11	9.87	1.51	63.61	.00	1.22	.00	1.250	.000	.00	1 .0
129.000	.0049					.0351	4.53	17.13	.00	1.25	.013	.00	.00	PIPE

Program Package Serial Number: 1540

WATER SURFACE PROFILE LISTING Date: 6-17-2024 Time: 2:22:22

NCTD OCEANSIDE TRANSIT CENTER TOD
EXISTING CONDITION CENTRAL TRIBUTARY AREA ANALYSIS
LINE A WSPG FOR 100-YEAR STORM

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/ Dia.-FT / "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth Prs/Pip / Type Ch
L/Elem	Ch Slope													
586.500	45.600	21.183	66.783	12.11	9.87	1.51	68.30	.00	1.22	.00	1.250	.000	.00	1 .0
20.625	.0048					.0351	.72	21.18	.00	1.25	.013	.00	.00	PIPE
607.125	45.700	21.958	67.658	12.11	9.87	1.51	69.17	.00	1.22	.00	1.250	.000	.00	1 .0
20.625	.0053					.0351	.72	21.96	.00	1.25	.013	.00	.00	PIPE
627.750	45.810	22.722	68.532	12.11	9.87	1.51	70.04	.00	1.22	.00	1.250	.000	.00	1 .0
JUNCT STR	.0450					.0351	.14	.00	.00		.013	.00	.00	PIPE
631.750	45.990	22.684	68.674	12.11	9.87	1.51	70.19	.00	1.22	.00	1.250	.000	.00	1 .0
225.000	.0467					.0351	7.91	22.68	.00	.90	.013	.00	.00	PIPE
856.750	56.500	20.231	76.731	12.11	9.87	1.51	78.24	.00	1.22	.00	1.250	.000	.00	1 .0
29.000	.0128					.0351	1.02	20.23	.00	1.25	.013	.00	.00	PIPE
885.750	56.870	21.029	77.899	12.11	9.87	1.51	79.41	.00	1.22	.00	1.250	.000	.00	1 .0
29.000	.0128					.0351	1.02	21.03	.00	1.25	.013	.00	.00	PIPE
914.750	57.240	21.828	79.068	12.11	9.87	1.51	80.58	.00	1.22	.00	1.250	.000	.00	1 .0
79.000	.0129					.0351	2.78	21.83	.00	1.25	.013	.00	.00	PIPE
993.750	58.260	23.734	81.994	12.11	9.87	1.51	83.51	.00	1.22	.00	1.250	.000	.00	1 .0
8.000	.0125					.0351	.28	23.73	.00	1.25	.013	.00	.00	PIPE
1001.750	58.360	24.065	82.425	12.11	9.87	1.51	83.94	.00	1.22	.00	1.250	.000	.00	1 .0
8.000	.0125					.0351	.28	24.07	.00	1.25	.013	.00	.00	PIPE

Program Package Serial Number: 1540

WATER SURFACE PROFILE LISTING Date: 6-17-2024 Time: 2:22:22

NCTD OCEANSIDE TRANSIT CENTER TOD
EXISTING CONDITION CENTRAL TRIBUTARY AREA ANALYSIS
LINE A WSPG FOR 100-YEAR STORM

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
1009.750	58.460	24.396	82.856	12.11	9.87	1.51	84.37	.00	1.22	.00	1.250	.000	.00	1 .0
32.000	.0128					.0351	1.12	24.40	.00	1.25	.013	.00	.00	PIPE
1041.750	58.870	25.335	84.205	12.11	9.87	1.51	85.72	.00	1.22	.00	1.250	.000	.00	1 .0
10.000	.0130					.0351	.35	25.34	.00	1.25	.013	.00	.00	PIPE
1051.750	59.000	25.557	84.557	12.11	9.87	1.51	86.07	.00	1.22	.00	1.250	.000	.00	1 .0

```
T1 NCTD OCEANSIDE TRANSIT CENTER TOD                                                0
T2 PROPOSED CONDITION CENTRAL TRIBUTARY AREA ANALYSIS
T3 LINE A WSPG FOR 100-YEAR STORM
SO    -16.000  42.620  1                          43.120
R        .000  42.700  1      .013                                  .000    .000 0
TS      4.500  42.720  2      .013                                  .000
R     215.500  43.780  2      .013                                  .000    .000 0
JX    221.500  43.810  4  3   .013    0.001          43.810         90.0      -68.000
R     245.500  43.930  4      .013                                  .000  68.000 0
R     280.500  44.100  4      .013                                  .000  90.000 0
R     318.500  44.280  4      .013                                  .000 -90.000 0
R     457.500  44.970  4      .013                                  .000  90.000 0
R     586.500  45.600  4      .013                                  .000 -30.000 0
R     607.125  45.700  4      .013                                  .000 -30.000 0
R     627.750  45.810  4      .013                                  .000 -30.000 0
JX    631.750  45.990  4  3   .013    0.001          45.990         90.0      -30.000
R     856.750  56.500  4      .013                                  .000 -30.000 0
R     885.750  56.870  4      .013                                  .000 -30.000 0
R     914.750  57.240  4      .013                                  .000 -30.000 0
R     993.750  58.260  4      .013                                  .000  30.000 0
R    1001.750  58.360  4      .013                                  .000  30.000 0
R    1009.750  58.460  4      .013                                  .000  30.000 0
R    1041.750  58.870  4      .013                                  .000  45.000 0
R    1051.750  59.000  4      .013                                  .000    .000 0
SH   1051.750  59.000  4                          59.000
CD   1  3   0    .000    .250    6.000  .000  .000   .00
CD   2  4   1    .000   1.250     .000  .000  .000   .00
CD   3  4   1    .000   1.250     .000  .000  .000   .00
CD   4  4   1    .000   1.250     .000  .000  .000   .00
Q           10.660   .0
```

Program Package Serial Number: 1540

WATER SURFACE PROFILE LISTING Date: 6-17-2024 Time: 2:24:54

NCTD OCEANSIDE TRANSIT CENTER TOD
PROPOSED CONDITION CENTRAL TRIBUTARY AREA ANALYSIS
LINE A WSPG FOR 100-YEAR STORM

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
-16.000	42.620	.500	43.120	10.66	7.11	.78	43.90	.00	.25	6.00	.250	6.000	.00	0 .0
16.000	.0050					.0653	1.05	.50	2.51	.25	.013	.00	.00	BOX
.000	42.700	1.465	44.165	10.66	7.11	.78	44.95	.00	.25	6.00	.250	6.000	.00	0 .0
TRANS STR	.0044					.0463	.21	1.47	2.51		.013	.00	.00	BOX
4.500	42.720	1.460	44.180	10.66	8.69	1.17	45.35	.00	1.20	.00	1.250	.000	.00	1 .0
211.000	.0050					.0272	5.75	1.46	.00	1.25	.013	.00	.00	PIPE
215.500	43.780	6.148	49.928	10.66	8.69	1.17	51.10	.00	1.20	.00	1.250	.000	.00	1 .0
JUNCT STR	.0050					.0272	.16	.00	.00		.013	.00	.00	PIPE
221.500	43.810	6.282	50.092	10.66	8.69	1.17	51.26	.00	1.20	.00	1.250	.000	.00	1 .0
24.000	.0050					.0272	.65	6.28	.00	1.25	.013	.00	.00	PIPE
245.500	43.930	7.078	51.008	10.66	8.69	1.17	52.18	.00	1.20	.00	1.250	.000	.00	1 .0
35.000	.0049					.0272	.95	7.08	.00	1.25	.013	.00	.00	PIPE
280.500	44.100	8.210	52.310	10.66	8.69	1.17	53.48	.00	1.20	.00	1.250	.000	.00	1 .0
38.000	.0047					.0272	1.04	8.21	.00	1.25	.013	.00	.00	PIPE
318.500	44.280	9.413	53.693	10.66	8.69	1.17	54.86	.00	1.20	.00	1.250	.000	.00	1 .0
139.000	.0050					.0272	3.79	9.41	.00	1.25	.013	.00	.00	PIPE
457.500	44.970	12.857	57.827	10.66	8.69	1.17	59.00	.00	1.20	.00	1.250	.000	.00	1 .0
129.000	.0049					.0272	3.51	12.86	.00	1.25	.013	.00	.00	PIPE

Program Package Serial Number: 1540

WATER SURFACE PROFILE LISTING Date: 6-17-2024 Time: 2:24:54

NCTD OCEANSIDE TRANSIT CENTER TOD

PROPOSED CONDITION CENTRAL TRIBUTARY AREA ANALYSIS

LINE A WSPG FOR 100-YEAR STORM

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
586.500	45.600	15.856	61.456	10.66	8.69	1.17	62.63	.00	1.20	.00	1.250	.000	.00	1 .0
20.625	.0048					.0272	.56	15.86	.00	1.25	.013	.00	.00	PIPE
607.125	45.700	16.434	62.134	10.66	8.69	1.17	63.31	.00	1.20	.00	1.250	.000	.00	1 .0
20.625	.0053					.0272	.56	16.43	.00	1.25	.013	.00	.00	PIPE
627.750	45.810	17.002	62.812	10.66	8.69	1.17	63.98	.00	1.20	.00	1.250	.000	.00	1 .0
JUNCT STR	.0450					.0272	.11	.00	.00		.013	.00	.00	PIPE
631.750	45.990	16.931	62.921	10.66	8.69	1.17	64.09	.00	1.20	.00	1.250	.000	.00	1 .0
225.000	.0467					.0272	6.13	16.93	.00	.82	.013	.00	.00	PIPE
856.750	56.500	12.664	69.164	10.66	8.69	1.17	70.34	.00	1.20	.00	1.250	.000	.00	1 .0
29.000	.0128					.0272	.79	12.66	.00	1.25	.013	.00	.00	PIPE
885.750	56.870	13.200	70.070	10.66	8.69	1.17	71.24	.00	1.20	.00	1.250	.000	.00	1 .0
29.000	.0128					.0272	.79	13.20	.00	1.25	.013	.00	.00	PIPE
914.750	57.240	13.736	70.976	10.66	8.69	1.17	72.15	.00	1.20	.00	1.250	.000	.00	1 .0
79.000	.0129					.0272	2.15	13.74	.00	1.25	.013	.00	.00	PIPE
993.750	58.260	14.983	73.243	10.66	8.69	1.17	74.41	.00	1.20	.00	1.250	.000	.00	1 .0
8.000	.0125					.0272	.22	14.98	.00	1.25	.013	.00	.00	PIPE
1001.750	58.360	15.217	73.577	10.66	8.69	1.17	74.75	.00	1.20	.00	1.250	.000	.00	1 .0
8.000	.0125					.0272	.22	15.22	.00	1.25	.013	.00	.00	PIPE

Program Package Serial Number: 1540

WATER SURFACE PROFILE LISTING Date: 6-17-2024 Time: 2:24:54

NCTD OCEANSIDE TRANSIT CENTER TOD
PROPOSED CONDITION CENTRAL TRIBUTARY AREA ANALYSIS
LINE A WSPG FOR 100-YEAR STORM

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
1009.750	58.460	15.451	73.911	10.66	8.69	1.17	75.08	.00	1.20	.00	1.250	.000	.00	1 .0
32.000	.0128					.0272	.87	15.45	.00	1.25	.013	.00	.00	PIPE
1041.750	58.870	16.086	74.956	10.66	8.69	1.17	76.13	.00	1.20	.00	1.250	.000	.00	1 .0
10.000	.0130					.0272	.27	16.09	.00	1.25	.013	.00	.00	PIPE
1051.750	59.000	16.229	75.229	10.66	8.69	1.17	76.40	.00	1.20	.00	1.250	.000	.00	1 .0

ATTACHMENT C
100-YEAR RATIONAL METHOD AND WSPG HYDRAULIC ANALYSIS FOR CENTRAL TRIBUTARY AREA

100-YEAR RATIONAL METHOD RESULTS (3 PAGES)

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**************************************************************************

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
        (c) Copyright 1982-2016 Advanced Engineering Software (aes)
            Ver. 23.0 Release Date: 07/01/2016  License ID 1535

                          Analysis prepared by:

                                 Stantec



 ************************* DESCRIPTION OF STUDY *************************
* NCTD OCEANSIDE TRANSIT CENTER TOD                                      *
* ALTERNATE CENTRAL TRIBUTARY AREA ANALYSIS                              *
* PROPOSED CONDITION FOR 100-YEAR STORM                                  *
 ************************************************************************

  FILE NAME: ALT100YR.DAT
  TIME/DATE OF STUDY: 10:39 01/04/2024
------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.600
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  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   18.0     13.0    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.50 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    200.00 TO NODE    202.00 IS CODE =  21
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
========================================================================
  STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  98
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   255.00
  UPSTREAM ELEVATION(FEET) =     70.00
  DOWNSTREAM ELEVATION(FEET) =     65.00
  ELEVATION DIFFERENCE(FEET) =      5.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.760
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    69.61
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.850
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      1.07
  TOTAL AREA(ACRES) =      0.18   TOTAL RUNOFF(CFS) =      1.07

**************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    204.00 IS CODE =  31
------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    59.00  DOWNSTREAM(FEET) =    47.00
  FLOW LENGTH(FEET) =   421.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   3.5 INCHES
```

```
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.68
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.07
  PIPE TRAVEL TIME(MIN.) =   1.23    Tc(MIN.) =    3.99
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    204.00 =     676.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    204.00 TO NODE    204.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.850
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  98
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
  SUBAREA AREA(ACRES) =    0.59   SUBAREA RUNOFF(CFS) =    3.52
  TOTAL AREA(ACRES) =        0.8   TOTAL RUNOFF(CFS) =       4.59
  TC(MIN.) =    3.99

****************************************************************************
  FLOW PROCESS FROM NODE    204.00 TO NODE    206.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    47.00  DOWNSTREAM(FEET) =    41.22
  FLOW LENGTH(FEET) =   407.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   8.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.42
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.59
  PIPE TRAVEL TIME(MIN.) =   1.06    Tc(MIN.) =    5.05
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    206.00 =    1083.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    206.00 TO NODE    206.00 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.) =    5.05
  RAINFALL INTENSITY(INCH/HR) =   6.81
  TOTAL STREAM AREA(ACRES) =     0.77
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.59

****************************************************************************
  FLOW PROCESS FROM NODE    208.00 TO NODE    210.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  98
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   296.00
  UPSTREAM ELEVATION(FEET) =     52.40
  DOWNSTREAM ELEVATION(FEET) =     50.60
  ELEVATION DIFFERENCE(FEET) =      1.80
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.529
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    52.16
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.850
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      3.46
  TOTAL AREA(ACRES) =      0.58   TOTAL RUNOFF(CFS) =      3.46

****************************************************************************
  FLOW PROCESS FROM NODE    210.00 TO NODE    206.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    50.60  DOWNSTREAM(FEET) =    44.60
  FLOW LENGTH(FEET) =   398.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   8.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.05
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
```

```
  PIPE-FLOW(CFS) =       3.46
  PIPE TRAVEL TIME(MIN.) =   1.10    Tc(MIN.) =    4.63
  LONGEST FLOWPATH FROM NODE    208.00 TO NODE    206.00 =     694.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    206.00 TO NODE    206.00 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.) =    4.63
  RAINFALL INTENSITY(INCH/HR) =   6.85
  TOTAL STREAM AREA(ACRES) =     0.58
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.46

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        4.59     5.05        6.806          0.77
      2        3.46     4.63        6.850          0.58

  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        7.66     4.63       6.850
      2        8.02     5.05       6.806

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       8.02   Tc(MIN.) =    5.05
  TOTAL AREA(ACRES) =        1.3
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    206.00 =    1083.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        1.3  TC(MIN.) =      5.05
  PEAK FLOW RATE(CFS)   =       8.02
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

LINE A WSPG INPUT (1 PAGE)

```
T1 NCTD OCEANSIDE TRANSIT CENTER TOD                                        0
T2 ALTERNATE CENTRAL TRIBUTARY AREA ANALYSIS
T3 LINE A WSPG FOR 100-YEAR STORM
SO    -16.000  42.620  1                          43.120
R        .000  42.700  1      .013                                .000    .000 0
TS      4.500  42.720  2      .013                                .000
R     215.500  43.780  2      .013                                .000    .000 0
JX    221.500  43.810  4  3   .013    3.43          43.810        90.0      -68.000
R     245.500  43.930  4      .013                                .000  68.000 0
R     280.500  44.100  4      .013                                .000  90.000 0
R     318.500  44.280  4      .013                                .000 -90.000 0
R     457.500  44.970  4      .013                                .000  90.000 0
R     586.500  45.600  4      .013                                .000 -30.000 0
R     607.125  45.700  4      .013                                .000 -30.000 0
R     627.750  45.810  4      .013                                .000 -30.000 0
JX    631.750  45.990  4  3   .013    3.52          45.990        90.0      -30.000
R     856.750  56.500  4      .013                                .000 -30.000 0
R     885.750  56.870  4      .013                                .000 -30.000 0
R     914.750  57.240  4      .013                                .000 -30.000 0
R     993.750  58.260  4      .013                                .000  30.000 0
R    1001.750  58.360  4      .013                                .000  30.000 0
R    1009.750  58.460  4      .013                                .000  30.000 0
R    1041.750  58.870  4      .013                                .000  45.000 0
R    1051.750  59.000  4      .013                                .000    .000 0
SH   1051.750  59.000  4                          59.000
CD   1  3   0    .000    .250    6.000  .000  .000   .00
CD   2  4   1    .000   1.250     .000  .000  .000   .00
CD   3  4   1    .000   1.250     .000  .000  .000   .00
CD   4  4   1    .000   1.250     .000  .000  .000   .00
Q            1.070   .0
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LINE A WSPG OUTPUT (6 PAGES)

Program Package Serial Number: 1540

WATER SURFACE PROFILE LISTING Date: 1-11-2024 Time: 3:39:32

NCTD OCEANSIDE TRANSIT CENTER TOD
ALTERNATE CENTRAL TRIBUTARY AREA ANALYSIS
LINE A WSPG FOR 100-YEAR STORM

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
-16.000	42.620	.500	43.120	8.02	5.35	.44	43.56	.00	.25	6.00	.250	6.000	.00	0 .0
16.000	.0050					.0370	.59	.50	1.88	.25	.013	.00	.00	BOX
.000	42.700	1.011	43.711	8.02	5.35	.44	44.16	.00	.25	6.00	.250	6.000	.00	0 .0
TRANS STR	.0044							1.01	1.88		.013	.00	.00	BOX
4.500	42.720	1.116	43.836	8.02	6.94	.75	44.58	.00	1.12	.77	1.250	.000	.00	1 .0
2.374	.0050					.0136	.03	1.12	1.00	1.25	.013	.00	.00	PIPE
6.874	42.732	1.204	43.936	8.02	6.61	.68	44.61	.00	1.12	.47	1.250	.000	.00	1 .0
3.411	.0050					.0139	.05	1.20	.73	1.25	.013	.00	.00	PIPE
10.285	42.749	1.250	43.999	8.02	6.54	.66	44.66	.00	1.12	.00	1.250	.000	.00	1 .0
205.215	.0050					.0148	3.04	1.25	.00	1.25	.013	.00	.00	PIPE
215.500	43.780	3.382	47.162	8.02	6.54	.66	47.83	.00	1.12	.00	1.250	.000	.00	1 .0
JUNCT STR	.0050					.0102	.06	.00	.00		.013	.00	.00	PIPE
221.500	43.810	4.306	48.116	4.59	3.74	.22	48.33	.00	.87	.00	1.250	.000	.00	1 .0
24.000	.0050					.0050	.12	4.31	.00	1.03	.013	.00	.00	PIPE
245.500	43.930	4.355	48.285	4.59	3.74	.22	48.50	.00	.87	.00	1.250	.000	.00	1 .0
35.000	.0049					.0050	.18	4.36	.00	1.05	.013	.00	.00	PIPE
280.500	44.100	4.427	48.527	4.59	3.74	.22	48.74	.00	.87	.00	1.250	.000	.00	1 .0
38.000	.0047					.0050	.19	4.43	.00	1.07	.013	.00	.00	PIPE

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WATER SURFACE PROFILE LISTING Date: 1-11-2024 Time: 3:39:32

NCTD OCEANSIDE TRANSIT CENTER TOD
ALTERNATE CENTRAL TRIBUTARY AREA ANALYSIS
LINE A WSPG FOR 100-YEAR STORM

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip

L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
318.500	44.280	4.503	48.783	4.59	3.74	.22	49.00	.00	.87	.00	1.250	.000	.00	1 .0
139.000	.0050					.0050	.70	4.50	.00	1.03	.013	.00	.00	PIPE
457.500	44.970	4.579	49.549	4.59	3.74	.22	49.77	.00	.87	.00	1.250	.000	.00	1 .0
129.000	.0049					.0050	.65	4.58	.00	1.04	.013	.00	.00	PIPE
586.500	45.600	4.622	50.222	4.59	3.74	.22	50.44	.00	.87	.00	1.250	.000	.00	1 .0
20.625	.0048					.0050	.10	4.62	.00	1.05	.013	.00	.00	PIPE
607.125	45.700	4.648	50.348	4.59	3.74	.22	50.57	.00	.87	.00	1.250	.000	.00	1 .0
20.625	.0053					.0050	.10	4.65	.00	1.00	.013	.00	.00	PIPE
627.750	45.810	4.663	50.473	4.59	3.74	.22	50.69	.00	.87	.00	1.250	.000	.00	1 .0
JUNCT STR	.0450					.0027	.01	.00	.00		.013	.00	.00	PIPE
631.750	45.990	4.905	50.895	1.07	.87	.01	50.91	.00	.41	.00	1.250	.000	.00	1 .0
78.733	.0467					.0003	.02	4.90	.00	.23	.013	.00	.00	PIPE
710.483	49.668	1.250	50.918	1.07	.87	.01	50.93	.00	.41	.00	1.250	.000	.00	1 .0
2.448	.0467					.0003	.00	1.25	.00	.23	.013	.00	.00	PIPE
712.931	49.782	1.134	50.916	1.07	.91	.01	50.93	.00	.41	.73	1.250	.000	.00	1 .0
1.436	.0467					.0002	.00	1.13	.13	.23	.013	.00	.00	PIPE
714.366	49.849	1.066	50.915	1.07	.96	.01	50.93	.00	.41	.89	1.250	.000	.00	1 .0
1.154	.0467					.0003	.00	1.07	.15	.23	.013	.00	.00	PIPE

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
715.520	49.903	1.011	50.914	1.07	1.01	.02	50.93	.00	.41	.98	1.250	.000	.00	1 .0
1.022	.0467					.0003	.00	1.01	.17	.23	.013	.00	.00	PIPE
716.542	49.951	.962	50.913	1.07	1.06	.02	50.93	.00	.41	1.05	1.250	.000	.00	1 .0
.911	.0467					.0003	.00	.96	.19	.23	.013	.00	.00	PIPE

717.453	49.993	.918	50.911	1.07	1.11	.02	50.93	.00	.41	1.10	1.250	.000	.00	1 .0
.822	.0467					.0004	.00	.92	.21	.23	.013	.00	.00	PIPE
718.275	50.032	.878	50.910	1.07	1.16	.02	50.93	.00	.41	1.14	1.250	.000	.00	1 .0
.754	.0467					.0004	.00	.88	.23	.23	.013	.00	.00	PIPE
719.029	50.067	.841	50.908	1.07	1.22	.02	50.93	.00	.41	1.17	1.250	.000	.00	1 .0
.685	.0467					.0005	.00	.84	.25	.23	.013	.00	.00	PIPE
719.714	50.099	.807	50.906	1.07	1.28	.03	50.93	.00	.41	1.20	1.250	.000	.00	1 .0
.660	.0467					.0005	.00	.81	.27	.23	.013	.00	.00	PIPE
720.374	50.130	.774	50.904	1.07	1.34	.03	50.93	.00	.41	1.21	1.250	.000	.00	1 .0
.590	.0467					.0006	.00	.77	.29	.23	.013	.00	.00	PIPE
720.964	50.157	.744	50.901	1.07	1.40	.03	50.93	.00	.41	1.23	1.250	.000	.00	1 .0
.563	.0467					.0007	.00	.74	.31	.23	.013	.00	.00	PIPE
721.527	50.184	.715	50.899	1.07	1.47	.03	50.93	.00	.41	1.24	1.250	.000	.00	1 .0
.514	.0467					.0007	.00	.72	.34	.23	.013	.00	.00	PIPE

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
722.041	50.208	.688	50.896	1.07	1.54	.04	50.93	.00	.41	1.24	1.250	.000	.00	1 .0
.486	.0467					.0008	.00	.69	.36	.23	.013	.00	.00	PIPE
722.528	50.230	.662	50.892	1.07	1.62	.04	50.93	.00	.41	1.25	1.250	.000	.00	1 .0
.052	.0467					.0010	.00	.66	.39	.23	.013	.00	.00	PIPE
722.579	50.233	.637	50.870	1.07	1.70	.04	50.91	.00	.41	1.25	1.250	.000	.00	1 .0
HYDRAULIC JUMP														
722.579	50.233	.234	50.467	1.07	6.73	.70	51.17	.00	.41	.98	1.250	.000	.00	1 .0
94.649	.0467					.0467	4.42	.23	2.94	.23	.013	.00	.00	PIPE
817.229	54.654	.234	54.888	1.07	6.73	.70	55.59	.00	.41	.98	1.250	.000	.00	1 .0

18.902	.0467					.0448	.85	.23	2.94	.23	.013	.00	.00	PIPE			
836.131	55.537	.239	55.776	1.07	6.52	.66	56.44	.00	.41	.98	1.250	.000	.00	1	.0		
7.879	.0467					.0401	.32	.24	2.82	.23	.013	.00	.00	PIPE			
844.010	55.905	.247	56.152	1.07	6.22	.60	56.75	.00	.41	1.00	1.250	.000	.00	1	.0		
3.987	.0467					.0350	.14	.25	2.64	.23	.013	.00	.00	PIPE			
847.997	56.091	.255	56.346	1.07	5.93	.55	56.89	.00	.41	1.01	1.250	.000	.00	1	.0		
2.523	.0467					.0306	.08	.26	2.47	.23	.013	.00	.00	PIPE			
850.520	56.209	.264	56.473	1.07	5.66	.50	56.97	.00	.41	1.02	1.250	.000	.00	1	.0		
1.811	.0467					.0268	.05	.26	2.31	.23	.013	.00	.00	PIPE			

Program Package Serial Number: 1540

WATER SURFACE PROFILE LISTING Date: 1-11-2024 Time: 3:39:32

NCTD OCEANSIDE TRANSIT CENTER TOD
ALTERNATE CENTRAL TRIBUTARY AREA ANALYSIS
LINE A WSPG FOR 100-YEAR STORM

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
852.332	56.294	.273	56.567	1.07	5.39	.45	57.02	.00	.41	1.03	1.250	.000	.00	1	.0		
1.373	.0467					.0234	.03	.27	2.17	.23	.013	.00	.00	PIPE			
853.705	56.358	.282	56.640	1.07	5.14	.41	57.05	.00	.41	1.05	1.250	.000	.00	1	.0		
1.040	.0467					.0204	.02	.28	2.03	.23	.013	.00	.00	PIPE			
854.744	56.406	.292	56.698	1.07	4.90	.37	57.07	.00	.41	1.06	1.250	.000	.00	1	.0		
.830	.0467					.0179	.01	.29	1.90	.23	.013	.00	.00	PIPE			
855.574	56.445	.302	56.747	1.07	4.67	.34	57.09	.00	.41	1.07	1.250	.000	.00	1	.0		
.670	.0467					.0156	.01	.30	1.78	.23	.013	.00	.00	PIPE			
856.244	56.476	.312	56.788	1.07	4.46	.31	57.10	.00	.41	1.08	1.250	.000	.00	1	.0		
.506	.0467					.0137	.01	.31	1.67	.23	.013	.00	.00	PIPE			
856.750	56.500	.323	56.823	1.07	4.25	.28	57.10	.00	.41	1.09	1.250	.000	.00	1	.0		
29.000	.0128					.0128	.37	.32	1.56	.32	.013	.00	.00	PIPE			
885.750	56.870	.323	57.193	1.07	4.25	.28	57.47	.00	.41	1.09	1.250	.000	.00	1	.0		
11.267	.0128					.0128	.14	.32	1.56	.32	.013	.00	.00	PIPE			

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
897.017	57.014	.323	57.337	1.07	4.25	.28	57.62	.00	.41	1.09	1.250	.000	.00	1 .0
17.733	.0128					.0128	.23	.32	1.56	.32	.013	.00	.00	PIPE
914.750	57.240	.322	57.562	1.07	4.27	.28	57.85	.00	.41	1.09	1.250	.000	.00	1 .0
59.608	.0129					.0129	.77	.32	1.57	.32	.013	.00	.00	PIPE

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
974.358	58.010	.322	58.332	1.07	4.27	.28	58.61	.00	.41	1.09	1.250	.000	.00	1 .0
19.392	.0129					.0128	.25	.32	1.57	.32	.013	.00	.00	PIPE
993.750	58.260	.324	58.584	1.07	4.23	.28	58.86	.00	.41	1.10	1.250	.000	.00	1 .0
8.000	.0125					.0126	.10	.32	1.55	.33	.013	.00	.00	PIPE
1001.750	58.360	.324	58.685	1.07	4.23	.28	58.96	.00	.41	1.10	1.250	.000	.00	1 .0
8.000	.0125					.0127	.10	.32	1.55	.33	.013	.00	.00	PIPE
1009.750	58.460	.323	58.783	1.07	4.26	.28	59.06	.00	.41	1.09	1.250	.000	.00	1 .0
13.667	.0128					.0128	.18	.32	1.57	.32	.013	.00	.00	PIPE
1023.417	58.635	.323	58.958	1.07	4.26	.28	59.24	.00	.41	1.09	1.250	.000	.00	1 .0
18.333	.0128					.0121	.22	.32	1.57	.32	.013	.00	.00	PIPE
1041.750	58.870	.333	59.203	1.07	4.08	.26	59.46	.00	.41	1.11	1.250	.000	.00	1 .0
4.084	.0130					.0108	.04	.33	1.47	.32	.013	.00	.00	PIPE
1045.834	58.923	.341	59.264	1.07	3.93	.24	59.50	.00	.41	1.11	1.250	.000	.00	1 .0
2.874	.0130					.0096	.03	.34	1.40	.32	.013	.00	.00	PIPE
1048.708	58.960	.353	59.314	1.07	3.75	.22	59.53	.00	.41	1.13	1.250	.000	.00	1 .0
1.482	.0130					.0084	.01	.35	1.31	.32	.013	.00	.00	PIPE
1050.190	58.980	.366	59.346	1.07	3.57	.20	59.54	.00	.41	1.14	1.250	.000	.00	1 .0
1.065	.0130					.0074	.01	.37	1.23	.32	.013	.00	.00	PIPE

WATER SURFACE PROFILE LISTING Date: 1-11-2024 Time: 3:39:32

NCTD OCEANSIDE TRANSIT CENTER TOD
ALTERNATE CENTRAL TRIBUTARY AREA ANALYSIS
LINE A WSPG FOR 100-YEAR STORM

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
1051.255	58.994	.378	59.372	1.07	3.41	.18	59.55	.00	.41	1.15	1.250	.000	.00	1 .0
.362	.0130					.0064	.00	.38	1.15	.32	.013	.00	.00	PIPE
1051.617	58.998	.392	59.390	1.07	3.25	.16	59.55	.00	.41	1.16	1.250	.000	.00	1 .0
.133	.0130					.0056	.00	.39	1.07	.32	.013	.00	.00	PIPE
1051.750	59.000	.407	59.407	1.07	3.09	.15	59.55	.00	.41	1.17	1.250	.000	.00	1 .0

LINE A1 WSPG (1 PAGE)

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T1 NCTD OCEANSIDE TRANSIT CENTER TOD                                          0
T2 ALTERNATE CENTRAL TRIBUTARY AREA ANALYSIS
T3 LINE A1 WSPG FOR 100-YR STORM
SO    221.500  43.810  1                          48.116
R     394.500  44.680  1      .013                              .000 -90.000 0
R     473.050  45.070  1      .013                              .000  90.000 0
R     610.500  45.760  1      .013                              .000  90.000 0
R     618.500  45.800  1      .013                              .000    .000 0
SH    618.500  45.800  1                          45.800
CD   1  4   1    .000   1.250     .000  .000  .000   .00
Q             3.460   .0
```

LINE A1 WSPG OUTPUT (1 PAGE)

Program Package Serial Number: 1540

WATER SURFACE PROFILE LISTING Date: 1-11-2024 Time: 3:39:53

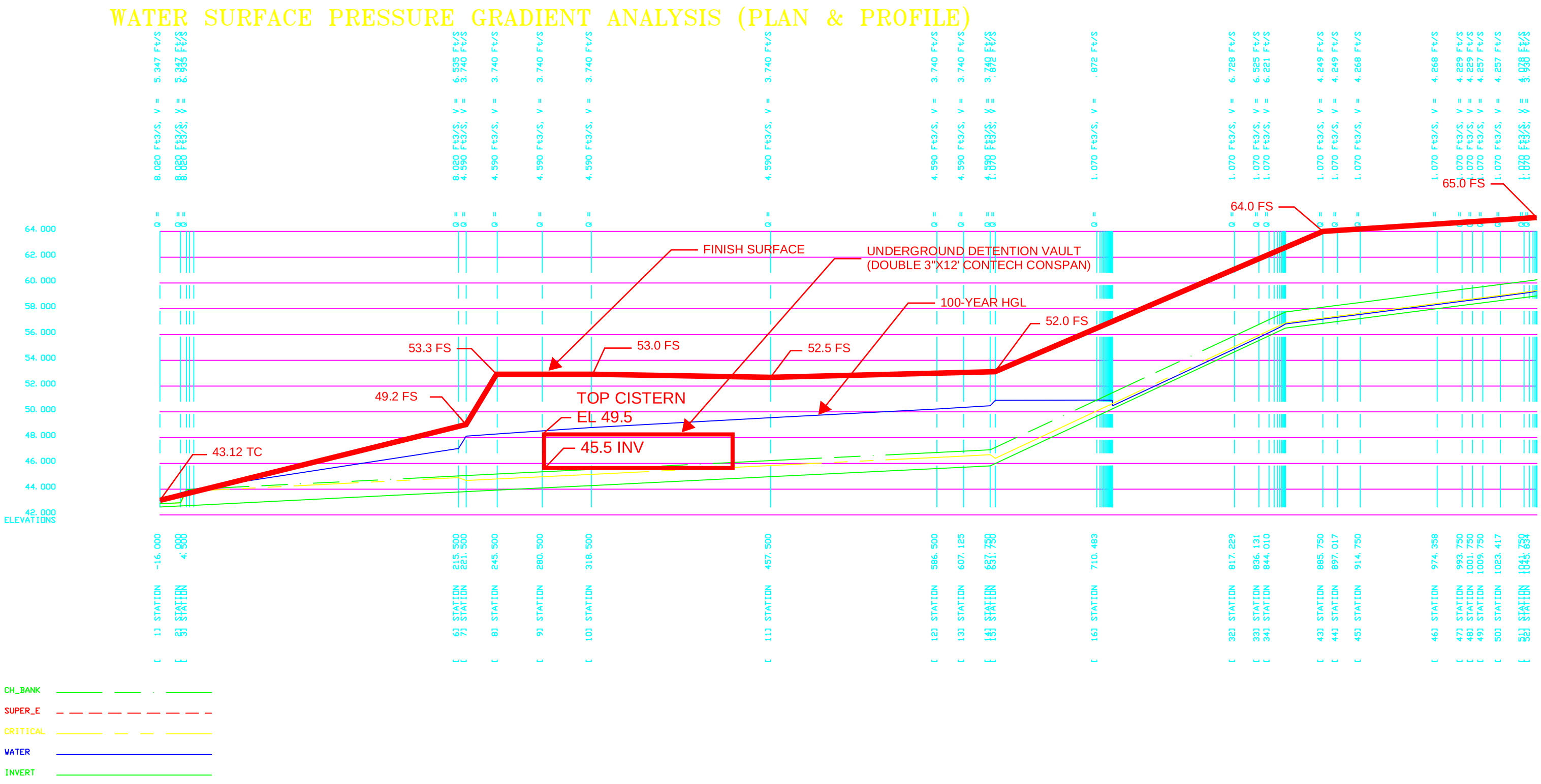
NCTD OCEANSIDE TRANSIT CENTER TOD

ALTERNATE CENTRAL TRIBUTARY AREA ANALYSIS

LINE A1 WSPG FOR 100-YR STORM

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/ Dia.-FT / "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth Prs/Pip / Type Ch
221.500	43.810	4.306	48.116	3.46	2.82	.12	48.24	.00	.75	.00	1.250	.000	.00	1 .0
173.000	.0050					.0029	.50	4.31	.00	.81	.013	.00	.00	PIPE
394.500	44.680	3.969	48.649	3.46	2.82	.12	48.77	.00	.75	.00	1.250	.000	.00	1 .0
78.550	.0050					.0029	.23	3.97	.00	.82	.013	.00	.00	PIPE
473.050	45.070	3.841	48.911	3.46	2.82	.12	49.03	.00	.75	.00	1.250	.000	.00	1 .0
137.450	.0050					.0029	.39	3.84	.00	.81	.013	.00	.00	PIPE
610.500	45.760	3.582	49.342	3.46	2.82	.12	49.47	.00	.75	.00	1.250	.000	.00	1 .0
8.000	.0050					.0029	.02	3.58	.00	.81	.013	.00	.00	PIPE
618.500	45.800	3.565	49.365	3.46	2.82	.12	49.49	.00	.75	.00	1.250	.000	.00	1 .0

LINE A HGL PROFILE DETAIL (1 PAGE)



```
T1 Oceanside OTC Tremont                                                    0
T2 Cleveland SD Extention Capacity Analysis
T3 C:\Program Files\CIVILD\OTC_prop100_nf.wsw
SO   1000.000  39.000  1                          42.500
R    1042.550  39.130  1      .013                                    45.0
R    1073.970  39.220  1      .013                                   -45.0
R    1388.420  40.170  1      .013
JX   1392.420  40.180  1  2   .013    0.001          42.18          45.0
R    1428.790  40.290  1      .013
JX   1432.790  40.300  1  2   .013    0.001          42.30          45.0
R    1820.560  41.460  1      .013
JX   1824.560  41.470  1  2   .013    0.001          43.47          45.0
R    1865.820  41.600  1      .013
JX   1869.820  41.610  3  2   .013    0.001          43.11          45.0
R    2327.550  43.000  3      .013
JX   2331.550  44.500  2  2   .013    0.001          44.50          45.0
R    2380.940  44.720  2      .013                              -49.240
R    2416.270  44.910  2      .013                               49.200
JX   2420.270  45.430  4  4   .013    0.001          45.43          -90.0
R    2816.100  47.000  4      .013
R    2849.420  47.150  4      .013                               45.000
JX   2853.420  47.200  4  4   .013    0.001          47.20          -90.0
R    2886.770  48.180  4      .013                               45.000
R    2921.220  49.190  4      .013
JX   2925.220  49.310  4  4  5.013    0.001    1.010  49.31   49.31  45.0-45.0
R    3188.180  57.030  4      .013
R    3197.660  57.340  4      .013
SH   3197.660  57.340  4
CD   1  4   0           4.000    0.000
CD   2  4   0           2.000    0.000
CD   3  4   0           3.500    0.000
CD   4  4   0           1.500    0.000
CD   5  4   0           1.000    0.000
Q            15.500   .0
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Program Package Serial Number: 1540

WATER SURFACE PROFILE LISTING Date: 7-19-2024 Time: 2: 4:53

Oceanside OTC Tremont
Cleveland SD Extention Capacity Analysis
C:\Program Files\CIVILD\OTC_prop100_nf.wsw

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
1000.000	39.000	3.500	42.500	16.52	1.42	.03	42.53	.00	1.19	2.65	4.000	.000	.00	0 .0
42.550	.0031					.0001	.01	3.50	.12	1.24	.013	.00	.00	PIPE
1042.550	39.130	3.373	42.503	16.52	1.46	.03	42.54	.00	1.19	2.91	4.000	.000	.00	0 .0
31.420	.0029					.0001	.00	3.37	.13	1.26	.013	.00	.00	PIPE
1073.970	39.220	3.286	42.506	16.52	1.50	.03	42.54	.00	1.19	3.06	4.000	.000	.00	0 .0
54.891	.0030					.0001	.01	3.29	.14	1.24	.013	.00	.00	PIPE
1128.861	39.386	3.124	42.510	16.52	1.57	.04	42.55	.00	1.19	3.31	4.000	.000	.00	0 .0
48.881	.0030					.0002	.01	3.12	.15	1.24	.013	.00	.00	PIPE
1177.742	39.534	2.980	42.514	16.52	1.64	.04	42.56	.00	1.19	3.49	4.000	.000	.00	0 .0
44.487	.0030					.0002	.01	2.98	.17	1.24	.013	.00	.00	PIPE
1222.230	39.668	2.849	42.517	16.52	1.73	.05	42.56	.00	1.19	3.62	4.000	.000	.00	0 .0
41.478	.0030					.0002	.01	2.85	.19	1.24	.013	.00	.00	PIPE
1263.708	39.793	2.727	42.520	16.52	1.81	.05	42.57	.00	1.19	3.73	4.000	.000	.00	0 .0
38.097	.0030					.0002	.01	2.73	.20	1.24	.013	.00	.00	PIPE
1301.805	39.908	2.615	42.523	16.52	1.90	.06	42.58	.00	1.19	3.81	4.000	.000	.00	0 .0
36.126	.0030					.0002	.01	2.62	.22	1.24	.013	.00	.00	PIPE
1337.931	40.017	2.509	42.527	16.52	1.99	.06	42.59	.00	1.19	3.87	4.000	.000	.00	0 .0
33.781	.0030					.0003	.01	2.51	.24	1.24	.013	.00	.00	PIPE

Program Package Serial Number: 1540

WATER SURFACE PROFILE LISTING Date: 7-19-2024 Time: 2: 4:53

Oceanside OTC Tremont
Cleveland SD Extention Capacity Analysis
C:\Program Files\CIVILD\OTC_prop100_nf.wsw

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
1371.712	40.120	2.410	42.530	16.52	2.09	.07	42.60	.00	1.19	3.92	4.000	.000	.00	0 .0
16.708	.0030					.0003	.00	2.41	.26	1.24	.013	.00	.00	PIPE
1388.420	40.170	2.361	42.531	16.52	2.14	.07	42.60	.00	1.19	3.93	4.000	.000	.00	0 .0
JUNCT STR	.0025					.0003	.00	2.36	.27		.013	.00	.00	PIPE
1392.420	40.180	2.352	42.532	16.52	2.15	.07	42.60	.00	1.19	3.94	4.000	.000	.00	0 .0
30.992	.0030					.0003	.01	2.35	.27	1.24	.013	.00	.00	PIPE
1423.412	40.274	2.261	42.535	16.52	2.25	.08	42.61	.00	1.19	3.97	4.000	.000	.00	0 .0
5.378	.0030					.0004	.00	2.26	.29	1.24	.013	.00	.00	PIPE
1428.790	40.290	2.245	42.535	16.52	2.27	.08	42.62	.00	1.19	3.97	4.000	.000	.00	0 .0
JUNCT STR	.0025					.0004	.00	2.25	.30		.013	.00	.00	PIPE
1432.790	40.300	2.236	42.536	16.52	2.29	.08	42.62	.00	1.19	3.97	4.000	.000	.00	0 .0
29.525	.0030					.0004	.01	2.24	.30	1.24	.013	.00	.00	PIPE
1462.315	40.388	2.151	42.539	16.52	2.40	.09	42.63	.00	1.19	3.99	4.000	.000	.00	0 .0
27.879	.0030					.0004	.01	2.15	.32	1.24	.013	.00	.00	PIPE
1490.194	40.472	2.071	42.543	16.52	2.51	.10	42.64	.00	1.19	4.00	4.000	.000	.00	0 .0
26.982	.0030					.0005	.01	2.07	.35	1.24	.013	.00	.00	PIPE
1517.177	40.552	1.994	42.547	16.52	2.64	.11	42.65	.00	1.19	4.00	4.000	.000	.00	0 .0
25.682	.0030					.0006	.01	1.99	.37	1.24	.013	.00	.00	PIPE

Program Package Serial Number: 1540

WATER SURFACE PROFILE LISTING Date: 7-19-2024 Time: 2: 4:53

Oceanside OTC Tremont
Cleveland SD Extention Capacity Analysis
C:\Program Files\CIVILD\OTC_prop100_nf.wsw

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
1542.859	40.629	1.921	42.550	16.52	2.77	.12	42.67	.00	1.19	4.00	4.000	.000	.00	0 .0
24.367	.0030					.0006	.02	1.92	.40	1.24	.013	.00	.00	PIPE
1567.225	40.702	1.852	42.554	16.52	2.90	.13	42.68	.00	1.19	3.99	4.000	.000	.00	0 .0
23.912	.0030					.0007	.02	1.85	.43	1.24	.013	.00	.00	PIPE
1591.137	40.774	1.785	42.559	16.52	3.04	.14	42.70	.00	1.19	3.98	4.000	.000	.00	0 .0
22.574	.0030					.0008	.02	1.79	.46	1.24	.013	.00	.00	PIPE
1613.712	40.841	1.722	42.563	16.52	3.19	.16	42.72	.00	1.19	3.96	4.000	.000	.00	0 .0
22.172	.0030					.0010	.02	1.72	.49	1.24	.013	.00	.00	PIPE
1635.884	40.908	1.661	42.569	16.52	3.35	.17	42.74	.00	1.19	3.94	4.000	.000	.00	0 .0
21.832	.0030					.0011	.02	1.66	.53	1.24	.013	.00	.00	PIPE
1657.716	40.973	1.602	42.575	16.52	3.51	.19	42.77	.00	1.19	3.92	4.000	.000	.00	0 .0
21.011	.0030					.0012	.03	1.60	.56	1.24	.013	.00	.00	PIPE
1678.727	41.036	1.546	42.582	16.52	3.68	.21	42.79	.00	1.19	3.90	4.000	.000	.00	0 .0
20.206	.0030					.0014	.03	1.55	.60	1.24	.013	.00	.00	PIPE
1698.933	41.096	1.493	42.589	16.52	3.86	.23	42.82	.00	1.19	3.87	4.000	.000	.00	0 .0
20.852	.0030					.0016	.03	1.49	.65	1.24	.013	.00	.00	PIPE
1719.784	41.159	1.441	42.600	16.52	4.05	.25	42.85	.00	1.19	3.84	4.000	.000	.00	0 .0
21.190	.0030					.0018	.04	1.44	.69	1.24	.013	.00	.00	PIPE

Program Package Serial Number: 1540

WATER SURFACE PROFILE LISTING Date: 7-19-2024 Time: 2: 4:53

Oceanside OTC Tremont
Cleveland SD Extention Capacity Analysis
C:\Program Files\CIVILD\OTC_prop100_nf.wsw

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
1740.974	41.222	1.391	42.613	16.52	4.25	.28	42.89	.00	1.19	3.81	4.000	.000	.00	0 .0
21.118	.0030					.0021	.04	1.39	.74	1.24	.013	.00	.00	PIPE
1762.092	41.285	1.344	42.629	16.52	4.45	.31	42.94	.00	1.19	3.78	4.000	.000	.00	0 .0
25.178	.0030					.0024	.06	1.34	.79	1.24	.013	.00	.00	PIPE
1787.270	41.360	1.298	42.659	16.52	4.67	.34	43.00	.00	1.19	3.75	4.000	.000	.00	0 .0
33.290	.0030					.0027	.09	1.30	.85	1.24	.013	.00	.00	PIPE
1820.560	41.460	1.259	42.719	16.52	4.88	.37	43.09	.00	1.19	3.72	4.000	.000	.00	0 .0
JUNCT STR	.0025					.0028	.01	1.26	.90		.013	.00	.00	PIPE
1824.560	41.470	1.266	42.736	16.51	4.84	.36	43.10	.00	1.19	3.72	4.000	.000	.00	0 .0
14.551	.0032					.0030	.04	1.27	.89	1.23	.013	.00	.00	PIPE
1839.111	41.516	1.228	42.744	16.51	5.04	.39	43.14	.00	1.19	3.69	4.000	.000	.00	0 .0
HYDRAULIC JUMP														
1839.111	41.516	1.126	42.642	16.51	5.69	.50	43.14	.00	1.19	3.60	4.000	.000	.00	0 .0
1.825	.0032					.0044	.01	1.13	1.12	1.23	.013	.00	.00	PIPE
1840.936	41.522	1.126	42.648	16.51	5.69	.50	43.15	.00	1.19	3.60	4.000	.000	.00	0 .0
7.786	.0032					.0047	.04	1.13	1.12	1.23	.013	.00	.00	PIPE
1848.722	41.546	1.088	42.634	16.51	5.97	.55	43.19	.00	1.19	3.56	4.000	.000	.00	0 .0
8.571	.0032					.0054	.05	1.09	1.19	1.23	.013	.00	.00	PIPE

Program Package Serial Number: 1540

WATER SURFACE PROFILE LISTING Date: 7-19-2024 Time: 2: 4:53

Oceanside OTC Tremont
Cleveland SD Extention Capacity Analysis
C:\Program Files\CIVILD\OTC_prop100_nf.wsw

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
1857.293	41.573	1.052	42.625	16.51	6.26	.61	43.23	.00	1.19	3.52	4.000	.000	.00	0 .0
8.527	.0032					.0062	.05	1.05	1.27	1.23	.013	.00	.00	PIPE
1865.820	41.600	1.017	42.617	16.51	6.56	.67	43.29	.00	1.19	3.48	4.000	.000	.00	0 .0
JUNCT STR	.0025					.0052	.02	1.02	1.36		.013	.00	.00	PIPE
1869.820	41.610	1.239	42.849	16.51	5.42	.46	43.30	.00	1.24	3.35	3.500	.000	.00	0 .0
5.130	.0030					.0035	.02	1.24	1.00	1.31	.013	.00	.00	PIPE
1874.950	41.626	1.283	42.909	16.51	5.16	.41	43.32	.00	1.24	3.37	3.500	.000	.00	0 .0
42.662	.0030					.0031	.13	1.28	.93	1.31	.013	.00	.00	PIPE
1917.613	41.755	1.309	43.064	16.51	5.03	.39	43.46	.00	1.24	3.39	3.500	.000	.00	0 .0
283.789	.0030					.0030	.86	1.31	.90	1.31	.013	.00	.00	PIPE
2201.402	42.617	1.309	43.926	16.51	5.03	.39	44.32	.00	1.24	3.39	3.500	.000	.00	0 .0
HYDRAULIC JUMP														
2201.402	42.617	1.137	43.754	16.51	6.09	.58	44.33	.00	1.24	3.28	3.500	.000	.00	0 .0
5.604	.0030					.0052	.03	1.14	1.18	1.31	.013	.00	.00	PIPE
2207.006	42.634	1.137	43.771	16.51	6.09	.58	44.35	.00	1.24	3.28	3.500	.000	.00	0 .0
7.871	.0030					.0055	.04	1.14	1.18	1.31	.013	.00	.00	PIPE
2214.877	42.658	1.099	43.757	16.51	6.38	.63	44.39	.00	1.24	3.25	3.500	.000	.00	0 .0
8.047	.0030					.0063	.05	1.10	1.26	1.31	.013	.00	.00	PIPE

Oceanside OTC Tremont
Cleveland SD Extention Capacity Analysis
C:\Program Files\CIVILD\OTC_prop100_nf.wsw

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
2222.924	42.682	1.062	43.744	16.51	6.70	.70	44.44	.00	1.24	3.22	3.500	.000	.00	0 .0
8.075	.0030					.0072	.06	1.06	1.35	1.31	.013	.00	.00	PIPE
2231.000	42.707	1.026	43.733	16.51	7.02	.77	44.50	.00	1.24	3.19	3.500	.000	.00	0 .0
8.017	.0030					.0082	.07	1.03	1.44	1.31	.013	.00	.00	PIPE
2239.017	42.731	.991	43.722	16.51	7.37	.84	44.56	.00	1.24	3.15	3.500	.000	.00	0 .0
8.058	.0030					.0094	.08	.99	1.54	1.31	.013	.00	.00	PIPE
2247.075	42.756	.958	43.714	16.51	7.73	.93	44.64	.00	1.24	3.12	3.500	.000	.00	0 .0
7.876	.0030					.0107	.08	.96	1.64	1.31	.013	.00	.00	PIPE
2254.951	42.780	.926	43.706	16.51	8.10	1.02	44.72	.00	1.24	3.09	3.500	.000	.00	0 .0
7.678	.0030					.0123	.09	.93	1.76	1.31	.013	.00	.00	PIPE
2262.629	42.803	.895	43.698	16.51	8.50	1.12	44.82	.00	1.24	3.05	3.500	.000	.00	0 .0
7.469	.0030					.0140	.10	.90	1.88	1.31	.013	.00	.00	PIPE
2270.099	42.826	.865	43.691	16.51	8.91	1.23	44.92	.00	1.24	3.02	3.500	.000	.00	0 .0
7.327	.0030					.0160	.12	.87	2.00	1.31	.013	.00	.00	PIPE
2277.426	42.848	.837	43.685	16.51	9.35	1.36	45.04	.00	1.24	2.99	3.500	.000	.00	0 .0
7.029	.0030					.0184	.13	.84	2.14	1.31	.013	.00	.00	PIPE
2284.454	42.869	.809	43.678	16.51	9.80	1.49	45.17	.00	1.24	2.95	3.500	.000	.00	0 .0
6.809	.0030					.0210	.14	.81	2.29	1.31	.013	.00	.00	PIPE

Oceanside OTC Tremont
Cleveland SD Extention Capacity Analysis
C:\Program Files\CIVILD\OTC_prop100_nf.wsw

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
2291.263	42.890	.782	43.672	16.51	10.28	1.64	45.31	.00	1.24	2.92	3.500	.000	.00	0 .0
6.589	.0030					.0240	.16	.78	2.44	1.31	.013	.00	.00	PIPE
2297.852	42.910	.756	43.666	16.51	10.78	1.81	45.47	.00	1.24	2.88	3.500	.000	.00	0 .0
6.370	.0030					.0275	.17	.76	2.61	1.31	.013	.00	.00	PIPE
2304.222	42.929	.731	43.660	16.51	11.31	1.99	45.65	.00	1.24	2.85	3.500	.000	.00	0 .0
6.153	.0030					.0314	.19	.73	2.78	1.31	.013	.00	.00	PIPE
2310.375	42.948	.707	43.655	16.51	11.86	2.19	45.84	.00	1.24	2.81	3.500	.000	.00	0 .0
5.938	.0030					.0360	.21	.71	2.97	1.31	.013	.00	.00	PIPE
2316.313	42.966	.684	43.650	16.51	12.44	2.40	46.05	.00	1.24	2.78	3.500	.000	.00	0 .0
5.726	.0030					.0412	.24	.68	3.17	1.31	.013	.00	.00	PIPE
2322.039	42.983	.662	43.645	16.51	13.05	2.64	46.29	.00	1.24	2.74	3.500	.000	.00	0 .0
5.511	.0030					.0471	.26	.66	3.38	1.31	.013	.00	.00	PIPE
2327.550	43.000	.641	43.641	16.51	13.69	2.91	46.55	.00	1.24	2.71	3.500	.000	.00	0 .0
JUNCT STR	.3750					.0292	.12	.91	3.61		.013	.00	.00	PIPE
2331.550	44.500	1.373	45.873	16.51	7.18	.80	46.67	.03	1.47	1.86	2.000	.000	.00	0 .0
4.444	.0045					.0084	.04	1.40	1.14	2.00	.013	.00	.00	PIPE
2335.994	44.520	1.327	45.847	16.51	7.46	.86	46.71	.03	1.47	1.89	2.000	.000	.00	0 .0
6.647	.0045					.0093	.06	1.36	1.21	2.00	.013	.00	.00	PIPE

Oceanside OTC Tremont
Cleveland SD Extention Capacity Analysis
C:\Program Files\CIVILD\OTC_prop100_nf.wsw

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
2342.641	44.549	1.273	45.823	16.51	7.82	.95	46.77	.03	1.47	1.92	2.000	.000	.00	0 .0
7.270	.0045					.0105	.08	1.30	1.32	2.00	.013	.00	.00	PIPE
2349.911	44.582	1.222	45.804	16.51	8.20	1.04	46.85	.04	1.47	1.95	2.000	.000	.00	0 .0
7.759	.0045					.0119	.09	1.26	1.42	2.00	.013	.00	.00	PIPE
2357.670	44.616	1.175	45.791	16.51	8.60	1.15	46.94	.04	1.47	1.97	2.000	.000	.00	0 .0
7.695	.0045					.0134	.10	1.21	1.54	2.00	.013	.00	.00	PIPE
2365.365	44.651	1.129	45.780	16.51	9.02	1.26	47.04	.04	1.47	1.98	2.000	.000	.00	0 .0
7.867	.0045					.0152	.12	1.17	1.66	2.00	.013	.00	.00	PIPE
2373.232	44.686	1.087	45.773	16.51	9.46	1.39	47.16	.05	1.47	1.99	2.000	.000	.00	0 .0
7.708	.0045					.0172	.13	1.14	1.78	2.00	.013	.00	.00	PIPE
2380.940	44.720	1.046	45.766	16.51	9.93	1.53	47.30	.07	1.47	2.00	2.000	.000	.00	0 .0
5.177	.0054					.0191	.10	1.12	1.92	1.63	.013	.00	.00	PIPE
2386.117	44.748	1.021	45.769	16.51	10.23	1.63	47.39	.08	1.47	2.00	2.000	.000	.00	0 .0
7.952	.0054					.0212	.17	1.10	2.01	1.63	.013	.00	.00	PIPE
2394.069	44.791	.984	45.775	16.51	10.73	1.79	47.56	.09	1.47	2.00	2.000	.000	.00	0 .0
7.650	.0054					.0240	.18	1.07	2.16	1.63	.013	.00	.00	PIPE
2401.719	44.832	.948	45.780	16.51	11.25	1.97	47.75	.10	1.47	2.00	2.000	.000	.00	0 .0
7.410	.0054					.0273	.20	1.04	2.31	1.63	.013	.00	.00	PIPE

Oceanside OTC Tremont
Cleveland SD Extention Capacity Analysis
C:\Program Files\CIVILD\OTC_prop100_nf.wsw

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
2409.130	44.872	.914	45.786	16.51	11.80	2.16	47.95	.10	1.47	1.99	2.000	.000	.00	0 .0
7.140	.0054					.0311	.22	1.02	2.48	1.63	.013	.00	.00	PIPE
2416.270	44.910	.881	45.791	16.51	12.38	2.38	48.17	.00	1.47	1.99	2.000	.000	.00	0 .0
JUNCT STR	.1300					.0273	.11	.88	2.66		.013	.00	.00	PIPE
2420.270	45.430	1.433	46.863	16.51	9.50	1.40	48.26	.00	1.43	.62	1.500	.000	.00	0 .0
1.264	.0040					.0222	.03	1.43	1.00	1.50	.013	.00	.00	PIPE
2421.534	45.435	1.500	46.935	16.51	9.34	1.36	48.29	.00	1.43	.00	1.500	.000	.00	0 .0
394.566	.0040					.0239	9.41	1.50	.00	1.50	.013	.00	.00	PIPE
2816.100	47.000	9.684	56.684	16.51	9.34	1.36	58.04	.00	1.43	.00	1.500	.000	.00	0 .0
33.320	.0045					.0247	.82	.00	.00	1.50	.013	.00	.00	PIPE
2849.420	47.150	10.550	57.700	16.51	9.34	1.36	59.06	.00	1.43	.00	1.500	.000	.00	0 .0
JUNCT STR	.0125					.0247	.10	.00	.00		.013	.00	.00	PIPE
2853.420	47.200	10.599	57.799	16.51	9.34	1.36	59.15	.00	1.43	.00	1.500	.000	.00	0 .0
33.350	.0294					.0247	.82	.00	.00	1.13	.013	.00	.00	PIPE
2886.770	48.180	10.634	58.814	16.51	9.34	1.36	60.17	.00	1.43	.00	1.500	.000	.00	0 .0
34.450	.0293					.0247	.85	10.63	.00	1.13	.013	.00	.00	PIPE
2921.220	49.190	10.475	59.665	16.51	9.34	1.36	61.02	.00	1.43	.00	1.500	.000	.00	0 .0
JUNCT STR	.0300					.0232	.09	10.48	.00		.013	.00	.00	PIPE

Program Package Serial Number: 1540

WATER SURFACE PROFILE LISTING Date: 7-19-2024 Time: 2: 4:53

Oceanside OTC Tremont
Cleveland SD Extention Capacity Analysis
C:\Program Files\CIVILD\OTC_prop100_nf.wsw

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
2925.220	49.310	10.754	60.064	15.50	8.77	1.19	61.26	.00	1.42	.00	1.500	.000	.00	0 .0
262.960	.0294					.0218	5.73	10.75	.00	1.07	.013	.00	.00	PIPE
3188.180	57.030	8.760	65.790	15.50	8.77	1.19	66.98	.00	1.42	.00	1.500	.000	.00	0 .0
9.480	.0327					.0218	.21	8.76	.00	1.03	.013	.00	.00	PIPE
3197.660	57.340	8.656	65.996	15.50	8.77	1.19	67.19	.00	1.42	.00	1.500	.000	.00	0 .0

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T1 Oceanside OTC Tremont                                                    0
T2 2 YR Cleveland SD Extention Capacity Analysis
T3 C:\Program Files\CIVILD\OTC_prop_.wsw
SO   1000.000  39.000  1                          42.500
R    1042.550  39.130  1      .013                                    45.0
R    1073.970  39.220  1      .013                                   -45.0
R    1388.420  40.170  1      .013
JX   1392.420  40.180  1  2   .013    0.820           42.18          45.0
R    1428.790  40.290  1      .013
JX   1432.790  40.300  1  2   .013   15.190           42.30          45.0
R    1820.560  41.460  1      .013
JX   1824.560  41.470  1  2   .013    1.970           43.47          45.0
R    1865.820  41.600  1      .013
JX   1869.820  41.610  3  2   .013   14.380           43.11          45.0
R    2327.550  43.000  3      .013
JX   2331.550  44.500  2  2   .013    8.460           44.50          45.0
R    2380.940  44.720  2      .013                               -49.240
R    2416.270  44.910  2      .013                                49.200
JX   2420.270  45.430  4  4   .013    4.000           45.43          -90.0
R    2816.100  47.000  4      .013
R    2849.420  47.150  4      .013                                45.000
JX   2853.420  47.200  4  4   .013    0.310           47.20          -90.0
R    2886.770  48.180  4      .013                                45.000
R    2921.220  49.190  4      .013
JX   2925.220  49.310  4  4  5.013    0.660    1.080  49.31   49.31  45.0-45.0
R    3188.180  57.030  4      .013
R    3197.660  57.340  4      .013
SH   3197.660  57.340  4
CD   1  4   0           4.000    0.000
CD   2  4   0           2.000    0.000
CD   3  4   0           3.500    0.000
CD   4  4   0           1.500    0.000
CD   5  4   0           1.000    0.000
Q             5.110   .0
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Program Package Serial Number: 1540

WATER SURFACE PROFILE LISTING Date: 7-18-2024 Time: 7:32: 5

Oceanside OTC Tremont
2 YR Cleveland SD Extention Capacity Analysis
C:\Program Files\CIVILD\OTC_prop_.wsw

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
1000.000	39.000	3.500	42.500	51.98	4.46	.31	42.81	.00	2.17	2.65	4.000	.000	.00	0 .0
42.550	.0031					.0012	.05	3.50	.37	2.36	.013	.00	.00	PIPE
1042.550	39.130	3.408	42.538	51.98	4.56	.32	42.86	.00	2.17	2.84	4.000	.000	.00	0 .0
31.420	.0029					.0012	.04	3.41	.40	2.41	.013	.00	.00	PIPE
1073.970	39.220	3.347	42.567	51.98	4.63	.33	42.90	.00	2.17	2.96	4.000	.000	.00	0 .0
79.865	.0030					.0013	.11	3.35	.42	2.37	.013	.00	.00	PIPE
1153.835	39.461	3.178	42.639	51.98	4.85	.37	43.01	.00	2.17	3.23	4.000	.000	.00	0 .0
72.867	.0030					.0015	.11	3.18	.47	2.37	.013	.00	.00	PIPE
1226.702	39.681	3.028	42.710	51.98	5.09	.40	43.11	.00	2.17	3.43	4.000	.000	.00	0 .0
68.071	.0030					.0016	.11	3.03	.52	2.37	.013	.00	.00	PIPE
1294.773	39.887	2.893	42.780	51.98	5.34	.44	43.22	.00	2.17	3.58	4.000	.000	.00	0 .0
67.259	.0030					.0018	.12	2.89	.57	2.37	.013	.00	.00	PIPE
1362.032	40.090	2.768	42.858	51.98	5.60	.49	43.35	.00	2.17	3.69	4.000	.000	.00	0 .0
26.388	.0030					.0020	.05	2.77	.62	2.37	.013	.00	.00	PIPE
1388.420	40.170	2.722	42.892	51.98	5.71	.51	43.40	.00	2.17	3.73	4.000	.000	.00	0 .0
JUNCT STR	.0025					.0019	.01	2.72	.64		.013	.00	.00	PIPE
1392.420	40.180	2.767	42.947	51.16	5.52	.47	43.42	.00	2.15	3.69	4.000	.000	.00	0 .0
36.370	.0030					.0019	.07	2.77	.61	2.34	.013	.00	.00	PIPE

Program Package Serial Number: 1540

WATER SURFACE PROFILE LISTING Date: 7-18-2024 Time: 7:32: 5

Oceanside OTC Tremont
2 YR Cleveland SD Extention Capacity Analysis
C:\Program Files\CIVILD\OTC_prop_.wsw

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
1428.790	40.290	2.702	42.992	51.16	5.67	.50	43.49	.00	2.15	3.75	4.000	.000	.00	0 .0
JUNCT STR	.0025							2.70	.64		.013	.00	.00	PIPE
1432.790	40.300	1.785	42.085	35.97	6.63	.68	42.77	.00	1.79	3.98	4.000	.000	.00	0 .0
7.454	.0030					.0035	.03	1.79	1.00	1.90	.013	.00	.00	PIPE
1440.244	40.322	1.851	42.173	35.97	6.32	.62	42.79	.00	1.79	3.99	4.000	.000	.00	0 .0
67.573	.0030					.0031	.21	1.85	.93	1.90	.013	.00	.00	PIPE
1507.818	40.524	1.900	42.424	35.97	6.11	.58	43.00	.00	1.79	3.99	4.000	.000	.00	0 .0
312.742	.0030					.0030	.93	1.90	.89	1.90	.013	.00	.00	PIPE
1820.560	41.460	1.900	43.360	35.97	6.11	.58	43.94	.00	1.79	3.99	4.000	.000	.00	0 .0
JUNCT STR	.0025					.0024	.01	1.90	.89		.013	.00	.00	PIPE
1824.560	41.470	2.110	43.580	34.00	5.06	.40	43.98	.00	1.73	3.99	4.000	.000	.00	0 .0
33.986	.0032					.0020	.07	2.11	.69	1.81	.013	.00	.00	PIPE
1858.546	41.577	2.031	43.608	34.00	5.30	.44	44.05	.00	1.73	4.00	4.000	.000	.00	0 .0
7.274	.0032					.0022	.02	2.03	.74	1.81	.013	.00	.00	PIPE
1865.820	41.600	2.015	43.615	34.00	5.36	.45	44.06	.00	1.73	4.00	4.000	.000	.00	0 .0
JUNCT STR	.0025							2.01	.75		.013	.00	.00	PIPE
1869.820	41.610	1.356	42.966	19.62	5.70	.50	43.47	.00	1.36	3.41	3.500	.000	.00	0 .0
5.400	.0030					.0035	.02	1.36	1.00	1.44	.013	.00	.00	PIPE

Oceanside OTC Tremont
2 YR Cleveland SD Extention Capacity Analysis
C:\Program Files\CIVILD\OTC_prop_.wsw

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
1875.220	41.626	1.404	43.030	19.62	5.44	.46	43.49	.00	1.36	3.43	3.500	.000	.00	0 .0
47.697	.0030					.0032	.15	1.40	.93	1.44	.013	.00	.00	PIPE
1922.917	41.771	1.438	43.209	19.62	5.27	.43	43.64	.00	1.36	3.44	3.500	.000	.00	0 .0
287.122	.0030					.0030	.87	1.44	.89	1.44	.013	.00	.00	PIPE
2210.039	42.643	1.438	44.081	19.62	5.27	.43	44.51	.00	1.36	3.44	3.500	.000	.00	0 .0
HYDRAULIC JUMP														
2210.039	42.643	1.258	43.901	19.62	6.30	.62	44.52	.00	1.36	3.36	3.500	.000	.00	0 .0
3.310	.0030					.0050	.02	1.26	1.15	1.44	.013	.00	.00	PIPE
2213.348	42.653	1.258	43.911	19.62	6.30	.62	44.53	.00	1.36	3.36	3.500	.000	.00	0 .0
8.182	.0030					.0053	.04	1.26	1.15	1.44	.013	.00	.00	PIPE
2221.530	42.678	1.215	43.893	19.62	6.61	.68	44.57	.00	1.36	3.33	3.500	.000	.00	0 .0
8.523	.0030					.0061	.05	1.22	1.23	1.44	.013	.00	.00	PIPE
2230.053	42.704	1.173	43.877	19.62	6.93	.75	44.62	.00	1.36	3.30	3.500	.000	.00	0 .0
8.904	.0030					.0069	.06	1.17	1.32	1.44	.013	.00	.00	PIPE
2238.958	42.731	1.133	43.864	19.62	7.27	.82	44.68	.00	1.36	3.28	3.500	.000	.00	0 .0
9.051	.0030					.0079	.07	1.13	1.41	1.44	.013	.00	.00	PIPE
2248.009	42.758	1.095	43.854	19.62	7.63	.90	44.76	.00	1.36	3.25	3.500	.000	.00	0 .0
8.890	.0030					.0090	.08	1.10	1.51	1.44	.013	.00	.00	PIPE

Oceanside OTC Tremont
2 YR Cleveland SD Extention Capacity Analysis
C:\Program Files\CIVILD\OTC_prop_.wsw

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
2256.899	42.785	1.058	43.844	19.62	8.00	.99	44.84	.00	1.36	3.21	3.500	.000	.00	0 .0
8.701	.0030					.0103	.09	1.06	1.61	1.44	.013	.00	.00	PIPE
2265.600	42.812	1.022	43.834	19.62	8.39	1.09	44.93	.00	1.36	3.18	3.500	.000	.00	0 .0
8.494	.0030					.0118	.10	1.02	1.72	1.44	.013	.00	.00	PIPE
2274.094	42.838	.987	43.825	19.62	8.80	1.20	45.03	.00	1.36	3.15	3.500	.000	.00	0 .0
8.366	.0030					.0135	.11	.99	1.84	1.44	.013	.00	.00	PIPE
2282.460	42.863	.954	43.817	19.62	9.23	1.32	45.14	.00	1.36	3.12	3.500	.000	.00	0 .0
8.118	.0030					.0154	.12	.95	1.97	1.44	.013	.00	.00	PIPE
2290.578	42.888	.922	43.810	19.62	9.68	1.45	45.26	.00	1.36	3.08	3.500	.000	.00	0 .0
7.933	.0030					.0176	.14	.92	2.10	1.44	.013	.00	.00	PIPE
2298.511	42.912	.892	43.804	19.62	10.15	1.60	45.40	.00	1.36	3.05	3.500	.000	.00	0 .0
7.613	.0030					.0201	.15	.89	2.25	1.44	.013	.00	.00	PIPE
2306.124	42.935	.862	43.797	19.62	10.64	1.76	45.56	.00	1.36	3.02	3.500	.000	.00	0 .0
7.367	.0030					.0230	.17	.86	2.40	1.44	.013	.00	.00	PIPE
2313.490	42.957	.833	43.790	19.62	11.16	1.94	45.73	.00	1.36	2.98	3.500	.000	.00	0 .0
7.162	.0030					.0263	.19	.83	2.56	1.44	.013	.00	.00	PIPE
2320.653	42.979	.806	43.785	19.62	11.71	2.13	45.91	.00	1.36	2.95	3.500	.000	.00	0 .0
6.897	.0030					.0301	.21	.81	2.74	1.44	.013	.00	.00	PIPE

Oceanside OTC Tremont
2 YR Cleveland SD Extention Capacity Analysis
C:\Program Files\CIVILD\OTC_prop_.wsw

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
2327.550	43.000	.780	43.780	19.62	12.28	2.34	46.12	.00	1.36	2.91	3.500	.000	.00	0 .0
JUNCT STR	.3750					.0188	.08	1.02	2.92		.013	.00	.00	PIPE
2331.550	44.500	1.198	45.698	11.16	5.68	.50	46.20	.02	1.20	1.96	2.000	.000	.00	0 .0
5.122	.0045					.0051	.03	1.22	1.00	1.28	.013	.00	.00	PIPE
2336.672	44.523	1.247	45.770	11.16	5.42	.46	46.23	.02	1.20	1.94	2.000	.000	.00	0 .0
39.961	.0045					.0046	.18	1.26	.93	1.28	.013	.00	.00	PIPE
2376.633	44.701	1.279	45.980	11.16	5.26	.43	46.41	.01	1.20	1.92	2.000	.000	.00	0 .0
4.307	.0045					.0044	.02	1.29	.88	1.28	.013	.00	.00	PIPE
2380.940	44.720	1.279	45.999	11.16	5.26	.43	46.43	.02	1.20	1.92	2.000	.000	.00	0 .0
12.949	.0054					.0047	.06	1.30	.88	1.20	.013	.00	.00	PIPE
2393.889	44.790	1.228	46.018	11.16	5.52	.47	46.49	.02	1.20	1.95	2.000	.000	.00	0 .0
6.158	.0054					.0052	.03	1.25	.95	1.20	.013	.00	.00	PIPE
2400.048	44.823	1.201	46.024	11.16	5.67	.50	46.52	.02	1.20	1.96	2.000	.000	.00	0 .0
16.222	.0054					.0053	.09	1.22	1.00	1.20	.013	.00	.00	PIPE
2416.270	44.910	1.201	46.111	11.16	5.67	.50	46.61	.00	1.20	1.96	2.000	.000	.00	0 .0
JUNCT STR	.1300					.0050	.02	1.20	1.00		.013	.00	.00	PIPE
2420.270	45.430	1.234	46.664	7.16	4.60	.33	46.99	.00	1.04	1.15	1.500	.000	.00	0 .0
86.982	.0040					.0044	.39	1.23	.70	1.50	.013	.00	.00	PIPE

Oceanside OTC Tremont
2 YR Cleveland SD Extention Capacity Analysis
C:\Program Files\CIVILD\OTC_prop_.wsw

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
2507.252	45.775	1.304	47.079	7.16	4.39	.30	47.38	.00	1.04	1.01	1.500	.000	.00	0 .0
308.848	.0040					.0041	1.28	1.30	.61	1.50	.013	.00	.00	PIPE
2816.100	47.000	1.381	48.381	7.16	4.21	.27	48.66	.01	1.04	.81	1.500	.000	.00	0 .0
24.674	.0045					.0040	.10	1.39	.51	1.25	.013	.00	.00	PIPE
2840.774	47.111	1.360	48.471	7.16	4.25	.28	48.75	.01	1.04	.87	1.500	.000	.00	0 .0
HYDRAULIC JUMP														
2840.774	47.111	.752	47.863	7.16	8.07	1.01	48.88	.04	1.04	1.50	1.500	.000	.00	0 .0
3.727	.0045					.0184	.07	.79	1.85	1.25	.013	.00	.00	PIPE
2844.502	47.128	.752	47.880	7.16	8.06	1.01	48.89	.04	1.04	1.50	1.500	.000	.00	0 .0
4.918	.0045					.0196	.10	.79	1.85	1.25	.013	.00	.00	PIPE
2849.420	47.150	.725	47.875	7.16	8.46	1.11	48.99	.00	1.04	1.50	1.500	.000	.00	0 .0
JUNCT STR	.0125					.0242	.10	.80	1.98		.013	.00	.00	PIPE
2853.420	47.200	.652	47.852	6.85	9.29	1.34	49.19	.09	1.01	1.49	1.500	.000	.00	0 .0
11.716	.0294					.0272	.32	.75	2.32	.64	.013	.00	.00	PIPE
2865.136	47.544	.658	48.202	6.85	9.17	1.30	49.51	.09	1.01	1.49	1.500	.000	.00	0 .0
21.634	.0294					.0251	.54	.75	2.28	.64	.013	.00	.00	PIPE
2886.770	48.180	.683	48.863	6.85	8.74	1.19	50.05	.00	1.01	1.49	1.500	.000	.00	0 .0
1.250	.0293					.0233	.03	.68	2.13	.64	.013	.00	.00	PIPE

Program Package Serial Number: 1540

WATER SURFACE PROFILE LISTING Date: 7-18-2024 Time: 7:32: 5

Oceanside OTC Tremont
2 YR Cleveland SD Extention Capacity Analysis
C:\Program Files\CIVILD\OTC_prop_.wsw

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
2888.020	48.217	.685	48.902	6.85	8.70	1.17	50.08	.00	1.01	1.49	1.500	.000	.00	0 .0
10.659	.0293					.0217	.23	.69	2.11	.64	.013	.00	.00	PIPE
2898.680	48.529	.711	49.240	6.85	8.29	1.07	50.31	.00	1.01	1.50	1.500	.000	.00	0 .0
6.878	.0293					.0191	.13	.71	1.97	.64	.013	.00	.00	PIPE
2905.558	48.731	.738	49.469	6.85	7.91	.97	50.44	.00	1.01	1.50	1.500	.000	.00	0 .0
4.829	.0293					.0168	.08	.74	1.83	.64	.013	.00	.00	PIPE
2910.387	48.872	.766	49.638	6.85	7.54	.88	50.52	.00	1.01	1.50	1.500	.000	.00	0 .0
3.469	.0293					.0148	.05	.77	1.71	.64	.013	.00	.00	PIPE
2913.856	48.974	.796	49.770	6.85	7.19	.80	50.57	.00	1.01	1.50	1.500	.000	.00	0 .0
2.583	.0293					.0131	.03	.80	1.59	.64	.013	.00	.00	PIPE
2916.439	49.050	.827	49.877	6.85	6.85	.73	50.61	.00	1.01	1.49	1.500	.000	.00	0 .0
1.874	.0293					.0116	.02	.83	1.48	.64	.013	.00	.00	PIPE
2918.313	49.105	.860	49.965	6.85	6.53	.66	50.63	.00	1.01	1.48	1.500	.000	.00	0 .0
1.375	.0293					.0102	.01	.86	1.37	.64	.013	.00	.00	PIPE
2919.688	49.145	.894	50.039	6.85	6.23	.60	50.64	.00	1.01	1.47	1.500	.000	.00	0 .0
.877	.0293					.0090	.01	.89	1.27	.64	.013	.00	.00	PIPE
2920.564	49.171	.931	50.102	6.85	5.94	.55	50.65	.00	1.01	1.46	1.500	.000	.00	0 .0
.507	.0293					.0080	.00	.93	1.18	.64	.013	.00	.00	PIPE

Oceanside OTC Tremont
2 YR Cleveland SD Extention Capacity Analysis
C:\Program Files\CIVILD\OTC_prop_.wsw

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
2921.072	49.186	.970	50.156	6.85	5.66	.50	50.65	.00	1.01	1.43	1.500	.000	.00	0 .0
.148	.0293					.0071	.00	.97	1.09	.64	.013	.00	.00	PIPE
2921.220	49.190	1.013	50.203	6.85	5.39	.45	50.65	.00	1.01	1.40	1.500	.000	.00	0 .0
JUNCT STR	.0300					.0044	.02	1.01	1.00		.013	.00	.00	PIPE
2925.220	49.310	1.333	50.643	5.11	3.08	.15	50.79	.00	.87	.94	1.500	.000	.00	0 .0
.041	.0294					.0021	.00	1.33	.41	.55	.013	.00	.00	PIPE
2925.261	49.311	1.333	50.644	5.11	3.08	.15	50.79	.00	.87	.94	1.500	.000	.00	0 .0
HYDRAULIC JUMP														
2925.261	49.311	.547	49.858	5.11	8.77	1.19	51.05	.00	.87	1.44	1.500	.000	.00	0 .0
164.110	.0294					.0294	4.82	.55	2.43	.55	.013	.00	.00	PIPE
3089.371	54.129	.547	54.676	5.11	8.77	1.19	55.87	.00	.87	1.44	1.500	.000	.00	0 .0
50.149	.0294					.0286	1.43	.55	2.43	.55	.013	.00	.00	PIPE
3139.520	55.601	.554	56.156	5.11	8.60	1.15	57.30	.00	.87	1.45	1.500	.000	.00	0 .0
25.615	.0294					.0261	.67	.55	2.37	.55	.013	.00	.00	PIPE
3165.135	56.353	.574	56.928	5.11	8.20	1.04	57.97	.00	.87	1.46	1.500	.000	.00	0 .0
11.385	.0294					.0229	.26	.57	2.21	.55	.013	.00	.00	PIPE
3176.521	56.688	.595	57.283	5.11	7.82	.95	58.23	.00	.87	1.47	1.500	.000	.00	0 .0
6.923	.0294					.0201	.14	.60	2.06	.55	.013	.00	.00	PIPE

Program Package Serial Number: 1540

WATER SURFACE PROFILE LISTING Date: 7-18-2024 Time: 7:32: 5

Oceanside OTC Tremont
2 YR Cleveland SD Extention Capacity Analysis
C:\Program Files\CIVILD\OTC_prop_.wsw

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
3183.443	56.891	.617	57.508	5.11	7.45	.86	58.37	.00	.87	1.48	1.500	.000	.00	0 .0
4.737	.0294					.0176	.08	.62	1.93	.55	.013	.00	.00	PIPE
3188.180	57.030	.640	57.670	5.11	7.11	.78	58.45	.00	.87	1.48	1.500	.000	.00	0 .0
.423	.0327					.0163	.01	.64	1.80	.53	.013	.00	.00	PIPE
3188.602	57.044	.643	57.687	5.11	7.05	.77	58.46	.00	.87	1.48	1.500	.000	.00	0 .0
2.628	.0327					.0151	.04	.64	1.78	.53	.013	.00	.00	PIPE
3191.230	57.130	.667	57.797	5.11	6.72	.70	58.50	.00	.87	1.49	1.500	.000	.00	0 .0
1.999	.0327					.0133	.03	.67	1.66	.53	.013	.00	.00	PIPE
3193.229	57.195	.692	57.887	5.11	6.41	.64	58.52	.00	.87	1.50	1.500	.000	.00	0 .0
1.523	.0327					.0117	.02	.69	1.55	.53	.013	.00	.00	PIPE
3194.752	57.245	.718	57.963	5.11	6.11	.58	58.54	.00	.87	1.50	1.500	.000	.00	0 .0
1.147	.0327					.0103	.01	.72	1.44	.53	.013	.00	.00	PIPE
3195.899	57.282	.745	58.028	5.11	5.83	.53	58.55	.00	.87	1.50	1.500	.000	.00	0 .0
.800	.0327					.0091	.01	.75	1.34	.53	.013	.00	.00	PIPE
3196.699	57.309	.774	58.083	5.11	5.55	.48	58.56	.00	.87	1.50	1.500	.000	.00	0 .0
.549	.0327					.0080	.00	.77	1.25	.53	.013	.00	.00	PIPE
3197.248	57.327	.804	58.131	5.11	5.30	.44	58.57	.00	.87	1.50	1.500	.000	.00	0 .0
.335	.0327					.0071	.00	.80	1.16	.53	.013	.00	.00	PIPE

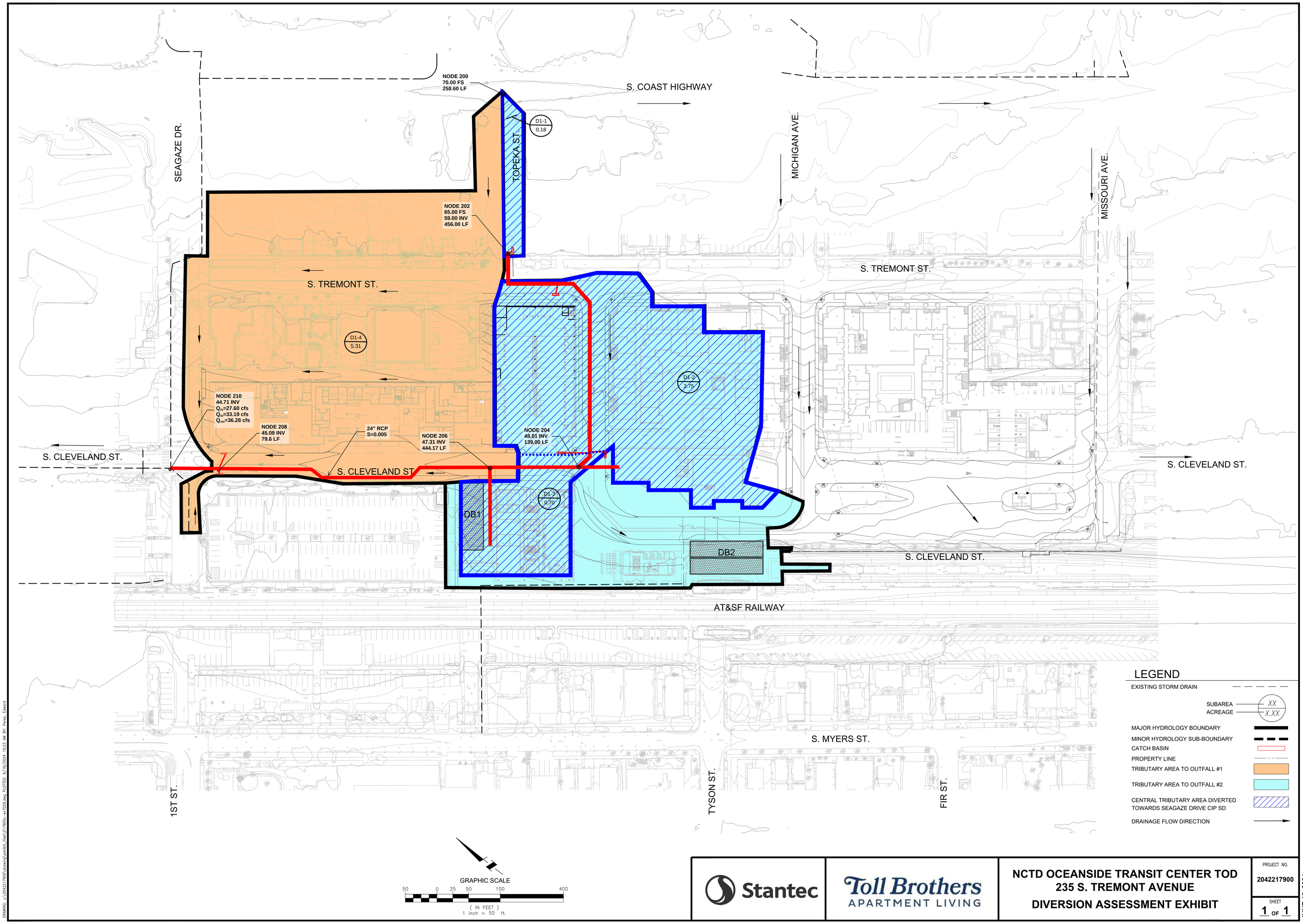
Program Package Serial Number: 1540

WATER SURFACE PROFILE LISTING Date: 7-18-2024 Time: 7:32: 5

Oceanside OTC Tremont
2 YR Cleveland SD Extention Capacity Analysis
C:\Program Files\CIVILD\OTC_prop_.wsw

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
3197.583	57.337	.835	58.173	5.11	5.05	.40	58.57	.00	.87	1.49	1.500	.000	.00	0 .0
.077	.0327					.0062	.00	.84	1.08	.53	.013	.00	.00	PIPE
3197.660	57.340	.870	58.210	5.11	4.81	.36	58.57	.00	.87	1.48	1.500	.000	.00	0 .0

X. CENTRAL TRIBUTARY DIVERSION HYDROLOGY & EXHIBIT



LEGEND

- EXISTING STORM DRAIN
- SUBAREA — XX
- ACREAGE — X.XX
- MAJOR HYDROLOGY BOUNDARY
- MINOR HYDROLOGY SUB-BOUNDARY
- CATCH BASIN
- PROPERTY LINE
- TRIBUTARY AREA TO OUTFALL #1
- TRIBUTARY AREA TO OUTFALL #2
- CENTRAL TRIBUTARY AREA DIVERTED TOWARDS SEAGAZE DRIVE CIP SD
- DRAINAGE FLOW DIRECTION

GRAPHIC SCALE

50 0 25 50 100 400

(IN FEET)
1 inch = 50 ft.

Stantec

Toll Brothers APARTMENT LIVING

NCTD OCEANSIDE TRANSIT CENTER TOD
235 S. TREMONT AVENUE
DIVERSION ASSESSMENT EXHIBIT

PROJECT NO. 2042217900

SHEET 1 OF 1

JUNE 16, 2024

DRAWING: ...\2042217900\drawing\xsh\hl_Flow\2217900--ex7029.dwg PLOTTED: 6/16/2024 10:23 AM BY: Perez, Edward

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            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2016 Advanced Engineering Software (aes)
              Ver. 23.0 Release Date: 07/01/2016  License ID 1535

                              Analysis prepared by:

                                     Stantec



 ************************* DESCRIPTION OF STUDY *************************
* OCEANSIDE TOD - TREMONT SITE                                          *
* ASSESSMENT TO DIVERT PORTIONS OF THE CENTRAL TRIBUTARY AREA TO THE NORTH *
* 25-YEAR STORM                                                         *
 ************************************************************************

  FILE NAME: DIV25YR.DAT
  TIME/DATE OF STUDY: 10:03 06/16/2024
------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) =  25.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.020
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  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    200.00 TO NODE    202.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   258.60
  UPSTREAM ELEVATION(FEET) =     70.00
  DOWNSTREAM ELEVATION(FEET) =     65.00
  ELEVATION DIFFERENCE(FEET) =      5.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.226
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    74.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.322
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.73
  TOTAL AREA(ACRES) =      0.18   TOTAL RUNOFF(CFS) =      0.73

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    204.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    59.00  DOWNSTREAM(FEET) =    48.01
  FLOW LENGTH(FEET) =   456.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   3.0 INCHES
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  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.78
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.73
  PIPE TRAVEL TIME(MIN.) =   1.59    Tc(MIN.) =    5.82
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    204.00 =     714.60 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    204.00 TO NODE    204.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.828
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7600
  SUBAREA AREA(ACRES) =    2.75   SUBAREA RUNOFF(CFS) =   10.09
  TOTAL AREA(ACRES) =        2.9   TOTAL RUNOFF(CFS) =      10.75
  TC(MIN.) =    5.82

****************************************************************************
  FLOW PROCESS FROM NODE    204.00 TO NODE    206.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    48.01  DOWNSTREAM(FEET) =    47.31
  FLOW LENGTH(FEET) =   139.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  16.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.19
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.75
  PIPE TRAVEL TIME(MIN.) =   0.45    Tc(MIN.) =    6.26
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    206.00 =     853.60 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    206.00 TO NODE    206.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.603
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7600
  SUBAREA AREA(ACRES) =    0.70   SUBAREA RUNOFF(CFS) =    2.45
  TOTAL AREA(ACRES) =        3.6   TOTAL RUNOFF(CFS) =      12.70
  TC(MIN.) =    6.26

****************************************************************************
  FLOW PROCESS FROM NODE    206.00 TO NODE    208.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    47.31  DOWNSTREAM(FEET) =    45.09
  FLOW LENGTH(FEET) =   444.17   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.53
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.70
  PIPE TRAVEL TIME(MIN.) =   1.34    Tc(MIN.) =    7.60
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    208.00 =    1297.77 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    208.00 TO NODE    208.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.062
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7600
  SUBAREA AREA(ACRES) =    5.31   SUBAREA RUNOFF(CFS) =   16.39
  TOTAL AREA(ACRES) =        8.9   TOTAL RUNOFF(CFS) =      27.60
  TC(MIN.) =    7.60

****************************************************************************
  FLOW PROCESS FROM NODE    208.00 TO NODE    210.00 IS CODE =  31
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    45.09  DOWNSTREAM(FEET) =    44.71
  FLOW LENGTH(FEET) =    79.60   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  24.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.41
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      27.60
  PIPE TRAVEL TIME(MIN.) =   0.21    Tc(MIN.) =    7.81
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    210.00 =    1377.37 FEET.
================================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        8.9  TC(MIN.) =      7.81
  PEAK FLOW RATE(CFS)   =      27.60
================================================================================
================================================================================
  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 1982-2016 Advanced Engineering Software (aes)
              Ver. 23.0 Release Date: 07/01/2016  License ID 1535

                            Analysis prepared by:

                                   Stantec



 ************************* DESCRIPTION OF STUDY *************************
* OCEANSIDE TOD - TREMONT SITE                                          *
* ASSESSMENT TO DIVERT PORTIONS OF THE CENTRAL TRIBUTARY AREA TO THE NORTH *
* 50-YEAR STORM                                                         *
 ************************************************************************

  FILE NAME: DIV50YR.DAT
  TIME/DATE OF STUDY: 10:07 06/16/2024
------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) =  50.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.400
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  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    200.00 TO NODE    202.00 IS CODE =  21
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
========================================================================
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   258.60
  UPSTREAM ELEVATION(FEET) =     70.00
  DOWNSTREAM ELEVATION(FEET) =     65.00
  ELEVATION DIFFERENCE(FEET) =      5.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.226
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    74.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.323
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.87
  TOTAL AREA(ACRES) =      0.18   TOTAL RUNOFF(CFS) =      0.87

************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    204.00 IS CODE =  31
------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    59.00  DOWNSTREAM(FEET) =    48.01
  FLOW LENGTH(FEET) =   456.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   3.2 INCHES
```

```
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.04
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.87
  PIPE TRAVEL TIME(MIN.) =   1.51    Tc(MIN.) =    5.74
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    204.00 =     714.60 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    204.00 TO NODE    204.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.788
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7600
  SUBAREA AREA(ACRES) =    2.75   SUBAREA RUNOFF(CFS) =   12.10
  TOTAL AREA(ACRES) =        2.9   TOTAL RUNOFF(CFS) =      12.89
  TC(MIN.) =    5.74

****************************************************************************
  FLOW PROCESS FROM NODE    204.00 TO NODE    206.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    48.01  DOWNSTREAM(FEET) =    47.31
  FLOW LENGTH(FEET) =   139.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.56
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.89
  PIPE TRAVEL TIME(MIN.) =   0.42    Tc(MIN.) =    6.15
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    206.00 =     853.60 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    206.00 TO NODE    206.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.532
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7600
  SUBAREA AREA(ACRES) =    0.70   SUBAREA RUNOFF(CFS) =    2.94
  TOTAL AREA(ACRES) =        3.6   TOTAL RUNOFF(CFS) =      15.26
  TC(MIN.) =    6.15

****************************************************************************
  FLOW PROCESS FROM NODE    206.00 TO NODE    208.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    47.31  DOWNSTREAM(FEET) =    45.09
  FLOW LENGTH(FEET) =   444.17   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  19.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.65
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      15.26
  PIPE TRAVEL TIME(MIN.) =   1.31    Tc(MIN.) =    7.46
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    208.00 =    1297.77 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    208.00 TO NODE    208.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.885
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7600
  SUBAREA AREA(ACRES) =    5.31   SUBAREA RUNOFF(CFS) =   19.71
  TOTAL AREA(ACRES) =        8.9   TOTAL RUNOFF(CFS) =      33.19
  TC(MIN.) =    7.46

****************************************************************************
  FLOW PROCESS FROM NODE    208.00 TO NODE    210.00 IS CODE =  31
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    45.09  DOWNSTREAM(FEET) =    44.71
  FLOW LENGTH(FEET) =    79.60   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  25.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.81
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      33.19
  PIPE TRAVEL TIME(MIN.) =   0.19    Tc(MIN.) =    7.66
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    210.00 =    1377.37 FEET.
================================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        8.9  TC(MIN.) =      7.66
  PEAK FLOW RATE(CFS)   =      33.19
================================================================================
================================================================================
  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 1982-2016 Advanced Engineering Software (aes)
              Ver. 23.0 Release Date: 07/01/2016  License ID 1535

                              Analysis prepared by:

                                     Stantec



 ************************* DESCRIPTION OF STUDY *************************
* OCEANSIDE TOD - TREMONT SITE                                           *
* ASSESSMENT TO DIVERT PORTIONS OF THE CENTRAL TRIBUTARY AREA TO THE NORTH *
* 100-YEAR STORM                                                         *
 ************************************************************************

  FILE NAME: DIV100YR.DAT
  TIME/DATE OF STUDY: 10:09 06/16/2024
------------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.600
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  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    200.00 TO NODE    202.00 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==============================================================================
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   258.60
  UPSTREAM ELEVATION(FEET) =     70.00
  DOWNSTREAM ELEVATION(FEET) =     65.00
  ELEVATION DIFFERENCE(FEET) =      5.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.226
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    74.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.850
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.94
  TOTAL AREA(ACRES) =      0.18   TOTAL RUNOFF(CFS) =      0.94

******************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    204.00 IS CODE =  31
------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    59.00  DOWNSTREAM(FEET) =    48.01
  FLOW LENGTH(FEET) =   456.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   3.4 INCHES
```

```
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.16
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.94
  PIPE TRAVEL TIME(MIN.) =   1.47    Tc(MIN.) =    5.70
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    204.00 =     714.60 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    204.00 TO NODE    204.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.296
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7600
  SUBAREA AREA(ACRES) =    2.75   SUBAREA RUNOFF(CFS) =   13.16
  TOTAL AREA(ACRES) =        2.9   TOTAL RUNOFF(CFS) =      14.02
  TC(MIN.) =    5.70

****************************************************************************
  FLOW PROCESS FROM NODE    204.00 TO NODE    206.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    48.01  DOWNSTREAM(FEET) =    47.31
  FLOW LENGTH(FEET) =   139.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  17.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.63
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      14.02
  PIPE TRAVEL TIME(MIN.) =   0.41    Tc(MIN.) =    6.11
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    206.00 =     853.60 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    206.00 TO NODE    206.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.020
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7600
  SUBAREA AREA(ACRES) =    0.70   SUBAREA RUNOFF(CFS) =    3.20
  TOTAL AREA(ACRES) =        3.6   TOTAL RUNOFF(CFS) =      16.61
  TC(MIN.) =    6.11

****************************************************************************
  FLOW PROCESS FROM NODE    206.00 TO NODE    208.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    47.31  DOWNSTREAM(FEET) =    45.09
  FLOW LENGTH(FEET) =   444.17   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  17.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.93
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      16.61
  PIPE TRAVEL TIME(MIN.) =   1.25    Tc(MIN.) =    7.36
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    208.00 =    1297.77 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    208.00 TO NODE    208.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.340
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7600
  SUBAREA AREA(ACRES) =    5.31   SUBAREA RUNOFF(CFS) =   21.55
  TOTAL AREA(ACRES) =        8.9   TOTAL RUNOFF(CFS) =      36.28
  TC(MIN.) =    7.36

****************************************************************************
  FLOW PROCESS FROM NODE    208.00 TO NODE    210.00 IS CODE =  31
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    45.09  DOWNSTREAM(FEET) =    44.71
  FLOW LENGTH(FEET) =    79.60   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  24.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.07
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      36.28
  PIPE TRAVEL TIME(MIN.) =   0.19    Tc(MIN.) =    7.54
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    210.00 =    1377.37 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        8.9  TC(MIN.) =      7.54
  PEAK FLOW RATE(CFS)   =      36.28
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

ATTACHMENT 6
Geotechnical and Groundwater Investigation Report

(For geotechnical studies, refer to Appendix VI and VII of the drainage report provided in Attachment 5.)

ATTACHMENT 7
Storm Water Quality Assessment Form

DocuSign Envelope ID: 3AB36283-BAA0-47A2-98F6-0F042691C740

City of Oceanside – Engineering Division – Clean Water Program

STORM WATER QUALITY ASSESSMENT FOR PLANNING, ENGINEERING, AND BUILDING PERMIT APPLICATIONS

All applications for Planning, Engineering, or Building Division permits are required to complete this assessment form and include it as part of the initial permit application submittal. Staff will review the permit application content to determine the applicability of State and City storm water requirements. Please note a storm water assessment cannot be provided without a complete permit application package.

Section 1 – Project Information	
Applicant Name: Toll Bros., Inc.	Phone Number: (949) 573-7300
Project Name: North County Transit Center	Project Site Address: 235 South Tremont St., Oceanside, CA 92054
Permit Applications Number(s): GPA22-00002	Assessor Parcel Number(s): 147-350-24; 150-046-17; 150-046-01 thru 08; 150-043-01 thru 06; and 147-350-25
Project Description: Mixed Use Redeveoplment	Project Disturbed Area (square feet): 482,210 sf
Existing Impervious Area (square feet): 428,500 sf	Created or Replicated Impervious Area (square feet): 425,600 sf

	Section 2 – Identify Applicable Priority Development Project Categories (Check All Boxes that Apply)
☐	**New Development Project** – A project that creates 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.
☒	**Redevelopment Project** – A project that creates and/or replaces 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.
☐	**Restaurants** – 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 (SIC code 5812); where new or redevelopment projects create and/or replace 5,000 square feet or more impervious surface (collectively over the entire project site).
☐	**Hillside Development** – Category includes development on any natural slope that is twenty-five percent or greater; where new or redevelopment projects create and/or replace 5,000 square feet or more impervious surface (collectively over the entire project site).
☒	**Parking Lots** – 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; where new or redevelopment projects create and/or replace 5,000 square feet or more impervious surface (collectively over the entire project site).
☒	**Streets, Roads, Highways, Freeways, and Driveways** – Category is defined as any paved impervious surface used for the transportation of automobiles, trucks, motorcycles, and other vehicles; where new or redevelopment projects that create and/or replace 5,000 square feet or more impervious surface (collectively over the entire project site).
☐	**Water Quality Environmentally Sensitive Area** – 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 discharge directly to a Water Quality Environmentally Sensitive Area (WQESA). "Discharge directly to" includes flow that is conveyed overland a distance of 200 feet or less from the project to the WQESA, 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).
☐	**Automotive Repair Shop** – Category is defined as a facility that is categorized in any one of the following Standard Industrial Classification (SIC) codes: 5013, 5014, 5541, 7532-7534, or 7536-7539, where new or redevelopment projects create and/or replace 5,000 square feet or more impervious surface (collectively over the entire project site).
☐	**Retail Gasoline Outlet (RGOs)** – 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; where new or redevelopment projects create and/or replace 5,000 square feet or more impervious surface (collectively over the entire project site).
☒	**Development Projects greater than one acre** – New or redevelopment projects that result in the disturbance of one or more acres of land and are expected to generate pollutants post construction.

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City of Oceanside – Engineering Division – Clean Water Program

STORM WATER QUALITY ASSESSMENT FOR PLANNING, ENGINEERING, AND BUILDING PERMIT APPLICATIONS

Section 3 – Identify Projects Not Subject to Permanent Stormwater Requirements (Check All Boxes that Apply)	
☐	The project consists of work entirely within an existing structure.
☐	The project consists of construction of overhead or underground utilities (no new impervious surfaces).
☐	The project consists of routine maintenance.
☐	The project consists of less than 50 yards of grading and presents no opportunities to improve water quality.
Section 4 – Project Category Determination	
☒	**Priority Development Project**: If any item in Section 2 is applicable, the project is a Priority Development Project. **Please prepare a PDP SWQMP for the project.**
☐	**Standard Development Project**: If none of the items in Section 2 or 3 are applicable, the project is a Standard Development Project. **Please prepare an SDP SWQMP.**
☐	**Project Not Subject to Permanent Stormwater Requirements:** If any item in Section 3 is applicable, the project is not subject to Permanent Stormwater Requirements. **Please submit the project plans with this form.** **Note:** Projects in this category are subject to typical pollution prevention measures outlined by the pollution prevention checklist on the following page.

Section 5 – Applicant Certification	
Name of Responsible Party: Eric Cohen	Title: Vice President
Email Address (optional)	Phone Number: (215) 914-1310
I understand and acknowledge the City of Oceanside has adopted minimum requirements, as mandated by the San Diego Regional Water Quality Control Board – Order No. R9-2013-0001, as amended by Order Nos. R9-2015-0001 and R9-2015-0100 (NPDES NO. CAS0109266) for mitigating impacts associated with urban runoff, including storm water from construction and land development activities. I certify this assessment has been accurately completed to the best of my knowledge and is consistent with the proposed project. I acknowledge that non-compliance with the City Best Management Practice (BMP) Design Manual, Grading Ordinance, and Erosion Control Ordinance may result in enforcement action by the City, the California State Water Resources Control Board, and/or the San Diego Regional Water Quality Control Board. Enforcement action may include stop work orders, notice of violation, fines, or other actions.	
Applicant Signature: DocuSigned by: Eric Cohen F7FDGGE08E97459...	Date: 06-17-2024

If These Sources Will Be on the Project Site …	… Then Your SWQMP Shall Consider These Source Control BMPs		
1 **Potential Sources of Runoff Pollutants**	2 **Permanent Controls—Show on Drawings**	3 **Permanent Controls—List in Table and Narrative**	4 **Operational BMPs—Include in Table and Narrative**
☒ **A.** Onsite storm drain inlets ☐ Not Applicable	☒ Locations of inlets.	☒ Mark all inlets with the words "No Dumping! Flows to Bay" or similar.	☒ Maintain and periodically repaint or replace inlet markings. ☒ Provide storm water pollution prevention information to new site owners, lessees, or operators. ☒ See applicable operational BMPs in Fact Sheet SC-44, "Drainage System Maintenance," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com. ☒ Include the following in lease agreements: "Tenant shall not allow anyone to discharge anything to storm drains or to store or deposit materials so as to create a potential discharge to storm drains."

If These Sources Will Be on the Project Site …	… Then Your SWQMP shall consider These Source Control BMPs		
1 **Potential Sources of Runoff Pollutants**	2 **Permanent Controls—Show on Drawings**	3 **Permanent Controls—List in Table and Narrative**	4 **Operational BMPs—Include in Table and Narrative**
☒ **B.** Interior floor drains and elevator shaft sump pumps ☐ Not Applicable		☒ State that interior floor drains and elevator shaft sump pumps will be plumbed to sanitary sewer.	☒ Inspect and maintain drains to prevent blockages and overflow.
☒ **C.** Interior parking garages ☐ Not Applicable		☒ State that parking garage floor drains will be plumbed to the sanitary sewer.	☒ Inspect and maintain drains to prevent blockages and overflow.
☒ **D1.** Need for future indoor & structural pest control ☐ Not Applicable		☒ Note building design features that discourage entry of pests.	☒ Provide Integrated Pest Management information to owners, lessees, and operators.

If These Sources Will Be on the Project Site …	… Then Your SWQMP shall consider These Source Control BMPs		
1 **Potential Sources of Runoff Pollutants**	2 **Permanent Controls—Show on Drawings**	3 **Permanent Controls—List in Table and Narrative**	4 **Operational BMPs—Include in Table and Narrative**
☒ **D2.** Landscape/ Outdoor Pesticide Use ☐ Not Applicable	☒ Show locations of existing trees or areas of shrubs and ground cover to be undisturbed and retained. ☒ Show self-retaining landscape areas, if any. ☒ Show storm water treatment facilities.	State that final landscape plans will accomplish all of the following. ☒ Preserve existing drought tolerant trees, shrubs, and ground cover to the maximum extent possible. ☒ Design landscaping to minimize irrigation and runoff, to promote surface infiltration where appropriate, and to minimize the use of fertilizers and pesticides that can contribute to storm water pollution. ☒ Where landscaped areas are used to retain or detain storm water, specify plants that are tolerant of periodic saturated soil conditions. ☒ Consider using pest-resistant plants, especially adjacent to hardscape. ☒ To ensure successful establishment, select plants appropriate to site soils, slopes, climate, sun, wind, rain, land use, air movement, ecological consistency, and plant interactions.	☒ Maintain landscaping using minimum or no pesticides. ☒ See applicable operational BMPs in Fact Sheet SC-41, "Building and Grounds Maintenance," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com. ☒ Provide IPM information to new owners, lessees and operators.

If These Sources Will Be on the Project Site …	… Then Your SWQMP shall consider These Source Control BMPs		
1 **Potential Sources of Runoff Pollutants**	2 **Permanent Controls—Show on Drawings**	3 **Permanent Controls—List in Table and Narrative**	4 **Operational BMPs—Include in Table and Narrative**
☒ **E.** Pools, spas, ponds, decorative fountains, and other water features. ☐ Not Applicable	☒ Show location of water feature and a sanitary sewer cleanout in an accessible area within 10 feet.	☒ If the City requires pools to be plumbed to the sanitary sewer, place a note on the plans and state in the narrative that this connection will be made according to City requirements.	☒ See applicable operational BMPs in Fact Sheet SC-72, "Fountain and Pool Maintenance," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com.
☒ **F.** Food service ☐ Not Applicable	☒ For restaurants, grocery stores, and other food service operations, show location (indoors or in a covered area outdoors) of a floor sink or other area for cleaning floor mats, containers, and equipment. ☒ On the drawing, show a note that this drain will be connected to a grease interceptor before discharging to the sanitary sewer.	☒ Describe the location and features of the designated cleaning area. ☒ Describe the items to be cleaned in this facility and how it has been sized to ensure that the largest items can be accommodated.	

If These Sources Will Be on the Project Site …	… Then Your SWQMP shall consider These Source Control BMPs		
1 **Potential Sources of Runoff Pollutants**	2 **Permanent Controls—Show on Drawings**	3 **Permanent Controls—List in Table and Narrative**	4 **Operational BMPs—Include in Table and Narrative**
☒ **G.** Refuse areas ☐ Not Applicable	☒ Show where site refuse and recycled materials will be handled and stored for pickup. See City requirements for sizes and other details of refuse areas. ☒ If dumpsters or other receptacles are outdoors, show how the designated area will be covered, graded, and paved to prevent run- on and show locations of berms to prevent runoff from the area. Also show how the designated area will be protected from wind dispersal. ☒ Any drains from dumpsters, compactors, and tallow bin areas shall be connected to a grease removal device before discharge to sanitary sewer.	☒ State how site refuse will be handled and provide supporting detail to what is shown on plans. ☒ State that signs will be posted on or near dumpsters with the words "Do not dump hazardous materials here" or similar.	☒ State how the following will be implemented: Provide adequate number of receptacles. Inspect receptacles regularly; repair or replace leaky receptacles. Keep receptacles covered. Prohibit/prevent dumping of liquid or hazardous wastes. Post "no hazardous materials" signs. Inspect and pick up litter daily and clean up spills immediately. Keep spill control materials available on- site. See Fact Sheet SC-34, "Waste Handling and Disposal" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com.

If These Sources Will Be on the Project Site …	… Then Your SWQMP shall consider These Source Control BMPs		
1 **Potential Sources of Runoff Pollutants**	2 **Permanent Controls—Show on Drawings**	3 **Permanent Controls—List in Table and Narrative**	4 **Operational BMPs—Include in Table and Narrative Table and Narrative**
❑ **H.** Industrial processes. ❑ Not Applicable	❑ Show process area.	❑ If industrial processes are to be located onsite, state: "All process activities to be performed indoors. No processes to drain to exterior or to storm drain system."	❑ See Fact Sheet SC-10, "Non-Stormwater Discharges" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com.
❑ **I.** Outdoor storage of equipment or materials. (See rows J and K for source control measures for vehicle cleaning, repair, and maintenance.) ❑ Not Applicable	❑ Show any outdoor storage areas, including how materials will be covered. Show how areas will be graded and bermed to prevent run-on or runoff from area and protected from wind dispersal. ❑ Storage of non-hazardous liquids shall be covered by a roof and/or drain to the sanitary sewer system, and be contained by berms, dikes, liners, or vaults. ❑ Storage of hazardous materials and wastes must be in compliance with the local hazardous materials ordinance and a Hazardous Materials Management Plan for the site.	❑ Include a detailed description of materials to be stored, storage areas, and structural features to prevent pollutants from entering storm drains. Where appropriate, reference documentation of compliance with the requirements of local Hazardous Materials Programs for: ▪ Hazardous Waste Generation ▪ Hazardous Materials Release Response and Inventory ▪ California Accidental Release Prevention Program ▪ Aboveground Storage Tank ▪ Uniform Fire Code Article 80 Section 103(b) & (c) 1991 ▪ Underground Storage Tank	❑ See the Fact Sheets SC-31, "Outdoor Liquid Container Storage" and SC-33, "Outdoor Storage of Raw Materials" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com.

If These Sources Will Be on the Project Site …	… Then Your SWQMP shall consider These Source Control BMPs		
1 **Potential Sources of Runoff Pollutants**	2 **Permanent Controls—Show on Drawings**	3 **Permanent Controls—List in Table and Narrative**	4 **Operational BMPs—Include in Table and Narrative**
❑ **J.** Vehicle and Equipment Cleaning ❑ Not Applicable	❑ Show on drawings as appropriate: (1) Commercial/industrial facilities having vehicle /equipment cleaning needs shall either provide a covered, bermed area for washing activities or discourage vehicle/equipment washing by removing hose bibs and installing signs prohibiting such uses. (2) Multi-dwelling complexes shall have a paved, bermed, and covered car wash area (unless car washing is prohibited onsite and hoses are provided with an automatic shut- off to discourage such use). (3) Washing areas for cars, vehicles, and equipment shall be paved, designed to prevent run-on to or runoff from the area, and plumbed to drain to the sanitary sewer. (4) Commercial car wash facilities shall be designed such that no runoff from the facility is discharged to the storm drain system. Wastewater from the facility shall discharge to the sanitary sewer, or a wastewater reclamation system shall be installed.	❑ If a car wash area is not provided, describe measures taken to discourage onsite car washing and explain how these will be enforced.	Describe operational measures to implement the following (if applicable): ❑ Washwater from vehicle and equipment washing operations shall not be discharged to the storm drain system. ❑ Car dealerships and similar may rinse cars with water only. ❑ See Fact Sheet SC-21, "Vehicle and Equipment Cleaning," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com

If These Sources Will Be on the Project Site …	… Then Your SWQMP shall consider These Source Control BMPs		
1 **Potential Sources of Runoff Pollutants**	**2** **Permanent Controls—Show on Drawings**	**3** **Permanent Controls—List in Table and Narrative**	**4** **Operational BMPs—Include in Table and Narrative**
❑ **K.** Vehicle/Equipment Repair and Maintenance ❑ Not Applicable	❑ Accommodate all vehicle equipment repair and maintenance indoors. Or designate an outdoor work area and design the area to protect from rainfall, run-on runoff, and wind dispersal. ❑ Show secondary containment for exterior work areas where motor oil, brake fluid, gasoline, diesel fuel, radiator fluid, acid-containing batteries or other hazardous materials or hazardous wastes are used or stored. Drains shall not be installed within the secondary containment areas. ❑ Add a note on the plans that states either (1) there are no floor drains, or (2) floor drains are connected to wastewater pretreatment systems prior to discharge to the sanitary sewer and an industrial waste discharge permit will be obtained.	❑ State that no vehicle repair or maintenance will be done outdoors, or else describe the required features of the outdoor work area. ❑ State that there are no floor drains or if there are floor drains, note the agency from which an industrial waste discharge permit will be obtained and that the design meets that agency's requirements. ❑ State that there are no tanks, containers or sinks to be used for parts cleaning or rinsing or, if there are, note the agency from which an industrial waste discharge permit will be obtained and that the design meets that agency's requirements.	In the report, note that all of the following restrictions apply to use the site: ❑ No person shall dispose of, nor permit the disposal, directly or indirectly of vehicle fluids, hazardous materials, or rinsewater from parts cleaning into storm drains. ❑ No vehicle fluid removal shall be performed outside a building, nor on asphalt or ground surfaces, whether inside or outside a building, except in such a manner as to ensure that any spilled fluid will be in an area of secondary containment. Leaking vehicle fluids shall be contained or drained from the vehicle immediately. ❑ No person shall leave unattended drip parts or other open containers containing vehicle fluid, unless such containers are in use or in an area of secondary containment.

If These Sources Will Be on the Project Site …	… Then Your SWQMP shall consider These Source Control BMPs		
1 **Potential Sources of Runoff Pollutants**	2 **Permanent Controls—Show on Drawings**	3 **Permanent Controls—List in Table and Narrative**	4 **Operational BMPs—Include in Table and Narrative**
❑ **L.** Fuel Dispensing Areas ❑ Not Applicable	❑ Fueling areas[1] shall have impermeable floors (i.e., portland cement concrete or equivalent smooth impervious surface) that are (1) graded at the minimum slope necessary to prevent ponding; and (2) separated from the rest of the site by a grade break that prevents run-on of storm water to the MEP. ❑ Fueling areas shall be covered by a canopy that extends a minimum of ten feet in each direction from each pump. [Alternative: The fueling area must be covered and the cover's minimum dimensions must be equal to or greater than the area within the grade break or fuel dispensing area1.] The canopy [or cover] shall not drain onto the fueling area.		❑ The property owner shall dry sweep the fueling area routinely. ❑ See the Business Guide Sheet, "Automotive Service—Service Stations" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com.

1. The fueling area shall be defined as the area extending a minimum of 6.5 feet from the corner of each fuel dispenser or the length at which the hose and nozzle assembly may be operated plus a minimum of one foot, whichever is greater.

If These Sources Will Be on the Project Site …	… Then Your SWQMP shall consider These Source Control BMPs		
1 **Potential Sources of Runoff Pollutants**	2 **Permanent Controls—Show on Drawings**	3 **Permanent Controls—List in Table and Narrative**	4 **Operational BMPs—Include in Table and Narrative**
M. Loading Docks ☐ Not Applicable	☒ Show a preliminary design for the loading dock area, including roofing and drainage. Loading docks shall be covered and/or graded to minimize run-on to and runoff from the loading area. Roof downspouts shall be positioned to direct storm water away from the loading area. Water from loading dock areas should be drained to the sanitary sewer where feasible. Direct connections to storm drains from depressed loading docks are prohibited. ☒ Loading dock areas draining directly to the sanitary sewer shall be equipped with a spill control valve or equivalent device, which shall be kept closed during periods of operation. ☒ Provide a roof overhang over the loading area or install door skirts (cowling) at each bay that enclose the end of the trailer.		☒ Move loaded and unloaded items indoors as soon as possible. ☒ See Fact Sheet SC-30, "Outdoor Loading and Unloading," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com.

If These Sources Will Be on the Project Site …	… Then Your SWQMP shall consider These Source Control BMPs		
1 **Potential Sources of Runoff Pollutants**	2 **Permanent Controls—Show on Drawings**	3 **Permanent Controls—List in Table and Narrative**	4 **Operational BMPs—Include in Table and Narrative**
☒ **N.** Fire Sprinkler Test Water ☐ Not Applicable		☒ Provide a means to drain fire sprinkler test water to the sanitary sewer.	☒ See the note in Fact Sheet SC-41, "Building and Grounds Maintenance," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com.
O. Miscellaneous Drain or Wash Water ☒ Boiler drain lines ☐ Condensate drain lines ☐ Rooftop equipment ☐ Drainage sumps ☒ Roofing, gutters, and trim ☐ Not Applicable		☒ Boiler drain lines shall be directly or indirectly connected to the sanitary sewer system and may not discharge to the storm drain system. ☐ Condensate drain lines may discharge to landscaped areas if the flow is small enough that runoff will not occur. Condensate drain lines may not discharge to the storm drain system. ☐ Rooftop mounted equipment with potential to produce pollutants shall be roofed and/or have secondary containment. ☐ Any drainage sumps onsite shall feature a sediment sump to reduce the quantity of sediment in pumped water. ☒ Avoid roofing, gutters, and trim made of copper or other unprotected metals that may leach into runoff.	

If These Sources Will Be on the Project Site …	… Then Your SWQMP shall consider These Source Control BMPs		
1 **Potential Sources of Runoff Pollutants**	2 **Permanent Controls—Show on Drawings**	3 **Permanent Controls—List in Table and Narrative**	4 **Operational BMPs—Include in Table and Narrative**
☒ **P.** Plazas, sidewalks, and parking lots. ☐ Not Applicable			☒ Plazas, sidewalks, and parking lots shall be swept regularly to prevent the accumulation of litter and debris. Debris from pressure washing shall be collected to prevent entry into the storm drain system. Washwater containing any cleaning agent or degreaser shall be collected and discharged to the sanitary sewer and not discharged to a storm drain.

Technical Memo

To:	Edwin Medina City of Oceanside	From:	Edward Perez Stantec
File:	2042217900	Date:	August 12, 2024

Reference: NCTD OCEANSIDE TRANSIT CENTER AT 235 SOUTH TREMONT STREET ASSESSMENT TO DIVERT PORTIONS OF THE CENTRAL TRIBUTARY TO THE NORTH

INTRODUCTION

The Project, a 10.3 acre site located at 235 South Tremont Street, will be developed as a transit-oriented development (TOD) with mixed-use program generally consisting of residential apartment units, hotel, NCTD office building, bus transit center, retail store front, and parking structures.

The City performed an analysis of their future CIP storm drain in North Cleveland Street and determined that an additional 10 cubic feet per second (CFS) can be diverted to this system.

As summarized in the section below, an assessment was completed to see how much of the project's central tributary area can be diverted to the future CIP storm drain in North Cleveland Street so that it receives the additional flow rate of 10 CFS.

DRAINAGE ASSESSMENT

Based on updated hydrology calculations, it would take 2 acres to generate approximately 10 CFS of runoff for the 100-year storm. See Attachment 1 and 2 for interim condition hydrology exhibit and corresponding rational method calculations. The interim condition hydrology exhibit shows the portion of the central tributary shaded in dark blue that can be diverted to the north towards the future CIP storm drain in North Cleveland Street. To achieve this flow routing configuration, the project's proposed storm drain system will need to be re-designed to allow the dark blue area's flows to drain northerly towards the intersection of North Cleveland Street and Seagaze Drive and into the future CIP storm drain.

To comply with the project CEQA drainage analysis and mitigation measures developed in the project's EIR, the project cannot divert flows to the future CIP storm drain in North Cleveland Street until such a time when the CIP storm drain facility is constructed by the City to provide an increased flow capacity at the project's storm drain point of connection in North Cleveland Street. Therefore, in the interim condition prior to construction of the new CIP storm drain, the project's drainage configuration for the central tributary cannot change from the drainage concept presented in the proposed project condition hydrology map as presented in Stantec's hydrology report entitled, "Preliminary Hydrology Report for: NCTD Oceanside Transit Center" dated July 19, 2024, contained in the project EIR appendices.

To provide a 10 CFS diversion to meet the city's proposed condition of approval, the project will need to construct a flow diversion structure, immediately upstream of the underground Detention Basin #1 (DB1) structure within South Cleveland Street. The diversion structure will be designed to initially route flows from the 2 acre "dark blue" diversion area through DB1 to comply with the flow routing design in the proposed condition hydrology map and the EIR mitigation measures, so as not to increase discharge rates at the project's proposed point of connections on North Cleveland Street and Seagaze Drive and the existing 15" RCP under the railroad track. See Attachment 1 for interim condition flow routing. Once the City has constructed the new CIP Storm Drain in North Cleveland and 10 CFS of additional capacity is available at the project's storm drain point of connection, the diversion structure in South Cleveland Street constructed by the project can be field modified to cut off flow from the "dark blue" diversion area into DB1, and open a storm

drain flow conduit into the South Cleveland Street storm drain system. See Attachment 3 for ultimate condition flow routing. The diversion cut over can be executed in the diversion structure manhole using a standard brick and mortar plug detail provided in the City's storm drain design standards. Once this diversion cut over is in place, the "dark blue" diversion area will route 10 CFS through the new CIP storm drain in North Cleveland Street and not through DB1 and the 15" RCP under the railroad tracks.

It shall be noted that the diversion of flows requested by the City's Engineering staff will result in the comingling of private and public flows in the privately maintained DB1 in the interim condition prior to construction of the CIP Storm Drain in North Cleveland Street. Once the modification to the proposed diversion structure is complete, all public flows upstream of DB1 will be routed to the North Cleveland Street storm drain system and will no longer be comingled with private flows in DB1. In prior screen check comments and design iterations of the detention basin systems for the project, the City's Engineering staff has raised concerns about commingling of public and private flows within a privately maintained detention basin system. To accommodate the City's request for the project to divert 10 CFS to the future North Clevland Street CIP storm drain, and not cause any delay to the project construction, an exception to the City's position on comingling of public and private flows will be necessary.

PROPOSED CONDITION OF APPROVAL

To facilitate the City's request to divert 10 CFS of storm flow to the North Cleveland CIP storm drain, we propose the following condition of approval, a modification of the condition of approval proposed by the City's Engineering staff, be contained in the Cumulative Impacts section of the project EIR.

"Prior to issuance of the first grading permit, the project is conditioned to design and construct a diversion structure upstream of Detention Basin #1, designed with the ability to ultimately divert 2 acres of developed area, approximately equal to 10 CFS of storm flow, towards the South Cleveland Street storm drain system. Prior to construction of the new CIP storm drain system in North Cleveland Street, the diversion structure shall be designed to route the 2 acres of developed area (10 CFS) through Detention Basin #1. A detail shall be provided on the project's storm drain construction plans detailing how to convert the diversion structure to route flow into the S. Cleveland Street storm drain and cut off flow to Detention Basin #1. Upon final inspection and City of Oceanside acceptance of the new CIP Storm Drain facility in North Cleveland Street, the City shall provide written notice to NCTD confirming completion of the new CIP Storm Drain system and as a result increase the capacity to allow the 10 CFS diversion to take place. The written notice shall include City accepted "As-Built Plans" of the newly constructed CIP Storm Drain in North Cleveland Street. The written notice shall instruct NCTD to modify the diversion structure upstream of Detention Basin #1 to re-route flows to the South Cleveland Street storm drain system into the newly constructed CIP storm drain in North Cleveland Street. NCTD shall call for City of Oceanside for inspection of the modified diversion structure once it is completed. To accommodate this condition of approval, the City of Oceanside will accept "mixing" of public storm drain flow and private storm drain flow into the privately maintained Detention Basin #1 until the diversion structure modification is made and rerouting of public storm flow to the South Cleveland storm drain system is complete."

CONCLUSION

We look forward to working with the City's Engineering staff to quickly gain concurrence on the solution provided above. We believe this solution addresses the City's latest review comment to establish the condition of approval for the diversion of flow. Time is of the essence on this issue to gain "deemed complete" status for the project's entitlement submittal, issue a draft EIR for public review, and move into the public review process as quickly as possible.

Reference: NCTD OCEANSIDE TRANSIT CENTER AT 235 SOUTH TREMONT STREET ASSESSMENT TO DIVERT PORTIONS OF THE CENTRAL TRIBUTARY TO THE NORTH

Thank you for your collaboration, help, and support of this important project.

Respectfully,

Stantec Consulting Services Inc.

Edward Perez, PE
Project Manager

Phone: (949) 923-6013
Edward.Perez@stantec.com

Attachments:
Attachment 1 – Interim Condition Hydrology and Flow Routing Exhibit (1 page)
Attachment 2 – Rational Method Calculations (2 pages)
Attachment 3 – Proposed Condition Hydrology and Flow Routing Exhibit (1 page)

c. Michael McCann, Toll Brothers, John Hyde, Toll Brothers; Kristen Bogue, Michael Baker International; Ted Grove, Stantec

ATTACHMENT #1 INTERIM CONDITION

IN THE INTERIM CONDITION PRIOR TO COMPLETION OF CIP STORM DRAIN IN NORTH CLEVELAND STREET, THERE WILL BE A COMINGLING OF PRIVATE AND PUBLIC FLOWS DRAINING INTO DETENTION BASIN #1.

S. COAST HIGHWAY
SEAGAZE DR.
TOPEKA ST.
MICHIGAN AVE.
MISSOURI AVE.
S. TREMONT ST.
S. CLEVELAND ST.
TRIBUTARY OUTFALL #1
TRIBUTARY OUTFALL #2
TRIBUTARY OUTFALL #3
AT&SF RAILWAY
S. MYERS ST.
1ST ST.
TYSON ST.
FIR ST.
MATCHLINE - SEE SHEET 2 OF 2

200
202
204
206
DB1
DB2

PROPOSED FLOW DIVERSION STRUCTURE

BRICK AND MORTAR PLUG

FLOW ROUTED THROUGH DETENTION BASIN #1 PRIOR TO CONSTRUCTION OF CIP STORM DRAIN IN NORTH CLEVELAND STREET.

EX. 15" RCP

EX CURB OUTLET
42.62 FL
$Q_{25-CURB\ OUTLET}$=8.36 CFS
$Q_{100-CURB\ OUTLET}$=10.66 CFS
$Q_{25-UPSTREAM\ ST\ FLOW}$=8.3 CFS
$Q_{100-UPSTREAM\ ST\ FLOW}$=11.18 CFS
$Q_{25-TOTAL\ ST\ FLOW}$=16.66 CFS
$Q_{100-TOTAL\ ST\ FLOW}$=21.84 CFS

TRIBUTARY OUTFALL #1
48.2 FL
43.91 INV
Q_{25}=23.8 CFS
Q_{100}=31.3 CFS
A=6.9 AC

TRIBUTARY OUTFALL #2
48.2 FL
43.79 INV
Q_{25}=8.36 CFS
Q_{100}=10.66 CFS
A=5.1 AC

TRIBUTARY OUTFALL #3
49.27 FS
43.00 INV
Q_{25}=30.1 CFS
Q_{100}=39.5 CFS
A=11.9 AC

A1-1 0.27
A1-2 1.26
A1-3 1.97
A1-4 1.46
A2-1 0.80
A2-2 0.06
A2-3 0.
A3 0.35
B1-1 0.18
B1-2 0.49
B1-3 0.11
B1-4 0.64
B2-1 1.66
B2-2 0.54
B2-3 0.66
C1-1 0.48
C1-2 0.27
C1-3 0.
C1-4 0.38
C1-5 0.40
C1-6 0.19
C2-1 0.43
C2-2 1.38
C2-3 1.48
C2-4 1.73
C2-5 0.40
C2-6 2.69
C8-1 0.22
G1 0.28
G2 0.60
G3 2.12

LEGEND

EXISTING STORM DRAIN
FINISH SURFACE ELEVATION — XX.XX FS
FLOW LINE LENGTH — XX.XX LF
XX — NODE
SUBAREA — XX
ACREAGE — X.XX
MAJOR HYDROLOGY BOUNDARY
MINOR HYDROLOGY SUB-BOUNDARY
CATCH BASIN
PROPERTY LINE
TRIBUTARY AREA TO OUTFALL #1
TRIBUTARY AREA TO OUTFALL #2
TRIBUTARY AREA TO OUTFALL #3
TRIBUTARY AREA UPSTREAM OF SIDEWALK UNDER DRAIN IN MYERS STREET
DRAINAGE FLOW DIRECTION

NOTES:

1. PIPE ELEVATIONS SHOWN HEREIN ARE BASED ON GIS METADATA AND AS-BUILT DRAWINGS. THE VERTICAL DATUM HAS NOT BEEN VERIFIED BY DESIGN ENGINEER.
2. FUTURE DESIGN SURVEYS SHALL INCLUDE DATA COLLECTION OF PIPE SIZES AND INVERT ELEVATIONS

GRAPHIC SCALE
50 0 25 50 100 400
(IN FEET)
1 inch = 50 ft.

Stantec
Toll Brothers APARTMENT LIVING

NCTD OCEANSIDE TRANSIT CENTER TOD
235 S. TREMONT AVENUE
PROPOSED HYDROLOGY MAP

PROJECT NO. 2042217900
SHEET 1 OF 2
JULY 19, 2024

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ATTACHMENT #2 RATIONAL METHOD CALCULATIONS

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

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2016 Advanced Engineering Software (aes)
              Ver. 23.0 Release Date: 07/01/2016  License ID 1535

                            Analysis prepared by:

                                    Stantec



 ************************** DESCRIPTION OF STUDY **************************
* OCEANSIDE TOD - TREMONT SITE                                             *
* ASSESSMENT TO DIVERT PORTIONS OF THE CENTRAL TRIBUTARY AREA TO THE NORTH *
* 100-YEAR STORM                                                           *
 ****************************************************************************

  FILE NAME: DIV100YR.DAT
  TIME/DATE OF STUDY: 07:24 08/09/2024
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.600
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  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    200.00 TO NODE    202.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
  SOIL CLASSIFICATION IS "A"
  S.C.S. CURVE NUMBER (AMC II) =  86
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   258.60
  UPSTREAM ELEVATION(FEET) =     70.00
  DOWNSTREAM ELEVATION(FEET) =     65.00
  ELEVATION DIFFERENCE(FEET) =      5.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.226
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    74.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.850
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.94
  TOTAL AREA(ACRES) =      0.18   TOTAL RUNOFF(CFS) =      0.94

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    204.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    59.00  DOWNSTREAM(FEET) =    48.01
  FLOW LENGTH(FEET) =   456.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   3.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.16
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.94
  PIPE TRAVEL TIME(MIN.) =   1.47    Tc(MIN.) =    5.70
```

```
 LONGEST FLOWPATH FROM NODE    200.00 TO NODE    204.00 =     714.60 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    204.00 TO NODE    204.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.296
 NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7600
 SOIL CLASSIFICATION IS "A"
 S.C.S. CURVE NUMBER (AMC II) =  86
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.7600
 SUBAREA AREA(ACRES) =    1.86   SUBAREA RUNOFF(CFS) =    8.90
 TOTAL AREA(ACRES) =        2.0   TOTAL RUNOFF(CFS) =       9.76
 TC(MIN.) =    5.70

****************************************************************************
 FLOW PROCESS FROM NODE    204.00 TO NODE    206.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    48.01  DOWNSTREAM(FEET) =    47.31
 FLOW LENGTH(FEET) =   139.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  21.0 INCH PIPE IS  15.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.15
 ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       9.76
 PIPE TRAVEL TIME(MIN.) =   0.45    Tc(MIN.) =    6.15
 LONGEST FLOWPATH FROM NODE    200.00 TO NODE    206.00 =     853.60 FEET.
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)     =        2.0  TC(MIN.) =      6.15
 PEAK FLOW RATE(CFS)   =       9.76
============================================================================
============================================================================
 END OF RATIONAL METHOD ANALYSIS
```

ATTACHMENT #3 ULTIMATE CONDITION

IN THE ULTIMATE CONDITION WHEN CONSTRUCTION IS COMPLETE FOR CIP STORM DRAIN IN NORTH CLEVELAND STREET, DIVERSION STRUCTURE WILL BE MODIFIED TO DIVERT DARKER BLUE AREAS OF THE CENTRAL TRIBUTARY TO THE NORTH.

ONCE CONSTRUCTION IS COMPLETE FOR THE CIP STORM DRAIN IN NORTH CLEVELAND STREET, APPROXIMATELY 2 ACRES OF THE CENTRAL TRIBUTARY AREA WILL BE REROUTED WITH THE INSTALLATION OF BRICK AND MORTAR PLUG

PROPOSED FLOW DIVERSION STRUCTURE

BRICK AND MORTAR PLUG

S. COAST HIGHWAY
SEAGAZE DR.
TOPEKA ST.
MICHIGAN AVE.
MISSOURI AVE.
S. TREMONT ST.
S. CLEVELAND ST.
AT&SF RAILWAY
S. MYERS ST.
1ST ST.
TYSON ST.
FIR ST.

TRIBUTARY OUTFALL #1
TRIBUTARY OUTFALL #2
TRIBUTARY OUTFALL #3

MATCHLINE - SEE SHEET 2 OF 2

DB1
DB2

A1-1 0.27
A1-2 1.26
A1-3 1.97
A1-4 1.46
A2-1 0.80
A2-2 0.06
A3 0.35
B1-1 0.18
B1-2 0.49
B1-3 0.11
B1-4 0.64
B2-1 1.66
B2-2 0.54
B2-3 0.66
B1-5 0.86
C1-4 0.38
C1-5 0.40
C1-6 0.19
C1-6 2.69
C2-1 0.43
C2-2 1.38
C2-3 1.48
C2-4 1.73
C2-5 0.40
C8-1 0.22
G1 0.28
G2 0.60
G3 2.12

70.0 FS 258.6 LF (20)
70.0 FS 710 LF (40)
70.0 FS 301.4 LF (10)
70.0 FS 254.7 LF (30)
69.0 FS 239.4 LF (36)
66.6 FS 482.7 LF (37)
61.9 FS 54.5 INV (41)
60.9 FS 173.5 LF (12)
64.0 FS 418.6 LF (11)
65.0 FS 59.0 INV 375.9 LF (21)
58.9 FS 10 LF (38)
58.4 FS 255.8 LF (39)
54.9 FS 133 LF (13)
50.5 FS 44.5 INV 31 LF (14)
48.2 FL 43.91 INV Q_{25}=23.8 CFS Q_{100}=31.3 CFS A=6.9 AC (17)
44.00 INV 75 LF (14)
122.76 FS 235 LF (25)
123.31 FS 342 LF (27)
52.8 FS 47.56 INV 36 LF (22)
52.6 FS 47.16 INV 328 LF (23)
121.60 FS 46.80 INV 255 LF (26)
52.4 FS 470.2 LF (15)
52.93 FS 49.19 INV 72 LF (32)
52.15 FS 47.15 INV 431 LF (33)
50.1 FS 44.1 INV 55.9 LF (40)
48.8 FS 500 LF (51.2)
49.27 FS 43.00 INV Q_{25}=30.1 CFS Q_{100}=39.5 CFS A=11.9 AC (35)
48.8 FS 910 LF (71)
50.16 FS 44.91 INV 89 LF (34)
121.60 FS 45.99 INV 53 LF (28)
53.18 FS 303 LF (31)
50.0 FL 46.0 INV 166 LF (32)
50.1 FS 44.2 INV 10 LF (16)
71.05 FS 44.5 INV Q_{25}=7.4 CFS Q_{100}=9.5 CFS A=1.6 AC (52)
71.05 FS 44.6 INV 15.3 LF (51)
52.8 FS 45.52 INV 73 LF (24)
73.0 FS 344.3 LF (50)
48.2 FL 43.79 INV Q_{25}=8.36 CFS Q_{100}=10.66 CFS A=5.1 AC (27)
44.92 INV 227 LF (30)
45.72 INV 161 LF (29)
47.80 FS (49.3)
45.20 FS (49.4)
43.25 FS (49.5)
EX. 15" RCP
EX CURB OUTLET 42.62 FL (49.2)
$Q_{25-CURB\ OUTLET}$=8.36 CFS
$Q_{100-CURB\ OUTLET}$=10.66 CFS
$Q_{25-UPSTREAM\ ST\ FLOW}$=8.3 CFS
$Q_{100-UPSTREAM\ ST\ FLOW}$=11.18 CFS
$Q_{25-TOTAL\ ST\ FLOW}$=16.66 CFS
$Q_{100-TOTAL\ ST\ FLOW}$=21.84 CFS

LEGEND

- EXISTING STORM DRAIN
- FINISH SURFACE ELEVATION — XX.XX FS — (XX) NODE
- FLOW LINE LENGTH — XX.XX LF
- SUBAREA — XX
- ACREAGE — X.XX
- MAJOR HYDROLOGY BOUNDARY
- MINOR HYDROLOGY SUB-BOUNDARY
- CATCH BASIN
- PROPERTY LINE
- TRIBUTARY AREA TO OUTFALL #1
- TRIBUTARY AREA TO OUTFALL #2
- TRIBUTARY AREA TO OUTFALL #3
- TRIBUTARY AREA UPSTREAM OF SIDEWALK UNDER DRAIN IN MYERS STREET
- DRAINAGE FLOW DIRECTION

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1 inch = 50 ft.

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PROPOSED HYDROLOGY MAP

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