Preliminary Water Quality Management Plan

For:

Highland East Industrial Warehouse

3RD STREET/CENTRAL AVENUE/5TH STREET

APN: 1192-631-09,-10,-11,-12,-13,-14,-22,-23,-24,-25,-26,-27, AND -28 1192-641-08,- 09,-10,-11,-15,-16,-17,-18,-19,-20,-21

WQP 22-004

Prepared for:

CHIPT Highland 210, L.P.

527 W. 7th Street, Suite 200

Los Angeles, CA 90014

(909) 358-7715

Prepared by:

Kier + Wright Engineers

163 Technology Drive, Suite 150

Irvine, CA 92618

(949) 508-0202

Submittal Date: 01/16/2023

Revision Date: 02/27/2023

Approval Date:_____

Project Owner's Certification

This Water Quality Management Plan (WQMP) has been prepared for CHIPT Highland 210, L.P. by Kier + Wright Engineers. The WQMP is intended to comply with the requirements of the City of Highland and the NPDES Area wide Stormwater Program requiring the preparation of a WQMP. The undersigned, while it owns the subject property, is responsible for the implementation of the provisions of this plan and will ensure that this plan is amended as appropriate to reflect up-to-date conditions on the site consistent with San Bernardino County's Municipal Storm Water Management Program and the intent of the NPDES Permit for San Bernardino County and the incorporated cities of San Bernardino County within the Santa Ana Region. Once the undersigned transfers its interest in the property, its successors in interest and the city/county shall be notified of the transfer. The new owner will be informed of its responsibility under this WQMP. A copy of the approved WQMP shall be available on the subject site in perpetuity.

"I certify under a penalty of law that the provisions (implementation, operation, maintenance, and funding) of the WQMP have been accepted and that the plan will be transferred to future successors."

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Project Data			
Permit/Application Number(s):		Grading Permit Number(s):	
Tract/Parcel Map Number(s):		Building Permit Number(s):	
CUP, SUP, and/or APN (Specify Lot Numbers if Portions of Tract):			APN: 1192-631-09,-10,-11,-12,-13,-14,-22,-23,-24,-25,-26,-27, and -28 1192-641-08,- 09,-10,-11,-15,-16,-17,-18,-19,-20,-21

Owner's Signature			
Owner Name: Phillip Prassas			
Title	Vice President		
Company	CHIPT Highland 210, L.P.		
Address	527 W. 7Th Street, Suite 200 Los Angeles CA 90014		
Email	jgarcia@crowholdings.com		
Telephone #	909-358-7715		
Signature		Date	

Preparer's Certification

Project Data			
Permit/Application Number(s):		Grading Permit Number(s):	
Tract/Parcel Map Number(s):		Building Permit Number(s):	
CUP, SUP, and/or APN (Specify Lot Numbers if Portions of Tract):			APN: 1192-631-09,-10,-11,-12,-13,-14,-22,-23,-24,-25,-26,-27, and -28 1192-641-08,- 09,-10,-11,-15,-16,-17,-18,-19,-20,-21

"The selection, sizing and design of stormwater treatment and other stormwater quality and quantity control measures in this plan were prepared under my oversight and meet the requirements of Regional Water Quality Control Board Order No. R8-2010-0036."

Engineer: Garrett Readler		PE Stamp Below
Title	Principal	
Company	Kier + Wright Engineers	
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Telephone #	(949) 508-0202	
Signature		
Date		

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Section 1 Discretionary Permit(s)

Form 1-1 Project Information					
Project Name	Highland Industrial Development				
Project Owner Contact Name:	Jorge Garcia				
Mailing Address:	527 W. 7th Street, Suite 200, Los Angeles, CA 90014	E-mail Address:	jgarcia@chindustrial.com	Telephone:	(909) 358-7715
Permit/Application Number(s):			Tract/Parcel Map Number(s):		
Additional Information/ Comments:					
Description of Project:	The project is located in the City of Highland, between 3rd Street and 5th Street, east of Central Avenue and west of Palm Avenue. The proposed development will demolish the existing buildings and other site improvements and replace with an industrial warehouse building. The project site is approximately 11.1 acres. Typical site improvements for the warehouse building include loading docks, trailer parking, vehicular parking. Landscaping is proposed around the perimeter of the site and adjacent to building where appropriate. The warehouse building is 245,011 sf in size with a 7,000 office space.				

Provide summary of Conceptual WQMP conditions (if previously submitted and approved). Attach complete copy.	N/A

Section 2 Project Description

2.1 Project Information

This section of the WQMP should provide the information listed below. The information provided for Conceptual/ Preliminary WQMP should give sufficient detail to identify the major proposed site design and LID BMPs and other anticipated water quality features that impact site planning. Final Project WQMP must specifically identify all BMP incorporated into the final site design and provide other detailed information as described herein.

The purpose of this information is to help determine the applicable development category, pollutants of concern, watershed description, and long term maintenance responsibilities for the project, and any applicable water quality credits. This information will be used in conjunction with the information in Section 3, Site Description, to establish the performance criteria and to select the LID BMP or other BMP for the project or other alternative programs that the project will participate in, which are described in Section 4.

Form 2.1-1 Description of Proposed Project

1 Development Category (Select all that apply):

☒ Significant re-development involving the addition or replacement of 5,000 ft^2 or more of impervious surface on an already developed site	☐ New development involving the creation of 10,000 ft^2 or more of impervious surface collectively over entire site	☐ Automotive repair shops with standard industrial classification (SIC) codes 5013, 5014, 5541, 7532- 7534, 7536-7539	☐ Restaurants (with SIC code 5812) where the land area of development is 5,000 ft^2 or more
☐ Hillside developments of 5,000 ft^2 or more which are located on areas with known erosive soil conditions or where the natural slope is 25 percent or more	☐ Developments of 2,500 ft^2 of impervious surface or more adjacent to (within 200 ft) or discharging directly into environmentally sensitive areas or waterbodies listed on the CWA Section 303(d) list of impaired waters.	☒ Parking lots of 5,000 ft^2 or more exposed to storm water	☐ Retail gasoline outlets that are either 5,000 ft^2 or more, or have a projected average daily traffic of 100 or more vehicles per day

☐ Non-Priority / Non-Category Project *May require source control LID BMPs and other LIP requirements. Please consult with local jurisdiction on specific requirements*.

2 Project Area (ft2):	482827 sf (11.1 Ac.)	**3** Number of Dwelling Units:		**4** SIC Code:	4225

5 Is Project going to be phased? Yes ☐ No ☒ *If yes, ensure that the WQMP evaluates each phase as a distinct DA, requiring LID BMPs to address runoff at time of completion.*

6 Does Project include roads? Yes ☐ No ☒ *If yes, ensure that applicable requirements for transportation projects are addressed (see Appendix A of TGD for WQMP)*

2.2 Property Ownership/Management

Describe the ownership/management of all portions of the project and site. State whether any infrastructure will transfer to public agencies (City, County, Caltrans, etc.) after project completion. State if a homeowners or property owners association will be formed and be responsible for the long-term maintenance of project stormwater facilities. Describe any lot-level stormwater features that will be the responsibility of individual property owners.

Form 2.2-1 Property Ownership/Management

Describe property ownership/management responsible for long-term maintenance of WQMP stormwater facilities:

CHIPT Highland 210, L.P.

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Los Angeles, CA 90014

The property owner will be solely responsible for the maintenance of the onsite WQMP Stormwater Facilities. There will be no transfer of maintenance responsibility to The City of Highland.

2.3 Potential Stormwater Pollutants

Determine and describe expected stormwater pollutants of concern based on land uses and site activities (refer to Table 3-3 in the TGD for WQMP).

Form 2.3-1 Pollutants of Concern			
Pollutant	Please check: E=Expected, N=Not Expected		Additional Information and Comments
Pathogens (Bacterial / Virus)	E ☒	N ☐	Bacteria indicators are routinely detected in pavement runoff. Including petroleum hydrocarbons
Nutrients - Phosphorous	E ☒	N ☐	Expected pollutant if landscaping exists on site.
Nutrients - Nitrogen	E ☒	N ☐	Expected pollutant if landscaping exists on site.
Noxious Aquatic Plants	E ☒	N ☐	Expected pollutant if landscaping exists on site.
Sediment	E ☒	N ☐	Expected pollutant if landscaping exists on site.
Metals	E ☒	N ☐	
Oil and Grease	E ☒	N ☐	
Trash/Debris	E ☒	N ☐	
Pesticides / Herbicides	E ☒	N ☐	
Organic Compounds	E ☒	N ☐	Expected pollutant if landscaping exists on site.
Other:	E ☐	N ☐	
Other:	E ☐	N ☐	
Other:	E ☐	N ☐	
Other:	E ☐	N ☐	
Other:	E ☐	N ☐	

2.4 Water Quality Credits

A water quality credit program is applicable for certain types of development projects if it is not feasible to meet the requirements for on-site LID. Proponents for eligible projects, as described below, can apply for water quality credits that would reduce project obligations for selecting and sizing other treatment BMP or participating in other alternative compliance programs. Refer to Section 6.2 in the TGD for WQMP to determine if water quality credits are applicable for the project.

Form 2.4-1 Water Quality Credits

1 Project Types that Qualify for Water Quality Credits: *Select all that apply*

☐ Redevelopment projects that reduce the overall impervious footprint of the project site. [Credit = % impervious reduced]	Higher density development projects ☐ Vertical density [20%] ☐ 7 units/ acre [5%]	☐ Mixed use development, (combination of residential, commercial, industrial, office, institutional, or other land uses which incorporate design principles that demonstrate environmental benefits not realized through single use projects) [20%]	☐ Brownfield redevelopment (redevelop real property complicated by presence or potential of hazardous contaminants) [25%]
☐ Redevelopment projects in established historic district, historic preservation area, or similar significant core city center areas [10%]	☐ Transit-oriented developments (mixed use residential or commercial area designed to maximize access to public transportation) [20%]	☐ In-fill projects (conversion of empty lots & other underused spaces < 5 acres, substantially surrounded by urban land uses, into more beneficially used spaces, such as residential or commercial areas) [10%]	☐ Live-Work developments (variety of developments designed to support residential and vocational needs) [20%]
2 Total Credit % *(Total all credit percentages up to a maximum allowable credit of 50 percent)*			
Description of Water Quality Credit Eligibility (if applicable)	N/A		

Section 3 Site and Watershed Description

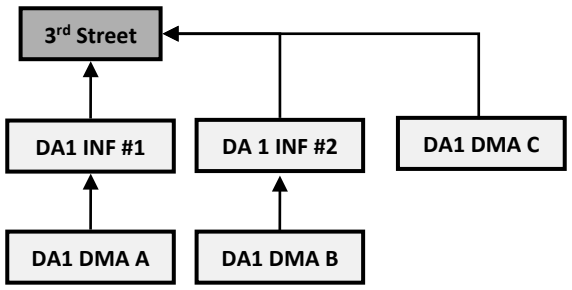
Describe the project site conditions that will facilitate the selection of BMP through an analysis of the physical conditions and limitations of the site and its receiving waters. Identify distinct drainage areas (DA) that collect flow from a portion of the site and describe how runoff from each DA (and sub-watershed DMAs) is conveyed to the site outlet(s). Refer to Section 3.2 in the TGD for WQMP. The form below is provided as an example. Then complete Forms 3.2 and 3.3 for each DA on the project site. ***If the project has more than one drainage area for stormwater management, then complete additional versions of these forms for each DA / outlet.***

Form 3-1 Site Location and Hydrologic Features

Site coordinates *take GPS measurement at approximate center of site*	Latitude 34.10710	Longitude -117.21350	Thomas Bros Map page 577

1 San Bernardino County climatic region: ☒ Valley ☐ Mountain

2 Does the site have more than one drainage area (DA): Yes☐ No☒ *If no, proceed to Form 3-2. If yes, then use this form to show a conceptual schematic describing DMAs and hydrologic feature connecting DMAs to the site outlet(s). An example is provided below that can be modified for proposed project or a drawing clearly showing DMA and flow routing may be attached*



Conveyance	Briefly describe on-site drainage features to convey runoff that is not retained within a DMA
DA1 DMA A flows to 3rd Street	DA 1 DMA 1 includes the warehouse building, the loading docks, parking and drive aisle on the north and east side of the building. Drainage surface flows to inlets strategically located within the drainage area. An underground storm drain pipe directs the captured stormwater from the inlets to an underground infiltration system (INF #1) to infiltrate at least the DCV. Runoff which exceeds the capacity of the infiltration system is directed via a pipe to outlet onto a bubbler box at the southwest corner of the site before discharging to the existing curb and gutter on 3rd Street via an undersidewalk parkway culvert. A hydrodynamic separator is proposed as a pre-treatment bmp, to be located upstream of the underground infiltration system.
DA1 DMA B flows to 3rd Street	DA 1 DMA 2 is located on the southwest side of the site, consisting primarily of automobile parking stalls and drive aisle. Drainage surface flows to a curb opening inlet located at near the south west entrance to the site. An underground storm drain pipe directs the captured stormwater from the inlet to an underground infiltration system (INF #2) to infiltrate at least the DCV. Runoff which exceeds the capacity of the infiltration system "back up" and overflow the catch basin at near the driveway entry on

	the southwest corner of the property before overflowing via surface flow over the driveway and onto the curb and gutter on 3rd Street. A hydrodynamic separator is proposed as a pre-treatment bmp, to be located upstream of the underground infiltration system.
DA1 DMA C flows to 3rd Street	DA 1 DMA C is primarily the landscape areas between the south side of the building and the right-of way line on 3rd Street. The area is considered a self-treating area with respect to storm water quality treatment. Runoff excess of the DCV will be routed via undersidewalk drains/culverts to outlet onto the gutter on 3rd Street.

Form 3-2 Existing Hydrologic Characteristics for Drainage Area 1

For Drainage Area 1's sub-watershed DMA, provide the following characteristics	DMA A	DMA B	DMA C	DMA D
1 DMA drainage area (ft^2)	434,020	33,569	15,603	
2 Existing site impervious area (ft^2)	123,700	0	2,600	
3 Antecedent moisture condition *For desert areas, use http://www.sbcounty.gov/dpw/floodcontrol/pdf/20100412_map.pdf*	AMC II	AMC II	AMC II	
4 Hydrologic soil group *Refer to Watershed Mapping Tool – http://permitrack.sbcounty.gov/wap/*	HSG A	HSG A	HSG A	
5 Longest flowpath length (ft)	875'	120'	40'	
6 Longest flowpath slope (ft/ft)	0.01	0.017	0.01	
7 Current land cover type(s) *Select from Fig C-3 of Hydrology Manual*	Commercial	Commercial	Commercial	
8 Pre-developed pervious area condition: *Based on the extent of wet season vegetated cover good >75%; Fair 50-75%; Poor <50% Attach photos of site to support rating See Appendix A-Google Aerial Photo*	Poor	Poor	Poor	

Form 3-3 Watershed Description for Drainage Area

Receiving waters *Refer to Watershed Mapping Tool -* *http://permitrack.sbcounty.gov/wap/* *See 'Drainage Facilities" link at this website*	City Creek Santa Ana River, Reach 5 Santa Ana River, Reach 4 Santa Ana River, Reach 3 Prado Dam Santa Ana River, Reach 2 Santa Ana River, Reach 1 Pacific Ocean
Applicable TMDLs *Refer to Local Implementation Plan*	City Creek: None Santa Ana River, Reach 5: None Santa Ana River, Reach 4: None Santa Ana River, Reach 3: Pathogens, Nitrate Prado Dam: Pathogens Santa Ana River, Reach 2: None Santa Ana River, Reach 1: None Pacific Ocean: None
303(d) listed impairments *Refer to Local Implementation Plan and Watershed Mapping Tool –* *http://permitrack.sbcounty.gov/wap/ and State Water Resources Control Board website – http://www.waterboards.ca.gov/santaana/water_issues/programs/tmdl/index.shtml*	City Creek: None Santa Ana River, Reach 5: None Santa Ana River, Reach 4: Indicator Bacteria Santa Ana River, Reach 3: Copper, Indicator Bacteria, Lead Prado Dam: pH Santa Ana River, Reach 2: None Santa Ana River, Reach 1: None Pacific Ocean: None
Environmentally Sensitive Areas (ESA) *Refer to Watershed Mapping Tool –* *http://permitrack.sbcounty.gov/wap/*	N/A

Unlined Downstream Water Bodies *Refer to Watershed Mapping Tool –* *http://permitrack.sbcounty.gov/wap/*	City Creek, Santa Ana River
Hydrologic Conditions of Concern	☐ Yes *Complete Hydrologic Conditions of Concern (HCOC) Assessment. Include Forms 4.2-2 through Form 4.2-5 and Hydromodification BMP Form 4.3-10 in submittal* ☒ No (HCOC Exempt)
Watershed–based BMP included in a RWQCB approved WAP	☐ Yes *Attach verification of regional BMP evaluation criteria in WAP* • *More Effective than On-site LID* • *Remaining Capacity for Project DCV* • *Upstream of any Water of the US* • *Operational at Project Completion* • *Long-Term Maintenance Plan* ☒ No

Section 4 Best Management Practices (BMP)

4.1 Source Control BMP

4.1.1 Pollution Prevention

Non-structural and structural source control BMP are required to be incorporated into all new development and significant redevelopment projects. Form 4.1-1 and 4.1-2 are used to describe specific source control BMPs used in the WQMP or to explain why a certain BMP is not applicable. Table 7-3 of the TGD for WQMP provides a list of applicable source control BMP for projects with specific types of potential pollutant sources or activities. The source control BMP in this table must be implemented for projects with these specific types of potential pollutant sources or activities.

The preparers of this WQMP have reviewed the source control BMP requirements for new development and significant redevelopment projects. The preparers have also reviewed the specific BMP required for project as specified in Forms 4.1-1 and 4.1-2. All applicable non-structural and structural source control BMP shall be implemented in the project.

Form 4.1-1 Non-Structural Source Control BMPs

Identifier	Name	Check One		Describe BMP Implementation OR, if not applicable, state reason
		Included	Not Applicable	
N1	Education of Property Owners, Tenants and Occupants on Stormwater BMPs	☒	☐	Owner/tenant shall be familiarized with the educational materials in the attachment and the contents of the WQMP.
N2	Activity Restrictions	☒	☐	Activities shall be restricted to that allowed by local governing agencies.
N3	Landscape Management BMPs	☒	☐	Irrigation shall be consistent with San Bernardino's Water Conservation Ordinance. Fertilizer and pesticide usage will be consistent with County Management Guidelines for Use of Fertilizers and Pesticides. Landscape will be inspected and maintained weekly by a qualified contractor and all landscape waste will be disposed of properly.
N4	BMP Maintenance	☒	☐	BMP shall be inspected and maintained in accordance with manufacturer's recommendations. BMPs shall be maintained in accordance with the WQMP Operations and Maintenance Plan.
N5	Title 22 CCR Compliance (How development will comply)	☐	☒	No hazardous waste expected to be kept on site.
N6	Local Water Quality Ordinances	☒	☐	Owner/tenant shall comply with the requirements of the Local Water Quality Ordinances.
N7	Spill Contingency Plan	☒	☐	Owner/tenant shall have site specific Spill Contingency Plan consistent with the site usage and potential for spills.
N8	Underground Storage Tank Compliance	☐	☒	No Underground Storage Tank.
N9	Hazardous Materials Disclosure Compliance	☐	☒	No hazardous materials expected to be stored on site.

Form 4.1-1 Non-Structural Source Control BMPs

Identifier	Name	Check One		Describe BMP Implementation OR, if not applicable, state reason
		Included	Not Applicable	
N10	Uniform Fire Code Implementation	☒	☐	Owner shall comply with Article 80 of the Uniform Fire Code as enforced by the local fire protection agency.
N11	Litter/Debris Control Program	☒	☐	A litter/debris control program shall be implemented as part of the site regularly scheduled maintenance.
N12	Employee Training	☒	☐	The owner will ensure that tenants are also familiar with onsite BMPs and necessary maintenance required of the tenants. Employees shall be trained to clean up minor spills and participate in ongoing maintenance.
N13	Housekeeping of Loading Docks	☒	☐	Loading docks should be kept in a clean and orderly condition through a regular program of sweeping and litter control and immediate cleanup of spills and broken containers. Cleanup procedures should minimize or eliminate the use of water. If wash water is used, it must be disposed of in an approved manner and not discharged to the storm drain system.
N14	Catch Basin Inspection Program	☒	☐	At least 80 percent of drainage facilities shall be inspected, cleaned and maintained on an annual basis with 100 percent of the facilities included in a two-year period. Cleaning should take place in the late summer/early fall prior to the start of the rainy season. Drainage facilities include catch basins (storm drain inlets), detention or retention basins, and infiltration system.
N15	Vacuum Sweeping of Private Streets and Parking Lots	☒	☐	Driveways, and parking lots are required to be swept on a regular frequency based usage and field observations of waste accumulation, using a vacuum assisted sweeper. All paved areas of a business shall be swept, in late summer or early fall, prior to the start of the rainy season or equivalent, as required by the governing jurisdiction.

N16	Other Non-structural Measures for Public Agency Projects	☐	☒	Not a public agency project.
N17	Comply with all other applicable NPDES permits	☒	☐	Will comply with Construction General Permit.

Form 4.1-2 Structural Source Control BMPs

Identifier	Name	Check One		Describe BMP Implementation OR, If not applicable, state reason
		Included	Not Applicable	
S1	Provide storm drain system stencilling and signage (CASQA New Development BMP Handbook SD-13)	☒	☐	"No Dumping – Drains to Ocean" stencils will be applied. Legibility of stencil will be inspected annually for legibility and corrected as necessary, and at a minimum re-applied at least once every 5 years.
S2	Design and construct outdoor material storage areas to reduce pollution introduction (CASQA New Development BMP Handbook SD-34)	☒	☐	Outdoor storage areas shall be paved and sufficiently impervious to leaks and spills.
S3	Design and construct trash and waste storage areas to reduce pollution introduction (CASQA New Development BMP Handbook SD-32)	☒	☐	Outdoor trash and waste storage areas shall be paved with impervious material, and trash bins shall have solid covered lids.
S4	Use efficient irrigation systems & landscape design, water conservation, smart controllers, and source control (Statewide Model Landscape Ordinance; CASQA New Development BMP Handbook SD-12)	☒	☐	Irrigation systems shall include shutoff valves triggered by a pressure drop to control water loss in the event of broken sprinkler heads or lines. Timers will be used to avoid over watering and watering cycles and duration shall be adjusted seasonally by the landscape maintenance contractor. The landscaping areas will be grouped with plants that have similar water requirements. Native or drought tolerant species shall also be used where appropriate to reduce excess irrigation runoff and promote surface filtration.
S5	Finish grade of landscaped areas at a minimum of 1-2 inches below top of curb, sidewalk, or pavement	☒	☐	Landscape areas will be depressed at a minimum 1" below top of curb or sidewalk.
S6	Protect slopes and channels and provide energy dissipation (CASQA New Development BMP Handbook SD-10)	☐	☒	No onsite channels or slopes to protect.
S7	Covered dock areas (CASQA New Development BMP Handbook SD-31)	☒	☐	Dock areas shall be maintained and swept in accordance to the site's regularly scheduled maintenance program. Debris and trash shall be picked up, and disposed.
S8	Covered maintenance bays with spill containment plans (CASQA New Development BMP Handbook SD-31)	☐	☒	No maintenance bays onsite.
S9	Vehicle wash areas with spill containment plans (CASQA New Development BMP Handbook SD-33)	☐	☒	No vehicle wash areas onsite.

S10	Covered outdoor processing areas (CASQA New Development BMP Handbook SD-36)	☐	☒	No outdoor processing areas onsite.

Form 4.1-2 Structural Source Control BMPs

Identifier	Name	Check One		Describe BMP Implementation OR, If not applicable, state reason
		Included	Not Applicable	
S11	Equipment wash areas with spill containment plans (CASQA New Development BMP Handbook SD-33)	☐	☒	No equipment wash areas onsite.
S12	Fueling areas (CASQA New Development BMP Handbook SD-30)	☐	☒	No fueling areas onsite.
S13	Hillside landscaping (CASQA New Development BMP Handbook SD-10)	☐	☒	No hillsides onsite.
S14	Wash water control for food preparation areas	☐	☒	No food preparation onsite.
S15	Community car wash racks (CASQA New Development BMP Handbook SD-33)	☐	☒	No community cars wash racks onsite.

4.1.2 Preventative LID Site Design Practices

Site design practices associated with new LID requirements in the MS4 Permit should be considered in the earliest phases of a project. Preventative site design practices can result in smaller DCV for LID BMP and hydromodification control BMP by reducing runoff generation. Describe site design and drainage plan including:

- A narrative of site design practices utilized or rationale for not using practices
- A narrative of how site plan incorporates preventive site design practices
- Include an attached Site Plan layout which shows how preventative site design practices are included in WQMP

Refer to Section 5.2 of the TGD for WQMP for more details.

Form 4.1-3 Preventative LID Site Design Practices Checklist

Site Design Practices *If yes, explain how preventative site design practice is addressed in project site plan. If no, other LID BMPs must be selected to meet targets*
Minimize impervious areas: Yes ☐ No ☒ Explanation: Infiltration BMP will be used to infiltrate the design capture volume (DCV).
Maximize natural infiltration capacity: Yes ☒ No ☐ Explanation: Infiltration system shall be designed with sufficient base surface areas that will drawdown the design capture volume within 48-hrs. Unnecessary compaction of soil shall be minimized.
Preserve existing drainage patterns and time of concentration: Yes ☒ No ☐ Explanation: Post-development drainage patterns will mimic pre-development conditions to the extent feasible. The infiltration facilities will assist in maintaining the existing time of concentration.
Disconnect impervious areas: Yes ☐ No ☒ Explanation:
Protect existing vegetation and sensitive areas: Yes ☐ No ☒ Explanation: The project site is a developed site. No vegetation or sensitive areas to protect.
Re-vegetate disturbed areas: Yes ☐ No ☒ Explanation: Not applicable, development consists of a light industrial facility. Most of the disturbed areas will be paved; Landscape will be provided throughout the site.
Minimize unnecessary compaction in stormwater retention/infiltration basin/trench areas: Yes ☒ No ☐ Explanation: Heavy construction vehicles will be prohibited from unnecessary soil compaction around the infiltration facilities.
Utilize vegetated drainage swales in place of underground piping or imperviously lined swales: Yes ☐ No ☒ Explanation: Underground piping is located underneath paved areas that could not be substituted with vegetated swales.
Stake off areas that will be used for landscaping to minimize compaction during construction : Yes ☒ No ☐ Explanation: Where feasible, Landscaped areas will be staked to minimize unnecessary compaction during construction.

4.2 Project Performance Criteria

The purpose of this section of the Project WQMP is to establish targets for post-development hydrology based on performance criteria specified in the MS4 Permit. These targets include runoff volume for water quality control (referred to as LID design capture volume), and runoff volume, time of concentration, and peak runoff for protection of any downstream waterbody segments with a HCOC. ***If the project has more than one outlet for stormwater runoff, then complete additional versions of these forms for each DA / outlet.***

Methods applied in the following forms include:

- For LID BMP Design Capture Volume (DCV), the San Bernardino County Stormwater Program requires use of the P_6 method (MS4 Permit Section XI.D.6a.ii) – Form 4.2-1
- For HCOC pre- and post-development hydrologic calculation, the San Bernardino County Stormwater Program requires the use of the Rational Method (San Bernardino County Hydrology Manual Section D). Forms 4.2-2 through Form 4.2-5 calculate hydrologic variables including runoff volume, time of concentration, and peak runoff from the project site pre- and post-development using the Hydrology Manual Rational Method approach. For projects greater than 640 acres (1.0 mi^2), the Rational Method and these forms should not be used. For such projects, the Unit Hydrograph Method (San Bernardino County Hydrology Manual Section E) shall be applied for hydrologic calculations for HCOC performance criteria.

Refer to Section 4 in the TGD for WQMP for detailed guidance and instructions.

Form 4.2-1 LID BMP Performance Criteria for Design Capture Volume (DA 1-DMA A)

1 Project area DA 1 -DMA A (ft^2): 434,020	**2** Imperviousness after applying preventative site design practices (Imp%): 91.2%	**3** Runoff Coefficient (Rc): 0.7479 *$R_c = 0.858(Imp\%)^{\wedge 3} - 0.78(Imp\%)^{\wedge 2} + 0.774(Imp\%) + 0.04$*
4 Determine 1-hour rainfall depth for a 2-year return period $P_{2yr\text{-}1hr}$ (in): 0.515 http://hdsc.nws.noaa.gov/hdsc/pfds/sa/sca_pfds.html		
5 Compute P_6, Mean 6-hr Precipitation (inches): 0.763 *P_6 = Item 4 *C_1, where C_1 is a function of site climatic region specified in Form 3-1 Item 1 (Valley = 1.4807; Mountain = 1.909; Desert = 1.2371)*		
6 Drawdown Rate *Use 48 hours as the default condition. Selection and use of the 24 hour drawdown time condition is subject to approval by the local jurisdiction. The necessary BMP footprint is a function of drawdown time. While shorter drawdown times reduce the performance criteria for LID BMP design capture volume, the depth of water that can be stored is also reduced.*		24-hrs ☐ 48-hrs ☒
7 Compute design capture volume, DCV (ft^3): 40,517 *DCV = 1/12 * [Item 1* Item 3 *Item 5 * C_2], where C_2 is a function of drawdown rate (24-hr = 1.582; 48-hr = 1.963)* *Compute separate DCV for each outlet from the project site per schematic drawn in Form 3-1 Item 2*		

Form 4.2-1 LID BMP Performance Criteria for Design Capture Volume (DA 1-DMA B)

1 Project area DA 1 --DMA B (ft^2): 33,569	**2** Imperviousness after applying preventative site design practices (Imp%): 74.2%	**3** Runoff Coefficient (Rc): 0.5354 *$R_c = 0.858(Imp\%)^{\wedge 3}-0.78(Imp\%)^{\wedge 2}+0.774(Imp\%)+0.04$*
4 Determine 1-hour rainfall depth for a 2-year return period $P_{2yr\text{-}1hr}$ (in): 0.515 http://hdsc.nws.noaa.gov/hdsc/pfds/sa/sca_pfds.html		
5 Compute P_6, Mean 6-hr Precipitation (inches): 0.763 *P_6 = Item 4 *C_1, where C_1 is a function of site climatic region specified in Form 3-1 Item 1 (Valley = 1.4807; Mountain = 1.909; Desert = 1.2371)*		
6 Drawdown Rate *Use 48 hours as the default condition. Selection and use of the 24 hour drawdown time condition is subject to approval by the local jurisdiction. The necessary BMP footprint is a function of drawdown time. While shorter drawdown times reduce the performance criteria for LID BMP design capture volume, the depth of water that can be stored is also reduced.*		24-hrs ☐ 48-hrs ☒
7 Compute design capture volume, DCV (ft^3): 2,243 *DCV = 1/12 * [Item 1* Item 3 *Item 5 * C_2], where C_2 is a function of drawdown rate (24-hr = 1.582; 48-hr = 1.963)* *Compute separate DCV for each outlet from the project site per schematic drawn in Form 3-1 Item 2*		

Form 4.2-1 LID BMP Performance Criteria for Design Capture Volume (DA 1-DMA C)

1 Project area DA 1 -DMA C (ft^2): 15,603	**2** Imperviousness after applying preventative site design practices (Imp%): 9.6%	**3** Runoff Coefficient (Rc): 0.1079 *$R_c = 0.858(Imp\%)^{\wedge 3}-0.78(Imp\%)^{\wedge 2}+0.774(Imp\%)+0.04$*
4 Determine 1-hour rainfall depth for a 2-year return period $P_{2yr\text{-}1hr}$ (in): 0.515 http://hdsc.nws.noaa.gov/hdsc/pfds/sa/sca_pfds.html		
5 Compute P_6, Mean 6-hr Precipitation (inches): 0.763 *P_6 = Item 4 *C_1, where C_1 is a function of site climatic region specified in Form 3-1 Item 1 (Valley = 1.4807; Mountain = 1.909; Desert = 1.2371)*		
6 Drawdown Rate *Use 48 hours as the default condition. Selection and use of the 24 hour drawdown time condition is subject to approval by the local jurisdiction. The necessary BMP footprint is a function of drawdown time. While shorter drawdown times reduce the performance criteria for LID BMP design capture volume, the depth of water that can be stored is also reduced.*		24-hrs ☐ 48-hrs ☒
7 Compute design capture volume, DCV (ft^3): 210 *DCV = 1/12 * [Item 1* Item 3 *Item 5 * C_2], where C_2 is a function of drawdown rate (24-hr = 1.582; 48-hr = 1.963)* *Compute separate DCV for each outlet from the project site per schematic drawn in Form 3-1 Item 2*		

Form 4.2-2 Summary of HCOC Assessment (DA 1)

Does project have the potential to cause or contribute to an HCOC in a downstream channel: Yes ☐ No ☒

Go to: *http://permitrack.sbcounty.gov/wap/*

If "Yes", then complete HCOC assessment of site hydrology for 2yr storm event using Forms 4.2-3 through 4.2-5 and insert results below

(Forms 4.2-3 through 4.2-5 may be replaced by computer software analysis based on the San Bernardino County Hydrology Manual)

If "No," then proceed to Section 4.3 Project Conformance Analysis

Condition	Runoff Volume (ft^3)	Time of Concentration (min)	Peak Runoff (cfs)
Pre-developed	**1** *Form 4.2-3 Item 12*	**2** *Form 4.2-4 Item 13*	**3** *Form 4.2-5 Item 10*
Post-developed	**4** *Form 4.2-3 Item 13*	**5** *Form 4.2-4 Item 14*	**6** *Form 4.2-5 Item 14*
Difference	**7** *Item 4 – Item 1*	**8** *Item 2 – Item 5*	**9** *Item 6 – Item 3*
Difference (as % of pre-developed)	**10** % *Item 7 / Item 1*	**11** % *Item 8 / Item 2*	**12** % *Item 9 / Item 3*

See Appendix C for HCOC Map

Form 4.2-3 HCOC Assessment for Runoff Volume (DA 1)

Weighted Curve Number Determination for: Pre-developed DA	DMA A	DMA B	DMA C	DMA D	DMA E	DMA F	DMA G	DMA H
1a Land Cover type								
2a Hydrologic Soil Group (HSG)								
3a DMA Area, ft^2 *sum of areas of DMA should equal area of DA*								
4a Curve Number (CN) *use Items 1 and 2 to select the appropriate CN from Appendix C-2 of the TGD for WQMP*								
Weighted Curve Number Determination for: Post-developed DA	DMA A	DMA B	DMA C	DMA D	DMA E	DMA F	DMA G	DMA H
1b Land Cover type								
2b Hydrologic Soil Group (HSG)								
3b DMA Area, ft^2 *sum of areas of DMA should equal area of DA*								
4b Curve Number (CN) *use Items 5 and 6 to select the appropriate CN from Appendix C-2 of the TGD for WQMP*								

5 Pre-Developed area-weighted CN:	**7** Pre-developed soil storage capacity, S (in): *S = (1000 / Item 5) - 10*	**9** Initial abstraction, I_a (in): *I_a = 0.2 * Item 7*
6 Post-Developed area-weighted CN:	**8** Post-developed soil storage capacity, S (in): *S = (1000 / Item 6) - 10*	**10** Initial abstraction, I_a (in): *I_a = 0.2 * Item 8*

11 Precipitation for 2 yr, 24 hr storm (in):
Go to: http://hdsc.nws.noaa.gov/hdsc/pfds/sa/sca_pfds.html

12 Pre-developed Volume (ft^3):
*V_{pre} =(1 / 12) * (Item sum of Item 3) * [(Item 11 – Item 9)^2 / ((Item 11 – Item 9 + Item 7)*

13 Post-developed Volume (ft^3):
*V_{pre} =(1 / 12) * (Item sum of Item 3) * [(Item 11 – Item 10)^2 / ((Item 11 – Item 10 + Item 8)*

14 Volume Reduction needed to meet HCOC Requirement, (ft^3):
*V_{HCOC} = (Item 13 * 0.95) – Item 12*

Form 4.2-4 HCOC Assessment for Time of Concentration (DA 1)

Compute time of concentration for pre and post developed conditions for each DA *(For projects using the Hydrology Manual complete the form below)*

Variables	Pre-developed DA1 *Use additional forms if there are more than 4 DMA*				Post-developed DA1 *Use additional forms if there are more than 4 DMA*			
	DMA A	DMA B	DMA C	DMA D	DMA A	DMA B	DMA C	DMA D
1 Length of flowpath (ft) *Use Form 3-2 Item 5 for pre-developed condition*								
2 Change in elevation (ft)								
3 Slope (ft/ft), S_o = *Item 2 / Item 1*								
4 Land cover								
5 Initial DMA Time of Concentration (min) *Appendix C-1 of the TGD for WQMP*								
6 Length of conveyance from DMA outlet to project site outlet (ft) *May be zero if DMA outlet is at project site outlet*								
7 Cross-sectional area of channel (ft^2)								
8 Wetted perimeter of channel (ft)								
9 Manning's roughness of channel (n)								
10 Channel flow velocity (ft/sec) V_{fps} = *(1.49 / Item 9) * (Item 7/Item 8)^0.67 * (Item 3)^0.5*								
11 Travel time to outlet (min) T_t = *Item 6 / (Item 10 * 60)*								
12 Total time of concentration (min) T_c = *Item 5 + Item 11*								
13 Pre-developed time of concentration (min): *Minimum of Item 12 pre-developed DMA*								
14 Post-developed time of concentration (min): *Minimum of Item 12 post-developed DMA*								
15 Additional time of concentration needed to meet HCOC requirement (min): $T_{C\text{-}HCOC}$ = *(Item 13 * 0.95) – Item 14*								

Form 4.2-5 HCOC Assessment for Peak Runoff (DA 1)

Compute peak runoff for pre- and post-developed conditions

Variables		Pre-developed DA to Project Outlet (*Use additional forms if more than 3 DMA)*			Post-developed DA to Project Outlet (*Use additional forms if more than 3 DMA)*		
		DMA A	DMA B	DMA C	DMA A	DMA B	DMA C
1 Rainfall Intensity for storm duration equal to time of concentration *I_{peak} = 10^(LOG Form 4.2-1 Item 4 - 0.6 LOG Form 4.2-4 Item 5 /60)*							
2 Drainage Area of each DMA (Acres) *For DMA with outlet at project site outlet, include upstream DMA (Using example schematic in Form 3-1, DMA A will include drainage from DMA C)*							
3 Ratio of pervious area to total area *For DMA with outlet at project site outlet, include upstream DMA (Using example schematic in Form 3-1, DMA A will include drainage from DMA C)*							
4 Pervious area infiltration rate (in/hr) *Use pervious area CN and antecedent moisture condition with Appendix C-3 of the TGD for WQMP*							
5 Maximum loss rate (in/hr) *F_m = Item 3 * Item 4* *Use area-weighted F_m from DMA with outlet at project site outlet, include upstream DMA (Using example schematic in Form 3-1, DMA A will include drainage from DMA C)*							
6 Peak Flow from DMA (cfs) *Q_p =Item 2 * 0.9 * (Item 1 - Item 5)*							
7 Time of concentration adjustment factor for other DMA to site discharge point *Form 4.2-4 Item 12 DMA / Other DMA upstream of site discharge point (If ratio is greater than 1.0, then use maximum value of 1.0)*	DMA A	*n/a*			*n/a*		
	DMA B		*n/a*			*n/a*	
	DMA C			*n/a*			*n/a*

8 Pre-developed Q_p at T_c for DMA A: *Q_p = Item 6_{DMAA} + [Item 6_{DMAB} * (Item 1_{DMAA} - Item 5_{DMAB})/(Item 1_{DMAB} - Item 5_{DMAB})* Item $7_{DMAA/2}$] + [Item 6_{DMAC} * (Item 1_{DMAA} - Item 5_{DMAC})/(Item 1_{DMAC} - Item 5_{DMAC})* Item $7_{DMAA/3}$]*	**9** Pre-developed Q_p at T_c for DMA B: *Q_p = Item 6_{DMAB} + [Item 6_{DMAA} * (Item 1_{DMAB} - Item 5_{DMAA})/(Item 1_{DMAA} - Item 5_{DMAA})* Item $7_{DMAB/1}$] + [Item 6_{DMAC} * (Item 1_{DMAB} - Item 5_{DMAC})/(Item 1_{DMAC} - Item 5_{DMAC})* Item $7_{DMAB/3}$]*	**10** Pre-developed Q_p at T_c for DMA C: *Q_p = Item 6_{DMAC} + [Item 6_{DMAA} * (Item 1_{DMAC} - Item 5_{DMAA})/(Item 1_{DMAA} - Item 5_{DMAA})* Item $7_{DMAC/1}$] + [Item 6_{DMAB} * (Item 1_{DMAC} - Item 5_{DMAB})/(Item 1_{DMAB} - Item 5_{DMAB})* Item $7_{DMAC/2}$]*
10 Peak runoff from pre-developed condition confluence analysis (cfs):	*Maximum of Item 8, 9, and 10 (including additional forms as needed)*	
11 Post-developed Q_p at T_c for DMA A: *Same as Item 8 for post-developed values*	**12** Post-developed Q_p at T_c for DMA B: *Same as Item 9 for post-developed values*	**13** Post-developed Q_p at T_c for DMA C: *Same as Item 10 for post-developed values*
14 Peak runoff from post-developed condition confluence analysis (cfs):	*Maximum of Item 11, 12, and 13 (including additional forms as needed)*	
15 Peak runoff reduction needed to meet HCOC Requirement (cfs):	*$Q_{p\text{-}HCOC}$ = (Item 14 * 0.95) – Item 10*	

4.3 Project Conformance Analysis

Complete the following forms for each project site DA to document that the proposed LID BMPs conform to the project DCV developed to meet performance criteria specified in the MS4 Permit (WQMP Template Section 4.2). For the LID DCV, the forms are ordered according to hierarchy of BMP selection as required by the MS4 Permit (see Section 5.3.1 in the TGD for WQMP). The forms compute the following for on-site LID BMP:

- Site Design and Hydrologic Source Controls (Form 4.3-2)
- Retention and Infiltration (Form 4.3-3)
- Harvested and Use (Form 4.3-4) or
- Biotreatment (Form 4.3-5).

At the end of each form, additional fields facilitate the determination of the extent of mitigation provided by the specific BMP category, allowing for use of the next category of BMP in the hierarchy, if necessary.

The first step in the analysis, using Section 5.3.2.1 of the TGD for WQMP, is to complete Forms 4.3-1 and 4.3-3) to determine if retention and infiltration BMPs are infeasible for the project. For each feasibility criterion in Form 4.3-1, if the answer is "Yes," provide all study findings that includes relevant calculations, maps, data sources, etc. used to make the determination of infeasibility.

Next, complete Forms 4.3-2 and 4.3-4 to determine the feasibility of applicable HSC and harvest and use BMPs, and, if their implementation is feasible, the extent of mitigation of the DCV.

If no site constraints exist that would limit the type of BMP to be implemented in a DA, evaluate the use of combinations of LID BMPs, including all applicable HSC BMPs to maximize on-site retention of the DCV. If no combination of BMP can mitigate the entire DCV, implement the single BMP type, or combination of BMP types, that maximizes on-site retention of the DCV within the minimum effective area.

If the combination of LID HSC, retention and infiltration, and harvest and use BMPs are unable to mitigate the entire DCV, then biotreatment BMPs may be implemented by the project proponent. If biotreatment BMPs are used, then they must be sized to provide sufficient capacity for effective treatment of the remainder of the volume-based performance criteria that cannot be achieved with LID BMPs (TGD for WQMP Section 5.4.4.2). **Under no circumstances shall any portion of the DCV be released from the site without effective mitigation and/or treatment**.

Form 4.3-1 Infiltration BMP Feasibility (DA 1)

Feasibility Criterion – Complete evaluation for each DA on the Project Site

[1] Would infiltration BMP pose significant risk for groundwater related concerns? Yes ☐ No ☒
Refer to Section 5.3.2.1 of the TGD for WQMP

If Yes, Provide basis: (attach)

[2] Would installation of infiltration BMP significantly increase the risk of geotechnical hazards? Yes ☐ No ☒
(Yes, if the answer to any of the following questions is yes, as established by a geotechnical expert):

- The location is less than 50 feet away from slopes steeper than 15 percent
- The location is less than eight feet from building foundations or an alternative setback.
- A study certified by a geotechnical professional or an available watershed study determines that stormwater infiltration would result in significantly increased risks of geotechnical hazards.

If Yes, Provide basis: (attach)

[3] Would infiltration of runoff on a Project site violate downstream water rights? Yes ☐ No ☒

If Yes, Provide basis: (attach)

[4] Is proposed infiltration facility located on hydrologic soil group (HSG) D soils or does the site geotechnical investigation indicate presence of soil characteristics, which support categorization as D soils? Yes ☐ No ☒

If Yes, Provide basis: (attach)

[5] Is the design infiltration rate, after accounting for safety factor of 2.0, below proposed facility less than 0.3 in/hr (accounting for soil amendments)? Yes ☐ No ☒

If Yes, Provide basis: (attach)

[6] Would on-site infiltration or reduction of runoff over pre-developed conditions be partially or fully inconsistent with watershed management strategies as defined in the WAP, or impair beneficial uses? Yes ☐ No ☒
See Section 3.5 of the TGD for WQMP and WAP

If Yes, Provide basis: (attach)

[7] Any answer from Item 1 through Item 3 is "Yes": Yes ☐ No ☒
If yes, infiltration of any volume is not feasible onsite. Proceed to Form 4.3-4, Harvest and Use BMP. If no, then proceed to Item 8 below.

[8] Any answer from Item 4 through Item 6 is "Yes": Yes ☐ No ☒
If yes, infiltration is permissible but is not required to be considered. Proceed to Form 4.3-2, Hydrologic Source Control BMP. If no, then proceed to Item 9, below.

[9] All answers to Item 1 through Item 6 are "No":
Infiltration of the full DCV is potentially feasible, LID infiltration BMP must be designed to infiltrate the full DCV to the MEP. Proceed to Form 4.3-2, Hydrologic Source Control BMP.

4.3.1 Site Design Hydrologic Source Control BMP

Section XI.E. of the Permit emphasizes the use of LID preventative measures; and the use of LID HSC BMPs reduces the portion of the DCV that must be addressed in downstream BMPs. Therefore, all applicable HSC shall be provided except where they are mutually exclusive with each other, or with other BMPs. Mutual exclusivity may result from overlapping BMP footprints such that either would be potentially feasible by itself, but both could not be implemented. Please note that while there are no numeric standards regarding the use of HSC, if a project cannot feasibly meet BMP sizing requirements or cannot fully address HCOCs, feasibility of all applicable HSC must be part of demonstrating that the BMP system has been designed to retain the maximum feasible portion of the DCV. Complete Form 4.3-2 to identify and calculate estimated retention volume from implementing site design HSC BMP. Refer to Section 5.4.1 in the TGD for more detailed guidance.

Form 4.3-2 Site Design Hydrologic Source Control BMPs (DA 1)

1 Implementation of Impervious Area Dispersion BMP (i.e. routing runoff from impervious to pervious areas), excluding impervious areas planned for routing to on-lot infiltration BMP: Yes ☐ No ☒ *If yes, complete Items 2-5; If no, proceed to Item 6*	DA 1 DMA C BMP Type Self-Treating Landscape areas	DA DMA BMP Type	DA DMA BMP Type *(Use additional forms for more BMPs)*
2 Total impervious area draining to pervious area (ft^2)	1,496		
3 Ratio of pervious area receiving runoff to impervious area	14,107/1,496 = 9.43		
4 Retention volume achieved from impervious area dispersion (ft^3) *V = Item2 * Item 3 * (0.5/12), assuming retention of 0.5 inches of runoff*	588		
5 Sum of retention volume achieved from impervious area dispersion (ft^3): 588 $V_{retention}$ *=Sum of Item 4 for all BMPs*			
6 Implementation of Localized On-lot Infiltration BMPs (e.g. on-lot rain gardens): Yes ☐ No ☒ *If yes, complete Items 7-13 for aggregate of all on-lot infiltration BMP in each DA; If no, proceed to Item 14*	DA DMA BMP Type	DA DMA BMP Type	DA DMA BMP Type *(Use additional forms for more BMPs)*
7 Ponding surface area (ft^2)			
8 Ponding depth (ft)			
9 Surface area of amended soil/gravel (ft^2)			
10 Average depth of amended soil/gravel (ft)			
11 Average porosity of amended soil/gravel			
12 Retention volume achieved from on-lot infiltration (ft^3) $V_{retention}$ *= (Item 7 *Item 8) + (Item 9 * Item 10 * Item 11)*			
13 Runoff volume retention from on-lot infiltration (ft^3): $V_{retention}$ *=Sum of Item 12 for all BMPs*			

Form 4.3-2 cont. Site Design Hydrologic Source Control BMPs (DA 1)

14 Implementation of evapotranspiration BMP (green, brown, or blue roofs): Yes ☐ No ☒ *If yes, complete Items 15-20. If no, proceed to Item 21*	DA DMA BMP Type	DA DMA BMP Type	DA DMA BMP Type *(Use additional forms for more BMPs)*
15 Rooftop area planned for ET BMP (ft^2)			

Form 4.3-2 Site Design Hydrologic Source Control BMPs (DA 1)

16 Average wet season ET demand (in/day) *Use local values, typical ~ 0.1*			
17 Daily ET demand (ft^3/day) *Item 15 * (Item 16 / 12)*			
18 Drawdown time (hrs) *Copy Item 6 in Form 4.2-1*			
19 Retention Volume (ft^3) *$V_{retention}$ = Item 17 * (Item 18 / 24)*			
20 Runoff volume retention from evapotranspiration BMPs (ft^3): *$V_{retention}$ =Sum of Item 19 for all BMPs*			
21 Implementation of Street Trees: Yes ☐ No ☒ *If yes, complete Items 22-25. If no, proceed to Item 26*	DA DMA BMP Type	DA DMA BMP Type	DA DMA BMP Type *(Use additional forms for more BMPs)*
22 Number of Street Trees			
23 Average canopy cover over impervious area (ft^2)			
24 Runoff volume retention from street trees (ft^3) *$V_{retention}$ = Item 22 * Item 23 * (0.05/12) assume runoff retention of 0.05 inches*			
25 Runoff volume retention from street tree BMPs (ft^3): *$V_{retention}$ = Sum of Item 24 for all BMPs*			
26 Implementation of residential rain barrel/cisterns: Yes☐ No ☒ *If yes, complete Items 27-29; If no, proceed to Item 30*	DA DMA BMP Type	DA DMA BMP Type	DA DMA BMP Type *(Use additional forms for more BMPs)*
27 Number of rain barrels/cisterns			
28 Runoff volume retention from rain barrels/cisterns (ft^3) *$V_{retention}$ = Item 27 * 3*			
29 Runoff volume retention from residential rain barrels/Cisterns (ft3): *$V_{retention}$ =Sum of Item 28 for all BMPs*			
30 Total Retention Volume from Site Design Hydrologic Source Control BMPs: 588 *Sum of Items 5, 13, 20, 25 and 29*			

4.3.2 Infiltration BMPs

Use Form 4.3-3 to compute on-site retention of runoff from proposed retention and infiltration BMPs. Volume retention estimates are sensitive to the percolation rate used, which determines the amount of runoff that can be infiltrated within the specified drawdown time. The infiltration safety factor reduces field measured percolation to account for potential inaccuracy associated with field measurements, declining BMP performance over time, and compaction during construction. Appendix D of the TGD for WQMP provides guidance on estimating an appropriate safety factor to use in Form 4.3-3.

If site constraints limit the use of BMPs to a single type and implementation of retention and infiltration BMPs mitigate no more than 40% of the DCV, then they are considered infeasible and the Project Proponent may evaluate the effectiveness of BMPs lower in the LID hierarchy of use (Section 5.5.1 of the TGD for WQMP)

If implementation of infiltrations BMPs is feasible as determined using Form 4.3-1, then LID infiltration BMPs shall be implemented to the MEP (section 4.1 of the TGD for WQMP).

Form 4.3-3 Infiltration LID BMP - including underground BMPs (DA 1)

1 Remaining LID DCV not met by site design HSC BMP (ft^3): 43,297 (DMA A + DMA B) *V_{unmet} = Form 4.2-1 Item 7 - Form 4.3-2 Item 30*			
BMP Type *Use columns to the right to compute runoff volume retention from proposed infiltration BMP (select BMP from Table 5-4 in TGD for WQMP) - Use additional forms for more BMPs*	DA 1 DMA A BMP Type Underground Infiltration	DA 1 DMA B BMP Type Underground Infiltration	DA DMA BMP Type Underground Infiltration
2 Infiltration rate of underlying soils (in/hr) *See Section 5.4.2 and Appendix D of the TGD for WQMP for minimum requirements for assessment methods*	20"/hr	20"/hr	
3 Infiltration safety factor *See TGD Section 5.4.2 and Appendix D*	8.33	8.33	
4 Design percolation rate (in/hr) *P_{design} = Item 2 / Item 3*	2.4"/hr	2.4"/hr	
5 Ponded water drawdown time (hr) *Copy Item 6 in Form 4.2-1*	48	48	
6 Maximum ponding depth (ft) *BMP specific, see Table 5-4 of the TGD for WQMP for BMP design details*	4.7'	4.9'	
7 Ponding Depth (ft) *d_{BMP} = Minimum of (1/12*Item 4*Item 5) or Item 6*	4.7'	4.9'	
8 Infiltrating surface area, SA_{BMP} (ft^2) *the lesser of the area needed for infiltration of full DCV or minimum space requirements from Table 5.7 of the TGD for WQMP*	8,901 sf	578 sf	
9 Amended soil depth, d_{media} (ft) *Only included in certain BMP types, see Table 5-4 in the TGD for WQMP for reference to BMP design details*	N/A	N/A	
10 Amended soil porosity	N/A	N/A	
11 Gravel depth, d_{media} (ft) *Only included in certain BMP types, see Table 5-4 of the TGD for WQMP for BMP design details*	N/A	N/A	
12 Gravel porosity	0.4	0.4	
13 Duration of storm as basin is filling (hrs) *Typical ~ 3hrs*	3	3	
14 Above Ground Retention Volume (ft^3) *$V_{retention}$ = Item 8 * [Item7 + (Item 9 * Item 10) + (Item 11 * Item 12) + (Item 13 * (Item 4 / 12))]*	0	0	
15 Underground Retention Volume (ft^3) *Volume determined using manufacturer's specifications and calculations*	42,251 ft3	2,806 ft3	
16 Total Retention Volume from LID Infiltration BMPs: 45,057 ft3 *(Sum of Items 14 and 15 for all infiltration BMP included in plan)*			
17 Fraction of DCV achieved with infiltration BMP: 100% *Retention% = Item 16 / Form 4.2-1 Item 7*			
18 Is full LID DCV retained onsite with combination of hydrologic source control and LID retention/infiltration BMPs? Yes ☒ No ☐ *If yes, demonstrate conformance using Form 4.3-10; If no, then reduce Item 3, Factor of Safety to 2.0 and increase Item 8, Infiltrating Surface Area, such that*			

the portion of the site area used for retention and infiltration BMPs equals or exceeds the minimum effective area thresholds (Table 5-7 of the TGD for WQMP) for the applicable category of development and repeat all above calculations.

For Item 6 & 15 above:

Since this is an underground infiltration bmp only, the ponding depth is calculated by ponding depth d_{bmp}=Infiltration system volume/infiltration system base area. See Attachment B for Infiltration system

4.3.3 Harvest and Use BMP

Harvest and use BMP may be considered if the full LID DCV cannot be met by maximizing infiltration BMPs. Use Form 4.3-4 to compute on-site retention of runoff from proposed harvest and use BMPs.

Volume retention estimates for harvest and use BMPs are sensitive to the on-site demand for captured stormwater. Since irrigation water demand is low in the wet season, when most rainfall events occur in San Bernardino County, the volume of water that can be used within a specified drawdown period is relatively low. The bottom portion of Form 4.3-4 facilitates the necessary computations to show infeasibility if a minimum incremental benefit of 40 percent of the LID DCV would not be achievable with MEP implementation of on-site harvest and use of stormwater (Section 5.5.4 of the TGD for WQMP).

Form 4.3-4 Harvest and Use BMPs (DA 1)

1 Remaining LID DCV not met by site design HSC or infiltration BMP (ft^3): *V_{unmet} = Form 4.2-1 Item 7 - Form 4.3-2 Item 30 – Form 4.3-3 Item 16*			
BMP Type(s) *Compute runoff volume retention from proposed harvest and use BMP (Select BMPs from Table 5-4 of the TGD for WQMP) - Use additional forms for more BMPs*	DA DMA BMP Type	DA DMA BMP Type	DA DMA BMP Type *(Use additional forms for more BMPs)*
2 Describe cistern or runoff detention facility			
3 Storage volume for proposed detention type (ft^3) *Volume of cistern*			
4 Landscaped area planned for use of harvested stormwater (ft^2)			
5 Average wet season daily irrigation demand (in/day) Use local values, typical ~ 0.1 in/day			
6 Daily water demand (ft^3/day) *Item 4 * (Item 5 / 12)*			
7 Drawdown time (hrs) *Copy Item 6 from Form 4.2-1*			
8 Retention Volume (ft^3) *$V_{retention}$ = Minimum of (Item 3) or (Item 6 * (Item 7 / 24))*			
9 Total Retention Volume (ft^3) from Harvest and Use BMP *Sum of Item 8 for all harvest and use BMP included in plan*			

10 Is the full DCV retained with a combination of LID HSC, retention and infiltration, and harvest & use BMPs? Yes ☐ No ☐

If yes, demonstrate conformance using Form 4.3-10. If no, then re-evaluate combinations of all LID BMP and optimize their implementation such that the maximum portion of the DCV is retained on-site (using a single BMP type or combination of BMP types). If the full DCV cannot be mitigated after this optimization process, proceed to Section 4.3.4.

4.3.4 Biotreatment BMP

Biotreatment BMPs may be considered if the full LID DCV cannot be met by maximizing retention and infiltration, and harvest and use BMPs. A key consideration when using biotreatment BMP is the effectiveness of the proposed BMP in addressing the pollutants of concern for the project (see Table 5-5 of the TGD for WQMP).

Use Form 4.3-5 to summarize the potential for volume based and/or flow based biotreatment options to biotreat the remaining unmet LID DCV w. Biotreatment computations are included as follows:

- Use Form 4.3-6 to compute biotreatment in small volume based biotreatment BMP (e.g. bioretention w/underdrains);
- Use Form 4.3-7 to compute biotreatment in large volume based biotreatment BMP (e.g. constructed wetlands);
- Use Form 4.3-8 to compute sizing criteria for flow-based biotreatment BMP (e.g. bioswales)

Form 4.3-5 Selection and Evaluation of Biotreatment BMP (DA 1)

1 Remaining LID DCV not met by site design HSC, infiltration, or harvest and use BMP for potential biotreatment (ft^3): *Form 4.2-1 Item 7 - Form 4.3-2 Item 30 – Form 4.3-3 Item 16- Form 4.3-4 Item 9*	List pollutants of concern *Copy from Form 2.3-1.*	
2 Biotreatment BMP Selected *(Select biotreatment BMP(s) necessary to ensure all pollutants of concern are addressed through Unit Operations and Processes, described in Table 5-5 of the TGD for WQMP)*	Volume-based biotreatment *Use Forms 4.3-6 and 4.3-7 to compute treated volume*	Flow-based biotreatment *Use Form 4.3-8 to compute treated volume*
	☐ Bioretention with underdrain ☐ Planter box with underdrain ☐ Constructed wetlands ☐ Wet extended detention ☐ Dry extended detention	☐ Vegetated swale ☐ Vegetated filter strip ☐ Proprietary biotreatment
3 Volume biotreated in volume based biotreatment BMP (ft^3): *Form 4.3-6 Item 15 + Form 4.3-7 Item 13*	**4** Compute remaining LID DCV with implementation of volume based biotreatment BMP (ft^3): *Item 1 – Item 3*	**5** Remaining fraction of LID DCV for sizing flow based biotreatment BMP: % *Item 4 / Item 1*
6 Flow-based biotreatment BMP capacity provided (cfs): *Use Figure 5-2 of the TGD for WQMP to determine flow capacity required to provide biotreatment of remaining percentage of unmet LID DCV (Item 5), for the project's precipitation zone (Form 3-1 Item 1)*		
7 Metrics for MEP determination: • Provided a WQMP with the portion of site area used for suite of LID BMP equal to minimum thresholds in Table 5-7 of the TGD for WQMP for the proposed category of development: ☐ *If maximized on-site retention BMPs is feasible for partial capture, then LID BMP implementation must be optimized to retain and infiltrate the maximum portion of the DCV possible within the prescribed minimum effective area. The remaining portion of the DCV shall then be mitigated using biotreatment BMP.*		

Form 4.3-6 Volume Based Biotreatment (DA 1) – Bioretention and Planter Boxes with Underdrains

Biotreatment BMP Type *(Bioretention w/underdrain, planter box w/underdrain, other comparable BMP)*	DA DMA BMP Type	DA DMA BMP Type	DA DMA BMP Type *(Use additional forms for more BMPs)*
1 Pollutants addressed with BMP *List all pollutant of concern that will be effectively reduced through specific Unit Operations and Processes described in Table 5-5 of the TGD for WQMP*			
2 Amended soil infiltration rate *Typical ~ 5.0*			
3 Amended soil infiltration safety factor *Typical ~ 2.0*			
4 Amended soil design percolation rate (in/hr) P_{design} *= Item 2 / Item 3*			
5 Ponded water drawdown time (hr) *Copy Item 6 from Form 4.2-1*			
6 Maximum ponding depth (ft) *see Table 5-6 of the TGD for WQMP for reference to BMP design details*			
7 Ponding Depth (ft) d_{BMP} *= Minimum of (1/12 * Item 4 * Item 5) or Item 6*			
8 Amended soil surface area (ft^2)			
9 Amended soil depth (ft) *see Table 5-6 of the TGD for WQMP for reference to BMP design details*			
10 Amended soil porosity, *n*			
11 Gravel depth (ft) *see Table 5-6 of the TGD for WQMP for reference to BMP design details*			
12 Gravel porosity, *n*			
13 Duration of storm as basin is filling (hrs) *Typical ~ 3hrs*			
14 Biotreated Volume (ft^3) $V_{biotreated}$ *= Item 8 * [(Item 7/2) + (Item 9 * Item 10) +(Item 11 * Item 12) + (Item 13 * (Item 4 / 12))]*			
15 Total biotreated volume from bioretention and/or planter box with underdrains BMP: *Sum of Item 14 for all volume-based BMPs included in this form*			

Form 4.3-7 Volume Based Biotreatment (DA 1) – Constructed Wetlands and Extended Detention

Biotreatment BMP Type *Constructed wetlands, extended wet detention, extended dry detention, or other comparable proprietary BMP. If BMP includes multiple modules (e.g. forebay and main basin), provide separate estimates for storage and pollutants treated in each module.*	DA DMA BMP Type		DA DMA BMP Type *(Use additional forms for more BMPs)*	
	Forebay	Basin	Forebay	Basin
1 Pollutants addressed with BMP forebay and basin *List all pollutant of concern that will be effectively reduced through specific Unit Operations and Processes described in Table 5-5 of the TGD for WQMP*				
2 Bottom width (ft)				
3 Bottom length (ft)				
4 Bottom area (ft^2) A_{bottom} = *Item 2 * Item 3*				
5 Side slope (ft/ft)				
6 Depth of storage (ft)				
7 Water surface area (ft^2) $A_{surface}$ =*(Item 2 + (2 * Item 5 * Item 6)) * (Item 3 + (2 * Item 5 * Item 6))*				
8 Storage volume (ft^3) *For BMP with a forebay, ensure fraction of total storage is within ranges specified in BMP specific fact sheets, see Table 5-6 of the TGD for WQMP for reference to BMP design details* V =*Item 6 / 3 * [Item 4 + Item 7 + (Item 4 * Item 7)^0.5]*				
9 Drawdown Time (hrs) *Copy Item 6 from Form 2.1*				
10 Outflow rate (cfs) Q_{BMP} = *(Item* $8_{forebay}$ *+ Item* 8_{basin}*) / (Item 9 * 3600)*				
11 Duration of design storm event (hrs)				
12 Biotreated Volume (ft^3) $V_{biotreated}$ = *(Item* $8_{forebay}$ *+ Item* 8_{basin}*) +(Item 10 * Item 11 * 3600)*				
13 Total biotreated volume from constructed wetlands, extended dry detention, or extended wet detention : *(Sum of Item 12 for all BMP included in plan)*				

Form 4.3-8 Flow Based Biotreatment (DA 1)

Biotreatment BMP Type *Vegetated swale, vegetated filter strip, or other comparable proprietary BMP*	DA DMA BMP Type	DA DMA BMP Type	DA DMA BMP Type *(Use additional forms for more BMPs)*
1 Pollutants addressed with BMP *List all pollutant of concern that will be effectively reduced through specific Unit Operations and Processes described in TGD Table 5-5*			
2 Flow depth for water quality treatment (ft) *BMP specific, see Table 5-6 of the TGD for WQMP for reference to BMP design details*			
3 Bed slope (ft/ft) *BMP specific, see Table 5-6 of the TGD for WQMP for reference to BMP design details*			
4 Manning's roughness coefficient			
5 Bottom width (ft) b_w *= (Form 4.3-5 Item 6 * Item 4) / (1.49 * Item 2^1.67 * Item 3^0.5)*			
6 Side Slope (ft/ft) *BMP specific, see Table 5-6 of the TGD for WQMP for reference to BMP design details*			
7 Cross sectional area (ft^2) *A = (Item 5 * Item 2) + (Item 6 * Item 2^2)*			
8 Water quality flow velocity (ft/sec) *V = Form 4.3-5 Item 6 / Item 7*			
9 Hydraulic residence time (min) *Pollutant specific, see Table 5-6 of the TGD for WQMP for reference to BMP design details*			
10 Length of flow based BMP (ft) *L = Item 8 * Item 9 * 60*			
11 Water surface area at water quality flow depth (ft^2) SA_{top} *= (Item 5 + (2 * Item 2 * Item 6)) * Item 10*			

4.3.5 Conformance Summary

Complete Form 4.3-9 to demonstrate how on-site LID DCV is met with proposed site design hydrologic source control, infiltration, harvest and use, and/or biotreatment BMP. The bottom line of the form is used to describe the basis for infeasibility determination for on-site LID BMP to achieve full LID DCV, and provides methods for computing remaining volume to be addressed in an alternative compliance plan. If the project has more than one outlet, then complete additional versions of this form for each outlet.

Form 4.3-9 Conformance Summary and Alternative Compliance Volume Estimate (DA 1)

1 Total LID DCV for the Project DA-1 (ft^3): 42,971 *Copy Item 7 in Form 4.2-1*

2 On-site retention with site design hydrologic source control LID BMP (ft^3): 588 *Copy Item 30 in Form 4.3-2*

3 On-site retention with LID infiltration BMP (ft^3): 45,057 *Copy Item 16 in Form 4.3-3*

4 On-site retention with LID harvest and use BMP (ft^3): 0 *Copy Item 9 in Form 4.3-4*

5 On-site biotreatment with volume based biotreatment BMP (ft^3): 0 *Copy Item 3 in Form 4.3-5*

6 Flow capacity provided by flow based biotreatment BMP (cfs): 0 *Copy Item 6 in Form 4.3-5*

7 LID BMP performance criteria are achieved if answer to any of the following is "Yes":

- Full retention of LID DCV with site design HSC, infiltration, or harvest and use BMP: Yes ☒ No ☐
  If yes, sum of Items 2, 3, and 4 is greater than Item 1
- Combination of on-site retention BMPs for a portion of the LID DCV and volume-based biotreatment BMP that address all pollutants of concern for the remaining LID DCV: Yes ☐ No ☐
  If yes, a) sum of Items 2, 3, 4, and 5 is greater than Item 1, and Items 2, 3 and 4 are maximized; or b) Item 6 is greater than Form 4.3--5 Item 6 and Items 2, 3 and 4 are maximized
- On-site retention and infiltration is determined to be infeasible and biotreatment BMP provide biotreatment for all pollutants of concern for full LID DCV: Yes ☐ No ☐
  If yes, Form 4.3-1 Items 7 and 8 were both checked yes

8 If the LID DCV is not achieved by any of these means, then the project may be allowed to develop an alternative compliance plan. Check box that describes the scenario which caused the need for alternative compliance:

- Combination of HSC, retention and infiltration, harvest and use, and biotreatment BMPs provide less than full LID DCV capture: ☐
  Checked yes for Form 4.3-5 Item 7, Item 6 is zero, and sum of Items 2, 3, 4, and 5 is less than Item 1. If so, apply water quality credits and calculate volume for alternative compliance, V_{alt} *= (Item 1 – Item 2 – Item 3 – Item 4 – Item 5) * (100 - Form 2.4-1 Item 2)%*
- An approved Watershed Action Plan (WAP) demonstrates that water quality and hydrologic impacts of urbanization are more effective when managed in at an off-site facility: ☐
  Attach appropriate WAP section, including technical documentation, showing effectiveness comparisons for the project site and regional watershed

4.3.6 Hydromodification Control BMP

Use Form 4.3-10 to compute the remaining runoff volume retention, after LID BMP are implemented, needed to address HCOC, and the increase in time of concentration and decrease in peak runoff necessary to meet targets for protection of waterbodies with a potential HCOC. Describe hydromodification control BMP that address HCOC, which may include off-site BMP and/or in-stream controls. Section 5.6 of the TGD for WQMP provides additional details on selection and evaluation of hydromodification control BMP.

Form 4.3-10 Hydromodification Control BMPs (DA 1)

1 Volume reduction needed for HCOC performance criteria (ft^3): *(Form 4.2-2 Item 4 * 0.95) – Form 4.2-2 Item 1*	**2** On-site retention with site design hydrologic source control, infiltration, and harvest and use LID BMP (ft^3): *Sum of Form 4.3-9 Items 2, 3, and 4 Evaluate option to increase implementation of on-site retention in Forms 4.3-2, 4.3-3, and 4.3-4 in excess of LID DCV toward achieving HCOC volume reduction*
3 Remaining volume for HCOC volume capture (ft^3): *Item 1 – Item 2*	**4** Volume capture provided by incorporating additional on-site or off-site retention BMPs (ft^3): *Existing downstream BMP may be used to demonstrate additional volume capture (if so, attach to this WQMP a hydrologic analysis showing how the additional volume would be retained during a 2-yr storm event for the regional watershed)*

5 If Item 4 is less than Item 3, incorporate in-stream controls on downstream waterbody segment to prevent impacts due to hydromodification ☐ *Attach in-stream control BMP selection and evaluation to this WQMP*

6 Is Form 4.2-2 Item 11 less than or equal to 5%: Yes ☐ No ☐

If yes, HCOC performance criteria is achieved. If no, select one or more mitigation options below:

- Demonstrate increase in time of concentration achieved by proposed LID site design, LID BMP, and additional on-site or off-site retention BMP ☐
  BMP upstream of a waterbody segment with a potential HCOC may be used to demonstrate increased time of concentration through hydrograph attenuation (if so, show that the hydraulic residence time provided in BMP for a 2-year storm event is equal or greater than the addition time of concentration requirement in Form 4.2-4 Item 15)
- Increase time of concentration by preserving pre-developed flow path and/or increase travel time by reducing slope and increasing cross-sectional area and roughness for proposed on-site conveyance facilities ☐
- Incorporate appropriate in-stream controls for downstream waterbody segment to prevent impacts due to hydromodification, in a plan approved and signed by a licensed engineer in the State of California ☐

7 Form 4.2-2 Item 12 less than or equal to 5%: Yes ☐ No ☐

If yes, HCOC performance criteria is achieved. If no, select one or more mitigation options below:

- Demonstrate reduction in peak runoff achieved by proposed LID site design, LID BMPs, and additional on-site or off-site retention BMPs ☐
  BMPs upstream of a waterbody segment with a potential HCOC may be used to demonstrate additional peak runoff reduction through hydrograph attenuation (if so, attach to this WQMP, a hydrograph analysis showing how the peak runoff would be reduced during a 2-yr storm event)
- Incorporate appropriate in-stream controls for downstream waterbody segment to prevent impacts due to hydromodification, in a plan approved and signed by a licensed engineer in the State of California ☐

4.4 Alternative Compliance Plan (if applicable)

Describe an alternative compliance plan (if applicable) for projects not fully able to infiltrate, harvest and use, or biotreat the DCV via on-site LID practices. A project proponent must develop an alternative compliance plan to address the remainder of the LID DCV. Depending on project type some projects may qualify for water quality credits that can be applied to reduce the DCV that must be treated prior to development of an alternative compliance plan (see Form 2.4-1, Water Quality Credits). Form 4.3-9 Item 8 includes instructions on how to apply water quality credits when computing the DCV that must be met through alternative compliance. Alternative compliance plans may include one or more of the following elements:

- On-site structural treatment control BMP - All treatment control BMP should be located as close to possible to the pollutant sources and should not be located within receiving waters;
- Off-site structural treatment control BMP - Pollutant removal should occur prior to discharge of runoff to receiving waters;
- Urban runoff fund or In-lieu program, if available

Depending upon the proposed alternative compliance plan, approval by the executive officer may or may not be required (see Section 6 of the TGD for WQMP).

Section 5 Inspection and Maintenance Responsibility for Post Construction BMP

All BMP included as part of the project WQMP are required to be maintained through regular scheduled inspection and maintenance (refer to Section 8, Post Construction BMP Requirements, in the TGD for WQMP). Fully complete Form 5-1 summarizing all BMP included in the WQMP. Attach additional forms as needed. The WQMP shall also include a detailed Operation and Maintenance Plan for all BMP and may require a Maintenance Agreement (consult the jurisdiction's LIP). If a Maintenance Agreement is required, it must also be attached to the WQMP.

Form 5-1 BMP Inspection and Maintenance (use additional forms as necessary)

BMP	Reponsible Party(s)	Inspection/ Maintenance Activities Required	Minimum Frequency of Activities

Section 6 WQMP Attachments

6.1. Site Plan and Drainage Plan

Include a site plan and drainage plan sheet set containing the following minimum information:

- Project location
- Site boundary
- Land uses and land covers, as applicable
- Suitability/feasibility constraints
- Structural Source Control BMP locations
- Site Design Hydrologic Source Control BMP locations
- LID BMP details
- Drainage delineations and flow information
- Drainage connections

6.2 Electronic Data Submittal

Minimum requirements include submittal of PDF exhibits in addition to hard copies. Format must not require specialized software to open. If the local jurisdiction requires specialized electronic document formats (as described in their local Local Implementation Plan), this section will describe the contents (e.g., layering, nomenclature, geo-referencing, etc.) of these documents so that they may be interpreted efficiently and accurately.

6.3 Post Construction

Attach all O&M Plans and Maintenance Agreements for BMP to the WQMP.

6.4 Other Supporting Documentation

- BMP Educational Materials
- Activity Restriction – C, C&R's & Lease Agreements

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APPENDIX A

Vicinity Map

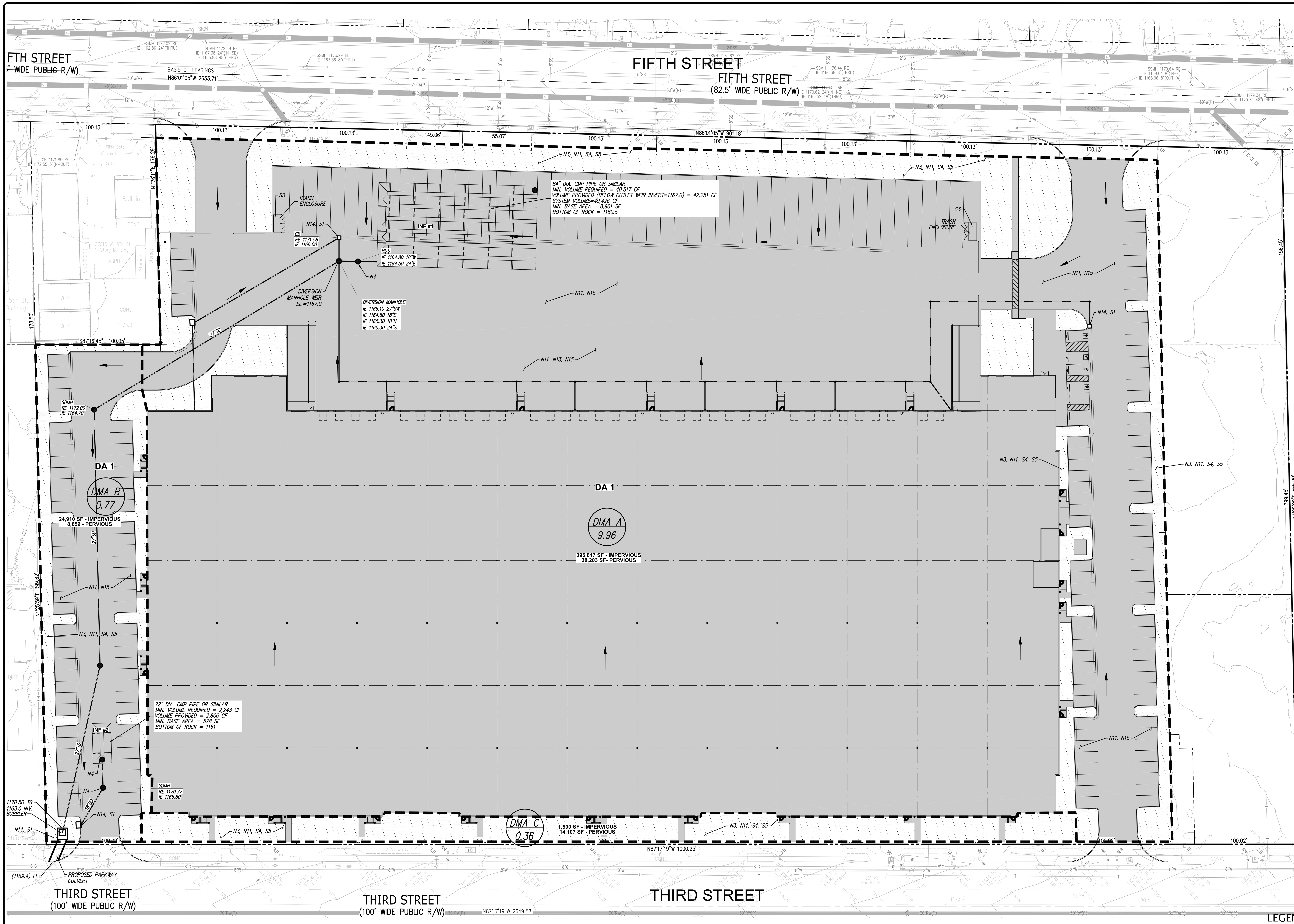
Storm Water Quality Control Plan

BMP Calculations

Aerial Photo



FIGURE 1: Vicinity Map



BMP

N1	EDUCATION OF PROPERTY OWNERS, TENANTS, AND OCCUPANTS
N2	ACTIVITY RESTRICTION
N3	LANDSCAPE MANAGEMENT
N4	BMP MAINTENANCE
N6	LOCAL WATER QUALITY
N7	SPILL CONTINGENCY
N10	UNIFORM FIRE CODE IMPLEMENTATION
N11	LITTER/DEBRIS CONTROL
N12	EMPLOYEE TRAINING
N13	HOUSEKEEPING OF LOADING DOCS
N14	CATCH BASIN INSPECTION
N15	VACUUM SWEEPING OF PRIVATE STREETS AND PARKING LOTS
S1	PROVIDE STORM DRAIN SYSTEM STENCILING AND SIGNAGE
S3	TRASH AND WASTE STORAGE
S4	EFFICIENT IRRIGATION SYSTEMS AND LANDSCAPE DESIGN
S5	DEPRESSED LANDSCAPE 1" BELOW TOP OF CURB/SIDEWALK

FLOW BASED BMP DESIGN (Pre-Treatment)

DRAINAGE AREA	DRAINAGE SUB-AREA	TGD - FACTOR	Impervious Area (Ac.)	Q (CFS)
DA 1	DMA A	0.136	9.09	1.24
DA 1	DMA B	0.136	0.57	0.08

PROPOSED BMP INFORMATION

DRAINAGE AREA	DRAINAGE SUB-AREA	TOTAL (Ac.)	IMP. (Ac.)	% IMPERVIOUS	% PERVIOUS	C_{BMP}	P6 (IN)	DCV (CF)	DRAWDOWN (HR)	INFILTRATION SYSTEM ID	INFILTRATION SYSTEM LOCATION	STORAGE VOLUME PROVIDED (CF)	TREATMENT FLOWRATE REQUIRED (CFS)	TREATMENT FLOWRATE PROVIDED (CFS)	Pre-Treatment System
DA 1	DMA A	9.96	9.09	91.2%	8.8%	0.748	0.763	40,517	48	INF #1	LAT: 34.10789 LONG: 117.21420	42,251	1.24	1.6	CDS2025-5-C
	DMA B	0.77	0.57	74.2%	25.8%	0.535	0.763	2,243	48	INF #2	LAT: 34.10700 LONG: 117.21500	2,806	0.08	0.7	CDS2015-4-C
	DMA C	0.36	0.03	9.6%	90.4%	0.108	0.763	210	48	N/A - SELF TREATING	N/A -SELF TREATING	N/A -SELF TREATING	N/A -SELF TREATING	N/A -SELF TREATING	N/A

LEGEND

- TRIBUTARY AREA LIMITS
- LANDSCAPE AREA
- IMPERVIOUS PAVEMENT
- FLOW DIRECTION

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HIGHLAND, CALIFORNIA

DATE	JANUARY, 2023
SCALE	AS SHOWN
DESIGNER	JO
DRAWN BY	STAFF
JOB NO.	A22078-1
SHEET	PG5.0

Pre-Treatment BMP

Sizing of the hydrodynamic separator

The required treatment flow rate is based on the following chart from the Technical Guidance Design Manual, using 0.136 cfs/impervious acre for "Valley" and 100% remaining percentage of Lid BMP Volume.

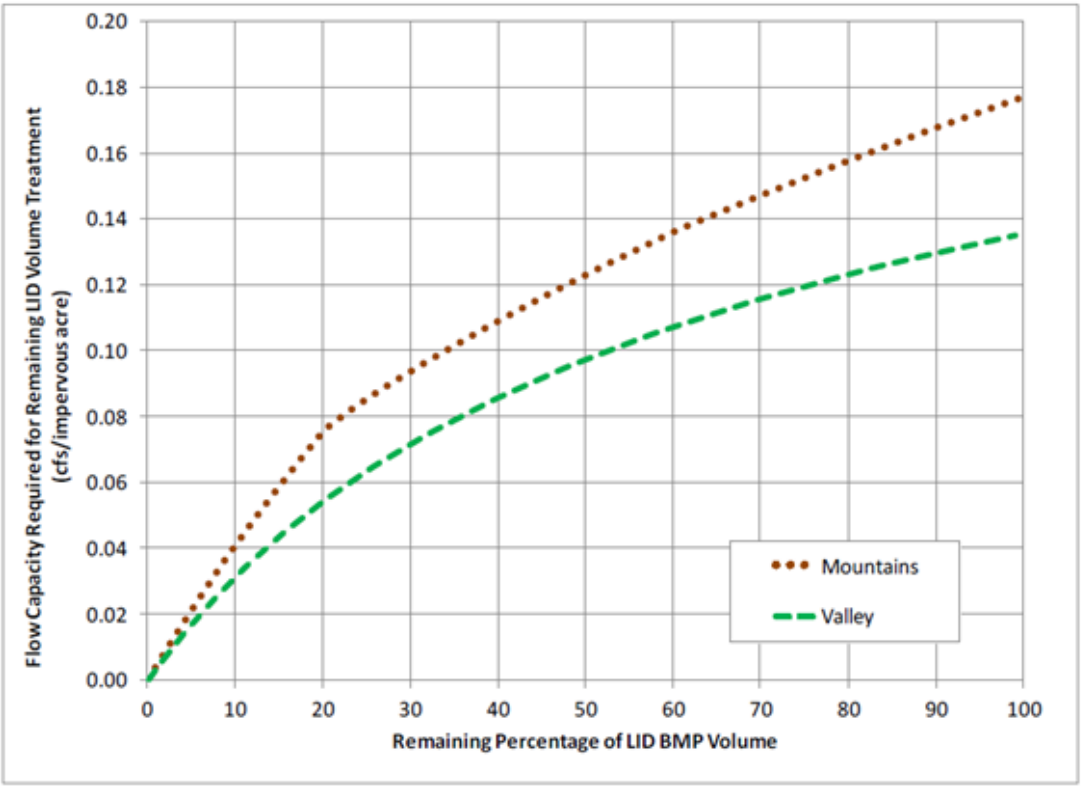


Figure 5-2. Nomograph for Determining Flow-based BMP Capacity Requirement to meet Remaining Unmet DCV

FLOW BASED BMP DESIGN (Pre-Treatment)				
DRAINAGE AREA	DRAINAGE SUB-AREA	TGD - FACTOR	Impervious Area (Ac.)	Q (CFS)
DA 1	DMA A	0.136	9.12	1.24
DA 1	DMA B	0.136	0.61	0.08

CDS Hydrodynamic Separators from Contech are proposed to pre-treat the water quality design flow rate before it is diverted to the infiltration system. Per Contech, for the infiltration system at DA1-DMA A, a CDS 2025-5-C will be needed. A Stormgate diversion manhole is proposed upstream of the CDS unit, to create an off-line system such that the peak flow rates from larger storm events are routed around the hydrodynamic separator.

At DMA 1-DMA B, a CDS2015-4-C is proposed. No diversion manhole is needed due to the much smaller peak flow rates.

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Date: 12/02/2022

Memo: Applicability of Contech Multi-Benefit Trash Full Capture Systems for Meeting California Trash Control Requirements

The California State Water Resources Control Board has issued updated fact sheets for five types of Multi-Benefit Trash Full Capture Systems (MBTFCS) that can meet the requirements of the statewide trash amendments. In addition to capturing trash, these systems provide other environmental benefits such as capture, reuse, treatment, and/or infiltration of stormwater runoff. Each of the individual MBTFCS fact sheets are written with a description of the fundamental unit processes and physical characteristics that define the MBTFCS and that provide trash control. Most Contech media filters, biofilters, detention, infiltration and capture and use systems fit the definitions provided in the fact sheets and therefore do not need separate certification if they also meet the performance, design, and maintenance requirements in the fact sheets.

Multi-Benefit Trash Full Capture System	Trash Removal Unit Processes	Applicable Contech Products
Bioretention	Physical filtration through mulch, soil, and gravel	Filterra® Bioretention
Capture and Use Systems	Rainwater capture and use	Contech Rainwater Harvesting Systems
Detention Basin	Detention, filtration through media, infiltration through soils	Contech Detention Systems
Infiltration Trench or Basin	Infiltration into native soils	Contech Infiltration Systems
Media Filter	Physical filtration through media, fine grained materials, or fabrics	Stormwater Management StormFilter® Jellyfish® Filter Kraken® Filter

Other multi-benefit systems of a similar type, but with substantially different designs than described in the fact sheet, require separate approval following the Application Requirements for Trash Full Capture System Certification. For example, Modular Wetlands® incorporates prefilters upstream of the biofiltration cells instead of mulch and incorporates a horizontal flow path within its biofiltration cells rather than a conventional vertical flow path. The Modular Wetlands system has been approved separately as a "High Flow Capacity Trash Full Capture System".

In addition, the Contech CDS® system and the Debris Separating Baffle Box are certified High Flow Capacity Trash Full Capture Systems appearing on the Certified Full Capture System List published by the California State Water Resources Control Board. Bio Clean® Curb Inlet and Grate Inlet Filters are also certified trash full capture systems provided by Contech that can be utilized at individual inlets.

For more information about Contech products, please contact your local Contech Stormwater Consultant at: https://www.conteches.com/connect.

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For more information about implementation of the California Trash Amendments, please contact:
Leo Cosentini
Division of Water Quality
California State Water Resources Control Board
lcosentini@waterboards.ca.gov
(916) 341-5524

References:

Application Requirements for Trash Full Capture System Certification (Updated September 2022). California State Water Resources Control Board. Available online at: https://www.waterboards.ca.gov/water_issues/programs/stormwater/docs/trash_implementation/2022/application-requirements-09092022.pdf

Bio Clean® Catch Basin Filters (12/02/2022). Contech Engineered Solutions, LLC. Available online at: www.conteches.com/catch-basin

CDS® Stormwater Treatment. (12/02/2022). Contech Engineered Solutions, LLC. Available online at: www.conteches.com/CDS

Certified Multi-Benefit Trash Full Capture Systems (Updated September 22, 2022). California State Water Resources Control Board. Available online at: https://www.waterboards.ca.gov/water_issues/programs/stormwater/docs/trash_implementation/2022/list-multi-benefit-09092022.pdf

Certified Trash Full Capture Systems Available to the Public (Updated October 13, 2022). California State Water Resources Control Board. Available online at: https://www.waterboards.ca.gov/water_issues/programs/stormwater/docs/trash_implementation/2022/fullcptre-availabletopublic10-11.pdf

The Debris Separating Baffle Box (DSBB) (10/02/2022. Contech Engineered Solutions, LLC. Available online at: www.conteches.com/dsbb

DuroMaxx Rainwater Harvesting Cisterns (12/02/2022). Contech Engineered Solutions, LLC. Available online at: www.conteches.com/rwh

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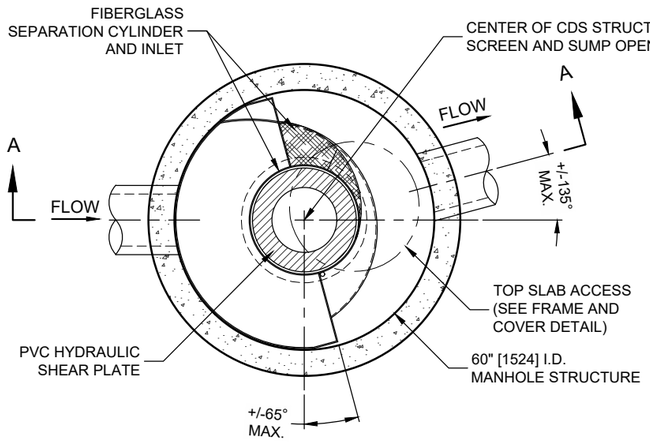
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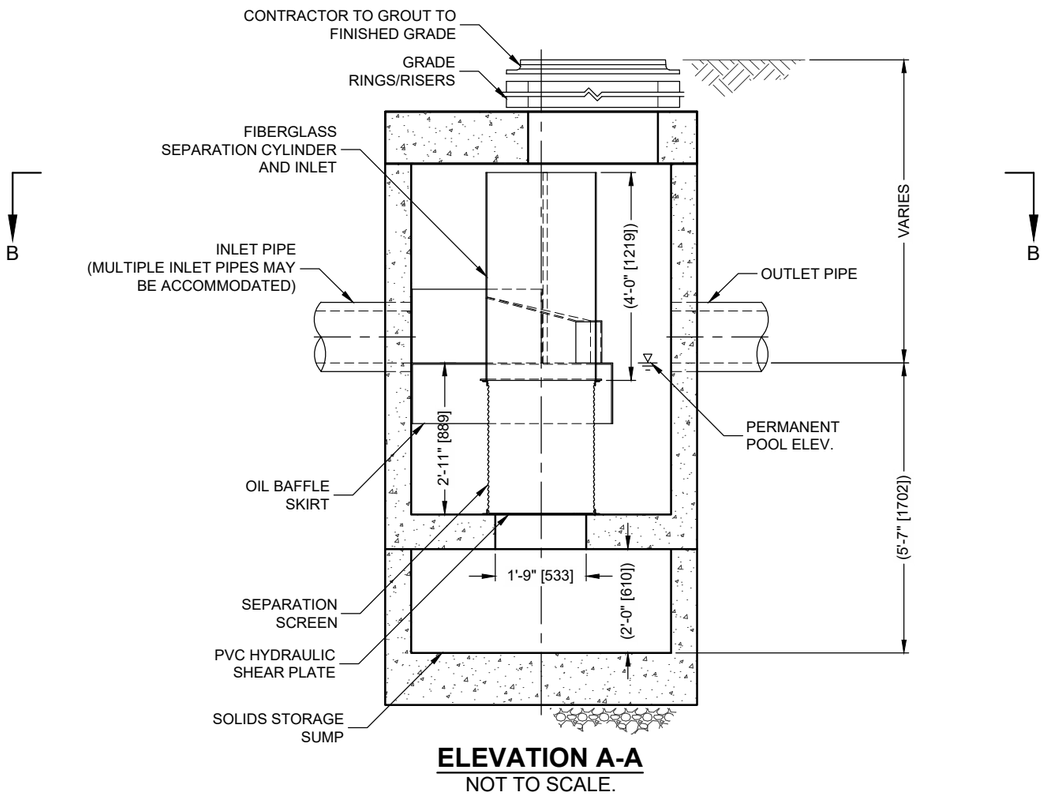
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FOR INFILTRATION SYSTEM #1



PLAN VIEW B-B
NOT TO SCALE.



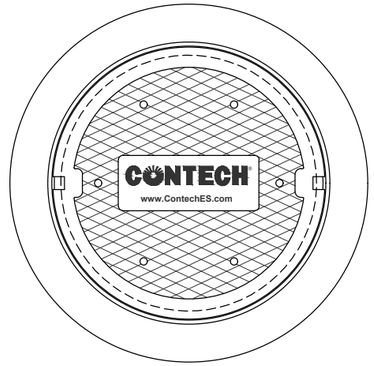
ELEVATION A-A
NOT TO SCALE.

CDS2025-5-C DESIGN NOTES

CDS2025-5-C RATED TREATMENT CAPACITY IS 1.6 CFS [45.3 L/s], OR PER LOCAL REGULATIONS. IF THE SITE CONDITIONS EXCEED MAXIMUM HYDRAULIC CAPACITY, AN UPSTREAM BYPASS STRUCTURE IS REQUIRED.

CDS2025-5-C STANDARD CONFIGURATION IS SHOWN.

FOR NJDEP PROJECTS, PLEASE CONTACT YOUR LOCAL CONTECH REPRESENTATIVE FOR APPROVED CONFIGURATIONS.



FRAME AND COVER
(DIAMETER VARIES)
NOT TO SCALE

SITE SPECIFIC DATA REQUIREMENTS

STRUCTURE ID	
WATER QUALITY FLOW RATE (CFS OR L/s)	*
PEAK FLOW RATE (CFS OR L/s)	*
RETURN PERIOD OF PEAK FLOW (YRS)	*
SCREEN APERTURE (2400 OR 4700)	*

PIPE DATA:	I.E.	MATERIAL	DIAMETER
INLET PIPE 1	*	*	*
INLET PIPE 2	*	*	*
OUTLET PIPE	*	*	*

RIM ELEVATION	*

ANTI-FLOTATION BALLAST	WIDTH	HEIGHT
	*	*

NOTES/SPECIAL REQUIREMENTS:

* PER ENGINEER OF RECORD

GENERAL NOTES
1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. FOR SITE SPECIFIC DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHT, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS LLC REPRESENTATIVE. www.ContechES.com
3. CDS WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING. CONTRACTOR TO CONFIRM STRUCTURE MEETS REQUIREMENTS OF PROJECT.
4. STRUCTURE SHALL MEET AASHTO HS20 LOAD RATING, ASSUMING EARTH COVER OF 0' - 2', AND GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION. CASTINGS SHALL MEET AASHTO M306 AND BE CAST WITH THE CONTECH LOGO..
5. IF REQUIRED, PVC HYDRAULIC SHEAR PLATE IS PLACED ON SHELF AT BOTTOM OF SCREEN CYLINDER. REMOVE AND REPLACE AS NECESSARY DURING MAINTENANCE CLEANING.
6. CDS STRUCTURE SHALL BE PRECAST CONCRETE CONFORMING TO ASTM C-478 AND AASHTO LOAD FACTOR DESIGN METHOD.

INSTALLATION NOTES
A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE CDS MANHOLE STRUCTURE.
C. CONTRACTOR TO INSTALL JOINT SEALANT BETWEEN ALL STRUCTURE SECTIONS AND ASSEMBLE STRUCTURE.
D. CONTRACTOR TO PROVIDE, INSTALL, AND GROUT INLET AND OUTLET PIPE(S). MATCH PIPE INVERTS WITH ELEVATIONS SHOWN. ALL PIPE CENTERLINES TO MATCH PIPE OPENING CENTERLINES.
E. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO ASSURE UNIT IS WATER TIGHT, HOLDING WATER TO FLOWLINE INVERT MINIMUM. IT IS SUGGESTED THAT ALL JOINTS BELOW PIPE INVERTS ARE GROUTED.

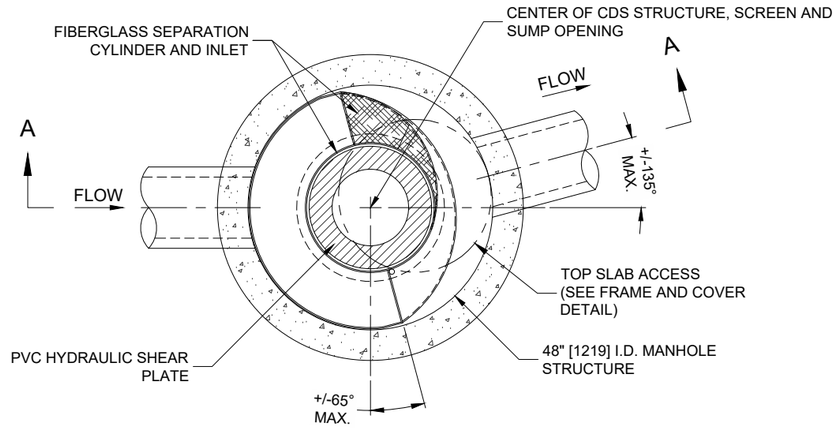
THIS PRODUCT MAY BE PROTECTED BY ONE OR MORE OF THE FOLLOWING U.S. PATENTS: 5,788,848; 6,641,720; 6,511,595; 6,581,783; RELATED FOREIGN PATENTS, OR OTHER PATENTS PENDING.

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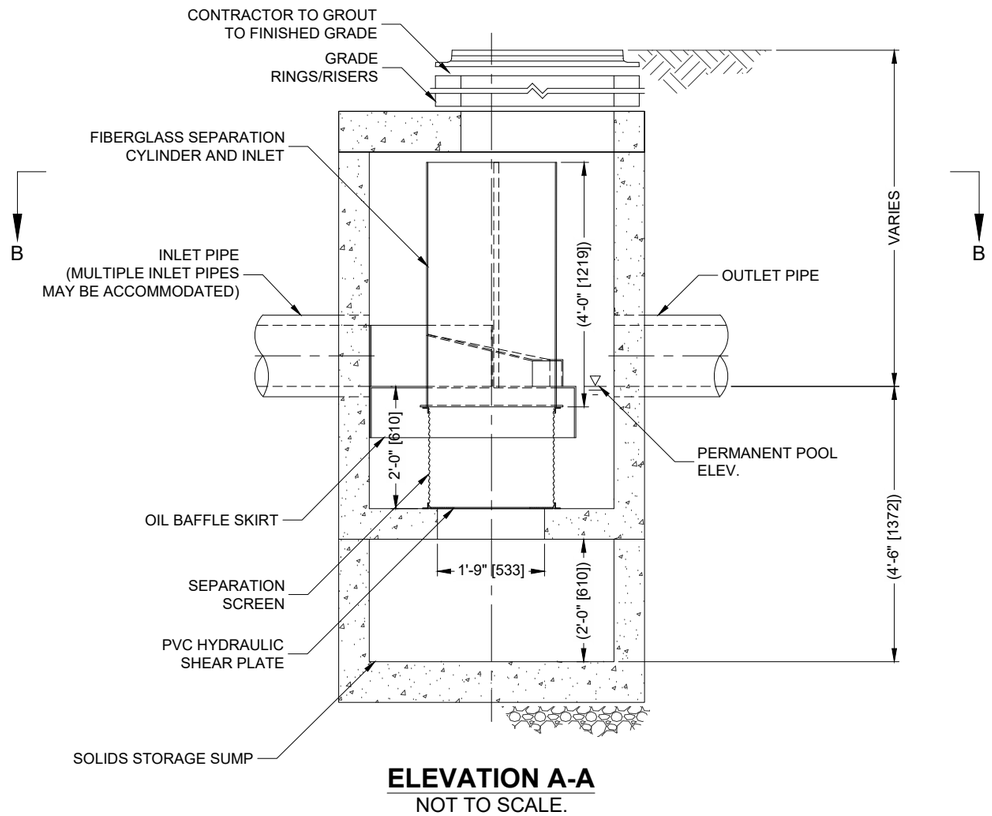
CDS2025-5-C
ONLINE CDS
STANDARD DETAIL

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FOR INFILTRATION SYSTEM #2



PLAN VIEW B-B
NOT TO SCALE.



ELEVATION A-A
NOT TO SCALE.

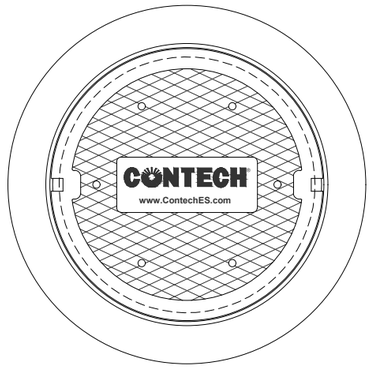
THIS PRODUCT MAY BE PROTECTED BY ONE OR MORE OF THE FOLLOWING U.S. PATENTS: 5,788,848; 6,641,720; 6,511,595; 6,581,783; RELATED FOREIGN PATENTS, OR OTHER PATENTS PENDING.

CDS2015-4-C DESIGN NOTES

CDS2015-4-C RATED TREATMENT CAPACITY IS 0.7 CFS [19.8 L/s], OR PER LOCAL REGULATIONS. IF THE SITE CONDITIONS EXCEED MAXIMUM HYDRAULIC CAPACITY, AN UPSTREAM BYPASS STRUCTURE IS REQUIRED.

CDS2015-4-C STANDARD CONFIGURATION IS SHOWN.

FOR NJDEP PROJECTS, PLEASE CONTACT YOUR LOCAL CONTECH REPRESENTATIVE FOR APPROVED CONFIGURATIONS.



FRAME AND COVER
(DIAMETER VARIES)
NOT TO SCALE

SITE SPECIFIC DATA REQUIREMENTS

STRUCTURE ID			
WATER QUALITY FLOW RATE (CFS OR L/s)			*
PEAK FLOW RATE (CFS OR L/s)			*
RETURN PERIOD OF PEAK FLOW (YRS)			*
SCREEN APERTURE (2400 OR 4700)			*
PIPE DATA:	I.E.	MATERIAL	DIAMETER
INLET PIPE 1	*	*	*
INLET PIPE 2	*	*	*
OUTLET PIPE	*	*	*
RIM ELEVATION			*
ANTI-FLOTATION BALLAST	WIDTH	HEIGHT	
	*	*	

NOTES/SPECIAL REQUIREMENTS:

* PER ENGINEER OF RECORD

GENERAL NOTES

1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. FOR SITE SPECIFIC DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHT, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS LLC REPRESENTATIVE. www.ContechES.com
3. CDS WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING. CONTRACTOR TO CONFIRM STRUCTURE MEETS REQUIREMENTS OF PROJECT.
4. STRUCTURE SHALL MEET AASHTO HS20 LOAD RATING, ASSUMING EARTH COVER OF 0' - 2', AND GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION. CASTINGS SHALL MEET AASHTO M306 AND BE CAST WITH THE CONTECH LOGO..
5. IF REQUIRED, PVC HYDRAULIC SHEAR PLATE IS PLACED ON SHELF AT BOTTOM OF SCREEN CYLINDER. REMOVE AND REPLACE AS NECESSARY DURING MAINTENANCE CLEANING.
6. CDS STRUCTURE SHALL BE PRECAST CONCRETE CONFORMING TO ASTM C-478 AND AASHTO LOAD FACTOR DESIGN METHOD.

INSTALLATION NOTES

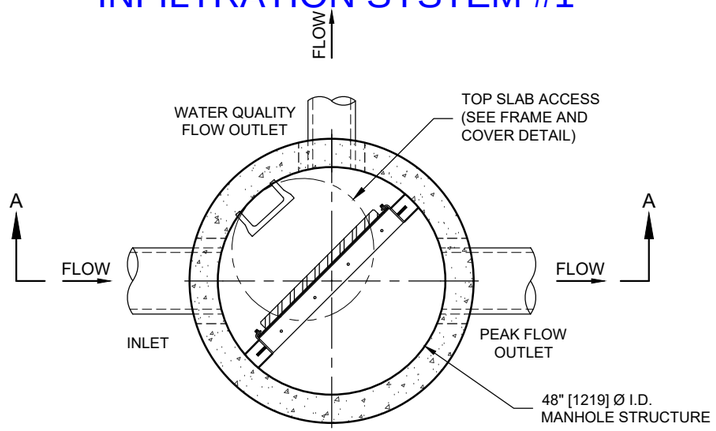
A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE CDS MANHOLE STRUCTURE.
C. CONTRACTOR TO INSTALL JOINT SEALANT BETWEEN ALL STRUCTURE SECTIONS AND ASSEMBLE STRUCTURE.
D. CONTRACTOR TO PROVIDE, INSTALL, AND GROUT INLET AND OUTLET PIPE(S). MATCH PIPE INVERTS WITH ELEVATIONS SHOWN. ALL PIPE CENTERLINES TO MATCH PIPE OPENING CENTERLINES.
E. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO ASSURE UNIT IS WATER TIGHT, HOLDING WATER TO FLOWLINE INVERT MINIMUM. IT IS SUGGESTED THAT ALL JOINTS BELOW PIPE INVERTS ARE GROUTED.

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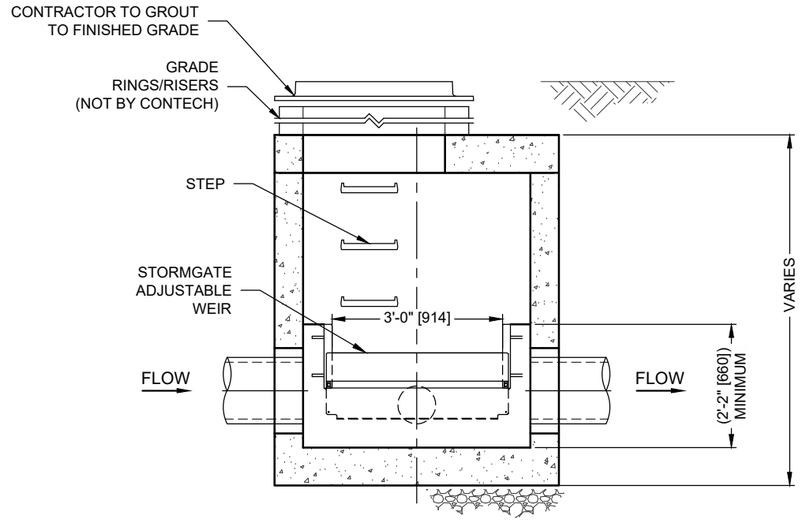
CDS2015-4-C
ONLINE CDS
STANDARD DETAIL

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DIVERSION MANHOLE
INFILTRATION SYSTEM #1



PLAN VIEW
TOP SLAB NOT SHOWN

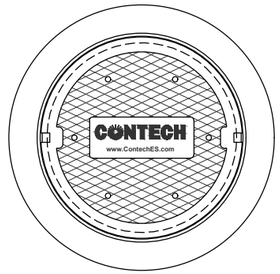


SECTION A-A

StormGate™

STORMGATE DESIGN NOTES

THE STORMGATE IS A WEIR STYLE DIVERSION STRUCTURE. A 48" [1219] Ø MANHOLE CONFIGURATION IS SHOWN. THE UNIT IS DESIGNED SUCH THAT THE TREATMENT FLOW IS DIVERTED TO THE OFFLINE WATER QUALITY DEVICE. THE HIGH FLOWS ARE BYPASSED OVER THE WEIR DIRECTLY TO THE DOWNSTREAM CONVEYANCE. THE STORMGATE TYPICALLY HAS ONE INLET, A LOW FLOW OUTLET FOR TREATMENT FLOW, AND A HIGH FLOW BYPASS OUTLET. THE STORMGATE INCORPORATES A FIELD-ADJUSTABLE ALUMINUM WEIR PLATE WHICH ALLOWS FOR 6" [152] OF WEIR HEIGHT ADJUSTMENT AFTER INSTALLATION. THE CAPACITY OF THE STORMGATE IS A FUNCTION OF THE AVAILABLE HEIGHT ABOVE THE WEIR (HEAD) AND UNIT GEOMETRY. PLEASE CONTACT YOUR LOCAL CONTECH DESIGN ENGINEER FOR SIZING ASSISTANCE.



FRAME AND COVER
(DIAMETER VARIES)
NOT TO SCALE

SITE SPECIFIC DATA REQUIREMENTS

STRUCTURE ID				
WATER QUALITY (WQ) FLOW RATE (cfs [L/s])				
PEAK FLOW RATE (cfs [L/s])				
RIM ELEVATION				
PIPE DATA:	INVERT	ORIENTATION	MATERIAL	DIAMETER
INLET PIPE				
WQ FLOW OUTLET PIPE				
PEAK FLOW OUTLET PIPE				
ORIFICE TYPE (PIPE, PLATE)				
ORIFICE DIAMETER (in. [mm])				
WEIR CREST ELEVATION				
WEIR WALL ELEVATION				
HEAD OVER WEIR, H (ft. [mm])				
WSE AT PEAK FLOW RATE				
WEIR ORIENTATION				
FLOOR ELEVATION				

NOTES / SPECIAL REQUIREMENTS:

GENERAL NOTES
1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. FOR SITE SPECIFIC DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHTS, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS LLC REPRESENTATIVE. www.ContechES.com
3. STORMGATE WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING. CONTRACTOR TO CONFIRM STRUCTURE MEETS THE REQUIREMENTS OF THE PROJECT.
4. STORMGATE STRUCTURE SHALL MEET AASHTO HS-20 LOAD RATING, ASSUMING EARTH COVER OF 0' - 2' [610] AND GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION. CASTINGS SHALL MEET AASHTO M306 AND BE CAST WITH THE CONTECH LOGO.
5. STORMGATE STRUCTURE SHALL BE PRECAST CONCRETE CONFORMING TO ASTM C478 AND AASHTO LOAD FACTOR DESIGN METHOD.
6. WEIR FRAME AND ADJUSTABLE WEIR PLATE SHALL BE FABRICATED OF ALUMINUM ALLOY ASTM B209, T-5052, T-6061, PROVIDED AND INSTALLED BY CONTECH.
7. ALTERNATE UNITS ARE SHOWN IN MILLIMETERS [mm].

INSTALLATION NOTES
A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE STORMGATE STRUCTURE.
C. CONTRACTOR TO INSTALL JOINT SEALANT BETWEEN ALL STRUCTURE SECTIONS AND ASSEMBLE STRUCTURE.
D. CONTRACTOR TO PROVIDE, INSTALL, AND GROUT INLET AND OUTLET PIPE(S). MATCH PIPE INVERTS WITH ELEVATIONS SHOWN ON SITE SPECIFIC DRAWINGS. ALL PIPE CENTERLINES TO MATCH PIPE OPENING CENTERLINES.
E. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO ASSURE UNIT IS WATER TIGHT, HOLDING WATER TO FLOWLINE INVERT MINIMUM.
F. CONTRACTOR TO ADJUST STORMGATE WEIR TO DESIGN ELEVATION SPECIFIED IN DRAWING. DO NOT EXCEED 5.0 FT-LBS TORQUE WHEN TIGHTENING SCREWS ON WEIR FRAME. SEAL WEIR TO FRAME WITH SIKAFLEX 1A SEALANT AFTER FINAL ADJUSTMENT.

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SGMH48
STORMGATE MANHOLE
STANDARD DETAIL

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INFILTRATION SYSTEM #1

Date: 1/12/2023
Project Name: Highland East Detention System 1 - 25555 (1-12-2023 22-57-44)

City / County:
State:

Designed By:
Company:
Telephone:

CMP: Underground Detention System Storage Volume Estimation

=Adjustable Input Cells

Contech Engineered Solutions, LLC is pleased to offer the following estimate of storage volume for the above named project. The results are submitted as an estimate only, without liability on the part of Contech Engineered Solutions, LLC for accuracy or suitability to any particular applicaton and are subject to verification of the Engineer of Record. **This tool is only applicable for rectangular shaped systems.**

Summary of Inputs

System Information		Backfill Information		Pipe & Analysis Information	
Out-to-out length (ft):	127.0	Backfill Porosity (%):	40%	System Diameter (in):	84
Out-to-out width (ft):	67.0	Depth Above Pipe (in):	6.0	Pipe Spacing (in):	36
Number of Manifolds (ea):	1.0	Depth Below Pipe (in):	6.0	Incremental Analysis (in):	2
Number of Barrels (ea):	7.0	Width At Ends (ft):	1.0	System Invert (Elevation):	1160.5
		Width At Sides (ft):	1.0		

BASE OF ROCK ELEVATION FOR INFILTRATION SYSTEM

Storage Volume Estimation

System		Pipe		Stone		Total System		Miscellaneous	
Depth (ft)	Elevation (ft)	Incremental Storage (cf)	Cumulative Storage (cf)	Incremental Storage (cf)	Cumulative Storage (cf)	Incremental Storage (cf)	Cumulative Storage (cf)	Percent Open Storage (%)	Ave. Surface Area (sf)
0.00	1160.50	0.0	0.0	0.0	0.0	0.0	0.0	0.0%	3,560.4
0.17	1160.66	0.0	0.0	593.4	593.4	593.4	593.4	0.0%	3,560.4
0.33	1160.83	0.0	0.0	593.4	1,186.8	593.4	1,186.8	0.0%	3,560.4
0.50	1161.00	0.0	0.0	593.4	1,780.2	593.4	1,780.2	0.0%	3,560.4
0.67	1161.16	216.1	216.1	506.9	2,287.1	723.1	2,503.3	8.6%	4,721.9
0.83	1161.33	390.7	606.9	437.1	2,724.2	827.8	3,331.1	18.2%	5,182.9
1.00	1161.50	499.8	1,106.7	393.5	3,117.7	893.3	4,224.4	26.2%	5,522.5
1.17	1161.66	584.3	1,691.0	359.7	3,477.4	944.0	5,168.4	32.7%	5,796.8
1.33	1161.83	654.1	2,345.1	331.7	3,809.1	985.9	6,154.3	38.1%	6,027.7
1.50	1162.00	713.6	3,058.8	308.0	4,117.1	1,021.6	7,175.9	42.6%	6,226.4
1.67	1162.16	765.2	3,823.9	287.3	4,404.4	1,052.5	8,228.4	46.5%	6,399.8
1.83	1162.33	810.3	4,634.2	269.3	4,673.7	1,079.6	9,307.9	49.8%	6,552.1
2.00	1162.50	850.1	5,484.3	253.4	4,927.1	1,103.5	10,411.4	52.7%	6,686.6
2.17	1162.66	885.2	6,369.6	239.3	5,166.4	1,124.5	11,535.9	55.2%	6,805.4
2.33	1162.83	916.2	7,285.8	226.9	5,393.3	1,143.1	12,679.1	57.5%	6,910.2
2.50	1163.00	943.6	8,229.4	216.0	5,609.3	1,159.5	13,838.6	59.5%	7,002.2
2.67	1163.16	967.5	9,196.9	206.4	5,815.7	1,173.9	15,012.5	61.3%	7,082.6
2.83	1163.33	988.3	10,185.1	198.1	6,013.8	1,186.4	16,198.9	62.9%	7,151.9
3.00	1163.50	1,006.1	11,191.2	191.0	6,204.7	1,197.1	17,395.9	64.3%	7,211.0
3.17	1163.66	1,021.1	12,212.3	185.0	6,389.7	1,206.1	18,602.0	65.7%	7,260.2
3.33	1163.83	1,033.5	13,245.8	180.0	6,569.7	1,213.5	19,815.5	66.8%	7,300.1
3.50	1164.00	1,043.3	14,289.1	176.1	6,745.8	1,219.4	21,034.8	67.9%	7,330.7
3.67	1164.16	1,050.5	15,339.6	173.2	6,919.0	1,223.7	22,258.6	68.9%	7,352.5
3.83	1164.33	1,055.4	16,395.0	171.3	7,090.2	1,226.6	23,485.2	69.8%	7,365.5
4.00	1164.50	1,057.8	17,452.7	170.3	7,260.5	1,228.1	24,713.2	70.6%	7,369.8
4.17	1164.66	1,057.8	18,510.5	170.3	7,430.8	1,228.1	25,941.3	71.4%	7,365.5
4.33	1164.83	1,055.4	19,565.9	171.3	7,602.1	1,226.6	27,167.9	72.0%	7,352.5
4.50	1165.00	1,050.5	20,616.4	173.2	7,775.2	1,223.7	28,391.6	72.6%	7,330.7
4.67	1165.16	1,043.3	21,659.7	176.1	7,951.3	1,219.4	29,611.0	73.1%	7,300.1
4.83	1165.33	1,033.5	22,693.1	180.0	8,131.3	1,213.5	30,824.5	73.6%	7,260.2
5.00	1165.50	1,021.1	23,714.3	185.0	8,316.3	1,206.1	32,030.6	74.0%	7,211.0
5.17	1165.66	1,006.1	24,720.3	191.0	8,507.3	1,197.1	33,227.6	74.4%	7,151.9
5.33	1165.83	988.3	25,708.6	198.1	8,705.4	1,186.4	34,414.0	74.7%	7,082.6
5.50	1166.00	967.5	26,676.1	206.4	8,911.8	1,173.9	35,587.8	75.0%	7,002.2
5.67	1166.16	943.6	27,619.6	216.0	9,127.7	1,159.5	36,747.4	75.2%	6,910.2
5.83	1166.33	916.2	28,535.9	226.9	9,354.6	1,143.1	37,890.5	75.3%	6,805.4
6.00	1166.50	885.2	29,421.1	239.3	9,594.0	1,124.5	39,015.1	75.4%	6,686.6
6.17	1166.66	850.1	30,271.2	253.4	9,847.3	1,103.5	40,118.5	75.5%	6,552.1
6.33	1166.83	810.3	31,081.5	269.3	10,116.6	1,079.6	41,198.1	75.4%	6,399.8
6.50	1167.00	765.2	31,846.7	287.3	10,403.9	1,052.5	42,250.6	75.4%	6,226.4
6.67	1167.16	713.6	32,560.3	308.0	10,711.9	1,021.6	43,272.2	75.2%	6,027.7
6.83	1167.33	654.1	33,214.5	331.7	11,043.6	985.9	44,258.1	75.0%	5,796.8
7.00	1167.50	584.3	33,798.8	359.7	11,403.3	944.0	45,202.1	74.8%	5,522.5
7.17	1167.66	499.8	34,298.6	393.5	11,796.8	893.3	46,095.3	74.4%	5,182.9
7.33	1167.83	390.7	34,689.3	437.1	12,233.9	827.8	46,923.2	73.9%	4,721.9
7.50	1168.00	216.1	34,905.5	506.9	12,740.8	723.1	47,646.3	73.3%	3,560.4
7.67	1168.16	0.0	34,905.5	593.4	13,334.2	593.4	48,239.7	72.4%	3,560.4
7.83	1168.33	0.0	34,905.5	593.4	13,927.6	593.4	48,833.1	71.5%	3,560.4
8.00	1168.50	0.0	34,905.5	593.4	14,521.0	593.4	49,426.5	70.6%	3,560.4

PIPE OUTLET INVERT ELEVATION

STORAGE VOLUME BELOW PIPE OUTLET INVERT ELEVATION > DCV OF 40,517 CF

These results are submitted to you as a guideline only, without liability on the part of CONTECH Engineered Solutions, LLC for accuracy or suitability to any particular application, and are subject to your verification.

PROJECT SUMMARY

CALCULATION DETAILS
- LOADING = HS20/HS25
- APPROX. LINEAR FOOTAGE = 907 LF

STORAGE SUMMARY
- STORAGE VOLUME REQUIRED = N/A
- PIPE STORAGE VOLUME = 34,905 CF
- BACKFILL STORAGE VOLUME = 14,521 CF
- TOTAL STORAGE PROVIDED = 49,426 CF

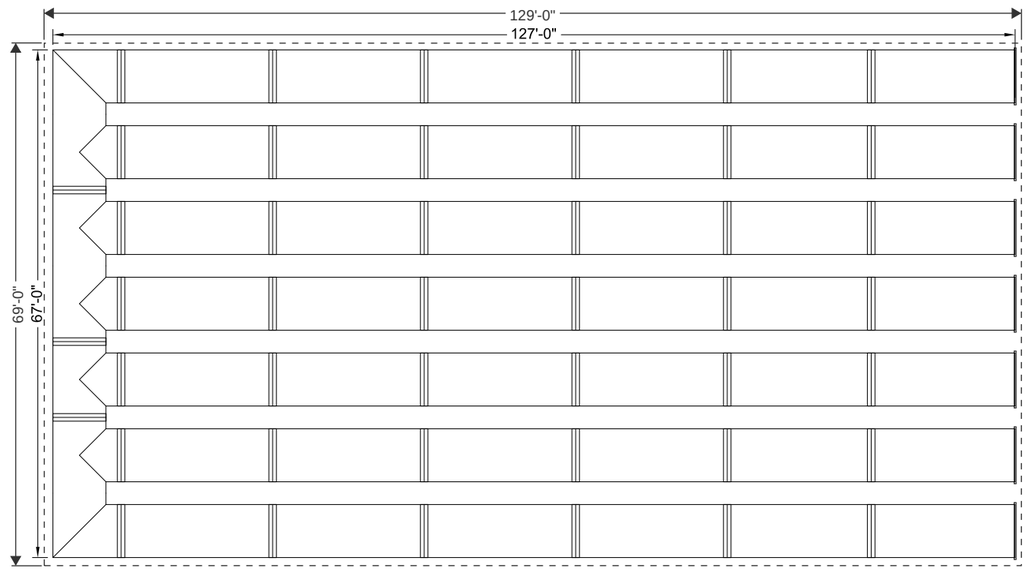
PIPE DETAILS
- DIAMETER = 84"
- CORRUGATION = 5x1
- GAGE = 16
- COATING = ALT2
- WALL TYPE = PERFORATED
- BARREL SPACING = 36"

BACKFILL DETAILS
- WIDTH AT ENDS = 12"
- ABOVE PIPE = 6"
- WIDTH AT SIDES = 12"
- BELOW PIPE = 6"

NOTES

- ALL RISER AND STUB DIMENSIONS ARE TO CENTERLINE. ALL ELEVATIONS, DIMENSIONS, AND LOCATIONS OF RISERS AND INLETS, SHALL BE VERIFIED BY THE ENGINEER OF RECORD PRIOR TO RELEASING FOR FABRICATION.
- ALL FITTINGS AND REINFORCEMENT COMPLY WITH ASTM A998.
- ALL RISERS AND STUBS ARE $2\frac{2}{3}$" x $\frac{1}{2}$" CORRUGATION AND 16 GAGE UNLESS OTHERWISE NOTED.
- RISERS TO BE FIELD TRIMMED TO GRADE.
- QUANTITY OF PIPE SHOWN DOES NOT PROVIDE EXTRA PIPE FOR CONNECTING THE SYSTEM TO EXISTING PIPE OR DRAINAGE STRUCTURES. OUR SYSTEM AS DETAILED PROVIDES NOMINAL INLET AND/OR OUTLET PIPE STUB FOR CONNECTION TO EXISTING DRAINAGE FACILITIES. IF ADDITIONAL PIPE IS NEEDED IT IS THE RESPONSIBILITY OF THE CONTRACTOR.
- BAND TYPE TO BE DETERMINED UPON FINAL DESIGN.
- THE PROJECT SUMMARY IS REFLECTIVE OF THE DYODS DESIGN, QUANTITIES ARE APPROX. AND SHOULD BE VERIFIED UPON FINAL DESIGN AND APPROVAL. FOR EXAMPLE, TOTAL EXCAVATION DOES NOT CONSIDER ALL VARIABLES SUCH AS SHORING AND ONLY ACCOUNTS FOR MATERIAL WITHIN THE ESTIMATED EXCAVATION FOOTPRINT.
- THESE DRAWINGS ARE FOR CONCEPTUAL PURPOSES AND DO NOT REFLECT ANY LOCAL PREFERENCES OR REGULATIONS. PLEASE CONTACT YOUR LOCAL CONTECH REP FOR MODIFICATIONS.

INFILTRATION SYSTEM #1



ASSEMBLY
SCALE: 1" = 20'

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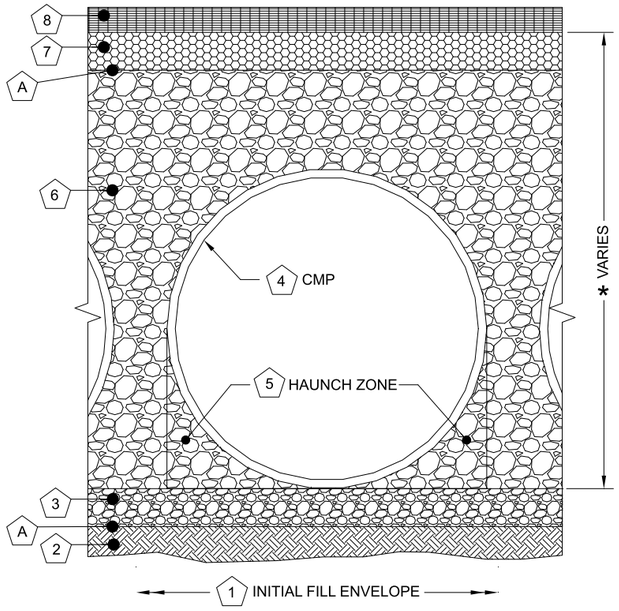
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CONTECH CMP DETENTION SYSTEMS
CONTECH DYODS DRAWING

DYO25555 A22078-1 Highland East
Highland East Detention System 1
Highland, CA
DETENTION SYSTEM

PROJECT No.:	SEQ. No.:	DATE:
16947	25555	1/12/2023
DESIGNED: DYO	DRAWN: DYO	
CHECKED: DYO	APPROVED: DYO	
SHEET NO.: 1		

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	Infiltration Systems - CMP Infiltration & CMP Perforated Drainage Pipe			
	Material Location	Description	Material Designation	Designation
8	Rigid or Flexible Pavement (if applicable)			
7	Road Base (if applicable			
A	Geotextile Layer	Non-Woven Geotextile	CONTECH C-40 or C-45	Engineer Decision for consideration to prevent soil migration into varying soil types. Wrap the trench only.
6	Backfill	Infiltration pipe systems have a pipe perforation sized of 3/8" diameter. An open graded, free draining stone, with a particle size of ½" – 2 ½" diameter is recommended.	AASHTO M 145-A-1 or AASHTO M 43 - 3, 4	Material shall be worked into the pipe haunches by means of shovel-slicing, rodding, air-tamper, vibratory rod, or other effective methods. Compaction of all placed fill material is necessary and shall be considered adequate when no further yielding of the material is observed under the compactor, or under foot, and the Project Engineer or his representative is satisfied with the level of compaction"
3	Bedding Stone	Well graded granular bedding material w/maximum particle size of 3"	AASHTO M43 - 3,357,4,467, 5, 56, 57	For soil aggregates larger than 3/8" a dedicated bedding layer is not required for CMP. Pipe may be placed on the trench bottom comprised of native suitable well graded & granular material. For Arch pipes it is recommended to be shaped to a relatively flat bottom or fine-grade the foundation to a slight v-shape. Soil aggregates less than 3/8" and unsuitable material should be over-excavated and re-placed with a 4"-6" layer of well graded & granular stone per the material designation.
A	Geotextile Layer	None	None	Contech does not recommend geotextiles be placed under the invert of Infiltration systems due to the propensity for geotextiles to clog over time.
*	Note: The listed AASHTO designations are for gradation only. The stone must also be angular and clean.			

1 MINIMUM WIDTH DEPENDS ON SITE CONDITIONS AND ENGINEERING JUDGEMENT.

FOUNDATION/BEDDING PREPARATION

2 PRIOR TO PLACING THE BEDDING, THE FOUNDATION MUST BE CONSTRUCTED TO A UNIFORM AND STABLE GRADE. IN THE EVENT THAT UNSUITABLE FOUNDATION MATERIALS ARE ENCOUNTERED DURING EXCAVATION, THEY SHALL BE REMOVED AND BROUGHT BACK TO THE GRADE WITH A FILL MATERIAL AS APPROVED BY THE ENGINEER.

5 HAUNCH ZONE MATERIAL SHALL BE PLACED AND UNIFORMLY COMPACTED WITHOUT SOFT SPOTS.

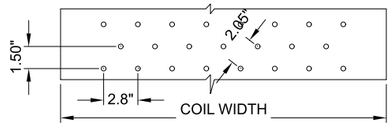
BACKFILL

MATERIAL SHALL BE PLACED IN 8"-10" MAXIMUM LIFTS. INADEQUATE COMPACTION CAN LEAD TO EXCESSIVE DEFLECTIONS WITHIN THE SYSTEM AND SETTLEMENT OF THE SOILS OVER THE SYSTEM. BACKFILL SHALL BE PLACED SUCH THAT THERE IS NO MORE THAN A TWO-LIFT DIFFERENTIAL BETWEEN THE SIDES OF ANY PIPE IN THE SYSTEM AT ALL TIMES DURING THE BACKFILL PROCESS. BACKFILL SHALL BE ADVANCED ALONG THE LENGTH OF THE SYSTEM AT THE SAME RATE TO AVOID DIFFERENTIAL LOADING ON ANY PIPES IN THE SYSTEM.

EQUIPMENT USED TO PLACE AND COMPACT THE BACKFILL SHALL BE OF A SIZE AND TYPE SO AS NOT TO DISTORT, DAMAGE, OR DISPLACE THE PIPE. ATTENTION MUST BE GIVEN TO PROVIDING ADEQUATE MINIMUM COVER FOR SUCH EQUIPMENT. MAINTAIN BALANCED LOADING ON ALL PIPES IN THE SYSTEM DURING ALL SUCH OPERATIONS.

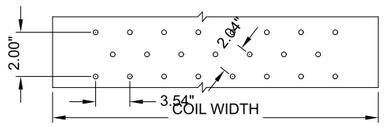
OTHER ALTERNATE BACKFILL MATERIAL MAY BE ALLOWED DEPENDING ON SITE SPECIFIC CONDITIONS. REFER TO TYPICAL BACKFILL DETAIL FOR MATERIAL REQUIRED.

2 2/3" x 1/2" CORRUGATION - STEEL AND ALUMINUM CMP EDGE SPACING EQUAL ON BOTH SIDES



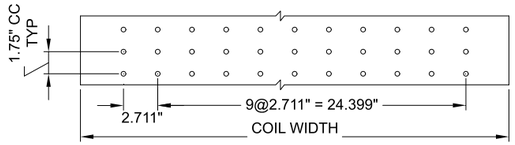
OPEN AREA = 3.76 SQ IN/SQ FT

3" x 1" CORRUGATION - STEEL AND ALUMINUM CMP (COIL PROVIDED FROM CONTECH LANTANA, FL PLANT)



OPEN AREA = 4.16 SQ IN/SQ FT

5" x 1" CORRUGATION - STEEL ONLY
EDGE SPACING EQUAL ON BOTH SIDES



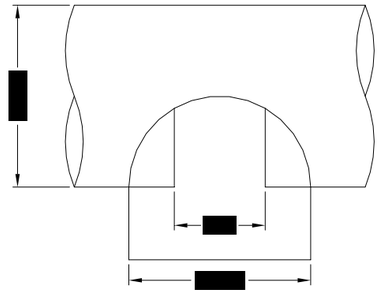
OPEN AREA = 3.33 SQ IN/SQ FT

NOTES:

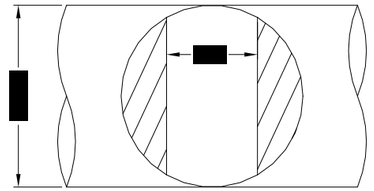
1. PERFORATIONS MEET AASHTO AND ASTM SPECIFICATIONS.
2. PERFORATION OPEN AREA PER SQUARE FOOT OF PIPE IS BASED ON THE NOMINAL DIAMETER AND LENGTH OF PIPE.
3. ALL DIMENSIONS ARE SUBJECT TO MANUFACTURING TOLERANCES.
4. ALL HOLES ⌀3/8".

TYPICAL PERFORATION DETAIL

SCALE: N.T.S.



PLAN

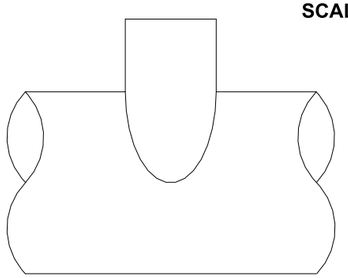


FRONT

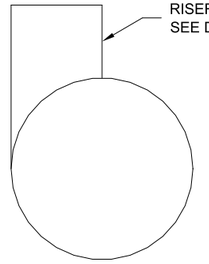
TYPICAL MANWAY DETAIL

SCALE: N.T.S.

NOTE:
MANWAY DETAIL APPLICABLE FOR CMP SYSTEMS WITH DIAMETERS 48" AND LARGER. MANWAYS MAY BE REQUIRED ON SMALLER SYSTEMS DEPENDING ON ACTUAL SITE SPECIFIC CONDITIONS.



ELEVATION

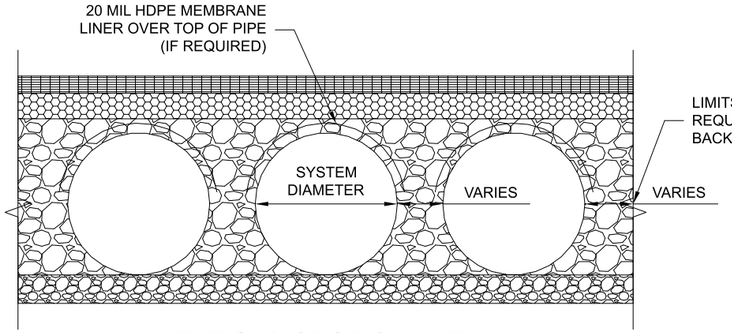


END

TYPICAL RISER DETAIL

SCALE: N.T.S.

NOTE:
LADDERS ARE OPTIONAL AND ARE NOT REQUIRED FOR ALL SYSTEMS.



TYPICAL SECTION VIEW

LINER OVER ROWS
SCALE: N.T.S.

NOTE: IF SALTING AGENTS FOR SNOW AND ICE REMOVAL ARE USED ON OR NEAR THE PROJECT, AN HDPE MEMBRANE LINER IS RECOMMENDED WITH THE SYSTEM. THE IMPERMEABLE LINER IS INTENDED TO HELP PROTECT THE SYSTEM FROM THE POTENTIAL ADVERSE EFFECTS THAT MAY RESULT FROM A CHANGE IN THE SURROUNDING ENVIRONMENT OVER A PERIOD OF TIME. PLEASE REFER TO THE CORRUGATED METAL PIPE DETENTION DESIGN GUIDE FOR ADDITIONAL INFORMATION.

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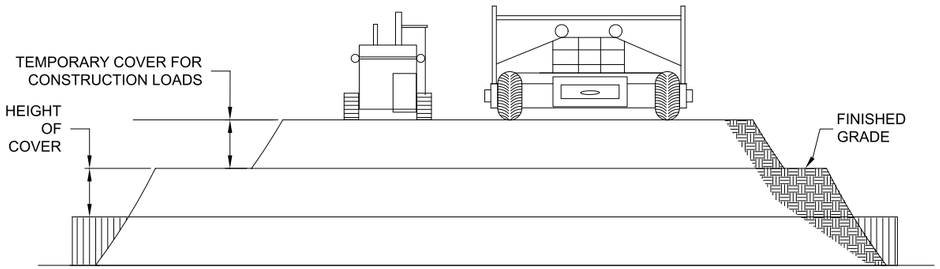
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CONTECH CMP DETENTION SYSTEMS
CONTECH DYODS DRAWING

DYO25555 A22078-1 Highland East
Highland East Detention System 1
Highland, CA
DETENTION SYSTEM

PROJECT No.:	SEQ. No.:	DATE:
16947	25555	1/12/2023
DESIGNED: DYO	DRAWN: DYO	
CHECKED: DYO	APPROVED: DYO	
SHEET NO.: 1		

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CONSTRUCTION LOADS

FOR TEMPORARY CONSTRUCTION VEHICLE LOADS, AN EXTRA AMOUNT OF COMPACTED COVER MAY BE REQUIRED OVER THE TOP OF THE PIPE. THE HEIGHT-OF-COVER SHALL MEET THE MINIMUM REQUIREMENTS SHOWN IN THE TABLE BELOW. THE USE OF HEAVY CONSTRUCTION EQUIPMENT NECESSITATES GREATER PROTECTION FOR THE PIPE THAN FINISHED GRADE COVER MINIMUMS FOR NORMAL HIGHWAY TRAFFIC.

PIPE SPAN, INCHES	AXLE LOADS (kips)			
	18-50	50-75	75-110	110-150
	MINIMUM COVER (FT)			
12-42	2.0	2.5	3.0	3.0
48-72	3.0	3.0	3.5	4.0
78-120	3.0	3.5	4.0	4.0
126-144	3.5	4.0	4.5	4.5

*MINIMUM COVER MAY VARY, DEPENDING ON LOCAL CONDITIONS. THE CONTRACTOR MUST PROVIDE THE ADDITIONAL COVER REQUIRED TO AVOID DAMAGE TO THE PIPE. MINIMUM COVER IS MEASURED FROM THE TOP OF THE PIPE TO THE TOP OF THE MAINTAINED CONSTRUCTION ROADWAY SURFACE.

CONSTRUCTION LOADING DIAGRAM

SCALE: N.T.S.

SPECIFICATION FOR DESIGNED DETENTION SYSTEM:

SCOPE
THIS SPECIFICATION COVERS THE MANUFACTURE AND INSTALLATION OF THE DESIGNED DETENTION SYSTEM DETAILED IN THE PROJECT PLANS.

MATERIAL
THE MATERIAL SHALL CONFORM TO THE APPLICABLE REQUIREMENTS LISTED BELOW:

ALUMINIZED TYPE 2 STEEL COILS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M-274 OR ASTM A-92.

THE GALVANIZED STEEL COILS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M-218 OR ASTM A-929.

THE POLYMER COATED STEEL COILS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M-246 OR ASTM A-742.

THE ALUMINUM COILS SHALL CONFORM TO THE APPLICABLE OF AASHTO M-197 OR ASTM B-744.

CONSTRUCTION LOADS
CONSTRUCTION LOADS MAY BE HIGHER THAN FINAL LOADS. FOLLOW THE MANUFACTURER'S OR NCSPA GUIDELINES.

PIPE
THE PIPE SHALL BE MANUFACTURED IN ACCORDANCE TO THE APPLICABLE REQUIREMENTS LISTED BELOW:

ALUMINIZED TYPE 2: AASHTO M-36 OR ASTM A-760

GALVANIZED: AASHTO M-36 OR ASTM A-760

APPLICABLE POLYMER COATED: AASHTO M-245 OR ASTM A-762

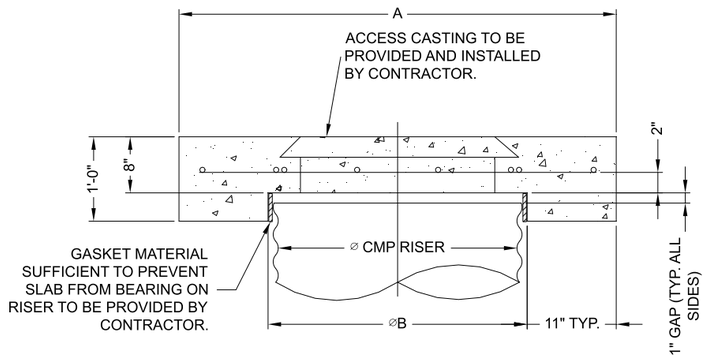
ALUMINUM: AASHTO M-196 OR ASTM B-745

APPLICABLE HANDLING AND ASSEMBLY
SHALL BE IN ACCORDANCE WITH NCSP'S (NATIONAL CORRUGATED STEEL PIPE ASSOCIATION) FOR ALUMINIZED TYPE 2, GALVANIZED OR POLYMER COATED STEEL. SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS FOR ALUMINUM PIPE.

REQUIREMENTS INSTALLATION
SHALL BE IN ACCORDANCE WITH AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES, SECTION 26, DIVISION II DIVISION II OR ASTM A-798 (FOR ALUMINIZED TYPE 2, GALVANIZED OR POLYMER COATED STEEL) OR ASTM B-788 (FOR ALUMINUM PIPE) AND IN CONFORMANCE WITH THE PROJECT PLANS AND SPECIFICATIONS. IF THERE ARE ANY INCONSISTENCIES OR CONFLICTS THE CONTRACTOR SHOULD DISCUSS AND RESOLVE WITH THE SITE ENGINEER.

IT IS ALWAYS THE RESPONSIBILITY OF THE CONTRACTOR TO FOLLOW OSHA GUIDELINES FOR SAFE PRACTICES.

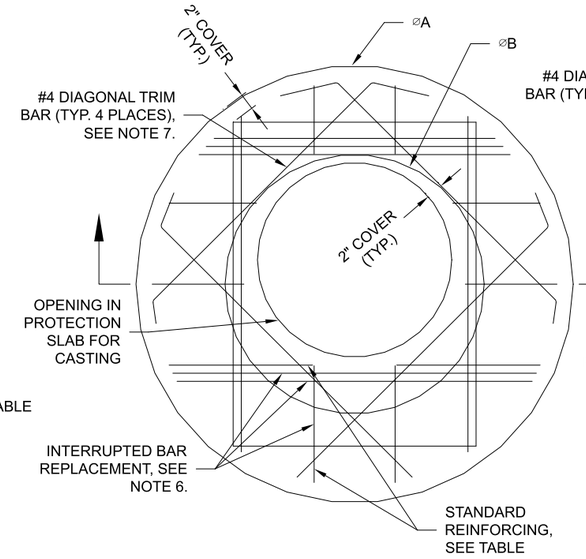
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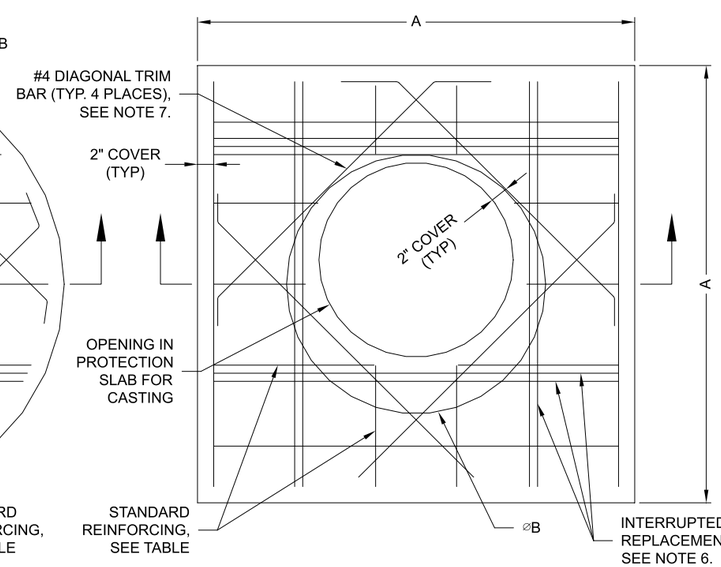
SECTION VIEW

REINFORCING TABLE				
⌀ CMP RISER	A	⌀ B	REINFORCING	**BEARING PRESSURE (PSF)
24"	⌀ 4' 4'X4'	26"	#5 @ 12" OCEW #5 @ 12" OCEW	2,410 1,780
30"	⌀ 4'-6" 4'-6" X 4'-6"	32"	#5 @ 12" OCEW #5 @ 12" OCEW	2,120 1,530
36"	⌀ 5' 5' X 5'	38"	#5 @ 10" OCEW #5 @ 10" OCEW	1,890 1,350
42"	⌀ 5'-6" 5'-6" X 5'-6"	44"	#5 @ 10" OCEW #5 @ 9" OCEW	1,720 1,210
48"	⌀ 6' 6' X 6'	50"	#5 @ 9" OCEW #5 @ 8" OCEW	1,600 1,100

** ASSUMED SOIL BEARING CAPACITY



ROUND OPTION PLAN VIEW



SQUARE OPTION PLAN VIEW

NOTES:

1. DESIGN IN ACCORDANCE WITH AASHTO, 17th EDITION.
2. DESIGN LOAD HS25.
3. EARTH COVER = 1' MAX.
4. CONCRETE STRENGTH = 3,500 psi
5. REINFORCING STEEL = ASTM A615, GRADE 60.
6. PROVIDE ADDITIONAL REINFORCING AROUND OPENINGS EQUAL TO THE BARS INTERRUPTED, HALF EACH SIDE. ADDITIONAL BARS TO BE IN THE SAME PLANE.
7. TRIM OPENING WITH DIAGONAL #4 BARS, EXTEND BARS A MINIMUM OF 12" BEYOND OPENING, BEND BARS AS REQUIRED TO MAINTAIN BAR COVER.
8. PROTECTION SLAB AND ALL MATERIALS TO BE PROVIDED AND INSTALLED BY CONTRACTOR.
9. DETAIL DESIGN BY DELTA ENGINEERING, BINGHAMTON, NY.

MANHOLE CAP DETAIL

SCALE: N.T.S.

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CONTECH CMP DETENTION SYSTEMS
CONTECH DYODS DRAWING

DYO25555 A22078-1 Highland East
Highland East Detention System 1
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DETENTION SYSTEM

PROJECT No.:	SEQ. No.:	DATE:
16947	25555	1/12/2023
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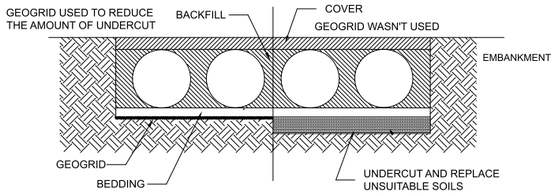
CMP DETENTION INSTALLATION GUIDE

PROPER INSTALLATION OF A FLEXIBLE UNDERGROUND DETENTION SYSTEM WILL ENSURE LONG-TERM PERFORMANCE. THE CONFIGURATION OF THESE SYSTEMS OFTEN REQUIRES SPECIAL CONSTRUCTION PRACTICES THAT DIFFER FROM CONVENTIONAL FLEXIBLE PIPE CONSTRUCTION. CONTECH ENGINEERED SOLUTIONS STRONGLY SUGGESTS SCHEDULING A PRE-CONSTRUCTION MEETING WITH YOUR LOCAL SALES ENGINEER TO DETERMINE IF ADDITIONAL MEASURES, NOT COVERED IN THIS GUIDE, ARE APPROPRIATE FOR YOUR SITE.

FOUNDATION

CONSTRUCT A FOUNDATION THAT CAN SUPPORT THE DESIGN LOADING APPLIED BY THE PIPE AND ADJACENT BACKFILL WEIGHT AS WELL AS MAINTAIN ITS INTEGRITY DURING CONSTRUCTION.

IF SOFT OR UNSUITABLE SOILS ARE ENCOUNTERED, REMOVE THE POOR SOILS DOWN TO A SUITABLE DEPTH AND THEN BUILD UP TO THE APPROPRIATE ELEVATION WITH A COMPETENT BACKFILL MATERIAL. THE STRUCTURAL FILL MATERIAL GRADATION SHOULD NOT ALLOW THE MIGRATION OF FINES, WHICH CAN CAUSE SETTLEMENT OF THE DETENTION SYSTEM OR PAVEMENT ABOVE. IF THE STRUCTURAL FILL MATERIAL IS NOT COMPATIBLE WITH THE UNDERLYING SOILS AN ENGINEERING FABRIC SHOULD BE USED AS A SEPARATOR. IN SOME CASES, USING A STIFF REINFORCING GEOGRID REDUCES OVER EXCAVATION AND REPLACEMENT FILL QUANTITIES.

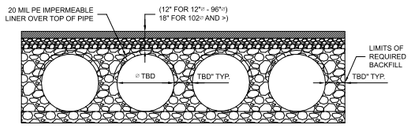


GRADE THE FOUNDATION SUBGRADE TO A UNIFORM OR SLIGHTLY SLOPING GRADE. IF THE SUBGRADE IS CLAY OR RELATIVELY NON-POROUS AND THE CONSTRUCTION SEQUENCE WILL LAST FOR AN EXTENDED PERIOD OF TIME, IT IS BEST TO SLOPE THE GRADE TO ONE END OF THE SYSTEM. THIS WILL ALLOW EXCESS WATER TO DRAIN QUICKLY, PREVENTING SATURATION OF THE SUBGRADE.

GEOMEMBRANE BARRIER

A SITE'S RESISTIVITY MAY CHANGE OVER TIME WHEN VARIOUS TYPES OF SALTING AGENTS ARE USED, SUCH AS ROAD SALTS FOR DEICING AGENTS. IF SALTING AGENTS ARE USED ON OR NEAR THE PROJECT SITE, A GEOMEMBRANE BARRIER IS RECOMMENDED WITH THE SYSTEM. THE GEOMEMBRANE LINER IS INTENDED TO HELP PROTECT THE SYSTEM FROM THE POTENTIAL ADVERSE EFFECTS THAT MAY RESULT FROM THE USE OF SUCH AGENTS INCLUDING PREMATURE CORROSION AND REDUCED ACTUAL SERVICE LIFE.

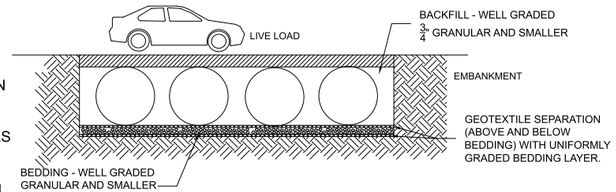
THE PROJECT'S ENGINEER OF RECORD IS TO EVALUATE WHETHER SALTING AGENTS WILL BE USED ON OR NEAR THE PROJECT SITE, AND USE HIS/HER BEST JUDGEMENT TO DETERMINE IF ANY ADDITIONAL PROTECTIVE MEASURES ARE REQUIRED. BELOW IS A TYPICAL DETAIL SHOWING THE PLACEMENT OF A GEOMEMBRANE BARRIER FOR PROJECTS WHERE SALTING AGENTS ARE USED ON OR NEAR THE PROJECT SITE.



IN-SITU TRENCH WALL

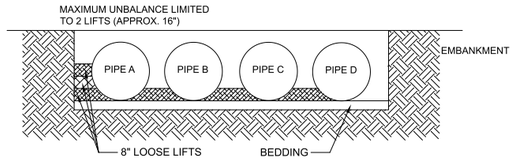
IF EXCAVATION IS REQUIRED, THE TRENCH WALL NEEDS TO BE CAPABLE OF SUPPORTING THE LOAD THAT THE PIPE SHEDS AS THE SYSTEM IS LOADED. IF SOILS ARE NOT CAPABLE OF SUPPORTING THESE LOADS, THE PIPE CAN DEFLECT. PERFORM A SIMPLE SOIL PRESSURE CHECK USING THE APPLIED LOADS TO DETERMINE THE LIMITS OF EXCAVATION BEYOND THE SPRING LINE OF THE OUTER MOST PIPES.

IN MOST CASES THE REQUIREMENTS FOR A SAFE WORK ENVIRONMENT AND PROPER BACKFILL PLACEMENT AND COMPACTION TAKE CARE OF THIS CONCERN.



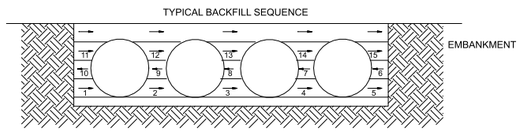
BACKFILL PLACEMENT

MATERIAL SHALL BE WORKED INTO THE PIPE HAUNCHES BY MEANS OF SHOVEL-SLICING, RODDING, AIR TAMPER, VIBRATORY ROD, OR OTHER EFFECTIVE METHODS.

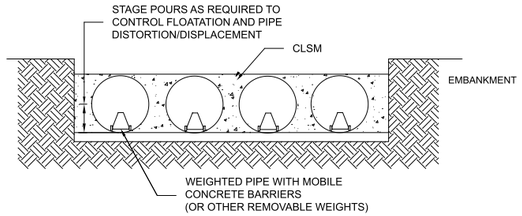


IF AASHTO T99 PROCEDURES ARE DETERMINED INFEASIBLE BY THE GEOTECHNICAL ENGINEER OF RECORD, COMPACTION IS CONSIDERED ADEQUATE WHEN NO FURTHER YIELDING OF THE MATERIAL IS OBSERVED UNDER THE COMPACTOR, OR UNDER FOOT, AND THE GEOTECHNICAL ENGINEER OF RECORD (OR REPRESENTATIVE THEREOF) IS SATISFIED WITH THE LEVEL OF COMPACTION.

FOR LARGE SYSTEMS, CONVEYOR SYSTEMS, BACKHOES WITH LONG REACHES OR DRAGLINES WITH STONE BUCKETS MAY BE USED TO PLACE BACKFILL. ONCE MINIMUM COVER FOR CONSTRUCTION LOADING ACROSS THE ENTIRE WIDTH OF THE SYSTEM IS REACHED, ADVANCE THE EQUIPMENT TO THE END OF THE RECENTLY PLACED FILL, AND BEGIN THE SEQUENCE AGAIN UNTIL THE SYSTEM IS COMPLETELY BACKFILLED. THIS TYPE OF CONSTRUCTION SEQUENCE PROVIDES ROOM FOR STOCKPILED BACKFILL DIRECTLY BEHIND THE BACKHOE, AS WELL AS THE MOVEMENT OF CONSTRUCTION TRAFFIC. MATERIAL STOCKPILES ON TOP OF THE BACKFILLED DETENTION SYSTEM SHOULD BE LIMITED TO 8- TO 10-FEET HIGH AND MUST PROVIDE BALANCED LOADING ACROSS ALL BARRELS. TO DETERMINE THE PROPER COVER OVER THE PIPES TO ALLOW THE MOVEMENT OF CONSTRUCTION EQUIPMENT SEE TABLE 1, OR CONTACT YOUR LOCAL CONTECH SALES ENGINEER.



WHEN FLOWABLE FILL IS USED, YOU MUST PREVENT PIPE FLOATATION. TYPICALLY, SMALL LIFTS ARE PLACED BETWEEN THE PIPES AND THEN ALLOWED TO SET-UP PRIOR TO THE PLACEMENT OF THE NEXT LIFT. THE ALLOWABLE THICKNESS OF THE CLSM LIFT IS A FUNCTION OF A PROPER BALANCE BETWEEN THE UPLIFT FORCE OF THE CLSM, THE OPPOSING WEIGHT OF THE PIPE, AND THE EFFECT OF OTHER RESTRAINING MEASURES. THE PIPE CAN CARRY LIMITED FLUID PRESSURE WITHOUT PIPE DISTORTION OR DISPLACEMENT, WHICH ALSO AFFECTS THE CLSM LIFT THICKNESS. YOUR LOCAL CONTECH SALES ENGINEER CAN HELP DETERMINE THE PROPER LIFT THICKNESS.

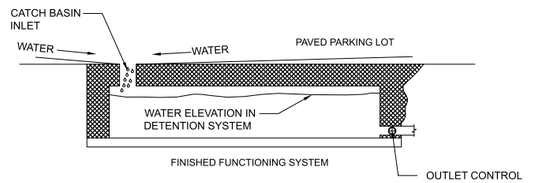


CONSTRUCTION LOADING

TYPICALLY, THE MINIMUM COVER SPECIFIED FOR A PROJECT ASSUMES H-20 LIVE LOAD. BECAUSE CONSTRUCTION LOADS OFTEN EXCEED DESIGN LIVE LOADS, INCREASED TEMPORARY MINIMUM COVER REQUIREMENTS ARE NECESSARY. SINCE CONSTRUCTION EQUIPMENT VARIES FROM JOB TO JOB, IT IS BEST TO ADDRESS EQUIPMENT SPECIFIC MINIMUM COVER REQUIREMENTS WITH YOUR LOCAL CONTECH SALES ENGINEER DURING YOUR PRE-CONSTRUCTION MEETING.

ADDITIONAL CONSIDERATIONS

BECAUSE MOST SYSTEMS ARE CONSTRUCTED BELOW-GRADE, RAINFALL CAN RAPIDLY FILL THE EXCAVATION; POTENTIALLY CAUSING FLOATATION AND MOVEMENT OF THE PREVIOUSLY PLACED PIPES. TO HELP MITIGATE POTENTIAL PROBLEMS, IT IS BEST TO START THE INSTALLATION AT THE DOWNSTREAM END WITH THE OUTLET ALREADY CONSTRUCTED TO ALLOW A ROUTE FOR THE WATER TO ESCAPE. TEMPORARY DIVERSION MEASURES MAY BE REQUIRED FOR HIGH FLOWS DUE TO THE RESTRICTED NATURE OF THE OUTLET PIPE.



CMP DETENTION SYSTEM INSPECTION AND MAINTENANCE

UNDERGROUND STORMWATER DETENTION AND INFILTRATION SYSTEMS MUST BE INSPECTED AND MAINTAINED AT REGULAR INTERVALS FOR PURPOSES OF PERFORMANCE AND LONGEVITY.

INSPECTION

INSPECTION IS THE KEY TO EFFECTIVE MAINTENANCE OF CMP DETENTION SYSTEMS AND IS EASILY PERFORMED. CONTECH RECOMMENDS ONGOING, ANNUAL INSPECTIONS. SITES WITH HIGH TRASH LOAD OR SMALL OUTLET CONTROL ORIFICES MAY NEED MORE FREQUENT INSPECTIONS. THE RATE AT WHICH THE SYSTEM COLLECTS POLLUTANTS WILL DEPEND MORE ON SITE SPECIFIC ACTIVITIES RATHER THAN THE SIZE OR CONFIGURATION OF THE SYSTEM.

INSPECTIONS SHOULD BE PERFORMED MORE OFTEN IN EQUIPMENT WASHDOWN AREAS, IN CLIMATES WHERE SANDING AND/OR SALTING OPERATIONS TAKE PLACE, AND IN OTHER VARIOUS INSTANCES IN WHICH ONE WOULD EXPECT HIGHER ACCUMULATIONS OF SEDIMENT OR ABRASIVE/ CORROSIVE CONDITIONS. A RECORD OF EACH INSPECTION IS TO BE MAINTAINED FOR THE LIFE OF THE SYSTEM

MAINTENANCE

CMP DETENTION SYSTEMS SHOULD BE CLEANED WHEN AN INSPECTION REVEALS ACCUMULATED SEDIMENT OR TRASH IS CLOGGING THE DISCHARGE ORIFICE.

ACCUMULATED SEDIMENT AND TRASH CAN TYPICALLY BE EVACUATED THROUGH THE MANHOLE OVER THE OUTLET ORIFICE. IF MAINTENANCE IS NOT PERFORMED AS RECOMMENDED, SEDIMENT AND TRASH MAY ACCUMULATE IN FRONT OF THE OUTLET ORIFICE. MANHOLE COVERS SHOULD BE SECURELY SEATED FOLLOWING CLEANING ACTIVITIES. CONTECH SUGGESTS THAT ALL SYSTEMS BE DESIGNED WITH AN ACCESS/INSPECTION MANHOLE SITUATED AT OR NEAR THE INLET AND THE OUTLET ORIFICE. SHOULD IT BE NECESSARY TO GET INSIDE THE SYSTEM TO PERFORM MAINTENANCE ACTIVITIES, ALL APPROPRIATE PRECAUTIONS REGARDING CONFINED SPACE ENTRY AND OSHA REGULATIONS SHOULD BE FOLLOWED.

ANNUAL INSPECTIONS ARE BEST PRACTICE FOR ALL UNDERGROUND SYSTEMS. DURING THIS INSPECTION, IF EVIDENCE OF SALTING/DE-ICING AGENTS IS OBSERVED WITHIN THE SYSTEM, IT IS BEST PRACTICE FOR THE SYSTEM TO BE RINSED, INCLUDING ABOVE THE SPRING LINE SOON AFTER THE SPRING THAW AS PART OF THE MAINTENANCE PROGRAM FOR THE SYSTEM.

MAINTAINING AN UNDERGROUND DETENTION OR INFILTRATION SYSTEM IS EASIEST WHEN THERE IS NO FLOW ENTERING THE SYSTEM. FOR THIS REASON, IT IS A GOOD IDEA TO SCHEDULE THE CLEANOUT DURING DRY WEATHER.

THE FOREGOING INSPECTION AND MAINTENANCE EFFORTS HELP ENSURE UNDERGROUND PIPE SYSTEMS USED FOR STORMWATER STORAGE CONTINUE TO FUNCTION AS INTENDED BY IDENTIFYING RECOMMENDED REGULAR INSPECTION AND MAINTENANCE PRACTICES. INSPECTION AND MAINTENANCE RELATED TO THE STRUCTURAL INTEGRITY OF THE PIPE OR THE SOUNDNESS OF PIPE JOINT CONNECTIONS IS BEYOND THE SCOPE OF THIS GUIDE.

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DATE	REVISION DESCRIPTION	BY

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www.ContechES.com
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

CONTECH CMP DETENTION SYSTEMS

CONTECH **DYODS** DRAWING

DYO25555 A22078-1 Highland East
Highland East Detention System 1
Highland, CA
DETENTION SYSTEM

PROJECT No.:	SEQ. No.:	DATE:
16947	25555	1/12/2023
DESIGNED: DYO	DRAWN: DYO	
CHECKED: DYO	APPROVED: DYO	
SHEET NO.: 1		

INFILTRATION SYSTEM #2

Date: 1/12/2023
Project Name: Highland East Detention System 2 - 25558 (1-12-2023 23-39-16)

City / County:
State:

Designed By:
Company:
Telephone:

CMP: Underground Detention System Storage Volume Estimation

=Adjustable Input Cells

Contech Engineered Solutions, LLC is pleased to offer the following estimate of storage volume for the above named project. The results are submitted as an estimate only, without liability on the part of Contech Engineered Solutions, LLC for accuracy or suitability to any particular applicaton and are subject to verification of the Engineer of Record. **This tool is only applicable for rectangular shaped systems.**

Summary of Inputs

System Information		Backfill Information		Pipe & Analysis Information	
Out-to-out length (ft):	32.0	Backfill Porosity (%):	40%	System Diameter (in):	72
Out-to-out width (ft):	15.0	Depth Above Pipe (in):	6.0	Pipe Spacing (in):	36
Number of Manifolds (ea):	2.0	Depth Below Pipe (in):	6.0	Incremental Analysis (in):	2
Number of Barrels (ea):	2.0	Width At Ends (ft):	1.0	System Invert (Elevation):	1161
		Width At Sides (ft):	1.0		

BASE OF ROCK ELEVATION FOR INFILTRATION SYSTEM

Storage Volume Estimation

System		Pipe		Stone		Total System		Miscellaneous	
Depth (ft)	Elevation (ft)	Incremental Storage (cf)	Cumulative Storage (cf)	Incremental Storage (cf)	Cumulative Storage (cf)	Incremental Storage (cf)	Cumulative Storage (cf)	Percent Open Storage (%)	Ave. Surface Area (sf)
0.00	1161.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0%	231.2
0.17	1161.16	0.0	0.0	38.5	38.5	38.5	38.5	0.0%	231.2
0.33	1161.33	0.0	0.0	38.5	77.1	38.5	77.1	0.0%	231.2
0.50	1161.50	0.0	0.0	38.5	115.6	38.5	115.6	0.0%	231.2
0.67	1161.66	15.4	15.4	32.4	148.0	47.8	163.4	9.4%	314.0
0.83	1161.83	27.8	43.3	27.4	175.4	55.2	218.6	19.8%	346.6
1.00	1162.00	35.5	78.8	24.3	199.7	59.8	278.5	28.3%	370.5
1.17	1162.16	41.4	120.2	22.0	221.6	63.4	341.9	35.2%	389.6
1.33	1162.33	46.3	166.5	20.0	241.7	66.3	408.2	40.8%	405.5
1.50	1162.50	50.3	216.8	18.4	260.1	68.7	476.9	45.5%	419.0
1.67	1162.66	53.8	270.7	17.0	277.1	70.8	547.7	49.4%	430.7
1.83	1162.83	56.8	327.5	15.8	292.9	72.6	620.4	52.8%	440.7
2.00	1163.00	59.4	386.9	14.8	307.6	74.2	694.6	55.7%	449.4
2.17	1163.16	61.7	448.6	13.9	321.5	75.5	770.1	58.3%	456.9
2.33	1163.33	63.6	512.2	13.1	334.6	76.7	846.8	60.5%	463.4
2.50	1163.50	65.3	577.5	12.4	347.0	77.7	924.5	62.5%	468.8
2.67	1163.66	66.6	644.2	11.9	358.9	78.5	1,003.0	64.2%	473.3
2.83	1163.83	67.8	711.9	11.4	370.3	79.2	1,082.2	65.8%	476.9
3.00	1164.00	68.7	780.6	11.1	381.4	79.7	1,161.9	67.2%	479.7
3.17	1164.16	69.3	849.9	10.8	392.2	80.1	1,242.1	68.4%	481.6
3.33	1164.33	69.7	919.6	10.6	402.8	80.4	1,322.4	69.5%	482.8
3.50	1164.50	70.0	989.6	10.5	413.4	80.5	1,403.0	70.5%	483.2
3.67	1164.66	70.0	1,059.6	10.5	423.9	80.5	1,483.5	71.4%	482.8
3.83	1164.83	69.7	1,129.3	10.6	434.5	80.4	1,563.9	72.2%	481.6
4.00	1165.00	69.3	1,198.6	10.8	445.3	80.1	1,644.0	72.9%	479.7
4.17	1165.16	68.7	1,267.3	11.1	456.4	79.7	1,723.7	73.5%	476.9
4.33	1165.33	67.8	1,335.0	11.4	467.8	79.2	1,802.9	74.1%	473.3
4.50	1165.50	66.6	1,401.7	11.9	479.7	78.5	1,881.4	74.5%	468.8
4.67	1165.66	65.3	1,467.0	12.4	492.2	77.7	1,959.1	74.9%	463.4
4.83	1165.83	63.6	1,530.6	13.1	505.2	76.7	2,035.8	75.2%	456.9
5.00	1166.00	61.7	1,592.3	13.9	519.1	75.5	2,111.4	75.4%	449.4
5.17	1166.16	59.4	1,651.7	14.8	533.8	74.2	2,185.6	75.6%	440.7
5.33	1166.33	56.8	1,708.5	15.8	549.6	72.6	2,258.2	75.7%	430.7
5.50	1166.50	53.8	1,762.4	17.0	566.6	70.8	2,329.0	75.7%	419.0
5.67	1166.66	50.3	1,812.7	18.4	585.0	68.7	2,397.8	75.6%	405.5
5.83	1166.83	46.3	1,859.0	20.0	605.1	66.3	2,464.1	75.4%	389.6
6.00	1167.00	41.4	1,900.4	22.0	627.0	63.4	2,527.5	75.2%	370.5
6.17	1167.16	35.5	1,935.9	24.3	651.4	59.8	2,587.3	74.8%	346.6
6.33	1167.33	27.8	1,963.8	27.4	678.8	55.2	2,642.5	74.3%	314.0
6.50	1167.50	15.4	1,979.2	32.4	711.1	47.8	2,690.3	73.6%	231.2
6.67	1167.66	0.0	1,979.2	38.5	749.7	38.5	2,728.9	72.5%	231.2
6.83	1167.83	0.0	1,979.2	38.5	788.2	38.5	2,767.4	71.5%	231.2
7.00	1168.00	0.0	1,979.2	38.5	826.7	38.5	2,805.9	70.5%	231.2

STORAGE VOLUME AT TOP OF ROCK

STORAGE VOLUME > DCV OF 2,243 CF.

SYSTEM OVERFLOW FROM THE CATCH BASIN TO 3RD STREET CURB AND GUTTER

These results are submitted to you as a guideline only, without liability on the part of CONTECH Engineered Solutions, LLC for accuracy or suitability to any particular application, and are subject to your verification.

PROJECT SUMMARY

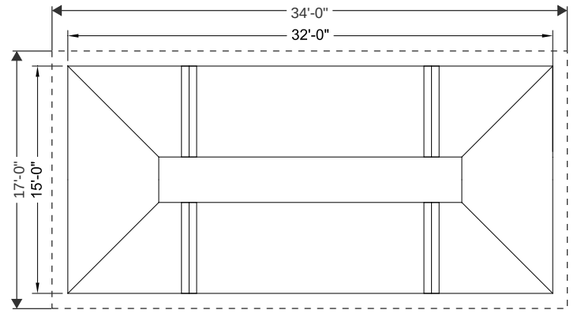
CALCULATION DETAILS
- LOADING = HS20/HS25
- APPROX. LINEAR FOOTAGE = 70 LF

STORAGE SUMMARY
- STORAGE VOLUME REQUIRED = N/A
- PIPE STORAGE VOLUME = 1,979 CF
- BACKFILL STORAGE VOLUME = 827 CF
- TOTAL STORAGE PROVIDED = 2,806 CF

PIPE DETAILS
- DIAMETER = 72"
- CORRUGATION = 5x1
- GAGE = 16
- COATING = ALT2
- WALL TYPE = PERFORATED
- BARREL SPACING = 36"

BACKFILL DETAILS
- WIDTH AT ENDS = 12"
- ABOVE PIPE = 6"
- WIDTH AT SIDES = 12"
- BELOW PIPE = 6"

INFILTRATION SYSTEM #2



NOTES

- ALL RISER AND STUB DIMENSIONS ARE TO CENTERLINE. ALL ELEVATIONS, DIMENSIONS, AND LOCATIONS OF RISERS AND INLETS, SHALL BE VERIFIED BY THE ENGINEER OF RECORD PRIOR TO RELEASING FOR FABRICATION.
- ALL FITTINGS AND REINFORCEMENT COMPLY WITH ASTM A998.
- ALL RISERS AND STUBS ARE $2\frac{2}{3}$" x $\frac{1}{2}$" CORRUGATION AND 16 GAGE UNLESS OTHERWISE NOTED.
- RISERS TO BE FIELD TRIMMED TO GRADE.
- QUANTITY OF PIPE SHOWN DOES NOT PROVIDE EXTRA PIPE FOR CONNECTING THE SYSTEM TO EXISTING PIPE OR DRAINAGE STRUCTURES. OUR SYSTEM AS DETAILED PROVIDES NOMINAL INLET AND/OR OUTLET PIPE STUB FOR CONNECTION TO EXISTING DRAINAGE FACILITIES. IF ADDITIONAL PIPE IS NEEDED IT IS THE RESPONSIBILITY OF THE CONTRACTOR.
- BAND TYPE TO BE DETERMINED UPON FINAL DESIGN.
- THE PROJECT SUMMARY IS REFLECTIVE OF THE DYODS DESIGN, QUANTITIES ARE APPROX. AND SHOULD BE VERIFIED UPON FINAL DESIGN AND APPROVAL. FOR EXAMPLE, TOTAL EXCAVATION DOES NOT CONSIDER ALL VARIABLES SUCH AS SHORING AND ONLY ACCOUNTS FOR MATERIAL WITHIN THE ESTIMATED EXCAVATION FOOTPRINT.
- THESE DRAWINGS ARE FOR CONCEPTUAL PURPOSES AND DO NOT REFLECT ANY LOCAL PREFERENCES OR REGULATIONS. PLEASE CONTACT YOUR LOCAL CONTECH REP FOR MODIFICATIONS.

ASSEMBLY

SCALE: 1" = 10'

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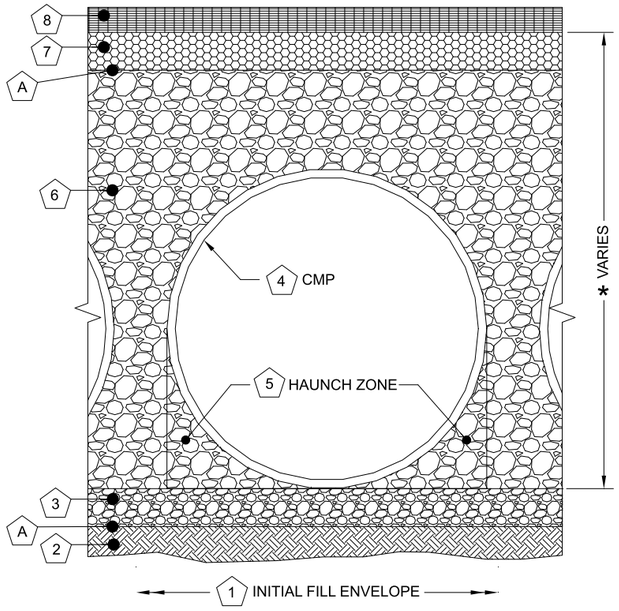
DATE	REVISION DESCRIPTION	BY

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CONTECH® CMP DETENTION SYSTEMS
CONTECH DYODS DRAWING

DYO25558 A22078-1 Highland East
Highland East Detention System 2
Highland, CA
DETENTION SYSTEM

PROJECT No.:	SEQ. No.:	DATE:
16950	25558	1/12/2023
DESIGNED: DYO	DRAWN: DYO	
CHECKED: DYO	APPROVED: DYO	
SHEET NO.: 1		



	Infiltration Systems - CMP Infiltration & CMP Perforated Drainage Pipe			
	Material Location	Description	Material Designation	Designation
8	Rigid or Flexible Pavement (if applicable)			
7	Road Base (if applicable			
A	Geotextile Layer	Non-Woven Geotextile	CONTECH C-40 or C-45	Engineer Decision for consideration to prevent soil migration into varying soil types. Wrap the trench only.
6	Backfill	Infiltration pipe systems have a pipe perforation sized of 3/8" diameter. An open graded, free draining stone, with a particle size of ½" – 2 ½" diameter is recommended.	AASHTO M 145-A-1 or AASHTO M 43 - 3, 4	Material shall be worked into the pipe haunches by means of shovel-slicing, rodding, air-tamper, vibratory rod, or other effective methods. Compaction of all placed fill material is necessary and shall be considered adequate when no further yielding of the material is observed under the compactor, or under foot, and the Project Engineer or his representative is satisfied with the level of compaction"
3	Bedding Stone	Well graded granular bedding material w/maximum particle size of 3"	AASHTO M43 - 3,357,4,467, 5, 56, 57	For soil aggregates larger than 3/8" a dedicated bedding layer is not required for CMP. Pipe may be placed on the trench bottom comprised of native suitable well graded & granular material. For Arch pipes it is recommended to be shaped to a relatively flat bottom or fine-grade the foundation to a slight v-shape. Soil aggregates less than 3/8" and unsuitable material should be over-excavated and re-placed with a 4"-6" layer of well graded & granular stone per the material designation.
A	Geotextile Layer	None	None	Contech does not recommend geotextiles be placed under the invert of Infiltration systems due to the propensity for geotextiles to clog over time.
*	Note: The listed AASHTO designations are for gradation only. The stone must also be angular and clean.			

1 MINIMUM WIDTH DEPENDS ON SITE CONDITIONS AND ENGINEERING JUDGEMENT.

FOUNDATION/BEDDING PREPARATION

2 PRIOR TO PLACING THE BEDDING, THE FOUNDATION MUST BE CONSTRUCTED TO A UNIFORM AND STABLE GRADE. IN THE EVENT THAT UNSUITABLE FOUNDATION MATERIALS ARE ENCOUNTERED DURING EXCAVATION, THEY SHALL BE REMOVED AND BROUGHT BACK TO THE GRADE WITH A FILL MATERIAL AS APPROVED BY THE ENGINEER.

5 HAUNCH ZONE MATERIAL SHALL BE PLACED AND UNIFORMLY COMPACTED WITHOUT SOFT SPOTS.

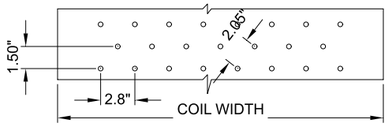
BACKFILL

MATERIAL SHALL BE PLACED IN 8"-10" MAXIMUM LIFTS. INADEQUATE COMPACTION CAN LEAD TO EXCESSIVE DEFLECTIONS WITHIN THE SYSTEM AND SETTLEMENT OF THE SOILS OVER THE SYSTEM. BACKFILL SHALL BE PLACED SUCH THAT THERE IS NO MORE THAN A TWO-LIFT DIFFERENTIAL BETWEEN THE SIDES OF ANY PIPE IN THE SYSTEM AT ALL TIMES DURING THE BACKFILL PROCESS. BACKFILL SHALL BE ADVANCED ALONG THE LENGTH OF THE SYSTEM AT THE SAME RATE TO AVOID DIFFERENTIAL LOADING ON ANY PIPES IN THE SYSTEM.

EQUIPMENT USED TO PLACE AND COMPACT THE BACKFILL SHALL BE OF A SIZE AND TYPE SO AS NOT TO DISTORT, DAMAGE, OR DISPLACE THE PIPE. ATTENTION MUST BE GIVEN TO PROVIDING ADEQUATE MINIMUM COVER FOR SUCH EQUIPMENT. MAINTAIN BALANCED LOADING ON ALL PIPES IN THE SYSTEM DURING ALL SUCH OPERATIONS.

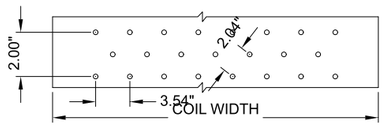
OTHER ALTERNATE BACKFILL MATERIAL MAY BE ALLOWED DEPENDING ON SITE SPECIFIC CONDITIONS. REFER TO TYPICAL BACKFILL DETAIL FOR MATERIAL REQUIRED.

2 2/3" x 1/2" CORRUGATION - STEEL AND ALUMINUM CMP EDGE SPACING EQUAL ON BOTH SIDES



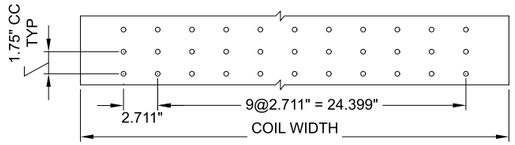
OPEN AREA = 3.76 SQ IN/SQ FT

3" x 1" CORRUGATION - STEEL AND ALUMINUM CMP (COIL PROVIDED FROM CONTECH LANTANA, FL PLANT)



OPEN AREA = 4.16 SQ IN/SQ FT

5" x 1" CORRUGATION - STEEL ONLY
EDGE SPACING EQUAL ON BOTH SIDES



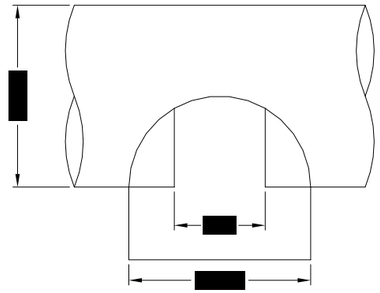
OPEN AREA = 3.33 SQ IN/SQ FT

NOTES:

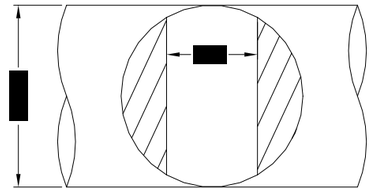
1. PERFORATIONS MEET AASHTO AND ASTM SPECIFICATIONS.
2. PERFORATION OPEN AREA PER SQUARE FOOT OF PIPE IS BASED ON THE NOMINAL DIAMETER AND LENGTH OF PIPE.
3. ALL DIMENSIONS ARE SUBJECT TO MANUFACTURING TOLERANCES.
4. ALL HOLES ⌀3/8".

TYPICAL PERFORATION DETAIL

SCALE: N.T.S.



PLAN

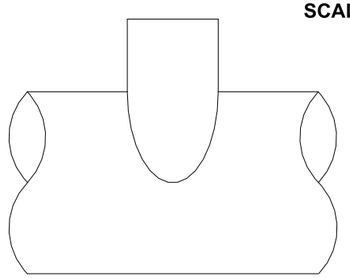


FRONT

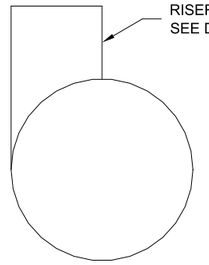
TYPICAL MANWAY DETAIL

SCALE: N.T.S.

NOTE:
MANWAY DETAIL APPLICABLE FOR CMP SYSTEMS WITH DIAMETERS 48" AND LARGER. MANWAYS MAY BE REQUIRED ON SMALLER SYSTEMS DEPENDING ON ACTUAL SITE SPECIFIC CONDITIONS.



ELEVATION

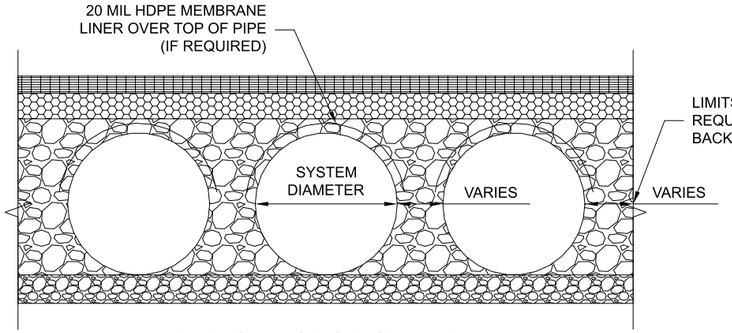


END

TYPICAL RISER DETAIL

SCALE: N.T.S.

NOTE:
LADDERS ARE OPTIONAL AND ARE NOT REQUIRED FOR ALL SYSTEMS.



TYPICAL SECTION VIEW

LINER OVER ROWS
SCALE: N.T.S.

NOTE: IF SALTING AGENTS FOR SNOW AND ICE REMOVAL ARE USED ON OR NEAR THE PROJECT, AN HDPE MEMBRANE LINER IS RECOMMENDED WITH THE SYSTEM. THE IMPERMEABLE LINER IS INTENDED TO HELP PROTECT THE SYSTEM FROM THE POTENTIAL ADVERSE EFFECTS THAT MAY RESULT FROM A CHANGE IN THE SURROUNDING ENVIRONMENT OVER A PERIOD OF TIME. PLEASE REFER TO THE CORRUGATED METAL PIPE DETENTION DESIGN GUIDE FOR ADDITIONAL INFORMATION.

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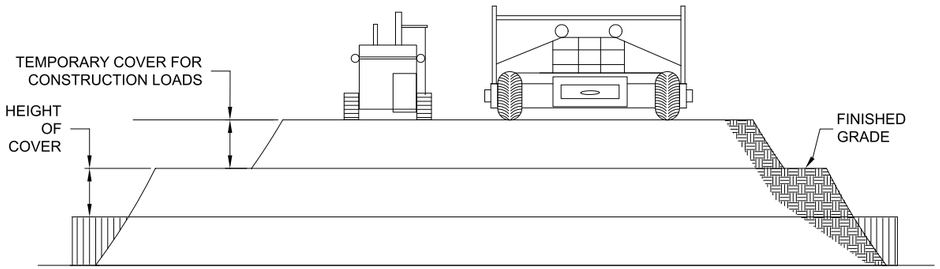
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CONTECH CMP DETENTION SYSTEMS
CONTECH DYODS DRAWING

DYO25558 A22078-1 Highland East
Highland East Detention System 2
Highland, CA
DETENTION SYSTEM

PROJECT No.:	SEQ. No.:	DATE:
16950	25558	1/12/2023
DESIGNED: DYO	DRAWN: DYO	
CHECKED: DYO	APPROVED: DYO	
SHEET NO.: 1		

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CONSTRUCTION LOADS

FOR TEMPORARY CONSTRUCTION VEHICLE LOADS, AN EXTRA AMOUNT OF COMPACTED COVER MAY BE REQUIRED OVER THE TOP OF THE PIPE. THE HEIGHT-OF-COVER SHALL MEET THE MINIMUM REQUIREMENTS SHOWN IN THE TABLE BELOW. THE USE OF HEAVY CONSTRUCTION EQUIPMENT NECESSITATES GREATER PROTECTION FOR THE PIPE THAN FINISHED GRADE COVER MINIMUMS FOR NORMAL HIGHWAY TRAFFIC.

PIPE SPAN, INCHES	AXLE LOADS (kips)			
	18-50	50-75	75-110	110-150
	MINIMUM COVER (FT)			
12-42	2.0	2.5	3.0	3.0
48-72	3.0	3.0	3.5	4.0
78-120	3.0	3.5	4.0	4.0
126-144	3.5	4.0	4.5	4.5

*MINIMUM COVER MAY VARY, DEPENDING ON LOCAL CONDITIONS. THE CONTRACTOR MUST PROVIDE THE ADDITIONAL COVER REQUIRED TO AVOID DAMAGE TO THE PIPE. MINIMUM COVER IS MEASURED FROM THE TOP OF THE PIPE TO THE TOP OF THE MAINTAINED CONSTRUCTION ROADWAY SURFACE.

CONSTRUCTION LOADING DIAGRAM

SCALE: N.T.S.

SPECIFICATION FOR DESIGNED DETENTION SYSTEM:

SCOPE
THIS SPECIFICATION COVERS THE MANUFACTURE AND INSTALLATION OF THE DESIGNED DETENTION SYSTEM DETAILED IN THE PROJECT PLANS.

MATERIAL
THE MATERIAL SHALL CONFORM TO THE APPLICABLE REQUIREMENTS LISTED BELOW:

ALUMINIZED TYPE 2 STEEL COILS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M-274 OR ASTM A-92.

THE GALVANIZED STEEL COILS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M-218 OR ASTM A-929.

THE POLYMER COATED STEEL COILS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M-246 OR ASTM A-742.

THE ALUMINUM COILS SHALL CONFORM TO THE APPLICABLE OF AASHTO M-197 OR ASTM B-744.

CONSTRUCTION LOADS
CONSTRUCTION LOADS MAY BE HIGHER THAN FINAL LOADS. FOLLOW THE MANUFACTURER'S OR NCSPA GUIDELINES.

PIPE
THE PIPE SHALL BE MANUFACTURED IN ACCORDANCE TO THE APPLICABLE REQUIREMENTS LISTED BELOW:

ALUMINIZED TYPE 2: AASHTO M-36 OR ASTM A-760

GALVANIZED: AASHTO M-36 OR ASTM A-760

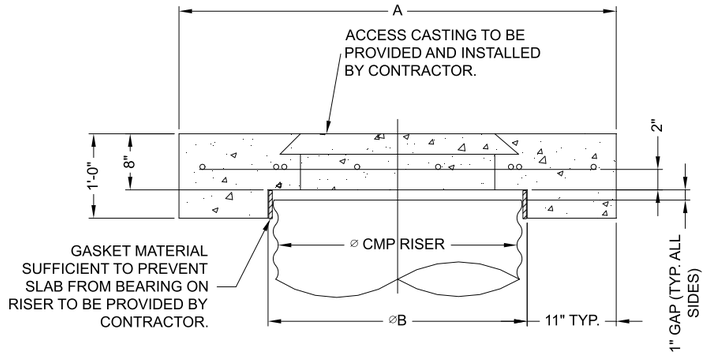
APPLICABLE POLYMER COATED: AASHTO M-245 OR ASTM A-762

ALUMINUM: AASHTO M-196 OR ASTM B-745

APPLICABLE
HANDLING AND ASSEMBLY
SHALL BE IN ACCORDANCE WITH NCSP'S (NATIONAL CORRUGATED STEEL PIPE ASSOCIATION) FOR ALUMINIZED TYPE 2, GALVANIZED OR POLYMER COATED STEEL. SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS FOR ALUMINUM PIPE.
REQUIREMENTS
INSTALLATION
SHALL BE IN ACCORDANCE WITH AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES, SECTION 26, DIVISION II DIVISION II OR ASTM A-798 (FOR ALUMINIZED TYPE 2, GALVANIZED OR POLYMER COATED STEEL) OR ASTM B-788 (FOR ALUMINUM PIPE) AND IN CONFORMANCE WITH THE PROJECT PLANS AND SPECIFICATIONS. IF THERE ARE ANY INCONSISTENCIES OR CONFLICTS THE CONTRACTOR SHOULD DISCUSS AND RESOLVE WITH THE SITE ENGINEER.

IT IS ALWAYS THE RESPONSIBILITY OF THE CONTRACTOR TO FOLLOW OSHA GUIDELINES FOR SAFE PRACTICES.

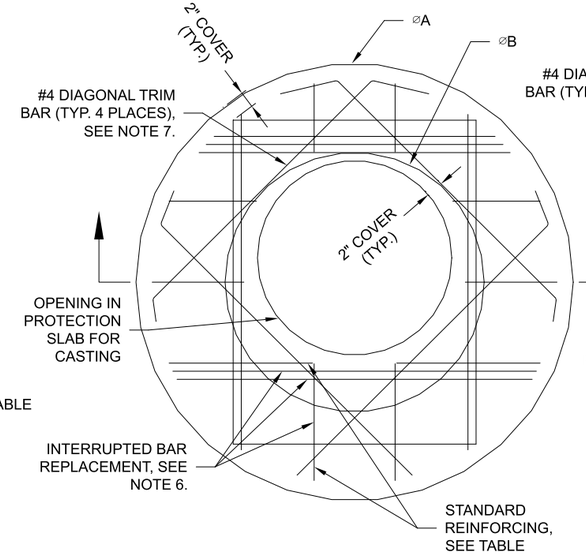
NOTE:
THESE DRAWINGS ARE FOR CONCEPTUAL PURPOSES AND DO NOT REFLECT ANY LOCAL PREFERENCES OR REGULATIONS. PLEASE CONTACT YOUR LOCAL CONTECH REP FOR MODIFICATIONS.



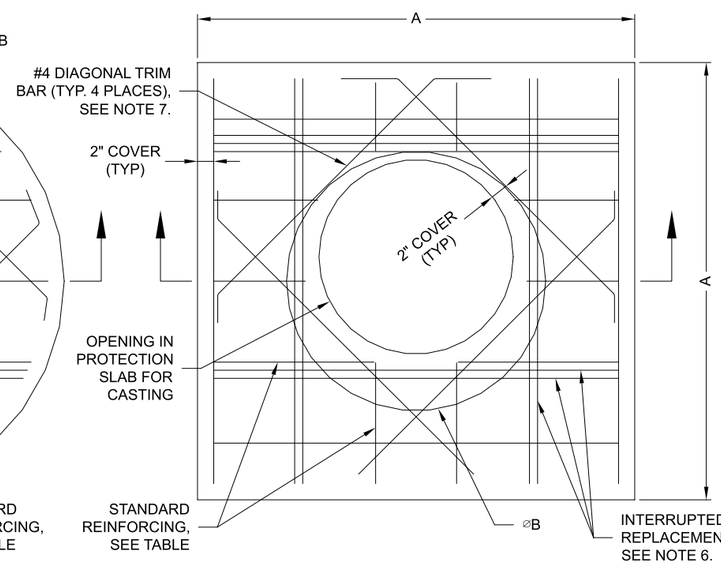
SECTION VIEW

REINFORCING TABLE				
⌀ CMP RISER	A	⌀ B	REINFORCING	**BEARING PRESSURE (PSF)
24"	⌀ 4' 4'X4'	26"	#5 @ 12" OCEW #5 @ 12" OCEW	2,410 1,780
30"	⌀ 4'-6" 4'-6" X 4'-6"	32"	#5 @ 12" OCEW #5 @ 12" OCEW	2,120 1,530
36"	⌀ 5' 5' X 5'	38"	#5 @ 10" OCEW #5 @ 10" OCEW	1,890 1,350
42"	⌀ 5'-6" 5'-6" X 5'-6"	44"	#5 @ 10" OCEW #5 @ 9" OCEW	1,720 1,210
48"	⌀ 6' 6' X 6'	50"	#5 @ 9" OCEW #5 @ 8" OCEW	1,600 1,100

** ASSUMED SOIL BEARING CAPACITY



ROUND OPTION PLAN VIEW



SQUARE OPTION PLAN VIEW

NOTES:

1. DESIGN IN ACCORDANCE WITH AASHTO, 17th EDITION.
2. DESIGN LOAD HS25.
3. EARTH COVER = 1' MAX.
4. CONCRETE STRENGTH = 3,500 psi
5. REINFORCING STEEL = ASTM A615, GRADE 60.
6. PROVIDE ADDITIONAL REINFORCING AROUND OPENINGS EQUAL TO THE BARS INTERRUPTED, HALF EACH SIDE. ADDITIONAL BARS TO BE IN THE SAME PLANE.
7. TRIM OPENING WITH DIAGONAL #4 BARS, EXTEND BARS A MINIMUM OF 12" BEYOND OPENING, BEND BARS AS REQUIRED TO MAINTAIN BAR COVER.
8. PROTECTION SLAB AND ALL MATERIALS TO BE PROVIDED AND INSTALLED BY CONTRACTOR.
9. DETAIL DESIGN BY DELTA ENGINEERING, BINGHAMTON, NY.

MANHOLE CAP DETAIL

SCALE: N.T.S.

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CONTECH CMP DETENTION SYSTEMS
CONTECH DYODS DRAWING

DYO25558 A22078-1 Highland East
Highland East Detention System 2
Highland, CA
DETENTION SYSTEM

PROJECT No.:	SEQ. No.:	DATE:
16950	25558	1/12/2023
DESIGNED: DYO	DRAWN: DYO	
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SHEET NO.: 1		

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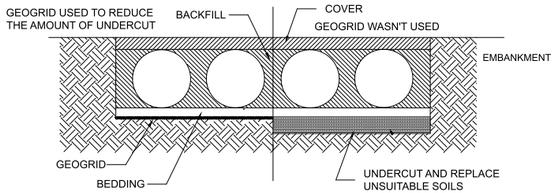
CMP DETENTION INSTALLATION GUIDE

PROPER INSTALLATION OF A FLEXIBLE UNDERGROUND DETENTION SYSTEM WILL ENSURE LONG-TERM PERFORMANCE. THE CONFIGURATION OF THESE SYSTEMS OFTEN REQUIRES SPECIAL CONSTRUCTION PRACTICES THAT DIFFER FROM CONVENTIONAL FLEXIBLE PIPE CONSTRUCTION. CONTECH ENGINEERED SOLUTIONS STRONGLY SUGGESTS SCHEDULING A PRE-CONSTRUCTION MEETING WITH YOUR LOCAL SALES ENGINEER TO DETERMINE IF ADDITIONAL MEASURES, NOT COVERED IN THIS GUIDE, ARE APPROPRIATE FOR YOUR SITE.

FOUNDATION

CONSTRUCT A FOUNDATION THAT CAN SUPPORT THE DESIGN LOADING APPLIED BY THE PIPE AND ADJACENT BACKFILL WEIGHT AS WELL AS MAINTAIN ITS INTEGRITY DURING CONSTRUCTION.

IF SOFT OR UNSUITABLE SOILS ARE ENCOUNTERED, REMOVE THE POOR SOILS DOWN TO A SUITABLE DEPTH AND THEN BUILD UP TO THE APPROPRIATE ELEVATION WITH A COMPETENT BACKFILL MATERIAL. THE STRUCTURAL FILL MATERIAL GRADATION SHOULD NOT ALLOW THE MIGRATION OF FINES, WHICH CAN CAUSE SETTLEMENT OF THE DETENTION SYSTEM OR PAVEMENT ABOVE. IF THE STRUCTURAL FILL MATERIAL IS NOT COMPATIBLE WITH THE UNDERLYING SOILS AN ENGINEERING FABRIC SHOULD BE USED AS A SEPARATOR. IN SOME CASES, USING A STIFF REINFORCING GEOGRID REDUCES OVER EXCAVATION AND REPLACEMENT FILL QUANTITIES.

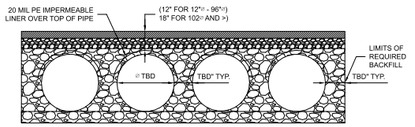


GRADE THE FOUNDATION SUBGRADE TO A UNIFORM OR SLIGHTLY SLOPING GRADE. IF THE SUBGRADE IS CLAY OR RELATIVELY NON-POROUS AND THE CONSTRUCTION SEQUENCE WILL LAST FOR AN EXTENDED PERIOD OF TIME, IT IS BEST TO SLOPE THE GRADE TO ONE END OF THE SYSTEM. THIS WILL ALLOW EXCESS WATER TO DRAIN QUICKLY, PREVENTING SATURATION OF THE SUBGRADE.

GEOMEMBRANE BARRIER

A SITE'S RESISTIVITY MAY CHANGE OVER TIME WHEN VARIOUS TYPES OF SALTING AGENTS ARE USED, SUCH AS ROAD SALTS FOR DEICING AGENTS. IF SALTING AGENTS ARE USED ON OR NEAR THE PROJECT SITE, A GEOMEMBRANE BARRIER IS RECOMMENDED WITH THE SYSTEM. THE GEOMEMBRANE LINER IS INTENDED TO HELP PROTECT THE SYSTEM FROM THE POTENTIAL ADVERSE EFFECTS THAT MAY RESULT FROM THE USE OF SUCH AGENTS INCLUDING PREMATURE CORROSION AND REDUCED ACTUAL SERVICE LIFE.

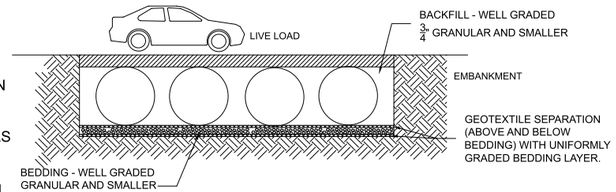
THE PROJECT'S ENGINEER OF RECORD IS TO EVALUATE WHETHER SALTING AGENTS WILL BE USED ON OR NEAR THE PROJECT SITE, AND USE HIS/HER BEST JUDGEMENT TO DETERMINE IF ANY ADDITIONAL PROTECTIVE MEASURES ARE REQUIRED. BELOW IS A TYPICAL DETAIL SHOWING THE PLACEMENT OF A GEOMEMBRANE BARRIER FOR PROJECTS WHERE SALTING AGENTS ARE USED ON OR NEAR THE PROJECT SITE.



IN-SITU TRENCH WALL

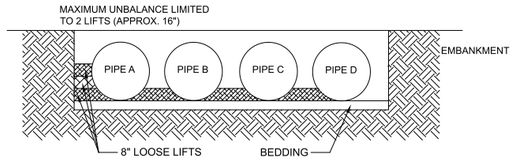
IF EXCAVATION IS REQUIRED, THE TRENCH WALL NEEDS TO BE CAPABLE OF SUPPORTING THE LOAD THAT THE PIPE SHEDS AS THE SYSTEM IS LOADED. IF SOILS ARE NOT CAPABLE OF SUPPORTING THESE LOADS, THE PIPE CAN DEFLECT. PERFORM A SIMPLE SOIL PRESSURE CHECK USING THE APPLIED LOADS TO DETERMINE THE LIMITS OF EXCAVATION BEYOND THE SPRING LINE OF THE OUTER MOST PIPES.

IN MOST CASES THE REQUIREMENTS FOR A SAFE WORK ENVIRONMENT AND PROPER BACKFILL PLACEMENT AND COMPACTION TAKE CARE OF THIS CONCERN.



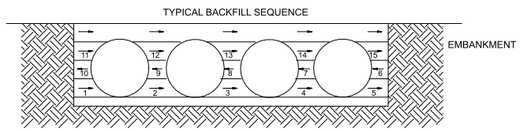
BACKFILL PLACEMENT

MATERIAL SHALL BE WORKED INTO THE PIPE HAUNCHES BY MEANS OF SHOVEL-SLICING, RODDING, AIR TAMPER, VIBRATORY ROD, OR OTHER EFFECTIVE METHODS.

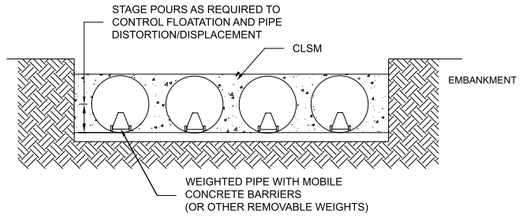


IF AASHTO T99 PROCEDURES ARE DETERMINED INFEASIBLE BY THE GEOTECHNICAL ENGINEER OF RECORD, COMPACTION IS CONSIDERED ADEQUATE WHEN NO FURTHER YIELDING OF THE MATERIAL IS OBSERVED UNDER THE COMPACTOR, OR UNDER FOOT, AND THE GEOTECHNICAL ENGINEER OF RECORD (OR REPRESENTATIVE THEREOF) IS SATISFIED WITH THE LEVEL OF COMPACTION.

FOR LARGE SYSTEMS, CONVEYOR SYSTEMS, BACKHOES WITH LONG REACHES OR DRAGLINES WITH STONE BUCKETS MAY BE USED TO PLACE BACKFILL. ONCE MINIMUM COVER FOR CONSTRUCTION LOADING ACROSS THE ENTIRE WIDTH OF THE SYSTEM IS REACHED, ADVANCE THE EQUIPMENT TO THE END OF THE RECENTLY PLACED FILL, AND BEGIN THE SEQUENCE AGAIN UNTIL THE SYSTEM IS COMPLETELY BACKFILLED. THIS TYPE OF CONSTRUCTION SEQUENCE PROVIDES ROOM FOR STOCKPILED BACKFILL DIRECTLY BEHIND THE BACKHOE, AS WELL AS THE MOVEMENT OF CONSTRUCTION TRAFFIC. MATERIAL STOCKPILES ON TOP OF THE BACKFILLED DETENTION SYSTEM SHOULD BE LIMITED TO 8- TO 10-FEET HIGH AND MUST PROVIDE BALANCED LOADING ACROSS ALL BARRELS. TO DETERMINE THE PROPER COVER OVER THE PIPES TO ALLOW THE MOVEMENT OF CONSTRUCTION EQUIPMENT SEE TABLE 1, OR CONTACT YOUR LOCAL CONTECH SALES ENGINEER.



WHEN FLOWABLE FILL IS USED, YOU MUST PREVENT PIPE FLOATATION. TYPICALLY, SMALL LIFTS ARE PLACED BETWEEN THE PIPES AND THEN ALLOWED TO SET-UP PRIOR TO THE PLACEMENT OF THE NEXT LIFT. THE ALLOWABLE THICKNESS OF THE CLSM LIFT IS A FUNCTION OF A PROPER BALANCE BETWEEN THE UPLIFT FORCE OF THE CLSM, THE OPPOSING WEIGHT OF THE PIPE, AND THE EFFECT OF OTHER RESTRAINING MEASURES. THE PIPE CAN CARRY LIMITED FLUID PRESSURE WITHOUT PIPE DISTORTION OR DISPLACEMENT, WHICH ALSO AFFECTS THE CLSM LIFT THICKNESS. YOUR LOCAL CONTECH SALES ENGINEER CAN HELP DETERMINE THE PROPER LIFT THICKNESS.

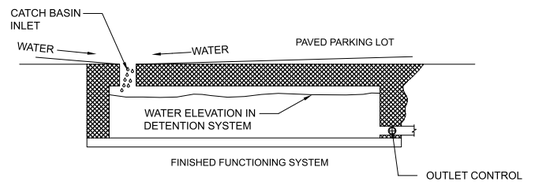


CONSTRUCTION LOADING

TYPICALLY, THE MINIMUM COVER SPECIFIED FOR A PROJECT ASSUMES H-20 LIVE LOAD. BECAUSE CONSTRUCTION LOADS OFTEN EXCEED DESIGN LIVE LOADS, INCREASED TEMPORARY MINIMUM COVER REQUIREMENTS ARE NECESSARY. SINCE CONSTRUCTION EQUIPMENT VARIES FROM JOB TO JOB, IT IS BEST TO ADDRESS EQUIPMENT SPECIFIC MINIMUM COVER REQUIREMENTS WITH YOUR LOCAL CONTECH SALES ENGINEER DURING YOUR PRE-CONSTRUCTION MEETING.

ADDITIONAL CONSIDERATIONS

BECAUSE MOST SYSTEMS ARE CONSTRUCTED BELOW-GRADE, RAINFALL CAN RAPIDLY FILL THE EXCAVATION; POTENTIALLY CAUSING FLOATATION AND MOVEMENT OF THE PREVIOUSLY PLACED PIPES. TO HELP MITIGATE POTENTIAL PROBLEMS, IT IS BEST TO START THE INSTALLATION AT THE DOWNSTREAM END WITH THE OUTLET ALREADY CONSTRUCTED TO ALLOW A ROUTE FOR THE WATER TO ESCAPE. TEMPORARY DIVERSION MEASURES MAY BE REQUIRED FOR HIGH FLOWS DUE TO THE RESTRICTED NATURE OF THE OUTLET PIPE.



CMP DETENTION SYSTEM INSPECTION AND MAINTENANCE

UNDERGROUND STORMWATER DETENTION AND INFILTRATION SYSTEMS MUST BE INSPECTED AND MAINTAINED AT REGULAR INTERVALS FOR PURPOSES OF PERFORMANCE AND LONGEVITY.

INSPECTION

INSPECTION IS THE KEY TO EFFECTIVE MAINTENANCE OF CMP DETENTION SYSTEMS AND IS EASILY PERFORMED. CONTECH RECOMMENDS ONGOING, ANNUAL INSPECTIONS. SITES WITH HIGH TRASH LOAD OR SMALL OUTLET CONTROL ORIFICES MAY NEED MORE FREQUENT INSPECTIONS. THE RATE AT WHICH THE SYSTEM COLLECTS POLLUTANTS WILL DEPEND MORE ON SITE SPECIFIC ACTIVITIES RATHER THAN THE SIZE OR CONFIGURATION OF THE SYSTEM.

INSPECTIONS SHOULD BE PERFORMED MORE OFTEN IN EQUIPMENT WASHDOWN AREAS, IN CLIMATES WHERE SANDING AND/OR SALTING OPERATIONS TAKE PLACE, AND IN OTHER VARIOUS INSTANCES IN WHICH ONE WOULD EXPECT HIGHER ACCUMULATIONS OF SEDIMENT OR ABRASIVE/ CORROSIVE CONDITIONS. A RECORD OF EACH INSPECTION IS TO BE MAINTAINED FOR THE LIFE OF THE SYSTEM

MAINTENANCE

CMP DETENTION SYSTEMS SHOULD BE CLEANED WHEN AN INSPECTION REVEALS ACCUMULATED SEDIMENT OR TRASH IS CLOGGING THE DISCHARGE ORIFICE.

ACCUMULATED SEDIMENT AND TRASH CAN TYPICALLY BE EVACUATED THROUGH THE MANHOLE OVER THE OUTLET ORIFICE. IF MAINTENANCE IS NOT PERFORMED AS RECOMMENDED, SEDIMENT AND TRASH MAY ACCUMULATE IN FRONT OF THE OUTLET ORIFICE. MANHOLE COVERS SHOULD BE SECURELY SEATED FOLLOWING CLEANING ACTIVITIES. CONTECH SUGGESTS THAT ALL SYSTEMS BE DESIGNED WITH AN ACCESS/INSPECTION MANHOLE SITUATED AT OR NEAR THE INLET AND THE OUTLET ORIFICE. SHOULD IT BE NECESSARY TO GET INSIDE THE SYSTEM TO PERFORM MAINTENANCE ACTIVITIES, ALL APPROPRIATE PRECAUTIONS REGARDING CONFINED SPACE ENTRY AND OSHA REGULATIONS SHOULD BE FOLLOWED.

ANNUAL INSPECTIONS ARE BEST PRACTICE FOR ALL UNDERGROUND SYSTEMS. DURING THIS INSPECTION, IF EVIDENCE OF SALTING/DE-ICING AGENTS IS OBSERVED WITHIN THE SYSTEM, IT IS BEST PRACTICE FOR THE SYSTEM TO BE RINSED, INCLUDING ABOVE THE SPRING LINE SOON AFTER THE SPRING THAW AS PART OF THE MAINTENANCE PROGRAM FOR THE SYSTEM.

MAINTAINING AN UNDERGROUND DETENTION OR INFILTRATION SYSTEM IS EASIEST WHEN THERE IS NO FLOW ENTERING THE SYSTEM. FOR THIS REASON, IT IS A GOOD IDEA TO SCHEDULE THE CLEANOUT DURING DRY WEATHER.

THE FOREGOING INSPECTION AND MAINTENANCE EFFORTS HELP ENSURE UNDERGROUND PIPE SYSTEMS USED FOR STORMWATER STORAGE CONTINUE TO FUNCTION AS INTENDED BY IDENTIFYING RECOMMENDED REGULAR INSPECTION AND MAINTENANCE PRACTICES. INSPECTION AND MAINTENANCE RELATED TO THE STRUCTURAL INTEGRITY OF THE PIPE OR THE SOUNDNESS OF PIPE JOINT CONNECTIONS IS BEYOND THE SCOPE OF THIS GUIDE.

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CONTECH CMP DETENTION SYSTEMS

CONTECH **DYODS** DRAWING

DYO25558 A22078-1 Highland East
Highland East Detention System 2
Highland, CA
DETENTION SYSTEM

PROJECT No.:	SEQ. No.:	DATE:
16950	25558	1/12/2023
DESIGNED: DYO	DRAWN: DYO	
CHECKED: DYO	APPROVED: DYO	
SHEET NO.: 1		



Aerial Photo

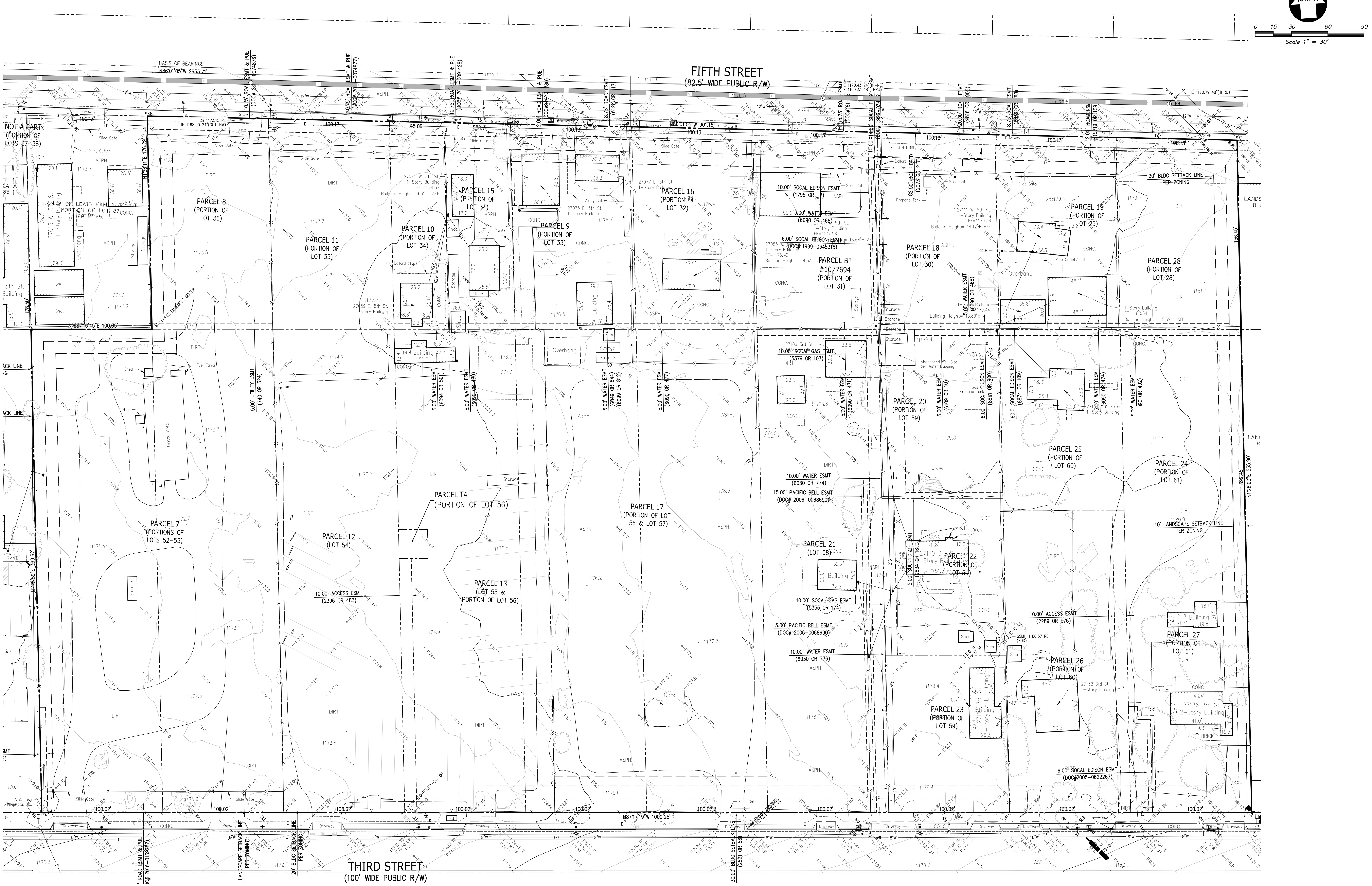
Source: Google Earth

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APPENDIX B

Topographic Survey Map

Preliminary Grading Plan



DRAFT

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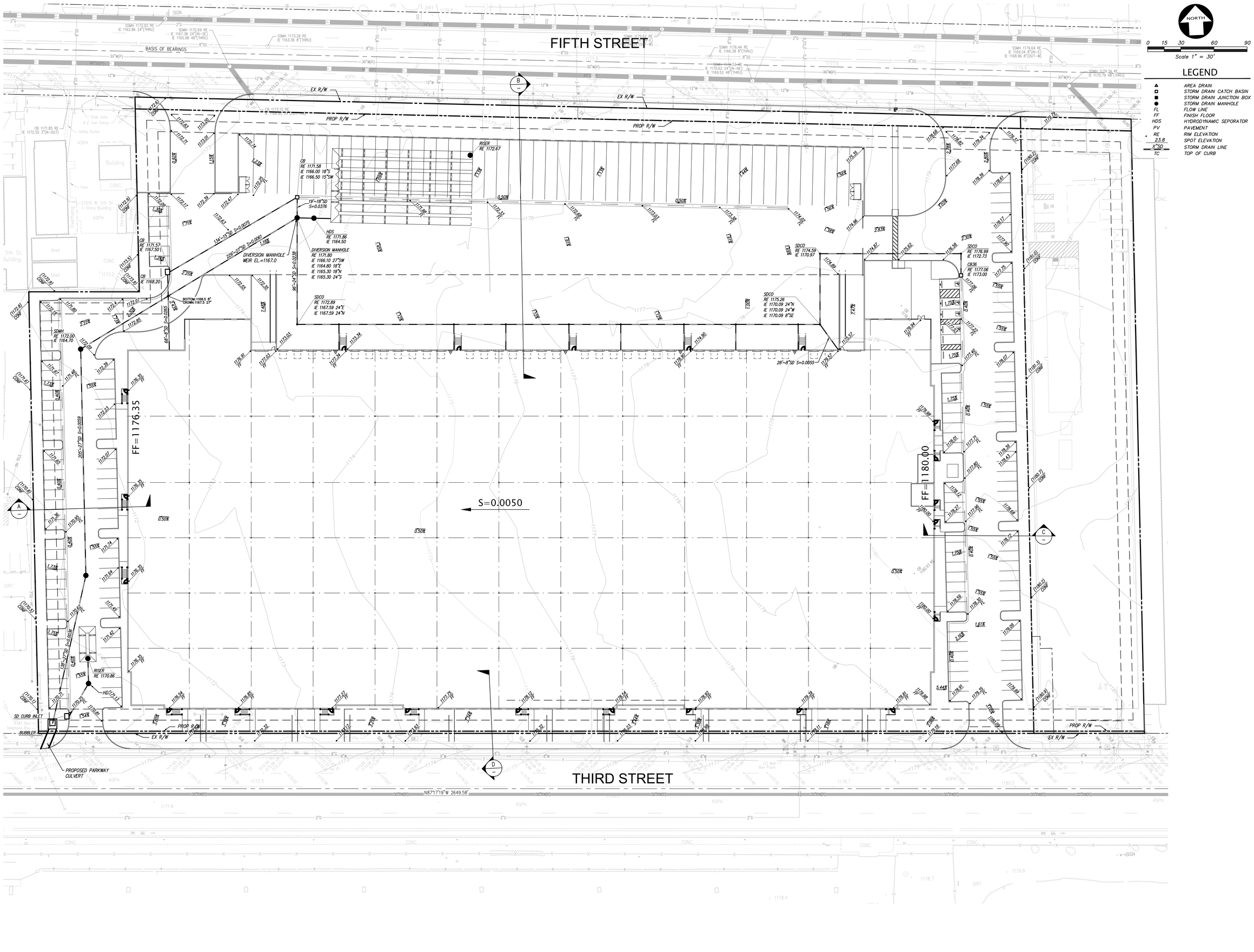
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TOPOGRAPHIC SURVEY
EAST BUILDING
OF
E. 3RD STREET & CENTRAL AVENUE
FOR
CROW HOLDINGS
HIGHLAND, CALIFORNIA

DATE	APRIL, 2022
SCALE	AS SHOWN
DESIGNER	JO
DRAWN BY	STAFF
JOB NO.	A22078
SHEET	C1.0

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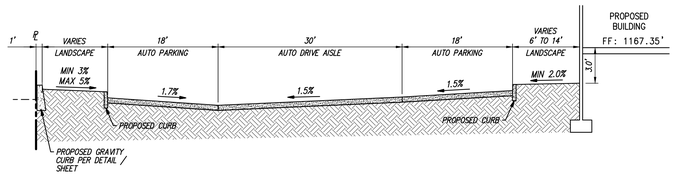
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PRELIMINARY GRADING PLAN
EAST BUILDING
OF
E. 3RD STREET & CENTRAL AVENUE
FOR
CROW HOLDINGS
HIGHLAND, CALIFORNIA

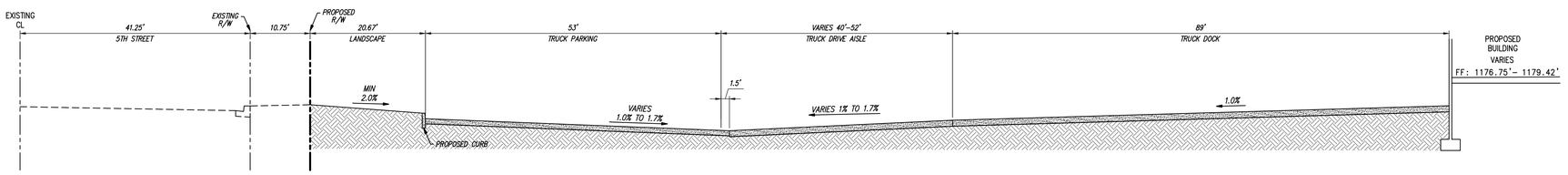
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DESIGNER	JO
DRAWN BY	STAFF
JOB NO.	A22078-1
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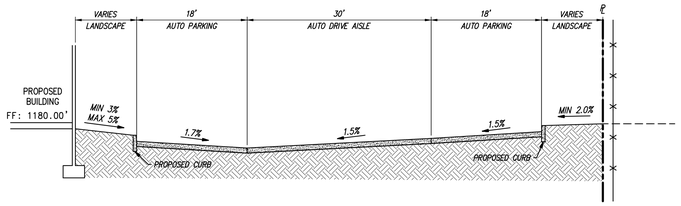
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HORIZ: 1"=10'
VERT: 1"=5'



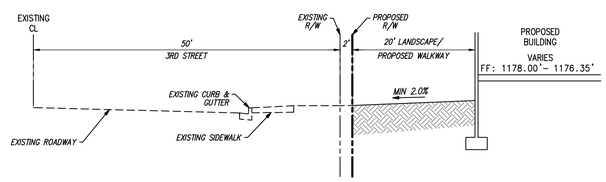
TYPICAL SECTION B

HORIZ: 1"=10'
VERT: 1"=5'



TYPICAL SECTION C

HORIZ: 1"=10'
VERT: 1"=5'



TYPICAL SECTION D

HORIZ: 1"=10'
VERT: 1"=5'

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TYPICAL SECTIONS
EAST BUILDING
OF
E. 3RD STREET & CENTRAL AVENUE
FOR
CROW HOLDINGS
HIGHLAND, CALIFORNIA

DATE	JANUARY, 2023
SCALE	AS SHOWN
DESIGNER	JO
DRAWN BY	STAFF
JOB NO.	A22078-1
SHEET	PG2.1

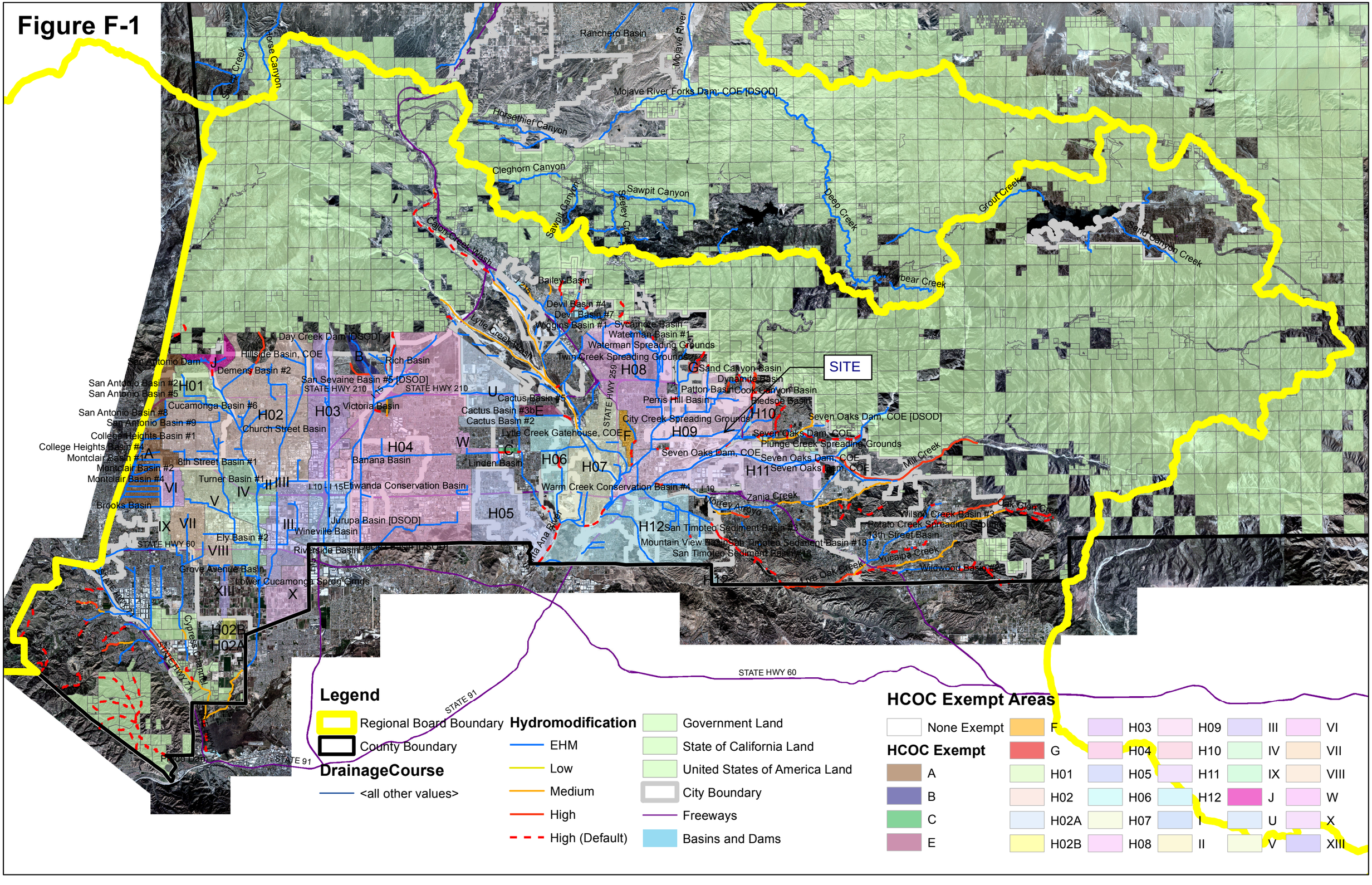
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APPENDIX C

HCOC Map

Figure F-1



Legend

- Regional Board Boundary
- County Boundary

DrainageCourse

- <all other values>

Hydromodification

- EHM
- Low
- Medium
- High
- High (Default)

- Government Land
- State of California Land
- United States of America Land
- City Boundary
- Freeways
- Basins and Dams

HCOC Exempt Areas

- None Exempt

HCOC Exempt

A, B, C, E, F, G, H01, H02, H02A, H02B, H03, H04, H05, H06, H07, H08, H09, H10, H11, H12, I, II, III, IV, V, VI, VII, VIII, IX, J, U, W, X, XIII

Hydromodification

A.1 Hydrologic Conditions of Concern (HCOC) Analysis

HCOC Exemption:

1. **Sump Condition:** All downstream conveyance channel to an adequate sump (for example, Prado Dam, Santa Ana River, or other Lake, Reservoir or naturally erosion resistant feature) that will receive runoff from the project are engineered and regularly maintained to ensure design flow capacity; no sensitive stream habitat areas will be adversely affected; or are not identified on the Co-Permittees Hydromodification Sensitivity Maps.

2. **Pre = Post**: The runoff flow rate, volume and velocity for the post-development condition of the Priority Development Project do not exceed the pre-development (i.e, naturally occurring condition for the 2-year, 24-hour rainfall event utilizing latest San Bernardino County Hydrology Manual.

    a. Submit a substantiated hydrologic analysis to justify your request.

3. **Diversion to Storage Area**: The drainage areas that divert to water storage areas which are considered as control/release point and utilized for water conservation.

    a. See Appendix F for the HCOC Exemption Map and the on-line Watershed Geodatabase (http://sbcounty.permitrack.com/wap) for reference.

4. **Less than One Acre**: The Priority Development Project disturbs less than one acre. The Co-permittee has the discretion to require a Project Specific WQMP to address HCOCs on projects less than one acre on a case by case basis. The project disturbs less than one acre and is not part of a common plan of development.

5. **Built Out Area**: The contributing watershed area to which the project discharges has a developed area percentage greater than 90 percent.

    a. See Appendix F for the HCOC Exemption Map and the on-line Watershed Geodatabase (http://sbcounty.permitrack.com/wap) for reference.

Summary of HCOC Exempted Area

	HCOC Exemption reasoning				
	1	2	3	4	5
Area					
A			X		X
B			X		
C					X
E			X		
F					X
G			X		X
H01	X		X		
H02	X		X		
H02A	X		X		
H02B			X		
H03			X		
H04	X		X		
H05	X				
H06			X		
H07	X				
H08	X		X		
H09	X				
H10	X		X		
H11	X		X		
H12	X				
J			X		
U			X		
W			X		
I			X		
II			X		
III					X
IV			X		X
V			X*		
VI					X
VII					X
VIII			X		
IX					X
X			X		
XIII			X		

*Detention/Conservation Basin

APPENDIX D

Soil Infiltration Test Report

September 8, 2022

CHIPT Highland 210 L.P. - East
527 West 7th Street, Suite 200
Los Angeles, California 90014

Attention: Mr. Jorge A. Garcia
Development Associate

Project No.: **22G156EA-2**

Subject: **Results of Infiltration Testing**
Proposed Warehouse
North Side of East 3rd Street, 730± feet East of Central Avenue
Highland, California

Reference: Updated Geotechnical Investigation, Proposed Warehouse, North Side of East 3rd Street, 730± feet East of Central Avenue, Highland, California, prepared for CHIPT Highland 210 L.P. - East by Southern California Geotechnical, Inc. (SCG), SCG Project No. 22G156EA-1, dated September 7, 2022.

Mr. Garcia:

In accordance with your request, we have conducted infiltration testing at the subject site. We are pleased to represent this report summarizing the results of the infiltration testing and our design recommendations.

Scope of Services

The scope of services performed for this project was in accordance with our Proposal No. 22P273R2, dated June 27, 2022. The scope of services included a visual site reconnaissance and the review of the previously prepared infiltration report to determine the infiltration rates of the on-site soils. The infiltration testing was performed in general accordance with ASTM Test Method D-3385-03, Standard Test Method for Infiltration Rate of Soils in Field Using Double Ring Infiltrometer.

Site and Project Description

The project site is located on the north side of East 3rd Street, approximately 730± feet east of the intersection of East 3rd Street and Central Avenue in Highland, California. The site is bounded to the north by West 5th Street, to the west by a restaurant business and a retail center, to the south by East 3rd Street, and to the east by a single-family residence (SFR) property and a storage lot. The general location of the site is illustrated on the Site Location Map, included as Plate 1 of this report.

The site consists of an irregular-shaped property, 11.09± acres in size. The site consists of numerous rectangular-shaped parcels which are developed for various uses, such as, truck and trailer parking facilities, small industrial/manufacturing buildings and equipment storage, and SFR properties. The existing buildings range from 1,000± to 3,000± ft² in size. The majority of

the buildings are single-story structures of wood frame and stucco construction or steel frame and metal panel construction, and are presumed to be supported on conventional shallow foundations with concrete slab-on-grade floors. The buildings are generally surrounded by asphaltic concrete (AC) and crushed aggregate base (CAB) pavements, with isolated Portland cement concrete (PCC) pavements and exposed soil with sparse to moderate grass and weed growth. The existing pavements are generally in poor condition with noticeable cracking throughout. Some medium-to large-size trees are scattered throughout the site.

Detailed topographic information was not available at the time of this report. Based on the elevations obtained from Google Earth, and visual observations made at the time of the subsurface investigation, the overall site topography slopes downward to the west at a gradient of 1 to 1½± percent.

Proposed Development

The conceptual site plan for the project site prepared by RGA, RGA Project No. 21072.00, has been provided to our office by the client. Based on this plan, the site will be developed with a 248,511± ft² warehouse located in the southern portion of the site. Dock-high doors will be constructed along a portion of the north building wall. The proposed building is expected to be surrounded by AC pavements in the parking and drive areas, PCC pavements in the loading dock area, and concrete flatwork and landscaped planters throughout the site.

The proposed development will include on-site storm water disposal. Three (3) infiltration systems identified as System "C," System "D," and System "E" will be constructed to the southwest, northwest, and southeast of the proposed building, respectively. The proposed infiltration systems will consist of below-grade chambers. The bottoms of the infiltration systems are expected to be 10 to 13± feet below the existing site grades.

Previous Study

SCG previously performed a geotechnical investigation at the subject site, which is referenced above. As a part of this study, fourteen (14) borings (identified as Boring Nos. B-4, B-5, B-6, B-8, B-9, and B-19 through B-27) were advanced to depths of 6½ to 35± feet below existing site grades.

AC pavements were encountered at the ground surface of Boring No. B-9. The pavement section at this location consists of 1± inch of AC with no discernible layer of underlying aggregate base. A 3½±-inch-thick PCC section was encountered at the ground surface at Boring No. B-26. Steel reinforcement was not observed at this location. Artificial fill soils were encountered beneath the existing pavements or at the ground surface at most of the boring locations, with the exception of Boring Nos. B-4, B-8, and B-22, extending to depths of 2½ to 5½± feet below the existing site grades. The fill soils generally consist of medium dense to very dense sands and silty sands, with occasional gravelly sands. Occasional cobbles were encountered at the ground surface at Boring Nos. B-6, and B-19. Native alluvium was encountered at the ground surface at Boring Nos. B-4, B-8, and B-22, and beneath the fill soils at the remaining boring locations, extending to at least the maximum depth explored of 35± feet. The alluvium generally consists of medium dense to very dense sands and gravelly sands with varying silt content, and occasional medium dense to very dense silty sands. Occasional

cobbles were encountered during drilling at most of the boring locations at various depths, and at the ground surface at Boring No. B-22.

Groundwater

Groundwater was not encountered at any of the borings. Based on the lack of any water within the borings, and the moisture contents of the recovered soil samples, the static groundwater table is considered to have existed at a depth in excess of 35± feet below existing site grades, at the time of the subsurface investigation.

As part of our research, we reviewed available groundwater data in order to determine groundwater levels for the site. Water level data was obtained from the California Department of Water Resources Water Data Library website, https://wdl.water.ca.gov/waterdatalibrary/. The nearest monitoring well on record (identified as State Well Number: 01S03W09E002S) is located as close as 3,000± feet southeast of the project site. Water level readings within this monitoring well indicate a high groundwater level of 52± feet below the ground surface in October 1984.

Subsurface Exploration

Scope of Exploration

The subsurface exploration for the infiltration testing consisted of nine (9) backhoe-excavated trenches, extending to depths of 10 to 13± feet below the existing site grades. The trenches were logged during excavation by a member of our staff. The approximate locations of the infiltration trenches (identified as Infiltration Test Nos. I-11 through I-19) are indicated on the Infiltration Test Location Plan, enclosed as Plate 2 of this report. The trenches were excavated between the dates of February 21 and February 24, 2022.

Geotechnical Conditions

Artificial fill soils were encountered at the ground surface at most of the infiltration test locations, extending to depths of 1 to 2± feet below the existing site grades. The fill soils generally consist of loose to medium dense silty sands with varying gravel content. Occasional cobbles were encountered at the ground surface at Infiltration Test No. I-12. The fill soils possess a disturbed appearance resulting in their classification as artificial fill. Native alluvium was encountered beneath the artificial fill soils or at the ground surface at all of the infiltration test locations, extending to at least the maximum depth explored of 13± feet. The alluvium generally consists of loose to dense gravelly sands with varying silt content, and sands with varying gravel content. Occasional cobbles were encountered at some of the infiltration trenches at various depths. The Trench Logs, which illustrate the conditions encountered at the infiltration test locations, are presented in this report. Infiltration Test No. I-16 encountered a stratum consisting of dense gravelly sands to sandy gravels with occasional to extensive cobbles and occasional boulders, extending from the ground surface to a depth of 13± feet.

Infiltration Testing

We understand that the results of the testing will be used to prepare a preliminary design for the storm water infiltration systems that will be used at the project site. As previously mentioned, the infiltration testing was performed in general accordance with ASTM Test Method D-3385-03, Standard Test Method for Infiltration Rate of Soils in Field Using Double Ring Infiltrometer.

Two stainless steel infiltration rings were used for the infiltration testing. The outer infiltration ring is 2 feet in diameter and 20 inches in height. The inner infiltration ring is 1 foot in diameter and 20 inches in height. At the test locations, the outer ring was driven 3± inches into the soil at the base of each trench. The inner ring was centered inside the outer ring and subsequently driven 3± inches into the soil at the base of the trench. The rings were driven into the soil using a ten-pound sledge hammer. The soil surrounding the wall of the infiltration rings was only slightly disturbed during the driving process.

Infiltration Testing Procedure

Infiltration testing was performed at all of the trench locations. The infiltration testing consisted of filling the inner ring and the annular space (the space between the inner and outer rings) with water, approximately 3 to 4 inches above the soil. To prevent the flow of water from one ring to the other, the water level in both the inner ring and the annular space between the rings was maintained using constant-head float valves. The volume of water that was added to maintain a constant head in the inner ring and the annular space during each time interval was determined and recorded. A cap was placed over the rings to minimize the evaporation of water during the tests.

The schedule for readings was determined based on the observed soil type at the base of each backhoe-excavated trench. Based on the existing soils at the trench locations, the volumetric measurements were made at 3-minute increments. The water volume measurements are presented on the spreadsheets enclosed with this report. The infiltration rates for each of the timed intervals are also tabulated on these spreadsheets.

The infiltration rates for the infiltration tests are calculated in centimeters per hour and then converted to inches per hour. The rates are summarized below:

Infiltration Test No.	Depth (feet)	Soil Description	Measured Infiltration Rate (inches/hour)
I-11	10	Gravelly fine to coarse Sand, trace Silt, occasional Cobbles	20.5
I-12	10	Gravelly fine to coarse Sand, trace to little Silt	20.0
I-13	13	Fine to coarse Sand, trace fine Gravel	21.0
I-14	13	Fine to coarse Sand, trace Silt, occasional Cobbles	23.7
I-15	13	Fine to coarse Sand, little fine Gravel	20.5

Infiltration Test No.	Depth (feet)	Soil Description	Measured Infiltration Rate (inches/hour)
I-16	13	Gravelly fine to coarse Sand to fine to coarse Sandy Gravel, occasional to extensive Cobbles, occasional Boulders	24.3
I-17	13	Gravelly fine to coarse Sand, trace Silt	20.2
I-18	13	Fine to coarse Sand, little fine Gravel, occasional Cobbles	23.2
I-19	13	Gravelly fine to medium Sand, trace coarse Sand, occasional Cobbles	22.7

Laboratory Testing

Moisture Content

The moisture contents for the recovered soil samples within the trenches were determined in accordance with ASTM D-2216 and are expressed as a percentage of the dry weight. These test results are presented on the Trench Logs.

Grain Size Analysis

The grain size distribution of selected soils collected from the base of each infiltration test location have been determined using a range of wire mesh screens. These tests were performed in general accordance with ASTM D-422 and/or ASTM D-1140. The weight of the portion of the sample retained on each screen is recorded and the percentage finer or coarser of the total weight is calculated. The results of these tests are presented on Plates C-1 through C-9 of this report.

Design Recommendations

Nine (9) infiltration tests were performed within the proposed infiltration systems at the project site. As noted above, the calculated infiltration rates at the infiltration test locations range from 20.0 to 24.3 inches per hour. **Based on the results of infiltration testing, we recommend that an infiltration rate of 20.0 inches per hour be used for the proposed infiltration systems if the bottom of each infiltration system is supported by sands or gravelly sands.**

We recommend that a representative from the geotechnical engineer be on-site during the construction of the proposed infiltration systems to identify the soil classification at the base of each chamber system. It should be confirmed that the soils at the base of the proposed infiltration systems correspond with those presented in this report to ensure that the performance of the systems will be consistent with the rates reported herein.

The design of the storm water infiltration system should be performed by the project civil engineer, in accordance with the City of Highland and/or County of San Bernardino guidelines. It is recommended that the system be constructed so as to facilitate removal of silt and clay, or other deleterious materials from any water that may enter the systems. The presence of such materials would decrease the effective infiltration rates. **It is recommended that the project**

civil engineer apply an appropriate factor of safety. The infiltration rate recommended above is based on the assumption that only clean water will be introduced to the subsurface profile. Any fines, debris, or organic materials could significantly impact the infiltration rate. It should be noted that the recommended infiltration rate is based on infiltration testing at nine (9) discrete locations and that the overall infiltration rate of the proposed infiltration systems could vary considerably.

Infiltration Rate Considerations

The infiltration rate presented herein was determined in accordance with the San Bernardino County guidelines and is considered valid only for the time and place of the actual test. Varying subsurface conditions will exist in other areas of the site, which could alter the recommended infiltration rate presented above. The infiltration rate will decline over time between maintenance cycles as silt or clay particles accumulate on the BMP surface. The infiltration rate is highly dependent upon a number of factors, including density, silt and clay content, grainsize distribution throughout the range of particle sizes, and particle shape. Small changes in these factors can cause large changes in the infiltration rate.

Infiltration rates are based on unsaturated flow. As water is introduced into soils by infiltration, the soils become saturated and the wetting front advances from the unsaturated zone to the saturated zone. Once the soils become saturated, infiltration rates become zero, and water can only move through soils by hydraulic conductivity at a rate determined by pressure head and soil permeability. Changes in soil moisture content will affect the infiltration rate. Infiltration rates should be expected to decrease until the soils become saturated. Soil permeability values will then govern groundwater movement. Permeability values may be on the order of 10 to 20 times less than infiltration rates. The system designer should incorporate adequate factors of safety and allow for overflow design into appropriate traditional storm drain systems, which would transport storm water off-site.

Construction Considerations

The infiltration rate presented in this report is specific to the tested locations and tested depths. Infiltration rates can be significantly reduced if the soils are exposed to excessive disturbance or compaction during construction. Compaction of the soils at the bottom of the infiltration systems can significantly reduce the infiltration ability of the chambers. Therefore, the subgrade soils within proposed infiltration system areas should not be over-excavated, undercut or compacted in any significant manner. **It is recommended that a note to this effect be added to the project plans and/or specifications.**

We recommend that a representative from the geotechnical engineer be on-site during the construction of the proposed infiltration systems to identify the soil classification at the base of each chamber system. The infiltration rate of the system will likely vary significantly if the composition of the soil located beneath the system is not consistent with the tested soils.

We recommend that scrapers and other rubber-tired heavy equipment not be operated on the chambers bottom, or at levels lower than 2 feet above the bottom of the system, particularly within basins. As such, the bottom 24 inches of the infiltration system should be excavated with non-rubber-tired equipment, such as excavators.

Chamber Maintenance

The proposed project will include infiltration chambers. Water flowing into these chambers will carry some level of sediment. This layer has the potential to significantly reduce the infiltration rate of the chamber subgrade soils. Therefore, a formal chamber maintenance program should be established to ensure that these silt and clay deposits are removed from the chamber on a regular basis.

Location of Infiltration Systems

The use of on-site storm water infiltration systems carries a risk of creating adverse geotechnical conditions. Increasing the moisture content of the soil can cause the soil to lose internal shear strength and increase its compressibility, resulting in a change in the designed engineering properties. Overlying structures and pavements in the infiltration area could potentially be damaged due to saturation of the subgrade soils. **The proposed infiltration systems for this site should be located at least 25 feet away from any structures, including retaining walls.** Even with this provision of locating the infiltration system at least 25 feet from the building(s), it is possible that infiltrating water into the subsurface soils could have an adverse effect on the proposed or existing structures. It should also be noted that utility trenches which happen to collect storm water can also serve as conduits to transmit storm water toward the structure, depending on the slope of the utility trench. Therefore, consideration should also be given to the proposed locations of underground utilities which may pass near the proposed infiltration systems.

The infiltration system designer should also give special consideration to the effect that the proposed infiltration systems may have on nearby subterranean structures, open excavations, or descending slopes. Infiltration systems should not be located near the crest of descending slopes, particularly where the slopes are comprised of granular soils. Such systems will require specialized design and analysis to evaluate the potential for slope instability, piping failures and other phenomena that typically apply to earthen dam design. This type of analysis is beyond the scope of this infiltration test report, but these factors should be considered by the infiltration system designer when locating the infiltration systems.

General Comments

This report has been prepared as an instrument of service for use by the client in order to aid in the evaluation of this property and to assist the architects and engineers in the design and preparation of the project plans and specifications. This report may be provided to the contractor(s) and other design consultants to disclose information relative to the project. However, this report is not intended to be utilized as a specification in and of itself, without appropriate interpretation by the project architect, structural engineer, and/or civil engineer. The design of the proposed storm water infiltration system is the responsibility of the civil engineer. The role of the geotechnical engineer is limited to determination of infiltration rate only. By using the design infiltration rate contained herein, the civil engineer agrees to indemnify, defend, and hold harmless the geotechnical engineer for all aspects of the design and performance of the proposed storm water infiltration system. The reproduction and distribution of this report must be authorized by the client and Southern California Geotechnical,

Inc. Furthermore, any reliance on this report by an unauthorized third party is at such party's sole risk, and we accept no responsibility for damage or loss which may occur.

The analysis of this site was based on a subsurface profile interpolated from limited discrete soil samples. While the materials encountered in the project area are considered to be representative of the total area, some variations should be expected between boring locations and testing depths. If the conditions encountered during construction vary significantly from those detailed herein, we should be contacted immediately to determine if the conditions alter the recommendations contained herein.

This report has been based on assumed or provided characteristics of the proposed development. It is recommended that the owner, client, architect, structural engineer, and civil engineer carefully review these assumptions to ensure that they are consistent with the characteristics of the proposed development. If discrepancies exist, they should be brought to our attention to verify that they do not affect the conclusions and recommendations contained herein. We also recommend that the project plans and specifications be submitted to our office for review to verify that our recommendations have been correctly interpreted. The analysis, conclusions, and recommendations contained within this report have been promulgated in accordance with generally accepted professional geotechnical engineering practice. No other warranty is implied or expressed.

Closure

We sincerely appreciate the opportunity to be of service on this project. We look forward to providing additional consulting services during the course of the project. If we may be of further assistance in any manner, please contact our office.

Respectfully Submitted,

SOUTHERN CALIFORNIA GEOTECHNICAL, INC.

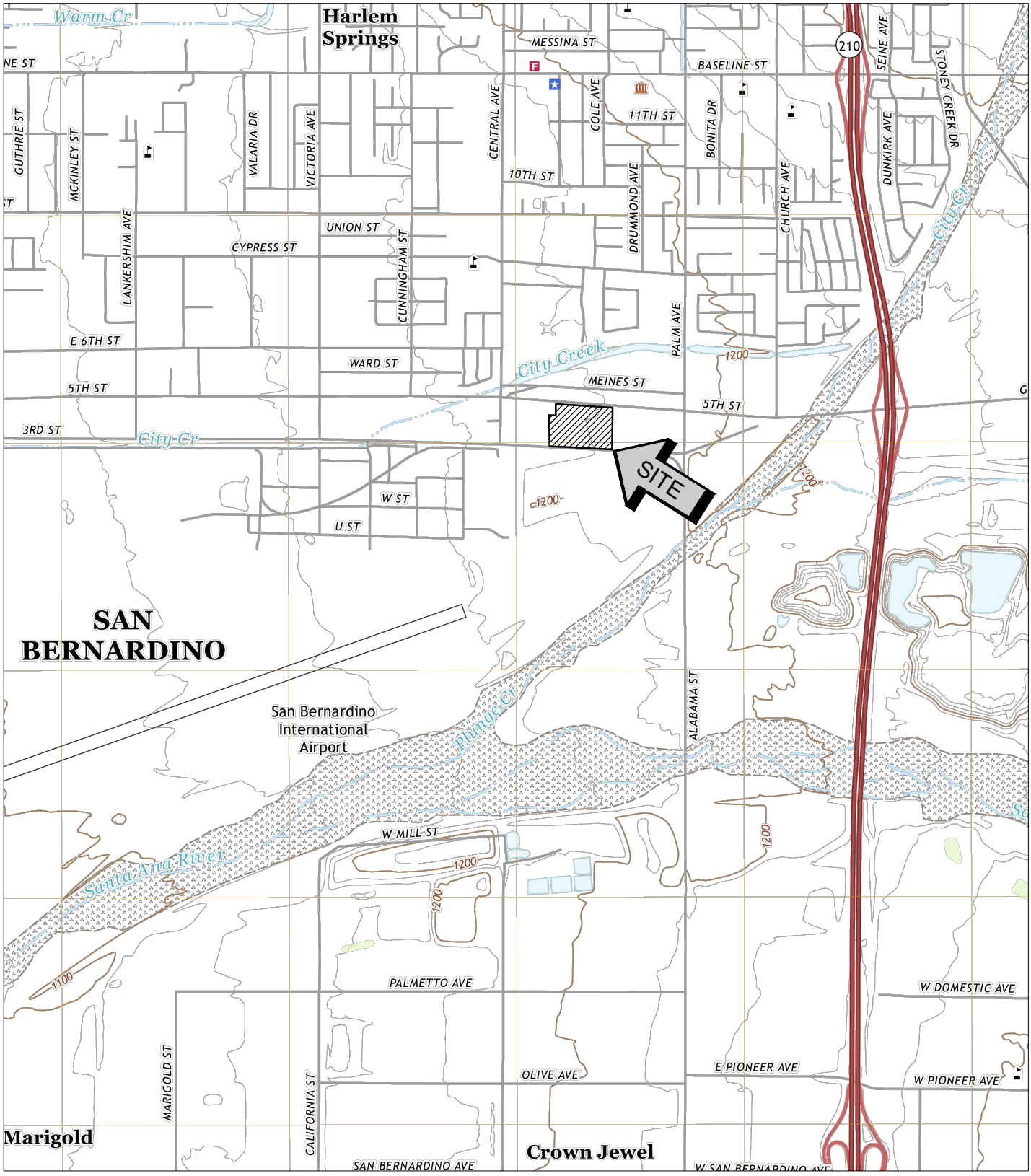
Joseph Lozano Leon
Staff Engineer

Robert G. Trazo, GE 2655
Principal Engineer



Distribution: (1) Addressee

Enclosures: Plate 1 - Site Location Map
Plate 2 - Infiltration Test Location Plan
Trench Log Legend and Logs (11 pages)
Infiltration Test Results Spreadsheets (45 pages)
Grain Size Distribution Graphs (9 pages)



SOURCE: USGS TOPOGRAPHIC MAP OF THE REDLANDS QUADRANGLE, SAN BERNARDINO COUNTY, CALIFORNIA, 2021.

SITE LOCATION MAP

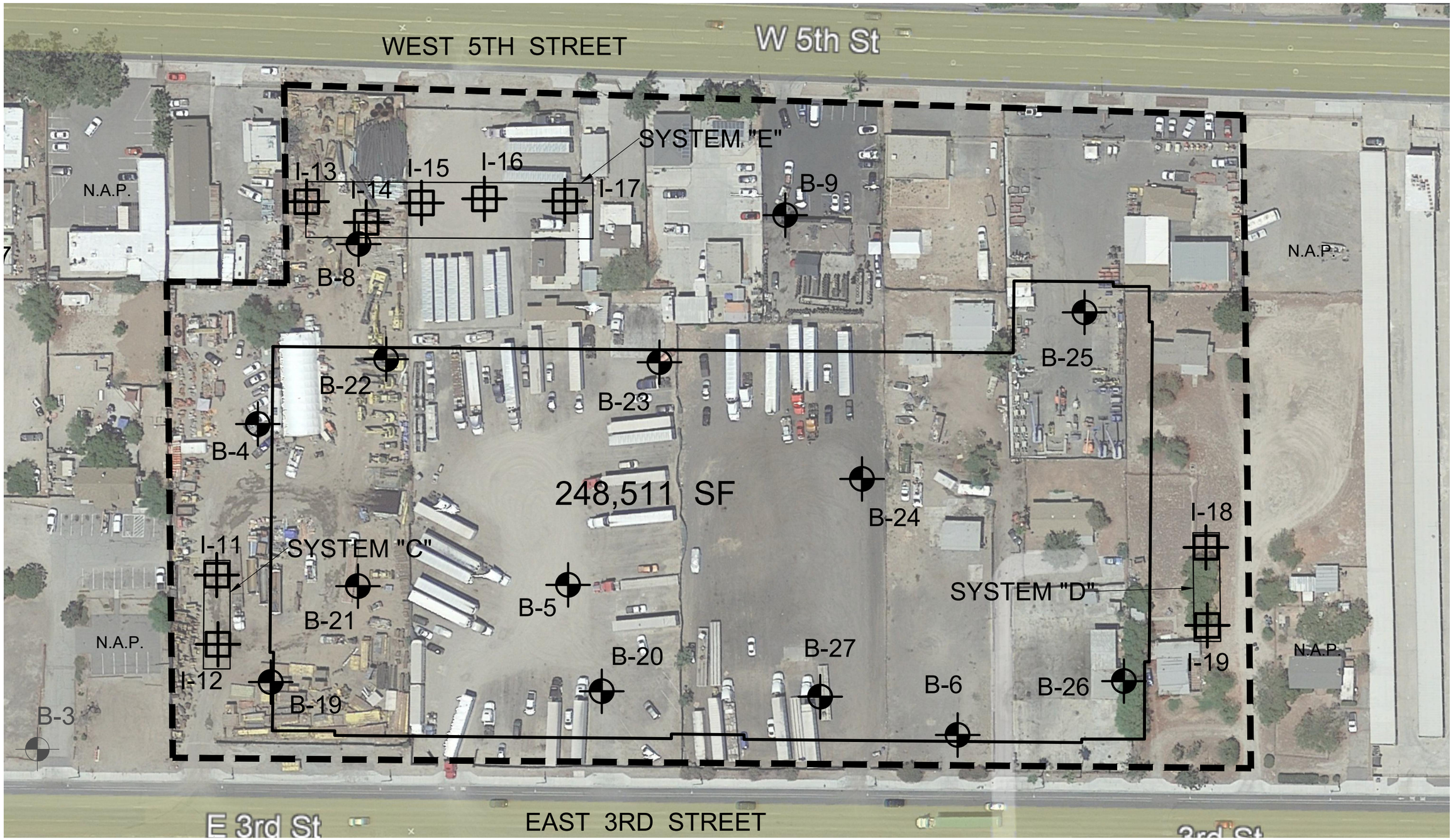
PROPOSED WAREHOUSE

HIGHLAND, CALIFORNIA

SCALE: 1" = 2000'	
DRAWN: JLL CHKD: RGT	
SCG PROJECT 22G156EA-2	
PLATE 1	

SoCalGeo

SOUTHERN CALIFORNIA GEOTECHNICAL



GEOTECHNICAL LEGEND

- PREVIOUS BORING LOCATION (SCG PROJECT NO. 21G193-4)
- PREVIOUS INFILTRATION TEST LOCATION (SCG PROJECT NO. 21G193-3)

SoCalGeo NORTH

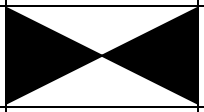
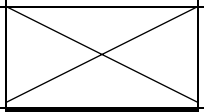
NOTE: SITE PLAN PREPARED BY RGA.
AERIAL PHOTOGRAPH OBTAINED FROM GOOGLE EARTH.

INFILTRATION TEST LOCATION PLAN
PROPOSED WAREHOUSE
HIGHLAND, CALIFORNIA

SCALE: 1" = 80'	
DRAWN: JLL CHKD: RGT	
SCG PROJECT 22G156EA-2	
PLATE 2	

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL

TRENCH LOG LEGEND

SAMPLE TYPE	GRAPHICAL SYMBOL	SAMPLE DESCRIPTION
AUGER		SAMPLE COLLECTED FROM AUGER CUTTINGS, NO FIELD MEASUREMENT OF SOIL STRENGTH. (DISTURBED)
CORE		ROCK CORE SAMPLE: TYPICALLY TAKEN WITH A DIAMOND-TIPPED CORE BARREL. TYPICALLY USED ONLY IN HIGHLY CONSOLIDATED BEDROCK.
GRAB		SOIL SAMPLE TAKEN WITH NO SPECIALIZED EQUIPMENT, SUCH AS FROM A STOCKPILE OR THE GROUND SURFACE. (DISTURBED)
CS		CALIFORNIA SAMPLER: 2-1/2 INCH I.D. SPLIT BARREL SAMPLER, LINED WITH 1-INCH HIGH BRASS RINGS. DRIVEN WITH SPT HAMMER. (RELATIVELY UNDISTURBED)
NSR		NO RECOVERY: THE SAMPLING ATTEMPT DID NOT RESULT IN RECOVERY OF ANY SIGNIFICANT SOIL OR ROCK MATERIAL.
SPT		STANDARD PENETRATION TEST: SAMPLER IS A 1.4 INCH INSIDE DIAMETER SPLIT BARREL, DRIVEN 18 INCHES WITH THE SPT HAMMER. (DISTURBED)
SH		SHELBY TUBE: TAKEN WITH A THIN WALL SAMPLE TUBE, PUSHED INTO THE SOIL AND THEN EXTRACTED. (UNDISTURBED)
VANE		VANE SHEAR TEST: SOIL STRENGTH OBTAINED USING A 4 BLADED SHEAR DEVICE. TYPICALLY USED IN SOFT CLAYS-NO SAMPLE RECOVERED.

COLUMN DESCRIPTIONS

DEPTH: Distance in feet below the ground surface.

SAMPLE: Sample Type as depicted above.

BLOW COUNT: Number of blows required to advance the sampler 12 inches using a 140 lb hammer with a 30-inch drop. 50/3" indicates penetration refusal (>50 blows) at 3 inches. WH indicates that the weight of the hammer was sufficient to push the sampler 6 inches or more.

POCKET PEN.: Approximate shear strength of a cohesive soil sample as measured by pocket penetrometer.

GRAPHIC LOG: Graphic Soil Symbol as depicted on the following page.

DRY DENSITY: Dry density of an undisturbed or relatively undisturbed sample in lbs/ft^3.

MOISTURE CONTENT: Moisture content of a soil sample, expressed as a percentage of the dry weight.

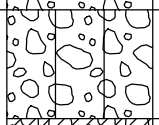
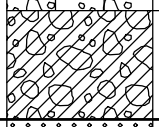
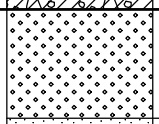
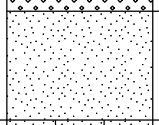
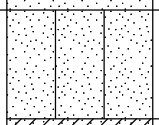
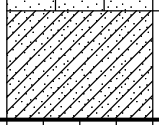
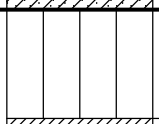
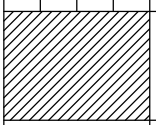
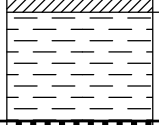
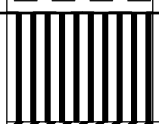
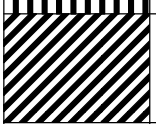
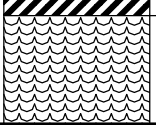
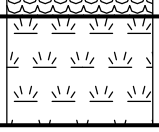
LIQUID LIMIT: The moisture content above which a soil behaves as a liquid.

PLASTIC LIMIT: The moisture content above which a soil behaves as a plastic.

PASSING #200 SIEVE: The percentage of the sample finer than the #200 standard sieve.

UNCONFINED SHEAR: The shear strength of a cohesive soil sample, as measured in the unconfined state.

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS		TYPICAL DESCRIPTIONS
			GRAPH	LETTER	
COARSE GRAINED SOILS MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVEL AND GRAVELLY SOILS MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
				GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
	SAND AND SANDY SOILS MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
				SP	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND - SILT MIXTURES
				SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

TRENCH NO. I-11

JOB NO.: 21G193-3
PROJECT: Proposed Warehouse
LOCATION: Highland, California

EXCAVATION DATE: 2/24/22
EXCAVATION METHOD: Backhoe
LOGGED BY: Caleb Brackett

WATER DEPTH: Dry
CAVE DEPTH: --
READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: --- MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	COMMENTS
					FILL: Brown Silty fine to medium Sand, trace fine Gravel, loose-damp							
					ALLUVIUM: Gray Brown Gravelly fine to coarse Sand, trace Silt, occasional Cobbles, medium dense-damp							
5												
							2			3		
10					Trench Terminated at 10'							

TBL 22G156EA-2.GPJ SOCALGEO.GDT 9/8/22

TEST TRENCH LOG

PLATE B-1

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

TRENCH NO. I-12

JOB NO.: 21G193-3
PROJECT: Proposed Warehouse
LOCATION: Highland, California

EXCAVATION DATE: 2/24/22
EXCAVATION METHOD: Backhoe
LOGGED BY: Sam Bergeland

WATER DEPTH: Dry
CAVE DEPTH: --
READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: --- MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	COMMENTS
					FILL: Brown Silty fine to coarse Sand, trace to little fine Gravel, occasional Cobbles, medium dense-damp							
					ALLUVIUM: Gray Brown Gravelly fine to coarse Sand, trace to little Silt, dense-damp							
5												
							2			8		
10					Trench Terminated at 10'							

TBL 22G156EA-2.GPJ SOCALGEO.GDT 9/8/22

TEST TRENCH LOG

PLATE B-2

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

TRENCH NO. I-13

JOB NO.: 21G193-3
PROJECT: Proposed Warehouse
LOCATION: Highland, California

EXCAVATION DATE: 2/24/22
EXCAVATION METHOD: Backhoe
LOGGED BY: Sam Bergeland

WATER DEPTH: Dry
CAVE DEPTH: --
READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: --- MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	COMMENTS
0					ALLUVIUM: Light Gray Brown fine to coarse Sand, trace fine Gravel, medium dense-dry							
5												
10												
							1			2		
					Trench Terminated at 13'							

TBL 22G156EA-2.GPJ SOCALGEO.GDT 9/8/22

TEST TRENCH LOG **PLATE B-3**

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

TRENCH NO. I-14

JOB NO.: 21G193-3
PROJECT: Proposed Warehouse
LOCATION: Highland, California

EXCAVATION DATE: 2/21/22
EXCAVATION METHOD: Backhoe
LOGGED BY: Sam Bergeland

WATER DEPTH: Dry
CAVE DEPTH: --
READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: --- MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	COMMENTS
5					ALLUVIUM: Light Gray Gravelly fine to coarse Sand, trace Silt, occasional Cobbles, dense-damp							
10							2			3		
					Trench Terminated at 13'							

TBL 22G156EA-2.GPJ SOCALGEO.GDT 9/8/22

TEST TRENCH LOG **PLATE B-4**

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

TRENCH NO. I-15

JOB NO.: 21G193-3
PROJECT: Proposed Warehouse
LOCATION: Highland, California

EXCAVATION DATE: 2/21/22
EXCAVATION METHOD: Backhoe
LOGGED BY: Sam Bergeland

WATER DEPTH: Dry
CAVE DEPTH: --
READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: --- MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	COMMENTS
					FILL: Light Gray Brown Silty fine to medium Sand, little fine Gravel, medium dense-dry to damp							
					ALLUVIUM: Light Gray Brown fine to coarse Sand, little fine Gravel, medium dense-dry							
5												
10												
							1			2		
					Trench Terminated at 13'							

TBL 22G156EA-2.GPJ SOCALGEO.GDT 9/8/22

TEST TRENCH LOG **PLATE B-5**

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

TRENCH NO. I-16

JOB NO.: 21G193-3
PROJECT: Proposed Warehouse
LOCATION: Highland, California

EXCAVATION DATE: 2/21/22
EXCAVATION METHOD: Backhoe
LOGGED BY: Sam Bergeland

WATER DEPTH: Dry
CAVE DEPTH: --
READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: --- MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	COMMENTS
0					ALLUVIUM: Light Gray Gravelly fine to coarse Sand to fine to coarse Sandy Gravel, occasional to extensive Cobbles, occasional Boulders, dense-dry							
5												
10												
							1			1		
					Trench Terminated at 13'							

TBL 22G156EA-2.GPJ SOCALGEO.GDT 9/8/22

TEST TRENCH LOG **PLATE B-6**

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

TRENCH NO. I-17

JOB NO.: 21G193-3
PROJECT: Proposed Warehouse
LOCATION: Highland, California

EXCAVATION DATE: 2/21/22
EXCAVATION METHOD: Backhoe
LOGGED BY: Sam Bergeland

WATER DEPTH: Dry
CAVE DEPTH: --
READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: --- MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	COMMENTS
					FILL: Brown Silty fine to medium Sand, little fine to coarse Gravel, loose-damp							
					ALLUVIUM: Gray Gravelly fine to coarse Sand, trace Silt, dense-damp to moist							
5												
10												
							5			4		
					Trench Terminated at 13'							

TBL 22G156EA-2.GPJ SOCALGEO.GDT 9/8/22

TEST TRENCH LOG **PLATE B-7**

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

TRENCH NO. I-18

JOB NO.: 21G193-3
PROJECT: Proposed Warehouse
LOCATION: Highland, California

EXCAVATION DATE: 2/24/22
EXCAVATION METHOD: Backhoe
LOGGED BY: Sam Bergeland

WATER DEPTH: Dry
CAVE DEPTH: --
READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: --- MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	COMMENTS
					FILL: Brown Silty fine Sand, trace medium Sand, little fine Gravel, loose-damp							
					ALLUVIUM: Gray Brown fine to coarse Sand, little fine Gravel, occasional Cobbles, dense-damp							
5												
10												
							2			2		
					Trench Terminated at 13'							

TBL 22G156EA-2.GPJ SOCALGEO.GDT 9/8/22

TEST TRENCH LOG **PLATE B-8**

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

TRENCH NO. I-19

JOB NO.: 21G193-3
PROJECT: Proposed Warehouse
LOCATION: Highland, California

EXCAVATION DATE: 2/24/22
EXCAVATION METHOD: Backhoe
LOGGED BY: Sam Bergeland

WATER DEPTH: Dry
CAVE DEPTH: --
READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: --- MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	COMMENTS
					FILL: Brown Silty fine Sand, trace to little medium to coarse Sand, little fine Gravel, loose-damp							
					ALLUVIUM: Gray Brown Gravelly fine to medium Sand, trace coarse Sand, occasional Cobbles, medium dense-damp							
5												
10							2			2		
					Trench Terminated at 13'							

TBL 22G156EA-2.GPJ SOCALGEO.GDT 9/8/22

TEST TRENCH LOG **PLATE B-9**

INFILTRATION CALCULATIONS

Project Name	Proposed Warehouse
Project Location	Highland, CA
Project Number	21G193-3
Engineer	Sam Bergeland

Infiltration Test No: I-11

Constants	Diameter (ft)	Area (ft^2)	Area (cm^2)
Inner	1	0.79	730
Anlr. Spac	2	2.36	2189

*Note: The infiltration rate was calculated based on current time interval

Test Interval		Time (hr)	Interval **Elapsed** (min)	Flow Readings: Inner Ring (ml)	Ring Flow (cm^3)	Annular Ring (ml)	Space Flow (cm^3)	Infiltration Rates: Inner Ring* (cm/hr)	Annular Space* (cm/hr)	Inner Ring* (in/hr)	Annular Space* (in/hr)
1	Initial	10:30 AM	3	0	4500	0	14500	123.35	132.49	48.56	52.16
	Final	10:33 AM	**3**	4500		14500					
2	Initial	10:33 AM	3	0	4750	0	14500	130.20	132.49	51.26	52.16
	Final	10:36 AM	**6**	4750		14500					
3	Initial	10:36 AM	3	0	4500	0	14500	123.35	132.49	48.56	52.16
	Final	10:39 AM	**9**	4500		14500					
4	Initial	10:39 AM	3	0	4650	0	14500	127.46	132.49	50.18	52.16
	Final	10:42 AM	**12**	4650		14500					
5	Initial	10:42 AM	3	0	4650	0	14500	127.46	132.49	50.18	52.16
	Final	10:45 AM	**15**	4650		14500					
6	Initial	10:45 AM	3	0	4500	0	14500	123.35	132.49	48.56	52.16
	Final	10:48 AM	**18**	4500		14500					
7	Initial	10:48 AM	3	0	4700	0	14500	128.83	132.49	50.72	52.16
	Final	10:51 AM	**21**	4700		14500					
8	Initial	10:51 AM	3	0	4500	0	14500	123.35	132.49	48.56	52.16
	Final	10:54 AM	**24**	4500		14500					
9	Initial	10:54 AM	3	0	4650	0	14500	127.46	132.49	50.18	52.16
	Final	10:57 AM	**27**	4650		14500					
10	Initial	10:57 AM	3	0	4650	0	14500	127.46	132.49	50.18	52.16
	Final	11:00 AM	**30**	4650		14500					
11	Initial	11:00 AM	3	0	4500	0	14500	123.35	132.49	48.56	52.16
	Final	11:03 AM	**33**	4500		14500					
12	Initial	11:03 AM	3	0	4750	0	14500	130.20	132.49	51.26	52.16
	Final	11:06 AM	**36**	4750		14500					
13	Initial	11:06 AM	3	0	4550	0	14500	124.72	132.49	49.10	52.16
	Final	11:09 AM	**39**	4550		14500					
14	Initial	11:09 AM	3	0	4650	0	14500	127.46	132.49	50.18	52.16
	Final	11:12 AM	**42**	4650		14500					
15	Initial	11:12 AM	3	0	4650	0	14500	127.46	132.49	50.18	52.16
	Final	11:15 AM	**45**	4650		14500					
16	Initial	11:15 AM	3	0	4500	0	14500	123.35	132.49	48.56	52.16
	Final	11:18 AM	**48**	4500		14500					
17	Initial	11:18 AM	3	0	4750	0	14500	130.20	132.49	51.26	52.16
	Final	11:21 AM	**51**	4750		14500					

18	Initial	11:21 AM	3	0	4500	0	14500	123.35	132.49	48.56	52.16
	Final	11:24 AM	**54**	4500		14500					
19	Initial	11:24 AM	3	0	4650	0	14500	127.46	132.49	50.18	52.16
	Final	11:27 AM	**57**	4650		14500					
20	Initial	11:27 AM	3	0	4650	0	14500	127.46	132.49	50.18	52.16
	Final	11:30 AM	**60**	4650		14500					
21	Initial	11:30 AM	3	0	4500	0	14500	123.35	132.49	48.56	52.16
	Final	11:33 AM	**63**	4500		14500					
22	Initial	11:33 AM	3	0	4750	0	14500	130.20	132.49	51.26	52.16
	Final	11:36 AM	**66**	4750		14500					
23	Initial	11:36 AM	3	0	4500	0	14500	123.35	132.49	48.56	52.16
	Final	11:39 AM	**69**	4500		14500					
24	Initial	11:39 AM	3	0	4200	0	14500	115.13	132.49	45.33	52.16
	Final	11:42 AM	**72**	4200		14500					
25	Initial	11:42 AM	3	0	4100	0	14500	112.38	132.49	44.25	52.16
	Final	11:45 AM	**75**	4100		14500					
26	Initial	11:45 AM	3	0	4000	0	14500	109.64	132.49	43.17	52.16
	Final	11:48 AM	**78**	4000		14500					
27	Initial	11:48 AM	3	0	4100	0	14500	112.38	132.49	44.25	52.16
	Final	11:51 AM	**81**	4100		14500					
28	Initial	11:51 AM	3	0	4000	0	14500	109.64	132.49	43.17	52.16
	Final	11:54 AM	**84**	4000		14500					
29	Initial	11:54 AM	3	0	4150	0	14100	113.76	128.83	44.79	50.72
	Final	11:57 AM	**87**	4150		14100					
30	Initial	11:57 AM	3	0	3900	0	14100	106.90	128.83	42.09	50.72
	Final	12:00 PM	**90**	3900		14100					
31	Initial	12:00 PM	3	0	3950	0	14000	108.27	127.92	42.63	50.36
	Final	12:03 PM	**93**	3950		14000					
32	Initial	12:03 PM	3	0	3850	0	14100	105.53	128.83	41.55	50.72
	Final	12:06 PM	**96**	3850		14100					
33	Initial	12:06 PM	3	0	3750	0	13900	102.79	127.00	40.47	50.00
	Final	12:09 PM	**99**	3750		13900					
34	Initial	12:09 PM	3	0	3700	0	13800	101.42	126.09	39.93	49.64
	Final	12:12 PM	**102**	3700		13800					
35	Initial	12:12 PM	3	0	3600	0	13850	98.68	126.55	38.85	49.82
	Final	12:15 PM	**105**	3600		13850					
36	Initial	12:15 PM	3	0	3550	0	13700	97.31	125.18	38.31	49.28
	Final	12:18 PM	**108**	3550		13700					
37	Initial	12:18 PM	3	0	3550	0	13500	97.31	123.35	38.31	48.56
	Final	12:21 PM	**111**	3550		13500					
38	Initial	12:21 PM	3	0	3600	0	13650	98.68	124.72	38.85	49.10
	Final	12:24 PM	**114**	3600		13650					
39	Initial	12:24 PM	3	0	3400	0	13700	93.20	125.18	36.69	49.28
	Final	12:27 PM	**117**	3400		13700					
40	Initial	12:27 PM	3	0	3300	0	13600	90.46	124.26	35.61	48.92
	Final	12:30 PM	**120**	3300		13600					
41	Initial	12:30 PM	3	0	3000	0	13500	82.23	123.35	32.38	48.56
	Final	12:33 PM	**123**	3000		13500					
42	Initial	12:33 PM	3	0	3100	0	13550	84.97	123.81	33.45	48.74
	Final	12:36 PM	**126**	3100		13550					
43	Initial	12:36 PM	3	0	3050	0	13400	83.60	122.44	32.91	48.20
	Final	12:39 PM	**129**	3050		13400					

44	Initial	12:39 PM	3	0	3100	0	13300	84.97	121.52	33.45	47.84
	Final	12:42 PM	**132**	3100		13300					
45	Initial	12:42 PM	3	0	3000	0	13300	82.23	121.52	32.38	47.84
	Final	12:45 PM	**135**	3000		13300					
46	Initial	12:45 PM	3	0	2900	0	13400	79.49	122.44	31.30	48.20
	Final	12:48 PM	**138**	2900		13400					
47	Initial	12:48 PM	3	0	2950	0	13400	80.86	122.44	31.84	48.20
	Final	12:51 PM	**141**	2950		13400					
48	Initial	12:51 PM	3	0	2800	0	13500	76.75	123.35	30.22	48.56
	Final	12:54 PM	**144**	2800		13500					
49	Initial	12:54 PM	3	0	2750	0	13300	75.38	121.52	29.68	47.84
	Final	12:57 PM	**147**	2750		13300					
50	Initial	12:57 PM	3	0	2800	0	13400	76.75	122.44	30.22	48.20
	Final	1:00 PM	**150**	2800		13400					
51	Initial	1:00 PM	3	0	2500	0	13300	68.53	121.52	26.98	47.84
	Final	1:03 PM	**153**	2500		13300					
52	Initial	1:03 PM	3	0	2400	0	13400	65.79	122.44	25.90	48.20
	Final	1:06 PM	**156**	2400		13400					
53	Initial	1:06 PM	3	0	2300	0	13500	63.05	123.35	24.82	48.56
	Final	1:09 PM	**159**	2300		13500					
54	Initial	1:09 PM	3	0	2350	0	13400	64.42	122.44	25.36	48.20
	Final	1:12 PM	**162**	2350		13400					
55	Initial	1:12 PM	3	0	2250	0	13300	61.67	121.52	24.28	47.84
	Final	1:15 PM	**165**	2250		13300					
56	Initial	1:15 PM	3	0	2200	0	13300	60.30	121.52	23.74	47.84
	Final	1:18 PM	**168**	2200		13300					
57	Initial	1:18 PM	3	0	2100	0	13100	57.56	119.69	22.66	47.12
	Final	1:21 PM	**171**	2100		13100					
58	Initial	1:21 PM	3	0	2200	0	13000	60.30	118.78	23.74	46.76
	Final	1:24 PM	**174**	2200		13000					
59	Initial	1:24 PM	3	0	2200	0	13100	60.30	119.69	23.74	47.12
	Final	1:27 PM	**177**	2200		13100					
60	Initial	1:27 PM	3	0	2100	0	13200	57.56	120.61	22.66	47.48
	Final	1:30 PM	**180**	2100		13200					
61	Initial	1:30 PM	3	0	2150	0	13100	58.93	119.69	23.20	47.12
	Final	1:33 PM	**183**	2150		13100					
62	Initial	1:33 PM	3	0	2000	0	12900	54.82	117.87	21.58	46.40
	Final	1:36 PM	**186**	2000		12900					
63	Initial	1:36 PM	3	0	2150	0	13100	58.93	119.69	23.20	47.12
	Final	1:39 PM	**189**	2150		13100					
64	Initial	1:39 PM	3	0	2200	0	13000	60.30	118.78	23.74	46.76
	Final	1:42 PM	**192**	2200		13000					
65	Initial	1:42 PM	3	0	2100	0	12900	57.56	117.87	22.66	46.40
	Final	1:45 PM	**195**	2100		12900					
66	Initial	1:45 PM	3	0	2050	0	13000	56.19	118.78	22.12	46.76
	Final	1:48 PM	**198**	2050		13000					
67	Initial	1:48 PM	3	0	2000	0	13700	54.82	125.18	21.58	49.28
	Final	1:51 PM	**201**	2000		13700					
68	Initial	1:51 PM	3	0	2050	0	12900	56.19	117.87	22.12	46.40
	Final	1:54 PM	**204**	2050		12900					
69	Initial	1:54 PM	3	0	2100	0	12800	57.56	116.95	22.66	46.04
	Final	1:57 PM	**207**	2100		12800					

70	Initial	1:57 PM	3	0	2100	0	12700	57.56	116.04	22.66	45.68
	Final	2:00 PM	**210**	2100		12700					
71	Initial	2:00 PM	3	0	2100	0	12500	57.56	114.21	22.66	44.97
	Final	2:03 PM	**213**	2100		12500					
72	Initial	2:03 PM	3	0	2000	0	12600	54.82	115.13	21.58	45.33
	Final	2:06 PM	**216**	2000		12600					
73	Initial	2:06 PM	3	0	2100	0	12600	57.56	115.13	22.66	45.33
	Final	2:09 PM	**219**	2100		12600					
74	Initial	2:09 PM	3	0	2200	0	12500	60.30	114.21	23.74	44.97
	Final	2:12 PM	**222**	2200		12500					
75	Initial	2:12 PM	3	0	2100	0	12300	57.56	112.38	22.66	44.25
	Final	2:15 PM	**225**	2100		12300					
76	Initial	2:15 PM	3	0	2050	0	12200	56.19	111.47	22.12	43.89
	Final	2:18 PM	**228**	2050		12200					
77	Initial	2:18 PM	3	0	2100	0	12400	57.56	113.30	22.66	44.61
	Final	2:21 PM	**231**	2100		12400					
78	Initial	2:21 PM	3	0	2150	0	12300	58.93	112.38	23.20	44.25
	Final	2:24 PM	**234**	2150		12300					
79	Initial	2:24 PM	3	0	2250	0	12300	61.67	112.38	24.28	44.25
	Final	2:27 PM	**237**	2250		12300					
80	Initial	2:27 PM	3	0	2100	0	12000	57.56	109.64	22.66	43.17
	Final	2:30 PM	**240**	2100		12000					
81	Initial	2:30 PM	3	0	2150	0	12200	58.93	111.47	23.20	43.89
	Final	2:33 PM	**243**	2150		12200					
82	Initial	2:33 PM	3	0	2000	0	12100	54.82	110.56	21.58	43.53
	Final	2:36 PM	**246**	2000		12100					
83	Initial	2:36 PM	3	0	2050	0	12000	56.19	109.64	22.12	43.17
	Final	2:39 PM	**249**	2050		12000					
84	Initial	2:39 PM	3	0	2000	0	11800	54.82	107.82	21.58	42.45
	Final	2:42 PM	**252**	2000		11800					
85	Initial	2:42 PM	3	0	2000	0	11600	54.82	105.99	21.58	41.73
	Final	2:45 PM	**255**	2000		11600					
86	Initial	2:45 PM	3	0	2050	0	11400	56.19	104.16	22.12	41.01
	Final	2:48 PM	**258**	2050		11400					
87	Initial	2:48 PM	3	0	1900	0	11250	52.08	102.79	20.50	40.47
	Final	2:51 PM	**261**	1900		11250					
88	Initial	2:51 PM	3	0	1950	0	11300	53.45	103.25	21.04	40.65
	Final	2:54 PM	**264**	1950		11300					
89	Initial	2:54 PM	3	0	1900	0	11200	52.08	102.33	20.50	40.29
	Final	2:57 PM	**267**	1900		11200					
90	Initial	2:57 PM	3	0	1900	0	11200	52.08	102.33	20.50	40.29
	Final	3:00 PM	**270**	1900		11200					
91	Initial	3:00 PM	3	0	1900	0	11000	52.08	100.51	20.50	39.57
	Final	3:03 PM	**273**	1900		11000					
92	Initial	3:03 PM	3	0	1900	0	11000	52.08	100.51	20.50	39.57
	Final	3:06 PM	**276**	1900		11000					
93	Initial	3:06 PM	3	0	1900	0	11000	52.08	100.51	20.50	39.57
	Final	3:09 PM	**279**	1900		11000					
94	Initial	3:09 PM	3	0	1900	0	11000	52.08	100.51	20.50	39.57
	Final	3:12 PM	**282**	1900		11000					
95	Initial	3:12 PM	3	0	1900	0	11000	52.08	100.51	20.50	39.57
	Final	3:15 PM	**285**	1900		11000					

96	Initial	3:15 PM	3	0	1950	0	11000	53.45	100.51	21.04	39.57
	Final	3:18 PM	**288**	1950		11000					
97	Initial	3:18 PM	3	0	1900	0	11000	52.08	100.51	20.50	39.57
	Final	3:21 PM	**291**	1900		11000					
98	Initial	3:21 PM	3	0	1900	0	11000	52.08	100.51	20.50	39.57
	Final	3:24 PM	**294**	1900		11000					
99	Initial	3:24 PM	3	0	1900	0	11000	52.08	100.51	20.50	39.57
	Final	3:27 PM	**297**	1900		11000					
100	Initial	3:27 PM	3	0	1900	0	11000	52.08	100.51	20.50	39.57
	Final	3:30 PM	**300**	1900		11000					
101	Initial	3:30 PM	3	0	1900	0	11000	52.08	100.51	20.50	39.57
	Final	3:33 PM	**303**	1900		11000					
102	Initial	3:33 PM	3	0	1900	0	11000	52.08	100.51	20.50	39.57
	Final	3:36 PM	**306**	1900		11000					
103	Initial	3:36 PM	3	0	1900	0	11000	52.08	100.51	20.50	39.57
	Final	3:39 PM	**309**	1900		11000					
104	Initial	3:39 PM	3	0	1900	0	11000	52.08	100.51	20.50	39.57
	Final	3:42 PM	**312**	1900		11000					
105	Initial	3:42 PM	3	0	1900	0	11000	52.08	100.51	20.50	39.57
	Final	3:45 PM	**315**	1900		11000					
106	Initial	3:45 PM	3	0	1900	0	11000	52.08	100.51	20.50	39.57
	Final	3:48 PM	**318**	1900		11000					
107	Initial	3:48 PM	3	0	1900	0	11000	52.08	100.51	20.50	39.57
	Final	3:51 PM	**321**	1900		11000					
108	Initial	3:51 PM	3	0	1900	0	11000	52.08	100.51	20.50	39.57
	Final	3:54 PM	**324**	1900		11000					
109	Initial	3:54 PM	3	0	1900	0	11000	52.08	100.51	20.50	39.57
	Final	3:57 PM	**327**	1900		11000					
110	Initial	3:57 PM	3	0	1900	0	11000	52.08	100.51	20.50	39.57
	Final	4:00 PM	**330**	1900		11000					
111	Initial	4:00 PM	3	0	1900	0	11000	52.08	100.51	20.50	39.57
	Final	4:03 PM	**333**	1900		11000					
112	Initial	4:03 PM	3	0	1950	0	11000	53.45	100.51	21.04	39.57
	Final	4:06 PM	**336**	1950		11000					
113	Initial	4:06 PM	3	0	1900	0	11000	52.08	100.51	20.50	39.57
	Final	4:09 PM	**339**	1900		11000					
114	Initial	4:09 PM	3	0	1900	0	11000	52.08	100.51	20.50	39.57
	Final	4:12 PM	**342**	1900		11000					
115	Initial	4:12 PM	3	0	1900	0	11000	52.08	100.51	20.50	39.57
	Final	4:15 PM	**345**	1900		11000					
116	Initial	4:15 PM	3	0	1900	0	11000	52.08	100.51	20.50	39.57
	Final	4:18 PM	**348**	1900		11000					
117	Initial	4:18 PM	3	0	1900	0	11000	52.08	100.51	20.50	39.57
	Final	4:21 PM	**351**	1900		11000					
118	Initial	4:21 PM	3	0	1900	0	11000	52.08	100.51	20.50	39.57
	Final	4:24 PM	**354**	1900		11000					
119	Initial	4:24 PM	3	0	1900	0	11000	52.08	100.51	20.50	39.57
	Final	4:27 PM	**357**	1900		11000					
120	Initial	4:27 PM	3	0	1900	0	11000	52.08	100.51	20.50	39.57
	Final	4:30 PM	**360**	1900		11000					
121	Initial	4:30 PM	3	0	1900	0	11000	52.08	100.51	20.50	39.57
	Final	4:33 PM	**363**	1900		11000					

INFILTRATION CALCULATIONS

Project Name	Proposed Warehouse
Project Location	Highland, CA
Project Number	21G193-3
Engineer	Sam Bergeland

Infiltration Test No: I-12

Constants	Diameter (ft)	Area (ft^2)	Area (cm^2)
Inner	1	0.79	730
Anlr. Spac	2	2.36	2189

*Note: The infiltration rate was calculated based on current time interval

Test Interval		Time (hr)	Interval **Elapsed** (min)	Flow Readings: Inner Ring (ml)	Ring Flow (cm^3)	Annular Ring (ml)	Space Flow (cm^3)	Infiltration Rates: Inner Ring* (cm/hr)	Annular Space* (cm/hr)	Inner Ring* (in/hr)	Annular Space* (in/hr)
1	Initial	8:00 AM	3	0	4400	0	14800	120.61	135.23	47.48	53.24
	Final	8:03 AM	**3**	4400		14800					
2	Initial	8:03 AM	3	0	4650	0	14500	127.46	132.49	50.18	52.16
	Final	8:06 AM	**6**	4650		14500					
3	Initial	8:06 AM	3	0	4300	0	14900	117.87	136.14	46.40	53.60
	Final	8:09 AM	**9**	4300		14900					
4	Initial	8:09 AM	3	0	4550	0	14800	124.72	135.23	49.10	53.24
	Final	8:12 AM	**12**	4550		14800					
5	Initial	8:12 AM	3	0	4300	0	14500	117.87	132.49	46.40	52.16
	Final	8:15 AM	**15**	4300		14500					
6	Initial	8:15 AM	3	0	4300	0	14500	117.87	132.49	46.40	52.16
	Final	8:18 AM	**18**	4300		14500					
7	Initial	8:18 AM	3	0	4750	0	14500	130.20	132.49	51.26	52.16
	Final	8:21 AM	**21**	4750		14500					
8	Initial	8:21 AM	3	0	4300	0	14500	117.87	132.49	46.40	52.16
	Final	8:24 AM	**24**	4300		14500					
9	Initial	8:24 AM	3	0	4400	0	14500	120.61	132.49	47.48	52.16
	Final	8:27 AM	**27**	4400		14500					
10	Initial	8:27 AM	3	0	4650	0	14500	127.46	132.49	50.18	52.16
	Final	8:30 AM	**30**	4650		14500					
11	Initial	8:30 AM	3	0	4300	0	14500	117.87	132.49	46.40	52.16
	Final	8:33 AM	**33**	4300		14500					
12	Initial	8:33 AM	3	0	4750	0	14500	130.20	132.49	51.26	52.16
	Final	8:36 AM	**36**	4750		14500					
13	Initial	8:36 AM	3	0	4300	0	14500	117.87	132.49	46.40	52.16
	Final	8:39 AM	**39**	4300		14500					
14	Initial	8:39 AM	3	0	4650	0	14500	127.46	132.49	50.18	52.16
	Final	8:42 AM	**42**	4650		14500					
15	Initial	8:42 AM	3	0	4650	0	14500	127.46	132.49	50.18	52.16
	Final	8:45 AM	**45**	4650		14500					
16	Initial	8:45 AM	3	0	4300	0	14500	117.87	132.49	46.40	52.16
	Final	8:48 AM	**48**	4300		14500					
17	Initial	8:48 AM	3	0	4750	0	14500	130.20	132.49	51.26	52.16
	Final	8:51 AM	**51**	4750		14500					

18	Initial	8:51 AM	3	0	4300	0	14500	117.87	132.49	46.40	52.16
	Final	8:54 AM	**54**	4300		14500					
19	Initial	8:54 AM	3	0	4650	0	14500	127.46	132.49	50.18	52.16
	Final	8:57 AM	**57**	4650		14500					
20	Initial	8:57 AM	3	0	4650	0	14500	127.46	132.49	50.18	52.16
	Final	9:00 AM	**60**	4650		14500					
21	Initial	9:00 AM	3	0	4300	0	14500	117.87	132.49	46.40	52.16
	Final	9:03 AM	**63**	4300		14500					
22	Initial	9:03 AM	3	0	4750	0	14500	130.20	132.49	51.26	52.16
	Final	9:06 AM	**66**	4750		14500					
23	Initial	9:06 AM	3	0	4300	0	14500	117.87	132.49	46.40	52.16
	Final	9:09 AM	**69**	4300		14500					
24	Initial	9:09 AM	3	0	4200	0	14500	115.13	132.49	45.33	52.16
	Final	9:12 AM	**72**	4200		14500					
25	Initial	9:12 AM	3	0	4100	0	14500	112.38	132.49	44.25	52.16
	Final	9:15 AM	**75**	4100		14500					
26	Initial	9:15 AM	3	0	4000	0	14500	109.64	132.49	43.17	52.16
	Final	9:18 AM	**78**	4000		14500					
27	Initial	9:18 AM	3	0	4100	0	14500	112.38	132.49	44.25	52.16
	Final	9:21 AM	**81**	4100		14500					
28	Initial	9:21 AM	3	0	4000	0	14500	109.64	132.49	43.17	52.16
	Final	9:24 AM	**84**	4000		14500					
29	Initial	9:24 AM	3	0	4150	0	14100	113.76	128.83	44.79	50.72
	Final	9:27 AM	**87**	4150		14100					
30	Initial	9:27 AM	3	0	3900	0	14100	106.90	128.83	42.09	50.72
	Final	9:30 AM	**90**	3900		14100					
31	Initial	9:30 AM	3	0	3900	0	14000	106.90	127.92	42.09	50.36
	Final	9:33 AM	**93**	3900		14000					
32	Initial	9:33 AM	3	0	3850	0	14100	105.53	128.83	41.55	50.72
	Final	9:36 AM	**96**	3850		14100					
33	Initial	9:36 AM	3	0	3750	0	13900	102.79	127.00	40.47	50.00
	Final	9:39 AM	**99**	3750		13900					
34	Initial	9:39 AM	3	0	3700	0	13800	101.42	126.09	39.93	49.64
	Final	9:42 AM	**102**	3700		13800					
35	Initial	9:42 AM	3	0	3600	0	13850	98.68	126.55	38.85	49.82
	Final	9:45 AM	**105**	3600		13850					
36	Initial	9:45 AM	3	0	3550	0	13700	97.31	125.18	38.31	49.28
	Final	9:48 AM	**108**	3550		13700					
37	Initial	9:48 AM	3	0	3550	0	13500	97.31	123.35	38.31	48.56
	Final	9:51 AM	**111**	3550		13500					
38	Initial	9:51 AM	3	0	3600	0	13650	98.68	124.72	38.85	49.10
	Final	9:54 AM	**114**	3600		13650					
39	Initial	9:54 AM	3	0	3400	0	13700	93.20	125.18	36.69	49.28
	Final	9:57 AM	**117**	3400		13700					
40	Initial	9:57 AM	3	0	3300	0	13600	90.46	124.26	35.61	48.92
	Final	10:00 AM	**120**	3300		13600					
41	Initial	10:00 AM	3	0	3000	0	13500	82.23	123.35	32.38	48.56
	Final	10:03 AM	**123**	3000		13500					
42	Initial	10:03 AM	3	0	3100	0	13550	84.97	123.81	33.45	48.74
	Final	10:06 AM	**126**	3100		13550					
43	Initial	10:06 AM	3	0	3050	0	13400	83.60	122.44	32.91	48.20
	Final	10:09 AM	**129**	3050		13400					

44	Initial	10:09 AM	3	0	3050	0	13300	83.60	121.52	32.91	47.84
	Final	10:12 AM	**132**	3050		13300					
45	Initial	10:12 AM	3	0	3000	0	13300	82.23	121.52	32.38	47.84
	Final	10:15 AM	**135**	3000		13300					
46	Initial	10:15 AM	3	0	2900	0	13400	79.49	122.44	31.30	48.20
	Final	10:18 AM	**138**	2900		13400					
47	Initial	10:18 AM	3	0	2950	0	13400	80.86	122.44	31.84	48.20
	Final	10:21 AM	**141**	2950		13400					
48	Initial	10:21 AM	3	0	2800	0	13500	76.75	123.35	30.22	48.56
	Final	10:24 AM	**144**	2800		13500					
49	Initial	10:24 AM	3	0	2750	0	13300	75.38	121.52	29.68	47.84
	Final	10:27 AM	**147**	2750		13300					
50	Initial	10:27 AM	3	0	2600	0	13400	71.27	122.44	28.06	48.20
	Final	10:30 AM	**150**	2600		13400					
51	Initial	10:30 AM	3	0	2500	0	13300	68.53	121.52	26.98	47.84
	Final	10:33 AM	**153**	2500		13300					
52	Initial	10:33 AM	3	0	2400	0	13400	65.79	122.44	25.90	48.20
	Final	10:36 AM	**156**	2400		13400					
53	Initial	10:36 AM	3	0	2250	0	13500	61.67	123.35	24.28	48.56
	Final	10:39 AM	**159**	2250		13500					
54	Initial	10:39 AM	3	0	2350	0	13400	64.42	122.44	25.36	48.20
	Final	10:42 AM	**162**	2350		13400					
55	Initial	10:42 AM	3	0	2250	0	13300	61.67	121.52	24.28	47.84
	Final	10:45 AM	**165**	2250		13300					
56	Initial	10:45 AM	3	0	2100	0	13300	57.56	121.52	22.66	47.84
	Final	10:48 AM	**168**	2100		13300					
57	Initial	10:48 AM	3	0	2100	0	13100	57.56	119.69	22.66	47.12
	Final	10:51 AM	**171**	2100		13100					
58	Initial	10:51 AM	3	0	2150	0	13000	58.93	118.78	23.20	46.76
	Final	10:54 AM	**174**	2150		13000					
59	Initial	10:54 AM	3	0	2100	0	13100	57.56	119.69	22.66	47.12
	Final	10:57 AM	**177**	2100		13100					
60	Initial	10:57 AM	3	0	2100	0	13200	57.56	120.61	22.66	47.48
	Final	11:00 AM	**180**	2100		13200					
61	Initial	11:00 AM	3	0	2150	0	13100	58.93	119.69	23.20	47.12
	Final	11:03 AM	**183**	2150		13100					
62	Initial	11:03 AM	3	0	2000	0	12900	54.82	117.87	21.58	46.40
	Final	11:06 AM	**186**	2000		12900					
63	Initial	11:06 AM	3	0	2150	0	13100	58.93	119.69	23.20	47.12
	Final	11:09 AM	**189**	2150		13100					
64	Initial	11:09 AM	3	0	2100	0	13000	57.56	118.78	22.66	46.76
	Final	11:12 AM	**192**	2100		13000					
65	Initial	11:12 AM	3	0	2100	0	12900	57.56	117.87	22.66	46.40
	Final	11:15 AM	**195**	2100		12900					
66	Initial	11:15 AM	3	0	2050	0	13000	56.19	118.78	22.12	46.76
	Final	11:18 AM	**198**	2050		13000					
67	Initial	11:18 AM	3	0	2000	0	13700	54.82	125.18	21.58	49.28
	Final	11:21 AM	**201**	2000		13700					
68	Initial	11:21 AM	3	0	2100	0	12900	57.56	117.87	22.66	46.40
	Final	11:24 AM	**204**	2100		12900					
69	Initial	11:24 AM	3	0	2100	0	12800	57.56	116.95	22.66	46.04
	Final	11:27 AM	**207**	2100		12800					

70	Initial	11:27 AM	3	0	2100	0	12700	57.56	116.04	22.66	45.68
	Final	11:30 AM	**210**	2100		12700					
71	Initial	11:30 AM	3	0	2100	0	12500	57.56	114.21	22.66	44.97
	Final	11:33 AM	**213**	2100		12500					
72	Initial	11:33 AM	3	0	2000	0	12600	54.82	115.13	21.58	45.33
	Final	11:36 AM	**216**	2000		12600					
73	Initial	11:36 AM	3	0	2100	0	12600	57.56	115.13	22.66	45.33
	Final	11:39 AM	**219**	2100		12600					
74	Initial	11:39 AM	3	0	2100	0	12500	57.56	114.21	22.66	44.97
	Final	11:42 AM	**222**	2100		12500					
75	Initial	11:42 AM	3	0	2100	0	12300	57.56	112.38	22.66	44.25
	Final	11:45 AM	**225**	2100		12300					
76	Initial	11:45 AM	3	0	2050	0	12200	56.19	111.47	22.12	43.89
	Final	11:48 AM	**228**	2050		12200					
77	Initial	11:48 AM	3	0	2100	0	12400	57.56	113.30	22.66	44.61
	Final	11:51 AM	**231**	2100		12400					
78	Initial	11:51 AM	3	0	2150	0	12300	58.93	112.38	23.20	44.25
	Final	11:54 AM	**234**	2150		12300					
79	Initial	11:54 AM	3	0	2250	0	12300	61.67	112.38	24.28	44.25
	Final	11:57 AM	**237**	2250		12300					
80	Initial	11:57 AM	3	0	2100	0	12000	57.56	109.64	22.66	43.17
	Final	12:00 PM	**240**	2100		12000					
81	Initial	12:00 PM	3	0	2150	0	12200	58.93	111.47	23.20	43.89
	Final	12:03 PM	**243**	2150		12200					
82	Initial	12:03 PM	3	0	2000	0	12100	54.82	110.56	21.58	43.53
	Final	12:06 PM	**246**	2000		12100					
83	Initial	12:06 PM	3	0	2050	0	12000	56.19	109.64	22.12	43.17
	Final	12:09 PM	**249**	2050		12000					
84	Initial	12:09 PM	3	0	2100	0	11800	57.56	107.82	22.66	42.45
	Final	12:12 PM	**252**	2100		11800					
85	Initial	12:12 PM	3	0	2050	0	11600	56.19	105.99	22.12	41.73
	Final	12:15 PM	**255**	2050		11600					
86	Initial	12:15 PM	3	0	2100	0	11400	57.56	104.16	22.66	41.01
	Final	12:18 PM	**258**	2100		11400					
87	Initial	12:18 PM	3	0	2150	0	11250	58.93	102.79	23.20	40.47
	Final	12:21 PM	**261**	2150		11250					
88	Initial	12:21 PM	3	0	2250	0	11300	61.67	103.25	24.28	40.65
	Final	12:24 PM	**264**	2250		11300					
89	Initial	12:24 PM	3	0	2100	0	11200	57.56	102.33	22.66	40.29
	Final	12:27 PM	**267**	2100		11200					
90	Initial	12:27 PM	3	0	2150	0	11200	58.93	102.33	23.20	40.29
	Final	12:30 PM	**270**	2150		11200					
91	Initial	12:30 PM	3	0	2050	0	11200	56.19	102.33	22.12	40.29
	Final	12:33 PM	**273**	2050		11200					
92	Initial	12:33 PM	3	0	2050	0	11200	56.19	102.33	22.12	40.29
	Final	12:36 PM	**276**	2050		11200					
93	Initial	12:36 PM	3	0	2100	0	11200	57.56	102.33	22.66	40.29
	Final	12:39 PM	**279**	2100		11200					
94	Initial	12:39 PM	3	0	2050	0	11200	56.19	102.33	22.12	40.29
	Final	12:42 PM	**282**	2050		11200					
95	Initial	12:42 PM	3	0	2100	0	11200	57.56	102.33	22.66	40.29
	Final	12:45 PM	**285**	2100		11200					

96	Initial	12:45 PM	3	0	2150	0	11200	58.93	102.33	23.20	40.29
	Final	12:48 PM	**288**	2150		11200					
97	Initial	12:48 PM	3	0	2250	0	11200	61.67	102.33	24.28	40.29
	Final	12:51 PM	**291**	2250		11200					
98	Initial	12:51 PM	3	0	2100	0	11200	57.56	102.33	22.66	40.29
	Final	12:54 PM	**294**	2100		11200					
99	Initial	12:54 PM	3	0	1950	0	11200	53.45	102.33	21.04	40.29
	Final	12:57 PM	**297**	1950		11200					
100	Initial	12:57 PM	3	0	1900	0	11200	52.08	102.33	20.50	40.29
	Final	1:00 PM	**300**	1900		11200					
101	Initial	1:00 PM	3	0	1900	0	11200	52.08	102.33	20.50	40.29
	Final	1:03 PM	**303**	1900		11200					
102	Initial	1:03 PM	3	0	2000	0	11200	54.82	102.33	21.58	40.29
	Final	1:06 PM	**306**	2000		11200					
103	Initial	1:06 PM	3	0	1950	0	11200	53.45	102.33	21.04	40.29
	Final	1:09 PM	**309**	1950		11200					
104	Initial	1:09 PM	3	0	1900	0	11200	52.08	102.33	20.50	40.29
	Final	1:12 PM	**312**	1900		11200					
105	Initial	1:12 PM	3	0	1900	0	11200	52.08	102.33	20.50	40.29
	Final	1:15 PM	**315**	1900		11200					
106	Initial	1:15 PM	3	0	1900	0	11200	52.08	102.33	20.50	40.29
	Final	1:18 PM	**318**	1900		11200					
107	Initial	1:18 PM	3	0	1900	0	11200	52.08	102.33	20.50	40.29
	Final	1:21 PM	**321**	1900		11200					
108	Initial	1:21 PM	3	0	1950	0	11200	53.45	102.33	21.04	40.29
	Final	1:24 PM	**324**	1950		11200					
109	Initial	1:24 PM	3	0	1900	0	11200	52.08	102.33	20.50	40.29
	Final	1:27 PM	**327**	1900		11200					
110	Initial	1:27 PM	3	0	1900	0	11200	52.08	102.33	20.50	40.29
	Final	1:30 PM	**330**	1900		11200					
111	Initial	1:30 PM	3	0	1950	0	11200	53.45	102.33	21.04	40.29
	Final	1:33 PM	**333**	1950		11200					
112	Initial	1:33 PM	3	0	1900	0	11200	52.08	102.33	20.50	40.29
	Final	1:36 PM	**336**	1900		11200					
113	Initial	1:36 PM	3	0	1900	0	11200	52.08	102.33	20.50	40.29
	Final	1:39 PM	**339**	1900		11200					
114	Initial	1:39 PM	3	0	1850	0	11200	50.71	102.33	19.96	40.29
	Final	1:42 PM	**342**	1850		11200					
115	Initial	1:42 PM	3	0	1850	0	11200	50.71	102.33	19.96	40.29
	Final	1:45 PM	**345**	1850		11200					
116	Initial	1:45 PM	3	0	1900	0	11200	52.08	102.33	20.50	40.29
	Final	1:48 PM	**348**	1900		11200					
117	Initial	1:48 PM	3	0	1850	0	11200	50.71	102.33	19.96	40.29
	Final	1:51 PM	**351**	1850		11200					
118	Initial	1:51 PM	3	0	1850	0	11200	50.71	102.33	19.96	40.29
	Final	1:54 PM	**354**	1850		11200					
119	Initial	1:54 PM	3	0	1850	0	11200	50.71	102.33	19.96	40.29
	Final	1:57 PM	**357**	1850		11200					
120	Initial	1:57 PM	3	0	1850	0	11200	50.71	102.33	19.96	40.29
	Final	2:00 PM	**360**	1850		11200					
121	Initial	2:00 PM	3	0	1850	0	11200	50.71	102.33	19.96	40.29
	Final	2:03 PM	**363**	1850		11200					

INFILTRATION CALCULATIONS

Project Name	Proposed Warehouse
Project Location	Highland, CA
Project Number	21G193-3
Engineer	Sam Bergeland

Infiltration Test No: I-13

Constants	Diameter (ft)	Area (ft^2)	Area (cm^2)
Inner	1	0.79	730
Anlr. Spac	2	2.36	2189

*Note: The infiltration rate was calculated based on current time interval

Test Interval		Time (hr)	Interval **Elapsed** (min)	Flow Readings: Inner Ring (ml)	Ring Flow (cm^3)	Annular Ring (ml)	Space Flow (cm^3)	Infiltration Rates: Inner Ring* (cm/hr)	Annular Space* (cm/hr)	Inner Ring* (in/hr)	Annular Space* (in/hr)
1	Initial	11:06 AM	3	0	4500	0	14500	123.35	132.49	48.56	52.16
	Final	11:09 AM	**3**	4500		14500					
2	Initial	11:09 AM	3	0	4650	0	14500	127.46	132.49	50.18	52.16
	Final	11:12 AM	**6**	4650		14500					
3	Initial	11:12 AM	3	0	4500	0	14500	123.35	132.49	48.56	52.16
	Final	11:15 AM	**9**	4500		14500					
4	Initial	11:15 AM	3	0	4650	0	14500	127.46	132.49	50.18	52.16
	Final	11:18 AM	**12**	4650		14500					
5	Initial	11:18 AM	3	0	4650	0	14500	127.46	132.49	50.18	52.16
	Final	11:21 AM	**15**	4650		14500					
6	Initial	11:21 AM	3	0	4500	0	14500	123.35	132.49	48.56	52.16
	Final	11:24 AM	**18**	4500		14500					
7	Initial	11:24 AM	3	0	4650	0	14500	127.46	132.49	50.18	52.16
	Final	11:27 AM	**21**	4650		14500					
8	Initial	11:27 AM	3	0	4500	0	14500	123.35	132.49	48.56	52.16
	Final	11:30 AM	**24**	4500		14500					
9	Initial	11:30 AM	3	0	4650	0	14500	127.46	132.49	50.18	52.16
	Final	11:33 AM	**27**	4650		14500					
10	Initial	11:33 AM	3	0	4650	0	14500	127.46	132.49	50.18	52.16
	Final	11:36 AM	**30**	4650		14500					
11	Initial	11:36 AM	3	0	4500	0	14500	123.35	132.49	48.56	52.16
	Final	11:39 AM	**33**	4500		14500					
12	Initial	11:39 AM	3	0	4650	0	14500	127.46	132.49	50.18	52.16
	Final	11:42 AM	**36**	4650		14500					
13	Initial	11:42 AM	3	0	4500	0	14500	123.35	132.49	48.56	52.16
	Final	11:45 AM	**39**	4500		14500					
14	Initial	11:45 AM	3	0	4650	0	14500	127.46	132.49	50.18	52.16
	Final	11:48 AM	**42**	4650		14500					
15	Initial	11:48 AM	3	0	4650	0	14500	127.46	132.49	50.18	52.16
	Final	11:51 AM	**45**	4650		14500					
16	Initial	11:51 AM	3	0	4500	0	14500	123.35	132.49	48.56	52.16
	Final	11:54 AM	**48**	4500		14500					
17	Initial	11:54 AM	3	0	4650	0	14500	127.46	132.49	50.18	52.16
	Final	11:57 AM	**51**	4650		14500					

18	Initial	11:57 AM	3	0	4500	0	14500	123.35	132.49	48.56	52.16
	Final	12:00 PM	**54**	4500		14500					
19	Initial	12:00 PM	3	0	4650	0	14500	127.46	132.49	50.18	52.16
	Final	12:03 PM	**57**	4650		14500					
20	Initial	12:03 PM	3	0	4650	0	14500	127.46	132.49	50.18	52.16
	Final	12:06 PM	**60**	4650		14500					
21	Initial	12:06 PM	3	0	4500	0	14500	123.35	132.49	48.56	52.16
	Final	12:09 PM	**63**	4500		14500					
22	Initial	12:09 PM	3	0	4650	0	14500	127.46	132.49	50.18	52.16
	Final	12:12 PM	**66**	4650		14500					
23	Initial	12:12 PM	3	0	4500	0	14500	123.35	132.49	48.56	52.16
	Final	12:15 PM	**69**	4500		14500					
24	Initial	12:15 PM	3	0	4200	0	14500	115.13	132.49	45.33	52.16
	Final	12:18 PM	**72**	4200		14500					
25	Initial	12:18 PM	3	0	4100	0	14500	112.38	132.49	44.25	52.16
	Final	12:21 PM	**75**	4100		14500					
26	Initial	12:21 PM	3	0	4000	0	14500	109.64	132.49	43.17	52.16
	Final	12:24 PM	**78**	4000		14500					
27	Initial	12:24 PM	3	0	4100	0	14500	112.38	132.49	44.25	52.16
	Final	12:27 PM	**81**	4100		14500					
28	Initial	12:27 PM	3	0	4000	0	14500	109.64	132.49	43.17	52.16
	Final	12:30 PM	**84**	4000		14500					
29	Initial	12:30 PM	3	0	4150	0	14100	113.76	128.83	44.79	50.72
	Final	12:33 PM	**87**	4150		14100					
30	Initial	12:33 PM	3	0	3900	0	14100	106.90	128.83	42.09	50.72
	Final	12:36 PM	**90**	3900		14100					
31	Initial	12:36 PM	3	0	3900	0	14000	106.90	127.92	42.09	50.36
	Final	12:39 PM	**93**	3900		14000					
32	Initial	12:39 PM	3	0	3850	0	14100	105.53	128.83	41.55	50.72
	Final	12:42 PM	**96**	3850		14100					
33	Initial	12:42 PM	3	0	3750	0	13900	102.79	127.00	40.47	50.00
	Final	12:45 PM	**99**	3750		13900					
34	Initial	12:45 PM	3	0	3700	0	13800	101.42	126.09	39.93	49.64
	Final	12:48 PM	**102**	3700		13800					
35	Initial	12:48 PM	3	0	3600	0	13850	98.68	126.55	38.85	49.82
	Final	12:51 PM	**105**	3600		13850					
36	Initial	12:51 PM	3	0	3550	0	13700	97.31	125.18	38.31	49.28
	Final	12:54 PM	**108**	3550		13700					
37	Initial	12:54 PM	3	0	3550	0	13500	97.31	123.35	38.31	48.56
	Final	12:57 PM	**111**	3550		13500					
38	Initial	12:57 PM	3	0	3600	0	13650	98.68	124.72	38.85	49.10
	Final	1:00 PM	**114**	3600		13650					
39	Initial	1:00 PM	3	0	3400	0	13700	93.20	125.18	36.69	49.28
	Final	1:03 PM	**117**	3400		13700					
40	Initial	1:03 PM	3	0	3300	0	13600	90.46	124.26	35.61	48.92
	Final	1:06 PM	**120**	3300		13600					
41	Initial	1:06 PM	3	0	3000	0	13500	82.23	123.35	32.38	48.56
	Final	1:09 PM	**123**	3000		13500					
42	Initial	1:09 PM	3	0	3100	0	13550	84.97	123.81	33.45	48.74
	Final	1:12 PM	**126**	3100		13550					
43	Initial	1:12 PM	3	0	3050	0	13400	83.60	122.44	32.91	48.20
	Final	1:15 PM	**129**	3050		13400					

44	Initial	1:15 PM	3	0	3100	0	13300	84.97	121.52	33.45	47.84
	Final	1:18 PM	**132**	3100		13300					
45	Initial	1:18 PM	3	0	3000	0	13300	82.23	121.52	32.38	47.84
	Final	1:21 PM	**135**	3000		13300					
46	Initial	1:21 PM	3	0	2900	0	13400	79.49	122.44	31.30	48.20
	Final	1:24 PM	**138**	2900		13400					
47	Initial	1:24 PM	3	0	2950	0	13400	80.86	122.44	31.84	48.20
	Final	1:27 PM	**141**	2950		13400					
48	Initial	1:27 PM	3	0	2800	0	13500	76.75	123.35	30.22	48.56
	Final	1:30 PM	**144**	2800		13500					
49	Initial	1:30 PM	3	0	2750	0	13300	75.38	121.52	29.68	47.84
	Final	1:33 PM	**147**	2750		13300					
50	Initial	1:33 PM	3	0	2800	0	13400	76.75	122.44	30.22	48.20
	Final	1:36 PM	**150**	2800		13400					
51	Initial	1:36 PM	3	0	2500	0	13300	68.53	121.52	26.98	47.84
	Final	1:39 PM	**153**	2500		13300					
52	Initial	1:39 PM	3	0	2400	0	13400	65.79	122.44	25.90	48.20
	Final	1:42 PM	**156**	2400		13400					
53	Initial	1:42 PM	3	0	2300	0	13500	63.05	123.35	24.82	48.56
	Final	1:45 PM	**159**	2300		13500					
54	Initial	1:45 PM	3	0	2350	0	13400	64.42	122.44	25.36	48.20
	Final	1:48 PM	**162**	2350		13400					
55	Initial	1:48 PM	3	0	2250	0	13300	61.67	121.52	24.28	47.84
	Final	1:51 PM	**165**	2250		13300					
56	Initial	1:51 PM	3	0	2200	0	13300	60.30	121.52	23.74	47.84
	Final	1:54 PM	**168**	2200		13300					
57	Initial	1:54 PM	3	0	2100	0	13100	57.56	119.69	22.66	47.12
	Final	1:57 PM	**171**	2100		13100					
58	Initial	1:57 PM	3	0	2200	0	13000	60.30	118.78	23.74	46.76
	Final	2:00 PM	**174**	2200		13000					
59	Initial	2:00 PM	3	0	2200	0	13100	60.30	119.69	23.74	47.12
	Final	2:03 PM	**177**	2200		13100					
60	Initial	2:03 PM	3	0	2100	0	13200	57.56	120.61	22.66	47.48
	Final	2:06 PM	**180**	2100		13200					
61	Initial	2:06 PM	3	0	2150	0	13100	58.93	119.69	23.20	47.12
	Final	2:09 PM	**183**	2150		13100					
62	Initial	2:09 PM	3	0	1950	0	12900	53.45	117.87	21.04	46.40
	Final	2:12 PM	**186**	1950		12900					
63	Initial	2:12 PM	3	0	2150	0	13100	58.93	119.69	23.20	47.12
	Final	2:15 PM	**189**	2150		13100					
64	Initial	2:15 PM	3	0	2200	0	13000	60.30	118.78	23.74	46.76
	Final	2:18 PM	**192**	2200		13000					
65	Initial	2:18 PM	3	0	2100	0	12900	57.56	117.87	22.66	46.40
	Final	2:21 PM	**195**	2100		12900					
66	Initial	2:21 PM	3	0	2000	0	13000	54.82	118.78	21.58	46.76
	Final	2:24 PM	**198**	2000		13000					
67	Initial	2:24 PM	3	0	1950	0	13700	53.45	125.18	21.04	49.28
	Final	2:27 PM	**201**	1950		13700					
68	Initial	2:27 PM	3	0	2000	0	12900	54.82	117.87	21.58	46.40
	Final	2:30 PM	**204**	2000		12900					
69	Initial	2:30 PM	3	0	2100	0	12800	57.56	116.95	22.66	46.04
	Final	2:33 PM	**207**	2100		12800					

70	Initial	2:33 PM	3	0	2100	0	12700	57.56	116.04	22.66	45.68
	Final	2:36 PM	**210**	2100		12700					
71	Initial	2:36 PM	3	0	2100	0	12500	57.56	114.21	22.66	44.97
	Final	2:39 PM	**213**	2100		12500					
72	Initial	2:39 PM	3	0	1950	0	12600	53.45	115.13	21.04	45.33
	Final	2:42 PM	**216**	1950		12600					
73	Initial	2:42 PM	3	0	2100	0	12600	57.56	115.13	22.66	45.33
	Final	2:45 PM	**219**	2100		12600					
74	Initial	2:45 PM	3	0	2200	0	12500	60.30	114.21	23.74	44.97
	Final	2:48 PM	**222**	2200		12500					
75	Initial	2:48 PM	3	0	2100	0	12300	57.56	112.38	22.66	44.25
	Final	2:51 PM	**225**	2100		12300					
76	Initial	2:51 PM	3	0	2000	0	12200	54.82	111.47	21.58	43.89
	Final	2:54 PM	**228**	2000		12200					
77	Initial	2:54 PM	3	0	2100	0	12400	57.56	113.30	22.66	44.61
	Final	2:57 PM	**231**	2100		12400					
78	Initial	2:57 PM	3	0	2150	0	12300	58.93	112.38	23.20	44.25
	Final	3:00 PM	**234**	2150		12300					
79	Initial	3:00 PM	3	0	2250	0	12300	61.67	112.38	24.28	44.25
	Final	3:03 PM	**237**	2250		12300					
80	Initial	3:03 PM	3	0	2100	0	12000	57.56	109.64	22.66	43.17
	Final	3:06 PM	**240**	2100		12000					
81	Initial	3:06 PM	3	0	2150	0	12200	58.93	111.47	23.20	43.89
	Final	3:09 PM	**243**	2150		12200					
82	Initial	3:09 PM	3	0	1950	0	12100	53.45	110.56	21.04	43.53
	Final	3:12 PM	**246**	1950		12100					
83	Initial	3:12 PM	3	0	2000	0	12000	54.82	109.64	21.58	43.17
	Final	3:15 PM	**249**	2000		12000					
84	Initial	3:15 PM	3	0	1950	0	11800	53.45	107.82	21.04	42.45
	Final	3:18 PM	**252**	1950		11800					
85	Initial	3:18 PM	3	0	1950	0	11600	53.45	105.99	21.04	41.73
	Final	3:21 PM	**255**	1950		11600					
86	Initial	3:21 PM	3	0	2000	0	11400	54.82	104.16	21.58	41.01
	Final	3:24 PM	**258**	2000		11400					
87	Initial	3:24 PM	3	0	1950	0	11250	53.45	102.79	21.04	40.47
	Final	3:27 PM	**261**	1950		11250					
88	Initial	3:27 PM	3	0	1950	0	11300	53.45	103.25	21.04	40.65
	Final	3:30 PM	**264**	1950		11300					
89	Initial	3:30 PM	3	0	1950	0	11200	53.45	102.33	21.04	40.29
	Final	3:33 PM	**267**	1950		11200					
90	Initial	3:33 PM	3	0	2000	0	11200	54.82	102.33	21.58	40.29
	Final	3:36 PM	**270**	2000		11200					
91	Initial	3:36 PM	3	0	1950	0	11000	53.45	100.51	21.04	39.57
	Final	3:39 PM	**273**	1950		11000					
92	Initial	3:39 PM	3	0	1950	0	11000	53.45	100.51	21.04	39.57
	Final	3:42 PM	**276**	1950		11000					
93	Initial	3:42 PM	3	0	1950	0	11000	53.45	100.51	21.04	39.57
	Final	3:45 PM	**279**	1950		11000					
94	Initial	3:45 PM	3	0	1950	0	11000	53.45	100.51	21.04	39.57
	Final	3:48 PM	**282**	1950		11000					
95	Initial	3:48 PM	3	0	1950	0	11000	53.45	100.51	21.04	39.57
	Final	3:51 PM	**285**	1950		11000					

96	Initial	3:51 PM	3	0	1950	0	11000	53.45	100.51	21.04	39.57
	Final	3:54 PM	**288**	1950		11000					
97	Initial	3:54 PM	3	0	1950	0	11000	53.45	100.51	21.04	39.57
	Final	3:57 PM	**291**	1950		11000					
98	Initial	3:57 PM	3	0	2000	0	11000	54.82	100.51	21.58	39.57
	Final	4:00 PM	**294**	2000		11000					
99	Initial	4:00 PM	3	0	2000	0	11000	54.82	100.51	21.58	39.57
	Final	4:03 PM	**297**	2000		11000					
100	Initial	4:03 PM	3	0	1950	0	11000	53.45	100.51	21.04	39.57
	Final	4:06 PM	**300**	1950		11000					
101	Initial	4:06 PM	3	0	1950	0	11000	53.45	100.51	21.04	39.57
	Final	4:09 PM	**303**	1950		11000					
102	Initial	4:09 PM	3	0	1950	0	11000	53.45	100.51	21.04	39.57
	Final	4:12 PM	**306**	1950		11000					
103	Initial	4:12 PM	3	0	1950	0	11000	53.45	100.51	21.04	39.57
	Final	4:15 PM	**309**	1950		11000					
104	Initial	4:15 PM	3	0	1950	0	11000	53.45	100.51	21.04	39.57
	Final	4:18 PM	**312**	1950		11000					
105	Initial	4:18 PM	3	0	1950	0	11000	53.45	100.51	21.04	39.57
	Final	4:21 PM	**315**	1950		11000					
106	Initial	4:21 PM	3	0	2000	0	11000	54.82	100.51	21.58	39.57
	Final	4:24 PM	**318**	2000		11000					
107	Initial	4:24 PM	3	0	1950	0	11000	53.45	100.51	21.04	39.57
	Final	4:27 PM	**321**	1950		11000					
108	Initial	4:27 PM	3	0	1950	0	11000	53.45	100.51	21.04	39.57
	Final	4:30 PM	**324**	1950		11000					
109	Initial	4:30 PM	3	0	1950	0	11000	53.45	100.51	21.04	39.57
	Final	4:33 PM	**327**	1950		11000					
110	Initial	4:33 PM	3	0	1950	0	11000	53.45	100.51	21.04	39.57
	Final	4:36 PM	**330**	1950		11000					
111	Initial	4:36 PM	3	0	1950	0	11000	53.45	100.51	21.04	39.57
	Final	4:39 PM	**333**	1950		11000					
112	Initial	4:39 PM	3	0	1950	0	11000	53.45	100.51	21.04	39.57
	Final	4:42 PM	**336**	1950		11000					
113	Initial	4:42 PM	3	0	1950	0	11000	53.45	100.51	21.04	39.57
	Final	4:45 PM	**339**	1950		11000					
114	Initial	4:45 PM	3	0	2000	0	11000	54.82	100.51	21.58	39.57
	Final	4:48 PM	**342**	2000		11000					
115	Initial	4:48 PM	3	0	1950	0	11000	53.45	100.51	21.04	39.57
	Final	4:51 PM	**345**	1950		11000					
116	Initial	4:51 PM	3	0	1950	0	11000	53.45	100.51	21.04	39.57
	Final	4:54 PM	**348**	1950		11000					
117	Initial	4:54 PM	3	0	1950	0	11000	53.45	100.51	21.04	39.57
	Final	4:57 PM	**351**	1950		11000					
118	Initial	4:57 PM	3	0	1950	0	11000	53.45	100.51	21.04	39.57
	Final	5:00 PM	**354**	1950		11000					
119	Initial	5:00 PM	3	0	1950	0	11000	53.45	100.51	21.04	39.57
	Final	5:03 PM	**357**	1950		11000					
120	Initial	5:03 PM	3	0	1950	0	11000	53.45	100.51	21.04	39.57
	Final	5:06 PM	**360**	1950		11000					
121	Initial	5:06 PM	3	0	1950	0	11000	53.45	100.51	21.04	39.57
	Final	5:09 PM	**363**	1950		11000					

INFILTRATION CALCULATIONS

Project Name	Proposed Warehouse
Project Location	Highland, CA
Project Number	21G193-3
Engineer	Sam Bergeland

Infiltration Test No: I-14

Constants	Diameter (ft)	Area (ft^2)	Area (cm^2)
Inner	1	0.79	730
Anlr. Spac	2	2.36	2189

*Note: The infiltration rate was calculated based on current time interval

Test Interval		Time (hr)	Interval **Elapsed** (min)	Flow Readings: Inner Ring (ml)	Ring Flow (cm^3)	Annular Ring (ml)	Space Flow (cm^3)	Infiltration Rates: Inner Ring* (cm/hr)	Annular Space* (cm/hr)	Inner Ring* (in/hr)	Annular Space* (in/hr)
1	Initial	8:30 AM	3	0	4600	0	14000	126.09	127.92	49.64	50.36
	Final	8:33 AM	**3**	4600		14000					
2	Initial	8:33 AM	3	0	4300	0	14300	117.87	130.66	46.40	51.44
	Final	8:36 AM	**6**	4300		14300					
3	Initial	8:36 AM	3	0	4600	0	14500	126.09	132.49	49.64	52.16
	Final	8:39 AM	**9**	4600		14500					
4	Initial	8:39 AM	3	0	4650	0	14500	127.46	132.49	50.18	52.16
	Final	8:42 AM	**12**	4650		14500					
5	Initial	8:42 AM	3	0	4500	0	14500	123.35	132.49	48.56	52.16
	Final	8:45 AM	**15**	4500		14500					
6	Initial	8:45 AM	3	0	4500	0	14500	123.35	132.49	48.56	52.16
	Final	8:48 AM	**18**	4500		14500					
7	Initial	8:48 AM	3	0	4750	0	14500	130.20	132.49	51.26	52.16
	Final	8:51 AM	**21**	4750		14500					
8	Initial	8:51 AM	3	0	4500	0	14500	123.35	132.49	48.56	52.16
	Final	8:54 AM	**24**	4500		14500					
9	Initial	8:54 AM	3	0	4550	0	14500	124.72	132.49	49.10	52.16
	Final	8:57 AM	**27**	4550		14500					
10	Initial	8:57 AM	3	0	4650	0	14500	127.46	132.49	50.18	52.16
	Final	9:00 AM	**30**	4650		14500					
11	Initial	9:00 AM	3	0	4500	0	14500	123.35	132.49	48.56	52.16
	Final	9:03 AM	**33**	4500		14500					
12	Initial	9:03 AM	3	0	4650	0	14500	127.46	132.49	50.18	52.16
	Final	9:06 AM	**36**	4650		14500					
13	Initial	9:06 AM	3	0	4500	0	14500	123.35	132.49	48.56	52.16
	Final	9:09 AM	**39**	4500		14500					
14	Initial	9:09 AM	3	0	4650	0	14500	127.46	132.49	50.18	52.16
	Final	9:12 AM	**42**	4650		14500					
15	Initial	9:12 AM	3	0	4650	0	14500	127.46	132.49	50.18	52.16
	Final	9:15 AM	**45**	4650		14500					
16	Initial	9:15 AM	3	0	4500	0	14500	123.35	132.49	48.56	52.16
	Final	9:18 AM	**48**	4500		14500					
17	Initial	9:18 AM	3	0	4750	0	14500	130.20	132.49	51.26	52.16
	Final	9:21 AM	**51**	4750		14500					

18	Initial	9:21 AM	3	0	4600	0	14500	126.09	132.49	49.64	52.16
	Final	9:24 AM	**54**	4600		14500					
19	Initial	9:24 AM	3	0	4650	0	14500	127.46	132.49	50.18	52.16
	Final	9:27 AM	**57**	4650		14500					
20	Initial	9:27 AM	3	0	4650	0	14500	127.46	132.49	50.18	52.16
	Final	9:30 AM	**60**	4650		14500					
21	Initial	9:30 AM	3	0	4500	0	14500	123.35	132.49	48.56	52.16
	Final	9:33 AM	**63**	4500		14500					
22	Initial	9:33 AM	3	0	4750	0	14500	130.20	132.49	51.26	52.16
	Final	9:36 AM	**66**	4750		14500					
23	Initial	9:36 AM	3	0	4500	0	14500	123.35	132.49	48.56	52.16
	Final	9:39 AM	**69**	4500		14500					
24	Initial	9:39 AM	3	0	4200	0	14500	115.13	132.49	45.33	52.16
	Final	9:42 AM	**72**	4200		14500					
25	Initial	9:42 AM	3	0	4100	0	14500	112.38	132.49	44.25	52.16
	Final	9:45 AM	**75**	4100		14500					
26	Initial	9:45 AM	3	0	4000	0	14500	109.64	132.49	43.17	52.16
	Final	9:48 AM	**78**	4000		14500					
27	Initial	9:48 AM	3	0	4100	0	14500	112.38	132.49	44.25	52.16
	Final	9:51 AM	**81**	4100		14500					
28	Initial	9:51 AM	3	0	4000	0	14500	109.64	132.49	43.17	52.16
	Final	9:54 AM	**84**	4000		14500					
29	Initial	9:54 AM	3	0	4150	0	14100	113.76	128.83	44.79	50.72
	Final	9:57 AM	**87**	4150		14100					
30	Initial	9:57 AM	3	0	3900	0	14100	106.90	128.83	42.09	50.72
	Final	10:00 AM	**90**	3900		14100					
31	Initial	10:00 AM	3	0	3900	0	14000	106.90	127.92	42.09	50.36
	Final	10:03 AM	**93**	3900		14000					
32	Initial	10:03 AM	3	0	3850	0	14100	105.53	128.83	41.55	50.72
	Final	10:06 AM	**96**	3850		14100					
33	Initial	10:06 AM	3	0	3750	0	13900	102.79	127.00	40.47	50.00
	Final	10:09 AM	**99**	3750		13900					
34	Initial	10:09 AM	3	0	3700	0	13800	101.42	126.09	39.93	49.64
	Final	10:12 AM	**102**	3700		13800					
35	Initial	10:12 AM	3	0	3600	0	13850	98.68	126.55	38.85	49.82
	Final	10:15 AM	**105**	3600		13850					
36	Initial	10:15 AM	3	0	3550	0	13700	97.31	125.18	38.31	49.28
	Final	10:18 AM	**108**	3550		13700					
37	Initial	10:18 AM	3	0	3550	0	13500	97.31	123.35	38.31	48.56
	Final	10:21 AM	**111**	3550		13500					
38	Initial	10:21 AM	3	0	3600	0	13650	98.68	124.72	38.85	49.10
	Final	10:24 AM	**114**	3600		13650					
39	Initial	10:24 AM	3	0	3400	0	13700	93.20	125.18	36.69	49.28
	Final	10:27 AM	**117**	3400		13700					
40	Initial	10:27 AM	3	0	3300	0	13600	90.46	124.26	35.61	48.92
	Final	10:30 AM	**120**	3300		13600					
41	Initial	10:30 AM	3	0	3000	0	13500	82.23	123.35	32.38	48.56
	Final	10:33 AM	**123**	3000		13500					
42	Initial	10:33 AM	3	0	3100	0	13550	84.97	123.81	33.45	48.74
	Final	10:36 AM	**126**	3100		13550					
43	Initial	10:36 AM	3	0	3050	0	13400	83.60	122.44	32.91	48.20
	Final	10:39 AM	**129**	3050		13400					

44	Initial	10:39 AM	3	0	3050	0	13300	83.60	121.52	32.91	47.84
	Final	10:42 AM	**132**	3050		13300					
45	Initial	10:42 AM	3	0	3000	0	13300	82.23	121.52	32.38	47.84
	Final	10:45 AM	**135**	3000		13300					
46	Initial	10:45 AM	3	0	2900	0	13400	79.49	122.44	31.30	48.20
	Final	10:48 AM	**138**	2900		13400					
47	Initial	10:48 AM	3	0	2950	0	13400	80.86	122.44	31.84	48.20
	Final	10:51 AM	**141**	2950		13400					
48	Initial	10:51 AM	3	0	2800	0	13500	76.75	123.35	30.22	48.56
	Final	10:54 AM	**144**	2800		13500					
49	Initial	10:54 AM	3	0	2750	0	13300	75.38	121.52	29.68	47.84
	Final	10:57 AM	**147**	2750		13300					
50	Initial	10:57 AM	3	0	2600	0	13400	71.27	122.44	28.06	48.20
	Final	11:00 AM	**150**	2600		13400					
51	Initial	11:00 AM	3	0	2500	0	13300	68.53	121.52	26.98	47.84
	Final	11:03 AM	**153**	2500		13300					
52	Initial	11:03 AM	3	0	2400	0	13400	65.79	122.44	25.90	48.20
	Final	11:06 AM	**156**	2400		13400					
53	Initial	11:06 AM	3	0	2300	0	13500	63.05	123.35	24.82	48.56
	Final	11:09 AM	**159**	2300		13500					
54	Initial	11:09 AM	3	0	2350	0	13400	64.42	122.44	25.36	48.20
	Final	11:12 AM	**162**	2350		13400					
55	Initial	11:12 AM	3	0	2250	0	13300	61.67	121.52	24.28	47.84
	Final	11:15 AM	**165**	2250		13300					
56	Initial	11:15 AM	3	0	2200	0	13300	60.30	121.52	23.74	47.84
	Final	11:18 AM	**168**	2200		13300					
57	Initial	11:18 AM	3	0	2200	0	13100	60.30	119.69	23.74	47.12
	Final	11:21 AM	**171**	2200		13100					
58	Initial	11:21 AM	3	0	2250	0	13000	61.67	118.78	24.28	46.76
	Final	11:24 AM	**174**	2250		13000					
59	Initial	11:24 AM	3	0	2200	0	13100	60.30	119.69	23.74	47.12
	Final	11:27 AM	**177**	2200		13100					
60	Initial	11:27 AM	3	0	2200	0	13200	60.30	120.61	23.74	47.48
	Final	11:30 AM	**180**	2200		13200					
61	Initial	11:30 AM	3	0	2250	0	13100	61.67	119.69	24.28	47.12
	Final	11:33 AM	**183**	2250		13100					
62	Initial	11:33 AM	3	0	2400	0	12900	65.79	117.87	25.90	46.40
	Final	11:36 AM	**186**	2400		12900					
63	Initial	11:36 AM	3	0	2250	0	13100	61.67	119.69	24.28	47.12
	Final	11:39 AM	**189**	2250		13100					
64	Initial	11:39 AM	3	0	2200	0	13000	60.30	118.78	23.74	46.76
	Final	11:42 AM	**192**	2200		13000					
65	Initial	11:42 AM	3	0	2200	0	12900	60.30	117.87	23.74	46.40
	Final	11:45 AM	**195**	2200		12900					
66	Initial	11:45 AM	3	0	2200	0	13000	60.30	118.78	23.74	46.76
	Final	11:48 AM	**198**	2200		13000					
67	Initial	11:48 AM	3	0	2200	0	12900	60.30	117.87	23.74	46.40
	Final	11:51 AM	**201**	2200		12900					
68	Initial	11:51 AM	3	0	2250	0	12900	61.67	117.87	24.28	46.40
	Final	11:54 AM	**204**	2250		12900					
69	Initial	11:54 AM	3	0	2400	0	12800	65.79	116.95	25.90	46.04
	Final	11:57 AM	**207**	2400		12800					

70	Initial	11:57 AM	3	0	2250	0	12700	61.67	116.04	24.28	45.68
	Final	12:00 PM	**210**	2250		12700					
71	Initial	12:00 PM	3	0	2200	0	12500	60.30	114.21	23.74	44.97
	Final	12:03 PM	**213**	2200		12500					
72	Initial	12:03 PM	3	0	2200	0	12600	60.30	115.13	23.74	45.33
	Final	12:06 PM	**216**	2200		12600					
73	Initial	12:06 PM	3	0	2200	0	12600	60.30	115.13	23.74	45.33
	Final	12:09 PM	**219**	2200		12600					
74	Initial	12:09 PM	3	0	2200	0	12500	60.30	114.21	23.74	44.97
	Final	12:12 PM	**222**	2200		12500					
75	Initial	12:12 PM	3	0	2250	0	12300	61.67	112.38	24.28	44.25
	Final	12:15 PM	**225**	2250		12300					
76	Initial	12:15 PM	3	0	2400	0	12200	65.79	111.47	25.90	43.89
	Final	12:18 PM	**228**	2400		12200					
77	Initial	12:18 PM	3	0	2250	0	12400	61.67	113.30	24.28	44.61
	Final	12:21 PM	**231**	2250		12400					
78	Initial	12:21 PM	3	0	2200	0	12300	60.30	112.38	23.74	44.25
	Final	12:24 PM	**234**	2200		12300					
79	Initial	12:24 PM	3	0	2200	0	12300	60.30	112.38	23.74	44.25
	Final	12:27 PM	**237**	2200		12300					
80	Initial	12:27 PM	3	0	2200	0	12000	60.30	109.64	23.74	43.17
	Final	12:30 PM	**240**	2200		12000					
81	Initial	12:30 PM	3	0	2200	0	12200	60.30	111.47	23.74	43.89
	Final	12:33 PM	**243**	2200		12200					
82	Initial	12:33 PM	3	0	2250	0	12100	61.67	110.56	24.28	43.53
	Final	12:36 PM	**246**	2250		12100					
83	Initial	12:36 PM	3	0	2400	0	12000	65.79	109.64	25.90	43.17
	Final	12:39 PM	**249**	2400		12000					
84	Initial	12:39 PM	3	0	2250	0	11800	61.67	107.82	24.28	42.45
	Final	12:42 PM	**252**	2250		11800					
85	Initial	12:42 PM	3	0	2200	0	12400	60.30	113.30	23.74	44.61
	Final	12:45 PM	**255**	2200		12400					
86	Initial	12:45 PM	3	0	2200	0	12300	60.30	112.38	23.74	44.25
	Final	12:48 PM	**258**	2200		12300					
87	Initial	12:48 PM	3	0	2200	0	12300	60.30	112.38	23.74	44.25
	Final	12:51 PM	**261**	2200		12300					
88	Initial	12:51 PM	3	0	2200	0	12000	60.30	109.64	23.74	43.17
	Final	12:54 PM	**264**	2200		12000					
89	Initial	12:54 PM	3	0	2250	0	12200	61.67	111.47	24.28	43.89
	Final	12:57 PM	**267**	2250		12200					
90	Initial	12:57 PM	3	0	2400	0	12100	65.79	110.56	25.90	43.53
	Final	1:00 PM	**270**	2400		12100					
91	Initial	1:00 PM	3	0	2250	0	12000	61.67	109.64	24.28	43.17
	Final	1:03 PM	**273**	2250		12000					
92	Initial	1:03 PM	3	0	2200	0	11800	60.30	107.82	23.74	42.45
	Final	1:06 PM	**276**	2200		11800					
93	Initial	1:06 PM	3	0	2200	0	12400	60.30	113.30	23.74	44.61
	Final	1:09 PM	**279**	2200		12400					
94	Initial	1:09 PM	3	0	2200	0	12300	60.30	112.38	23.74	44.25
	Final	1:12 PM	**282**	2200		12300					
95	Initial	1:12 PM	3	0	2200	0	12300	60.30	112.38	23.74	44.25
	Final	1:15 PM	**285**	2200		12300					

96	Initial	1:15 PM	3	0	2250	0	12000	61.67	109.64	24.28	43.17
	Final	1:18 PM	**288**	2250		12000					
97	Initial	1:18 PM	3	0	2200	0	12200	60.30	111.47	23.74	43.89
	Final	1:21 PM	**291**	2200		12200					
98	Initial	1:21 PM	3	0	2200	0	12100	60.30	110.56	23.74	43.53
	Final	1:24 PM	**294**	2200		12100					
99	Initial	1:24 PM	3	0	2200	0	12000	60.30	109.64	23.74	43.17
	Final	1:27 PM	**297**	2200		12000					
100	Initial	1:27 PM	3	0	2250	0	11800	61.67	107.82	24.28	42.45
	Final	1:30 PM	**300**	2250		11800					
101	Initial	1:30 PM	3	0	2200	0	12400	60.30	113.30	23.74	44.61
	Final	1:33 PM	**303**	2200		12400					
102	Initial	1:33 PM	3	0	2250	0	12300	61.67	112.38	24.28	44.25
	Final	1:36 PM	**306**	2250		12300					
103	Initial	1:36 PM	3	0	2250	0	12300	61.67	112.38	24.28	44.25
	Final	1:39 PM	**309**	2250		12300					
104	Initial	1:39 PM	3	0	2200	0	12000	60.30	109.64	23.74	43.17
	Final	1:42 PM	**312**	2200		12000					
105	Initial	1:42 PM	3	0	2300	0	12200	63.05	111.47	24.82	43.89
	Final	1:45 PM	**315**	2300		12200					
106	Initial	1:45 PM	3	0	2250	0	12100	61.67	110.56	24.28	43.53
	Final	1:48 PM	**318**	2250		12100					
107	Initial	1:48 PM	3	0	2250	0	12000	61.67	109.64	24.28	43.17
	Final	1:51 PM	**321**	2250		12000					
108	Initial	1:51 PM	3	0	2250	0	11800	61.67	107.82	24.28	42.45
	Final	1:54 PM	**324**	2250		11800					
109	Initial	1:54 PM	3	0	2250	0	12400	61.67	113.30	24.28	44.61
	Final	1:57 PM	**327**	2250		12400					
110	Initial	1:57 PM	3	0	2200	0	12000	60.30	109.64	23.74	43.17
	Final	2:00 PM	**330**	2200		12000					
111	Initial	2:00 PM	3	0	2200	0	12000	60.30	109.64	23.74	43.17
	Final	2:03 PM	**333**	2200		12000					
112	Initial	2:03 PM	3	0	2200	0	12000	60.30	109.64	23.74	43.17
	Final	2:06 PM	**336**	2200		12000					
113	Initial	2:06 PM	3	0	2250	0	12000	61.67	109.64	24.28	43.17
	Final	2:09 PM	**339**	2250		12000					
114	Initial	2:09 PM	3	0	2200	0	12000	60.30	109.64	23.74	43.17
	Final	2:12 PM	**342**	2200		12000					
115	Initial	2:12 PM	3	0	2200	0	12000	60.30	109.64	23.74	43.17
	Final	2:15 PM	**345**	2200		12000					
116	Initial	2:15 PM	3	0	2200	0	12000	60.30	109.64	23.74	43.17
	Final	2:18 PM	**348**	2200		12000					
117	Initial	2:18 PM	3	0	2200	0	12000	60.30	109.64	23.74	43.17
	Final	2:21 PM	**351**	2200		12000					
118	Initial	2:21 PM	3	0	2200	0	12000	60.30	109.64	23.74	43.17
	Final	2:24 PM	**354**	2200		12000					
119	Initial	2:24 PM	3	0	2200	0	12000	60.30	109.64	23.74	43.17
	Final	2:27 PM	**357**	2200		12000					
120	Initial	2:27 PM	3	0	2200	0	12000	60.30	109.64	23.74	43.17
	Final	2:30 PM	**360**	2200		12000					
121	Initial	2:30 PM	3	0	2200	0	12000	60.30	109.64	23.74	43.17
	Final	2:33 PM	**363**	2200		12000					

INFILTRATION CALCULATIONS

Project Name	Proposed Warehouse
Project Location	Highland, CA
Project Number	21G193-3
Engineer	Sam Bergeland

Infiltration Test No: I-15

Constants	Diameter (ft)	Area (ft^2)	Area (cm^2)
Inner	1	0.79	730
Anlr. Spac	2	2.36	2189

*Note: The infiltration rate was calculated based on current time interval

Test Interval		Time (hr)	Interval **Elapsed** (min)	Flow Readings: Inner Ring (ml)	Ring Flow (cm^3)	Annular Ring (ml)	Space Flow (cm^3)	Infiltration Rates: Inner Ring* (cm/hr)	Annular Space* (cm/hr)	Inner Ring* (in/hr)	Annular Space* (in/hr)
1	Initial	9:46 AM	3	0	4800	0	14800	131.57	135.23	51.80	53.24
	Final	9:49 AM	**3**	4800		14800					
2	Initial	9:49 AM	3	0	4750	0	14500	130.20	132.49	51.26	52.16
	Final	9:52 AM	**6**	4750		14500					
3	Initial	9:52 AM	3	0	4500	0	14900	123.35	136.14	48.56	53.60
	Final	9:55 AM	**9**	4500		14900					
4	Initial	9:55 AM	3	0	4650	0	14800	127.46	135.23	50.18	53.24
	Final	9:58 AM	**12**	4650		14800					
5	Initial	9:58 AM	3	0	4400	0	14500	120.61	132.49	47.48	52.16
	Final	10:01 AM	**15**	4400		14500					
6	Initial	10:01 AM	3	0	4500	0	14500	123.35	132.49	48.56	52.16
	Final	10:04 AM	**18**	4500		14500					
7	Initial	10:04 AM	3	0	4750	0	14500	130.20	132.49	51.26	52.16
	Final	10:07 AM	**21**	4750		14500					
8	Initial	10:07 AM	3	0	4500	0	14500	123.35	132.49	48.56	52.16
	Final	10:10 AM	**24**	4500		14500					
9	Initial	10:10 AM	3	0	4600	0	14500	126.09	132.49	49.64	52.16
	Final	10:13 AM	**27**	4600		14500					
10	Initial	10:13 AM	3	0	4650	0	14500	127.46	132.49	50.18	52.16
	Final	10:16 AM	**30**	4650		14500					
11	Initial	10:16 AM	3	0	4500	0	14500	123.35	132.49	48.56	52.16
	Final	10:19 AM	**33**	4500		14500					
12	Initial	10:19 AM	3	0	4750	0	14500	130.20	132.49	51.26	52.16
	Final	10:22 AM	**36**	4750		14500					
13	Initial	10:22 AM	3	0	4500	0	14500	123.35	132.49	48.56	52.16
	Final	10:25 AM	**39**	4500		14500					
14	Initial	10:25 AM	3	0	4650	0	14500	127.46	132.49	50.18	52.16
	Final	10:28 AM	**42**	4650		14500					
15	Initial	10:28 AM	3	0	4650	0	14500	127.46	132.49	50.18	52.16
	Final	10:31 AM	**45**	4650		14500					
16	Initial	10:31 AM	3	0	4500	0	14500	123.35	132.49	48.56	52.16
	Final	10:34 AM	**48**	4500		14500					
17	Initial	10:34 AM	3	0	4750	0	14500	130.20	132.49	51.26	52.16
	Final	10:37 AM	**51**	4750		14500					

18	Initial	10:37 AM	3	0	4500	0	14500	123.35	132.49	48.56	52.16
	Final	10:40 AM	**54**	4500		14500					
19	Initial	10:40 AM	3	0	4650	0	14500	127.46	132.49	50.18	52.16
	Final	10:43 AM	**57**	4650		14500					
20	Initial	10:43 AM	3	0	4650	0	14500	127.46	132.49	50.18	52.16
	Final	10:46 AM	**60**	4650		14500					
21	Initial	10:46 AM	3	0	4500	0	14500	123.35	132.49	48.56	52.16
	Final	10:49 AM	**63**	4500		14500					
22	Initial	10:49 AM	3	0	4750	0	14500	130.20	132.49	51.26	52.16
	Final	10:52 AM	**66**	4750		14500					
23	Initial	10:52 AM	3	0	4500	0	14500	123.35	132.49	48.56	52.16
	Final	10:55 AM	**69**	4500		14500					
24	Initial	10:55 AM	3	0	4200	0	14500	115.13	132.49	45.33	52.16
	Final	10:58 AM	**72**	4200		14500					
25	Initial	10:58 AM	3	0	4100	0	14500	112.38	132.49	44.25	52.16
	Final	11:01 AM	**75**	4100		14500					
26	Initial	11:01 AM	3	0	4000	0	14500	109.64	132.49	43.17	52.16
	Final	11:04 AM	**78**	4000		14500					
27	Initial	11:04 AM	3	0	4100	0	14500	112.38	132.49	44.25	52.16
	Final	11:07 AM	**81**	4100		14500					
28	Initial	11:07 AM	3	0	4000	0	14500	109.64	132.49	43.17	52.16
	Final	11:10 AM	**84**	4000		14500					
29	Initial	11:10 AM	3	0	4150	0	14100	113.76	128.83	44.79	50.72
	Final	11:13 AM	**87**	4150		14100					
30	Initial	11:13 AM	3	0	3900	0	14100	106.90	128.83	42.09	50.72
	Final	11:16 AM	**90**	3900		14100					
31	Initial	11:16 AM	3	0	3900	0	14000	106.90	127.92	42.09	50.36
	Final	11:19 AM	**93**	3900		14000					
32	Initial	11:19 AM	3	0	3850	0	14100	105.53	128.83	41.55	50.72
	Final	11:22 AM	**96**	3850		14100					
33	Initial	11:22 AM	3	0	3750	0	13900	102.79	127.00	40.47	50.00
	Final	11:25 AM	**99**	3750		13900					
34	Initial	11:25 AM	3	0	3700	0	13800	101.42	126.09	39.93	49.64
	Final	11:28 AM	**102**	3700		13800					
35	Initial	11:28 AM	3	0	3600	0	13850	98.68	126.55	38.85	49.82
	Final	11:31 AM	**105**	3600		13850					
36	Initial	11:31 AM	3	0	3550	0	13700	97.31	125.18	38.31	49.28
	Final	11:34 AM	**108**	3550		13700					
37	Initial	11:34 AM	3	0	3550	0	13500	97.31	123.35	38.31	48.56
	Final	11:37 AM	**111**	3550		13500					
38	Initial	11:37 AM	3	0	3600	0	13650	98.68	124.72	38.85	49.10
	Final	11:40 AM	**114**	3600		13650					
39	Initial	11:40 AM	3	0	3400	0	13700	93.20	125.18	36.69	49.28
	Final	11:43 AM	**117**	3400		13700					
40	Initial	11:43 AM	3	0	3300	0	13600	90.46	124.26	35.61	48.92
	Final	11:46 AM	**120**	3300		13600					
41	Initial	11:46 AM	3	0	3000	0	13500	82.23	123.35	32.38	48.56
	Final	11:49 AM	**123**	3000		13500					
42	Initial	11:49 AM	3	0	3100	0	13550	84.97	123.81	33.45	48.74
	Final	11:52 AM	**126**	3100		13550					
43	Initial	11:52 AM	3	0	3050	0	13400	83.60	122.44	32.91	48.20
	Final	11:55 AM	**129**	3050		13400					

44	Initial	11:55 AM	3	0	3050	0	13300	83.60	121.52	32.91	47.84
	Final	11:58 AM	**132**	3050		13300					
45	Initial	11:58 AM	3	0	3000	0	13300	82.23	121.52	32.38	47.84
	Final	12:01 PM	**135**	3000		13300					
46	Initial	12:01 PM	3	0	2900	0	13400	79.49	122.44	31.30	48.20
	Final	12:04 PM	**138**	2900		13400					
47	Initial	12:04 PM	3	0	2950	0	13400	80.86	122.44	31.84	48.20
	Final	12:07 PM	**141**	2950		13400					
48	Initial	12:07 PM	3	0	2800	0	13500	76.75	123.35	30.22	48.56
	Final	12:10 PM	**144**	2800		13500					
49	Initial	12:10 PM	3	0	2750	0	13300	75.38	121.52	29.68	47.84
	Final	12:13 PM	**147**	2750		13300					
50	Initial	12:13 PM	3	0	2600	0	13400	71.27	122.44	28.06	48.20
	Final	12:16 PM	**150**	2600		13400					
51	Initial	12:16 PM	3	0	2500	0	13300	68.53	121.52	26.98	47.84
	Final	12:19 PM	**153**	2500		13300					
52	Initial	12:19 PM	3	0	2400	0	13400	65.79	122.44	25.90	48.20
	Final	12:22 PM	**156**	2400		13400					
53	Initial	12:22 PM	3	0	2300	0	13500	63.05	123.35	24.82	48.56
	Final	12:25 PM	**159**	2300		13500					
54	Initial	12:25 PM	3	0	2350	0	13400	64.42	122.44	25.36	48.20
	Final	12:28 PM	**162**	2350		13400					
55	Initial	12:28 PM	3	0	2250	0	13300	61.67	121.52	24.28	47.84
	Final	12:31 PM	**165**	2250		13300					
56	Initial	12:31 PM	3	0	2200	0	13300	60.30	121.52	23.74	47.84
	Final	12:34 PM	**168**	2200		13300					
57	Initial	12:34 PM	3	0	2100	0	13100	57.56	119.69	22.66	47.12
	Final	12:37 PM	**171**	2100		13100					
58	Initial	12:37 PM	3	0	2150	0	13000	58.93	118.78	23.20	46.76
	Final	12:40 PM	**174**	2150		13000					
59	Initial	12:40 PM	3	0	2200	0	13100	60.30	119.69	23.74	47.12
	Final	12:43 PM	**177**	2200		13100					
60	Initial	12:43 PM	3	0	2100	0	13200	57.56	120.61	22.66	47.48
	Final	12:46 PM	**180**	2100		13200					
61	Initial	12:46 PM	3	0	2150	0	13100	58.93	119.69	23.20	47.12
	Final	12:49 PM	**183**	2150		13100					
62	Initial	12:49 PM	3	0	2000	0	12900	54.82	117.87	21.58	46.40
	Final	12:52 PM	**186**	2000		12900					
63	Initial	12:52 PM	3	0	2150	0	13100	58.93	119.69	23.20	47.12
	Final	12:55 PM	**189**	2150		13100					
64	Initial	12:55 PM	3	0	2200	0	13000	60.30	118.78	23.74	46.76
	Final	12:58 PM	**192**	2200		13000					
65	Initial	12:58 PM	3	0	2100	0	12900	57.56	117.87	22.66	46.40
	Final	1:01 PM	**195**	2100		12900					
66	Initial	1:01 PM	3	0	2050	0	13000	56.19	118.78	22.12	46.76
	Final	1:04 PM	**198**	2050		13000					
67	Initial	1:04 PM	3	0	2000	0	13700	54.82	125.18	21.58	49.28
	Final	1:07 PM	**201**	2000		13700					
68	Initial	1:07 PM	3	0	2100	0	12900	57.56	117.87	22.66	46.40
	Final	1:10 PM	**204**	2100		12900					
69	Initial	1:10 PM	3	0	2100	0	12800	57.56	116.95	22.66	46.04
	Final	1:13 PM	**207**	2100		12800					

70	Initial	1:13 PM	3	0	2100	0	12700	57.56	116.04	22.66	45.68
	Final	1:16 PM	**210**	2100		12700					
71	Initial	1:16 PM	3	0	2100	0	12500	57.56	114.21	22.66	44.97
	Final	1:19 PM	**213**	2100		12500					
72	Initial	1:19 PM	3	0	2000	0	12600	54.82	115.13	21.58	45.33
	Final	1:22 PM	**216**	2000		12600					
73	Initial	1:22 PM	3	0	2100	0	12600	57.56	115.13	22.66	45.33
	Final	1:25 PM	**219**	2100		12600					
74	Initial	1:25 PM	3	0	2200	0	12500	60.30	114.21	23.74	44.97
	Final	1:28 PM	**222**	2200		12500					
75	Initial	1:28 PM	3	0	2100	0	12300	57.56	112.38	22.66	44.25
	Final	1:31 PM	**225**	2100		12300					
76	Initial	1:31 PM	3	0	2100	0	12200	57.56	111.47	22.66	43.89
	Final	1:34 PM	**228**	2100		12200					
77	Initial	1:34 PM	3	0	2100	0	12400	57.56	113.30	22.66	44.61
	Final	1:37 PM	**231**	2100		12400					
78	Initial	1:37 PM	3	0	2150	0	12300	58.93	112.38	23.20	44.25
	Final	1:40 PM	**234**	2150		12300					
79	Initial	1:40 PM	3	0	2250	0	12300	61.67	112.38	24.28	44.25
	Final	1:43 PM	**237**	2250		12300					
80	Initial	1:43 PM	3	0	2100	0	12000	57.56	109.64	22.66	43.17
	Final	1:46 PM	**240**	2100		12000					
81	Initial	1:46 PM	3	0	2150	0	12200	58.93	111.47	23.20	43.89
	Final	1:49 PM	**243**	2150		12200					
82	Initial	1:49 PM	3	0	2100	0	12100	57.56	110.56	22.66	43.53
	Final	1:52 PM	**246**	2100		12100					
83	Initial	1:52 PM	3	0	2050	0	12000	56.19	109.64	22.12	43.17
	Final	1:55 PM	**249**	2050		12000					
84	Initial	1:55 PM	3	0	2100	0	11800	57.56	107.82	22.66	42.45
	Final	1:58 PM	**252**	2100		11800					
85	Initial	1:58 PM	3	0	2050	0	11600	56.19	105.99	22.12	41.73
	Final	2:01 PM	**255**	2050		11600					
86	Initial	2:01 PM	3	0	2100	0	11400	57.56	104.16	22.66	41.01
	Final	2:04 PM	**258**	2100		11400					
87	Initial	2:04 PM	3	0	2150	0	11250	58.93	102.79	23.20	40.47
	Final	2:07 PM	**261**	2150		11250					
88	Initial	2:07 PM	3	0	2250	0	11300	61.67	103.25	24.28	40.65
	Final	2:10 PM	**264**	2250		11300					
89	Initial	2:10 PM	3	0	2100	0	11200	57.56	102.33	22.66	40.29
	Final	2:13 PM	**267**	2100		11200					
90	Initial	2:13 PM	3	0	2150	0	11200	58.93	102.33	23.20	40.29
	Final	2:16 PM	**270**	2150		11200					
91	Initial	2:16 PM	3	0	2050	0	11200	56.19	102.33	22.12	40.29
	Final	2:19 PM	**273**	2050		11200					
92	Initial	2:19 PM	3	0	2050	0	11200	56.19	102.33	22.12	40.29
	Final	2:22 PM	**276**	2050		11200					
93	Initial	2:22 PM	3	0	2100	0	11200	57.56	102.33	22.66	40.29
	Final	2:25 PM	**279**	2100		11200					
94	Initial	2:25 PM	3	0	2050	0	11200	56.19	102.33	22.12	40.29
	Final	2:28 PM	**282**	2050		11200					
95	Initial	2:28 PM	3	0	2100	0	11200	57.56	102.33	22.66	40.29
	Final	2:31 PM	**285**	2100		11200					

96	Initial	2:31 PM	3	0	2150	0	11200	58.93	102.33	23.20	40.29
	Final	2:34 PM	**288**	2150		11200					
97	Initial	2:34 PM	3	0	2250	0	11200	61.67	102.33	24.28	40.29
	Final	2:37 PM	**291**	2250		11200					
98	Initial	2:37 PM	3	0	2100	0	11200	57.56	102.33	22.66	40.29
	Final	2:40 PM	**294**	2100		11200					
99	Initial	2:40 PM	3	0	1950	0	11200	53.45	102.33	21.04	40.29
	Final	2:43 PM	**297**	1950		11200					
100	Initial	2:43 PM	3	0	1900	0	11200	52.08	102.33	20.50	40.29
	Final	2:46 PM	**300**	1900		11200					
101	Initial	2:46 PM	3	0	1900	0	11200	52.08	102.33	20.50	40.29
	Final	2:49 PM	**303**	1900		11200					
102	Initial	2:49 PM	3	0	1900	0	11200	52.08	102.33	20.50	40.29
	Final	2:52 PM	**306**	1900		11200					
103	Initial	2:52 PM	3	0	1950	0	11200	53.45	102.33	21.04	40.29
	Final	2:55 PM	**309**	1950		11200					
104	Initial	2:55 PM	3	0	1900	0	11200	52.08	102.33	20.50	40.29
	Final	2:58 PM	**312**	1900		11200					
105	Initial	2:58 PM	3	0	1900	0	11200	52.08	102.33	20.50	40.29
	Final	3:01 PM	**315**	1900		11200					
106	Initial	3:01 PM	3	0	1900	0	11200	52.08	102.33	20.50	40.29
	Final	3:04 PM	**318**	1900		11200					
107	Initial	3:04 PM	3	0	1900	0	11200	52.08	102.33	20.50	40.29
	Final	3:07 PM	**321**	1900		11200					
108	Initial	3:07 PM	3	0	1950	0	11200	53.45	102.33	21.04	40.29
	Final	3:10 PM	**324**	1950		11200					
109	Initial	3:10 PM	3	0	1900	0	11200	52.08	102.33	20.50	40.29
	Final	3:13 PM	**327**	1900		11200					
110	Initial	3:13 PM	3	0	1900	0	11200	52.08	102.33	20.50	40.29
	Final	3:16 PM	**330**	1900		11200					
111	Initial	3:16 PM	3	0	1950	0	11200	53.45	102.33	21.04	40.29
	Final	3:19 PM	**333**	1950		11200					
112	Initial	3:19 PM	3	0	1900	0	11200	52.08	102.33	20.50	40.29
	Final	3:22 PM	**336**	1900		11200					
113	Initial	3:22 PM	3	0	1900	0	11200	52.08	102.33	20.50	40.29
	Final	3:25 PM	**339**	1900		11200					
114	Initial	3:25 PM	3	0	1900	0	11200	52.08	102.33	20.50	40.29
	Final	3:28 PM	**342**	1900		11200					
115	Initial	3:28 PM	3	0	1900	0	11200	52.08	102.33	20.50	40.29
	Final	3:31 PM	**345**	1900		11200					
116	Initial	3:31 PM	3	0	1900	0	11200	52.08	102.33	20.50	40.29
	Final	3:34 PM	**348**	1900		11200					
117	Initial	3:34 PM	3	0	1900	0	11200	52.08	102.33	20.50	40.29
	Final	3:37 PM	**351**	1900		11200					
118	Initial	3:37 PM	3	0	1950	0	11200	53.45	102.33	21.04	40.29
	Final	3:40 PM	**354**	1950		11200					
119	Initial	3:40 PM	3	0	1900	0	11200	52.08	102.33	20.50	40.29
	Final	3:43 PM	**357**	1900		11200					
120	Initial	3:43 PM	3	0	1900	0	11200	52.08	102.33	20.50	40.29
	Final	3:46 PM	**360**	1900		11200					
121	Initial	3:46 PM	3	0	1900	0	11200	52.08	102.33	20.50	40.29
	Final	3:49 PM	**363**	1900		11200					

INFILTRATION CALCULATIONS

Project Name	Proposed Warehouse
Project Location	Highland, CA
Project Number	21G193-3
Engineer	Sam Bergeland

Infiltration Test No: I-16

Constants	Diameter (ft)	Area (ft^2)	Area (cm^2)
Inner	1	0.79	730
Anlr. Spac	2	2.36	2189

*Note: The infiltration rate was calculated based on current time interval

Test Interval		Time (hr)	Interval **Elapsed** (min)	Flow Readings: Inner Ring (ml)	Ring Flow (cm^3)	Annular Ring (ml)	Space Flow (cm^3)	Infiltration Rates: Inner Ring* (cm/hr)	Annular Space* (cm/hr)	Inner Ring* (in/hr)	Annular Space* (in/hr)
1	Initial	10:18 AM	3	0	4600	0	14000	126.09	127.92	49.64	50.36
	Final	10:21 AM	**3**	4600		14000					
2	Initial	10:21 AM	3	0	4500	0	14300	123.35	130.66	48.56	51.44
	Final	10:24 AM	**6**	4500		14300					
3	Initial	10:24 AM	3	0	4600	0	14500	126.09	132.49	49.64	52.16
	Final	10:27 AM	**9**	4600		14500					
4	Initial	10:27 AM	3	0	4650	0	14500	127.46	132.49	50.18	52.16
	Final	10:30 AM	**12**	4650		14500					
5	Initial	10:30 AM	3	0	4500	0	14500	123.35	132.49	48.56	52.16
	Final	10:33 AM	**15**	4500		14500					
6	Initial	10:33 AM	3	0	4500	0	14500	123.35	132.49	48.56	52.16
	Final	10:36 AM	**18**	4500		14500					
7	Initial	10:36 AM	3	0	4600	0	14500	126.09	132.49	49.64	52.16
	Final	10:39 AM	**21**	4600		14500					
8	Initial	10:39 AM	3	0	4500	0	14500	123.35	132.49	48.56	52.16
	Final	10:42 AM	**24**	4500		14500					
9	Initial	10:42 AM	3	0	4550	0	14500	124.72	132.49	49.10	52.16
	Final	10:45 AM	**27**	4550		14500					
10	Initial	10:45 AM	3	0	4650	0	14500	127.46	132.49	50.18	52.16
	Final	10:48 AM	**30**	4650		14500					
11	Initial	10:48 AM	3	0	4550	0	14500	124.72	132.49	49.10	52.16
	Final	10:51 AM	**33**	4550		14500					
12	Initial	10:51 AM	3	0	4650	0	14500	127.46	132.49	50.18	52.16
	Final	10:54 AM	**36**	4650		14500					
13	Initial	10:54 AM	3	0	4500	0	14500	123.35	132.49	48.56	52.16
	Final	10:57 AM	**39**	4500		14500					
14	Initial	10:57 AM	3	0	4650	0	14500	127.46	132.49	50.18	52.16
	Final	11:00 AM	**42**	4650		14500					
15	Initial	11:00 AM	3	0	4600	0	14500	126.09	132.49	49.64	52.16
	Final	11:03 AM	**45**	4600		14500					
16	Initial	11:03 AM	3	0	4500	0	14500	123.35	132.49	48.56	52.16
	Final	11:06 AM	**48**	4500		14500					
17	Initial	11:06 AM	3	0	4600	0	14500	126.09	132.49	49.64	52.16
	Final	11:09 AM	**51**	4600		14500					

18	Initial	11:09 AM	3	0	4600	0	14500	126.09	132.49	49.64	52.16
	Final	11:12 AM	**54**	4600		14500					
19	Initial	11:12 AM	3	0	4650	0	14500	127.46	132.49	50.18	52.16
	Final	11:15 AM	**57**	4650		14500					
20	Initial	11:15 AM	3	0	4650	0	14500	127.46	132.49	50.18	52.16
	Final	11:18 AM	**60**	4650		14500					
21	Initial	11:18 AM	3	0	4550	0	14500	124.72	132.49	49.10	52.16
	Final	11:21 AM	**63**	4550		14500					
22	Initial	11:21 AM	3	0	4650	0	14500	127.46	132.49	50.18	52.16
	Final	11:24 AM	**66**	4650		14500					
23	Initial	11:24 AM	3	0	4500	0	14500	123.35	132.49	48.56	52.16
	Final	11:27 AM	**69**	4500		14500					
24	Initial	11:27 AM	3	0	4200	0	14500	115.13	132.49	45.33	52.16
	Final	11:30 AM	**72**	4200		14500					
25	Initial	11:30 AM	3	0	4100	0	14500	112.38	132.49	44.25	52.16
	Final	11:33 AM	**75**	4100		14500					
26	Initial	11:33 AM	3	0	4000	0	14500	109.64	132.49	43.17	52.16
	Final	11:36 AM	**78**	4000		14500					
27	Initial	11:36 AM	3	0	4100	0	14500	112.38	132.49	44.25	52.16
	Final	11:39 AM	**81**	4100		14500					
28	Initial	11:39 AM	3	0	4000	0	14500	109.64	132.49	43.17	52.16
	Final	11:42 AM	**84**	4000		14500					
29	Initial	11:42 AM	3	0	4150	0	14100	113.76	128.83	44.79	50.72
	Final	11:45 AM	**87**	4150		14100					
30	Initial	11:45 AM	3	0	3900	0	14100	106.90	128.83	42.09	50.72
	Final	11:48 AM	**90**	3900		14100					
31	Initial	11:48 AM	3	0	3900	0	14000	106.90	127.92	42.09	50.36
	Final	11:51 AM	**93**	3900		14000					
32	Initial	11:51 AM	3	0	3850	0	14100	105.53	128.83	41.55	50.72
	Final	11:54 AM	**96**	3850		14100					
33	Initial	11:54 AM	3	0	3750	0	13900	102.79	127.00	40.47	50.00
	Final	11:57 AM	**99**	3750		13900					
34	Initial	11:57 AM	3	0	3700	0	13800	101.42	126.09	39.93	49.64
	Final	12:00 PM	**102**	3700		13800					
35	Initial	12:00 PM	3	0	3600	0	13850	98.68	126.55	38.85	49.82
	Final	12:03 PM	**105**	3600		13850					
36	Initial	12:03 PM	3	0	3550	0	13700	97.31	125.18	38.31	49.28
	Final	12:06 PM	**108**	3550		13700					
37	Initial	12:06 PM	3	0	3550	0	13500	97.31	123.35	38.31	48.56
	Final	12:09 PM	**111**	3550		13500					
38	Initial	12:09 PM	3	0	3600	0	13650	98.68	124.72	38.85	49.10
	Final	12:12 PM	**114**	3600		13650					
39	Initial	12:12 PM	3	0	3400	0	13700	93.20	125.18	36.69	49.28
	Final	12:15 PM	**117**	3400		13700					
40	Initial	12:15 PM	3	0	3300	0	13600	90.46	124.26	35.61	48.92
	Final	12:18 PM	**120**	3300		13600					
41	Initial	12:18 PM	3	0	3000	0	13500	82.23	123.35	32.38	48.56
	Final	12:21 PM	**123**	3000		13500					
42	Initial	12:21 PM	3	0	3100	0	13550	84.97	123.81	33.45	48.74
	Final	12:24 PM	**126**	3100		13550					
43	Initial	12:24 PM	3	0	3050	0	13400	83.60	122.44	32.91	48.20
	Final	12:27 PM	**129**	3050		13400					

44	Initial	12:27 PM	3	0	3000	0	13300	82.23	121.52	32.38	47.84
	Final	12:30 PM	**132**	3000		13300					
45	Initial	12:30 PM	3	0	3000	0	13300	82.23	121.52	32.38	47.84
	Final	12:33 PM	**135**	3000		13300					
46	Initial	12:33 PM	3	0	2900	0	13400	79.49	122.44	31.30	48.20
	Final	12:36 PM	**138**	2900		13400					
47	Initial	12:36 PM	3	0	2950	0	13400	80.86	122.44	31.84	48.20
	Final	12:39 PM	**141**	2950		13400					
48	Initial	12:39 PM	3	0	2800	0	13500	76.75	123.35	30.22	48.56
	Final	12:42 PM	**144**	2800		13500					
49	Initial	12:42 PM	3	0	2750	0	13300	75.38	121.52	29.68	47.84
	Final	12:45 PM	**147**	2750		13300					
50	Initial	12:45 PM	3	0	2600	0	13400	71.27	122.44	28.06	48.20
	Final	12:48 PM	**150**	2600		13400					
51	Initial	12:48 PM	3	0	2500	0	13300	68.53	121.52	26.98	47.84
	Final	12:51 PM	**153**	2500		13300					
52	Initial	12:51 PM	3	0	2550	0	13400	69.90	122.44	27.52	48.20
	Final	12:54 PM	**156**	2550		13400					
53	Initial	12:54 PM	3	0	2300	0	13500	63.05	123.35	24.82	48.56
	Final	12:57 PM	**159**	2300		13500					
54	Initial	12:57 PM	3	0	2350	0	13400	64.42	122.44	25.36	48.20
	Final	1:00 PM	**162**	2350		13400					
55	Initial	1:00 PM	3	0	2400	0	13300	65.79	121.52	25.90	47.84
	Final	1:03 PM	**165**	2400		13300					
56	Initial	1:03 PM	3	0	2250	0	13300	61.67	121.52	24.28	47.84
	Final	1:06 PM	**168**	2250		13300					
57	Initial	1:06 PM	3	0	2250	0	13100	61.67	119.69	24.28	47.12
	Final	1:09 PM	**171**	2250		13100					
58	Initial	1:09 PM	3	0	2300	0	13000	63.05	118.78	24.82	46.76
	Final	1:12 PM	**174**	2300		13000					
59	Initial	1:12 PM	3	0	2250	0	13100	61.67	119.69	24.28	47.12
	Final	1:15 PM	**177**	2250		13100					
60	Initial	1:15 PM	3	0	2250	0	13200	61.67	120.61	24.28	47.48
	Final	1:18 PM	**180**	2250		13200					
61	Initial	1:18 PM	3	0	2300	0	13100	63.05	119.69	24.82	47.12
	Final	1:21 PM	**183**	2300		13100					
62	Initial	1:21 PM	3	0	2500	0	12900	68.53	117.87	26.98	46.40
	Final	1:24 PM	**186**	2500		12900					
63	Initial	1:24 PM	3	0	2300	0	13100	63.05	119.69	24.82	47.12
	Final	1:27 PM	**189**	2300		13100					
64	Initial	1:27 PM	3	0	2250	0	13000	61.67	118.78	24.28	46.76
	Final	1:30 PM	**192**	2250		13000					
65	Initial	1:30 PM	3	0	2250	0	12900	61.67	117.87	24.28	46.40
	Final	1:33 PM	**195**	2250		12900					
66	Initial	1:33 PM	3	0	2250	0	13000	61.67	118.78	24.28	46.76
	Final	1:36 PM	**198**	2250		13000					
67	Initial	1:36 PM	3	0	2250	0	12900	61.67	117.87	24.28	46.40
	Final	1:39 PM	**201**	2250		12900					
68	Initial	1:39 PM	3	0	2300	0	12900	63.05	117.87	24.82	46.40
	Final	1:42 PM	**204**	2300		12900					
69	Initial	1:42 PM	3	0	2400	0	12800	65.79	116.95	25.90	46.04
	Final	1:45 PM	**207**	2400		12800					

70	Initial	1:45 PM	3	0	2300	0	12700	63.05	116.04	24.82	45.68
	Final	1:48 PM	**210**	2300		12700					
71	Initial	1:48 PM	3	0	2250	0	12500	61.67	114.21	24.28	44.97
	Final	1:51 PM	**213**	2250		12500					
72	Initial	1:51 PM	3	0	2250	0	12600	61.67	115.13	24.28	45.33
	Final	1:54 PM	**216**	2250		12600					
73	Initial	1:54 PM	3	0	2250	0	12600	61.67	115.13	24.28	45.33
	Final	1:57 PM	**219**	2250		12600					
74	Initial	1:57 PM	3	0	2250	0	12500	61.67	114.21	24.28	44.97
	Final	2:00 PM	**222**	2250		12500					
75	Initial	2:00 PM	3	0	2300	0	12300	63.05	112.38	24.82	44.25
	Final	2:03 PM	**225**	2300		12300					
76	Initial	2:03 PM	3	0	2400	0	12200	65.79	111.47	25.90	43.89
	Final	2:06 PM	**228**	2400		12200					
77	Initial	2:06 PM	3	0	2300	0	12400	63.05	113.30	24.82	44.61
	Final	2:09 PM	**231**	2300		12400					
78	Initial	2:09 PM	3	0	2250	0	12300	61.67	112.38	24.28	44.25
	Final	2:12 PM	**234**	2250		12300					
79	Initial	2:12 PM	3	0	2250	0	12300	61.67	112.38	24.28	44.25
	Final	2:15 PM	**237**	2250		12300					
80	Initial	2:15 PM	3	0	2250	0	12000	61.67	109.64	24.28	43.17
	Final	2:18 PM	**240**	2250		12000					
81	Initial	2:18 PM	3	0	2250	0	12200	61.67	111.47	24.28	43.89
	Final	2:21 PM	**243**	2250		12200					
82	Initial	2:21 PM	3	0	2300	0	12100	63.05	110.56	24.82	43.53
	Final	2:24 PM	**246**	2300		12100					
83	Initial	2:24 PM	3	0	2400	0	12000	65.79	109.64	25.90	43.17
	Final	2:27 PM	**249**	2400		12000					
84	Initial	2:27 PM	3	0	2300	0	11800	63.05	107.82	24.82	42.45
	Final	2:30 PM	**252**	2300		11800					
85	Initial	2:30 PM	3	0	2250	0	12400	61.67	113.30	24.28	44.61
	Final	2:33 PM	**255**	2250		12400					
86	Initial	2:33 PM	3	0	2250	0	12300	61.67	112.38	24.28	44.25
	Final	2:36 PM	**258**	2250		12300					
87	Initial	2:36 PM	3	0	2250	0	12300	61.67	112.38	24.28	44.25
	Final	2:39 PM	**261**	2250		12300					
88	Initial	2:39 PM	3	0	2250	0	12000	61.67	109.64	24.28	43.17
	Final	2:42 PM	**264**	2250		12000					
89	Initial	2:42 PM	3	0	2300	0	12200	63.05	111.47	24.82	43.89
	Final	2:45 PM	**267**	2300		12200					
90	Initial	2:45 PM	3	0	2400	0	12100	65.79	110.56	25.90	43.53
	Final	2:48 PM	**270**	2400		12100					
91	Initial	2:48 PM	3	0	2300	0	12000	63.05	109.64	24.82	43.17
	Final	2:51 PM	**273**	2300		12000					
92	Initial	2:51 PM	3	0	2250	0	11800	61.67	107.82	24.28	42.45
	Final	2:54 PM	**276**	2250		11800					
93	Initial	2:54 PM	3	0	2250	0	12400	61.67	113.30	24.28	44.61
	Final	2:57 PM	**279**	2250		12400					
94	Initial	2:57 PM	3	0	2250	0	12300	61.67	112.38	24.28	44.25
	Final	3:00 PM	**282**	2250		12300					
95	Initial	3:00 PM	3	0	2250	0	12300	61.67	112.38	24.28	44.25
	Final	3:03 PM	**285**	2250		12300					

96	Initial	3:03 PM	3	0	2300	0	12000	63.05	109.64	24.82	43.17
	Final	3:06 PM	**288**	2300		12000					
97	Initial	3:06 PM	3	0	2250	0	12200	61.67	111.47	24.28	43.89
	Final	3:09 PM	**291**	2250		12200					
98	Initial	3:09 PM	3	0	2250	0	12100	61.67	110.56	24.28	43.53
	Final	3:12 PM	**294**	2250		12100					
99	Initial	3:12 PM	3	0	2250	0	12000	61.67	109.64	24.28	43.17
	Final	3:15 PM	**297**	2250		12000					
100	Initial	3:15 PM	3	0	2300	0	11800	63.05	107.82	24.82	42.45
	Final	3:18 PM	**300**	2300		11800					
101	Initial	3:18 PM	3	0	2250	0	12400	61.67	113.30	24.28	44.61
	Final	3:21 PM	**303**	2250		12400					
102	Initial	3:21 PM	3	0	2300	0	12300	63.05	112.38	24.82	44.25
	Final	3:24 PM	**306**	2300		12300					
103	Initial	3:24 PM	3	0	2300	0	12300	63.05	112.38	24.82	44.25
	Final	3:27 PM	**309**	2300		12300					
104	Initial	3:27 PM	3	0	2250	0	12000	61.67	109.64	24.28	43.17
	Final	3:30 PM	**312**	2250		12000					
105	Initial	3:30 PM	3	0	2300	0	12200	63.05	111.47	24.82	43.89
	Final	3:33 PM	**315**	2300		12200					
106	Initial	3:33 PM	3	0	2300	0	12100	63.05	110.56	24.82	43.53
	Final	3:36 PM	**318**	2300		12100					
107	Initial	3:36 PM	3	0	2300	0	12000	63.05	109.64	24.82	43.17
	Final	3:39 PM	**321**	2300		12000					
108	Initial	3:39 PM	3	0	2300	0	11800	63.05	107.82	24.82	42.45
	Final	3:42 PM	**324**	2300		11800					
109	Initial	3:42 PM	3	0	2300	0	12400	63.05	113.30	24.82	44.61
	Final	3:45 PM	**327**	2300		12400					
110	Initial	3:45 PM	3	0	2250	0	12000	61.67	109.64	24.28	43.17
	Final	3:48 PM	**330**	2250		12000					
111	Initial	3:48 PM	3	0	2250	0	12000	61.67	109.64	24.28	43.17
	Final	3:51 PM	**333**	2250		12000					
112	Initial	3:51 PM	3	0	2250	0	12000	61.67	109.64	24.28	43.17
	Final	3:54 PM	**336**	2250		12000					
113	Initial	3:54 PM	3	0	2300	0	12000	63.05	109.64	24.82	43.17
	Final	3:57 PM	**339**	2300		12000					
114	Initial	3:57 PM	3	0	2250	0	12000	61.67	109.64	24.28	43.17
	Final	4:00 PM	**342**	2250		12000					
115	Initial	4:00 PM	3	0	2250	0	12000	61.67	109.64	24.28	43.17
	Final	4:03 PM	**345**	2250		12000					
116	Initial	4:03 PM	3	0	2250	0	12000	61.67	109.64	24.28	43.17
	Final	4:06 PM	**348**	2250		12000					
117	Initial	4:06 PM	3	0	2250	0	12000	61.67	109.64	24.28	43.17
	Final	4:09 PM	**351**	2250		12000					
118	Initial	4:09 PM	3	0	2250	0	12000	61.67	109.64	24.28	43.17
	Final	4:12 PM	**354**	2250		12000					
119	Initial	4:12 PM	3	0	2250	0	12000	61.67	109.64	24.28	43.17
	Final	4:15 PM	**357**	2250		12000					
120	Initial	4:15 PM	3	0	2250	0	12000	61.67	109.64	24.28	43.17
	Final	4:18 PM	**360**	2250		12000					
121	Initial	4:18 PM	3	0	2250	0	12000	61.67	109.64	24.28	43.17
	Final	4:21 PM	**363**	2250		12000					

INFILTRATION CALCULATIONS

Project Name	Proposed Warehouse
Project Location	Highland, CA
Project Number	21G193-3
Engineer	Sam Bergeland

Infiltration Test No: I-17

Constants	Diameter (ft)	Area (ft^2)	Area (cm^2)
Inner	1	0.79	730
Anlr. Spac	2	2.36	2189

*Note: The infiltration rate was calculated based on current time interval

Test Interval		Time (hr)	Interval **Elapsed** (min)	Flow Readings: Inner Ring (ml)	Ring Flow (cm^3)	Annular Ring (ml)	Space Flow (cm^3)	Infiltration Rates: Inner Ring* (cm/hr)	Annular Space* (cm/hr)	Inner Ring* (in/hr)	Annular Space* (in/hr)
1	Initial	8:30 AM	3	0	4800	0	14800	131.57	135.23	51.80	53.24
	Final	8:33 AM	**3**	4800		14800					
2	Initial	8:33 AM	3	0	4750	0	14500	130.20	132.49	51.26	52.16
	Final	8:36 AM	**6**	4750		14500					
3	Initial	8:36 AM	3	0	4500	0	14900	123.35	136.14	48.56	53.60
	Final	8:39 AM	**9**	4500		14900					
4	Initial	8:39 AM	3	0	4650	0	14800	127.46	135.23	50.18	53.24
	Final	8:42 AM	**12**	4650		14800					
5	Initial	8:42 AM	3	0	4400	0	14500	120.61	132.49	47.48	52.16
	Final	8:45 AM	**15**	4400		14500					
6	Initial	8:45 AM	3	0	4500	0	14500	123.35	132.49	48.56	52.16
	Final	8:48 AM	**18**	4500		14500					
7	Initial	8:48 AM	3	0	4750	0	14500	130.20	132.49	51.26	52.16
	Final	8:51 AM	**21**	4750		14500					
8	Initial	8:51 AM	3	0	4500	0	14500	123.35	132.49	48.56	52.16
	Final	8:54 AM	**24**	4500		14500					
9	Initial	8:54 AM	3	0	4600	0	14500	126.09	132.49	49.64	52.16
	Final	8:57 AM	**27**	4600		14500					
10	Initial	8:57 AM	3	0	4650	0	14500	127.46	132.49	50.18	52.16
	Final	9:00 AM	**30**	4650		14500					
11	Initial	9:00 AM	3	0	4500	0	14500	123.35	132.49	48.56	52.16
	Final	9:03 AM	**33**	4500		14500					
12	Initial	9:03 AM	3	0	4750	0	14500	130.20	132.49	51.26	52.16
	Final	9:06 AM	**36**	4750		14500					
13	Initial	9:06 AM	3	0	4500	0	14500	123.35	132.49	48.56	52.16
	Final	9:09 AM	**39**	4500		14500					
14	Initial	9:09 AM	3	0	4650	0	14500	127.46	132.49	50.18	52.16
	Final	9:12 AM	**42**	4650		14500					
15	Initial	9:12 AM	3	0	4650	0	14500	127.46	132.49	50.18	52.16
	Final	9:15 AM	**45**	4650		14500					
16	Initial	9:15 AM	3	0	4500	0	14500	123.35	132.49	48.56	52.16
	Final	9:18 AM	**48**	4500		14500					
17	Initial	9:18 AM	3	0	4750	0	14500	130.20	132.49	51.26	52.16
	Final	9:21 AM	**51**	4750		14500					

18	Initial	9:21 AM	3	0	4500	0	14500	123.35	132.49	48.56	52.16
	Final	9:24 AM	**54**	4500		14500					
19	Initial	9:24 AM	3	0	4650	0	14500	127.46	132.49	50.18	52.16
	Final	9:27 AM	**57**	4650		14500					
20	Initial	9:27 AM	3	0	4650	0	14500	127.46	132.49	50.18	52.16
	Final	9:30 AM	**60**	4650		14500					
21	Initial	9:30 AM	3	0	4500	0	14500	123.35	132.49	48.56	52.16
	Final	9:33 AM	**63**	4500		14500					
22	Initial	9:33 AM	3	0	4750	0	14500	130.20	132.49	51.26	52.16
	Final	9:36 AM	**66**	4750		14500					
23	Initial	9:36 AM	3	0	4500	0	14500	123.35	132.49	48.56	52.16
	Final	9:39 AM	**69**	4500		14500					
24	Initial	9:39 AM	3	0	4200	0	14500	115.13	132.49	45.33	52.16
	Final	9:42 AM	**72**	4200		14500					
25	Initial	9:42 AM	3	0	4100	0	14500	112.38	132.49	44.25	52.16
	Final	9:45 AM	**75**	4100		14500					
26	Initial	9:45 AM	3	0	4000	0	14500	109.64	132.49	43.17	52.16
	Final	9:48 AM	**78**	4000		14500					
27	Initial	9:48 AM	3	0	4100	0	14500	112.38	132.49	44.25	52.16
	Final	9:51 AM	**81**	4100		14500					
28	Initial	9:51 AM	3	0	4000	0	14500	109.64	132.49	43.17	52.16
	Final	9:54 AM	**84**	4000		14500					
29	Initial	9:54 AM	3	0	4150	0	14100	113.76	128.83	44.79	50.72
	Final	9:57 AM	**87**	4150		14100					
30	Initial	9:57 AM	3	0	3900	0	14100	106.90	128.83	42.09	50.72
	Final	10:00 AM	**90**	3900		14100					
31	Initial	10:00 AM	3	0	3900	0	14000	106.90	127.92	42.09	50.36
	Final	10:03 AM	**93**	3900		14000					
32	Initial	10:03 AM	3	0	3850	0	14100	105.53	128.83	41.55	50.72
	Final	10:06 AM	**96**	3850		14100					
33	Initial	10:06 AM	3	0	3750	0	13900	102.79	127.00	40.47	50.00
	Final	10:09 AM	**99**	3750		13900					
34	Initial	10:09 AM	3	0	3700	0	13800	101.42	126.09	39.93	49.64
	Final	10:12 AM	**102**	3700		13800					
35	Initial	10:12 AM	3	0	3600	0	13850	98.68	126.55	38.85	49.82
	Final	10:15 AM	**105**	3600		13850					
36	Initial	10:15 AM	3	0	3550	0	13700	97.31	125.18	38.31	49.28
	Final	10:18 AM	**108**	3550		13700					
37	Initial	10:18 AM	3	0	3550	0	13500	97.31	123.35	38.31	48.56
	Final	10:21 AM	**111**	3550		13500					
38	Initial	10:21 AM	3	0	3600	0	13650	98.68	124.72	38.85	49.10
	Final	10:24 AM	**114**	3600		13650					
39	Initial	10:24 AM	3	0	3400	0	13700	93.20	125.18	36.69	49.28
	Final	10:27 AM	**117**	3400		13700					
40	Initial	10:27 AM	3	0	3300	0	13600	90.46	124.26	35.61	48.92
	Final	10:30 AM	**120**	3300		13600					
41	Initial	10:30 AM	3	0	3000	0	13500	82.23	123.35	32.38	48.56
	Final	10:33 AM	**123**	3000		13500					
42	Initial	10:33 AM	3	0	3100	0	13550	84.97	123.81	33.45	48.74
	Final	10:36 AM	**126**	3100		13550					
43	Initial	10:36 AM	3	0	3050	0	13400	83.60	122.44	32.91	48.20
	Final	10:39 AM	**129**	3050		13400					

44	Initial	10:39 AM	3	0	3050	0	13300	83.60	121.52	32.91	47.84
	Final	10:42 AM	**132**	3050		13300					
45	Initial	10:42 AM	3	0	3000	0	13300	82.23	121.52	32.38	47.84
	Final	10:45 AM	**135**	3000		13300					
46	Initial	10:45 AM	3	0	2900	0	13400	79.49	122.44	31.30	48.20
	Final	10:48 AM	**138**	2900		13400					
47	Initial	10:48 AM	3	0	2950	0	13400	80.86	122.44	31.84	48.20
	Final	10:51 AM	**141**	2950		13400					
48	Initial	10:51 AM	3	0	2800	0	13500	76.75	123.35	30.22	48.56
	Final	10:54 AM	**144**	2800		13500					
49	Initial	10:54 AM	3	0	2750	0	13300	75.38	121.52	29.68	47.84
	Final	10:57 AM	**147**	2750		13300					
50	Initial	10:57 AM	3	0	2600	0	13400	71.27	122.44	28.06	48.20
	Final	11:00 AM	**150**	2600		13400					
51	Initial	11:00 AM	3	0	2500	0	13300	68.53	121.52	26.98	47.84
	Final	11:03 AM	**153**	2500		13300					
52	Initial	11:03 AM	3	0	2400	0	13400	65.79	122.44	25.90	48.20
	Final	11:06 AM	**156**	2400		13400					
53	Initial	11:06 AM	3	0	2300	0	13500	63.05	123.35	24.82	48.56
	Final	11:09 AM	**159**	2300		13500					
54	Initial	11:09 AM	3	0	2350	0	13400	64.42	122.44	25.36	48.20
	Final	11:12 AM	**162**	2350		13400					
55	Initial	11:12 AM	3	0	2250	0	13300	61.67	121.52	24.28	47.84
	Final	11:15 AM	**165**	2250		13300					
56	Initial	11:15 AM	3	0	2200	0	13300	60.30	121.52	23.74	47.84
	Final	11:18 AM	**168**	2200		13300					
57	Initial	11:18 AM	3	0	2100	0	13100	57.56	119.69	22.66	47.12
	Final	11:21 AM	**171**	2100		13100					
58	Initial	11:21 AM	3	0	2150	0	13000	58.93	118.78	23.20	46.76
	Final	11:24 AM	**174**	2150		13000					
59	Initial	11:24 AM	3	0	2200	0	13100	60.30	119.69	23.74	47.12
	Final	11:27 AM	**177**	2200		13100					
60	Initial	11:27 AM	3	0	2100	0	13200	57.56	120.61	22.66	47.48
	Final	11:30 AM	**180**	2100		13200					
61	Initial	11:30 AM	3	0	2150	0	13100	58.93	119.69	23.20	47.12
	Final	11:33 AM	**183**	2150		13100					
62	Initial	11:33 AM	3	0	2000	0	12900	54.82	117.87	21.58	46.40
	Final	11:36 AM	**186**	2000		12900					
63	Initial	11:36 AM	3	0	2150	0	13100	58.93	119.69	23.20	47.12
	Final	11:39 AM	**189**	2150		13100					
64	Initial	11:39 AM	3	0	2200	0	13000	60.30	118.78	23.74	46.76
	Final	11:42 AM	**192**	2200		13000					
65	Initial	11:42 AM	3	0	2100	0	12900	57.56	117.87	22.66	46.40
	Final	11:45 AM	**195**	2100		12900					
66	Initial	11:45 AM	3	0	2050	0	13000	56.19	118.78	22.12	46.76
	Final	11:48 AM	**198**	2050		13000					
67	Initial	11:48 AM	3	0	2000	0	13700	54.82	125.18	21.58	49.28
	Final	11:51 AM	**201**	2000		13700					
68	Initial	11:51 AM	3	0	2100	0	12900	57.56	117.87	22.66	46.40
	Final	11:54 AM	**204**	2100		12900					
69	Initial	11:54 AM	3	0	2100	0	12800	57.56	116.95	22.66	46.04
	Final	11:57 AM	**207**	2100		12800					

70	Initial	11:57 AM	3	0	2100	0	12700	57.56	116.04	22.66	45.68
	Final	12:00 PM	**210**	2100		12700					
71	Initial	12:00 PM	3	0	2100	0	12500	57.56	114.21	22.66	44.97
	Final	12:03 PM	**213**	2100		12500					
72	Initial	12:03 PM	3	0	2000	0	12600	54.82	115.13	21.58	45.33
	Final	12:06 PM	**216**	2000		12600					
73	Initial	12:06 PM	3	0	2100	0	12600	57.56	115.13	22.66	45.33
	Final	12:09 PM	**219**	2100		12600					
74	Initial	12:09 PM	3	0	2200	0	12500	60.30	114.21	23.74	44.97
	Final	12:12 PM	**222**	2200		12500					
75	Initial	12:12 PM	3	0	2100	0	12300	57.56	112.38	22.66	44.25
	Final	12:15 PM	**225**	2100		12300					
76	Initial	12:15 PM	3	0	2050	0	12200	56.19	111.47	22.12	43.89
	Final	12:18 PM	**228**	2050		12200					
77	Initial	12:18 PM	3	0	2100	0	12400	57.56	113.30	22.66	44.61
	Final	12:21 PM	**231**	2100		12400					
78	Initial	12:21 PM	3	0	2150	0	12300	58.93	112.38	23.20	44.25
	Final	12:24 PM	**234**	2150		12300					
79	Initial	12:24 PM	3	0	2250	0	12300	61.67	112.38	24.28	44.25
	Final	12:27 PM	**237**	2250		12300					
80	Initial	12:27 PM	3	0	2100	0	12000	57.56	109.64	22.66	43.17
	Final	12:30 PM	**240**	2100		12000					
81	Initial	12:30 PM	3	0	2150	0	12200	58.93	111.47	23.20	43.89
	Final	12:33 PM	**243**	2150		12200					
82	Initial	12:33 PM	3	0	2000	0	12100	54.82	110.56	21.58	43.53
	Final	12:36 PM	**246**	2000		12100					
83	Initial	12:36 PM	3	0	2050	0	12000	56.19	109.64	22.12	43.17
	Final	12:39 PM	**249**	2050		12000					
84	Initial	12:39 PM	3	0	2100	0	11800	57.56	107.82	22.66	42.45
	Final	12:42 PM	**252**	2100		11800					
85	Initial	12:42 PM	3	0	2050	0	11600	56.19	105.99	22.12	41.73
	Final	12:45 PM	**255**	2050		11600					
86	Initial	12:45 PM	3	0	2100	0	11400	57.56	104.16	22.66	41.01
	Final	12:48 PM	**258**	2100		11400					
87	Initial	12:48 PM	3	0	2150	0	11250	58.93	102.79	23.20	40.47
	Final	12:51 PM	**261**	2150		11250					
88	Initial	12:51 PM	3	0	2250	0	11300	61.67	103.25	24.28	40.65
	Final	12:54 PM	**264**	2250		11300					
89	Initial	12:54 PM	3	0	2100	0	11200	57.56	102.33	22.66	40.29
	Final	12:57 PM	**267**	2100		11200					
90	Initial	12:57 PM	3	0	2150	0	11200	58.93	102.33	23.20	40.29
	Final	1:00 PM	**270**	2150		11200					
91	Initial	1:00 PM	3	0	2050	0	11200	56.19	102.33	22.12	40.29
	Final	1:03 PM	**273**	2050		11200					
92	Initial	1:03 PM	3	0	2050	0	11200	56.19	102.33	22.12	40.29
	Final	1:06 PM	**276**	2050		11200					
93	Initial	1:06 PM	3	0	2100	0	11200	57.56	102.33	22.66	40.29
	Final	1:09 PM	**279**	2100		11200					
94	Initial	1:09 PM	3	0	2050	0	11200	56.19	102.33	22.12	40.29
	Final	1:12 PM	**282**	2050		11200					
95	Initial	1:12 PM	3	0	2100	0	11200	57.56	102.33	22.66	40.29
	Final	1:15 PM	**285**	2100		11200					

96	Initial	1:15 PM	3	0	2150	0	11200	58.93	102.33	23.20	40.29
	Final	1:18 PM	**288**	2150		11200					
97	Initial	1:18 PM	3	0	2250	0	11200	61.67	102.33	24.28	40.29
	Final	1:21 PM	**291**	2250		11200					
98	Initial	1:21 PM	3	0	2100	0	11200	57.56	102.33	22.66	40.29
	Final	1:24 PM	**294**	2100		11200					
99	Initial	1:24 PM	3	0	1950	0	11200	53.45	102.33	21.04	40.29
	Final	1:27 PM	**297**	1950		11200					
100	Initial	1:27 PM	3	0	1900	0	11200	52.08	102.33	20.50	40.29
	Final	1:30 PM	**300**	1900		11200					
101	Initial	1:30 PM	3	0	1900	0	11200	52.08	102.33	20.50	40.29
	Final	1:33 PM	**303**	1900		11200					
102	Initial	1:33 PM	3	0	2000	0	11200	54.82	102.33	21.58	40.29
	Final	1:36 PM	**306**	2000		11200					
103	Initial	1:36 PM	3	0	1950	0	11200	53.45	102.33	21.04	40.29
	Final	1:39 PM	**309**	1950		11200					
104	Initial	1:39 PM	3	0	1900	0	11200	52.08	102.33	20.50	40.29
	Final	1:42 PM	**312**	1900		11200					
105	Initial	1:42 PM	3	0	1875	0	11200	51.40	102.33	20.23	40.29
	Final	1:45 PM	**315**	1875		11200					
106	Initial	1:45 PM	3	0	1950	0	11200	53.45	102.33	21.04	40.29
	Final	1:48 PM	**318**	1950		11200					
107	Initial	1:48 PM	3	0	1900	0	11200	52.08	102.33	20.50	40.29
	Final	1:51 PM	**321**	1900		11200					
108	Initial	1:51 PM	3	0	1950	0	11200	53.45	102.33	21.04	40.29
	Final	1:54 PM	**324**	1950		11200					
109	Initial	1:54 PM	3	0	1900	0	11200	52.08	102.33	20.50	40.29
	Final	1:57 PM	**327**	1900		11200					
110	Initial	1:57 PM	3	0	1875	0	11200	51.40	102.33	20.23	40.29
	Final	2:00 PM	**330**	1875		11200					
111	Initial	2:00 PM	3	0	1950	0	11200	53.45	102.33	21.04	40.29
	Final	2:03 PM	**333**	1950		11200					
112	Initial	2:03 PM	3	0	1900	0	11200	52.08	102.33	20.50	40.29
	Final	2:06 PM	**336**	1900		11200					
113	Initial	2:06 PM	3	0	1900	0	11200	52.08	102.33	20.50	40.29
	Final	2:09 PM	**339**	1900		11200					
114	Initial	2:09 PM	3	0	1875	0	11200	51.40	102.33	20.23	40.29
	Final	2:12 PM	**342**	1875		11200					
115	Initial	2:12 PM	3	0	1875	0	11200	51.40	102.33	20.23	40.29
	Final	2:15 PM	**345**	1875		11200					
116	Initial	2:15 PM	3	0	1875	0	11200	51.40	102.33	20.23	40.29
	Final	2:18 PM	**348**	1875		11200					
117	Initial	2:18 PM	3	0	1900	0	11200	52.08	102.33	20.50	40.29
	Final	2:21 PM	**351**	1900		11200					
118	Initial	2:21 PM	3	0	1875	0	11200	51.40	102.33	20.23	40.29
	Final	2:24 PM	**354**	1875		11200					
119	Initial	2:24 PM	3	0	1875	0	11200	51.40	102.33	20.23	40.29
	Final	2:27 PM	**357**	1875		11200					
120	Initial	2:27 PM	3	0	1875	0	11200	51.40	102.33	20.23	40.29
	Final	2:30 PM	**360**	1875		11200					
121	Initial	2:30 PM	3	0	1875	0	11200	51.40	102.33	20.23	40.29
	Final	2:33 PM	**363**	1875		11200					

INFILTRATION CALCULATIONS

Project Name	Proposed Warehouse
Project Location	Highland, CA
Project Number	21G193-3
Engineer	Sam Bergeland

Infiltration Test No: I-18

Constants	Diameter (ft)	Area (ft^2)	Area (cm^2)
Inner	1	0.79	730
Anlr. Spac	2	2.36	2189

*Note: The infiltration rate was calculated based on current time interval

Test Interval		Time (hr)	Interval **Elapsed** (min)	Flow Readings: Inner Ring (ml)	Ring Flow (cm^3)	Annular Ring (ml)	Space Flow (cm^3)	Infiltration Rates: Inner Ring* (cm/hr)	Annular Space* (cm/hr)	Inner Ring* (in/hr)	Annular Space* (in/hr)
1	Initial	9:15 AM	3	0	4400	0	14000	120.61	127.92	47.48	50.36
	Final	9:18 AM	**3**	4400		14000					
2	Initial	9:18 AM	3	0	4300	0	14300	117.87	130.66	46.40	51.44
	Final	9:21 AM	**6**	4300		14300					
3	Initial	9:21 AM	3	0	4500	0	14500	123.35	132.49	48.56	52.16
	Final	9:24 AM	**9**	4500		14500					
4	Initial	9:24 AM	3	0	4650	0	14500	127.46	132.49	50.18	52.16
	Final	9:27 AM	**12**	4650		14500					
5	Initial	9:27 AM	3	0	4650	0	14500	127.46	132.49	50.18	52.16
	Final	9:30 AM	**15**	4650		14500					
6	Initial	9:30 AM	3	0	4500	0	14500	123.35	132.49	48.56	52.16
	Final	9:33 AM	**18**	4500		14500					
7	Initial	9:33 AM	3	0	4750	0	14500	130.20	132.49	51.26	52.16
	Final	9:36 AM	**21**	4750		14500					
8	Initial	9:36 AM	3	0	4500	0	14500	123.35	132.49	48.56	52.16
	Final	9:39 AM	**24**	4500		14500					
9	Initial	9:39 AM	3	0	4650	0	14500	127.46	132.49	50.18	52.16
	Final	9:42 AM	**27**	4650		14500					
10	Initial	9:42 AM	3	0	4650	0	14500	127.46	132.49	50.18	52.16
	Final	9:45 AM	**30**	4650		14500					
11	Initial	9:45 AM	3	0	4500	0	14500	123.35	132.49	48.56	52.16
	Final	9:48 AM	**33**	4500		14500					
12	Initial	9:48 AM	3	0	4750	0	14500	130.20	132.49	51.26	52.16
	Final	9:51 AM	**36**	4750		14500					
13	Initial	9:51 AM	3	0	4500	0	14500	123.35	132.49	48.56	52.16
	Final	9:54 AM	**39**	4500		14500					
14	Initial	9:54 AM	3	0	4650	0	14500	127.46	132.49	50.18	52.16
	Final	9:57 AM	**42**	4650		14500					
15	Initial	9:57 AM	3	0	4650	0	14500	127.46	132.49	50.18	52.16
	Final	10:00 AM	**45**	4650		14500					
16	Initial	10:00 AM	3	0	4500	0	14500	123.35	132.49	48.56	52.16
	Final	10:03 AM	**48**	4500		14500					
17	Initial	10:03 AM	3	0	4750	0	14500	130.20	132.49	51.26	52.16
	Final	10:06 AM	**51**	4750		14500					

18	Initial	10:06 AM	3	0	4500	0	14500	123.35	132.49	48.56	52.16
	Final	10:09 AM	**54**	4500		14500					
19	Initial	10:09 AM	3	0	4650	0	14500	127.46	132.49	50.18	52.16
	Final	10:12 AM	**57**	4650		14500					
20	Initial	10:12 AM	3	0	4650	0	14500	127.46	132.49	50.18	52.16
	Final	10:15 AM	**60**	4650		14500					
21	Initial	10:15 AM	3	0	4500	0	14500	123.35	132.49	48.56	52.16
	Final	10:18 AM	**63**	4500		14500					
22	Initial	10:18 AM	3	0	4750	0	14500	130.20	132.49	51.26	52.16
	Final	10:21 AM	**66**	4750		14500					
23	Initial	10:21 AM	3	0	4500	0	14500	123.35	132.49	48.56	52.16
	Final	10:24 AM	**69**	4500		14500					
24	Initial	10:24 AM	3	0	4200	0	14500	115.13	132.49	45.33	52.16
	Final	10:27 AM	**72**	4200		14500					
25	Initial	10:27 AM	3	0	4100	0	14500	112.38	132.49	44.25	52.16
	Final	10:30 AM	**75**	4100		14500					
26	Initial	10:30 AM	3	0	4000	0	14500	109.64	132.49	43.17	52.16
	Final	10:33 AM	**78**	4000		14500					
27	Initial	10:33 AM	3	0	4100	0	14500	112.38	132.49	44.25	52.16
	Final	10:36 AM	**81**	4100		14500					
28	Initial	10:36 AM	3	0	4000	0	14500	109.64	132.49	43.17	52.16
	Final	10:39 AM	**84**	4000		14500					
29	Initial	10:39 AM	3	0	4150	0	14100	113.76	128.83	44.79	50.72
	Final	10:42 AM	**87**	4150		14100					
30	Initial	10:42 AM	3	0	3900	0	14100	106.90	128.83	42.09	50.72
	Final	10:45 AM	**90**	3900		14100					
31	Initial	10:45 AM	3	0	3900	0	14000	106.90	127.92	42.09	50.36
	Final	10:48 AM	**93**	3900		14000					
32	Initial	10:48 AM	3	0	3850	0	14100	105.53	128.83	41.55	50.72
	Final	10:51 AM	**96**	3850		14100					
33	Initial	10:51 AM	3	0	3750	0	13900	102.79	127.00	40.47	50.00
	Final	10:54 AM	**99**	3750		13900					
34	Initial	10:54 AM	3	0	3700	0	13800	101.42	126.09	39.93	49.64
	Final	10:57 AM	**102**	3700		13800					
35	Initial	10:57 AM	3	0	3600	0	13850	98.68	126.55	38.85	49.82
	Final	11:00 AM	**105**	3600		13850					
36	Initial	11:00 AM	3	0	3550	0	13700	97.31	125.18	38.31	49.28
	Final	11:03 AM	**108**	3550		13700					
37	Initial	11:03 AM	3	0	3550	0	13500	97.31	123.35	38.31	48.56
	Final	11:06 AM	**111**	3550		13500					
38	Initial	11:06 AM	3	0	3600	0	13650	98.68	124.72	38.85	49.10
	Final	11:09 AM	**114**	3600		13650					
39	Initial	11:09 AM	3	0	3400	0	13700	93.20	125.18	36.69	49.28
	Final	11:12 AM	**117**	3400		13700					
40	Initial	11:12 AM	3	0	3300	0	13600	90.46	124.26	35.61	48.92
	Final	11:15 AM	**120**	3300		13600					
41	Initial	11:15 AM	3	0	3000	0	13500	82.23	123.35	32.38	48.56
	Final	11:18 AM	**123**	3000		13500					
42	Initial	11:18 AM	3	0	3100	0	13550	84.97	123.81	33.45	48.74
	Final	11:21 AM	**126**	3100		13550					
43	Initial	11:21 AM	3	0	3050	0	13400	83.60	122.44	32.91	48.20
	Final	11:24 AM	**129**	3050		13400					

44	Initial	11:24 AM	3	0	3050	0	13300	83.60	121.52	32.91	47.84
	Final	11:27 AM	**132**	3050		13300					
45	Initial	11:27 AM	3	0	3000	0	13300	82.23	121.52	32.38	47.84
	Final	11:30 AM	**135**	3000		13300					
46	Initial	11:30 AM	3	0	2900	0	13400	79.49	122.44	31.30	48.20
	Final	11:33 AM	**138**	2900		13400					
47	Initial	11:33 AM	3	0	2950	0	13400	80.86	122.44	31.84	48.20
	Final	11:36 AM	**141**	2950		13400					
48	Initial	11:36 AM	3	0	2800	0	13500	76.75	123.35	30.22	48.56
	Final	11:39 AM	**144**	2800		13500					
49	Initial	11:39 AM	3	0	2750	0	13300	75.38	121.52	29.68	47.84
	Final	11:42 AM	**147**	2750		13300					
50	Initial	11:42 AM	3	0	2600	0	13400	71.27	122.44	28.06	48.20
	Final	11:45 AM	**150**	2600		13400					
51	Initial	11:45 AM	3	0	2500	0	13300	68.53	121.52	26.98	47.84
	Final	11:48 AM	**153**	2500		13300					
52	Initial	11:48 AM	3	0	2400	0	13400	65.79	122.44	25.90	48.20
	Final	11:51 AM	**156**	2400		13400					
53	Initial	11:51 AM	3	0	2300	0	13500	63.05	123.35	24.82	48.56
	Final	11:54 AM	**159**	2300		13500					
54	Initial	11:54 AM	3	0	2350	0	13400	64.42	122.44	25.36	48.20
	Final	11:57 AM	**162**	2350		13400					
55	Initial	11:57 AM	3	0	2250	0	13300	61.67	121.52	24.28	47.84
	Final	12:00 PM	**165**	2250		13300					
56	Initial	12:00 PM	3	0	2250	0	13300	61.67	121.52	24.28	47.84
	Final	12:03 PM	**168**	2250		13300					
57	Initial	12:03 PM	3	0	2150	0	13100	58.93	119.69	23.20	47.12
	Final	12:06 PM	**171**	2150		13100					
58	Initial	12:06 PM	3	0	2200	0	13000	60.30	118.78	23.74	46.76
	Final	12:09 PM	**174**	2200		13000					
59	Initial	12:09 PM	3	0	2250	0	13100	61.67	119.69	24.28	47.12
	Final	12:12 PM	**177**	2250		13100					
60	Initial	12:12 PM	3	0	2150	0	13200	58.93	120.61	23.20	47.48
	Final	12:15 PM	**180**	2150		13200					
61	Initial	12:15 PM	3	0	2200	0	13100	60.30	119.69	23.74	47.12
	Final	12:18 PM	**183**	2200		13100					
62	Initial	12:18 PM	3	0	2200	0	12900	60.30	117.87	23.74	46.40
	Final	12:21 PM	**186**	2200		12900					
63	Initial	12:21 PM	3	0	2200	0	13100	60.30	119.69	23.74	47.12
	Final	12:24 PM	**189**	2200		13100					
64	Initial	12:24 PM	3	0	2250	0	13000	61.67	118.78	24.28	46.76
	Final	12:27 PM	**192**	2250		13000					
65	Initial	12:27 PM	3	0	2150	0	12900	58.93	117.87	23.20	46.40
	Final	12:30 PM	**195**	2150		12900					
66	Initial	12:30 PM	3	0	2250	0	13000	61.67	118.78	24.28	46.76
	Final	12:33 PM	**198**	2250		13000					
67	Initial	12:33 PM	3	0	2150	0	12900	58.93	117.87	23.20	46.40
	Final	12:36 PM	**201**	2150		12900					
68	Initial	12:36 PM	3	0	2200	0	12900	60.30	117.87	23.74	46.40
	Final	12:39 PM	**204**	2200		12900					
69	Initial	12:39 PM	3	0	2250	0	12800	61.67	116.95	24.28	46.04
	Final	12:42 PM	**207**	2250		12800					

70	Initial	12:42 PM	3	0	2200	0	12700	60.30	116.04	23.74	45.68
	Final	12:45 PM	**210**	2200		12700					
71	Initial	12:45 PM	3	0	2250	0	12500	61.67	114.21	24.28	44.97
	Final	12:48 PM	**213**	2250		12500					
72	Initial	12:48 PM	3	0	2150	0	12600	58.93	115.13	23.20	45.33
	Final	12:51 PM	**216**	2150		12600					
73	Initial	12:51 PM	3	0	2250	0	12600	61.67	115.13	24.28	45.33
	Final	12:54 PM	**219**	2250		12600					
74	Initial	12:54 PM	3	0	2150	0	12500	58.93	114.21	23.20	44.97
	Final	12:57 PM	**222**	2150		12500					
75	Initial	12:57 PM	3	0	2200	0	12300	60.30	112.38	23.74	44.25
	Final	1:00 PM	**225**	2200		12300					
76	Initial	1:00 PM	3	0	2200	0	12200	60.30	111.47	23.74	43.89
	Final	1:03 PM	**228**	2200		12200					
77	Initial	1:03 PM	3	0	2200	0	12400	60.30	113.30	23.74	44.61
	Final	1:06 PM	**231**	2200		12400					
78	Initial	1:06 PM	3	0	2250	0	12300	61.67	112.38	24.28	44.25
	Final	1:09 PM	**234**	2250		12300					
79	Initial	1:09 PM	3	0	2150	0	12300	58.93	112.38	23.20	44.25
	Final	1:12 PM	**237**	2150		12300					
80	Initial	1:12 PM	3	0	2250	0	12000	61.67	109.64	24.28	43.17
	Final	1:15 PM	**240**	2250		12000					
81	Initial	1:15 PM	3	0	2150	0	12200	58.93	111.47	23.20	43.89
	Final	1:18 PM	**243**	2150		12200					
82	Initial	1:18 PM	3	0	2200	0	12100	60.30	110.56	23.74	43.53
	Final	1:21 PM	**246**	2200		12100					
83	Initial	1:21 PM	3	0	2200	0	12000	60.30	109.64	23.74	43.17
	Final	1:24 PM	**249**	2200		12000					
84	Initial	1:24 PM	3	0	2200	0	11800	60.30	107.82	23.74	42.45
	Final	1:27 PM	**252**	2200		11800					
85	Initial	1:27 PM	3	0	2250	0	12400	61.67	113.30	24.28	44.61
	Final	1:30 PM	**255**	2250		12400					
86	Initial	1:30 PM	3	0	2150	0	12300	58.93	112.38	23.20	44.25
	Final	1:33 PM	**258**	2150		12300					
87	Initial	1:33 PM	3	0	2250	0	12300	61.67	112.38	24.28	44.25
	Final	1:36 PM	**261**	2250		12300					
88	Initial	1:36 PM	3	0	2150	0	12000	58.93	109.64	23.20	43.17
	Final	1:39 PM	**264**	2150		12000					
89	Initial	1:39 PM	3	0	2200	0	12200	60.30	111.47	23.74	43.89
	Final	1:42 PM	**267**	2200		12200					
90	Initial	1:42 PM	3	0	2200	0	12100	60.30	110.56	23.74	43.53
	Final	1:45 PM	**270**	2200		12100					
91	Initial	1:45 PM	3	0	2200	0	12000	60.30	109.64	23.74	43.17
	Final	1:48 PM	**273**	2200		12000					
92	Initial	1:48 PM	3	0	2250	0	11800	61.67	107.82	24.28	42.45
	Final	1:51 PM	**276**	2250		11800					
93	Initial	1:51 PM	3	0	2150	0	12400	58.93	113.30	23.20	44.61
	Final	1:54 PM	**279**	2150		12400					
94	Initial	1:54 PM	3	0	2250	0	12300	61.67	112.38	24.28	44.25
	Final	1:57 PM	**282**	2250		12300					
95	Initial	1:57 PM	3	0	2150	0	12300	58.93	112.38	23.20	44.25
	Final	2:00 PM	**285**	2150		12300					

96	Initial	2:00 PM	3	0	2200	0	12000	60.30	109.64	23.74	43.17
	Final	2:03 PM	**288**	2200		12000					
97	Initial	2:03 PM	3	0	2250	0	12200	61.67	111.47	24.28	43.89
	Final	2:06 PM	**291**	2250		12200					
98	Initial	2:06 PM	3	0	2250	0	12100	61.67	110.56	24.28	43.53
	Final	2:09 PM	**294**	2250		12100					
99	Initial	2:09 PM	3	0	2150	0	12000	58.93	109.64	23.20	43.17
	Final	2:12 PM	**297**	2150		12000					
100	Initial	2:12 PM	3	0	2200	0	11800	60.30	107.82	23.74	42.45
	Final	2:15 PM	**300**	2200		11800					
101	Initial	2:15 PM	3	0	2250	0	12400	61.67	113.30	24.28	44.61
	Final	2:18 PM	**303**	2250		12400					
102	Initial	2:18 PM	3	0	2200	0	12300	60.30	112.38	23.74	44.25
	Final	2:21 PM	**306**	2200		12300					
103	Initial	2:21 PM	3	0	2150	0	12300	58.93	112.38	23.20	44.25
	Final	2:24 PM	**309**	2150		12300					
104	Initial	2:24 PM	3	0	2250	0	12000	61.67	109.64	24.28	43.17
	Final	2:27 PM	**312**	2250		12000					
105	Initial	2:27 PM	3	0	2300	0	12200	63.05	111.47	24.82	43.89
	Final	2:30 PM	**315**	2300		12200					
106	Initial	2:30 PM	3	0	2150	0	12100	58.93	110.56	23.20	43.53
	Final	2:33 PM	**318**	2150		12100					
107	Initial	2:33 PM	3	0	2200	0	12000	60.30	109.64	23.74	43.17
	Final	2:36 PM	**321**	2200		12000					
108	Initial	2:36 PM	3	0	2150	0	11800	58.93	107.82	23.20	42.45
	Final	2:39 PM	**324**	2150		11800					
109	Initial	2:39 PM	3	0	2150	0	12400	58.93	113.30	23.20	44.61
	Final	2:42 PM	**327**	2150		12400					
110	Initial	2:42 PM	3	0	2150	0	12000	58.93	109.64	23.20	43.17
	Final	2:45 PM	**330**	2150		12000					
111	Initial	2:45 PM	3	0	2250	0	12000	61.67	109.64	24.28	43.17
	Final	2:48 PM	**333**	2250		12000					
112	Initial	2:48 PM	3	0	2150	0	12000	58.93	109.64	23.20	43.17
	Final	2:51 PM	**336**	2150		12000					
113	Initial	2:51 PM	3	0	2200	0	12000	60.30	109.64	23.74	43.17
	Final	2:54 PM	**339**	2200		12000					
114	Initial	2:54 PM	3	0	2150	0	12000	58.93	109.64	23.20	43.17
	Final	2:57 PM	**342**	2150		12000					
115	Initial	2:57 PM	3	0	2150	0	12000	58.93	109.64	23.20	43.17
	Final	3:00 PM	**345**	2150		12000					
116	Initial	3:00 PM	3	0	2150	0	12000	58.93	109.64	23.20	43.17
	Final	3:03 PM	**348**	2150		12000					
117	Initial	3:03 PM	3	0	2150	0	12000	58.93	109.64	23.20	43.17
	Final	3:06 PM	**351**	2150		12000					
118	Initial	3:06 PM	3	0	2200	0	12000	60.30	109.64	23.74	43.17
	Final	3:09 PM	**354**	2200		12000					
119	Initial	3:09 PM	3	0	2150	0	12000	58.93	109.64	23.20	43.17
	Final	3:12 PM	**357**	2150		12000					
120	Initial	3:12 PM	3	0	2150	0	12000	58.93	109.64	23.20	43.17
	Final	3:15 PM	**360**	2150		12000					
121	Initial	3:15 PM	3	0	2150	0	12000	58.93	109.64	23.20	43.17
	Final	3:18 PM	**363**	2150		12000					

INFILTRATION CALCULATIONS

Project Name	Proposed Warehouse
Project Location	Highland, CA
Project Number	21G193-3
Engineer	Sam Bergeland

Infiltration Test No: I-19

Constants	Diameter (ft)	Area (ft^2)	Area (cm^2)
Inner	1	0.79	730
Anlr. Spac	2	2.36	2189

*Note: The infiltration rate was calculated based on current time interval

Test Interval		Time (hr)	Interval **Elapsed** (min)	Flow Readings: Inner Ring (ml)	Flow Readings: Ring Flow (cm^3)	Flow Readings: Annular Ring (ml)	Flow Readings: Space Flow (cm^3)	Infiltration Rates: Inner Ring* (cm/hr)	Infiltration Rates: Annular Space* (cm/hr)	Infiltration Rates: Inner Ring* (in/hr)	Infiltration Rates: Annular Space* (in/hr)
1	Initial	8:00 AM	3		4450	0	14000	121.98	127.92	48.02	50.36
	Final	8:03 AM	**3**	4450		14000					
2	Initial	8:03 AM	3		4350	0	14300	119.24	130.66	46.94	51.44
	Final	8:06 AM	**6**	4350		14300					
3	Initial	8:06 AM	3		4550	0	14500	124.72	132.49	49.10	52.16
	Final	8:09 AM	**9**	4550		14500					
4	Initial	8:09 AM	3		4700	0	14500	128.83	132.49	50.72	52.16
	Final	8:12 AM	**12**	4700		14500					
5	Initial	8:12 AM	3		4700	0	14500	128.83	132.49	50.72	52.16
	Final	8:15 AM	**15**	4700		14500					
6	Initial	8:15 AM	3		4550	0	14500	124.72	132.49	49.10	52.16
	Final	8:18 AM	**18**	4550		14500					
7	Initial	8:18 AM	3		4800	0	14500	131.57	132.49	51.80	52.16
	Final	8:21 AM	**21**	4800		14500					
8	Initial	8:21 AM	3		4550	0	14500	124.72	132.49	49.10	52.16
	Final	8:24 AM	**24**	4550		14500					
9	Initial	8:24 AM	3		4700	0	14500	128.83	132.49	50.72	52.16
	Final	8:27 AM	**27**	4700		14500					
10	Initial	8:27 AM	3		4700	0	14500	128.83	132.49	50.72	52.16
	Final	8:30 AM	**30**	4700		14500					
11	Initial	8:30 AM	3		4550	0	14500	124.72	132.49	49.10	52.16
	Final	8:33 AM	**33**	4550		14500					
12	Initial	8:33 AM	3		4800	0	14500	131.57	132.49	51.80	52.16
	Final	8:36 AM	**36**	4800		14500					
13	Initial	8:36 AM	3		4550	0	14500	124.72	132.49	49.10	52.16
	Final	8:39 AM	**39**	4550		14500					
14	Initial	8:39 AM	3		4700	0	14500	128.83	132.49	50.72	52.16
	Final	8:42 AM	**42**	4700		14500					
15	Initial	8:42 AM	3		4700	0	14500	128.83	132.49	50.72	52.16
	Final	8:45 AM	**45**	4700		14500					
16	Initial	8:45 AM	3		4550	0	14500	124.72	132.49	49.10	52.16
	Final	8:48 AM	**48**	4550		14500					
17	Initial	8:48 AM	3		4800	0	14500	131.57	132.49	51.80	52.16
	Final	8:51 AM	**51**	4800		14500					

18	Initial	8:51 AM	3		4550	0	14500	124.72	132.49	49.10	52.16
	Final	8:54 AM	**54**	4550		14500					
19	Initial	8:54 AM	3		4700	0	14500	128.83	132.49	50.72	52.16
	Final	8:57 AM	**57**	4700		14500					
20	Initial	8:57 AM	3		4700	0	14500	128.83	132.49	50.72	52.16
	Final	9:00 AM	**60**	4700		14500					
21	Initial	9:00 AM	3		4550	0	14500	124.72	132.49	49.10	52.16
	Final	9:03 AM	**63**	4550		14500					
22	Initial	9:03 AM	3		4800	0	14500	131.57	132.49	51.80	52.16
	Final	9:06 AM	**66**	4800		14500					
23	Initial	9:06 AM	3		4550	0	14500	124.72	132.49	49.10	52.16
	Final	9:09 AM	**69**	4550		14500					
24	Initial	9:09 AM	3		4250	0	14500	116.50	132.49	45.86	52.16
	Final	9:12 AM	**72**	4250		14500					
25	Initial	9:12 AM	3		4150	0	14500	113.76	132.49	44.79	52.16
	Final	9:15 AM	**75**	4150		14500					
26	Initial	9:15 AM	3		4050	0	14500	111.01	132.49	43.71	52.16
	Final	9:18 AM	**78**	4050		14500					
27	Initial	9:18 AM	3		4150	0	14500	113.76	132.49	44.79	52.16
	Final	9:21 AM	**81**	4150		14500					
28	Initial	9:21 AM	3		4050	0	14500	111.01	132.49	43.71	52.16
	Final	9:24 AM	**84**	4050		14500					
29	Initial	9:24 AM	3		4200	0	14100	115.13	128.83	45.33	50.72
	Final	9:27 AM	**87**	4200		14100					
30	Initial	9:27 AM	3		3950	0	14100	108.27	128.83	42.63	50.72
	Final	9:30 AM	**90**	3950		14100					
31	Initial	9:30 AM	3		3950	0	14000	108.27	127.92	42.63	50.36
	Final	9:33 AM	**93**	3950		14000					
32	Initial	9:33 AM	3		3900	0	14100	106.90	128.83	42.09	50.72
	Final	9:36 AM	**96**	3900		14100					
33	Initial	9:36 AM	3		3800	0	13900	104.16	127.00	41.01	50.00
	Final	9:39 AM	**99**	3800		13900					
34	Initial	9:39 AM	3		3750	0	13800	102.79	126.09	40.47	49.64
	Final	9:42 AM	**102**	3750		13800					
35	Initial	9:42 AM	3		3650	0	13850	100.05	126.55	39.39	49.82
	Final	9:45 AM	**105**	3650		13850					
36	Initial	9:45 AM	3		3600	0	13700	98.68	125.18	38.85	49.28
	Final	9:48 AM	**108**	3600		13700					
37	Initial	9:48 AM	3		3600	0	13500	98.68	123.35	38.85	48.56
	Final	9:51 AM	**111**	3600		13500					
38	Initial	9:51 AM	3		3650	0	13650	100.05	124.72	39.39	49.10
	Final	9:54 AM	**114**	3650		13650					
39	Initial	9:54 AM	3		3450	0	13700	94.57	125.18	37.23	49.28
	Final	9:57 AM	**117**	3450		13700					
40	Initial	9:57 AM	3		3350	0	13600	91.83	124.26	36.15	48.92
	Final	10:00 AM	**120**	3350		13600					
41	Initial	10:00 AM	3		3050	0	13500	83.60	123.35	32.91	48.56
	Final	10:03 AM	**123**	3050		13500					
42	Initial	10:03 AM	3		3150	0	13550	86.34	123.81	33.99	48.74
	Final	10:06 AM	**126**	3150		13550					
43	Initial	10:06 AM	3		3100	0	13400	84.97	122.44	33.45	48.20
	Final	10:09 AM	**129**	3100		13400					

44	Initial	10:09 AM	3		3100	0	13300	84.97	121.52	33.45	47.84
	Final	10:12 AM	**132**	3100		13300					
45	Initial	10:12 AM	3		3050	0	13300	83.60	121.52	32.91	47.84
	Final	10:15 AM	**135**	3050		13300					
46	Initial	10:15 AM	3		2950	0	13400	80.86	122.44	31.84	48.20
	Final	10:18 AM	**138**	2950		13400					
47	Initial	10:18 AM	3		3000	0	13400	82.23	122.44	32.38	48.20
	Final	10:21 AM	**141**	3000		13400					
48	Initial	10:21 AM	3		2850	0	13500	78.12	123.35	30.76	48.56
	Final	10:24 AM	**144**	2850		13500					
49	Initial	10:24 AM	3		2800	0	13300	76.75	121.52	30.22	47.84
	Final	10:27 AM	**147**	2800		13300					
50	Initial	10:27 AM	3		2650	0	13400	72.64	122.44	28.60	48.20
	Final	10:30 AM	**150**	2650		13400					
51	Initial	10:30 AM	3		2550	0	13300	69.90	121.52	27.52	47.84
	Final	10:33 AM	**153**	2550		13300					
52	Initial	10:33 AM	3		2450	0	13400	67.16	122.44	26.44	48.20
	Final	10:36 AM	**156**	2450		13400					
53	Initial	10:36 AM	3		2350	0	13500	64.42	123.35	25.36	48.56
	Final	10:39 AM	**159**	2350		13500					
54	Initial	10:39 AM	3		2400	0	13400	65.79	122.44	25.90	48.20
	Final	10:42 AM	**162**	2400		13400					
55	Initial	10:42 AM	3		2300	0	13300	63.05	121.52	24.82	47.84
	Final	10:45 AM	**165**	2300		13300					
56	Initial	10:45 AM	3		2250	0	13300	61.67	121.52	24.28	47.84
	Final	10:48 AM	**168**	2250		13300					
57	Initial	10:48 AM	3		2150	0	13100	58.93	119.69	23.20	47.12
	Final	10:51 AM	**171**	2150		13100					
58	Initial	10:51 AM	3		2200	0	13000	60.30	118.78	23.74	46.76
	Final	10:54 AM	**174**	2200		13000					
59	Initial	10:54 AM	3		2250	0	13100	61.67	119.69	24.28	47.12
	Final	10:57 AM	**177**	2250		13100					
60	Initial	10:57 AM	3		2150	0	13200	58.93	120.61	23.20	47.48
	Final	11:00 AM	**180**	2150		13200					
61	Initial	11:00 AM	3		2200	0	13100	60.30	119.69	23.74	47.12
	Final	11:03 AM	**183**	2200		13100					
62	Initial	11:03 AM	3		2150	0	12900	58.93	117.87	23.20	46.40
	Final	11:06 AM	**186**	2150		12900					
63	Initial	11:06 AM	3		2200	0	13100	60.30	119.69	23.74	47.12
	Final	11:09 AM	**189**	2200		13100					
64	Initial	11:09 AM	3		2250	0	13000	61.67	118.78	24.28	46.76
	Final	11:12 AM	**192**	2250		13000					
65	Initial	11:12 AM	3		2150	0	12900	58.93	117.87	23.20	46.40
	Final	11:15 AM	**195**	2150		12900					
66	Initial	11:15 AM	3		2250	0	13000	61.67	118.78	24.28	46.76
	Final	11:18 AM	**198**	2250		13000					
67	Initial	11:18 AM	3		2150	0	12900	58.93	117.87	23.20	46.40
	Final	11:21 AM	**201**	2150		12900					
68	Initial	11:21 AM	3		2200	0	12900	60.30	117.87	23.74	46.40
	Final	11:24 AM	**204**	2200		12900					
69	Initial	11:24 AM	3		2150	0	12800	58.93	116.95	23.20	46.04
	Final	11:27 AM	**207**	2150		12800					

70	Initial	11:27 AM	3		2200	0	12700	60.30	116.04	23.74	45.68
	Final	11:30 AM	**210**	2200		12700					
71	Initial	11:30 AM	3		2250	0	12500	61.67	114.21	24.28	44.97
	Final	11:33 AM	**213**	2250		12500					
72	Initial	11:33 AM	3		2150	0	12600	58.93	115.13	23.20	45.33
	Final	11:36 AM	**216**	2150		12600					
73	Initial	11:36 AM	3		2250	0	12600	61.67	115.13	24.28	45.33
	Final	11:39 AM	**219**	2250		12600					
74	Initial	11:39 AM	3		2150	0	12500	58.93	114.21	23.20	44.97
	Final	11:42 AM	**222**	2150		12500					
75	Initial	11:42 AM	3		2200	0	12300	60.30	112.38	23.74	44.25
	Final	11:45 AM	**225**	2200		12300					
76	Initial	11:45 AM	3		2150	0	12200	58.93	111.47	23.20	43.89
	Final	11:48 AM	**228**	2150		12200					
77	Initial	11:48 AM	3		2200	0	12400	60.30	113.30	23.74	44.61
	Final	11:51 AM	**231**	2200		12400					
78	Initial	11:51 AM	3		2250	0	12300	61.67	112.38	24.28	44.25
	Final	11:54 AM	**234**	2250		12300					
79	Initial	11:54 AM	3		2150	0	12300	58.93	112.38	23.20	44.25
	Final	11:57 AM	**237**	2150		12300					
80	Initial	11:57 AM	3		2250	0	12000	61.67	109.64	24.28	43.17
	Final	12:00 PM	**240**	2250		12000					
81	Initial	12:00 PM	3		2150	0	12200	58.93	111.47	23.20	43.89
	Final	12:03 PM	**243**	2150		12200					
82	Initial	12:03 PM	3		2200	0	12100	60.30	110.56	23.74	43.53
	Final	12:06 PM	**246**	2200		12100					
83	Initial	12:06 PM	3		2150	0	12000	58.93	109.64	23.20	43.17
	Final	12:09 PM	**249**	2150		12000					
84	Initial	12:09 PM	3		2200	0	11800	60.30	107.82	23.74	42.45
	Final	12:12 PM	**252**	2200		11800					
85	Initial	12:12 PM	3		2250	0	12400	61.67	113.30	24.28	44.61
	Final	12:15 PM	**255**	2250		12400					
86	Initial	12:15 PM	3		2150	0	12300	58.93	112.38	23.20	44.25
	Final	12:18 PM	**258**	2150		12300					
87	Initial	12:18 PM	3		2250	0	12300	61.67	112.38	24.28	44.25
	Final	12:21 PM	**261**	2250		12300					
88	Initial	12:21 PM	3		2150	0	12000	58.93	109.64	23.20	43.17
	Final	12:24 PM	**264**	2150		12000					
89	Initial	12:24 PM	3		2200	0	12200	60.30	111.47	23.74	43.89
	Final	12:27 PM	**267**	2200		12200					
90	Initial	12:27 PM	3		2150	0	12100	58.93	110.56	23.20	43.53
	Final	12:30 PM	**270**	2150		12100					
91	Initial	12:30 PM	3		2200	0	12000	60.30	109.64	23.74	43.17
	Final	12:33 PM	**273**	2200		12000					
92	Initial	12:33 PM	3		2250	0	11800	61.67	107.82	24.28	42.45
	Final	12:36 PM	**276**	2250		11800					
93	Initial	12:36 PM	3		2150	0	12400	58.93	113.30	23.20	44.61
	Final	12:39 PM	**279**	2150		12400					
94	Initial	12:39 PM	3		2250	0	12300	61.67	112.38	24.28	44.25
	Final	12:42 PM	**282**	2250		12300					
95	Initial	12:42 PM	3		2150	0	12300	58.93	112.38	23.20	44.25
	Final	12:45 PM	**285**	2150		12300					

96	Initial	12:45 PM	3		2200	0	12000	60.30	109.64	23.74	43.17
	Final	12:48 PM	**288**	2200		12000					
97	Initial	12:48 PM	3		2250	0	12200	61.67	111.47	24.28	43.89
	Final	12:51 PM	**291**	2250		12200					
98	Initial	12:51 PM	3		2250	0	12100	61.67	110.56	24.28	43.53
	Final	12:54 PM	**294**	2250		12100					
99	Initial	12:54 PM	3		2150	0	12000	58.93	109.64	23.20	43.17
	Final	12:57 PM	**297**	2150		12000					
100	Initial	12:57 PM	3		2200	0	11800	60.30	107.82	23.74	42.45
	Final	1:00 PM	**300**	2200		11800					
101	Initial	1:00 PM	3		2250	0	12400	61.67	113.30	24.28	44.61
	Final	1:03 PM	**303**	2250		12400					
102	Initial	1:03 PM	3		2200	0	12300	60.30	112.38	23.74	44.25
	Final	1:06 PM	**306**	2200		12300					
103	Initial	1:06 PM	3		2150	0	12300	58.93	112.38	23.20	44.25
	Final	1:09 PM	**309**	2150		12300					
104	Initial	1:09 PM	3		2250	0	12000	61.67	109.64	24.28	43.17
	Final	1:12 PM	**312**	2250		12000					
105	Initial	1:12 PM	3		2350	0	12200	64.42	111.47	25.36	43.89
	Final	1:15 PM	**315**	2350		12200					
106	Initial	1:15 PM	3		2150	0	12100	58.93	110.56	23.20	43.53
	Final	1:18 PM	**318**	2150		12100					
107	Initial	1:18 PM	3		2200	0	12000	60.30	109.64	23.74	43.17
	Final	1:21 PM	**321**	2200		12000					
108	Initial	1:21 PM	3		2150	0	11800	58.93	107.82	23.20	42.45
	Final	1:24 PM	**324**	2150		11800					
109	Initial	1:24 PM	3		2100	0	12400	57.56	113.30	22.66	44.61
	Final	1:27 PM	**327**	2100		12400					
110	Initial	1:27 PM	3		2150	0	12000	58.93	109.64	23.20	43.17
	Final	1:30 PM	**330**	2150		12000					
111	Initial	1:30 PM	3		2250	0	12000	61.67	109.64	24.28	43.17
	Final	1:33 PM	**333**	2250		12000					
112	Initial	1:33 PM	3		2150	0	12000	58.93	109.64	23.20	43.17
	Final	1:36 PM	**336**	2150		12000					
113	Initial	1:36 PM	3		2200	0	12000	60.30	109.64	23.74	43.17
	Final	1:39 PM	**339**	2200		12000					
114	Initial	1:39 PM	3		2150	0	12000	58.93	109.64	23.20	43.17
	Final	1:42 PM	**342**	2150		12000					
115	Initial	1:42 PM	3		2100	0	12000	57.56	109.64	22.66	43.17
	Final	1:45 PM	**345**	2100		12000					
116	Initial	1:45 PM	3		2100	0	12000	57.56	109.64	22.66	43.17
	Final	1:48 PM	**348**	2100		12000					
117	Initial	1:48 PM	3		2100	0	12000	57.56	109.64	22.66	43.17
	Final	1:51 PM	**351**	2100		12000					
118	Initial	1:51 PM	3		2150	0	12000	58.93	109.64	23.20	43.17
	Final	1:54 PM	**354**	2150		12000					
119	Initial	1:54 PM	3		2150	0	12000	58.93	109.64	23.20	43.17
	Final	1:57 PM	**357**	2150		12000					
120	Initial	1:57 PM	3		2100	0	12000	57.56	109.64	22.66	43.17
	Final	2:00 PM	**360**	2100		12000					
121	Initial	2:00 PM	3		2100	0	12000	57.56	109.64	22.66	43.17
	Final	2:03 PM	**363**	2100		12000					

Grain Size Distribution

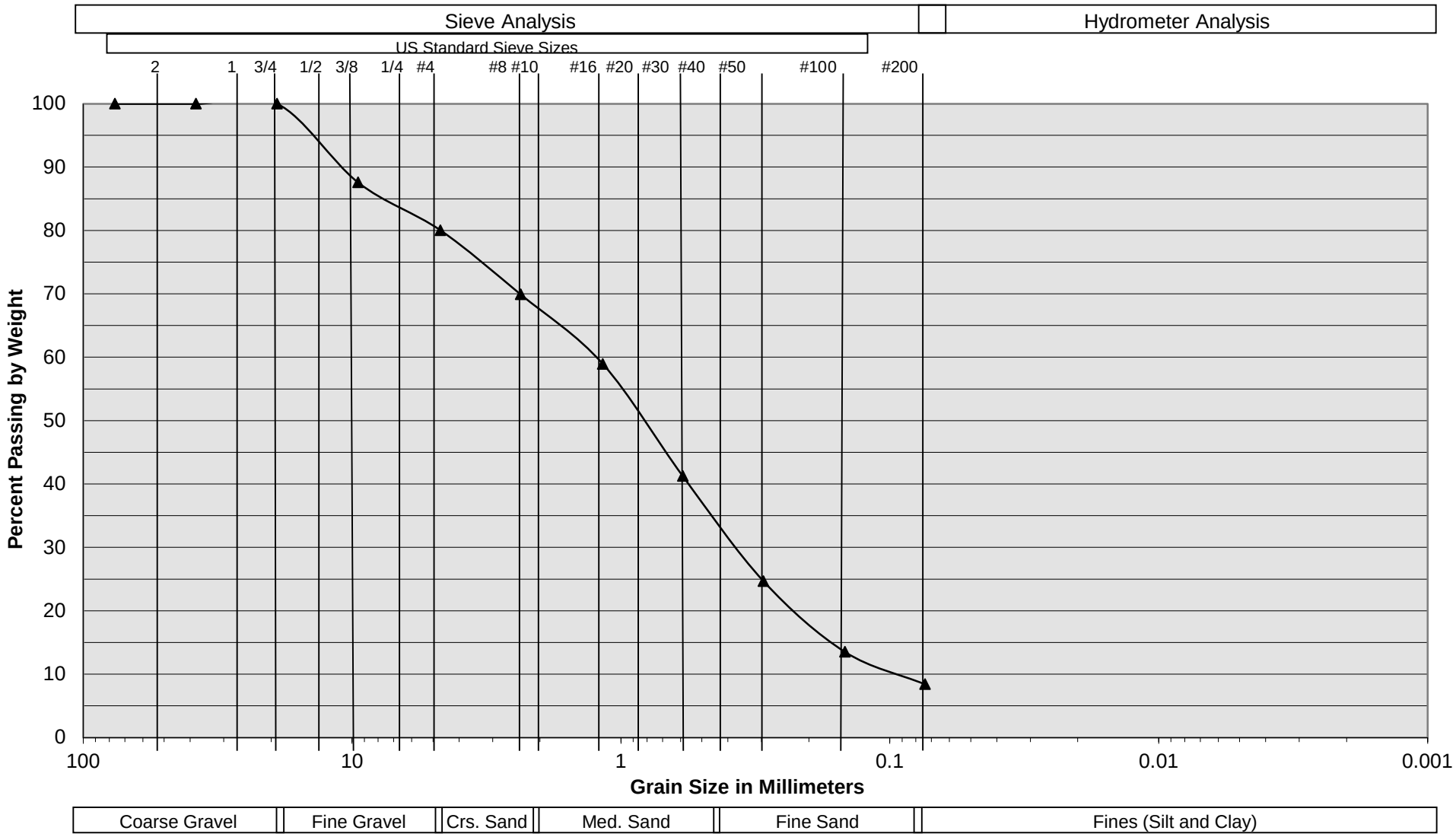


Sample Description	I-11 @ 9'
Soil Classification	Gray Brown Gravelly fine to coarse Sand, trace Silt

Proposed Warehouse
Highland, California
Project No. 21G193-3
PLATE C- 1

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

Grain Size Distribution

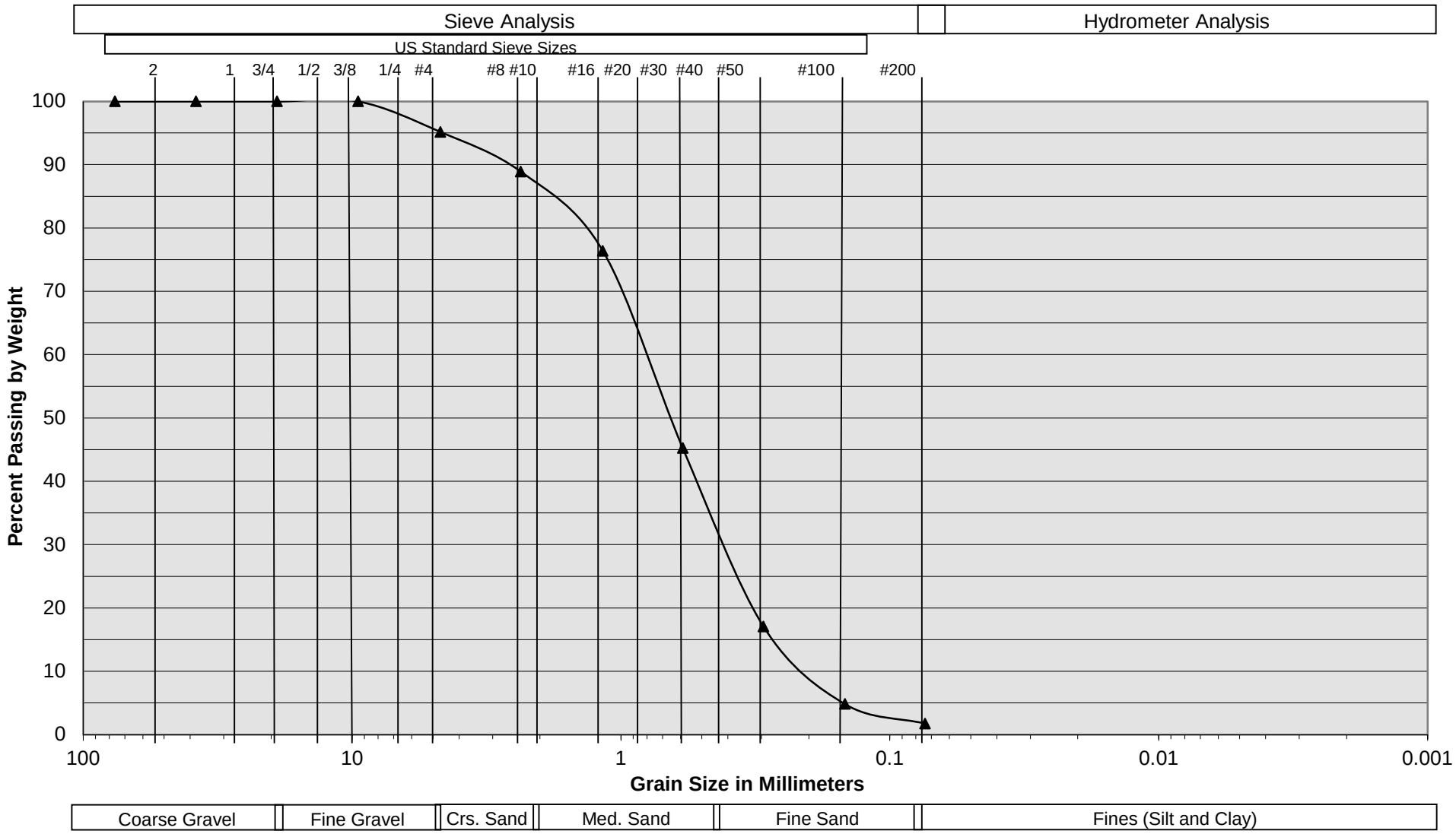


Sample Description	I-12 @ 9'
Soil Classification	Gray Brown Gravelly fine to coarse Sand, trace to little Silt

Proposed Warehouse
Highland, California
Project No. 21G193-3
PLATE C- 2

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

Grain Size Distribution



Sample Description	I-13 @ 12'
Soil Classification	Light Gray Brown fine to coarse Sand, trace fine Gravel

Proposed Warehouse
Highland, California
Project No. 21G193-3
PLATE C- 3

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

Grain Size Distribution

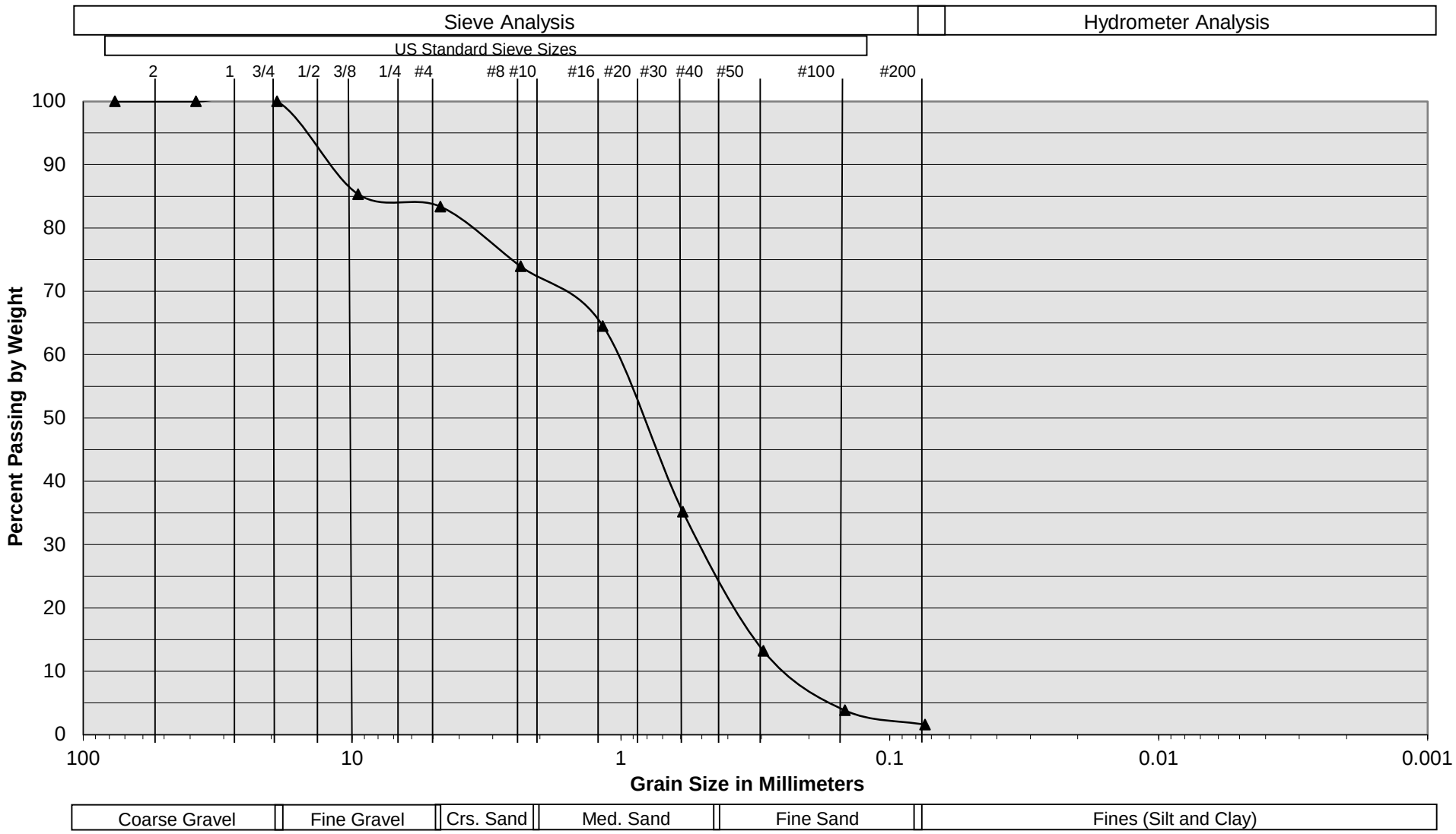


Sample Description	I-14 @ 12'
Soil Classification	Light Gray Gravelly fine to coarse Sand, trace Silt

Proposed Warehouse
Highland, California
Project No. 21G193-3
PLATE C- 4

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

Grain Size Distribution



Sample Description	I-15 @ 12'
Soil Classification	Light Gray Brown fine to coarse Sand, little fine Gravel

Proposed Warehouse
Highland, California
Project No. 21G193-3
PLATE C- 5

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

Grain Size Distribution



Sample Description	I-16 @ 12'
Soil Classification	Light Gray Gravelly fine to coarse Sand to fine to coarse Sandy Gravel

Proposed Warehouse
Highland, California
Project No. 21G193-3
PLATE C- 6

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

Grain Size Distribution

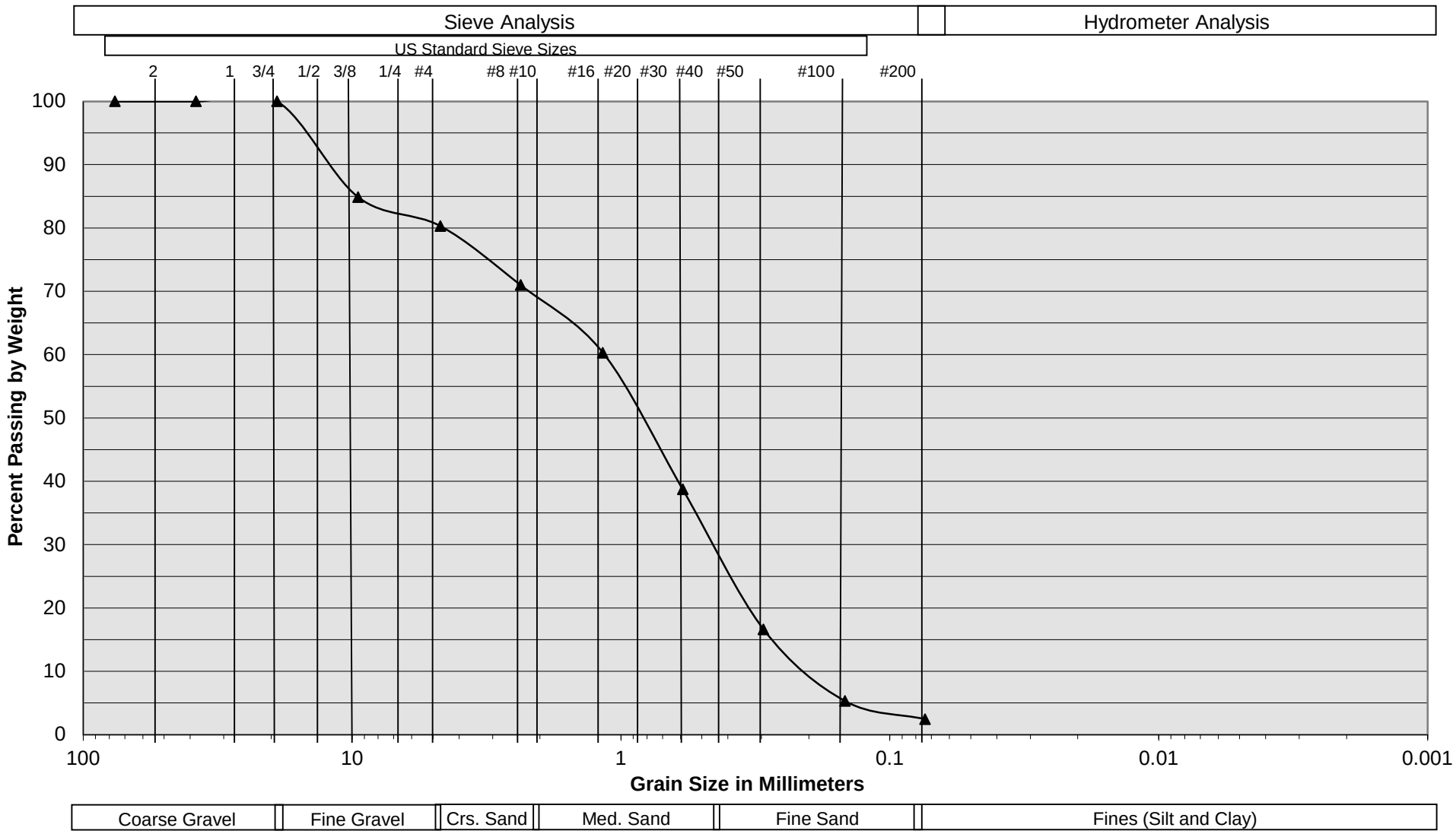


Sample Description	I-17 @ 12'
Soil Classification	Gray Gravelly fine to coarse Sand, trace Silt

Proposed Warehouse
Highland, California
Project No. 21G193-3
PLATE C- 7

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

Grain Size Distribution

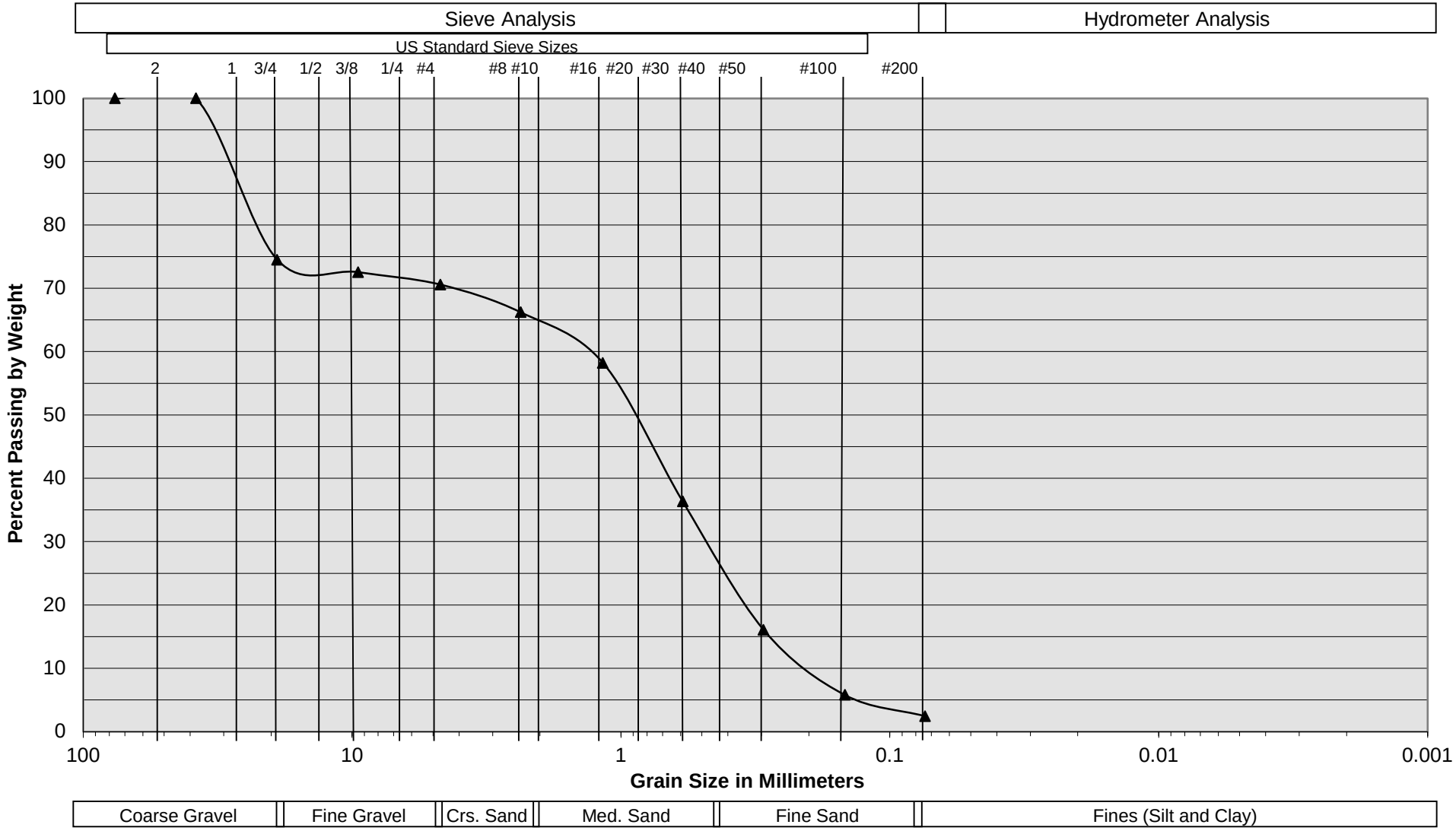


Sample Description	I-18 @ 12'
Soil Classification	Gray Brown fine to coarse Sand, little fine Gravel

Proposed Warehouse
Highland, California
Project No. 21G193-3
PLATE C- 8

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

Grain Size Distribution



Sample Description	I-19 @ 12'
Soil Classification	Gray Brown Gravelly fine to medium Sand, trace coarse Sand

Proposed Warehouse
Highland, California
Project No. 21G193-3
PLATE C- 9

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

KIER+WRIGHT

APPENDIX E

Preliminary Hydrology Report

PRELIMINARY HYDROLOGY STUDY

FOR

Highland East Industrial Warehouse

3RD STREET/CENTRAL AVENUE/5TH STREET

APN: 1192-631-09,-10,-11,-12,-13,-14,-22,-23,-24,-25,-26,-27, AND -28 1192-641-08,- 09,-10,-11,-15,-16,-17,-18,-19,-20,-21

PREPARED FOR:

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January 16, 2022

Rev: February 24, 2022

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Appendix 5: Proposed Hydrology Calculations

Appendix 6: HydroCad Calculations

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NOAA Precipitation Data

Introduction

The project is located in the City of Highland, between 3rd Street and 5th Street, east of Central Avenue and west of Palm Avenue.

The proposed development will demolish the existing buildings and other site improvements and replace with an industrial warehouse building. The project site is approximately 11.3 acres. Typical site improvements for the warehouse building include loading docks, trailer parking, vehicular parking. Landscaping is proposed around the perimeter of the site and adjacent to building where appropriate. The warehouse building is 245,011 sf in size with a 7,000-office space.



VICINITY MAP

NOT TO SCALE

Purpose

The purpose of this Hydrology Report is to determine the design flow rates and estimate the size of the storm drain system that will be needed for the proposed development. This study will estimate the post-development peak flow rate for the 10-year, 25-year, and 100-year storm event at the project site. A Unit Hydrograph and basin routing analysis is also included to mitigate post-development peak flow rate leaving to site to less than the pre-development peak flow rate.

Methodology

CivilDesign Hydrology software, based on the San Bernardino Hydrology Manual Rational Method was used to estimate the pre- and post-development peak flow rate. Unit Hydrograph analysis for the 10,25 and 100-year 24-hour storm event was also performed using the CivilDesign software.

HydroCad software, using the output data from the CivilDesign Unit Hydrograph analysis was used to size the infiltration/detention and outlet system.

Rainfall depths are based on NOAA Atlas 14 Point Precipitation Frequency Estimates. The site hydrologic soil type is "A". For the proposed development's hydrologic analysis, a commercial land use was used with an AMC of 3 for the 100-year storm events, and AMC 2 for the 10- and 25-year storm event.

Project Site Drainage

Existing Site Drainage Conditions:

The site is relatively flat. The north portion of the site slopes towards Fifth Street and the south portion of the site slopes southwest to Third Street. See Existing Condition Hydrology Map (Appendix 2).

DMA 1 and DMA 4 are on the adjoining lot to the east of the project site. DMA 1 drains onto (Node 101) and through the project site's DMA 3 and towards 5th Street. DMA 4 flows towards 3rd Street (Node 401).

The adjoining lot, comprising of DMA 1 & 4 is being developed as a separate project under a separate permit. Under this separate project/permit, the post-development drainage from DMA 1 & 4 is conveyed to the existing catch basin on 5th Street.

DMA 2, on the northerly portion and comprising approximately 35% of the project site drains towards 5th Street (Node 102). The remaining 65% of the project site comprise of DMA 2, and drains south to outlet onto 3rd Street (Node 301).

Proposed Site Drainage Conditions:

In the post-development condition, the project site drainage from DMA A1, A2, and A3 surface flows to various catch basins strategically located on-site as shown on the Proposed Condition Hydrology Map (Appendix 4).

Drainage from DMA A1 and A2 is conveyed to an underground infiltration system identified as Infiltration System #1 (Inf. #1) and drainage from DMA A3 is conveyed to an underground infiltration system identified as Infiltration System #2 (Inf. #2). DMA A4 is the landscape area adjacent to 3rd Street and will flow towards 3rd Street.

The infiltration systems are designed to infiltrate at least the Design Capture Volume (DCV) as required per the Water Quality Management Plan (WQMP). Hydrodynamic separators (HDS) are proposed to pre-treat the drainage before it enters the infiltration system.

For Inf #1, due to the high peak flow rate from larger storm events, a diversion manhole is proposed to direct the water quality treatment flow rate to the infiltration system. A weir inside the diversion manhole is set above the minimum elevation needed to retain the Design Capture Volume (DCV). Storm drainage that exceeds the weir elevation will bypass the infiltration system and will be routed, via a connecting

pipe from the diversion manhole to a bubbler at the southwest corner of the site and discharge to 3rd Street curb and gutter.

For Inf #2, the system is designed to capture and infiltrate at least the Design Capture Volume. Storm drainage that exceeds the capacity of the system will “back up” to the catch basin and then surface overflow through the driveway to the curb and gutter on 3rd Street.

The infiltration systems will also function as detention system to mitigate the total 100-year peak flow rate leaving the site to less than or equal to of the pre-development peak flow rate.

The 10-yr, 25-yr and 100-yr 24-hr storm event Unit Hydrograph analyses were performed using the CivilDesign software at Node 201 and Node 301, just upstream of where the infiltration/detention system is to be located.

Hydrograph information (Peak flow rate vs. time) obtained at Node 201 and Node 301 from the CivilDesign software were then used as the input hydrograph in the HydroCad Software to model the infiltration/detention system and outlet at the node to mitigate the total post-development peak flow rate leaving the site.

Discussion

The following table shows the pre-development peak flow rate for the project site at the following nodes:

Existing Drainage going to 5th Street				
Pre-Development Peak Flow Rate				
Node	**Q10 (cfs)**	**Q25 (cfs)**	**Q100 (cfs)**	**Description**
102	9.17	11.76	15.82	Flows north to Fifth Street

Existing Drainage going to 3rd Street				
Pre-Development Peak Flow Rate				
Node	**Q10 (cfs)**	**Q25 (cfs)**	**Q100 (cfs)**	**Description**
301	14.12	17.78	23.45	Flows south to Third Street
401	1.02	1.28	1.68	Flows southerly to Third Street
Total:	15.14	19.06	25.13	

See Existing Condition Hydrology Map (Appendix 2) for node location.

In the post-development condition, the project site drainage is conveyed southerly to outlet onto 3rd Street. No site drainage is proposed to outlet onto 5th Street in the post-development condition.
The project site drainage from DMA A1, A2 & A3 is conveyed to the 2 underground infiltration systems on site. DMA A4 consists primarily of the landscape area between the proposed building and 3rd Street. Drainage within this area will be conveyed to 3rd Street curb and gutter via undersidewalk pipe culverts.

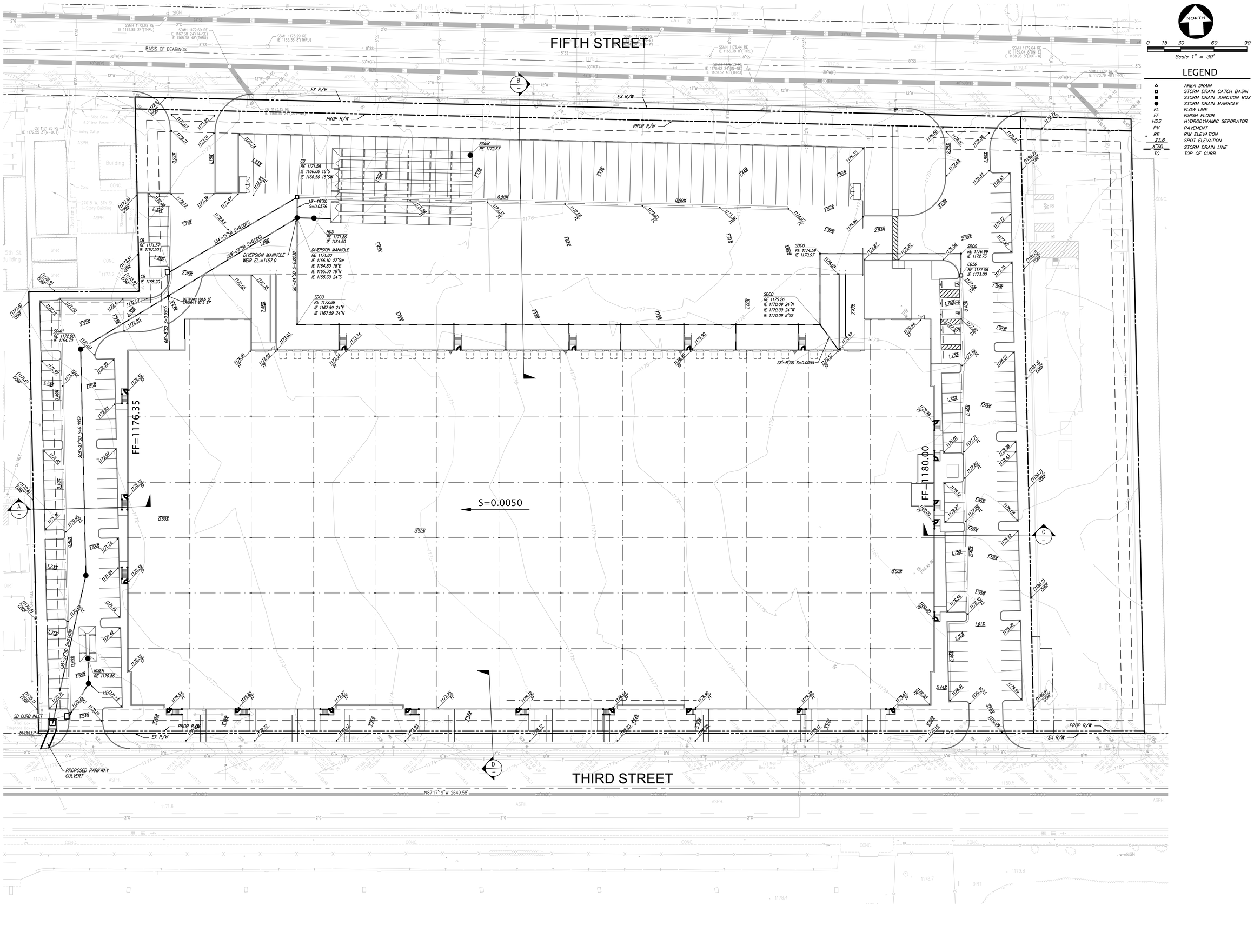
The following table shows the post-development peak flow rate for the project site at the following nodes:

Post-Development Drainage going to 3rd Street				
Post-Development Peak Flow Rate				
Node	**Q10 (cfs)**	**Q25 (cfs)**	**Q100 (cfs)**	**Description**
202	13.19	14.22	15.40	Mitigated peak flow rate from DMA A1 & A2 after passing through infiltration/detention system. See Hydrocad calcs in Appendix 6
302	1.07	1.41	1.85	Mitigated peak flow rate from DMA A3 after passing through infiltration/detention system. See Hydrocad calcs in Appendix 6.
401	0.74	0.93	1.23	DMA A4 - landscape area along Third Street
Total	15.00	16.56	18.48	

See Proposed Condition Hydrology Map (Appendix 4) for node location.

Comparing the total peak flow rate in the pre-development condition to the post-development condition in the 2 tables above, in the 10-yr, 25-yr and 100-yr storm year events, the post-development peak flow rate going towards 3rd Street is less than the pre-development condition after it is mitigated through the infiltration/detention system.

Appendix 1: Preliminary Grading Plan



NO.	BY	REVISION

NO.	BY	REVISION

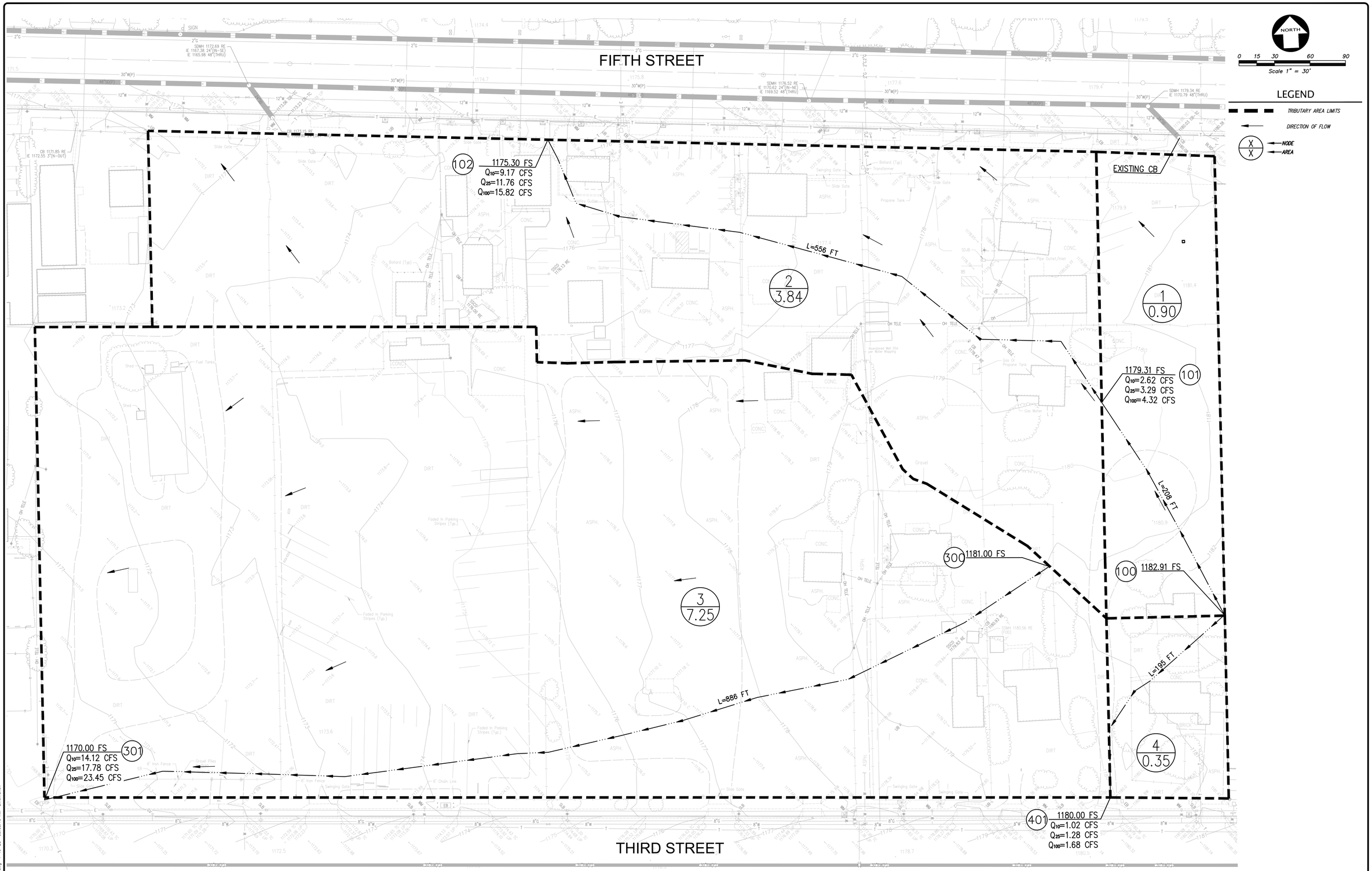
KIER+WRIGHT
163 Technology Drive
Irvine, CA 92620
Phone: (949) 508-0202
www.kierwright.com

PRELIMINARY GRADING PLAN
EAST BUILDING
OF
E. 3RD STREET & CENTRAL AVENUE
FOR
CROW HOLDINGS
HIGHLAND, CALIFORNIA

DATE	JANUARY, 2023
SCALE	AS SHOWN
DESIGNER	JO
DRAWN BY	STAFF
JOB NO.	A22078-1
SHEET	PG2.0

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Appendix 2: Existing Condition Hydrology Map



NO.	BY	REVISION

NO.	BY	REVISION

KIER+WRIGHT
163 Technology Drive
Irvine, CA 92620
Phone: (949) 598-0202
www.kierwright.com

EXISTING HYDROLOGY MAP
EAST BUILDING
OF
E. 3RD STREET & CENTRAL AVENUE
FOR
CROW HOLDINGS
HIGHLAND, CALIFORNIA

DATE	JANUARY, 2023
SCALE	AS SHOWN
DESIGNER	JO
DRAWN BY	STAFF
JOB NO.	A22078-1
SHEET	EX2.0

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Appendix 3: Existing Hydrology Calculations

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2019 Version 9.1

Rational Hydrology Study Date: 01/11/23

A22078-1 HIGHLAND EAST
Q10
EXISTING

Program License Serial Number 6509

********* Hydrology Study Control Information **********

Rational hydrology study storm event year is 10.0
Computed rainfall intensity:
Storm year = 10.00 1 hour rainfall = 0.819 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 2

++
Process from Point/Station 100.000 to Point/Station 101.000
**** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.098(In/Hr)
Initial subarea data:
Initial area flow distance = 208.000(Ft.)
Top (of initial area) elevation = 1182.910(Ft.)
Bottom (of initial area) elevation = 1179.310(Ft.)
Difference in elevation = 3.600(Ft.)
Slope = 0.01731 s(%)= 1.73
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 5.787 min.
Rainfall intensity = 3.332(In/Hr) for a 10.0 year storm

```
Effective runoff coefficient used for area (Q=KCIA) is C = 0.874
Subarea runoff =     2.620(CFS)
Total initial stream area =        0.900(Ac.)
Pervious area fraction = 0.100
Initial area Fm value =    0.098(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      101.000 to Point/Station      102.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of street segment elevation =  1179.310(Ft.)
End of street segment elevation =  1175.300(Ft.)
Length of street segment  =   556.000(Ft.)
Height of curb above gutter flowline  =    2.0(In.)
Width of half street (curb to crown)  =  30.000(Ft.)
Distance from crown to crossfall grade break  =  15.000(Ft.)
Slope from gutter to grade break (v/hz) =  -0.010
Slope from grade break to crown (v/hz)  =  -0.010
Street flow is on [2] side(s) of the street
Distance from curb to property line  =  10.000(Ft.)
Slope from curb to property line (v/hz) =   0.000
Gutter width =   0.000(Ft.)
Gutter hike from flowline =  0.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =      5.985(CFS)
Depth of flow =   0.186(Ft.), Average velocity =   1.728(Ft/s)
Note:  depth of flow exceeds top of street crown.
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  30.000(Ft.)
Flow velocity =   1.73(Ft/s)
Travel time =    5.36 min.     TC =   11.15  min.
 Adding area flow to street
COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Pervious ratio(Ap) = 0.1000     Max loss rate(Fm)=     0.098(In/Hr)
Rainfall intensity =      2.248(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.861
Subarea runoff =      6.553(CFS) for    3.840(Ac.)
Total runoff =     9.173(CFS)
Effective area this stream =        4.74(Ac.)
Total Study Area (Main Stream No. 1) =        4.74(Ac.)
Area averaged Fm value =    0.098(In/Hr)
Street flow at end of street =      9.173(CFS)
Half street flow at end of street =      4.586(CFS)
Depth of flow =   0.218(Ft.), Average velocity =   1.922(Ft/s)
```

```
Note:  depth of flow exceeds top of street crown.
Flow width (from curb towards crown)=  30.000(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      300.000 to Point/Station      301.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Pervious ratio(Ap) = 0.1000     Max loss rate(Fm)=     0.098(In/Hr)
Initial subarea data:
Initial area flow distance =   886.000(Ft.)
Top (of initial area) elevation =  1181.000(Ft.)
Bottom (of initial area) elevation =  1170.000(Ft.)
Difference in elevation =    11.000(Ft.)
Slope =    0.01242  s(%)=       1.24
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   11.042 min.
Rainfall intensity =      2.261(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.861
Subarea runoff =    14.116(CFS)
Total initial stream area =        7.250(Ac.)
Pervious area fraction = 0.100
Initial area Fm value =    0.098(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      100.000 to Point/Station      401.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Pervious ratio(Ap) = 0.1000     Max loss rate(Fm)=     0.098(In/Hr)
Initial subarea data:
Initial area flow distance =   195.000(Ft.)
Top (of initial area) elevation =  1182.910(Ft.)
Bottom (of initial area) elevation =  1180.000(Ft.)
Difference in elevation =     2.910(Ft.)
Slope =    0.01492  s(%)=       1.49
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    5.809 min.
Rainfall intensity =      3.324(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.874
Subarea runoff =     1.016(CFS)
```

Total initial stream area = 0.350(Ac.)
Pervious area fraction = 0.100
Initial area Fm value = 0.098(In/Hr)
End of computations, Total Study Area = 12.34 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.100
Area averaged SCS curve number = 32.0

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2019 Version 9.1

Rational Hydrology Study Date: 01/11/23

A22078-1 HIGHLAND EAST
Q25
EXISTING

Program License Serial Number 6509

********* Hydrology Study Control Information **********

Rational hydrology study storm event year is 25.0
10 Year storm 1 hour rainfall = 0.819(In.)
100 Year storm 1 hour rainfall = 1.330(In.)
Computed rainfall intensity:
Storm year = 25.00 1 hour rainfall = 1.022 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 2

++
Process from Point/Station 100.000 to Point/Station 101.000
**** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.098(In/Hr)
Initial subarea data:
Initial area flow distance = 208.000(Ft.)
Top (of initial area) elevation = 1182.910(Ft.)
Bottom (of initial area) elevation = 1179.310(Ft.)
Difference in elevation = 3.600(Ft.)
Slope = 0.01731 s(%)= 1.73
TC = k(0.304)*[(length^3)/(elevation change)]^0.2

```
Initial area time of concentration =    5.787 min.
Rainfall intensity =      4.159(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.879
Subarea runoff =      3.290(CFS)
Total initial stream area =        0.900(Ac.)
Pervious area fraction = 0.100
Initial area Fm value =    0.098(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      101.000 to Point/Station      102.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of street segment elevation =  1179.310(Ft.)
End of street segment elevation =  1175.300(Ft.)
Length of street segment  =   556.000(Ft.)
Height of curb above gutter flowline  =    2.0(In.)
Width of half street (curb to crown)  =  30.000(Ft.)
Distance from crown to crossfall grade break  =  15.000(Ft.)
Slope from gutter to grade break (v/hz) =  -0.010
Slope from grade break to crown (v/hz)  =  -0.010
Street flow is on [2] side(s) of the street
Distance from curb to property line  =  10.000(Ft.)
Slope from curb to property line (v/hz) =   0.000
Gutter width =   0.000(Ft.)
Gutter hike from flowline =  0.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =      7.579(CFS)
Depth of flow =   0.203(Ft.), Average velocity =   1.833(Ft/s)
Note:  depth of flow exceeds top of street crown.
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  30.000(Ft.)
Flow velocity =   1.83(Ft/s)
Travel time =    5.06 min.     TC =   10.84  min.
 Adding area flow to street
COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Pervious ratio(Ap) = 0.1000     Max loss rate(Fm)=     0.098(In/Hr)
Rainfall intensity =      2.854(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.869
Subarea runoff =      8.467(CFS) for    3.840(Ac.)
Total runoff =     11.756(CFS)
Effective area this stream =        4.74(Ac.)
Total Study Area (Main Stream No. 1) =        4.74(Ac.)
Area averaged Fm value =    0.098(In/Hr)
Street flow at end of street =     11.756(CFS)
```

```
Half street flow at end of street =      5.878(CFS)
Depth of flow =   0.240(Ft.), Average velocity =   2.045(Ft/s)
Note:  depth of flow exceeds top of street crown.
Flow width (from curb towards crown)=  30.000(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      300.000 to Point/Station      301.000
**** INITIAL AREA EVALUATION ****
_____________________________________________________________________________
COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Pervious ratio(Ap) = 0.1000     Max loss rate(Fm)=     0.098(In/Hr)
Initial subarea data:
Initial area flow distance =   886.000(Ft.)
Top (of initial area) elevation =  1181.000(Ft.)
Bottom (of initial area) elevation =  1170.000(Ft.)
Difference in elevation =    11.000(Ft.)
Slope =    0.01242  s(%)=       1.24
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   11.042 min.
Rainfall intensity =      2.823(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.869
Subarea runoff =     17.780(CFS)
Total initial stream area =        7.250(Ac.)
Pervious area fraction = 0.100
Initial area Fm value =    0.098(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      100.000 to Point/Station      401.000
**** INITIAL AREA EVALUATION ****
_____________________________________________________________________________
COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Pervious ratio(Ap) = 0.1000     Max loss rate(Fm)=     0.098(In/Hr)
Initial subarea data:
Initial area flow distance =   195.000(Ft.)
Top (of initial area) elevation =  1182.910(Ft.)
Bottom (of initial area) elevation =  1180.000(Ft.)
Difference in elevation =     2.910(Ft.)
Slope =    0.01492  s(%)=       1.49
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    5.809 min.
Rainfall intensity =      4.150(In/Hr) for a    25.0 year storm
```

Effective runoff coefficient used for area (Q=KCIA) is C = 0.879
Subarea runoff = 1.276(CFS)
Total initial stream area = 0.350(Ac.)
Pervious area fraction = 0.100
Initial area Fm value = 0.098(In/Hr)
End of computations, Total Study Area = 12.34 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.100
Area averaged SCS curve number = 32.0

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2019 Version 9.1

Rational Hydrology Study Date: 01/11/23

A22078-1 HIGHLAND EAST
Q100
EXISTING

Program License Serial Number 6509

********* Hydrology Study Control Information **********

Rational hydrology study storm event year is 100.0
10 Year storm 1 hour rainfall = 0.819(In.)
100 Year storm 1 hour rainfall = 1.330(In.)
Computed rainfall intensity:
Storm year = 100.00 1 hour rainfall = 1.330 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 3

++
Process from Point/Station 100.000 to Point/Station 101.000
**** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.079(In/Hr)
Initial subarea data:
Initial area flow distance = 208.000(Ft.)
Top (of initial area) elevation = 1182.910(Ft.)
Bottom (of initial area) elevation = 1179.310(Ft.)
Difference in elevation = 3.600(Ft.)
Slope = 0.01731 s(%)= 1.73

```
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    5.787 min.
Rainfall intensity =      5.411(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.887
Subarea runoff =      4.319(CFS)
Total initial stream area =        0.900(Ac.)
Pervious area fraction = 0.100
Initial area Fm value =    0.079(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      101.000 to Point/Station      102.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of street segment elevation =  1179.310(Ft.)
End of street segment elevation =  1175.300(Ft.)
Length of street segment  =   556.000(Ft.)
Height of curb above gutter flowline  =    2.0(In.)
Width of half street (curb to crown)  =  30.000(Ft.)
Distance from crown to crossfall grade break  =  15.000(Ft.)
Slope from gutter to grade break (v/hz) =  -0.010
Slope from grade break to crown (v/hz)  =  -0.010
Street flow is on [2] side(s) of the street
Distance from curb to property line  =  10.000(Ft.)
Slope from curb to property line (v/hz) =   0.000
Gutter width =   0.000(Ft.)
Gutter hike from flowline =  0.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =     10.139(CFS)
Depth of flow =   0.227(Ft.), Average velocity =   1.971(Ft/s)
Note:  depth of flow exceeds top of street crown.
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  30.000(Ft.)
Flow velocity =   1.97(Ft/s)
Travel time =    4.70 min.     TC =   10.49  min.
 Adding area flow to street
COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.1000     Max loss rate(Fm)=     0.079(In/Hr)
Rainfall intensity =      3.787(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.881
Subarea runoff =     11.502(CFS) for    3.840(Ac.)
Total runoff =     15.821(CFS)
Effective area this stream =        4.74(Ac.)
Total Study Area (Main Stream No. 1) =        4.74(Ac.)
```

```
Area averaged Fm value =    0.079(In/Hr)
Street flow at end of street =     15.821(CFS)
Half street flow at end of street =      7.911(CFS)
Depth of flow =   0.268(Ft.), Average velocity =   2.203(Ft/s)
Note:  depth of flow exceeds top of street crown.
Flow width (from curb towards crown)=  30.000(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      300.000 to Point/Station      301.000
**** INITIAL AREA EVALUATION ****
_____________________________________________________________________________
COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.1000     Max loss rate(Fm)=     0.079(In/Hr)
Initial subarea data:
Initial area flow distance =   886.000(Ft.)
Top (of initial area) elevation =  1181.000(Ft.)
Bottom (of initial area) elevation =  1170.000(Ft.)
Difference in elevation =    11.000(Ft.)
Slope =    0.01242  s(%)=       1.24
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   11.042 min.
Rainfall intensity =      3.672(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.881
Subarea runoff =     23.448(CFS)
Total initial stream area =        7.250(Ac.)
Pervious area fraction = 0.100
Initial area Fm value =    0.079(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      100.000 to Point/Station      401.000
**** INITIAL AREA EVALUATION ****
_____________________________________________________________________________
COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.1000     Max loss rate(Fm)=     0.079(In/Hr)
Initial subarea data:
Initial area flow distance =   195.000(Ft.)
Top (of initial area) elevation =  1182.910(Ft.)
Bottom (of initial area) elevation =  1180.000(Ft.)
Difference in elevation =     2.910(Ft.)
```

Slope = 0.01492 s(%)= 1.49
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 5.809 min.
Rainfall intensity = 5.398(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.887
Subarea runoff = 1.676(CFS)
Total initial stream area = 0.350(Ac.)
Pervious area fraction = 0.100
Initial area Fm value = 0.079(In/Hr)
End of computations, Total Study Area = 12.34 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.100
Area averaged SCS curve number = 32.0

Appendix 4: Proposed Condition Hydrology Map

FIFTH STREET

FTH STREET
WIDE PUBLIC R/W

BASIS OF BEARINGS

SIGN

SSMH 1172.02 RE
IE 1162.86 24"(THRU)

SSMH 1172.69 RE
IE 1167.38 24"(N-SE)
IE 1165.98 48"(THRU)

SSMH 1173.29 RE
IE 1163.36 8"(THRU)

SSMH 1176.44 RE
IE 1166.38 8"(THRU)

SSMH 1176.62 RE
IE 1170.62 24"(N-NE)
IE 1169.52 48"(THRU)

SSMH 1179.64 RE
IE 1169.04 8"(N-E)
IE 1168.96 8"(OUT-W)

SSMH 1179.34 RE
IE 1170.79 48"(THRU)

CB 1171.85 RE
1172.55 3"(N-OUT)

201 1171.58 FS
Q_{10}=17.84 CFS
Q_{25}=22.73 CFS
Q_{100}=30.38 CFS

CB

HYDRODYNAMIC SEPARATOR (HDS)

DIVERSION MANHOLE

INF #1
PROPOSED
INFILTRATION/DETENTION SYSTEM

300 1172.20 FS

L=775 FT

CB

1177.06 FS
Q_{10}=1.83 CFS
Q_{25}=2.30 CFS
Q_{100}=3.03 CFS
101

A3
0.77

L=435 FT

A2
9.13

A1
0.84

L=430 FT

INF #2
PROPOSED
INFILTRATION/DETENTION SYSTEM

1170.21 FS
Q_{10}=1.58 CFS
Q_{25}=1.99 CFS
Q_{100}=2.62 CFS
301

1170.40 FS
MITIGATED
Q_{10}=1.07 CFS
Q_{25}=1.41 CFS
Q_{100}=1.85 CFS
302

BUBBLER

CB

400 1179.75 FS

A4
0.36

L=690 FT

1180.10 FS 100

PARKWAY CULVERT

1170.50 TG
MITIGATED
Q_{10}=13.19 CFS
Q_{25}=14.22 CFS
Q_{100}=15.40 CFS
202

1171.83 FS
Q_{10}=0.74 CFS
Q_{25}=0.93 CFS
Q_{100}=1.23 CFS
401

THIRD STREET
(100' WIDE PUBLIC R/W)

THIRD STREET

N87°17'19"W 2649.58'

NORTH

0 15 30 60 90
Scale 1" = 30'

LEGEND

TRIBUTARY AREA LIMITS

DIRECTION OF FLOW

NODE
AREA

REVISION NO. BY

REVISION NO. BY

REGISTERED PROFESSIONAL ENGINEER
DAVID G. READER
No. 76867
CIVIL
STATE OF CALIFORNIA

KIER+WRIGHT
163 Technology Drive
Irvine, CA 92620
Phone: (949) 508-0202
www.kierwright.com

PROPOSED HYDROLOGY MAP
EAST BUILDING
OF
E. 3RD STREET & CENTRAL AVENUE
FOR
CROW HOLDINGS
HIGHLAND, CALIFORNIA

DATE	JANUARY, 2023
SCALE	AS SHOWN
DESIGNER	JO
DRAWN BY	STAFF
JOB NO.	A22078-1
SHEET	PR2.0

Z:\2022\A22078-1\DWG\EXHIBIT\EXHIBITS\PD PERMIT\A22078-1-PR-HYDRO.dwg 2-24-23 11:15:42 AM zmcmahon

Appendix 5: Proposed Hydrology Calculations

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2019 Version 9.1

Rational Hydrology Study Date: 02/22/23

A22078-1 PROPOSED HIGHLAND EAST
Q10

Program License Serial Number 6509

********* Hydrology Study Control Information **********

Rational hydrology study storm event year is 10.0
Computed rainfall intensity:
Storm year = 10.00 1 hour rainfall = 0.819 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 2

++
Process from Point/Station 100.000 to Point/Station 101.000
**** INITIAL AREA EVALUATION ****
_____
COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.098(In/Hr)
Initial subarea data:
Initial area flow distance = 430.000(Ft.)
Top (of initial area) elevation = 1180.100(Ft.)
Bottom (of initial area) elevation = 1177.060(Ft.)
Difference in elevation = 3.040(Ft.)
Slope = 0.00707 s(%)= 0.71
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 9.255 min.

```
Rainfall intensity =      2.514(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.865
Subarea runoff =      1.827(CFS)
Total initial stream area =        0.840(Ac.)
Pervious area fraction = 0.100
Initial area Fm value =    0.098(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      101.000 to Point/Station      201.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
____________________________________________________________________________
Upstream point/station elevation =  1177.060(Ft.)
Downstream point/station elevation =  1171.580(Ft.)
Pipe length  =   775.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     1.827(CFS)
Given pipe size =     24.00(In.)
Calculated individual pipe flow  =     1.827(CFS)
Normal flow depth in pipe =    5.02(In.)
Flow top width inside pipe =   19.52(In.)
Critical Depth =    5.61(In.)
Pipe flow velocity =      3.83(Ft/s)
Travel time through pipe =    3.38 min.
Time of concentration (TC) =    12.63 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      201.000 to Point/Station      201.000
**** SUBAREA FLOW ADDITION ****
____________________________________________________________________________
COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Pervious ratio(Ap) = 0.1000     Max loss rate(Fm)=     0.098(In/Hr)
Time of concentration =    12.63 min.
Rainfall intensity =      2.086(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.858
Subarea runoff =     16.013(CFS) for    9.130(Ac.)
Total runoff =     17.839(CFS)
Effective area this stream =        9.97(Ac.)
Total Study Area (Main Stream No. 1) =        9.97(Ac.)
Area averaged Fm value =    0.098(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      300.000 to Point/Station      301.000
**** INITIAL AREA EVALUATION ****
____________________________________________________________________________
COMMERCIAL subarea type
```

```
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Pervious ratio(Ap) = 0.1000     Max loss rate(Fm)=     0.098(In/Hr)
Initial subarea data:
Initial area flow distance =   435.000(Ft.)
Top (of initial area) elevation =  1172.200(Ft.)
Bottom (of initial area) elevation =  1170.210(Ft.)
Difference in elevation =     1.990(Ft.)
Slope =    0.00457  s(%)=       0.46
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   10.144 min.
Rainfall intensity =      2.379(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.863
Subarea runoff =      1.581(CFS)
Total initial stream area =        0.770(Ac.)
Pervious area fraction = 0.100
Initial area Fm value =    0.098(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      400.000 to Point/Station      401.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Pervious ratio(Ap) = 0.1000     Max loss rate(Fm)=     0.098(In/Hr)
Initial subarea data:
Initial area flow distance =   690.000(Ft.)
Top (of initial area) elevation =  1179.750(Ft.)
Bottom (of initial area) elevation =  1171.830(Ft.)
Difference in elevation =     7.920(Ft.)
Slope =    0.01148  s(%)=       1.15
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   10.149 min.
Rainfall intensity =      2.379(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.863
Subarea runoff =      0.739(CFS)
Total initial stream area =        0.360(Ac.)
Pervious area fraction = 0.100
Initial area Fm value =    0.098(In/Hr)
End of computations, Total Study Area =           11.10 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.
```

Area averaged pervious area fraction(Ap) = 0.100
Area averaged SCS curve number = 32.0

U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2018, Version 9.0

Study date 02/22/23

++

San Bernardino County Synthetic Unit Hydrology Method
Manual date - August 1986

Program License Serial Number 6509

A22078-1 EAST HIGHLAND
Q10
PT 201 10-YR STORM - UH AT NODE 201

Storm Event Year = 10

Antecedent Moisture Condition = 2

English (in-lb) Input Units Used

English Rainfall Data (Inches) Input Values Used

English Units used in output format

Area averaged rainfall intensity isohyetal data:

Sub-Area (Ac.)	Duration (hours)	Isohyetal (In)
Rainfall data for year 10		
9.97	1	0.82
Rainfall data for year 10		
9.97	6	1.86
Rainfall data for year 10		
9.97	24	3.49

++

******** Area-averaged max loss rate, Fm ********

SCS curve No.(AMCII)	SCS curve NO.(AMC 2)	Area (Ac.)	Area Fraction	Fp(Fig C6) (In/Hr)	Ap (dec.)	Fm (In/Hr)
32.0	32.0	9.97	1.000	0.978	0.082	0.080

Area-averaged adjusted loss rate Fm (In/Hr) = 0.080

********* Area-Averaged low loss rate fraction, Yb **********

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC2)	S	Pervious Yield Fr

```
     0.82   0.082         32.0      32.0      17.45     0.000
     9.15   0.918         98.0      98.0       0.20     0.933

Area-averaged catchment yield fraction, Y =  0.857
Area-averaged low loss fraction, Yb =  0.143
User entry of time of concentration  =   0.210 (hours)
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Watershed area =       9.97(Ac.)
Catchment Lag time =   0.168 hours
Unit interval =   5.000 minutes
Unit interval percentage of lag time = 49.4854
Hydrograph baseflow =     0.00(CFS)
Average maximum watershed loss rate(Fm) =  0.080(In/Hr)
Average low loss rate fraction (Yb) = 0.143 (decimal)
VALLEY DEVELOPED S-Graph Selected
Computed peak 5-minute rainfall =  0.215(In)
Computed peak 30-minute rainfall =  0.560(In)
Specified peak 1-hour rainfall =  0.819(In)
Computed peak 3-hour rainfall =  1.350(In)
Specified peak 6-hour rainfall =  1.860(In)
Specified peak 24-hour rainfall =  3.490(In)


Note: user specified rainfall values used.
Rainfall depth area reduction factors:
Using a total area of       9.97(Ac.) (Ref: fig. E-4)

5-minute factor = 1.000     Adjusted rainfall =  0.215(In)
30-minute factor = 1.000    Adjusted rainfall =  0.560(In)
1-hour factor = 1.000       Adjusted rainfall =  0.819(In)
3-hour factor = 1.000       Adjusted rainfall =  1.350(In)
6-hour factor = 1.000       Adjusted rainfall =  1.860(In)
24-hour factor = 1.000      Adjusted rainfall =  3.490(In)
------------------------------------------------------------------------

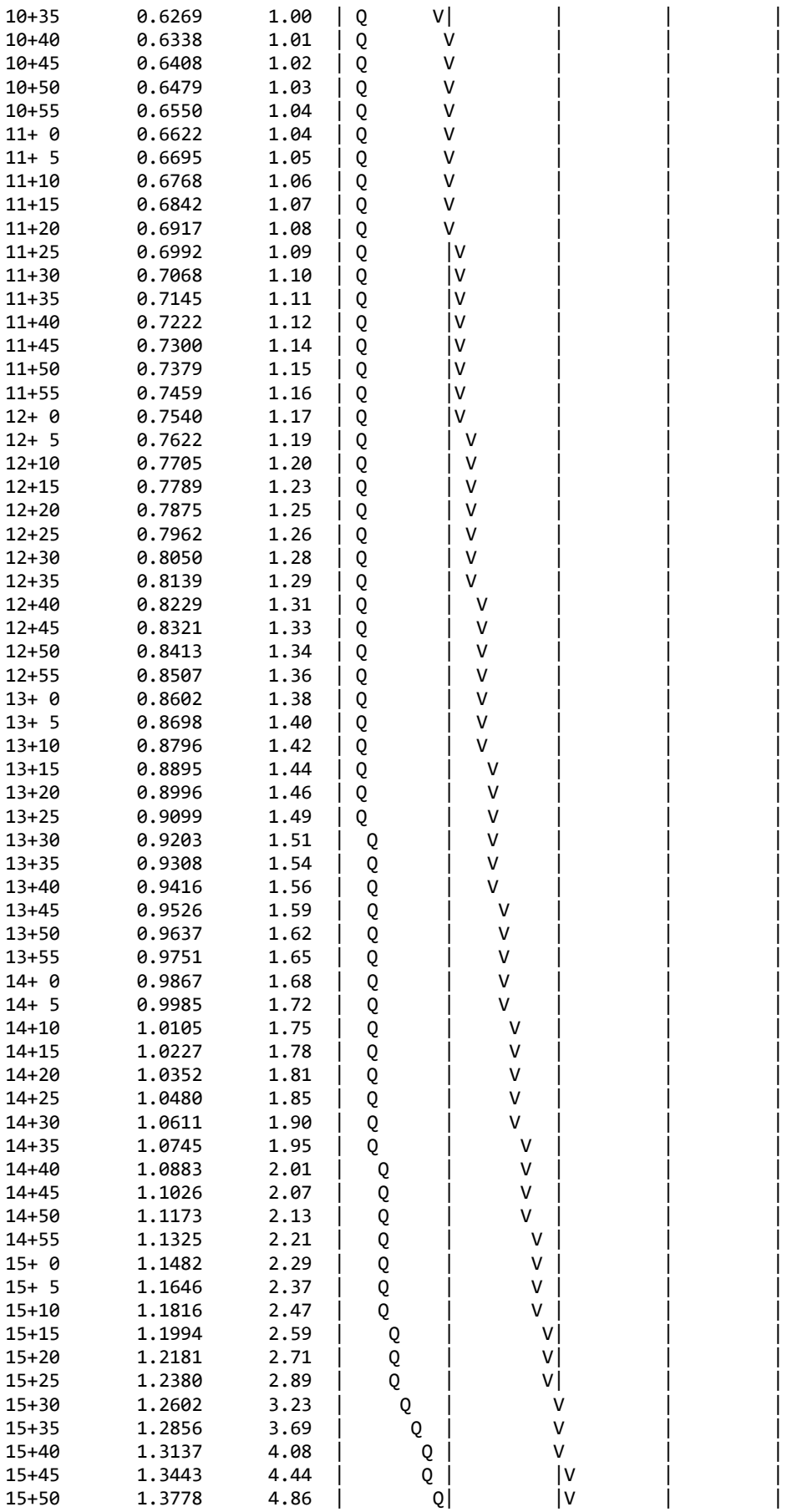
                      U n i t  H y d r o g r a p h
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Interval          'S' Graph          Unit Hydrograph
Number            Mean values             ((CFS))
------------------------------------------------------------------------
               (K =       120.57 (CFS))

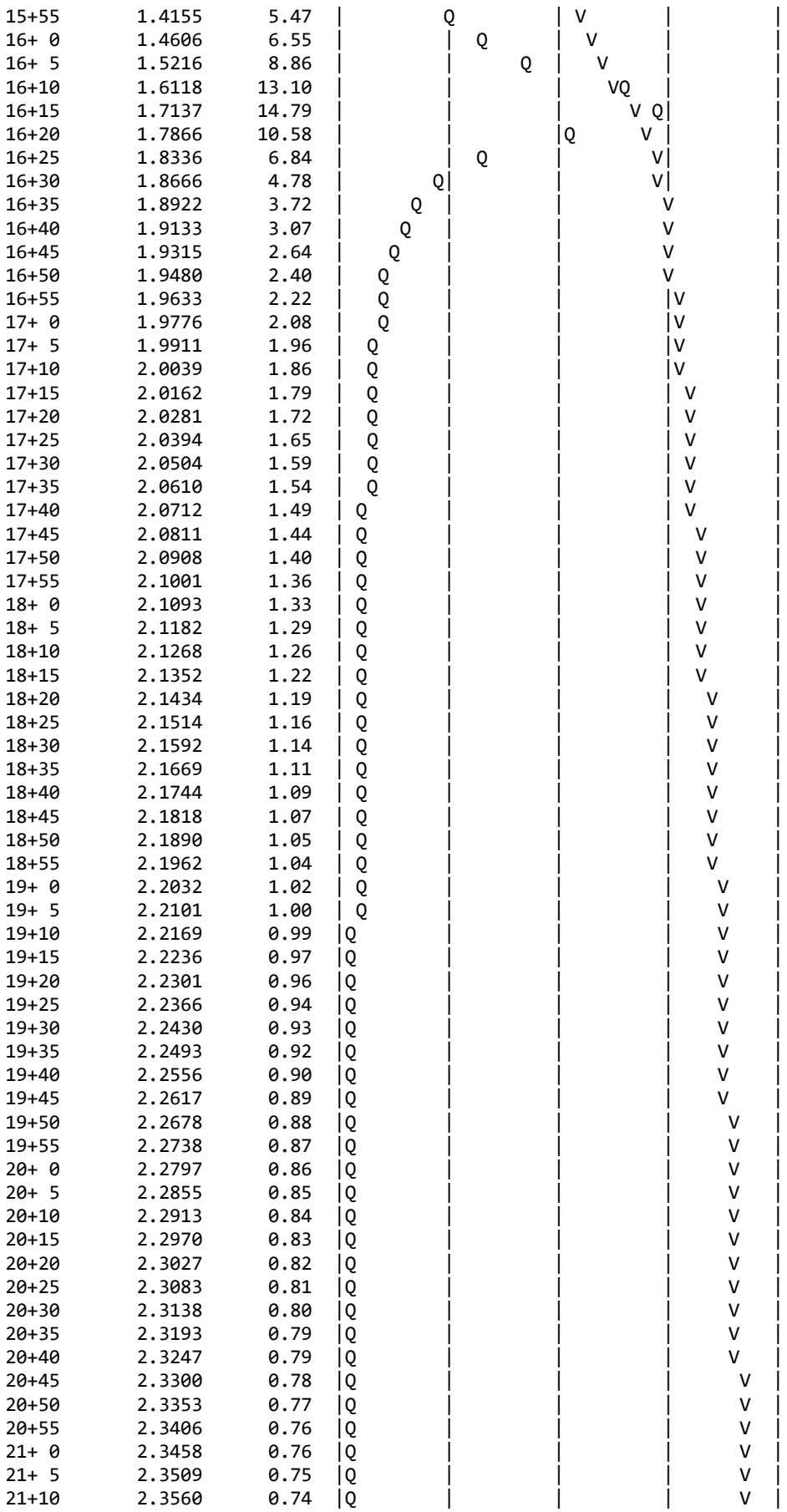
  1                4.488                   5.411
  2               29.220                  29.820
  3               67.983                  46.738
  4               89.490                  25.933
  5               96.848                   8.871
  6               98.699                   2.232
  7               99.585                   1.068
  8              100.000                   0.501
------------------------------------------------------------------------
------------------------------------------------------------------------
------------------------------------------------------------------------
Total soil rain loss =      0.46(In)
Total effective rainfall =      3.03(In)
Peak flow rate in flood hydrograph =     14.79(CFS)
------------------------------------------------------------------------
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                   24 - H O U R    S T O R M
               R u n o f f      H y d r o g r a p h
------------------------------------------------------------------------
            Hydrograph in   5   Minute intervals ((CFS))

------------------------------------------------------------------------
```

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	5.0	10.0	15.0	20.0
0+ 5	0.0002	0.03	Q				
0+10	0.0013	0.17	Q				
0+15	0.0040	0.39	Q				
0+20	0.0075	0.51	VQ				
0+25	0.0113	0.55	VQ				
0+30	0.0152	0.57	VQ				
0+35	0.0192	0.57	VQ				
0+40	0.0231	0.58	VQ				
0+45	0.0271	0.58	VQ				
0+50	0.0311	0.58	VQ				
0+55	0.0351	0.58	VQ				
1+ 0	0.0391	0.58	VQ				
1+ 5	0.0432	0.59	VQ				
1+10	0.0472	0.59	VQ				
1+15	0.0512	0.59	VQ				
1+20	0.0553	0.59	VQ				
1+25	0.0594	0.59	VQ				
1+30	0.0635	0.59	|Q				
1+35	0.0676	0.60	|Q				
1+40	0.0717	0.60	|Q				
1+45	0.0758	0.60	|Q				
1+50	0.0800	0.60	|Q				
1+55	0.0841	0.60	|Q				
2+ 0	0.0883	0.61	|Q				
2+ 5	0.0925	0.61	|Q				
2+10	0.0967	0.61	|Q				
2+15	0.1009	0.61	|Q				
2+20	0.1051	0.61	|Q				
2+25	0.1093	0.62	|Q				
2+30	0.1136	0.62	|Q				
2+35	0.1179	0.62	|Q				
2+40	0.1221	0.62	|Q				
2+45	0.1264	0.62	|QV				
2+50	0.1307	0.63	|QV				
2+55	0.1351	0.63	|QV				
3+ 0	0.1394	0.63	|QV				
3+ 5	0.1438	0.63	|QV				
3+10	0.1481	0.63	|QV				
3+15	0.1525	0.64	|QV				
3+20	0.1569	0.64	|QV				
3+25	0.1613	0.64	|QV				
3+30	0.1658	0.64	|QV				
3+35	0.1702	0.65	|QV				
3+40	0.1747	0.65	|QV				
3+45	0.1791	0.65	|QV				
3+50	0.1836	0.65	|QV				
3+55	0.1881	0.66	|QV				
4+ 0	0.1927	0.66	|Q V				
4+ 5	0.1972	0.66	|Q V				
4+10	0.2018	0.66	|Q V				
4+15	0.2064	0.66	|Q V				
4+20	0.2110	0.67	|Q V				
4+25	0.2156	0.67	|Q V				
4+30	0.2202	0.67	|Q V				
4+35	0.2249	0.68	|Q V				
4+40	0.2295	0.68	|Q V				
4+45	0.2342	0.68	|Q V				
4+50	0.2389	0.68	|Q V				
4+55	0.2436	0.69	|Q V				
5+ 0	0.2484	0.69	|Q V				
5+ 5	0.2531	0.69	|Q V				
5+10	0.2579	0.69	|Q V				

5+15	0.2627	0.70	|Q V |	|	|	|
5+20	0.2676	0.70	|Q V |	|	|	|
5+25	0.2724	0.70	|Q V |	|	|	|
5+30	0.2773	0.71	|Q V |	|	|	|
5+35	0.2821	0.71	|Q V |	|	|	|
5+40	0.2871	0.71	|Q V |	|	|	|
5+45	0.2920	0.72	|Q V |	|	|	|
5+50	0.2969	0.72	|Q V |	|	|	|
5+55	0.3019	0.72	|Q V |	|	|	|
6+ 0	0.3069	0.72	|Q V |	|	|	|
6+ 5	0.3119	0.73	|Q V |	|	|	|
6+10	0.3169	0.73	|Q V |	|	|	|
6+15	0.3220	0.73	|Q V |	|	|	|
6+20	0.3271	0.74	|Q V |	|	|	|
6+25	0.3322	0.74	|Q V |	|	|	|
6+30	0.3373	0.74	|Q V |	|	|	|
6+35	0.3425	0.75	|Q V |	|	|	|
6+40	0.3476	0.75	|Q V |	|	|	|
6+45	0.3528	0.76	|Q V |	|	|	|
6+50	0.3581	0.76	|Q V |	|	|	|
6+55	0.3633	0.76	|Q V |	|	|	|
7+ 0	0.3686	0.77	|Q V |	|	|	|
7+ 5	0.3739	0.77	|Q V |	|	|	|
7+10	0.3792	0.77	|Q V |	|	|	|
7+15	0.3846	0.78	|Q V |	|	|	|
7+20	0.3900	0.78	|Q V |	|	|	|
7+25	0.3954	0.79	|Q V |	|	|	|
7+30	0.4008	0.79	|Q V |	|	|	|
7+35	0.4063	0.79	|Q V |	|	|	|
7+40	0.4118	0.80	|Q V |	|	|	|
7+45	0.4173	0.80	|Q V |	|	|	|
7+50	0.4229	0.81	|Q V |	|	|	|
7+55	0.4285	0.81	|Q V |	|	|	|
8+ 0	0.4341	0.82	|Q V |	|	|	|
8+ 5	0.4398	0.82	|Q V |	|	|	|
8+10	0.4454	0.83	|Q V |	|	|	|
8+15	0.4511	0.83	|Q V |	|	|	|
8+20	0.4569	0.83	|Q V |	|	|	|
8+25	0.4627	0.84	|Q V |	|	|	|
8+30	0.4685	0.84	|Q V |	|	|	|
8+35	0.4743	0.85	|Q V |	|	|	|
8+40	0.4802	0.85	|Q V |	|	|	|
8+45	0.4861	0.86	|Q V |	|	|	|
8+50	0.4921	0.86	|Q V |	|	|	|
8+55	0.4981	0.87	|Q V |	|	|	|
9+ 0	0.5041	0.88	|Q V |	|	|	|
9+ 5	0.5102	0.88	|Q V |	|	|	|
9+10	0.5163	0.89	|Q V |	|	|	|
9+15	0.5224	0.89	|Q V |	|	|	|
9+20	0.5286	0.90	|Q V |	|	|	|
9+25	0.5349	0.90	|Q V |	|	|	|
9+30	0.5411	0.91	|Q V |	|	|	|
9+35	0.5474	0.92	|Q V |	|	|	|
9+40	0.5538	0.92	|Q V |	|	|	|
9+45	0.5602	0.93	|Q V |	|	|	|
9+50	0.5667	0.94	|Q V|	|	|	|
9+55	0.5731	0.94	|Q V|	|	|	|
10+ 0	0.5797	0.95	|Q V|	|	|	|
10+ 5	0.5863	0.96	|Q V|	|	|	|
10+10	0.5929	0.96	|Q V|	|	|	|
10+15	0.5996	0.97	|Q V|	|	|	|
10+20	0.6063	0.98	|Q V|	|	|	|
10+25	0.6131	0.99	|Q V|	|	|	|
10+30	0.6200	0.99	|Q V|	|	|	|





```
   21+15       2.3611      0.73  |Q        |         |         |      V  |
   21+20       2.3661      0.73  |Q        |         |         |      V  |
   21+25       2.3711      0.72  |Q        |         |         |      V  |
   21+30       2.3760      0.72  |Q        |         |         |      V  |
   21+35       2.3809      0.71  |Q        |         |         |      V  |
   21+40       2.3857      0.70  |Q        |         |         |      V  |
   21+45       2.3905      0.70  |Q        |         |         |       V |
   21+50       2.3953      0.69  |Q        |         |         |       V |
   21+55       2.4000      0.69  |Q        |         |         |       V |
   22+ 0       2.4047      0.68  |Q        |         |         |       V |
   22+ 5       2.4093      0.68  |Q        |         |         |       V |
   22+10       2.4140      0.67  |Q        |         |         |       V |
   22+15       2.4185      0.66  |Q        |         |         |       V |
   22+20       2.4231      0.66  |Q        |         |         |       V |
   22+25       2.4276      0.65  |Q        |         |         |       V |
   22+30       2.4321      0.65  |Q        |         |         |       V |
   22+35       2.4365      0.65  |Q        |         |         |       V |
   22+40       2.4409      0.64  |Q        |         |         |       V |
   22+45       2.4453      0.64  |Q        |         |         |       V |
   22+50       2.4497      0.63  |Q        |         |         |       V |
   22+55       2.4540      0.63  |Q        |         |         |        V|
   23+ 0       2.4583      0.62  |Q        |         |         |        V|
   23+ 5       2.4625      0.62  |Q        |         |         |        V|
   23+10       2.4668      0.62  |Q        |         |         |        V|
   23+15       2.4710      0.61  |Q        |         |         |        V|
   23+20       2.4752      0.61  |Q        |         |         |        V|
   23+25       2.4793      0.60  |Q        |         |         |        V|
   23+30       2.4834      0.60  |Q        |         |         |        V|
   23+35       2.4876      0.60  |Q        |         |         |        V|
   23+40       2.4916      0.59  |Q        |         |         |        V|
   23+45       2.4957      0.59  |Q        |         |         |        V|
   23+50       2.4997      0.58  |Q        |         |         |        V|
   23+55       2.5037      0.58  |Q        |         |         |        V|
   24+ 0       2.5077      0.58  |Q        |         |         |        V|
-------------------------------------------------------------------------
```

U n i t H y d r o g r a p h A n a l y s i s

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Study date 02/22/23

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San Bernardino County Synthetic Unit Hydrology Method
Manual date - August 1986

Program License Serial Number 6509

A22078-1 EAST HIGHLAND
Q10
PT 301 10-YR STORM - UH AT NODE 301

Storm Event Year = 10

Antecedent Moisture Condition = 2

English (in-lb) Input Units Used

English Rainfall Data (Inches) Input Values Used

English Units used in output format

Area averaged rainfall intensity isohyetal data:

Sub-Area (Ac.)	Duration (hours)	Isohyetal (In)
Rainfall data for year 10		
0.77	1	0.82
Rainfall data for year 10		
0.77	6	1.86
Rainfall data for year 10		
0.77	24	3.49

++

******** Area-averaged max loss rate, Fm ********

SCS curve No.(AMCII)	SCS curve NO.(AMC 2)	Area (Ac.)	Area Fraction	Fp(Fig C6) (In/Hr)	Ap (dec.)	Fm (In/Hr)
32.0	32.0	0.77	1.000	0.978	0.230	0.225

Area-averaged adjusted loss rate Fm (In/Hr) = 0.225

********* Area-Averaged low loss rate fraction, Yb **********

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC2)	S	Pervious Yield Fr

```
     0.18   0.230         32.0      32.0      17.45     0.000
     0.59   0.770         98.0      98.0       0.20     0.933

   Area-averaged catchment yield fraction, Y =  0.719
   Area-averaged low loss fraction, Yb =  0.281
   User entry of time of concentration  =   0.169 (hours)
   ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
   Watershed area =       0.77(Ac.)
   Catchment Lag time =   0.135 hours
   Unit interval =   5.000 minutes
   Unit interval percentage of lag time = 61.6371
   Hydrograph baseflow =     0.00(CFS)
   Average maximum watershed loss rate(Fm) =  0.225(In/Hr)
   Average low loss rate fraction (Yb) = 0.281 (decimal)
   VALLEY DEVELOPED S-Graph Selected
   Computed peak 5-minute rainfall =  0.215(In)
   Computed peak 30-minute rainfall =  0.560(In)
   Specified peak 1-hour rainfall =  0.819(In)
   Computed peak 3-hour rainfall =  1.350(In)
   Specified peak 6-hour rainfall =  1.860(In)
   Specified peak 24-hour rainfall =  3.490(In)


   Note: user specified rainfall values used.
   Rainfall depth area reduction factors:
   Using a total area of       0.77(Ac.) (Ref: fig. E-4)

   5-minute factor = 1.000     Adjusted rainfall =  0.215(In)
   30-minute factor = 1.000    Adjusted rainfall =  0.560(In)
   1-hour factor = 1.000       Adjusted rainfall =  0.819(In)
   3-hour factor = 1.000       Adjusted rainfall =  1.350(In)
   6-hour factor = 1.000       Adjusted rainfall =  1.860(In)
   24-hour factor = 1.000      Adjusted rainfall =  3.490(In)
   ----------------------------------------------------------------------

                         U n i t  H y d r o g r a p h
   ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
   Interval          'S' Graph          Unit Hydrograph
   Number            Mean values             ((CFS))
   ----------------------------------------------------------------------
                 (K =         9.31 (CFS))

     1                6.867                   0.639
     2               43.656                   3.426
     3               83.214                   3.684
     4               96.107                   1.201
     5               98.793                   0.250
     6              100.000                   0.112
   ----------------------------------------------------------------------
   ----------------------------------------------------------------------
   ----------------------------------------------------------------------
   Total soil rain loss =      0.93(In)
   Total effective rainfall =      2.56(In)
   Peak flow rate in flood hydrograph =      1.07(CFS)
   ----------------------------------------------------------------------
   ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                       24 - H O U R    S T O R M
                  R u n o f f      H y d r o g r a p h
   ----------------------------------------------------------------------
              Hydrograph in   5   Minute intervals ((CFS))

   ----------------------------------------------------------------------
Time(h+m) Volume Ac.Ft   Q(CFS)  0        2.5       5.0       7.5      10.0
----------------------------------------------------------------------
```

0+ 5	0.0000	0.00	Q	|	|	|	|
0+10	0.0001	0.02	Q	|	|	|	|
0+15	0.0003	0.03	Q	|	|	|	|
0+20	0.0006	0.04	Q	|	|	|	|
0+25	0.0008	0.04	Q	|	|	|	|
0+30	0.0011	0.04	Q	|	|	|	|
0+35	0.0013	0.04	Q	|	|	|	|
0+40	0.0016	0.04	Q	|	|	|	|
0+45	0.0019	0.04	Q	|	|	|	|
0+50	0.0021	0.04	Q	|	|	|	|
0+55	0.0024	0.04	Q	|	|	|	|
1+ 0	0.0026	0.04	Q	|	|	|	|
1+ 5	0.0029	0.04	Q	|	|	|	|
1+10	0.0032	0.04	Q	|	|	|	|
1+15	0.0034	0.04	Q	|	|	|	|
1+20	0.0037	0.04	Q	|	|	|	|
1+25	0.0040	0.04	Q	|	|	|	|
1+30	0.0042	0.04	QV	|	|	|	|
1+35	0.0045	0.04	QV	|	|	|	|
1+40	0.0048	0.04	QV	|	|	|	|
1+45	0.0050	0.04	QV	|	|	|	|
1+50	0.0053	0.04	QV	|	|	|	|
1+55	0.0056	0.04	QV	|	|	|	|
2+ 0	0.0058	0.04	QV	|	|	|	|
2+ 5	0.0061	0.04	QV	|	|	|	|
2+10	0.0064	0.04	QV	|	|	|	|
2+15	0.0067	0.04	QV	|	|	|	|
2+20	0.0069	0.04	QV	|	|	|	|
2+25	0.0072	0.04	QV	|	|	|	|
2+30	0.0075	0.04	QV	|	|	|	|
2+35	0.0078	0.04	QV	|	|	|	|
2+40	0.0080	0.04	QV	|	|	|	|
2+45	0.0083	0.04	Q V	|	|	|	|
2+50	0.0086	0.04	Q V	|	|	|	|
2+55	0.0089	0.04	Q V	|	|	|	|
3+ 0	0.0092	0.04	Q V	|	|	|	|
3+ 5	0.0094	0.04	Q V	|	|	|	|
3+10	0.0097	0.04	Q V	|	|	|	|
3+15	0.0100	0.04	Q V	|	|	|	|
3+20	0.0103	0.04	Q V	|	|	|	|
3+25	0.0106	0.04	Q V	|	|	|	|
3+30	0.0109	0.04	Q V	|	|	|	|
3+35	0.0112	0.04	Q V	|	|	|	|
3+40	0.0114	0.04	Q V	|	|	|	|
3+45	0.0117	0.04	Q V	|	|	|	|
3+50	0.0120	0.04	Q V	|	|	|	|
3+55	0.0123	0.04	Q V	|	|	|	|
4+ 0	0.0126	0.04	Q V	|	|	|	|
4+ 5	0.0129	0.04	Q V	|	|	|	|
4+10	0.0132	0.04	Q V	|	|	|	|
4+15	0.0135	0.04	Q V	|	|	|	|
4+20	0.0138	0.04	Q V	|	|	|	|
4+25	0.0141	0.04	Q V	|	|	|	|
4+30	0.0144	0.04	Q V	|	|	|	|
4+35	0.0147	0.04	Q V	|	|	|	|
4+40	0.0150	0.04	Q V	|	|	|	|
4+45	0.0153	0.04	Q V	|	|	|	|
4+50	0.0156	0.04	Q V	|	|	|	|
4+55	0.0159	0.04	Q V	|	|	|	|
5+ 0	0.0162	0.04	Q V	|	|	|	|
5+ 5	0.0165	0.04	Q V	|	|	|	|
5+10	0.0168	0.05	Q V	|	|	|	|
5+15	0.0172	0.05	Q V	|	|	|	|
5+20	0.0175	0.05	Q V	|	|	|	|

5+25	0.0178	0.05	Q	V	|	|	|	|
5+30	0.0181	0.05	Q	V	|	|	|	|
5+35	0.0184	0.05	Q	V	|	|	|	|
5+40	0.0187	0.05	Q	V	|	|	|	|
5+45	0.0191	0.05	Q	V	|	|	|	|
5+50	0.0194	0.05	Q	V	|	|	|	|
5+55	0.0197	0.05	Q	V	|	|	|	|
6+ 0	0.0200	0.05	Q	V	|	|	|	|
6+ 5	0.0203	0.05	Q	V	|	|	|	|
6+10	0.0207	0.05	Q	V	|	|	|	|
6+15	0.0210	0.05	Q	V	|	|	|	|
6+20	0.0213	0.05	Q	V	|	|	|	|
6+25	0.0217	0.05	Q	V	|	|	|	|
6+30	0.0220	0.05	Q	V	|	|	|	|
6+35	0.0223	0.05	Q	V	|	|	|	|
6+40	0.0227	0.05	Q	V	|	|	|	|
6+45	0.0230	0.05	Q	V	|	|	|	|
6+50	0.0233	0.05	Q	V	|	|	|	|
6+55	0.0237	0.05	Q	V	|	|	|	|
7+ 0	0.0240	0.05	Q	V	|	|	|	|
7+ 5	0.0244	0.05	Q	V	|	|	|	|
7+10	0.0247	0.05	Q	V	|	|	|	|
7+15	0.0251	0.05	Q	V	|	|	|	|
7+20	0.0254	0.05	Q	V	|	|	|	|
7+25	0.0258	0.05	Q	V	|	|	|	|
7+30	0.0261	0.05	Q	V	|	|	|	|
7+35	0.0265	0.05	Q	V	|	|	|	|
7+40	0.0268	0.05	Q	V	|	|	|	|
7+45	0.0272	0.05	Q	V	|	|	|	|
7+50	0.0276	0.05	Q	V	|	|	|	|
7+55	0.0279	0.05	Q	V	|	|	|	|
8+ 0	0.0283	0.05	Q	V	|	|	|	|
8+ 5	0.0286	0.05	Q	V	|	|	|	|
8+10	0.0290	0.05	Q	V	|	|	|	|
8+15	0.0294	0.05	Q	V	|	|	|	|
8+20	0.0298	0.05	Q	V	|	|	|	|
8+25	0.0301	0.05	Q	V	|	|	|	|
8+30	0.0305	0.05	Q	V	|	|	|	|
8+35	0.0309	0.06	Q	V	|	|	|	|
8+40	0.0313	0.06	Q	V	|	|	|	|
8+45	0.0317	0.06	Q	V	|	|	|	|
8+50	0.0320	0.06	Q	V	|	|	|	|
8+55	0.0324	0.06	Q	V	|	|	|	|
9+ 0	0.0328	0.06	Q	V	|	|	|	|
9+ 5	0.0332	0.06	Q	V	|	|	|	|
9+10	0.0336	0.06	Q	V	|	|	|	|
9+15	0.0340	0.06	Q	V	|	|	|	|
9+20	0.0344	0.06	Q	V	|	|	|	|
9+25	0.0348	0.06	Q	V	|	|	|	|
9+30	0.0352	0.06	Q	V	|	|	|	|
9+35	0.0356	0.06	Q	V	|	|	|	|
9+40	0.0361	0.06	Q	V	|	|	|	|
9+45	0.0365	0.06	Q	V	|	|	|	|
9+50	0.0369	0.06	Q	V	|	|	|	|
9+55	0.0373	0.06	Q	V	|	|	|	|
10+ 0	0.0377	0.06	Q	V	|	|	|	|
10+ 5	0.0382	0.06	Q	V	|	|	|	|
10+10	0.0386	0.06	Q	V	|	|	|	|
10+15	0.0390	0.06	Q	V	|	|	|	|
10+20	0.0395	0.06	Q	V	|	|	|	|
10+25	0.0399	0.06	Q	V	|	|	|	|
10+30	0.0404	0.06	Q	V	|	|	|	|
10+35	0.0408	0.07	Q	V	|	|	|	|
10+40	0.0413	0.07	Q	V	|	|	|	|

```
10+45       0.0417      0.07  Q         V         |         |         |
10+50       0.0422      0.07  Q         V         |         |         |
10+55       0.0426      0.07  Q         V         |         |         |
11+ 0       0.0431      0.07  Q         V         |         |         |
11+ 5       0.0436      0.07  Q         V         |         |         |
11+10       0.0441      0.07  Q         V         |         |         |
11+15       0.0445      0.07  Q         V         |         |         |
11+20       0.0450      0.07  Q         V         |         |         |
11+25       0.0455      0.07  Q         |V        |         |         |
11+30       0.0460      0.07  Q         |V        |         |         |
11+35       0.0465      0.07  Q         |V        |         |         |
11+40       0.0470      0.07  Q         |V        |         |         |
11+45       0.0475      0.07  Q         |V        |         |         |
11+50       0.0480      0.07  Q         |V        |         |         |
11+55       0.0486      0.08  Q         |V        |         |         |
12+ 0       0.0491      0.08  Q         |V        |         |         |
12+ 5       0.0496      0.08  Q         | V       |         |         |
12+10       0.0502      0.08  Q         | V       |         |         |
12+15       0.0507      0.08  Q         | V       |         |         |
12+20       0.0513      0.08  Q         | V       |         |         |
12+25       0.0518      0.08  Q         | V       |         |         |
12+30       0.0524      0.08  Q         | V       |         |         |
12+35       0.0530      0.08  Q         | V       |         |         |
12+40       0.0536      0.09  Q         |  V      |         |         |
12+45       0.0542      0.09  Q         |  V      |         |         |
12+50       0.0548      0.09  Q         |  V      |         |         |
12+55       0.0554      0.09  Q         |  V      |         |         |
13+ 0       0.0560      0.09  Q         |  V      |         |         |
13+ 5       0.0566      0.09  Q         |  V      |         |         |
13+10       0.0573      0.09  Q         |  V      |         |         |
13+15       0.0579      0.09  Q         |   V     |         |         |
13+20       0.0586      0.10  Q         |   V     |         |         |
13+25       0.0592      0.10  Q         |   V     |         |         |
13+30       0.0599      0.10  Q         |   V     |         |         |
13+35       0.0606      0.10  Q         |   V     |         |         |
13+40       0.0613      0.10  Q         |   V     |         |         |
13+45       0.0620      0.10  Q         |    V    |         |         |
13+50       0.0628      0.11  Q         |    V    |         |         |
13+55       0.0635      0.11  Q         |    V    |         |         |
14+ 0       0.0643      0.11  Q         |    V    |         |         |
14+ 5       0.0650      0.11  Q         |    V    |         |         |
14+10       0.0658      0.11  Q         |     V   |         |         |
14+15       0.0666      0.12  Q         |     V   |         |         |
14+20       0.0674      0.12  Q         |     V   |         |         |
14+25       0.0683      0.12  Q         |     V   |         |         |
14+30       0.0691      0.12  Q         |     V   |         |         |
14+35       0.0700      0.13  Q         |      V  |         |         |
14+40       0.0709      0.13  Q         |      V  |         |         |
14+45       0.0718      0.14  Q         |      V  |         |         |
14+50       0.0728      0.14  Q         |      V  |         |         |
14+55       0.0738      0.14  Q         |      V  |         |         |
15+ 0       0.0748      0.15  Q         |       V |         |         |
15+ 5       0.0759      0.16  Q         |       V |         |         |
15+10       0.0770      0.16  Q         |       V |         |         |
15+15       0.0782      0.17  Q         |        V|         |         |
15+20       0.0794      0.18  Q         |        V|         |         |
15+25       0.0808      0.19  Q         |        V|         |         |
15+30       0.0823      0.22  Q         |         V         |         |
15+35       0.0840      0.25  |Q        |         V         |         |
15+40       0.0859      0.27  |Q        |         V         |         |
15+45       0.0880      0.30  |Q        |         |V        |         |
15+50       0.0902      0.32  |Q        |         |V        |         |
15+55       0.0927      0.37  |Q        |         | V       |         |
16+ 0       0.0958      0.45  |Q        |         |  V      |         |
```

```
16+ 5       0.1004      0.66  | Q       |         |   V     |         |
16+10       0.1077      1.07  |   Q     |         |     V   |         |
16+15       0.1147      1.02  |   Q     |         |      V  |         |
16+20       0.1187      0.57  | Q       |         |       V |         |
16+25       0.1212      0.36  |Q        |         |        V|         |
16+30       0.1230      0.27  |Q        |         |        V|         |
16+35       0.1245      0.21  Q         |         |         V         |
16+40       0.1257      0.18  Q         |         |         V         |
16+45       0.1268      0.16  Q         |         |         V         |
16+50       0.1279      0.15  Q         |         |         |V        |
16+55       0.1288      0.14  Q         |         |         |V        |
17+ 0       0.1297      0.13  Q         |         |         |V        |
17+ 5       0.1306      0.12  Q         |         |         |V        |
17+10       0.1314      0.12  Q         |         |         | V       |
17+15       0.1322      0.11  Q         |         |         | V       |
17+20       0.1329      0.11  Q         |         |         | V       |
17+25       0.1337      0.11  Q         |         |         | V       |
17+30       0.1343      0.10  Q         |         |         | V       |
17+35       0.1350      0.10  Q         |         |         | V       |
17+40       0.1357      0.09  Q         |         |         |  V      |
17+45       0.1363      0.09  Q         |         |         |  V      |
17+50       0.1369      0.09  Q         |         |         |  V      |
17+55       0.1375      0.09  Q         |         |         |  V      |
18+ 0       0.1381      0.08  Q         |         |         |  V      |
18+ 5       0.1387      0.08  Q         |         |         |  V      |
18+10       0.1392      0.08  Q         |         |         |  V      |
18+15       0.1398      0.08  Q         |         |         |   V     |
18+20       0.1403      0.08  Q         |         |         |   V     |
18+25       0.1408      0.07  Q         |         |         |   V     |
18+30       0.1413      0.07  Q         |         |         |   V     |
18+35       0.1418      0.07  Q         |         |         |   V     |
18+40       0.1423      0.07  Q         |         |         |   V     |
18+45       0.1428      0.07  Q         |         |         |   V     |
18+50       0.1432      0.07  Q         |         |         |   V     |
18+55       0.1437      0.07  Q         |         |         |   V     |
19+ 0       0.1441      0.07  Q         |         |         |    V    |
19+ 5       0.1446      0.06  Q         |         |         |    V    |
19+10       0.1450      0.06  Q         |         |         |    V    |
19+15       0.1455      0.06  Q         |         |         |    V    |
19+20       0.1459      0.06  Q         |         |         |    V    |
19+25       0.1463      0.06  Q         |         |         |    V    |
19+30       0.1467      0.06  Q         |         |         |    V    |
19+35       0.1471      0.06  Q         |         |         |    V    |
19+40       0.1475      0.06  Q         |         |         |    V    |
19+45       0.1479      0.06  Q         |         |         |     V   |
19+50       0.1483      0.06  Q         |         |         |     V   |
19+55       0.1487      0.06  Q         |         |         |     V   |
20+ 0       0.1491      0.06  Q         |         |         |     V   |
20+ 5       0.1494      0.05  Q         |         |         |     V   |
20+10       0.1498      0.05  Q         |         |         |     V   |
20+15       0.1502      0.05  Q         |         |         |     V   |
20+20       0.1506      0.05  Q         |         |         |     V   |
20+25       0.1509      0.05  Q         |         |         |     V   |
20+30       0.1513      0.05  Q         |         |         |     V   |
20+35       0.1516      0.05  Q         |         |         |     V   |
20+40       0.1520      0.05  Q         |         |         |      V  |
20+45       0.1523      0.05  Q         |         |         |      V  |
20+50       0.1527      0.05  Q         |         |         |      V  |
20+55       0.1530      0.05  Q         |         |         |      V  |
21+ 0       0.1533      0.05  Q         |         |         |      V  |
21+ 5       0.1537      0.05  Q         |         |         |      V  |
21+10       0.1540      0.05  Q         |         |         |      V  |
21+15       0.1543      0.05  Q         |         |         |      V  |
21+20       0.1546      0.05  Q         |         |         |      V  |
```

```
   21+25       0.1550      0.05  Q         |          |          |      V  |
   21+30       0.1553      0.05  Q         |          |          |      V  |
   21+35       0.1556      0.05  Q         |          |          |      V  |
   21+40       0.1559      0.05  Q         |          |          |      V  |
   21+45       0.1562      0.05  Q         |          |          |       V |
   21+50       0.1565      0.04  Q         |          |          |       V |
   21+55       0.1568      0.04  Q         |          |          |       V |
   22+ 0       0.1571      0.04  Q         |          |          |       V |
   22+ 5       0.1574      0.04  Q         |          |          |       V |
   22+10       0.1577      0.04  Q         |          |          |       V |
   22+15       0.1580      0.04  Q         |          |          |       V |
   22+20       0.1583      0.04  Q         |          |          |       V |
   22+25       0.1586      0.04  Q         |          |          |       V |
   22+30       0.1589      0.04  Q         |          |          |       V |
   22+35       0.1592      0.04  Q         |          |          |       V |
   22+40       0.1595      0.04  Q         |          |          |       V |
   22+45       0.1598      0.04  Q         |          |          |       V |
   22+50       0.1600      0.04  Q         |          |          |       V |
   22+55       0.1603      0.04  Q         |          |          |        V|
   23+ 0       0.1606      0.04  Q         |          |          |        V|
   23+ 5       0.1609      0.04  Q         |          |          |        V|
   23+10       0.1611      0.04  Q         |          |          |        V|
   23+15       0.1614      0.04  Q         |          |          |        V|
   23+20       0.1617      0.04  Q         |          |          |        V|
   23+25       0.1620      0.04  Q         |          |          |        V|
   23+30       0.1622      0.04  Q         |          |          |        V|
   23+35       0.1625      0.04  Q         |          |          |        V|
   23+40       0.1628      0.04  Q         |          |          |        V|
   23+45       0.1630      0.04  Q         |          |          |        V|
   23+50       0.1633      0.04  Q         |          |          |        V|
   23+55       0.1635      0.04  Q         |          |          |        V|
   24+ 0       0.1638      0.04  Q         |          |          |        V|
-------------------------------------------------------------------------
```

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2019 Version 9.1

Rational Hydrology Study Date: 02/22/23

A22078-1 PROPOSED HIGHLAND EAST
Q25

Program License Serial Number 6509

********* Hydrology Study Control Information **********

Rational hydrology study storm event year is 25.0
10 Year storm 1 hour rainfall = 0.819(In.)
100 Year storm 1 hour rainfall = 1.330(In.)
Computed rainfall intensity:
Storm year = 25.00 1 hour rainfall = 1.022 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 2

++
Process from Point/Station 100.000 to Point/Station 101.000
**** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.098(In/Hr)
Initial subarea data:
Initial area flow distance = 430.000(Ft.)
Top (of initial area) elevation = 1180.100(Ft.)
Bottom (of initial area) elevation = 1177.060(Ft.)
Difference in elevation = 3.040(Ft.)
Slope = 0.00707 s(%)= 0.71

```
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    9.255 min.
Rainfall intensity =      3.138(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.872
Subarea runoff =      2.298(CFS)
Total initial stream area =        0.840(Ac.)
Pervious area fraction = 0.100
Initial area Fm value =    0.098(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      101.000 to Point/Station      201.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
________________________________________________________________________
Upstream point/station elevation =  1177.060(Ft.)
Downstream point/station elevation =  1171.580(Ft.)
Pipe length  =   775.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     2.298(CFS)
Given pipe size =     24.00(In.)
Calculated individual pipe flow  =     2.298(CFS)
Normal flow depth in pipe =    5.63(In.)
Flow top width inside pipe =   20.34(In.)
Critical Depth =    6.32(In.)
Pipe flow velocity =      4.09(Ft/s)
Travel time through pipe =    3.16 min.
Time of concentration (TC) =    12.41 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      201.000 to Point/Station      201.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Pervious ratio(Ap) = 0.1000     Max loss rate(Fm)=     0.098(In/Hr)
Time of concentration =    12.41 min.
Rainfall intensity =      2.631(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.867
Subarea runoff =     20.435(CFS) for    9.130(Ac.)
Total runoff =     22.733(CFS)
Effective area this stream =        9.97(Ac.)
Total Study Area (Main Stream No. 1) =        9.97(Ac.)
Area averaged Fm value =    0.098(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      300.000 to Point/Station      301.000
**** INITIAL AREA EVALUATION ****
```

```
COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Pervious ratio(Ap) = 0.1000     Max loss rate(Fm)=     0.098(In/Hr)
Initial subarea data:
Initial area flow distance =   435.000(Ft.)
Top (of initial area) elevation =  1172.200(Ft.)
Bottom (of initial area) elevation =  1170.210(Ft.)
Difference in elevation =     1.990(Ft.)
Slope =    0.00457  s(%)=       0.46
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   10.144 min.
Rainfall intensity =      2.970(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.870
Subarea runoff =      1.991(CFS)
Total initial stream area =        0.770(Ac.)
Pervious area fraction = 0.100
Initial area Fm value =    0.098(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      400.000 to Point/Station      401.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------------
COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Pervious ratio(Ap) = 0.1000     Max loss rate(Fm)=     0.098(In/Hr)
Initial subarea data:
Initial area flow distance =   690.000(Ft.)
Top (of initial area) elevation =  1179.750(Ft.)
Bottom (of initial area) elevation =  1171.830(Ft.)
Difference in elevation =     7.920(Ft.)
Slope =    0.01148  s(%)=       1.15
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   10.149 min.
Rainfall intensity =      2.969(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.870
Subarea runoff =      0.930(CFS)
Total initial stream area =        0.360(Ac.)
Pervious area fraction = 0.100
Initial area Fm value =    0.098(In/Hr)
End of computations, Total Study Area =           11.10 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
```

effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.100
Area averaged SCS curve number = 32.0

U n i t H y d r o g r a p h A n a l y s i s

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Study date 02/22/23

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San Bernardino County Synthetic Unit Hydrology Method
Manual date - August 1986

Program License Serial Number 6509

A22078-1 EAST HIGHLAND
Q25
PT 201 25-YR STORM - UH AT NODE 201

Storm Event Year = 25

Antecedent Moisture Condition = 2

English (in-lb) Input Units Used

English Rainfall Data (Inches) Input Values Used

English Units used in output format

Area averaged rainfall intensity isohyetal data:

Sub-Area (Ac.)	Duration (hours)	Isohyetal (In)
Rainfall data for year 25		
9.97	1	1.01
Rainfall data for year 25		
9.97	6	2.24
Rainfall data for year 25		
9.97	24	4.24

++

******** Area-averaged max loss rate, Fm ********

SCS curve No.(AMCII)	SCS curve NO.(AMC 2)	Area (Ac.)	Area Fraction	Fp(Fig C6) (In/Hr)	Ap (dec.)	Fm (In/Hr)
32.0	32.0	9.97	1.000	0.978	0.082	0.080

Area-averaged adjusted loss rate Fm (In/Hr) = 0.080

********* Area-Averaged low loss rate fraction, Yb **********

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC2)	S	Pervious Yield Fr

```
     0.82   0.082         32.0      32.0      21.20     0.000
     9.15   0.918         98.0      98.0       0.20     0.944

  Area-averaged catchment yield fraction, Y =  0.867
  Area-averaged low loss fraction, Yb =  0.133
  User entry of time of concentration  =   0.207 (hours)
  ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
  Watershed area =       9.97(Ac.)
  Catchment Lag time =   0.165 hours
  Unit interval =   5.000 minutes
  Unit interval percentage of lag time = 50.3707
  Hydrograph baseflow =     0.00(CFS)
  Average maximum watershed loss rate(Fm) =  0.080(In/Hr)
  Average low loss rate fraction (Yb) = 0.133 (decimal)
  VALLEY DEVELOPED S-Graph Selected
  Computed peak 5-minute rainfall =  0.266(In)
  Computed peak 30-minute rainfall =  0.693(In)
  Specified peak 1-hour rainfall =  1.010(In)
  Computed peak 3-hour rainfall =  1.640(In)
  Specified peak 6-hour rainfall =  2.240(In)
  Specified peak 24-hour rainfall =  4.240(In)


  Note: user specified rainfall values used.
  Rainfall depth area reduction factors:
  Using a total area of       9.97(Ac.) (Ref: fig. E-4)

  5-minute factor = 1.000     Adjusted rainfall =  0.266(In)
  30-minute factor = 1.000    Adjusted rainfall =  0.693(In)
  1-hour factor = 1.000       Adjusted rainfall =  1.010(In)
  3-hour factor = 1.000       Adjusted rainfall =  1.640(In)
  6-hour factor = 1.000       Adjusted rainfall =  2.240(In)
  24-hour factor = 1.000      Adjusted rainfall =  4.240(In)
  ----------------------------------------------------------------------

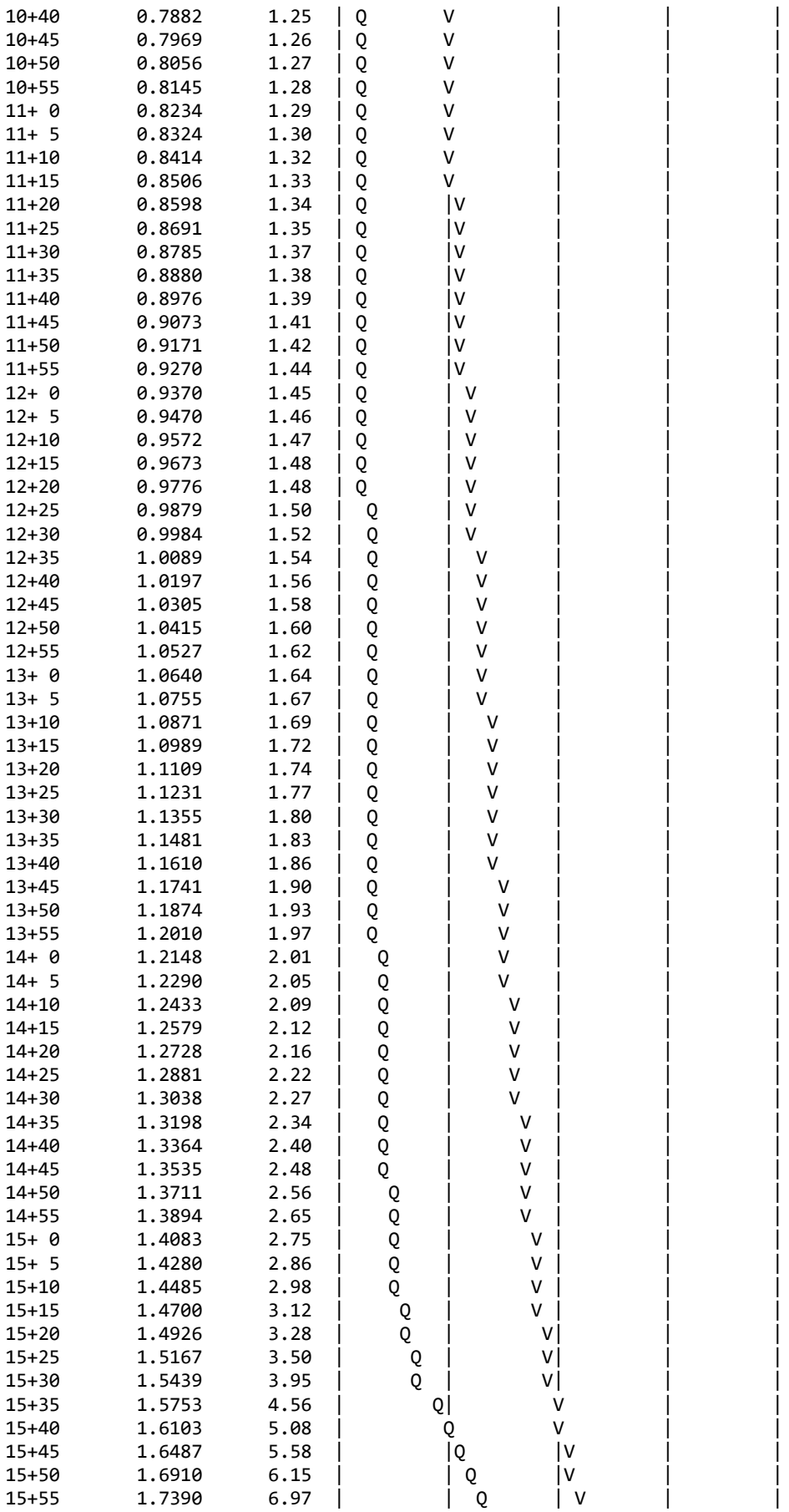
                        U n i t  H y d r o g r a p h
  ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
  Interval          'S' Graph          Unit Hydrograph
  Number            Mean values             ((CFS))
  ----------------------------------------------------------------------
                (K =       120.57 (CFS))

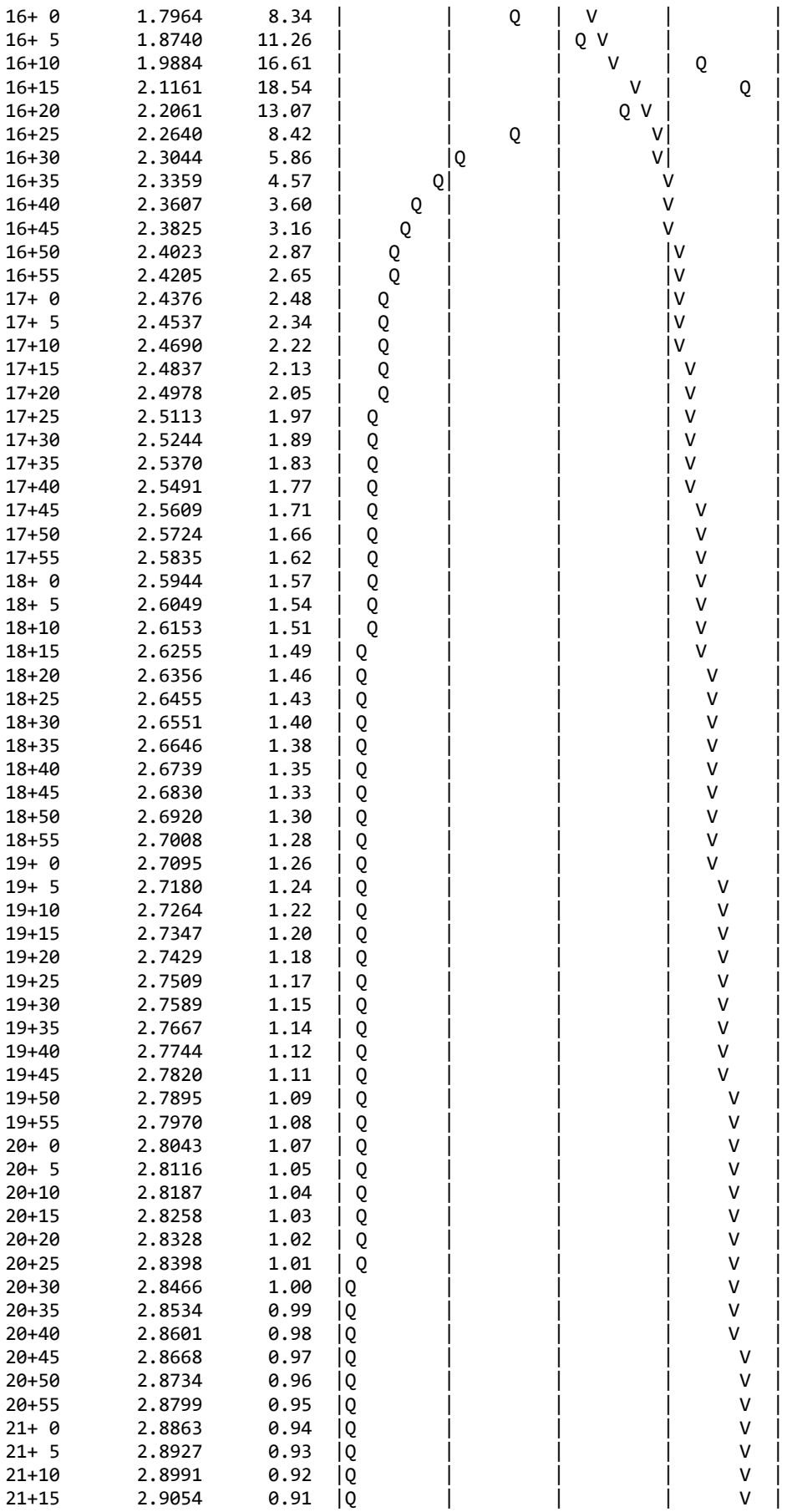
    1                4.642                   5.597
    2               30.224                  30.845
    3               69.377                  47.209
    4               90.236                  25.151
    5               97.125                   8.307
    6               98.787                   2.003
    7              100.000                   1.463
  ----------------------------------------------------------------------
  ----------------------------------------------------------------------
  ----------------------------------------------------------------------
  Total soil rain loss =      0.51(In)
  Total effective rainfall =      3.73(In)
  Peak flow rate in flood hydrograph =     18.54(CFS)
  ----------------------------------------------------------------------
  ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                      24 - H O U R    S T O R M
                  R u n o f f      H y d r o g r a p h
  ----------------------------------------------------------------------
              Hydrograph in   5   Minute intervals ((CFS))

  ----------------------------------------------------------------------
Time(h+m) Volume Ac.Ft   Q(CFS)  0        5.0      10.0      15.0      20.0
```

```
-------------------------------------------------------------------
 0+ 5      0.0002     0.03  Q         |         |         |         |
 0+10      0.0017     0.21  Q         |         |         |         |
 0+15      0.0051     0.49  Q         |         |         |         |
 0+20      0.0095     0.64  VQ        |         |         |         |
 0+25      0.0143     0.69  VQ        |         |         |         |
 0+30      0.0191     0.71  VQ        |         |         |         |
 0+35      0.0241     0.72  VQ        |         |         |         |
 0+40      0.0290     0.72  VQ        |         |         |         |
 0+45      0.0340     0.72  VQ        |         |         |         |
 0+50      0.0390     0.72  VQ        |         |         |         |
 0+55      0.0440     0.73  VQ        |         |         |         |
 1+ 0      0.0490     0.73  VQ        |         |         |         |
 1+ 5      0.0540     0.73  VQ        |         |         |         |
 1+10      0.0590     0.73  VQ        |         |         |         |
 1+15      0.0641     0.73  VQ        |         |         |         |
 1+20      0.0692     0.74  VQ        |         |         |         |
 1+25      0.0742     0.74  VQ        |         |         |         |
 1+30      0.0793     0.74  |Q        |         |         |         |
 1+35      0.0845     0.74  |Q        |         |         |         |
 1+40      0.0896     0.74  |Q        |         |         |         |
 1+45      0.0947     0.75  |Q        |         |         |         |
 1+50      0.0999     0.75  |Q        |         |         |         |
 1+55      0.1051     0.75  |Q        |         |         |         |
 2+ 0      0.1103     0.75  |Q        |         |         |         |
 2+ 5      0.1155     0.76  |Q        |         |         |         |
 2+10      0.1207     0.76  |Q        |         |         |         |
 2+15      0.1260     0.76  |Q        |         |         |         |
 2+20      0.1312     0.76  |Q        |         |         |         |
 2+25      0.1365     0.77  |Q        |         |         |         |
 2+30      0.1418     0.77  |Q        |         |         |         |
 2+35      0.1471     0.77  |Q        |         |         |         |
 2+40      0.1524     0.77  |Q        |         |         |         |
 2+45      0.1578     0.78  |QV       |         |         |         |
 2+50      0.1631     0.78  |QV       |         |         |         |
 2+55      0.1685     0.78  |QV       |         |         |         |
 3+ 0      0.1739     0.78  |QV       |         |         |         |
 3+ 5      0.1794     0.79  |QV       |         |         |         |
 3+10      0.1848     0.79  |QV       |         |         |         |
 3+15      0.1903     0.79  |QV       |         |         |         |
 3+20      0.1957     0.80  |QV       |         |         |         |
 3+25      0.2012     0.80  |QV       |         |         |         |
 3+30      0.2067     0.80  |QV       |         |         |         |
 3+35      0.2123     0.80  |QV       |         |         |         |
 3+40      0.2178     0.81  |QV       |         |         |         |
 3+45      0.2234     0.81  |QV       |         |         |         |
 3+50      0.2290     0.81  |QV       |         |         |         |
 3+55      0.2346     0.82  |Q V      |         |         |         |
 4+ 0      0.2403     0.82  |Q V      |         |         |         |
 4+ 5      0.2459     0.82  |Q V      |         |         |         |
 4+10      0.2516     0.82  |Q V      |         |         |         |
 4+15      0.2573     0.83  |Q V      |         |         |         |
 4+20      0.2630     0.83  |Q V      |         |         |         |
 4+25      0.2688     0.83  |Q V      |         |         |         |
 4+30      0.2745     0.84  |Q V      |         |         |         |
 4+35      0.2803     0.84  |Q V      |         |         |         |
 4+40      0.2861     0.84  |Q V      |         |         |         |
 4+45      0.2920     0.85  |Q V      |         |         |         |
 4+50      0.2978     0.85  |Q V      |         |         |         |
 4+55      0.3037     0.85  |Q V      |         |         |         |
 5+ 0      0.3096     0.86  |Q V      |         |         |         |
 5+ 5      0.3155     0.86  |Q  V     |         |         |         |
 5+10      0.3215     0.86  |Q  V     |         |         |         |
 5+15      0.3275     0.87  |Q  V     |         |         |         |
```

5+20	0.3334	0.87	Q V			
5+25	0.3395	0.87	Q V			
5+30	0.3455	0.88	Q V			
5+35	0.3516	0.88	Q V			
5+40	0.3577	0.89	Q V			
5+45	0.3638	0.89	Q V			
5+50	0.3700	0.89	Q V			
5+55	0.3762	0.90	Q V			
6+ 0	0.3824	0.90	Q V			
6+ 5	0.3886	0.91	Q V			
6+10	0.3949	0.91	Q V			
6+15	0.4011	0.91	Q V			
6+20	0.4075	0.92	Q V			
6+25	0.4138	0.92	Q V			
6+30	0.4202	0.93	Q V			
6+35	0.4266	0.93	Q V			
6+40	0.4330	0.93	Q V			
6+45	0.4395	0.94	Q V			
6+50	0.4460	0.94	Q V			
6+55	0.4525	0.95	Q V			
7+ 0	0.4591	0.95	Q V			
7+ 5	0.4657	0.96	Q V			
7+10	0.4723	0.96	Q V			
7+15	0.4790	0.97	Q V			
7+20	0.4857	0.97	Q V			
7+25	0.4924	0.98	Q V			
7+30	0.4991	0.98	Q V			
7+35	0.5059	0.99	Q V			
7+40	0.5128	0.99	Q V			
7+45	0.5196	1.00	Q V			
7+50	0.5265	1.00	Q V			
7+55	0.5335	1.01	Q V			
8+ 0	0.5405	1.01	Q V			
8+ 5	0.5475	1.02	Q V			
8+10	0.5545	1.02	Q V			
8+15	0.5616	1.03	Q V			
8+20	0.5688	1.04	Q V			
8+25	0.5759	1.04	Q V			
8+30	0.5832	1.05	Q V			
8+35	0.5904	1.05	Q V			
8+40	0.5977	1.06	Q V			
8+45	0.6051	1.07	Q V			
8+50	0.6125	1.07	Q V			
8+55	0.6199	1.08	Q V			
9+ 0	0.6274	1.09	Q V			
9+ 5	0.6349	1.09	Q V			
9+10	0.6425	1.10	Q V			
9+15	0.6501	1.11	Q V			
9+20	0.6578	1.11	Q V			
9+25	0.6655	1.12	Q V			
9+30	0.6733	1.13	Q V			
9+35	0.6811	1.14	Q V			
9+40	0.6890	1.14	Q V			
9+45	0.6969	1.15	Q V			
9+50	0.7049	1.16	Q V			
9+55	0.7130	1.17	Q V			
10+ 0	0.7211	1.18	Q V			
10+ 5	0.7293	1.19	Q V			
10+10	0.7375	1.19	Q V			
10+15	0.7458	1.20	Q V			
10+20	0.7541	1.21	Q V			
10+25	0.7626	1.22	Q V			
10+30	0.7710	1.23	Q V			
10+35	0.7796	1.24	Q V			


10+40 0.7882 1.25
10+45 0.7969 1.26
10+50 0.8056 1.27
10+55 0.8145 1.28
11+ 0 0.8234 1.29
11+ 5 0.8324 1.30
11+10 0.8414 1.32
11+15 0.8506 1.33
11+20 0.8598 1.34
11+25 0.8691 1.35
11+30 0.8785 1.37
11+35 0.8880 1.38
11+40 0.8976 1.39
11+45 0.9073 1.41
11+50 0.9171 1.42
11+55 0.9270 1.44
12+ 0 0.9370 1.45
12+ 5 0.9470 1.46
12+10 0.9572 1.47
12+15 0.9673 1.48
12+20 0.9776 1.48
12+25 0.9879 1.50
12+30 0.9984 1.52
12+35 1.0089 1.54
12+40 1.0197 1.56
12+45 1.0305 1.58
12+50 1.0415 1.60
12+55 1.0527 1.62
13+ 0 1.0640 1.64
13+ 5 1.0755 1.67
13+10 1.0871 1.69
13+15 1.0989 1.72
13+20 1.1109 1.74
13+25 1.1231 1.77
13+30 1.1355 1.80
13+35 1.1481 1.83
13+40 1.1610 1.86
13+45 1.1741 1.90
13+50 1.1874 1.93
13+55 1.2010 1.97
14+ 0 1.2148 2.01
14+ 5 1.2290 2.05
14+10 1.2433 2.09
14+15 1.2579 2.12
14+20 1.2728 2.16
14+25 1.2881 2.22
14+30 1.3038 2.27
14+35 1.3198 2.34
14+40 1.3364 2.40
14+45 1.3535 2.48
14+50 1.3711 2.56
14+55 1.3894 2.65
15+ 0 1.4083 2.75
15+ 5 1.4280 2.86
15+10 1.4485 2.98
15+15 1.4700 3.12
15+20 1.4926 3.28
15+25 1.5167 3.50
15+30 1.5439 3.95
15+35 1.5753 4.56
15+40 1.6103 5.08
15+45 1.6487 5.58
15+50 1.6910 6.15
15+55 1.7390 6.97



21+20	2.9116	0.90	Q				V
21+25	2.9178	0.90	Q				V
21+30	2.9239	0.89	Q				V
21+35	2.9300	0.88	Q				V
21+40	2.9360	0.87	Q				V
21+45	2.9420	0.87	Q				V
21+50	2.9479	0.86	Q				V
21+55	2.9538	0.85	Q				V
22+ 0	2.9596	0.85	Q				V
22+ 5	2.9654	0.84	Q				V
22+10	2.9711	0.83	Q				V
22+15	2.9768	0.83	Q				V
22+20	2.9825	0.82	Q				V
22+25	2.9881	0.81	Q				V
22+30	2.9936	0.81	Q				V
22+35	2.9992	0.80	Q				V
22+40	3.0047	0.80	Q				V
22+45	3.0101	0.79	Q				V
22+50	3.0155	0.79	Q				V
22+55	3.0209	0.78	Q				V
23+ 0	3.0263	0.78	Q				V
23+ 5	3.0316	0.77	Q				V
23+10	3.0368	0.77	Q				V
23+15	3.0421	0.76	Q				V
23+20	3.0473	0.76	Q				V
23+25	3.0525	0.75	Q				V
23+30	3.0576	0.75	Q				V
23+35	3.0627	0.74	Q				V
23+40	3.0678	0.74	Q				V
23+45	3.0729	0.73	Q				V
23+50	3.0779	0.73	Q				V
23+55	3.0829	0.72	Q				V
24+ 0	3.0878	0.72	Q				V

U n i t H y d r o g r a p h A n a l y s i s

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Study date 02/22/23

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San Bernardino County Synthetic Unit Hydrology Method
Manual date - August 1986

Program License Serial Number 6509

A22078-1 EAST HIGHLAND
Q25
PT 301 25-YR STORM - UH AT NODE 301

Storm Event Year = 25

Antecedent Moisture Condition = 2

English (in-lb) Input Units Used

English Rainfall Data (Inches) Input Values Used

English Units used in output format

Area averaged rainfall intensity isohyetal data:

Sub-Area (Ac.)	Duration (hours)	Isohyetal (In)
Rainfall data for year 25		
0.77	1	1.01
Rainfall data for year 25		
0.77	6	2.24
Rainfall data for year 25		
0.77	24	4.24

++

******** Area-averaged max loss rate, Fm ********

SCS curve No.(AMCII)	SCS curve NO.(AMC 2)	Area (Ac.)	Area Fraction	Fp(Fig C6) (In/Hr)	Ap (dec.)	Fm (In/Hr)
32.0	32.0	0.77	1.000	0.978	0.230	0.225

Area-averaged adjusted loss rate Fm (In/Hr) = 0.225

********* Area-Averaged low loss rate fraction, Yb **********

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC2)	S	Pervious Yield Fr

```
     0.18   0.230         32.0      32.0      21.20     0.000
     0.59   0.770         98.0      98.0       0.20     0.944

   Area-averaged catchment yield fraction, Y =  0.727
   Area-averaged low loss fraction, Yb =  0.273
   User entry of time of concentration  =   0.169 (hours)
   ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
   Watershed area =       0.77(Ac.)
   Catchment Lag time =   0.135 hours
   Unit interval =   5.000 minutes
   Unit interval percentage of lag time = 61.6371
   Hydrograph baseflow =     0.00(CFS)
   Average maximum watershed loss rate(Fm) =  0.225(In/Hr)
   Average low loss rate fraction (Yb) = 0.273 (decimal)
   VALLEY DEVELOPED S-Graph Selected
   Computed peak 5-minute rainfall =  0.266(In)
   Computed peak 30-minute rainfall =  0.693(In)
   Specified peak 1-hour rainfall =  1.010(In)
   Computed peak 3-hour rainfall =  1.640(In)
   Specified peak 6-hour rainfall =  2.240(In)
   Specified peak 24-hour rainfall =  4.240(In)


   Note: user specified rainfall values used.
   Rainfall depth area reduction factors:
   Using a total area of       0.77(Ac.) (Ref: fig. E-4)

   5-minute factor = 1.000     Adjusted rainfall =  0.266(In)
   30-minute factor = 1.000    Adjusted rainfall =  0.693(In)
   1-hour factor = 1.000       Adjusted rainfall =  1.010(In)
   3-hour factor = 1.000       Adjusted rainfall =  1.640(In)
   6-hour factor = 1.000       Adjusted rainfall =  2.240(In)
   24-hour factor = 1.000      Adjusted rainfall =  4.240(In)
   ------------------------------------------------------------------------

                          U n i t  H y d r o g r a p h
   ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
   Interval          'S' Graph          Unit Hydrograph
   Number            Mean values             ((CFS))
   ------------------------------------------------------------------------
                  (K =         9.31 (CFS))

     1                6.867                   0.639
     2               43.656                   3.426
     3               83.214                   3.684
     4               96.107                   1.201
     5               98.793                   0.250
     6              100.000                   0.112
   ------------------------------------------------------------------------
   ------------------------------------------------------------------------
   ------------------------------------------------------------------------
   Total soil rain loss =      1.08(In)
   Total effective rainfall =      3.16(In)
   Peak flow rate in flood hydrograph =      1.36(CFS)
   ------------------------------------------------------------------------
   ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                        24 - H O U R    S T O R M
                   R u n o f f      H y d r o g r a p h
   ------------------------------------------------------------------------
               Hydrograph in   5   Minute intervals ((CFS))

   ------------------------------------------------------------------------
Time(h+m) Volume Ac.Ft   Q(CFS)  0        2.5       5.0       7.5      10.0
------------------------------------------------------------------------
```

0+ 5	0.0000	0.00	Q	|	|	|	|
0+10	0.0002	0.02	Q	|	|	|	|
0+15	0.0004	0.04	Q	|	|	|	|
0+20	0.0007	0.04	Q	|	|	|	|
0+25	0.0010	0.05	Q	|	|	|	|
0+30	0.0014	0.05	Q	|	|	|	|
0+35	0.0017	0.05	Q	|	|	|	|
0+40	0.0020	0.05	Q	|	|	|	|
0+45	0.0023	0.05	Q	|	|	|	|
0+50	0.0026	0.05	Q	|	|	|	|
0+55	0.0030	0.05	Q	|	|	|	|
1+ 0	0.0033	0.05	Q	|	|	|	|
1+ 5	0.0036	0.05	Q	|	|	|	|
1+10	0.0040	0.05	Q	|	|	|	|
1+15	0.0043	0.05	Q	|	|	|	|
1+20	0.0046	0.05	Q	|	|	|	|
1+25	0.0049	0.05	Q	|	|	|	|
1+30	0.0053	0.05	QV	|	|	|	|
1+35	0.0056	0.05	QV	|	|	|	|
1+40	0.0059	0.05	QV	|	|	|	|
1+45	0.0063	0.05	QV	|	|	|	|
1+50	0.0066	0.05	QV	|	|	|	|
1+55	0.0069	0.05	QV	|	|	|	|
2+ 0	0.0073	0.05	QV	|	|	|	|
2+ 5	0.0076	0.05	QV	|	|	|	|
2+10	0.0080	0.05	QV	|	|	|	|
2+15	0.0083	0.05	QV	|	|	|	|
2+20	0.0086	0.05	QV	|	|	|	|
2+25	0.0090	0.05	QV	|	|	|	|
2+30	0.0093	0.05	QV	|	|	|	|
2+35	0.0097	0.05	QV	|	|	|	|
2+40	0.0100	0.05	QV	|	|	|	|
2+45	0.0104	0.05	Q V	|	|	|	|
2+50	0.0107	0.05	Q V	|	|	|	|
2+55	0.0111	0.05	Q V	|	|	|	|
3+ 0	0.0114	0.05	Q V	|	|	|	|
3+ 5	0.0118	0.05	Q V	|	|	|	|
3+10	0.0121	0.05	Q V	|	|	|	|
3+15	0.0125	0.05	Q V	|	|	|	|
3+20	0.0128	0.05	Q V	|	|	|	|
3+25	0.0132	0.05	Q V	|	|	|	|
3+30	0.0135	0.05	Q V	|	|	|	|
3+35	0.0139	0.05	Q V	|	|	|	|
3+40	0.0143	0.05	Q V	|	|	|	|
3+45	0.0146	0.05	Q V	|	|	|	|
3+50	0.0150	0.05	Q V	|	|	|	|
3+55	0.0153	0.05	Q V	|	|	|	|
4+ 0	0.0157	0.05	Q V	|	|	|	|
4+ 5	0.0161	0.05	Q V	|	|	|	|
4+10	0.0164	0.05	Q V	|	|	|	|
4+15	0.0168	0.05	Q V	|	|	|	|
4+20	0.0172	0.05	Q V	|	|	|	|
4+25	0.0176	0.05	Q V	|	|	|	|
4+30	0.0179	0.05	Q V	|	|	|	|
4+35	0.0183	0.05	Q V	|	|	|	|
4+40	0.0187	0.05	Q V	|	|	|	|
4+45	0.0191	0.05	Q V	|	|	|	|
4+50	0.0194	0.06	Q V	|	|	|	|
4+55	0.0198	0.06	Q V	|	|	|	|
5+ 0	0.0202	0.06	Q V	|	|	|	|
5+ 5	0.0206	0.06	Q V	|	|	|	|
5+10	0.0210	0.06	Q V	|	|	|	|
5+15	0.0214	0.06	Q V	|	|	|	|
5+20	0.0218	0.06	Q V	|	|	|	|

```
 5+25      0.0221     0.06  Q   V     |          |          |          |
 5+30      0.0225     0.06  Q   V     |          |          |          |
 5+35      0.0229     0.06  Q   V     |          |          |          |
 5+40      0.0233     0.06  Q   V     |          |          |          |
 5+45      0.0237     0.06  Q   V     |          |          |          |
 5+50      0.0241     0.06  Q   V     |          |          |          |
 5+55      0.0245     0.06  Q   V     |          |          |          |
 6+ 0      0.0249     0.06  Q   V     |          |          |          |
 6+ 5      0.0253     0.06  Q   V     |          |          |          |
 6+10      0.0257     0.06  Q    V    |          |          |          |
 6+15      0.0261     0.06  Q    V    |          |          |          |
 6+20      0.0266     0.06  Q    V    |          |          |          |
 6+25      0.0270     0.06  Q    V    |          |          |          |
 6+30      0.0274     0.06  Q    V    |          |          |          |
 6+35      0.0278     0.06  Q    V    |          |          |          |
 6+40      0.0282     0.06  Q    V    |          |          |          |
 6+45      0.0286     0.06  Q    V    |          |          |          |
 6+50      0.0291     0.06  Q    V    |          |          |          |
 6+55      0.0295     0.06  Q    V    |          |          |          |
 7+ 0      0.0299     0.06  Q    V    |          |          |          |
 7+ 5      0.0303     0.06  Q    V    |          |          |          |
 7+10      0.0308     0.06  Q     V   |          |          |          |
 7+15      0.0312     0.06  Q     V   |          |          |          |
 7+20      0.0316     0.06  Q     V   |          |          |          |
 7+25      0.0321     0.06  Q     V   |          |          |          |
 7+30      0.0325     0.06  Q     V   |          |          |          |
 7+35      0.0330     0.06  Q     V   |          |          |          |
 7+40      0.0334     0.06  Q     V   |          |          |          |
 7+45      0.0338     0.06  Q     V   |          |          |          |
 7+50      0.0343     0.07  Q     V   |          |          |          |
 7+55      0.0347     0.07  Q     V   |          |          |          |
 8+ 0      0.0352     0.07  Q     V   |          |          |          |
 8+ 5      0.0356     0.07  Q      V  |          |          |          |
 8+10      0.0361     0.07  Q      V  |          |          |          |
 8+15      0.0366     0.07  Q      V  |          |          |          |
 8+20      0.0370     0.07  Q      V  |          |          |          |
 8+25      0.0375     0.07  Q      V  |          |          |          |
 8+30      0.0380     0.07  Q      V  |          |          |          |
 8+35      0.0384     0.07  Q      V  |          |          |          |
 8+40      0.0389     0.07  Q      V  |          |          |          |
 8+45      0.0394     0.07  Q      V  |          |          |          |
 8+50      0.0399     0.07  Q      V  |          |          |          |
 8+55      0.0404     0.07  Q      V  |          |          |          |
 9+ 0      0.0408     0.07  Q       V |          |          |          |
 9+ 5      0.0413     0.07  Q       V |          |          |          |
 9+10      0.0418     0.07  Q       V |          |          |          |
 9+15      0.0423     0.07  Q       V |          |          |          |
 9+20      0.0428     0.07  Q       V |          |          |          |
 9+25      0.0433     0.07  Q       V |          |          |          |
 9+30      0.0438     0.07  Q       V |          |          |          |
 9+35      0.0443     0.07  Q       V |          |          |          |
 9+40      0.0448     0.07  Q       V |          |          |          |
 9+45      0.0454     0.07  Q       V |          |          |          |
 9+50      0.0459     0.08  Q        V|          |          |          |
 9+55      0.0464     0.08  Q        V|          |          |          |
10+ 0      0.0469     0.08  Q        V|          |          |          |
10+ 5      0.0475     0.08  Q        V|          |          |          |
10+10      0.0480     0.08  Q        V|          |          |          |
10+15      0.0485     0.08  Q        V|          |          |          |
10+20      0.0491     0.08  Q        V|          |          |          |
10+25      0.0496     0.08  Q        V|          |          |          |
10+30      0.0502     0.08  Q        V|          |          |          |
10+35      0.0507     0.08  Q         V          |          |          |
10+40      0.0513     0.08  Q         V          |          |          |
```

```
10+45      0.0519     0.08  Q         V         |         |         |
10+50      0.0524     0.08  Q         V         |         |         |
10+55      0.0530     0.08  Q         V         |         |         |
11+ 0      0.0536     0.08  Q         V         |         |         |
11+ 5      0.0542     0.08  Q         V         |         |         |
11+10      0.0547     0.09  Q         V         |         |         |
11+15      0.0553     0.09  Q         V         |         |         |
11+20      0.0559     0.09  Q         |V        |         |         |
11+25      0.0565     0.09  Q         |V        |         |         |
11+30      0.0572     0.09  Q         |V        |         |         |
11+35      0.0578     0.09  Q         |V        |         |         |
11+40      0.0584     0.09  Q         |V        |         |         |
11+45      0.0590     0.09  Q         |V        |         |         |
11+50      0.0597     0.09  Q         |V        |         |         |
11+55      0.0603     0.09  Q         |V        |         |         |
12+ 0      0.0610     0.09  Q         | V       |         |         |
12+ 5      0.0616     0.10  Q         | V       |         |         |
12+10      0.0623     0.10  Q         | V       |         |         |
12+15      0.0629     0.10  Q         | V       |         |         |
12+20      0.0636     0.10  Q         | V       |         |         |
12+25      0.0643     0.10  Q         | V       |         |         |
12+30      0.0649     0.10  Q         | V       |         |         |
12+35      0.0656     0.10  Q         | V       |         |         |
12+40      0.0663     0.10  Q         |  V      |         |         |
12+45      0.0670     0.10  Q         |  V      |         |         |
12+50      0.0678     0.10  Q         |  V      |         |         |
12+55      0.0685     0.11  Q         |  V      |         |         |
13+ 0      0.0692     0.11  Q         |  V      |         |         |
13+ 5      0.0700     0.11  Q         |  V      |         |         |
13+10      0.0707     0.11  Q         |  V      |         |         |
13+15      0.0715     0.11  Q         |   V     |         |         |
13+20      0.0723     0.11  Q         |   V     |         |         |
13+25      0.0731     0.12  Q         |   V     |         |         |
13+30      0.0739     0.12  Q         |   V     |         |         |
13+35      0.0747     0.12  Q         |   V     |         |         |
13+40      0.0755     0.12  Q         |   V     |         |         |
13+45      0.0764     0.12  Q         |    V    |         |         |
13+50      0.0773     0.13  Q         |    V    |         |         |
13+55      0.0782     0.13  Q         |    V    |         |         |
14+ 0      0.0791     0.13  Q         |    V    |         |         |
14+ 5      0.0800     0.13  Q         |    V    |         |         |
14+10      0.0809     0.14  Q         |    V    |         |         |
14+15      0.0819     0.14  Q         |     V   |         |         |
14+20      0.0828     0.14  Q         |     V   |         |         |
14+25      0.0838     0.14  Q         |     V   |         |         |
14+30      0.0849     0.15  Q         |     V   |         |         |
14+35      0.0859     0.15  Q         |     V   |         |         |
14+40      0.0870     0.16  Q         |      V  |         |         |
14+45      0.0881     0.16  Q         |      V  |         |         |
14+50      0.0893     0.17  Q         |      V  |         |         |
14+55      0.0905     0.17  Q         |      V  |         |         |
15+ 0      0.0917     0.18  Q         |       V |         |         |
15+ 5      0.0930     0.19  Q         |       V |         |         |
15+10      0.0944     0.20  Q         |       V |         |         |
15+15      0.0958     0.21  Q         |       V |         |         |
15+20      0.0973     0.22  Q         |        V|         |         |
15+25      0.0989     0.23  Q         |        V|         |         |
15+30      0.1007     0.27  |Q        |        V|         |         |
15+35      0.1029     0.31  |Q        |         V         |         |
15+40      0.1052     0.34  |Q        |         V         |         |
15+45      0.1077     0.37  |Q        |         |V        |         |
15+50      0.1105     0.40  |Q        |         |V        |         |
15+55      0.1137     0.46  |Q        |         | V       |         |
16+ 0      0.1177     0.58  | Q       |         |  V      |         |
```

```
16+ 5       0.1236      0.86  |  Q      |         |   V     |         |
16+10       0.1330      1.36  |    Q    |         |     V   |         |
16+15       0.1419      1.29  |    Q    |         |      V  |         |
16+20       0.1469      0.73  | Q       |         |       V |         |
16+25       0.1500      0.45  |Q        |         |        V|         |
16+30       0.1524      0.34  |Q        |         |         V         |
16+35       0.1541      0.25  |Q        |         |         V         |
16+40       0.1556      0.22  Q         |         |         V         |
16+45       0.1570      0.20  Q         |         |         V         |
16+50       0.1582      0.18  Q         |         |         |V        |
16+55       0.1593      0.17  Q         |         |         |V        |
17+ 0       0.1604      0.16  Q         |         |         |V        |
17+ 5       0.1614      0.15  Q         |         |         |V        |
17+10       0.1624      0.14  Q         |         |         | V       |
17+15       0.1633      0.14  Q         |         |         | V       |
17+20       0.1642      0.13  Q         |         |         | V       |
17+25       0.1651      0.13  Q         |         |         | V       |
17+30       0.1659      0.12  Q         |         |         | V       |
17+35       0.1667      0.12  Q         |         |         | V       |
17+40       0.1675      0.11  Q         |         |         |  V      |
17+45       0.1683      0.11  Q         |         |         |  V      |
17+50       0.1690      0.11  Q         |         |         |  V      |
17+55       0.1697      0.10  Q         |         |         |  V      |
18+ 0       0.1704      0.10  Q         |         |         |  V      |
18+ 5       0.1711      0.10  Q         |         |         |  V      |
18+10       0.1718      0.10  Q         |         |         |  V      |
18+15       0.1724      0.10  Q         |         |         |   V     |
18+20       0.1731      0.09  Q         |         |         |   V     |
18+25       0.1737      0.09  Q         |         |         |   V     |
18+30       0.1743      0.09  Q         |         |         |   V     |
18+35       0.1749      0.09  Q         |         |         |   V     |
18+40       0.1755      0.09  Q         |         |         |   V     |
18+45       0.1761      0.09  Q         |         |         |   V     |
18+50       0.1767      0.08  Q         |         |         |   V     |
18+55       0.1773      0.08  Q         |         |         |   V     |
19+ 0       0.1778      0.08  Q         |         |         |    V    |
19+ 5       0.1784      0.08  Q         |         |         |    V    |
19+10       0.1789      0.08  Q         |         |         |    V    |
19+15       0.1794      0.08  Q         |         |         |    V    |
19+20       0.1800      0.08  Q         |         |         |    V    |
19+25       0.1805      0.08  Q         |         |         |    V    |
19+30       0.1810      0.07  Q         |         |         |    V    |
19+35       0.1815      0.07  Q         |         |         |    V    |
19+40       0.1820      0.07  Q         |         |         |    V    |
19+45       0.1825      0.07  Q         |         |         |    V    |
19+50       0.1830      0.07  Q         |         |         |     V   |
19+55       0.1835      0.07  Q         |         |         |     V   |
20+ 0       0.1839      0.07  Q         |         |         |     V   |
20+ 5       0.1844      0.07  Q         |         |         |     V   |
20+10       0.1849      0.07  Q         |         |         |     V   |
20+15       0.1853      0.07  Q         |         |         |     V   |
20+20       0.1858      0.07  Q         |         |         |     V   |
20+25       0.1862      0.06  Q         |         |         |     V   |
20+30       0.1867      0.06  Q         |         |         |     V   |
20+35       0.1871      0.06  Q         |         |         |     V   |
20+40       0.1875      0.06  Q         |         |         |     V   |
20+45       0.1880      0.06  Q         |         |         |      V  |
20+50       0.1884      0.06  Q         |         |         |      V  |
20+55       0.1888      0.06  Q         |         |         |      V  |
21+ 0       0.1892      0.06  Q         |         |         |      V  |
21+ 5       0.1896      0.06  Q         |         |         |      V  |
21+10       0.1901      0.06  Q         |         |         |      V  |
21+15       0.1905      0.06  Q         |         |         |      V  |
21+20       0.1909      0.06  Q         |         |         |      V  |
```

```
   21+25       0.1913      0.06  Q         |          |          |      V  |
   21+30       0.1917      0.06  Q         |          |          |      V  |
   21+35       0.1920      0.06  Q         |          |          |      V  |
   21+40       0.1924      0.06  Q         |          |          |      V  |
   21+45       0.1928      0.06  Q         |          |          |       V |
   21+50       0.1932      0.06  Q         |          |          |       V |
   21+55       0.1936      0.06  Q         |          |          |       V |
   22+ 0       0.1940      0.05  Q         |          |          |       V |
   22+ 5       0.1943      0.05  Q         |          |          |       V |
   22+10       0.1947      0.05  Q         |          |          |       V |
   22+15       0.1951      0.05  Q         |          |          |       V |
   22+20       0.1954      0.05  Q         |          |          |       V |
   22+25       0.1958      0.05  Q         |          |          |       V |
   22+30       0.1962      0.05  Q         |          |          |       V |
   22+35       0.1965      0.05  Q         |          |          |       V |
   22+40       0.1969      0.05  Q         |          |          |       V |
   22+45       0.1972      0.05  Q         |          |          |       V |
   22+50       0.1976      0.05  Q         |          |          |       V |
   22+55       0.1979      0.05  Q         |          |          |        V|
   23+ 0       0.1983      0.05  Q         |          |          |        V|
   23+ 5       0.1986      0.05  Q         |          |          |        V|
   23+10       0.1990      0.05  Q         |          |          |        V|
   23+15       0.1993      0.05  Q         |          |          |        V|
   23+20       0.1996      0.05  Q         |          |          |        V|
   23+25       0.2000      0.05  Q         |          |          |        V|
   23+30       0.2003      0.05  Q         |          |          |        V|
   23+35       0.2006      0.05  Q         |          |          |        V|
   23+40       0.2010      0.05  Q         |          |          |        V|
   23+45       0.2013      0.05  Q         |          |          |        V|
   23+50       0.2016      0.05  Q         |          |          |        V|
   23+55       0.2019      0.05  Q         |          |          |        V|
   24+ 0       0.2022      0.05  Q         |          |          |        V|
-------------------------------------------------------------------------
```

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2019 Version 9.1

Rational Hydrology Study Date: 02/22/23

A22078-1 PROPOSED HIGHLAND EAST
Q100

Program License Serial Number 6509

********* Hydrology Study Control Information **********

Rational hydrology study storm event year is 100.0
10 Year storm 1 hour rainfall = 0.819(In.)
100 Year storm 1 hour rainfall = 1.330(In.)
Computed rainfall intensity:
Storm year = 100.00 1 hour rainfall = 1.330 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 3

++
Process from Point/Station 100.000 to Point/Station 101.000
**** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.079(In/Hr)
Initial subarea data:
Initial area flow distance = 430.000(Ft.)
Top (of initial area) elevation = 1180.100(Ft.)
Bottom (of initial area) elevation = 1177.060(Ft.)
Difference in elevation = 3.040(Ft.)

```
Slope =    0.00707  s(%)=       0.71
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    9.255 min.
Rainfall intensity =      4.082(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.883
Subarea runoff =      3.027(CFS)
Total initial stream area =        0.840(Ac.)
Pervious area fraction = 0.100
Initial area Fm value =    0.079(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      101.000 to Point/Station      201.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
______________________________________________________________________________
Upstream point/station elevation =  1177.060(Ft.)
Downstream point/station elevation =  1171.580(Ft.)
Pipe length  =   775.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     3.027(CFS)
Given pipe size =     24.00(In.)
Calculated individual pipe flow  =     3.027(CFS)
Normal flow depth in pipe =    6.47(In.)
Flow top width inside pipe =   21.30(In.)
Critical Depth =    7.27(In.)
Pipe flow velocity =      4.43(Ft/s)
Travel time through pipe =    2.92 min.
Time of concentration (TC) =    12.17 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      201.000 to Point/Station      201.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________________
COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.1000     Max loss rate(Fm)=     0.079(In/Hr)
Time of concentration =    12.17 min.
Rainfall intensity =      3.464(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.880
Subarea runoff =     27.349(CFS) for    9.130(Ac.)
Total runoff =     30.376(CFS)
Effective area this stream =        9.97(Ac.)
Total Study Area (Main Stream No. 1) =        9.97(Ac.)
Area averaged Fm value =    0.079(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
```

```
Process from Point/Station      300.000 to Point/Station      301.000
**** INITIAL AREA EVALUATION ****
----------------------------------------------------------------------
COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.1000     Max loss rate(Fm)=     0.079(In/Hr)
Initial subarea data:
Initial area flow distance =   435.000(Ft.)
Top (of initial area) elevation =  1172.200(Ft.)
Bottom (of initial area) elevation =  1170.210(Ft.)
Difference in elevation =     1.990(Ft.)
Slope =    0.00457  s(%)=       0.46
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   10.144 min.
Rainfall intensity =      3.864(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.882
Subarea runoff =      2.623(CFS)
Total initial stream area =        0.770(Ac.)
Pervious area fraction = 0.100
Initial area Fm value =    0.079(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      400.000 to Point/Station      401.000
**** INITIAL AREA EVALUATION ****
----------------------------------------------------------------------
COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.1000     Max loss rate(Fm)=     0.079(In/Hr)
Initial subarea data:
Initial area flow distance =   690.000(Ft.)
Top (of initial area) elevation =  1179.750(Ft.)
Bottom (of initial area) elevation =  1171.830(Ft.)
Difference in elevation =     7.920(Ft.)
Slope =    0.01148  s(%)=       1.15
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   10.149 min.
Rainfall intensity =      3.863(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.882
Subarea runoff =      1.226(CFS)
Total initial stream area =        0.360(Ac.)
Pervious area fraction = 0.100
Initial area Fm value =    0.079(In/Hr)
```

End of computations, Total Study Area = 11.10 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.100
Area averaged SCS curve number = 32.0

U n i t H y d r o g r a p h A n a l y s i s

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Study date 02/22/23

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San Bernardino County Synthetic Unit Hydrology Method
Manual date - August 1986

Program License Serial Number 6509

A22078-1 EAST HIGHLAND
Q100
PT 201 100-YR STORM - UH AT NODE 201

Storm Event Year = 100

Antecedent Moisture Condition = 3

English (in-lb) Input Units Used

English Rainfall Data (Inches) Input Values Used

English Units used in output format

Area averaged rainfall intensity isohyetal data:

Sub-Area (Ac.)	Duration (hours)	Isohyetal (In)
Rainfall data for year 100		
9.97	1	1.33
Rainfall data for year 100		
9.97	6	2.85
Rainfall data for year 100		
9.97	24	5.38

++

******** Area-averaged max loss rate, Fm ********

SCS curve No.(AMCII)	SCS curve NO.(AMC 3)	Area (Ac.)	Area Fraction	Fp(Fig C6) (In/Hr)	Ap (dec.)	Fm (In/Hr)
32.0	52.0	9.97	1.000	0.785	0.082	0.064

Area-averaged adjusted loss rate Fm (In/Hr) = 0.064

********* Area-Averaged low loss rate fraction, Yb **********

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC3)	S	Pervious Yield Fr

```
     0.82   0.082         32.0      52.0       9.23     0.182
     9.15   0.918         98.0      98.0       0.20     0.956

   Area-averaged catchment yield fraction, Y =  0.892
   Area-averaged low loss fraction, Yb =  0.108
   User entry of time of concentration  =   0.203 (hours)
   ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
   Watershed area =       9.97(Ac.)
   Catchment Lag time =   0.162 hours
   Unit interval =   5.000 minutes
   Unit interval percentage of lag time = 51.3642
   Hydrograph baseflow =     0.00(CFS)
   Average maximum watershed loss rate(Fm) =  0.064(In/Hr)
   Average low loss rate fraction (Yb) = 0.108 (decimal)
   VALLEY DEVELOPED S-Graph Selected
   Computed peak 5-minute rainfall =  0.349(In)
   Computed peak 30-minute rainfall =  0.910(In)
   Specified peak 1-hour rainfall =  1.330(In)
   Computed peak 3-hour rainfall =  2.090(In)
   Specified peak 6-hour rainfall =  2.850(In)
   Specified peak 24-hour rainfall =  5.380(In)


   Note: user specified rainfall values used.
   Rainfall depth area reduction factors:
   Using a total area of       9.97(Ac.) (Ref: fig. E-4)

   5-minute factor = 1.000     Adjusted rainfall =  0.349(In)
   30-minute factor = 1.000    Adjusted rainfall =  0.910(In)
   1-hour factor = 1.000       Adjusted rainfall =  1.329(In)
   3-hour factor = 1.000       Adjusted rainfall =  2.090(In)
   6-hour factor = 1.000       Adjusted rainfall =  2.850(In)
   24-hour factor = 1.000      Adjusted rainfall =  5.380(In)
   ----------------------------------------------------------------------

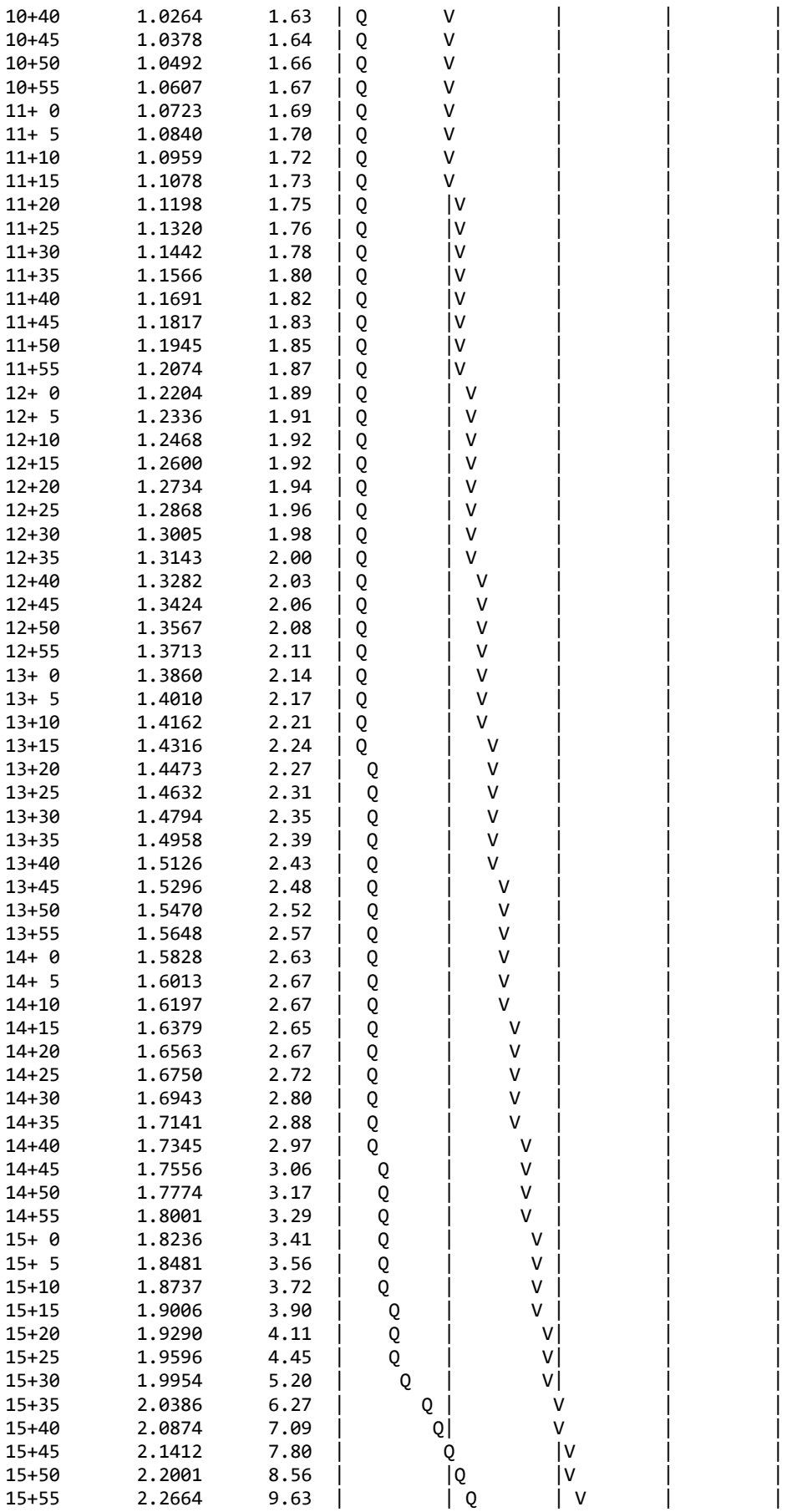
                         U n i t  H y d r o g r a p h
   ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
   Interval          'S' Graph          Unit Hydrograph
   Number            Mean values             ((CFS))
   ----------------------------------------------------------------------
                 (K =       120.57 (CFS))

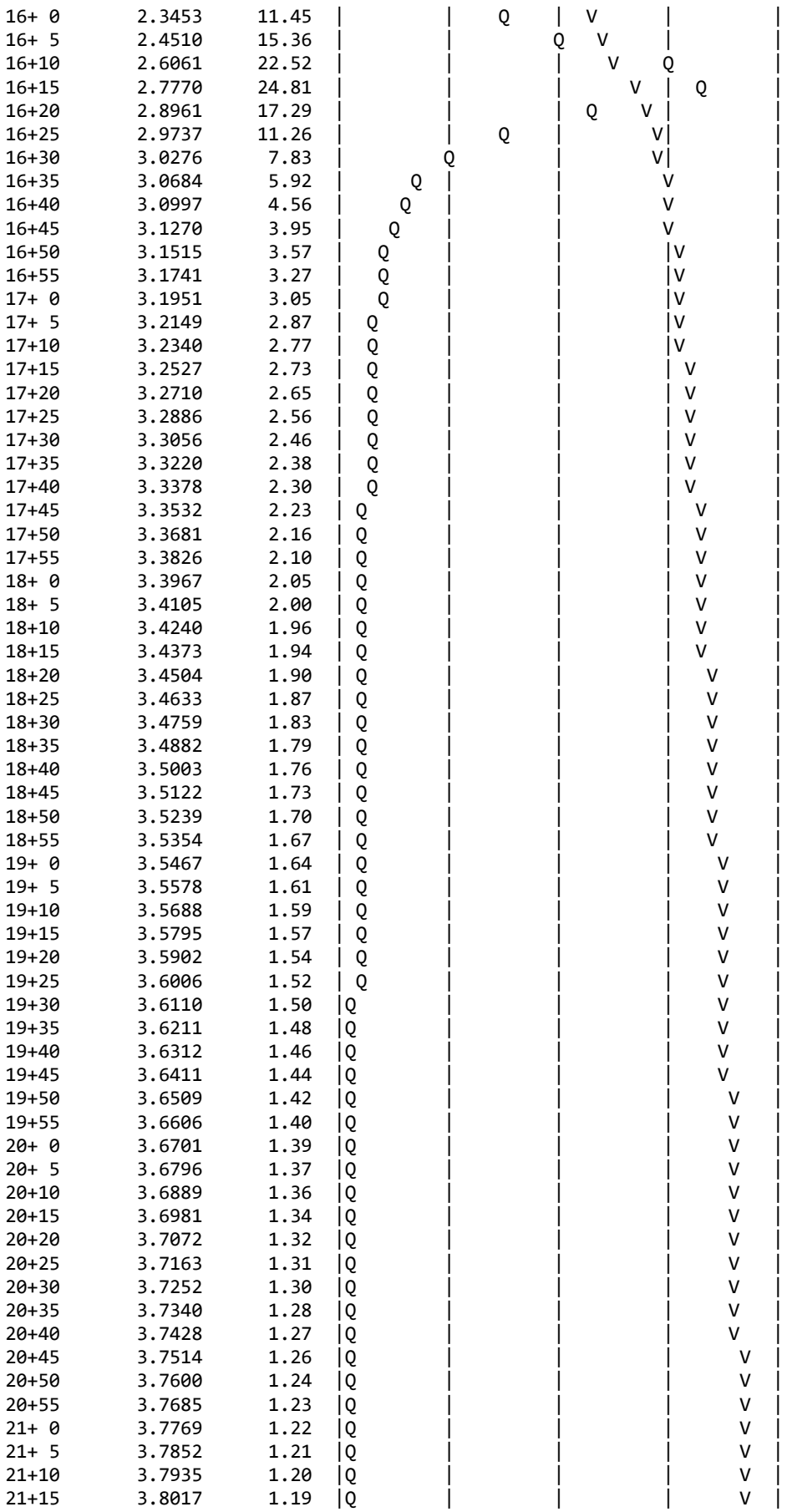
     1                4.820                   5.811
     2               31.354                  31.994
     3               70.906                  47.689
     4               91.004                  24.233
     5               97.394                   7.704
     6               98.885                   1.798
     7              100.000                   1.344
   ----------------------------------------------------------------------
   ----------------------------------------------------------------------
   ----------------------------------------------------------------------
   Total soil rain loss =      0.50(In)
   Total effective rainfall =      4.88(In)
   Peak flow rate in flood hydrograph =     24.81(CFS)
   ----------------------------------------------------------------------
   ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                       24 - H O U R    S T O R M
                  R u n o f f      H y d r o g r a p h
   ----------------------------------------------------------------------
              Hydrograph in   5   Minute intervals ((CFS))

   ----------------------------------------------------------------------
Time(h+m) Volume Ac.Ft   Q(CFS)  0        7.5      15.0      22.5      30.0
```

0+ 5	0.0003	0.04	Q				
0+10	0.0023	0.29	Q				
0+15	0.0068	0.65	Q				
0+20	0.0126	0.84	VQ				
0+25	0.0188	0.90	VQ				
0+30	0.0252	0.92	VQ				
0+35	0.0316	0.93	VQ				
0+40	0.0380	0.93	VQ				
0+45	0.0445	0.94	VQ				
0+50	0.0509	0.94	VQ				
0+55	0.0574	0.94	VQ				
1+ 0	0.0640	0.95	VQ				
1+ 5	0.0705	0.95	VQ				
1+10	0.0770	0.95	VQ				
1+15	0.0836	0.95	VQ				
1+20	0.0902	0.96	VQ				
1+25	0.0968	0.96	VQ				
1+30	0.1034	0.96	|Q				
1+35	0.1101	0.97	|Q				
1+40	0.1168	0.97	|Q				
1+45	0.1235	0.97	|Q				
1+50	0.1302	0.98	|Q				
1+55	0.1369	0.98	|Q				
2+ 0	0.1437	0.98	|Q				
2+ 5	0.1505	0.98	|Q				
2+10	0.1573	0.99	|Q				
2+15	0.1641	0.99	|Q				
2+20	0.1709	0.99	|Q				
2+25	0.1778	1.00	|Q				
2+30	0.1847	1.00	|Q				
2+35	0.1916	1.00	|Q				
2+40	0.1985	1.01	|Q				
2+45	0.2055	1.01	|QV				
2+50	0.2125	1.01	|QV				
2+55	0.2195	1.02	|QV				
3+ 0	0.2265	1.02	|QV				
3+ 5	0.2336	1.02	|QV				
3+10	0.2406	1.03	|QV				
3+15	0.2478	1.03	|QV				
3+20	0.2549	1.03	|QV				
3+25	0.2620	1.04	|QV				
3+30	0.2692	1.04	|QV				
3+35	0.2764	1.05	|QV				
3+40	0.2836	1.05	|QV				
3+45	0.2909	1.05	|QV				
3+50	0.2982	1.06	|QV				
3+55	0.3055	1.06	|Q V				
4+ 0	0.3128	1.07	|Q V				
4+ 5	0.3202	1.07	|Q V				
4+10	0.3276	1.07	|Q V				
4+15	0.3350	1.08	|Q V				
4+20	0.3424	1.08	|Q V				
4+25	0.3499	1.09	|Q V				
4+30	0.3574	1.09	|Q V				
4+35	0.3650	1.09	|Q V				
4+40	0.3725	1.10	|Q V				
4+45	0.3801	1.10	|Q V				
4+50	0.3877	1.11	|Q V				
4+55	0.3954	1.11	|Q V				
5+ 0	0.4031	1.12	|Q V				
5+ 5	0.4108	1.12	|Q V				
5+10	0.4185	1.12	|Q V				
5+15	0.4263	1.13	|Q V				

5+20	0.4341	1.13	Q V			
5+25	0.4419	1.14	Q V			
5+30	0.4498	1.14	Q V			
5+35	0.4577	1.15	Q V			
5+40	0.4657	1.15	Q V			
5+45	0.4736	1.16	Q V			
5+50	0.4817	1.16	Q V			
5+55	0.4897	1.17	Q V			
6+ 0	0.4978	1.17	Q V			
6+ 5	0.5059	1.18	Q V			
6+10	0.5140	1.18	Q V			
6+15	0.5222	1.19	Q V			
6+20	0.5305	1.19	Q V			
6+25	0.5387	1.20	Q V			
6+30	0.5470	1.21	Q V			
6+35	0.5554	1.21	Q V			
6+40	0.5637	1.22	Q V			
6+45	0.5722	1.22	Q V			
6+50	0.5806	1.23	Q V			
6+55	0.5891	1.23	Q V			
7+ 0	0.5977	1.24	Q V			
7+ 5	0.6063	1.25	Q V			
7+10	0.6149	1.25	Q V			
7+15	0.6235	1.26	Q V			
7+20	0.6323	1.27	Q V			
7+25	0.6410	1.27	Q V			
7+30	0.6498	1.28	Q V			
7+35	0.6587	1.28	Q V			
7+40	0.6676	1.29	Q V			
7+45	0.6765	1.30	Q V			
7+50	0.6855	1.31	Q V			
7+55	0.6945	1.31	Q V			
8+ 0	0.7036	1.32	Q V			
8+ 5	0.7128	1.33	Q V			
8+10	0.7220	1.33	Q V			
8+15	0.7312	1.34	Q V			
8+20	0.7405	1.35	Q V			
8+25	0.7498	1.36	Q V			
8+30	0.7593	1.37	Q V			
8+35	0.7687	1.37	Q V			
8+40	0.7782	1.38	Q V			
8+45	0.7878	1.39	Q V			
8+50	0.7974	1.40	Q V			
8+55	0.8071	1.41	Q V			
9+ 0	0.8169	1.42	Q V			
9+ 5	0.8267	1.42	Q V			
9+10	0.8365	1.43	Q V			
9+15	0.8465	1.44	Q V			
9+20	0.8565	1.45	Q V			
9+25	0.8666	1.46	Q V			
9+30	0.8767	1.47	Q V			
9+35	0.8869	1.48	Q V			
9+40	0.8972	1.49	Q V			
9+45	0.9075	1.50	Q V			
9+50	0.9179	1.51	Q V			
9+55	0.9284	1.52	Q V			
10+ 0	0.9390	1.53	Q V			
10+ 5	0.9496	1.55	Q V			
10+10	0.9603	1.56	Q V			
10+15	0.9711	1.57	Q V			
10+20	0.9820	1.58	Q V			
10+25	0.9930	1.59	Q V			
10+30	1.0041	1.61	Q V			
10+35	1.0152	1.62	Q V			





21+20	3.8098	1.18	Q				V
21+25	3.8178	1.17	Q				V
21+30	3.8258	1.16	Q				V
21+35	3.8337	1.15	Q				V
21+40	3.8415	1.14	Q				V
21+45	3.8493	1.13	Q				V
21+50	3.8570	1.12	Q				V
21+55	3.8646	1.11	Q				V
22+ 0	3.8722	1.10	Q				V
22+ 5	3.8797	1.09	Q				V
22+10	3.8872	1.08	Q				V
22+15	3.8946	1.08	Q				V
22+20	3.9019	1.07	Q				V
22+25	3.9092	1.06	Q				V
22+30	3.9165	1.05	Q				V
22+35	3.9237	1.04	Q				V
22+40	3.9308	1.04	Q				V
22+45	3.9379	1.03	Q				V
22+50	3.9450	1.02	Q				V
22+55	3.9520	1.02	Q				V
23+ 0	3.9589	1.01	Q				V
23+ 5	3.9658	1.00	Q				V
23+10	3.9727	1.00	Q				V
23+15	3.9795	0.99	Q				V
23+20	3.9863	0.98	Q				V
23+25	3.9930	0.98	Q				V
23+30	3.9997	0.97	Q				V
23+35	4.0063	0.97	Q				V
23+40	4.0129	0.96	Q				V
23+45	4.0195	0.95	Q				V
23+50	4.0260	0.95	Q				V
23+55	4.0325	0.94	Q				V
24+ 0	4.0390	0.94	Q				V

U n i t H y d r o g r a p h A n a l y s i s

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Study date 02/22/23

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San Bernardino County Synthetic Unit Hydrology Method
Manual date - August 1986

Program License Serial Number 6509

A22078-1 EAST HIGHLAND
Q100
PT 301 100-YR STORM - UH AT NODE 301

Storm Event Year = 100

Antecedent Moisture Condition = 3

English (in-lb) Input Units Used

English Rainfall Data (Inches) Input Values Used

English Units used in output format

Area averaged rainfall intensity isohyetal data:

Sub-Area (Ac.)	Duration (hours)	Isohyetal (In)
Rainfall data for year 100		
0.77	1	1.33
Rainfall data for year 100		
0.77	6	2.85
Rainfall data for year 100		
0.77	24	5.38

++

******** Area-averaged max loss rate, Fm ********

SCS curve No.(AMCII)	SCS curve NO.(AMC 3)	Area (Ac.)	Area Fraction	Fp(Fig C6) (In/Hr)	Ap (dec.)	Fm (In/Hr)
32.0	52.0	0.77	1.000	0.785	0.230	0.180

Area-averaged adjusted loss rate Fm (In/Hr) = 0.180

********* Area-Averaged low loss rate fraction, Yb **********

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC3)	S	Pervious Yield Fr

```
     0.18   0.230         32.0      52.0       9.23     0.182
     0.59   0.770         98.0      98.0       0.20     0.956

   Area-averaged catchment yield fraction, Y =  0.778
   Area-averaged low loss fraction, Yb =  0.222
   User entry of time of concentration  =   0.169 (hours)
   ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
   Watershed area =       0.77(Ac.)
   Catchment Lag time =   0.135 hours
   Unit interval =   5.000 minutes
   Unit interval percentage of lag time = 61.6371
   Hydrograph baseflow =     0.00(CFS)
   Average maximum watershed loss rate(Fm) =  0.180(In/Hr)
   Average low loss rate fraction (Yb) = 0.222 (decimal)
   VALLEY DEVELOPED S-Graph Selected
   Computed peak 5-minute rainfall =  0.349(In)
   Computed peak 30-minute rainfall =  0.910(In)
   Specified peak 1-hour rainfall =  1.330(In)
   Computed peak 3-hour rainfall =  2.090(In)
   Specified peak 6-hour rainfall =  2.850(In)
   Specified peak 24-hour rainfall =  5.380(In)


   Note: user specified rainfall values used.
   Rainfall depth area reduction factors:
   Using a total area of       0.77(Ac.) (Ref: fig. E-4)

   5-minute factor = 1.000     Adjusted rainfall =  0.349(In)
   30-minute factor = 1.000    Adjusted rainfall =  0.910(In)
   1-hour factor = 1.000       Adjusted rainfall =  1.330(In)
   3-hour factor = 1.000       Adjusted rainfall =  2.090(In)
   6-hour factor = 1.000       Adjusted rainfall =  2.850(In)
   24-hour factor = 1.000      Adjusted rainfall =  5.380(In)
   ------------------------------------------------------------------------

                         U n i t  H y d r o g r a p h
   ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
   Interval          'S' Graph          Unit Hydrograph
   Number            Mean values             ((CFS))
   ------------------------------------------------------------------------
                 (K =         9.31 (CFS))

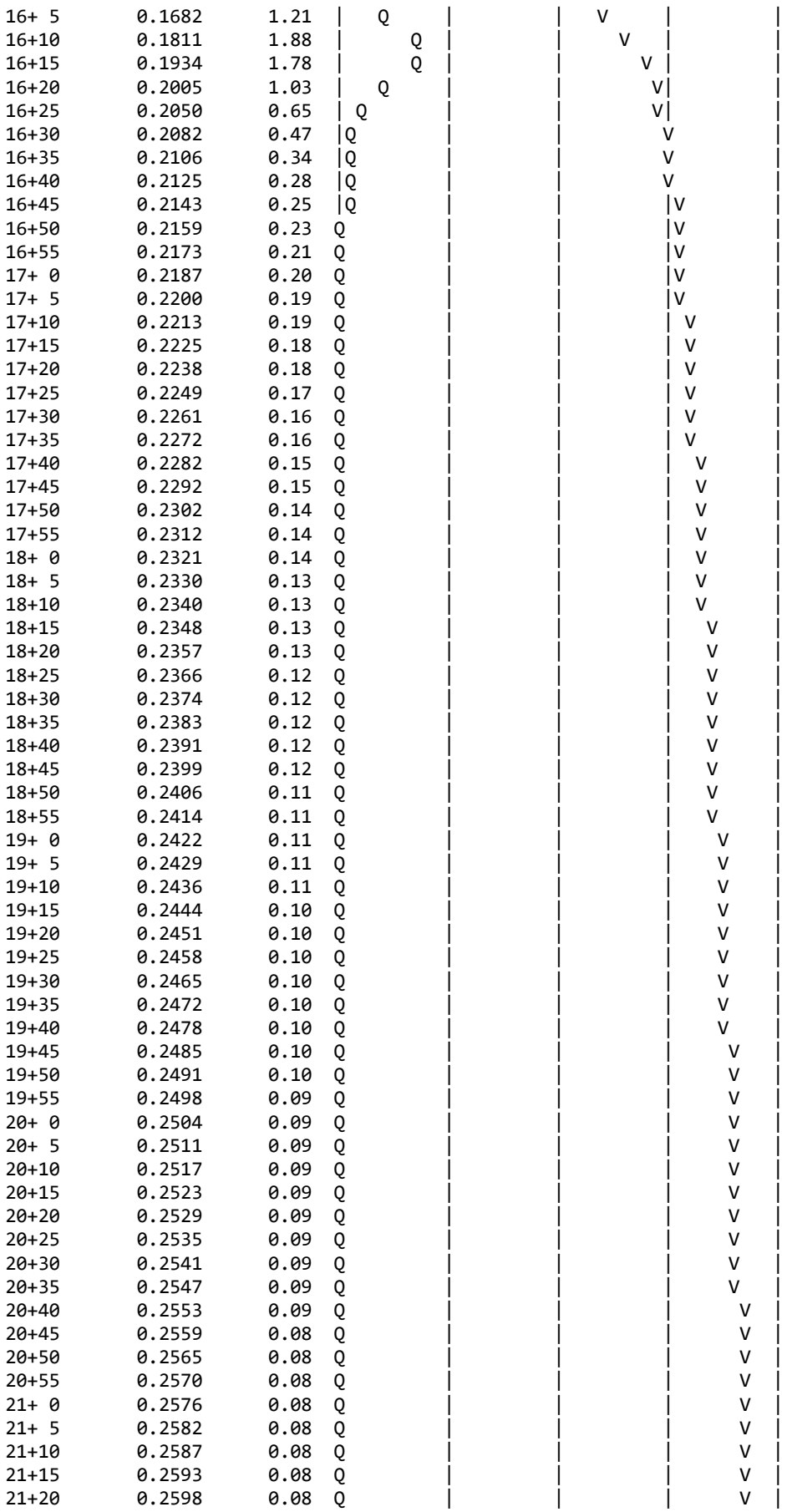
     1                6.867                   0.639
     2               43.656                   3.426
     3               83.214                   3.684
     4               96.107                   1.201
     5               98.793                   0.250
     6              100.000                   0.112
   ------------------------------------------------------------------------
   ------------------------------------------------------------------------
   ------------------------------------------------------------------------
   Total soil rain loss =      1.08(In)
   Total effective rainfall =      4.30(In)
   Peak flow rate in flood hydrograph =      1.88(CFS)
   ------------------------------------------------------------------------
   ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                       24 - H O U R    S T O R M
                  R u n o f f      H y d r o g r a p h
   ------------------------------------------------------------------------
              Hydrograph in   5   Minute intervals ((CFS))

   ------------------------------------------------------------------------
Time(h+m) Volume Ac.Ft   Q(CFS)  0        2.5       5.0       7.5      10.0
----------------------------------------------------------------------------
```

0+ 5	0.0000	0.00	Q	|	|	|	|
0+10	0.0002	0.03	Q	|	|	|	|
0+15	0.0006	0.05	Q	|	|	|	|
0+20	0.0010	0.06	Q	|	|	|	|
0+25	0.0014	0.06	Q	|	|	|	|
0+30	0.0018	0.06	Q	|	|	|	|
0+35	0.0023	0.06	Q	|	|	|	|
0+40	0.0027	0.06	Q	|	|	|	|
0+45	0.0031	0.06	Q	|	|	|	|
0+50	0.0036	0.06	Q	|	|	|	|
0+55	0.0040	0.06	Q	|	|	|	|
1+ 0	0.0045	0.06	Q	|	|	|	|
1+ 5	0.0049	0.06	Q	|	|	|	|
1+10	0.0053	0.06	Q	|	|	|	|
1+15	0.0058	0.06	Q	|	|	|	|
1+20	0.0062	0.06	Q	|	|	|	|
1+25	0.0067	0.06	Q	|	|	|	|
1+30	0.0071	0.06	QV	|	|	|	|
1+35	0.0076	0.07	QV	|	|	|	|
1+40	0.0080	0.07	QV	|	|	|	|
1+45	0.0085	0.07	QV	|	|	|	|
1+50	0.0089	0.07	QV	|	|	|	|
1+55	0.0094	0.07	QV	|	|	|	|
2+ 0	0.0098	0.07	QV	|	|	|	|
2+ 5	0.0103	0.07	QV	|	|	|	|
2+10	0.0107	0.07	QV	|	|	|	|
2+15	0.0112	0.07	QV	|	|	|	|
2+20	0.0117	0.07	QV	|	|	|	|
2+25	0.0121	0.07	QV	|	|	|	|
2+30	0.0126	0.07	QV	|	|	|	|
2+35	0.0131	0.07	QV	|	|	|	|
2+40	0.0135	0.07	QV	|	|	|	|
2+45	0.0140	0.07	Q V	|	|	|	|
2+50	0.0145	0.07	Q V	|	|	|	|
2+55	0.0149	0.07	Q V	|	|	|	|
3+ 0	0.0154	0.07	Q V	|	|	|	|
3+ 5	0.0159	0.07	Q V	|	|	|	|
3+10	0.0164	0.07	Q V	|	|	|	|
3+15	0.0168	0.07	Q V	|	|	|	|
3+20	0.0173	0.07	Q V	|	|	|	|
3+25	0.0178	0.07	Q V	|	|	|	|
3+30	0.0183	0.07	Q V	|	|	|	|
3+35	0.0188	0.07	Q V	|	|	|	|
3+40	0.0193	0.07	Q V	|	|	|	|
3+45	0.0198	0.07	Q V	|	|	|	|
3+50	0.0202	0.07	Q V	|	|	|	|
3+55	0.0207	0.07	Q V	|	|	|	|
4+ 0	0.0212	0.07	Q V	|	|	|	|
4+ 5	0.0217	0.07	Q V	|	|	|	|
4+10	0.0222	0.07	Q V	|	|	|	|
4+15	0.0227	0.07	Q V	|	|	|	|
4+20	0.0232	0.07	Q V	|	|	|	|
4+25	0.0237	0.07	Q V	|	|	|	|
4+30	0.0242	0.07	Q V	|	|	|	|
4+35	0.0247	0.07	Q V	|	|	|	|
4+40	0.0253	0.07	Q V	|	|	|	|
4+45	0.0258	0.07	Q V	|	|	|	|
4+50	0.0263	0.07	Q V	|	|	|	|
4+55	0.0268	0.07	Q V	|	|	|	|
5+ 0	0.0273	0.08	Q V	|	|	|	|
5+ 5	0.0278	0.08	Q V	|	|	|	|
5+10	0.0284	0.08	Q V	|	|	|	|
5+15	0.0289	0.08	Q V	|	|	|	|
5+20	0.0294	0.08	Q V	|	|	|	|

5+25	0.0299	0.08	Q	V	|	|	|	|
5+30	0.0305	0.08	Q	V	|	|	|	|
5+35	0.0310	0.08	Q	V	|	|	|	|
5+40	0.0315	0.08	Q	V	|	|	|	|
5+45	0.0321	0.08	Q	V	|	|	|	|
5+50	0.0326	0.08	Q	V	|	|	|	|
5+55	0.0332	0.08	Q	V	|	|	|	|
6+ 0	0.0337	0.08	Q	V	|	|	|	|
6+ 5	0.0342	0.08	Q	V	|	|	|	|
6+10	0.0348	0.08	Q	V	|	|	|	|
6+15	0.0354	0.08	Q	V	|	|	|	|
6+20	0.0359	0.08	Q	V	|	|	|	|
6+25	0.0365	0.08	Q	V	|	|	|	|
6+30	0.0370	0.08	Q	V	|	|	|	|
6+35	0.0376	0.08	Q	V	|	|	|	|
6+40	0.0382	0.08	Q	V	|	|	|	|
6+45	0.0387	0.08	Q	V	|	|	|	|
6+50	0.0393	0.08	Q	V	|	|	|	|
6+55	0.0399	0.08	Q	V	|	|	|	|
7+ 0	0.0404	0.08	Q	V	|	|	|	|
7+ 5	0.0410	0.08	Q	V	|	|	|	|
7+10	0.0416	0.08	Q	V	|	|	|	|
7+15	0.0422	0.08	Q	V	|	|	|	|
7+20	0.0428	0.09	Q	V	|	|	|	|
7+25	0.0434	0.09	Q	V	|	|	|	|
7+30	0.0440	0.09	Q	V	|	|	|	|
7+35	0.0446	0.09	Q	V	|	|	|	|
7+40	0.0452	0.09	Q	V	|	|	|	|
7+45	0.0458	0.09	Q	V	|	|	|	|
7+50	0.0464	0.09	Q	V	|	|	|	|
7+55	0.0470	0.09	Q	V	|	|	|	|
8+ 0	0.0476	0.09	Q	V	|	|	|	|
8+ 5	0.0482	0.09	Q	V	|	|	|	|
8+10	0.0488	0.09	Q	V	|	|	|	|
8+15	0.0494	0.09	Q	V	|	|	|	|
8+20	0.0501	0.09	Q	V	|	|	|	|
8+25	0.0507	0.09	Q	V	|	|	|	|
8+30	0.0513	0.09	Q	V	|	|	|	|
8+35	0.0520	0.09	Q	V	|	|	|	|
8+40	0.0526	0.09	Q	V	|	|	|	|
8+45	0.0533	0.09	Q	V	|	|	|	|
8+50	0.0539	0.09	Q	V	|	|	|	|
8+55	0.0546	0.09	Q	V	|	|	|	|
9+ 0	0.0552	0.10	Q	V	|	|	|	|
9+ 5	0.0559	0.10	Q	V	|	|	|	|
9+10	0.0566	0.10	Q	V	|	|	|	|
9+15	0.0572	0.10	Q	V	|	|	|	|
9+20	0.0579	0.10	Q	V	|	|	|	|
9+25	0.0586	0.10	Q	V	|	|	|	|
9+30	0.0593	0.10	Q	V	|	|	|	|
9+35	0.0600	0.10	Q	V	|	|	|	|
9+40	0.0606	0.10	Q	V	|	|	|	|
9+45	0.0613	0.10	Q	V	|	|	|	|
9+50	0.0620	0.10	Q	V	|	|	|	|
9+55	0.0628	0.10	Q	V	|	|	|	|
10+ 0	0.0635	0.10	Q	V	|	|	|	|
10+ 5	0.0642	0.10	Q	V	|	|	|	|
10+10	0.0649	0.11	Q	V	|	|	|	|
10+15	0.0656	0.11	Q	V	|	|	|	|
10+20	0.0664	0.11	Q	V	|	|	|	|
10+25	0.0671	0.11	Q	V	|	|	|	|
10+30	0.0679	0.11	Q	V	|	|	|	|
10+35	0.0686	0.11	Q	V	|	|	|	|
10+40	0.0694	0.11	Q	V	|	|	|	|

```
10+45       0.0701      0.11  Q         V         |         |         |
10+50       0.0709      0.11  Q         V         |         |         |
10+55       0.0717      0.11  Q         V         |         |         |
11+ 0       0.0725      0.11  Q         V         |         |         |
11+ 5       0.0733      0.11  Q         V         |         |         |
11+10       0.0741      0.12  Q         V         |         |         |
11+15       0.0749      0.12  Q         V         |         |         |
11+20       0.0757      0.12  Q         V         |         |         |
11+25       0.0765      0.12  Q         |V        |         |         |
11+30       0.0773      0.12  Q         |V        |         |         |
11+35       0.0782      0.12  Q         |V        |         |         |
11+40       0.0790      0.12  Q         |V        |         |         |
11+45       0.0799      0.12  Q         |V        |         |         |
11+50       0.0807      0.13  Q         |V        |         |         |
11+55       0.0816      0.13  Q         |V        |         |         |
12+ 0       0.0825      0.13  Q         |V        |         |         |
12+ 5       0.0834      0.13  Q         | V       |         |         |
12+10       0.0843      0.13  Q         | V       |         |         |
12+15       0.0851      0.13  Q         | V       |         |         |
12+20       0.0860      0.13  Q         | V       |         |         |
12+25       0.0870      0.13  Q         | V       |         |         |
12+30       0.0879      0.13  Q         | V       |         |         |
12+35       0.0888      0.14  Q         | V       |         |         |
12+40       0.0898      0.14  Q         |  V      |         |         |
12+45       0.0907      0.14  Q         |  V      |         |         |
12+50       0.0917      0.14  Q         |  V      |         |         |
12+55       0.0927      0.14  Q         |  V      |         |         |
13+ 0       0.0937      0.14  Q         |  V      |         |         |
13+ 5       0.0947      0.15  Q         |  V      |         |         |
13+10       0.0957      0.15  Q         |  V      |         |         |
13+15       0.0967      0.15  Q         |   V     |         |         |
13+20       0.0978      0.15  Q         |   V     |         |         |
13+25       0.0989      0.16  Q         |   V     |         |         |
13+30       0.1000      0.16  Q         |   V     |         |         |
13+35       0.1011      0.16  Q         |   V     |         |         |
13+40       0.1022      0.16  Q         |   V     |         |         |
13+45       0.1034      0.17  Q         |   V     |         |         |
13+50       0.1046      0.17  Q         |    V    |         |         |
13+55       0.1058      0.17  Q         |    V    |         |         |
14+ 0       0.1070      0.18  Q         |    V    |         |         |
14+ 5       0.1082      0.18  Q         |    V    |         |         |
14+10       0.1095      0.18  Q         |    V    |         |         |
14+15       0.1107      0.18  Q         |     V   |         |         |
14+20       0.1119      0.18  Q         |     V   |         |         |
14+25       0.1132      0.18  Q         |     V   |         |         |
14+30       0.1145      0.19  Q         |     V   |         |         |
14+35       0.1159      0.20  Q         |     V   |         |         |
14+40       0.1173      0.20  Q         |     V   |         |         |
14+45       0.1187      0.21  Q         |      V  |         |         |
14+50       0.1202      0.22  Q         |      V  |         |         |
14+55       0.1217      0.22  Q         |      V  |         |         |
15+ 0       0.1233      0.23  Q         |      V  |         |         |
15+ 5       0.1250      0.24  Q         |       V |         |         |
15+10       0.1267      0.25  |Q        |       V |         |         |
15+15       0.1286      0.27  |Q        |       V |         |         |
15+20       0.1305      0.28  |Q        |       V |         |         |
15+25       0.1326      0.31  |Q        |        V|         |         |
15+30       0.1352      0.37  |Q        |        V|         |         |
15+35       0.1382      0.44  |Q        |         V         |         |
15+40       0.1415      0.48  |Q        |         V         |         |
15+45       0.1452      0.53  | Q       |         |V        |         |
15+50       0.1493      0.59  | Q       |         |V        |         |
15+55       0.1540      0.68  | Q       |         | V       |         |
16+ 0       0.1598      0.85  |  Q      |         |  V      |         |
```

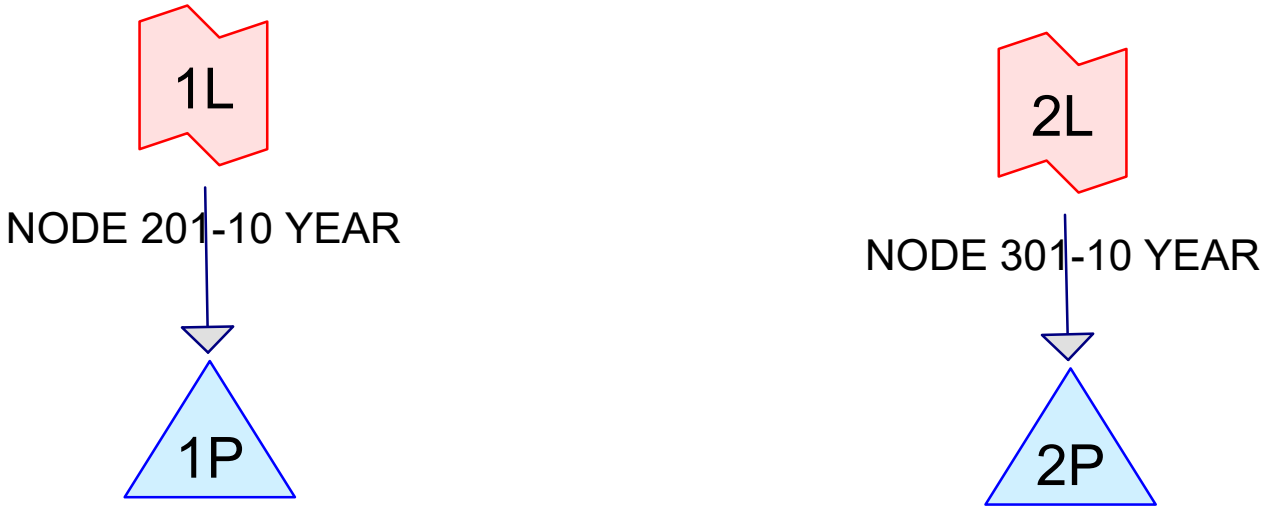

16+ 5 0.1682 1.21
16+10 0.1811 1.88
16+15 0.1934 1.78
16+20 0.2005 1.03
16+25 0.2050 0.65
16+30 0.2082 0.47
16+35 0.2106 0.34
16+40 0.2125 0.28
16+45 0.2143 0.25
16+50 0.2159 0.23
16+55 0.2173 0.21
17+ 0 0.2187 0.20
17+ 5 0.2200 0.19
17+10 0.2213 0.19
17+15 0.2225 0.18
17+20 0.2238 0.18
17+25 0.2249 0.17
17+30 0.2261 0.16
17+35 0.2272 0.16
17+40 0.2282 0.15
17+45 0.2292 0.15
17+50 0.2302 0.14
17+55 0.2312 0.14
18+ 0 0.2321 0.14
18+ 5 0.2330 0.13
18+10 0.2340 0.13
18+15 0.2348 0.13
18+20 0.2357 0.13
18+25 0.2366 0.12
18+30 0.2374 0.12
18+35 0.2383 0.12
18+40 0.2391 0.12
18+45 0.2399 0.12
18+50 0.2406 0.11
18+55 0.2414 0.11
19+ 0 0.2422 0.11
19+ 5 0.2429 0.11
19+10 0.2436 0.11
19+15 0.2444 0.10
19+20 0.2451 0.10
19+25 0.2458 0.10
19+30 0.2465 0.10
19+35 0.2472 0.10
19+40 0.2478 0.10
19+45 0.2485 0.10
19+50 0.2491 0.10
19+55 0.2498 0.09
20+ 0 0.2504 0.09
20+ 5 0.2511 0.09
20+10 0.2517 0.09
20+15 0.2523 0.09
20+20 0.2529 0.09
20+25 0.2535 0.09
20+30 0.2541 0.09
20+35 0.2547 0.09
20+40 0.2553 0.09
20+45 0.2559 0.08
20+50 0.2565 0.08
20+55 0.2570 0.08
21+ 0 0.2576 0.08
21+ 5 0.2582 0.08
21+10 0.2587 0.08
21+15 0.2593 0.08
21+20 0.2598 0.08

21+25	0.2603	0.08	Q	|	|	|	V |
21+30	0.2609	0.08	Q	|	|	|	V |
21+35	0.2614	0.08	Q	|	|	|	V |
21+40	0.2619	0.08	Q	|	|	|	V |
21+45	0.2625	0.08	Q	|	|	|	V |
21+50	0.2630	0.08	Q	|	|	|	V |
21+55	0.2635	0.07	Q	|	|	|	V |
22+ 0	0.2640	0.07	Q	|	|	|	V |
22+ 5	0.2645	0.07	Q	|	|	|	V |
22+10	0.2650	0.07	Q	|	|	|	V |
22+15	0.2655	0.07	Q	|	|	|	V |
22+20	0.2660	0.07	Q	|	|	|	V |
22+25	0.2665	0.07	Q	|	|	|	V |
22+30	0.2670	0.07	Q	|	|	|	V |
22+35	0.2675	0.07	Q	|	|	|	V |
22+40	0.2679	0.07	Q	|	|	|	V |
22+45	0.2684	0.07	Q	|	|	|	V |
22+50	0.2689	0.07	Q	|	|	|	V |
22+55	0.2694	0.07	Q	|	|	|	V|
23+ 0	0.2698	0.07	Q	|	|	|	V|
23+ 5	0.2703	0.07	Q	|	|	|	V|
23+10	0.2707	0.07	Q	|	|	|	V|
23+15	0.2712	0.07	Q	|	|	|	V|
23+20	0.2717	0.07	Q	|	|	|	V|
23+25	0.2721	0.07	Q	|	|	|	V|
23+30	0.2726	0.07	Q	|	|	|	V|
23+35	0.2730	0.06	Q	|	|	|	V|
23+40	0.2735	0.06	Q	|	|	|	V|
23+45	0.2739	0.06	Q	|	|	|	V|
23+50	0.2743	0.06	Q	|	|	|	V|
23+55	0.2748	0.06	Q	|	|	|	V|
24+ 0	0.2752	0.06	Q	|	|	|	V|

Appendix 6: HydroCad Calculations

Appendix 7: Supporting Documents

10-YEAR STORM EVENT
iNFILTRATION SYSTEM



Infiltration System - CMP

INFILTRATION SYTEM INF#1

Infiltration System - CMP

INFILTRATION SYTEM INF#2

Subcat Reach Pond Link

Routing Diagram for A22078-1 EAST BUILDING - 10 YEAR-AV
Prepared by Kier + Wright, Printed 2/24/2023
HydroCAD® 10.10-5a s/n 02379 © 2020 HydroCAD Software Solutions LLC

Time span=0.00-28.00 hrs, dt=0.05 hrs, 561 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Pond 1P: Infiltration System - CMP Peak Elev=1,171.88' Storage=49,853 cf Inflow=14.87 cfs 2.508 af
Discarded=0.26 cfs 0.595 af Primary=13.19 cfs 0.864 af Outflow=13.45 cfs 1.459 af

Pond 2P: Infiltration System - CMP Peak Elev=1,170.45' Storage=2,806 cf Inflow=1.05 cfs 0.164 af
Discarded=0.02 cfs 0.046 af Primary=1.05 cfs 0.060 af Outflow=1.07 cfs 0.106 af

Link 1L: NODE 201-10 10 YR Imported from P201-A220781Q-COMBINED.csv Inflow=14.87 cfs 2.508 af
Primary=14.87 cfs 2.508 af

Link 2L: NODE 301-10 YEAR 10 YR Imported from P301-A220781Q-COMBINED.csv Inflow=1.05 cfs 0.164 af
Primary=1.05 cfs 0.164 af

Summary for Pond 1P: Infiltration System - CMP

Inflow	=	14.87 cfs @	16.24 hrs,	Volume=	2.508 af
Outflow	=	13.45 cfs @	16.30 hrs,	Volume=	1.459 af, Atten= 10%, Lag= 3.6 min
Discarded	=	0.26 cfs @	0.55 hrs,	Volume=	0.595 af
Primary	=	13.19 cfs @	16.30 hrs,	Volume=	0.864 af

Routing by Stor-Ind method, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs
Peak Elev= 1,171.88' @ 16.28 hrs Surf.Area= 13,086 sf Storage= 49,853 cf

Plug-Flow detention time= 344.7 min calculated for 1.456 af (58% of inflow)
Center-of-Mass det. time= 155.3 min (978.9 - 823.6)

Volume	Invert	Avail.Storage	Storage Description
#1A	1,160.50'	14,521 cf	**69.00'W x 129.00'L x 8.00'H Field A** 71,208 cf Overall - 34,905 cf Embedded = 36,303 cf x 40.0% Voids
#2A	1,161.00'	34,905 cf	**CMP Round 84** x 42 Inside #1 Effective Size= 84.0"W x 84.0"H => 38.48 sf x 20.00'L = 769.7 cf Overall Size= 84.0"W x 84.0"H x 20.00'L 42 Chambers in 7 Rows 67.00' Header x 38.48 sf x 1 = 2,578.5 cf Inside
#3	1,171.50'	7,351 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)
		56,777 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,171.50	0	0	0
1,171.60	16	1	1
1,171.70	588	30	31
1,171.80	2,141	136	167
1,171.90	4,639	339	506
1,172.00	7,721	618	1,124
1,172.10	11,197	946	2,070
1,172.20	15,143	1,317	3,387
1,172.30	19,652	1,740	5,127
1,172.40	24,817	2,223	7,351

Device	Routing	Invert	Outlet Devices
#1	Device 2	1,167.00'	**27.0" Round Culvert** L= 560.0' Ke= 1.000 Inlet / Outlet Invert= 1,167.00' / 1,164.00' S= 0.0054 '/' Cc= 0.900 n= 0.013, Flow Area= 3.98 sf
#2	Primary	1,170.50'	**2.0" x 1.7" Horiz. Orifice/Grate X 115.00** C= 0.600 in 36.0" x 36.0" Grate (30% open area) Limited to weir flow at low heads
#3	Discarded	1,160.50'	**0.26 cfs Exfiltration at all elevations**

Discarded OutFlow Max=0.26 cfs @ 0.55 hrs HW=1,160.63' (Free Discharge)
└**3=Exfiltration** (Exfiltration Controls 0.26 cfs)

Primary OutFlow Max=13.19 cfs @ 16.30 hrs HW=1,171.86' TW=1,170.50' (Fixed TW Elev= 1,170.50')
└**2=Orifice/Grate** (Passes 13.19 cfs of 15.25 cfs potential flow)
└**1=Culvert** (Outlet Controls 13.19 cfs @ 3.32 fps)

Peak flow with mitigation with infiltration system

Bubbler outlet elevation

Pond 1P: Infiltration System - CMP - Chamber Wizard Field A

Chamber Model = CMP Round 84 (Round Corrugated Metal Pipe)
Effective Size= 84.0"W x 84.0"H => 38.48 sf x 20.00'L = 769.7 cf
Overall Size= 84.0"W x 84.0"H x 20.00'L

84.0" Wide + 36.0" Spacing = 120.0" C-C Row Spacing

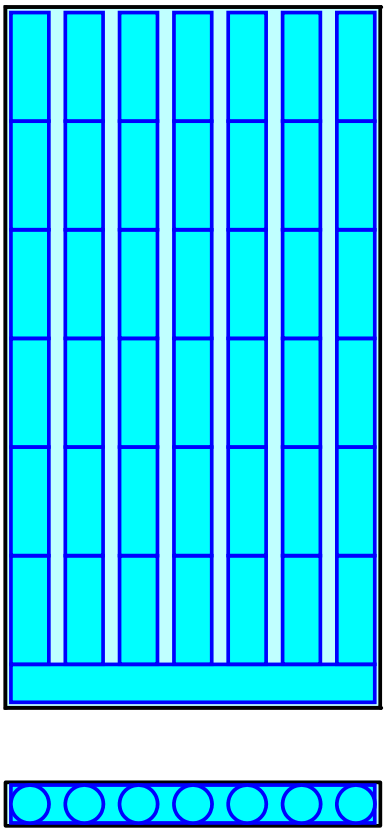
6 Chambers/Row x 20.00' Long +7.00' Header x 1 = 127.00' Row Length +12.0" End Stone x 2 = 129.00' Base Length
7 Rows x 84.0" Wide + 36.0" Spacing x 6 + 12.0" Side Stone x 2 = 69.00' Base Width
6.0" Stone Base + 84.0" Chamber Height + 6.0" Stone Cover = 8.00' Field Height

42 Chambers x 769.7 cf + 67.00' Header x 38.48 sf = 34,905.5 cf Chamber Storage

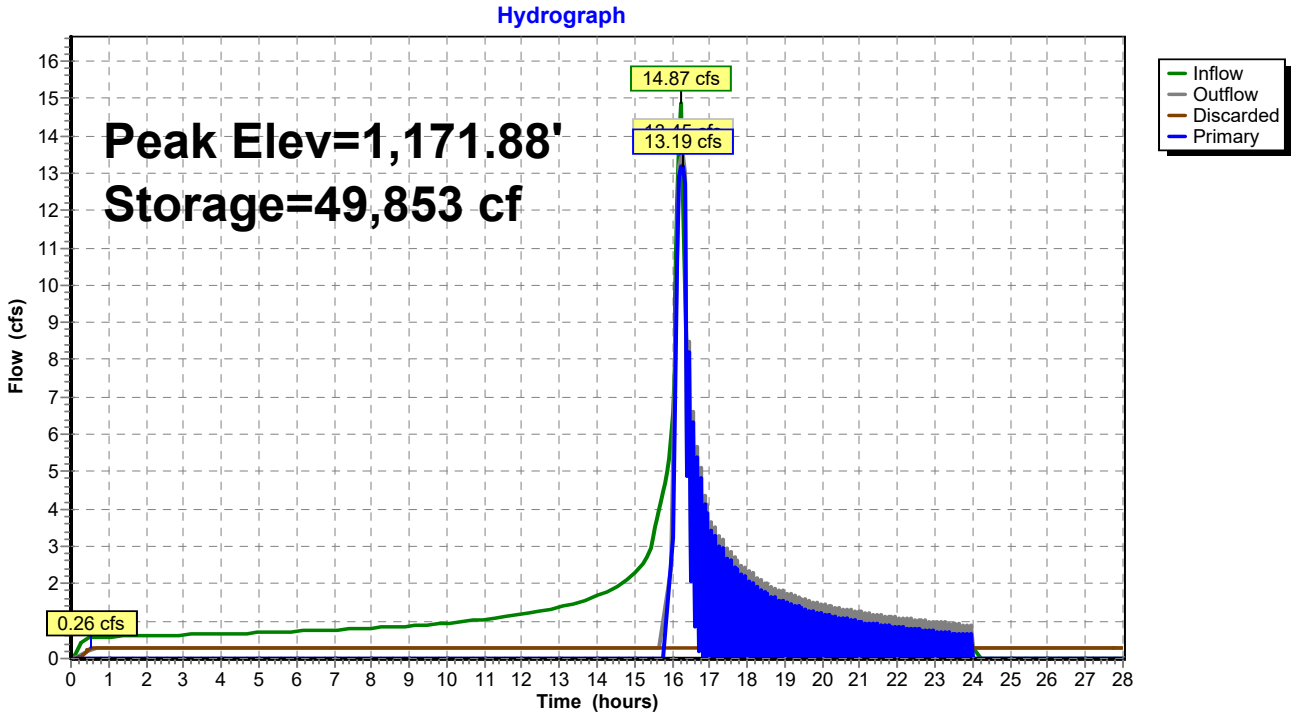
71,208.0 cf Field - 34,905.5 cf Chambers = 36,302.5 cf Stone x 40.0% Voids = 14,521.0 cf Stone Storage

Chamber Storage + Stone Storage = 49,426.5 cf = 1.135 af
Overall Storage Efficiency = 69.4%
Overall System Size = 129.00' x 69.00' x 8.00'

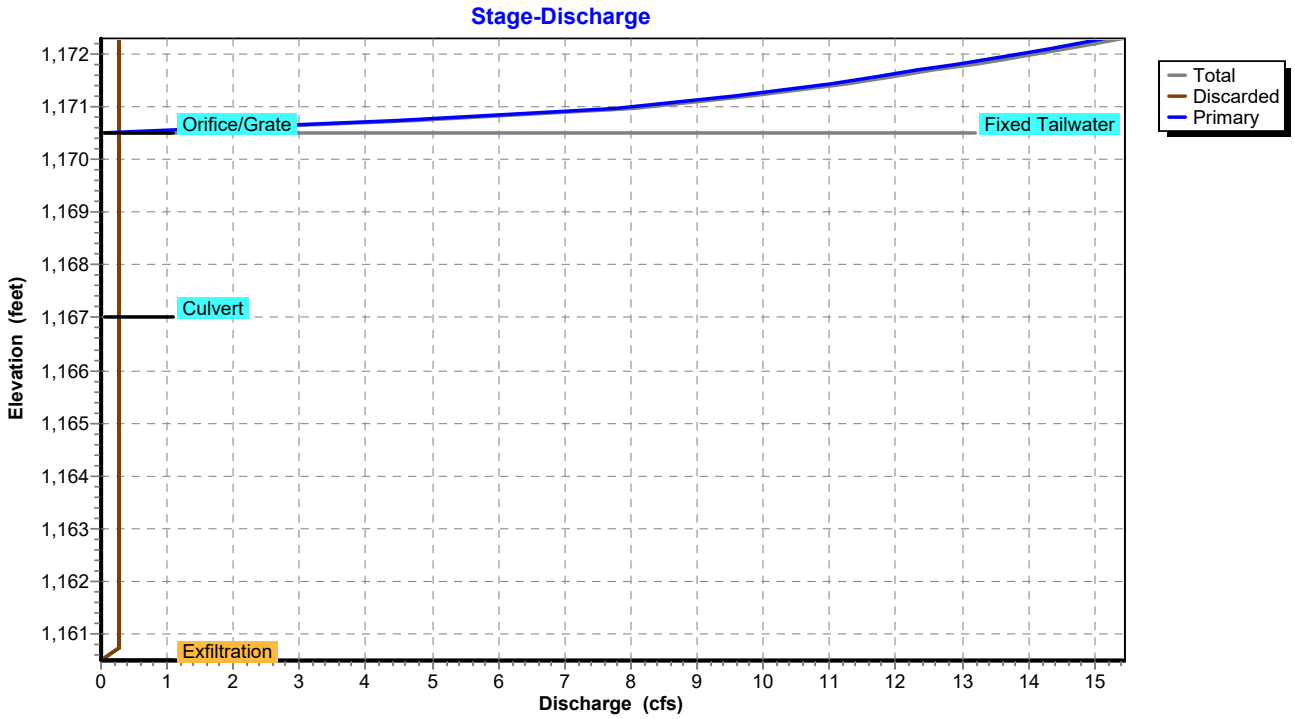
42 Chambers
2,637.3 cy Field
1,344.5 cy Stone



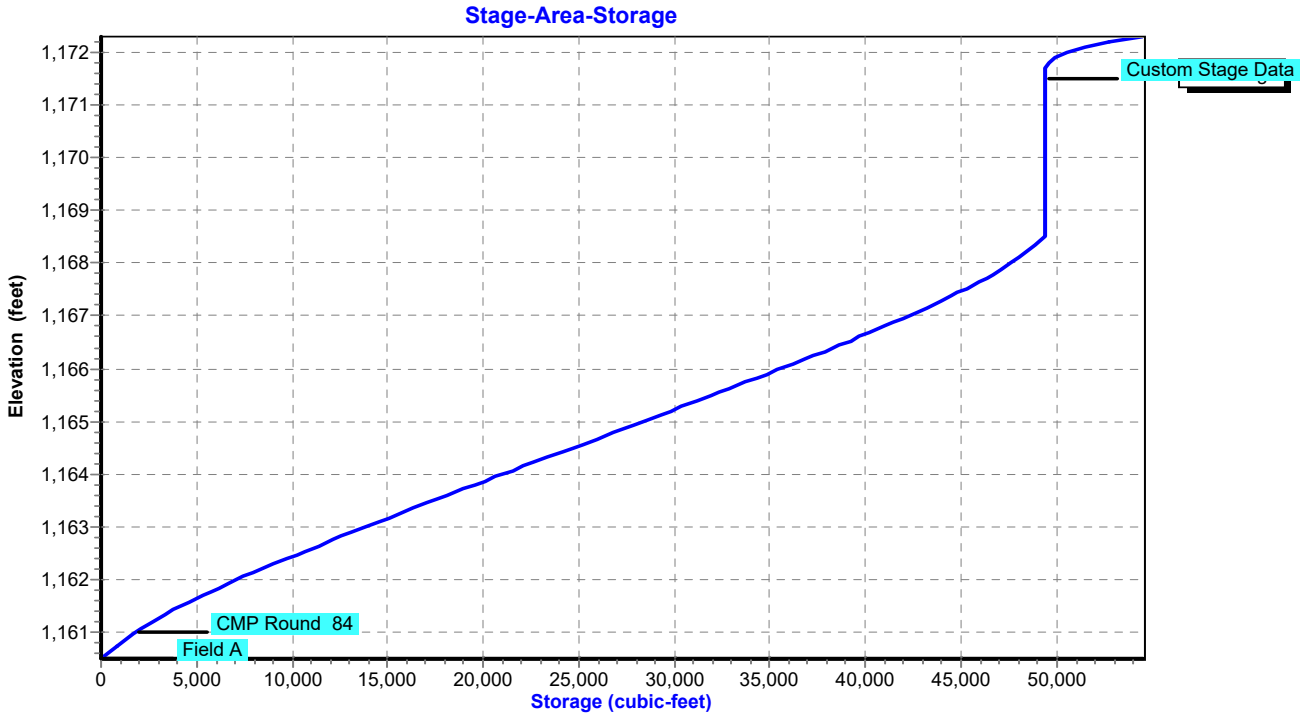
Pond 1P: Infiltration System - CMP



Pond 1P: Infiltration System - CMP



Pond 1P: Infiltration System - CMP



Hydrograph for Pond 1P: Infiltration System - CMP

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
0.00	0.00	0	1,160.50	0.00	0.00	0.00
0.10	0.06	5	1,160.50	0.00	0.00	0.00
0.20	0.26	53	1,160.51	0.03	0.03	0.00
0.30	0.46	165	1,160.55	0.10	0.10	0.00
0.40	0.54	297	1,160.58	0.18	0.18	0.00
0.50	0.57	419	1,160.62	0.26	**0.26**	0.00
0.60	0.57	531	1,160.65	0.26	**0.26**	0.00
0.70	0.58	645	1,160.68	0.26	0.26	0.00
0.80	0.58	760	1,160.71	0.26	0.26	0.00
0.90	0.58	875	1,160.75	0.26	0.26	0.00
1.00	0.58	990	1,160.78	0.26	0.26	0.00
1.10	0.59	1,108	1,160.81	0.26	0.26	0.00
1.20	0.59	1,226	1,160.84	0.26	0.26	0.00
1.30	0.59	1,345	1,160.88	0.26	0.26	0.00
1.40	0.59	1,464	1,160.91	0.26	0.26	0.00
1.50	0.59	1,583	1,160.94	0.26	0.26	0.00
1.60	0.60	1,704	1,160.98	0.26	0.26	0.00
1.70	0.60	1,826	1,161.01	0.26	0.26	0.00
1.80	0.60	1,948	1,161.04	0.26	0.26	0.00
1.90	0.60	2,071	1,161.07	0.26	0.26	0.00
2.00	0.61	2,195	1,161.10	0.26	0.26	0.00
2.10	0.61	2,321	1,161.13	0.26	0.26	0.00
2.20	0.61	2,447	1,161.15	0.26	0.26	0.00
2.30	0.61	2,573	1,161.18	0.26	0.26	0.00
2.40	0.62	2,700	1,161.21	0.26	0.26	0.00
2.50	0.62	2,829	1,161.23	0.26	0.26	0.00
2.60	0.62	2,959	1,161.26	0.26	0.26	0.00
2.70	0.62	3,088	1,161.29	0.26	0.26	0.00
2.80	0.63	3,219	1,161.31	0.26	0.26	0.00
2.90	0.63	3,351	1,161.34	0.26	0.26	0.00
3.00	0.63	3,485	1,161.36	0.26	0.26	0.00
3.10	0.63	3,618	1,161.39	0.26	0.26	0.00
3.20	0.63	3,751	1,161.41	0.26	0.26	0.00
3.30	0.64	3,888	1,161.44	0.26	0.26	0.00
3.40	0.64	4,024	1,161.46	0.26	0.26	0.00
3.50	0.64	4,161	1,161.49	0.26	0.26	0.00
3.60	0.65	4,300	1,161.51	0.26	0.26	0.00
3.70	0.65	4,440	1,161.54	0.26	0.26	0.00
3.80	0.65	4,581	1,161.56	0.26	0.26	0.00
3.90	0.66	4,722	1,161.59	0.26	0.26	0.00
4.00	0.66	4,866	1,161.61	0.26	0.26	0.00
4.10	0.66	5,010	1,161.64	0.26	0.26	0.00
4.20	0.66	5,154	1,161.66	0.26	0.26	0.00
4.30	0.67	5,299	1,161.69	0.26	0.26	0.00
4.40	0.67	5,446	1,161.71	0.26	0.26	0.00
4.50	0.67	5,594	1,161.74	0.26	0.26	0.00
4.60	0.68	5,743	1,161.76	0.26	0.26	0.00
4.70	0.68	5,894	1,161.79	0.26	0.26	0.00
4.80	0.68	6,046	1,161.82	0.26	0.26	0.00
4.90	0.69	6,198	1,161.84	0.26	0.26	0.00
5.00	0.69	6,352	1,161.87	0.26	0.26	0.00
5.10	0.69	6,507	1,161.89	0.26	0.26	0.00
5.20	0.69	6,662	1,161.92	0.26	0.26	0.00

Hydrograph for Pond 1P: Infiltration System - CMP (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
5.30	0.70	6,820	1,161.94	0.26	0.26	0.00
5.40	0.70	6,979	1,161.97	0.26	0.26	0.00
5.50	0.71	7,139	1,161.99	0.26	0.26	0.00
5.60	0.71	7,301	1,162.02	0.26	0.26	0.00
5.70	0.71	7,463	1,162.05	0.26	0.26	0.00
5.80	0.72	7,628	1,162.07	0.26	0.26	0.00
5.90	0.72	7,794	1,162.10	0.26	0.26	0.00
6.00	0.72	7,959	1,162.12	0.26	0.26	0.00
6.10	0.73	8,127	1,162.15	0.26	0.26	0.00
6.20	0.73	8,296	1,162.18	0.26	0.26	0.00
6.30	0.74	8,466	1,162.20	0.26	0.26	0.00
6.40	0.74	8,638	1,162.23	0.26	0.26	0.00
6.50	0.74	8,811	1,162.26	0.26	0.26	0.00
6.60	0.75	8,986	1,162.28	0.26	0.26	0.00
6.70	0.75	9,163	1,162.31	0.26	0.26	0.00
6.80	0.76	9,342	1,162.34	0.26	0.26	0.00
6.90	0.76	9,522	1,162.37	0.26	0.26	0.00
7.00	0.77	9,704	1,162.39	0.26	0.26	0.00
7.10	0.77	9,887	1,162.42	0.26	0.26	0.00
7.20	0.77	10,071	1,162.45	0.26	0.26	0.00
7.30	0.78	10,258	1,162.48	0.26	0.26	0.00
7.40	0.79	10,446	1,162.51	0.26	0.26	0.00
7.50	0.79	10,637	1,162.53	0.26	0.26	0.00
7.60	0.79	10,828	1,162.56	0.26	0.26	0.00
7.70	0.80	11,021	1,162.59	0.26	0.26	0.00
7.80	0.81	11,216	1,162.62	0.26	0.26	0.00
7.90	0.81	11,414	1,162.65	0.26	0.26	0.00
8.00	0.82	11,613	1,162.68	0.26	0.26	0.00
8.10	0.82	11,815	1,162.71	0.26	0.26	0.00
8.20	0.83	12,019	1,162.74	0.26	0.26	0.00
8.30	0.83	12,224	1,162.77	0.26	0.26	0.00
8.40	0.84	12,431	1,162.80	0.26	0.26	0.00
8.50	0.84	12,639	1,162.83	0.26	0.26	0.00
8.60	0.85	12,850	1,162.86	0.26	0.26	0.00
8.70	0.85	13,063	1,162.89	0.26	0.26	0.00
8.80	0.86	13,278	1,162.92	0.26	0.26	0.00
8.90	0.87	13,495	1,162.95	0.26	0.26	0.00
9.00	0.88	13,716	1,162.98	0.26	0.26	0.00
9.10	0.88	13,940	1,163.01	0.26	0.26	0.00
9.20	0.89	14,166	1,163.05	0.26	0.26	0.00
9.30	0.90	14,393	1,163.08	0.26	0.26	0.00
9.40	0.90	14,623	1,163.11	0.26	0.26	0.00
9.50	0.91	14,855	1,163.14	0.26	0.26	0.00
9.60	0.92	15,091	1,163.18	0.26	0.26	0.00
9.70	0.92	15,329	1,163.21	0.26	0.26	0.00
9.80	0.94	15,570	1,163.25	0.26	0.26	0.00
9.90	0.94	15,814	1,163.28	0.26	0.26	0.00
10.00	0.95	16,061	1,163.31	0.26	0.26	0.00
10.10	0.96	16,311	1,163.35	0.26	0.26	0.00
10.20	0.96	16,564	1,163.38	0.26	0.26	0.00
10.30	0.98	16,819	1,163.42	0.26	0.26	0.00
10.40	0.99	17,079	1,163.46	0.26	0.26	0.00
10.50	0.99	17,342	1,163.49	0.26	0.26	0.00

Hydrograph for Pond 1P: Infiltration System - CMP (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
10.60	1.00	17,607	1,163.53	0.26	0.26	0.00
10.70	1.01	17,876	1,163.57	0.26	0.26	0.00
10.80	1.03	18,150	1,163.60	0.26	0.26	0.00
10.90	1.04	18,428	1,163.64	0.26	0.26	0.00
11.00	1.04	18,708	1,163.68	0.26	0.26	0.00
11.10	1.05	18,991	1,163.72	0.26	0.26	0.00
11.20	1.06	19,278	1,163.76	0.26	0.26	0.00
11.30	1.08	19,570	1,163.80	0.26	0.26	0.00
11.40	1.09	19,866	1,163.84	0.26	0.26	0.00
11.50	1.10	20,166	1,163.88	0.26	0.26	0.00
11.60	1.11	20,471	1,163.92	0.26	0.26	0.00
11.70	1.13	20,780	1,163.97	0.26	0.26	0.00
11.80	1.15	21,096	1,164.01	0.26	0.26	0.00
11.90	1.16	21,417	1,164.05	0.26	0.26	0.00
12.00	1.17	21,743	1,164.10	0.26	0.26	0.00
12.10	1.19	22,075	1,164.14	0.26	0.26	0.00
12.20	1.21	22,413	1,164.19	0.26	0.26	0.00
12.30	1.24	22,762	1,164.24	0.26	0.26	0.00
12.40	1.26	23,118	1,164.28	0.26	0.26	0.00
12.50	1.28	23,481	1,164.33	0.26	0.26	0.00
12.60	1.29	23,851	1,164.38	0.26	0.26	0.00
12.70	1.32	24,228	1,164.43	0.26	0.26	0.00
12.80	1.34	24,612	1,164.49	0.26	0.26	0.00
12.90	1.36	25,003	1,164.54	0.26	0.26	0.00
13.00	1.38	25,402	1,164.59	0.26	0.26	0.00
13.10	1.40	25,809	1,164.65	0.26	0.26	0.00
13.20	1.43	26,225	1,164.71	0.26	0.26	0.00
13.30	1.45	26,650	1,164.76	0.26	0.26	0.00
13.40	1.48	27,085	1,164.82	0.26	0.26	0.00
13.50	1.51	27,530	1,164.88	0.26	0.26	0.00
13.60	1.54	27,986	1,164.94	0.26	0.26	0.00
13.70	1.57	28,453	1,165.01	0.26	0.26	0.00
13.80	1.61	28,932	1,165.07	0.26	0.26	0.00
13.90	1.64	29,424	1,165.14	0.26	0.26	0.00
14.00	1.68	29,929	1,165.21	0.26	0.26	0.00
14.10	1.73	30,448	1,165.28	0.26	0.26	0.00
14.20	1.76	30,983	1,165.36	0.26	0.26	0.00
14.30	1.80	31,530	1,165.43	0.26	0.26	0.00
14.40	1.84	32,091	1,165.51	0.26	0.26	0.00
14.50	1.90	32,671	1,165.59	0.26	0.26	0.00
14.60	1.96	33,272	1,165.67	0.26	0.26	0.00
14.70	2.03	33,898	1,165.76	0.26	0.26	0.00
14.80	2.11	34,549	1,165.85	0.26	0.26	0.00
14.90	2.19	35,229	1,165.95	0.26	0.26	0.00
15.00	2.29	35,943	1,166.05	0.26	0.26	0.00
15.10	2.39	36,691	1,166.16	0.26	0.26	0.00
15.20	2.52	37,480	1,166.27	0.26	0.26	0.00
15.30	2.66	38,319	1,166.40	0.26	0.26	0.00
15.40	2.85	39,216	1,166.53	0.26	0.26	0.00
15.50	3.23	40,215	1,166.68	0.26	0.26	0.00
15.60	3.77	41,382	1,166.86	0.26	0.26	0.00
15.70	4.22	42,728	1,167.08	0.26	0.26	0.00
15.80	4.69	44,236	1,167.33	0.26	0.26	0.00

Hydrograph for Pond 1P: Infiltration System - CMP (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
15.90	5.35	45,943	1,167.64	0.26	0.26	0.00
16.00	6.55	47,982	1,168.09	0.26	0.26	0.00
16.10	9.71	49,617	1,171.81	13.19	0.26	12.93
16.20	**13.78**	49,604	1,171.80	13.17	0.26	12.91
16.30	**12.26**	**49,798**	**1,171.86**	**13.45**	0.26	**13.19**
16.40	7.59	49,426	1,170.76	5.12	0.26	4.86
16.50	4.78	49,426	1,170.64	2.32	0.26	2.06
16.60	3.59	49,426	1,170.57	1.13	0.26	0.87
16.70	2.90	49,426	1,170.51	0.43	0.26	0.17
16.80	2.50	49,406	1,168.49	0.26	0.26	0.00
16.90	2.26	49,425	1,168.50	0.26	0.26	0.00
17.00	2.08	49,412	1,168.50	0.26	0.26	0.00
17.10	1.94	49,426	1,170.50	0.28	0.26	0.02
17.20	1.83	49,419	1,168.50	0.26	0.26	0.00
17.30	1.75	49,426	1,168.50	0.26	0.26	0.00
17.40	1.66	49,419	1,168.50	0.26	0.26	0.00
17.50	1.59	49,426	1,170.50	0.27	0.26	0.01
17.60	1.53	49,422	1,168.50	0.26	0.26	0.00
17.70	1.47	49,426	1,168.50	0.26	0.26	0.00
17.80	1.42	49,422	1,168.50	0.26	0.26	0.00
17.90	1.37	49,426	1,168.50	0.26	0.26	0.00
18.00	1.33	49,423	1,168.50	0.26	0.26	0.00
18.10	1.28	49,425	1,168.50	0.26	0.26	0.00
18.20	1.24	49,424	1,168.50	0.26	0.26	0.00
18.30	1.20	49,425	1,168.50	0.26	0.26	0.00
18.40	1.17	49,424	1,168.50	0.26	0.26	0.00
18.50	1.14	49,426	1,168.50	0.26	0.26	0.00
18.60	1.11	49,424	1,168.50	0.26	0.26	0.00
18.70	1.08	49,426	1,170.50	0.27	0.26	0.01
18.80	1.06	49,425	1,168.50	0.26	0.26	0.00
18.90	1.04	49,426	1,170.50	0.26	0.26	0.00
19.00	1.02	49,425	1,168.50	0.26	0.26	0.00
19.10	1.00	49,426	1,168.50	0.26	0.26	0.00
19.20	0.98	49,425	1,168.50	0.26	0.26	0.00
19.30	0.96	49,426	1,168.50	0.26	0.26	0.00
19.40	0.94	49,425	1,168.50	0.26	0.26	0.00
19.50	0.93	49,426	1,170.50	0.26	0.26	0.00
19.60	0.92	49,425	1,168.50	0.26	0.26	0.00
19.70	0.90	49,426	1,168.50	0.26	0.26	0.00
19.80	0.88	49,426	1,168.50	0.26	0.26	0.00
19.90	0.87	49,426	1,168.50	0.26	0.26	0.00
20.00	0.86	49,426	1,168.50	0.26	0.26	0.00
20.10	0.85	49,426	1,168.50	0.26	0.26	0.00
20.20	0.84	49,426	1,168.50	0.26	0.26	0.00
20.30	0.82	49,426	1,168.50	0.26	0.26	0.00
20.40	0.81	49,426	1,168.50	0.26	0.26	0.00
20.50	0.80	49,426	1,168.50	0.26	0.26	0.00
20.60	0.79	49,426	1,168.50	0.26	0.26	0.00
20.70	0.79	49,426	1,168.50	0.26	0.26	0.00
20.80	0.77	49,426	1,168.50	0.26	0.26	0.00
20.90	0.76	49,426	1,168.50	0.26	0.26	0.00
21.00	0.76	49,426	1,170.50	0.26	0.26	0.00
21.10	0.75	49,425	1,168.50	0.26	0.26	0.00

Hydrograph for Pond 1P: Infiltration System - CMP (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
21.20	0.74	49,426	1,168.50	0.26	0.26	0.00
21.30	0.73	49,426	1,168.50	0.26	0.26	0.00
21.40	0.72	49,426	1,168.50	0.26	0.26	0.00
21.50	0.72	49,426	1,170.50	0.26	0.26	0.00
21.60	0.71	49,425	1,168.50	0.26	0.26	0.00
21.70	0.70	49,426	1,170.50	0.26	0.26	0.00
21.80	0.69	49,426	1,168.50	0.26	0.26	0.00
21.90	0.69	49,426	1,168.50	0.26	0.26	0.00
22.00	0.68	49,426	1,168.50	0.26	0.26	0.00
22.10	0.68	49,426	1,170.50	0.27	0.26	0.01
22.20	0.67	49,426	1,168.50	0.26	0.26	0.00
22.30	0.66	49,426	1,168.50	0.26	0.26	0.00
22.40	0.65	49,426	1,168.50	0.26	0.26	0.00
22.50	0.65	49,426	1,170.50	0.27	0.26	0.01
22.60	0.65	49,426	1,170.50	0.26	0.26	0.00
22.70	0.64	49,426	1,168.50	0.26	0.26	0.00
22.80	0.63	49,426	1,168.50	0.26	0.26	0.00
22.90	0.63	49,426	1,168.50	0.26	0.26	0.00
23.00	0.62	49,426	1,168.50	0.26	0.26	0.00
23.10	0.62	49,426	1,170.50	0.27	0.26	0.01
23.20	0.62	49,426	1,170.50	0.26	0.26	0.00
23.30	0.61	49,426	1,168.50	0.26	0.26	0.00
23.40	0.60	49,426	1,168.50	0.26	0.26	0.00
23.50	0.60	49,426	1,170.50	0.26	0.26	0.00
23.60	0.60	49,426	1,170.50	0.26	0.26	0.00
23.70	0.59	49,426	1,168.50	0.26	0.26	0.00
23.80	0.58	49,426	1,170.50	0.26	0.26	0.00
23.90	0.58	49,426	1,168.50	0.26	0.26	0.00
24.00	0.58	49,426	1,170.50	0.26	0.26	0.00
24.10	0.00	49,375	1,168.49	0.26	0.26	0.00
24.20	0.00	49,281	1,168.46	0.26	0.26	0.00
24.30	0.00	49,187	1,168.43	0.26	0.26	0.00
24.40	0.00	49,094	1,168.41	0.26	0.26	0.00
24.50	0.00	49,000	1,168.38	0.26	0.26	0.00
24.60	0.00	48,907	1,168.35	0.26	0.26	0.00
24.70	0.00	48,813	1,168.33	0.26	0.26	0.00
24.80	0.00	48,719	1,168.30	0.26	0.26	0.00
24.90	0.00	48,626	1,168.28	0.26	0.26	0.00
25.00	0.00	48,532	1,168.25	0.26	0.26	0.00
25.10	0.00	48,439	1,168.22	0.26	0.26	0.00
25.20	0.00	48,345	1,168.20	0.26	0.26	0.00
25.30	0.00	48,251	1,168.17	0.26	0.26	0.00
25.40	0.00	48,158	1,168.14	0.26	0.26	0.00
25.50	0.00	48,064	1,168.12	0.26	0.26	0.00
25.60	0.00	47,971	1,168.09	0.26	0.26	0.00
25.70	0.00	47,877	1,168.06	0.26	0.26	0.00
25.80	0.00	47,783	1,168.04	0.26	0.26	0.00
25.90	0.00	47,690	1,168.01	0.26	0.26	0.00
26.00	0.00	47,596	1,167.99	0.26	0.26	0.00
26.10	0.00	47,503	1,167.97	0.26	0.26	0.00
26.20	0.00	47,409	1,167.94	0.26	0.26	0.00
26.30	0.00	47,315	1,167.92	0.26	0.26	0.00
26.40	0.00	47,222	1,167.90	0.26	0.26	0.00

Hydrograph for Pond 1P: Infiltration System - CMP (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
26.50	0.00	47,128	1,167.88	0.26	0.26	0.00
26.60	0.00	47,035	1,167.86	0.26	0.26	0.00
26.70	0.00	46,941	1,167.84	0.26	0.26	0.00
26.80	0.00	46,847	1,167.82	0.26	0.26	0.00
26.90	0.00	46,754	1,167.80	0.26	0.26	0.00
27.00	0.00	46,660	1,167.78	0.26	0.26	0.00
27.10	0.00	46,567	1,167.76	0.26	0.26	0.00
27.20	0.00	46,473	1,167.74	0.26	0.26	0.00
27.30	0.00	46,379	1,167.72	0.26	0.26	0.00
27.40	0.00	46,286	1,167.70	0.26	0.26	0.00
27.50	0.00	46,192	1,167.69	0.26	0.26	0.00
27.60	0.00	46,099	1,167.67	0.26	0.26	0.00
27.70	0.00	46,005	1,167.65	0.26	0.26	0.00
27.80	0.00	45,911	1,167.63	0.26	0.26	0.00
27.90	0.00	45,818	1,167.61	0.26	0.26	0.00
28.00	0.00	45,724	1,167.60	0.26	0.26	0.00

Stage-Discharge for Pond 1P: Infiltration System - CMP

Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)	Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)
1,160.50	0.00	**0.00**	0.00	1,165.80	0.26	0.26	0.00
1,160.60	0.26	**0.26**	0.00	1,165.90	0.26	0.26	0.00
1,160.70	0.26	0.26	0.00	1,166.00	0.26	0.26	0.00
1,160.80	0.26	0.26	0.00	1,166.10	0.26	0.26	0.00
1,160.90	0.26	0.26	0.00	1,166.20	0.26	0.26	0.00
1,161.00	0.26	0.26	0.00	1,166.30	0.26	0.26	0.00
1,161.10	0.26	0.26	0.00	1,166.40	0.26	0.26	0.00
1,161.20	0.26	0.26	0.00	1,166.50	0.26	0.26	0.00
1,161.30	0.26	0.26	0.00	1,166.60	0.26	0.26	0.00
1,161.40	0.26	0.26	0.00	1,166.70	0.26	0.26	0.00
1,161.50	0.26	0.26	0.00	1,166.80	0.26	0.26	0.00
1,161.60	0.26	0.26	0.00	1,166.90	0.26	0.26	0.00
1,161.70	0.26	0.26	0.00	1,167.00	0.26	0.26	0.00
1,161.80	0.26	0.26	0.00	1,167.10	0.26	0.26	0.00
1,161.90	0.26	0.26	0.00	1,167.20	0.26	0.26	0.00
1,162.00	0.26	0.26	0.00	1,167.30	0.26	0.26	0.00
1,162.10	0.26	0.26	0.00	1,167.40	0.26	0.26	0.00
1,162.20	0.26	0.26	0.00	1,167.50	0.26	0.26	0.00
1,162.30	0.26	0.26	0.00	1,167.60	0.26	0.26	0.00
1,162.40	0.26	0.26	0.00	1,167.70	0.26	0.26	0.00
1,162.50	0.26	0.26	0.00	1,167.80	0.26	0.26	0.00
1,162.60	0.26	0.26	0.00	1,167.90	0.26	0.26	0.00
1,162.70	0.26	0.26	0.00	1,168.00	0.26	0.26	0.00
1,162.80	0.26	0.26	0.00	1,168.10	0.26	0.26	0.00
1,162.90	0.26	0.26	0.00	1,168.20	0.26	0.26	0.00
1,163.00	0.26	0.26	0.00	1,168.30	0.26	0.26	0.00
1,163.10	0.26	0.26	0.00	1,168.40	0.26	0.26	0.00
1,163.20	0.26	0.26	0.00	1,168.50	0.26	0.26	0.00
1,163.30	0.26	0.26	0.00	1,168.60	0.26	0.26	0.00
1,163.40	0.26	0.26	0.00	1,168.70	0.26	0.26	0.00
1,163.50	0.26	0.26	0.00	1,168.80	0.26	0.26	0.00
1,163.60	0.26	0.26	0.00	1,168.90	0.26	0.26	0.00
1,163.70	0.26	0.26	0.00	1,169.00	0.26	0.26	0.00
1,163.80	0.26	0.26	0.00	1,169.10	0.26	0.26	0.00
1,163.90	0.26	0.26	0.00	1,169.20	0.26	0.26	0.00
1,164.00	0.26	0.26	0.00	1,169.30	0.26	0.26	0.00
1,164.10	0.26	0.26	0.00	1,169.40	0.26	0.26	0.00
1,164.20	0.26	0.26	0.00	1,169.50	0.26	0.26	0.00
1,164.30	0.26	0.26	0.00	1,169.60	0.26	0.26	0.00
1,164.40	0.26	0.26	0.00	1,169.70	0.26	0.26	0.00
1,164.50	0.26	0.26	0.00	1,169.80	0.26	0.26	0.00
1,164.60	0.26	0.26	0.00	1,169.90	0.26	0.26	0.00
1,164.70	0.26	0.26	0.00	1,170.00	0.26	0.26	0.00
1,164.80	0.26	0.26	0.00	1,170.10	0.26	0.26	0.00
1,164.90	0.26	0.26	0.00	1,170.20	0.26	0.26	0.00
1,165.00	0.26	0.26	0.00	1,170.30	0.26	0.26	0.00
1,165.10	0.26	0.26	0.00	1,170.40	0.26	0.26	0.00
1,165.20	0.26	0.26	0.00	1,170.50	0.26	0.26	0.00
1,165.30	0.26	0.26	0.00	1,170.60	1.50	0.26	1.24
1,165.40	0.26	0.26	0.00	1,170.70	3.77	0.26	3.51
1,165.50	0.26	0.26	0.00	1,170.80	6.45	0.26	6.19
1,165.60	0.26	0.26	0.00	1,170.90	7.41	0.26	7.15
1,165.70	0.26	0.26	0.00	1,171.00	8.25	0.26	7.99

Stage-Discharge for Pond 1P: Infiltration System - CMP (continued)

Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)
1,171.10	9.02	0.26	8.76
1,171.20	9.72	0.26	9.46
1,171.30	10.37	0.26	10.11
1,171.40	10.99	0.26	10.73
1,171.50	11.57	0.26	11.31
1,171.60	12.12	0.26	11.86
1,171.70	12.64	0.26	12.38
1,171.80	13.15	0.26	12.89
1,171.90	13.64	0.26	13.38
1,172.00	14.11	0.26	13.85
1,172.10	14.56	0.26	14.30
1,172.20	15.00	0.26	14.74
1,172.30	15.43	0.26	15.17
1,172.40	**15.84**	0.26	**15.58**

Stage-Area-Storage for Pond 1P: Infiltration System - CMP

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
1,160.50	0	1,165.80	34,178	1,171.10	49,426
1,160.60	356	1,165.90	34,885	1,171.20	49,426
1,160.70	712	1,166.00	35,588	1,171.30	49,426
1,160.80	1,068	1,166.10	36,285	1,171.40	49,426
1,160.90	1,424	1,166.20	36,977	1,171.50	49,426
1,161.00	1,780	1,166.30	37,663	1,171.60	49,427
1,161.10	2,196	1,166.40	38,343	1,171.70	49,457
1,161.20	2,662	1,166.50	39,015	1,171.80	49,594
1,161.30	3,160	1,166.60	39,680	1,171.90	49,933
1,161.40	3,682	1,166.70	40,336	1,172.00	50,551
1,161.50	4,224	1,166.80	40,984	1,172.10	51,497
1,161.60	4,785	1,166.90	41,623	1,172.20	52,814
1,161.70	5,362	1,167.00	42,251	1,172.30	54,554
1,161.80	5,954	1,167.10	42,868	1,172.40	**56,777**
1,161.90	6,559	1,167.20	43,472		
1,162.00	7,176	1,167.30	44,064		
1,162.10	7,804	1,167.40	44,641		
1,162.20	8,442	1,167.50	45,202		
1,162.30	9,090	1,167.60	45,745		
1,162.40	9,747	1,167.70	46,267		
1,162.50	10,411	1,167.80	46,764		
1,162.60	11,084	1,167.90	47,229		
1,162.70	11,763	1,168.00	47,646		
1,162.80	12,449	1,168.10	48,002		
1,162.90	13,141	1,168.20	48,358		
1,163.00	13,839	1,168.30	48,714		
1,163.10	14,541	1,168.40	49,070		
1,163.20	15,249	1,168.50	49,426		
1,163.30	15,961	1,168.60	49,426		
1,163.40	16,676	1,168.70	49,426		
1,163.50	17,396	1,168.80	49,426		
1,163.60	18,119	1,168.90	49,426		
1,163.70	18,844	1,169.00	49,426		
1,163.80	19,572	1,169.10	49,426		
1,163.90	20,303	1,169.20	49,426		
1,164.00	21,035	1,169.30	49,426		
1,164.10	21,769	1,169.40	49,426		
1,164.20	22,504	1,169.50	49,426		
1,164.30	23,240	1,169.60	49,426		
1,164.40	23,976	1,169.70	49,426		
1,164.50	24,713	1,169.80	49,426		
1,164.60	25,450	1,169.90	49,426		
1,164.70	26,187	1,170.00	49,426		
1,164.80	26,923	1,170.10	49,426		
1,164.90	27,658	1,170.20	49,426		
1,165.00	28,392	1,170.30	49,426		
1,165.10	29,124	1,170.40	49,426		
1,165.20	29,854	1,170.50	49,426		
1,165.30	30,582	1,170.60	49,426		
1,165.40	31,308	1,170.70	49,426		
1,165.50	32,031	1,170.80	49,426		
1,165.60	32,750	1,170.90	49,426		
1,165.70	33,466	1,171.00	49,426		

Summary for Pond 2P: Infiltration System - CMP

Inflow	=	1.05 cfs @	16.21 hrs, Volume=	0.164 af
Outflow	=	1.07 cfs @	16.20 hrs, Volume=	0.106 af, Atten= 0%, Lag= 0.0 min
Discarded	=	0.02 cfs @	0.45 hrs, Volume=	0.046 af
Primary	=	1.05 cfs @	16.20 hrs, Volume=	0.060 af

Routing by Stor-Ind method, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs
Peak Elev= 1,170.45' @ 16.20 hrs Surf.Area= 578 sf Storage= 2,806 cf

Plug-Flow detention time= 295.8 min calculated for 0.106 af (65% of inflow)
Center-of-Mass det. time= 140.8 min (963.2 - 822.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	1,161.00'	827 cf	**17.00'W x 34.00'L x 7.00'H Field A** 4,046 cf Overall - 1,979 cf Embedded = 2,067 cf x 40.0% Voids
#2A	1,161.50'	1,979 cf	**CMP Round 72** x 2 Inside #1 Effective Size= 72.0"W x 72.0"H => 28.27 sf x 20.00'L = 565.5 cf Overall Size= 72.0"W x 72.0"H x 20.00'L 2 Chambers in 2 Rows 15.00' Header x 28.27 sf x 2 = 848.2 cf Inside
		2,806 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	1,166.00'	**18.0" Round Culvert** L= 54.0' Ke= 1.000 Inlet / Outlet Invert= 1,165.60' / 1,166.00' S= -0.0074 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#2	Discarded	1,161.00'	**0.02 cfs Exfiltration at all elevations**

Discarded OutFlow Max=0.02 cfs @ 0.45 hrs HW=1,161.11' (Free Discharge)
└**2=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=1.43 cfs @ 16.20 hrs HW=1,170.45' TW=1,170.40' (Fixed TW Elev= 1,170.40')
└**1=Culvert** (Inlet Controls 1.43 cfs @ 0.81 fps)

Peak flow with mitigation with infiltration system

Overflow elevation at driveway

Pond 2P: Infiltration System - CMP - Chamber Wizard Field A

Chamber Model = CMP Round 72 (Round Corrugated Metal Pipe)
Effective Size= 72.0"W x 72.0"H => 28.27 sf x 20.00'L = 565.5 cf
Overall Size= 72.0"W x 72.0"H x 20.00'L

72.0" Wide + 36.0" Spacing = 108.0" C-C Row Spacing

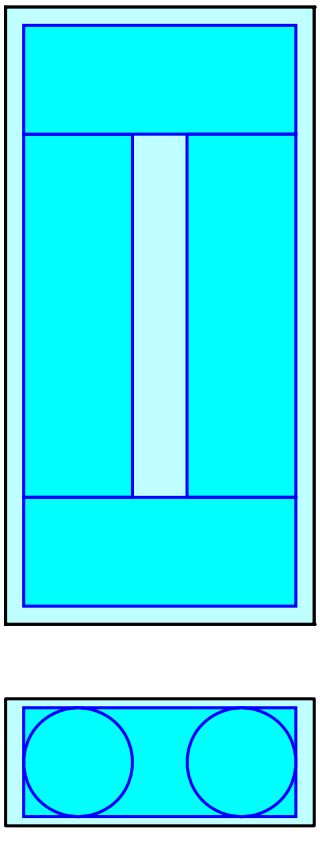
1 Chambers/Row x 20.00' Long +6.00' Header x 2 = 32.00' Row Length +12.0" End Stone x 2 = 34.00' Base Length
2 Rows x 72.0" Wide + 36.0" Spacing x 1 + 12.0" Side Stone x 2 = 17.00' Base Width
6.0" Stone Base + 72.0" Chamber Height + 6.0" Stone Cover = 7.00' Field Height

2 Chambers x 565.5 cf + 15.00' Header x 28.27 sf x 2 = 1,979.2 cf Chamber Storage

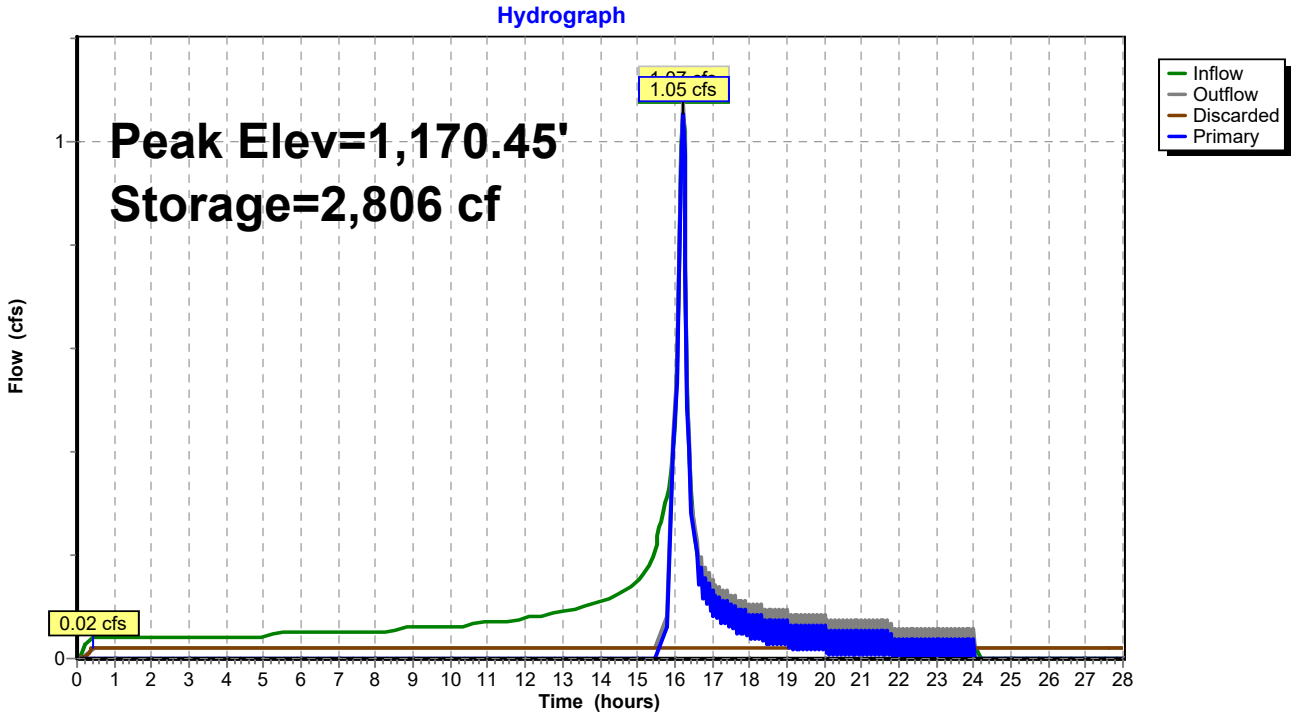
4,046.0 cf Field - 1,979.2 cf Chambers = 2,066.8 cf Stone x 40.0% Voids = 826.7 cf Stone Storage

Chamber Storage + Stone Storage = 2,805.9 cf = 0.064 af
Overall Storage Efficiency = 69.4%
Overall System Size = 34.00' x 17.00' x 7.00'

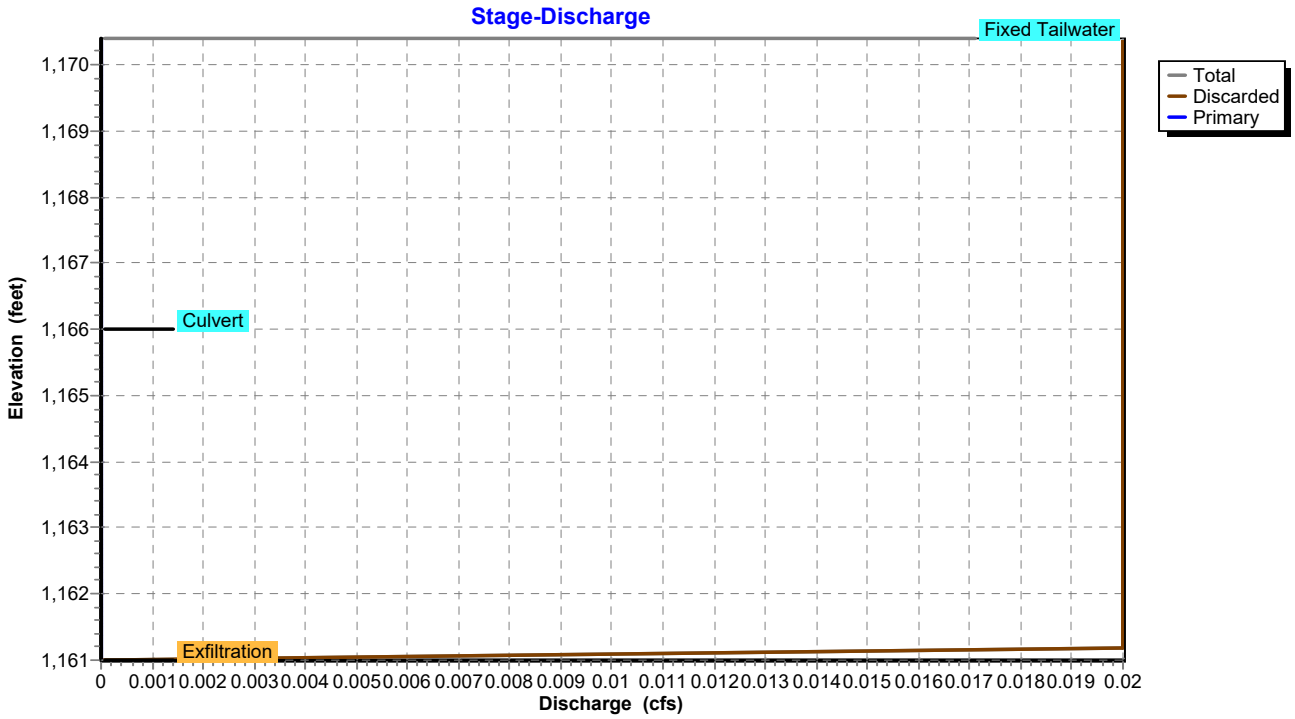
2 Chambers
149.9 cy Field
76.5 cy Stone



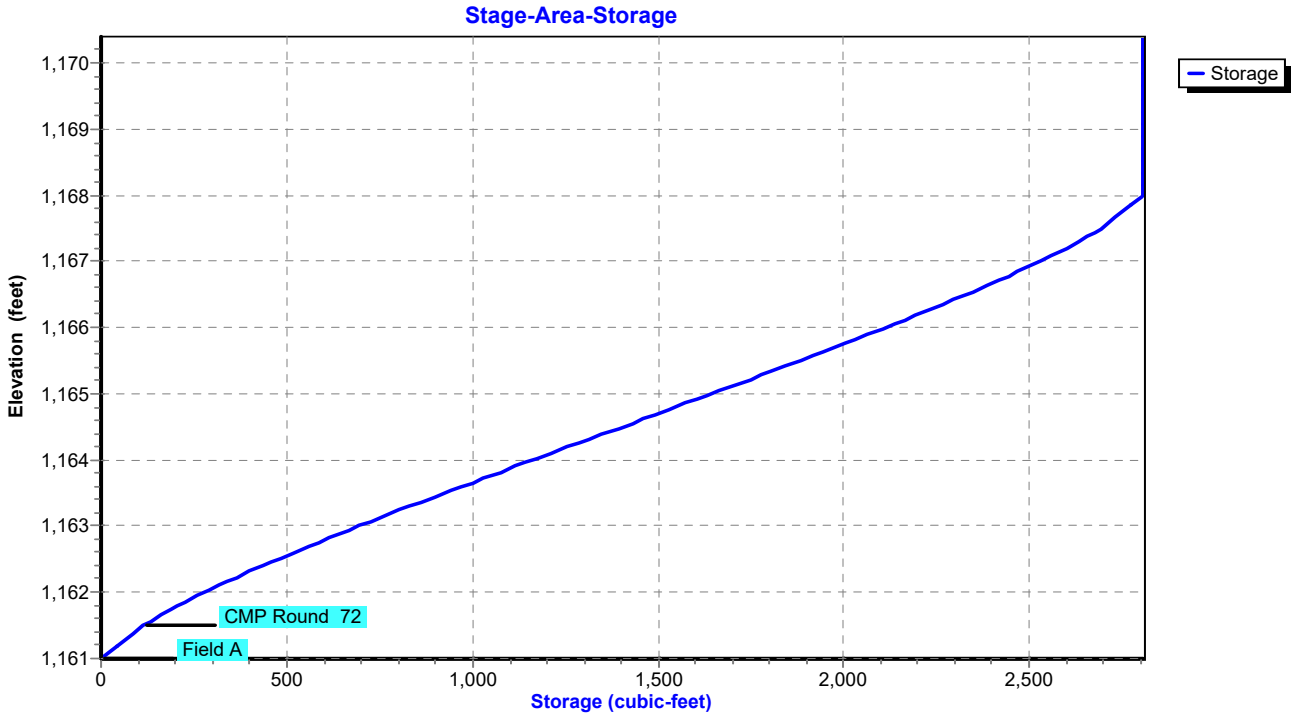
Pond 2P: Infiltration System - CMP



Pond 2P: Infiltration System - CMP



Pond 2P: Infiltration System - CMP



Hydrograph for Pond 2P: Infiltration System - CMP

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
0.00	0.00	0	1,161.00	0.00	0.00	0.00
0.10	0.00	0	1,161.00	0.00	0.00	0.00
0.20	0.02	5	1,161.02	0.00	0.00	0.00
0.30	0.04	13	1,161.06	0.01	0.01	0.00
0.40	0.04	21	1,161.09	0.02	**0.02**	0.00
0.50	0.04	28	1,161.12	0.02	**0.02**	0.00
0.60	0.04	36	1,161.15	0.02	0.02	0.00
0.70	0.04	43	1,161.19	0.02	0.02	0.00
0.80	0.04	50	1,161.22	0.02	0.02	0.00
0.90	0.04	57	1,161.25	0.02	0.02	0.00
1.00	0.04	64	1,161.28	0.02	0.02	0.00
1.10	0.04	72	1,161.31	0.02	0.02	0.00
1.20	0.04	79	1,161.34	0.02	0.02	0.00
1.30	0.04	86	1,161.37	0.02	0.02	0.00
1.40	0.04	93	1,161.40	0.02	0.02	0.00
1.50	0.04	100	1,161.43	0.02	0.02	0.00
1.60	0.04	108	1,161.47	0.02	0.02	0.00
1.70	0.04	115	1,161.50	0.02	0.02	0.00
1.80	0.04	122	1,161.53	0.02	0.02	0.00
1.90	0.04	129	1,161.55	0.02	0.02	0.00
2.00	0.04	136	1,161.58	0.02	0.02	0.00
2.10	0.04	144	1,161.60	0.02	0.02	0.00
2.20	0.04	151	1,161.63	0.02	0.02	0.00
2.30	0.04	158	1,161.65	0.02	0.02	0.00
2.40	0.04	165	1,161.67	0.02	0.02	0.00
2.50	0.04	172	1,161.70	0.02	0.02	0.00
2.60	0.04	180	1,161.72	0.02	0.02	0.00
2.70	0.04	187	1,161.74	0.02	0.02	0.00
2.80	0.04	194	1,161.76	0.02	0.02	0.00
2.90	0.04	201	1,161.78	0.02	0.02	0.00
3.00	0.04	208	1,161.80	0.02	0.02	0.00
3.10	0.04	216	1,161.82	0.02	0.02	0.00
3.20	0.04	223	1,161.85	0.02	0.02	0.00
3.30	0.04	230	1,161.87	0.02	0.02	0.00
3.40	0.04	237	1,161.89	0.02	0.02	0.00
3.50	0.04	244	1,161.91	0.02	0.02	0.00
3.60	0.04	252	1,161.93	0.02	0.02	0.00
3.70	0.04	259	1,161.95	0.02	0.02	0.00
3.80	0.04	266	1,161.97	0.02	0.02	0.00
3.90	0.04	273	1,161.99	0.02	0.02	0.00
4.00	0.04	280	1,162.01	0.02	0.02	0.00
4.10	0.04	288	1,162.02	0.02	0.02	0.00
4.20	0.04	295	1,162.04	0.02	0.02	0.00
4.30	0.04	302	1,162.06	0.02	0.02	0.00
4.40	0.04	309	1,162.08	0.02	0.02	0.00
4.50	0.04	316	1,162.10	0.02	0.02	0.00
4.60	0.04	324	1,162.12	0.02	0.02	0.00
4.70	0.04	331	1,162.14	0.02	0.02	0.00
4.80	0.04	338	1,162.16	0.02	0.02	0.00
4.90	0.04	345	1,162.18	0.02	0.02	0.00
5.00	0.04	352	1,162.19	0.02	0.02	0.00
5.10	0.04	360	1,162.21	0.02	0.02	0.00
5.20	0.05	370	1,162.24	0.02	0.02	0.00

Hydrograph for Pond 2P: Infiltration System - CMP (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
5.30	0.05	380	1,162.26	0.02	0.02	0.00
5.40	0.05	391	1,162.29	0.02	0.02	0.00
5.50	0.05	402	1,162.32	0.02	0.02	0.00
5.60	0.05	413	1,162.34	0.02	0.02	0.00
5.70	0.05	424	1,162.37	0.02	0.02	0.00
5.80	0.05	434	1,162.40	0.02	0.02	0.00
5.90	0.05	445	1,162.42	0.02	0.02	0.00
6.00	0.05	456	1,162.45	0.02	0.02	0.00
6.10	0.05	467	1,162.48	0.02	0.02	0.00
6.20	0.05	478	1,162.50	0.02	0.02	0.00
6.30	0.05	488	1,162.53	0.02	0.02	0.00
6.40	0.05	499	1,162.55	0.02	0.02	0.00
6.50	0.05	510	1,162.58	0.02	0.02	0.00
6.60	0.05	521	1,162.60	0.02	0.02	0.00
6.70	0.05	532	1,162.63	0.02	0.02	0.00
6.80	0.05	542	1,162.65	0.02	0.02	0.00
6.90	0.05	553	1,162.68	0.02	0.02	0.00
7.00	0.05	564	1,162.70	0.02	0.02	0.00
7.10	0.05	575	1,162.73	0.02	0.02	0.00
7.20	0.05	586	1,162.75	0.02	0.02	0.00
7.30	0.05	596	1,162.78	0.02	0.02	0.00
7.40	0.05	607	1,162.80	0.02	0.02	0.00
7.50	0.05	618	1,162.83	0.02	0.02	0.00
7.60	0.05	629	1,162.85	0.02	0.02	0.00
7.70	0.05	640	1,162.88	0.02	0.02	0.00
7.80	0.05	650	1,162.90	0.02	0.02	0.00
7.90	0.05	661	1,162.93	0.02	0.02	0.00
8.00	0.05	672	1,162.95	0.02	0.02	0.00
8.10	0.05	683	1,162.97	0.02	0.02	0.00
8.20	0.05	694	1,163.00	0.02	0.02	0.00
8.30	0.05	704	1,163.02	0.02	0.02	0.00
8.40	0.05	715	1,163.05	0.02	0.02	0.00
8.50	0.05	726	1,163.07	0.02	0.02	0.00
8.60	0.06	739	1,163.10	0.02	0.02	0.00
8.70	0.06	753	1,163.13	0.02	0.02	0.00
8.80	0.06	768	1,163.16	0.02	0.02	0.00
8.90	0.06	782	1,163.19	0.02	0.02	0.00
9.00	0.06	796	1,163.22	0.02	0.02	0.00
9.10	0.06	811	1,163.26	0.02	0.02	0.00
9.20	0.06	825	1,163.29	0.02	0.02	0.00
9.30	0.06	840	1,163.32	0.02	0.02	0.00
9.40	0.06	854	1,163.35	0.02	0.02	0.00
9.50	0.06	868	1,163.38	0.02	0.02	0.00
9.60	0.06	883	1,163.41	0.02	0.02	0.00
9.70	0.06	897	1,163.44	0.02	0.02	0.00
9.80	0.06	912	1,163.47	0.02	0.02	0.00
9.90	0.06	926	1,163.50	0.02	0.02	0.00
10.00	0.06	940	1,163.53	0.02	0.02	0.00
10.10	0.06	955	1,163.56	0.02	0.02	0.00
10.20	0.06	969	1,163.59	0.02	0.02	0.00
10.30	0.06	984	1,163.63	0.02	0.02	0.00
10.40	0.06	998	1,163.66	0.02	0.02	0.00
10.50	0.06	1,012	1,163.69	0.02	0.02	0.00

Hydrograph for Pond 2P: Infiltration System - CMP (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
10.60	0.07	1,029	1,163.72	0.02	0.02	0.00
10.70	0.07	1,047	1,163.76	0.02	0.02	0.00
10.80	0.07	1,065	1,163.80	0.02	0.02	0.00
10.90	0.07	1,083	1,163.83	0.02	0.02	0.00
11.00	0.07	1,101	1,163.87	0.02	0.02	0.00
11.10	0.07	1,119	1,163.91	0.02	0.02	0.00
11.20	0.07	1,137	1,163.95	0.02	0.02	0.00
11.30	0.07	1,155	1,163.98	0.02	0.02	0.00
11.40	0.07	1,173	1,164.02	0.02	0.02	0.00
11.50	0.07	1,191	1,164.06	0.02	0.02	0.00
11.60	0.07	1,209	1,164.10	0.02	0.02	0.00
11.70	0.07	1,227	1,164.13	0.02	0.02	0.00
11.80	0.07	1,245	1,164.17	0.02	0.02	0.00
11.90	0.08	1,264	1,164.21	0.02	0.02	0.00
12.00	0.08	1,285	1,164.26	0.02	0.02	0.00
12.10	0.08	1,307	1,164.30	0.02	0.02	0.00
12.20	0.08	1,328	1,164.35	0.02	0.02	0.00
12.30	0.08	1,350	1,164.39	0.02	0.02	0.00
12.40	0.08	1,372	1,164.44	0.02	0.02	0.00
12.50	0.08	1,393	1,164.48	0.02	0.02	0.00
12.60	0.08	1,415	1,164.52	0.02	0.02	0.00
12.70	0.09	1,439	1,164.57	0.02	0.02	0.00
12.80	0.09	1,464	1,164.63	0.02	0.02	0.00
12.90	0.09	1,490	1,164.68	0.02	0.02	0.00
13.00	0.09	1,515	1,164.73	0.02	0.02	0.00
13.10	0.09	1,540	1,164.78	0.02	0.02	0.00
13.20	0.09	1,565	1,164.84	0.02	0.02	0.00
13.30	0.10	1,591	1,164.89	0.02	0.02	0.00
13.40	0.10	1,619	1,164.95	0.02	0.02	0.00
13.50	0.10	1,648	1,165.01	0.02	0.02	0.00
13.60	0.10	1,677	1,165.07	0.02	0.02	0.00
13.70	0.10	1,706	1,165.13	0.02	0.02	0.00
13.80	0.11	1,735	1,165.19	0.02	0.02	0.00
13.90	0.11	1,767	1,165.26	0.02	0.02	0.00
14.00	0.11	1,799	1,165.33	0.02	0.02	0.00
14.10	0.11	1,832	1,165.39	0.02	0.02	0.00
14.20	0.11	1,865	1,165.46	0.02	0.02	0.00
14.30	0.12	1,900	1,165.54	0.02	0.02	0.00
14.40	0.12	1,936	1,165.62	0.02	0.02	0.00
14.50	0.12	1,972	1,165.69	0.02	0.02	0.00
14.60	0.13	2,010	1,165.78	0.02	0.02	0.00
14.70	0.13	2,050	1,165.86	0.02	0.02	0.00
14.80	0.14	2,093	1,165.96	0.02	0.02	0.00
14.90	0.14	2,136	1,166.05	0.02	0.02	0.00
15.00	0.15	2,181	1,166.16	0.02	0.02	0.00
15.10	0.16	2,230	1,166.27	0.02	0.02	0.00
15.20	0.16	2,280	1,166.38	0.02	0.02	0.00
15.30	0.18	2,334	1,166.51	0.02	0.02	0.00
15.40	0.19	2,393	1,166.65	0.02	0.02	0.00
15.50	0.22	2,458	1,166.82	0.02	0.02	0.00
15.60	0.25	2,537	1,167.03	0.02	0.02	0.00
15.70	0.28	2,626	1,167.28	0.02	0.02	0.00
15.80	0.31	2,726	1,167.65	0.02	0.02	0.00

Hydrograph for Pond 2P: Infiltration System - CMP (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
15.90	0.36	**2,806**	1,170.42	0.38	0.02	0.36
16.00	0.45	2,806	1,170.42	0.47	0.02	0.45
16.10	0.74	2,806	1,170.44	0.77	0.02	0.75
16.20	**1.05**	2,806	**1,170.45**	**1.07**	0.02	**1.05**
16.30	0.75	2,806	1,170.44	0.77	0.02	0.75
16.40	0.40	2,806	1,170.42	0.43	0.02	0.41
16.50	0.27	2,806	1,170.41	0.29	0.02	0.27
16.60	0.20	2,806	1,170.41	0.23	0.02	0.21
16.70	0.17	2,806	1,170.41	0.20	0.02	0.18
16.80	0.15	2,806	1,170.41	0.18	0.02	0.16
16.90	0.14	2,806	1,170.41	0.17	0.02	0.15
17.00	0.13	2,806	1,170.41	0.15	0.02	0.13
17.10	0.12	2,806	1,170.41	0.14	0.02	0.12
17.20	0.12	2,806	1,170.41	0.14	0.02	0.12
17.30	0.11	2,806	1,170.41	0.13	0.02	0.11
17.40	0.11	2,806	1,170.41	0.13	0.02	0.11
17.50	0.10	2,806	1,170.40	0.12	0.02	0.10
17.60	0.10	2,806	1,170.40	0.12	0.02	0.10
17.70	0.09	2,806	1,170.40	0.11	0.02	0.09
17.80	0.09	2,806	1,170.40	0.11	0.02	0.09
17.90	0.09	2,806	1,170.40	0.11	0.02	0.09
18.00	0.08	2,806	1,170.40	0.10	0.02	0.08
18.10	0.08	2,806	1,170.40	0.10	0.02	0.08
18.20	0.08	2,806	1,170.40	0.10	0.02	0.08
18.30	0.08	2,806	1,170.40	0.10	0.02	0.08
18.40	0.07	2,806	1,170.40	0.10	0.02	0.08
18.50	0.07	2,806	1,170.40	0.09	0.02	0.07
18.60	0.07	2,806	1,170.40	0.09	0.02	0.07
18.70	0.07	2,806	1,170.40	0.09	0.02	0.07
18.80	0.07	2,806	1,170.40	0.09	0.02	0.07
18.90	0.07	2,806	1,170.40	0.09	0.02	0.07
19.00	0.07	2,806	1,170.40	0.09	0.02	0.07
19.10	0.06	2,806	1,170.40	0.08	0.02	0.06
19.20	0.06	2,806	1,170.40	0.08	0.02	0.06
19.30	0.06	2,806	1,170.40	0.08	0.02	0.06
19.40	0.06	2,806	1,170.40	0.08	0.02	0.06
19.50	0.06	2,806	1,170.40	0.08	0.02	0.06
19.60	0.06	2,806	1,170.40	0.08	0.02	0.06
19.70	0.06	2,806	1,170.40	0.08	0.02	0.06
19.80	0.06	2,806	1,170.40	0.08	0.02	0.06
19.90	0.06	2,806	1,170.40	0.08	0.02	0.06
20.00	0.06	2,806	1,170.40	0.08	0.02	0.06
20.10	0.05	2,806	1,170.40	0.07	0.02	0.05
20.20	0.05	2,806	1,170.40	0.07	0.02	0.05
20.30	0.05	2,806	1,170.40	0.07	0.02	0.05
20.40	0.05	2,806	1,170.40	0.07	0.02	0.05
20.50	0.05	2,806	1,170.40	0.07	0.02	0.05
20.60	0.05	2,806	1,170.40	0.07	0.02	0.05
20.70	0.05	2,806	1,170.40	0.07	0.02	0.05
20.80	0.05	2,806	1,170.40	0.07	0.02	0.05
20.90	0.05	2,806	1,170.40	0.07	0.02	0.05
21.00	0.05	2,806	1,170.40	0.07	0.02	0.05
21.10	0.05	2,806	1,170.40	0.07	0.02	0.05

Hydrograph for Pond 2P: Infiltration System - CMP (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
21.20	0.05	2,806	1,170.40	0.07	0.02	0.05
21.30	0.05	2,806	1,170.40	0.07	0.02	0.05
21.40	0.05	2,806	1,170.40	0.07	0.02	0.05
21.50	0.05	2,806	1,170.40	0.07	0.02	0.05
21.60	0.05	2,806	1,170.40	0.07	0.02	0.05
21.70	0.05	2,806	1,170.40	0.07	0.02	0.05
21.80	0.04	2,806	1,170.40	0.07	0.02	0.05
21.90	0.04	2,806	1,170.40	0.06	0.02	0.04
22.00	0.04	2,806	1,170.40	0.06	0.02	0.04
22.10	0.04	2,806	1,170.40	0.06	0.02	0.04
22.20	0.04	2,806	1,170.40	0.06	0.02	0.04
22.30	0.04	2,806	1,170.40	0.06	0.02	0.04
22.40	0.04	2,806	1,170.40	0.06	0.02	0.04
22.50	0.04	2,806	1,170.40	0.06	0.02	0.04
22.60	0.04	2,806	1,170.40	0.06	0.02	0.04
22.70	0.04	2,806	1,170.40	0.06	0.02	0.04
22.80	0.04	2,806	1,170.40	0.06	0.02	0.04
22.90	0.04	2,806	1,170.40	0.06	0.02	0.04
23.00	0.04	2,806	1,170.40	0.06	0.02	0.04
23.10	0.04	2,806	1,170.40	0.06	0.02	0.04
23.20	0.04	2,806	1,170.40	0.06	0.02	0.04
23.30	0.04	2,806	1,170.40	0.06	0.02	0.04
23.40	0.04	2,806	1,170.40	0.06	0.02	0.04
23.50	0.04	2,806	1,170.40	0.06	0.02	0.04
23.60	0.04	2,806	1,170.40	0.06	0.02	0.04
23.70	0.04	2,806	1,170.40	0.06	0.02	0.04
23.80	0.04	2,806	1,170.40	0.06	0.02	0.04
23.90	0.04	2,806	1,170.40	0.06	0.02	0.04
24.00	0.04	2,806	1,170.40	0.06	0.02	0.04
24.10	0.00	2,799	1,167.97	0.02	0.02	0.00
24.20	0.00	2,792	1,167.94	0.02	0.02	0.00
24.30	0.00	2,785	1,167.91	0.02	0.02	0.00
24.40	0.00	2,777	1,167.88	0.02	0.02	0.00
24.50	0.00	2,770	1,167.85	0.02	0.02	0.00
24.60	0.00	2,763	1,167.81	0.02	0.02	0.00
24.70	0.00	2,756	1,167.78	0.02	0.02	0.00
24.80	0.00	2,749	1,167.75	0.02	0.02	0.00
24.90	0.00	2,741	1,167.72	0.02	0.02	0.00
25.00	0.00	2,734	1,167.69	0.02	0.02	0.00
25.10	0.00	2,727	1,167.66	0.02	0.02	0.00
25.20	0.00	2,720	1,167.63	0.02	0.02	0.00
25.30	0.00	2,713	1,167.60	0.02	0.02	0.00
25.40	0.00	2,705	1,167.57	0.02	0.02	0.00
25.50	0.00	2,698	1,167.53	0.02	0.02	0.00
25.60	0.00	2,691	1,167.50	0.02	0.02	0.00
25.70	0.00	2,684	1,167.48	0.02	0.02	0.00
25.80	0.00	2,677	1,167.45	0.02	0.02	0.00
25.90	0.00	2,669	1,167.42	0.02	0.02	0.00
26.00	0.00	2,662	1,167.40	0.02	0.02	0.00
26.10	0.00	2,655	1,167.37	0.02	0.02	0.00
26.20	0.00	2,648	1,167.35	0.02	0.02	0.00
26.30	0.00	2,641	1,167.33	0.02	0.02	0.00
26.40	0.00	2,633	1,167.30	0.02	0.02	0.00

Hydrograph for Pond 2P: Infiltration System - CMP (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
26.50	0.00	2,626	1,167.28	0.02	0.02	0.00
26.60	0.00	2,619	1,167.26	0.02	0.02	0.00
26.70	0.00	2,612	1,167.24	0.02	0.02	0.00
26.80	0.00	2,605	1,167.22	0.02	0.02	0.00
26.90	0.00	2,597	1,167.20	0.02	0.02	0.00
27.00	0.00	2,590	1,167.18	0.02	0.02	0.00
27.10	0.00	2,583	1,167.15	0.02	0.02	0.00
27.20	0.00	2,576	1,167.13	0.02	0.02	0.00
27.30	0.00	2,569	1,167.11	0.02	0.02	0.00
27.40	0.00	2,561	1,167.09	0.02	0.02	0.00
27.50	0.00	2,554	1,167.07	0.02	0.02	0.00
27.60	0.00	2,547	1,167.05	0.02	0.02	0.00
27.70	0.00	2,540	1,167.03	0.02	0.02	0.00
27.80	0.00	2,533	1,167.01	0.02	0.02	0.00
27.90	0.00	2,525	1,166.99	0.02	0.02	0.00
28.00	0.00	2,518	1,166.98	0.02	0.02	0.00

Stage-Discharge for Pond 2P: Infiltration System - CMP

Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)
1,161.00	0.00	**0.00**	0.00
1,161.10	0.02	**0.02**	0.00
1,161.20	0.02	0.02	0.00
1,161.30	0.02	0.02	0.00
1,161.40	0.02	0.02	0.00
1,161.50	0.02	0.02	0.00
1,161.60	0.02	0.02	0.00
1,161.70	0.02	0.02	0.00
1,161.80	0.02	0.02	0.00
1,161.90	0.02	0.02	0.00
1,162.00	0.02	0.02	0.00
1,162.10	0.02	0.02	0.00
1,162.20	0.02	0.02	0.00
1,162.30	0.02	0.02	0.00
1,162.40	0.02	0.02	0.00
1,162.50	0.02	0.02	0.00
1,162.60	0.02	0.02	0.00
1,162.70	0.02	0.02	0.00
1,162.80	0.02	0.02	0.00
1,162.90	0.02	0.02	0.00
1,163.00	0.02	0.02	0.00
1,163.10	0.02	0.02	0.00
1,163.20	0.02	0.02	0.00
1,163.30	0.02	0.02	0.00
1,163.40	0.02	0.02	0.00
1,163.50	0.02	0.02	0.00
1,163.60	0.02	0.02	0.00
1,163.70	0.02	0.02	0.00
1,163.80	0.02	0.02	0.00
1,163.90	0.02	0.02	0.00
1,164.00	0.02	0.02	0.00
1,164.10	0.02	0.02	0.00
1,164.20	0.02	0.02	0.00
1,164.30	0.02	0.02	0.00
1,164.40	0.02	0.02	0.00
1,164.50	0.02	0.02	0.00
1,164.60	0.02	0.02	0.00
1,164.70	0.02	0.02	0.00
1,164.80	0.02	0.02	0.00
1,164.90	0.02	0.02	0.00
1,165.00	0.02	0.02	0.00
1,165.10	0.02	0.02	0.00
1,165.20	0.02	0.02	0.00
1,165.30	0.02	0.02	0.00
1,165.40	0.02	0.02	0.00
1,165.50	0.02	0.02	0.00
1,165.60	0.02	0.02	0.00
1,165.70	0.02	0.02	0.00
1,165.80	0.02	0.02	0.00
1,165.90	0.02	0.02	0.00
1,166.00	0.02	0.02	0.00
1,166.10	0.02	0.02	0.00
1,166.20	0.02	0.02	0.00
1,166.30	0.02	0.02	0.00
1,166.40	0.02	0.02	0.00
1,166.50	0.02	0.02	0.00
1,166.60	0.02	0.02	0.00
1,166.70	0.02	0.02	0.00
1,166.80	0.02	0.02	0.00
1,166.90	0.02	0.02	0.00
1,167.00	0.02	0.02	0.00
1,167.10	0.02	0.02	0.00
1,167.20	0.02	0.02	0.00
1,167.30	0.02	0.02	0.00
1,167.40	0.02	0.02	0.00
1,167.50	0.02	0.02	0.00
1,167.60	0.02	0.02	0.00
1,167.70	0.02	0.02	0.00
1,167.80	0.02	0.02	0.00
1,167.90	0.02	0.02	0.00
1,168.00	0.02	0.02	0.00
1,168.10	0.02	0.02	0.00
1,168.20	0.02	0.02	0.00
1,168.30	0.02	0.02	0.00
1,168.40	0.02	0.02	0.00
1,168.50	0.02	0.02	0.00
1,168.60	0.02	0.02	0.00
1,168.70	0.02	0.02	0.00
1,168.80	0.02	0.02	0.00
1,168.90	0.02	0.02	0.00
1,169.00	0.02	0.02	0.00
1,169.10	0.02	0.02	0.00
1,169.20	0.02	0.02	0.00
1,169.30	0.02	0.02	0.00
1,169.40	0.02	0.02	0.00
1,169.50	0.02	0.02	0.00
1,169.60	0.02	0.02	0.00
1,169.70	0.02	0.02	0.00
1,169.80	0.02	0.02	0.00
1,169.90	0.02	0.02	0.00
1,170.00	0.02	0.02	0.00
1,170.10	0.02	0.02	0.00
1,170.20	0.02	0.02	0.00
1,170.30	0.02	0.02	0.00
1,170.40	**0.02**	0.02	**0.00**

Stage-Area-Storage for Pond 2P: Infiltration System - CMP

Elevation (feet)	Storage (cubic-feet)
1,161.00	0
1,161.10	23
1,161.20	46
1,161.30	69
1,161.40	92
1,161.50	116
1,161.60	143
1,161.70	174
1,161.80	207
1,161.90	242
1,162.00	278
1,162.10	316
1,162.20	355
1,162.30	395
1,162.40	435
1,162.50	477
1,162.60	519
1,162.70	562
1,162.80	606
1,162.90	650
1,163.00	695
1,163.10	740
1,163.20	785
1,163.30	831
1,163.40	878
1,163.50	925
1,163.60	972
1,163.70	1,019
1,163.80	1,066
1,163.90	1,114
1,164.00	1,162
1,164.10	1,210
1,164.20	1,258
1,164.30	1,306
1,164.40	1,355
1,164.50	1,403
1,164.60	1,451
1,164.70	1,500
1,164.80	1,548
1,164.90	1,596
1,165.00	1,644
1,165.10	1,692
1,165.20	1,740
1,165.30	1,787
1,165.40	1,834
1,165.50	1,881
1,165.60	1,928
1,165.70	1,975
1,165.80	2,021
1,165.90	2,066
1,166.00	2,111
1,166.10	2,156
1,166.20	2,200
1,166.30	2,244
1,166.40	2,287
1,166.50	2,329
1,166.60	2,371
1,166.70	2,411
1,166.80	2,451
1,166.90	2,490
1,167.00	2,527
1,167.10	2,564
1,167.20	2,599
1,167.30	2,632
1,167.40	2,663
1,167.50	2,690
1,167.60	2,713
1,167.70	2,737
1,167.80	2,760
1,167.90	2,783
1,168.00	**2,806**
1,168.10	2,806
1,168.20	2,806
1,168.30	2,806
1,168.40	2,806
1,168.50	2,806
1,168.60	2,806
1,168.70	2,806
1,168.80	2,806
1,168.90	2,806
1,169.00	2,806
1,169.10	2,806
1,169.20	2,806
1,169.30	2,806
1,169.40	2,806
1,169.50	2,806
1,169.60	2,806
1,169.70	2,806
1,169.80	2,806
1,169.90	2,806
1,170.00	2,806
1,170.10	2,806
1,170.20	2,806
1,170.30	2,806
1,170.40	2,806

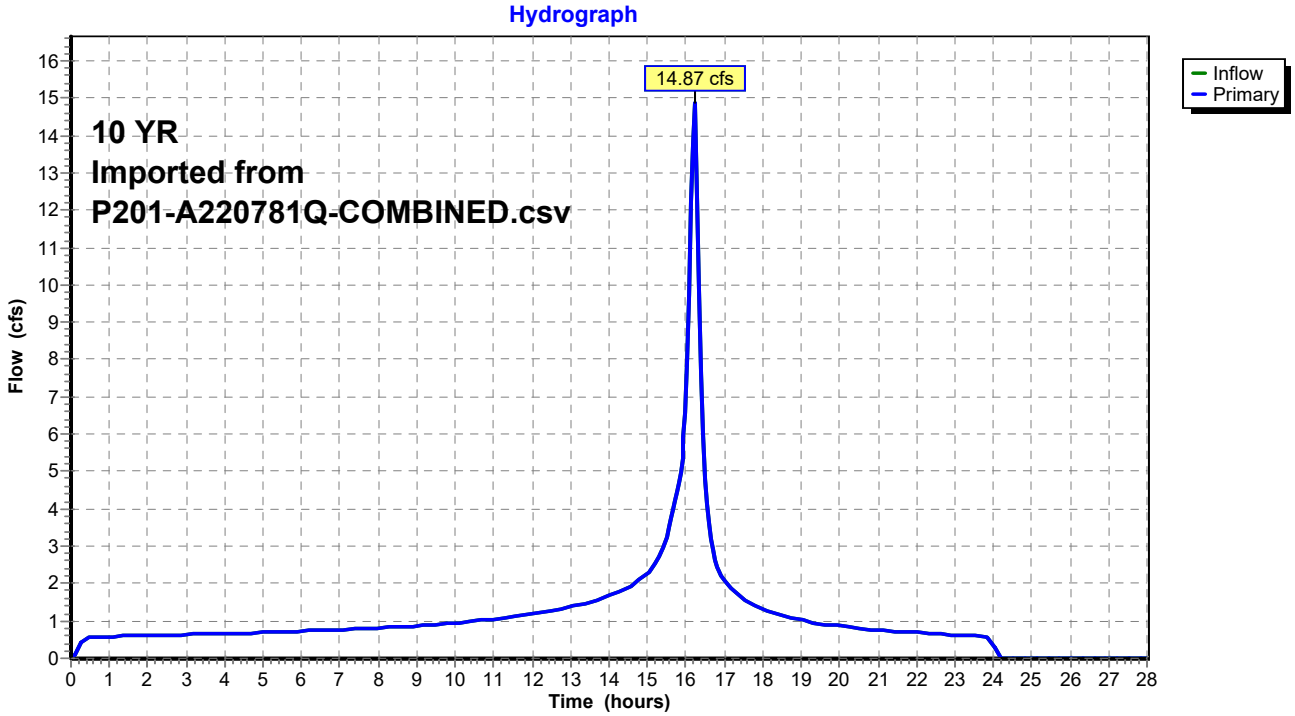
Summary for Link 1L: NODE 201-10 YEAR

Inflow = 14.87 cfs @ 16.24 hrs, Volume= 2.508 af
Primary = 14.87 cfs @ 16.24 hrs, Volume= 2.508 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs

10 YR Imported from P201-A220781Q-COMBINED.csv

Link 1L: NODE 201-10 YEAR



Hydrograph for Link 1L: NODE 201-10 YEAR

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	**0.00**	0.00	5.30	0.70	0.00	0.70
0.10	0.06	0.00	0.06	5.40	0.70	0.00	0.70
0.20	0.26	0.00	0.26	5.50	0.71	0.00	0.71
0.30	0.46	0.00	0.46	5.60	0.71	0.00	0.71
0.40	0.54	0.00	0.54	5.70	0.71	0.00	0.71
0.50	0.57	0.00	0.57	5.80	0.72	0.00	0.72
0.60	0.57	0.00	0.57	5.90	0.72	0.00	0.72
0.70	0.58	0.00	0.58	6.00	0.72	0.00	0.72
0.80	0.58	0.00	0.58	6.10	0.73	0.00	0.73
0.90	0.58	0.00	0.58	6.20	0.73	0.00	0.73
1.00	0.58	0.00	0.58	6.30	0.74	0.00	0.74
1.10	0.59	0.00	0.59	6.40	0.74	0.00	0.74
1.20	0.59	0.00	0.59	6.50	0.74	0.00	0.74
1.30	0.59	0.00	0.59	6.60	0.75	0.00	0.75
1.40	0.59	0.00	0.59	6.70	0.75	0.00	0.75
1.50	0.59	0.00	0.59	6.80	0.76	0.00	0.76
1.60	0.60	0.00	0.60	6.90	0.76	0.00	0.76
1.70	0.60	0.00	0.60	7.00	0.77	0.00	0.77
1.80	0.60	0.00	0.60	7.10	0.77	0.00	0.77
1.90	0.60	0.00	0.60	7.20	0.77	0.00	0.77
2.00	0.61	0.00	0.61	7.30	0.78	0.00	0.78
2.10	0.61	0.00	0.61	7.40	0.79	0.00	0.79
2.20	0.61	0.00	0.61	7.50	0.79	0.00	0.79
2.30	0.61	0.00	0.61	7.60	0.79	0.00	0.79
2.40	0.62	0.00	0.62	7.70	0.80	0.00	0.80
2.50	0.62	0.00	0.62	7.80	0.81	0.00	0.81
2.60	0.62	0.00	0.62	7.90	0.81	0.00	0.81
2.70	0.62	0.00	0.62	8.00	0.82	0.00	0.82
2.80	0.63	0.00	0.63	8.10	0.82	0.00	0.82
2.90	0.63	0.00	0.63	8.20	0.83	0.00	0.83
3.00	0.63	0.00	0.63	8.30	0.83	0.00	0.83
3.10	0.63	0.00	0.63	8.40	0.84	0.00	0.84
3.20	0.63	0.00	0.63	8.50	0.84	0.00	0.84
3.30	0.64	0.00	0.64	8.60	0.85	0.00	0.85
3.40	0.64	0.00	0.64	8.70	0.85	0.00	0.85
3.50	0.64	0.00	0.64	8.80	0.86	0.00	0.86
3.60	0.65	0.00	0.65	8.90	0.87	0.00	0.87
3.70	0.65	0.00	0.65	9.00	0.88	0.00	0.88
3.80	0.65	0.00	0.65	9.10	0.88	0.00	0.88
3.90	0.66	0.00	0.66	9.20	0.89	0.00	0.89
4.00	0.66	0.00	0.66	9.30	0.90	0.00	0.90
4.10	0.66	0.00	0.66	9.40	0.90	0.00	0.90
4.20	0.66	0.00	0.66	9.50	0.91	0.00	0.91
4.30	0.67	0.00	0.67	9.60	0.92	0.00	0.92
4.40	0.67	0.00	0.67	9.70	0.92	0.00	0.92
4.50	0.67	0.00	0.67	9.80	0.94	0.00	0.94
4.60	0.68	0.00	0.68	9.90	0.94	0.00	0.94
4.70	0.68	0.00	0.68	10.00	0.95	0.00	0.95
4.80	0.68	0.00	0.68	10.10	0.96	0.00	0.96
4.90	0.69	0.00	0.69	10.20	0.96	0.00	0.96
5.00	0.69	0.00	0.69	10.30	0.98	0.00	0.98
5.10	0.69	0.00	0.69	10.40	0.99	0.00	0.99
5.20	0.69	0.00	0.69	10.50	0.99	0.00	0.99

Hydrograph for Link 1L: NODE 201-10 YEAR (continued)

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
10.60	1.00	0.00	1.00	15.90	5.35	0.00	5.35
10.70	1.01	0.00	1.01	16.00	6.55	0.00	6.55
10.80	1.03	0.00	1.03	16.10	9.71	0.00	9.71
10.90	1.04	0.00	1.04	16.20	**13.78**	0.00	**13.78**
11.00	1.04	0.00	1.04	16.30	**12.26**	0.00	**12.26**
11.10	1.05	0.00	1.05	16.40	7.59	0.00	7.59
11.20	1.06	0.00	1.06	16.50	4.78	0.00	4.78
11.30	1.08	0.00	1.08	16.60	3.59	0.00	3.59
11.40	1.09	0.00	1.09	16.70	2.90	0.00	2.90
11.50	1.10	0.00	1.10	16.80	2.50	0.00	2.50
11.60	1.11	0.00	1.11	16.90	2.26	0.00	2.26
11.70	1.13	0.00	1.13	17.00	2.08	0.00	2.08
11.80	1.15	0.00	1.15	17.10	1.94	0.00	1.94
11.90	1.16	0.00	1.16	17.20	1.83	0.00	1.83
12.00	1.17	0.00	1.17	17.30	1.75	0.00	1.75
12.10	1.19	0.00	1.19	17.40	1.66	0.00	1.66
12.20	1.21	0.00	1.21	17.50	1.59	0.00	1.59
12.30	1.24	0.00	1.24	17.60	1.53	0.00	1.53
12.40	1.26	0.00	1.26	17.70	1.47	0.00	1.47
12.50	1.28	0.00	1.28	17.80	1.42	0.00	1.42
12.60	1.29	0.00	1.29	17.90	1.37	0.00	1.37
12.70	1.32	0.00	1.32	18.00	1.33	0.00	1.33
12.80	1.34	0.00	1.34	18.10	1.28	0.00	1.28
12.90	1.36	0.00	1.36	18.20	1.24	0.00	1.24
13.00	1.38	0.00	1.38	18.30	1.20	0.00	1.20
13.10	1.40	0.00	1.40	18.40	1.17	0.00	1.17
13.20	1.43	0.00	1.43	18.50	1.14	0.00	1.14
13.30	1.45	0.00	1.45	18.60	1.11	0.00	1.11
13.40	1.48	0.00	1.48	18.70	1.08	0.00	1.08
13.50	1.51	0.00	1.51	18.80	1.06	0.00	1.06
13.60	1.54	0.00	1.54	18.90	1.04	0.00	1.04
13.70	1.57	0.00	1.57	19.00	1.02	0.00	1.02
13.80	1.61	0.00	1.61	19.10	1.00	0.00	1.00
13.90	1.64	0.00	1.64	19.20	0.98	0.00	0.98
14.00	1.68	0.00	1.68	19.30	0.96	0.00	0.96
14.10	1.73	0.00	1.73	19.40	0.94	0.00	0.94
14.20	1.76	0.00	1.76	19.50	0.93	0.00	0.93
14.30	1.80	0.00	1.80	19.60	0.92	0.00	0.92
14.40	1.84	0.00	1.84	19.70	0.90	0.00	0.90
14.50	1.90	0.00	1.90	19.80	0.88	0.00	0.88
14.60	1.96	0.00	1.96	19.90	0.87	0.00	0.87
14.70	2.03	0.00	2.03	20.00	0.86	0.00	0.86
14.80	2.11	0.00	2.11	20.10	0.85	0.00	0.85
14.90	2.19	0.00	2.19	20.20	0.84	0.00	0.84
15.00	2.29	0.00	2.29	20.30	0.82	0.00	0.82
15.10	2.39	0.00	2.39	20.40	0.81	0.00	0.81
15.20	2.52	0.00	2.52	20.50	0.80	0.00	0.80
15.30	2.66	0.00	2.66	20.60	0.79	0.00	0.79
15.40	2.85	0.00	2.85	20.70	0.79	0.00	0.79
15.50	3.23	0.00	3.23	20.80	0.77	0.00	0.77
15.60	3.77	0.00	3.77	20.90	0.76	0.00	0.76
15.70	4.22	0.00	4.22	21.00	0.76	0.00	0.76
15.80	4.69	0.00	4.69	21.10	0.75	0.00	0.75

Hydrograph for Link 1L: NODE 201-10 YEAR (continued)

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
21.20	0.74	0.00	0.74
21.30	0.73	0.00	0.73
21.40	0.72	0.00	0.72
21.50	0.72	0.00	0.72
21.60	0.71	0.00	0.71
21.70	0.70	0.00	0.70
21.80	0.69	0.00	0.69
21.90	0.69	0.00	0.69
22.00	0.68	0.00	0.68
22.10	0.68	0.00	0.68
22.20	0.67	0.00	0.67
22.30	0.66	0.00	0.66
22.40	0.65	0.00	0.65
22.50	0.65	0.00	0.65
22.60	0.65	0.00	0.65
22.70	0.64	0.00	0.64
22.80	0.63	0.00	0.63
22.90	0.63	0.00	0.63
23.00	0.62	0.00	0.62
23.10	0.62	0.00	0.62
23.20	0.62	0.00	0.62
23.30	0.61	0.00	0.61
23.40	0.60	0.00	0.60
23.50	0.60	0.00	0.60
23.60	0.60	0.00	0.60
23.70	0.59	0.00	0.59
23.80	0.58	0.00	0.58
23.90	0.58	0.00	0.58
24.00	0.58	0.00	0.58
24.10	0.00	0.00	0.00
24.20	0.00	0.00	0.00
24.30	0.00	0.00	0.00
24.40	0.00	0.00	0.00
24.50	0.00	0.00	0.00
24.60	0.00	0.00	0.00
24.70	0.00	0.00	0.00
24.80	0.00	0.00	0.00
24.90	0.00	0.00	0.00
25.00	0.00	0.00	0.00
25.10	0.00	0.00	0.00
25.20	0.00	0.00	0.00
25.30	0.00	0.00	0.00
25.40	0.00	0.00	0.00
25.50	0.00	0.00	0.00
25.60	0.00	0.00	0.00
25.70	0.00	0.00	0.00
25.80	0.00	0.00	0.00
25.90	0.00	0.00	0.00
26.00	0.00	0.00	0.00
26.10	0.00	0.00	0.00
26.20	0.00	0.00	0.00
26.30	0.00	0.00	0.00
26.40	0.00	0.00	0.00
26.50	0.00	0.00	0.00
26.60	0.00	0.00	0.00
26.70	0.00	0.00	0.00
26.80	0.00	0.00	0.00
26.90	0.00	0.00	0.00
27.00	0.00	0.00	0.00
27.10	0.00	0.00	0.00
27.20	0.00	0.00	0.00
27.30	0.00	0.00	0.00
27.40	0.00	0.00	0.00
27.50	0.00	0.00	0.00
27.60	0.00	0.00	0.00
27.70	0.00	0.00	0.00
27.80	0.00	0.00	0.00
27.90	0.00	0.00	0.00
28.00	0.00	0.00	0.00

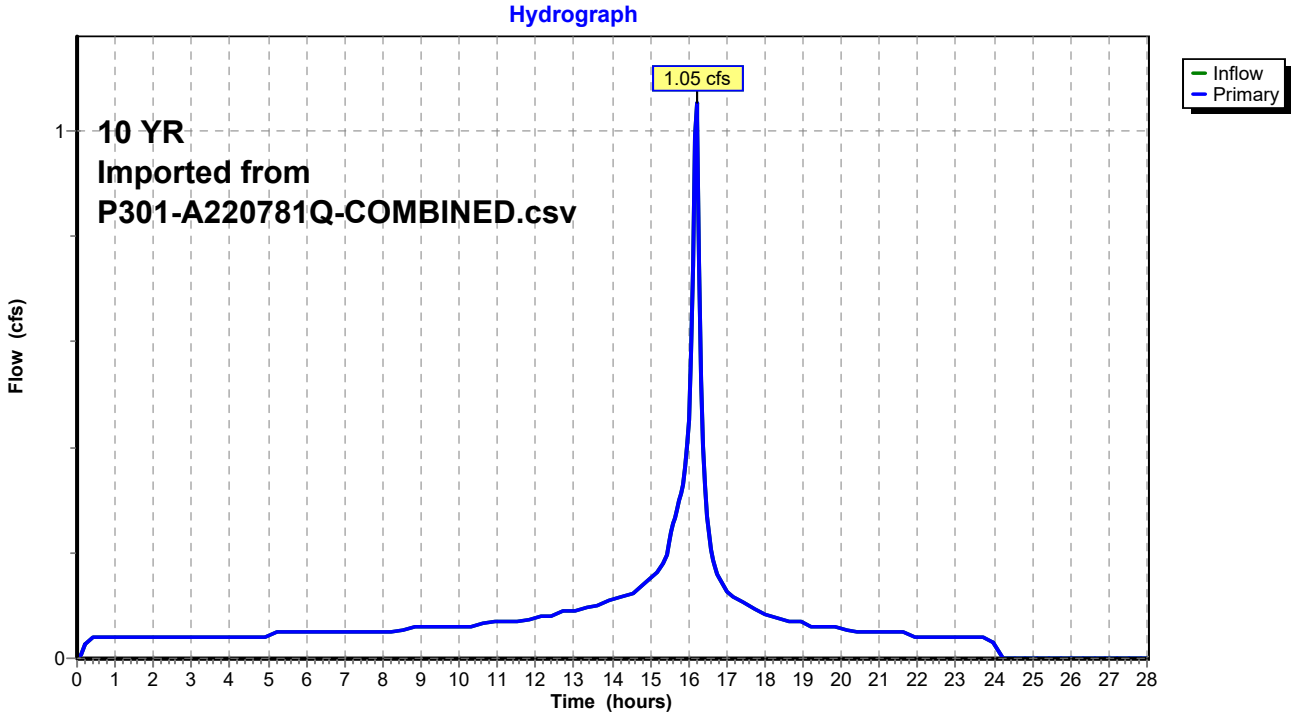
Summary for Link 2L: NODE 301-10 YEAR

Inflow = 1.05 cfs @ 16.21 hrs, Volume= 0.164 af
Primary = 1.05 cfs @ 16.21 hrs, Volume= 0.164 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs

10 YR Imported from P301-A220781Q-COMBINED.csv

Link 2L: NODE 301-10 YEAR



Hydrograph for Link 2L: NODE 301-10 YEAR

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	**0.00**	0.00	5.30	0.05	0.00	0.05
0.10	0.00	0.00	0.00	5.40	0.05	0.00	0.05
0.20	0.02	0.00	0.02	5.50	0.05	0.00	0.05
0.30	0.04	0.00	0.04	5.60	0.05	0.00	0.05
0.40	0.04	0.00	0.04	5.70	0.05	0.00	0.05
0.50	0.04	0.00	0.04	5.80	0.05	0.00	0.05
0.60	0.04	0.00	0.04	5.90	0.05	0.00	0.05
0.70	0.04	0.00	0.04	6.00	0.05	0.00	0.05
0.80	0.04	0.00	0.04	6.10	0.05	0.00	0.05
0.90	0.04	0.00	0.04	6.20	0.05	0.00	0.05
1.00	0.04	0.00	0.04	6.30	0.05	0.00	0.05
1.10	0.04	0.00	0.04	6.40	0.05	0.00	0.05
1.20	0.04	0.00	0.04	6.50	0.05	0.00	0.05
1.30	0.04	0.00	0.04	6.60	0.05	0.00	0.05
1.40	0.04	0.00	0.04	6.70	0.05	0.00	0.05
1.50	0.04	0.00	0.04	6.80	0.05	0.00	0.05
1.60	0.04	0.00	0.04	6.90	0.05	0.00	0.05
1.70	0.04	0.00	0.04	7.00	0.05	0.00	0.05
1.80	0.04	0.00	0.04	7.10	0.05	0.00	0.05
1.90	0.04	0.00	0.04	7.20	0.05	0.00	0.05
2.00	0.04	0.00	0.04	7.30	0.05	0.00	0.05
2.10	0.04	0.00	0.04	7.40	0.05	0.00	0.05
2.20	0.04	0.00	0.04	7.50	0.05	0.00	0.05
2.30	0.04	0.00	0.04	7.60	0.05	0.00	0.05
2.40	0.04	0.00	0.04	7.70	0.05	0.00	0.05
2.50	0.04	0.00	0.04	7.80	0.05	0.00	0.05
2.60	0.04	0.00	0.04	7.90	0.05	0.00	0.05
2.70	0.04	0.00	0.04	8.00	0.05	0.00	0.05
2.80	0.04	0.00	0.04	8.10	0.05	0.00	0.05
2.90	0.04	0.00	0.04	8.20	0.05	0.00	0.05
3.00	0.04	0.00	0.04	8.30	0.05	0.00	0.05
3.10	0.04	0.00	0.04	8.40	0.05	0.00	0.05
3.20	0.04	0.00	0.04	8.50	0.05	0.00	0.05
3.30	0.04	0.00	0.04	8.60	0.06	0.00	0.06
3.40	0.04	0.00	0.04	8.70	0.06	0.00	0.06
3.50	0.04	0.00	0.04	8.80	0.06	0.00	0.06
3.60	0.04	0.00	0.04	8.90	0.06	0.00	0.06
3.70	0.04	0.00	0.04	9.00	0.06	0.00	0.06
3.80	0.04	0.00	0.04	9.10	0.06	0.00	0.06
3.90	0.04	0.00	0.04	9.20	0.06	0.00	0.06
4.00	0.04	0.00	0.04	9.30	0.06	0.00	0.06
4.10	0.04	0.00	0.04	9.40	0.06	0.00	0.06
4.20	0.04	0.00	0.04	9.50	0.06	0.00	0.06
4.30	0.04	0.00	0.04	9.60	0.06	0.00	0.06
4.40	0.04	0.00	0.04	9.70	0.06	0.00	0.06
4.50	0.04	0.00	0.04	9.80	0.06	0.00	0.06
4.60	0.04	0.00	0.04	9.90	0.06	0.00	0.06
4.70	0.04	0.00	0.04	10.00	0.06	0.00	0.06
4.80	0.04	0.00	0.04	10.10	0.06	0.00	0.06
4.90	0.04	0.00	0.04	10.20	0.06	0.00	0.06
5.00	0.04	0.00	0.04	10.30	0.06	0.00	0.06
5.10	0.04	0.00	0.04	10.40	0.06	0.00	0.06
5.20	0.05	0.00	0.05	10.50	0.06	0.00	0.06

Hydrograph for Link 2L: NODE 301-10 YEAR (continued)

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
10.60	0.07	0.00	0.07	15.90	0.36	0.00	0.36
10.70	0.07	0.00	0.07	16.00	0.45	0.00	0.45
10.80	0.07	0.00	0.07	16.10	0.74	0.00	0.74
10.90	0.07	0.00	0.07	16.20	**1.05**	0.00	**1.05**
11.00	0.07	0.00	0.07	16.30	0.75	0.00	0.75
11.10	0.07	0.00	0.07	16.40	0.40	0.00	0.40
11.20	0.07	0.00	0.07	16.50	0.27	0.00	0.27
11.30	0.07	0.00	0.07	16.60	0.20	0.00	0.20
11.40	0.07	0.00	0.07	16.70	0.17	0.00	0.17
11.50	0.07	0.00	0.07	16.80	0.15	0.00	0.15
11.60	0.07	0.00	0.07	16.90	0.14	0.00	0.14
11.70	0.07	0.00	0.07	17.00	0.13	0.00	0.13
11.80	0.07	0.00	0.07	17.10	0.12	0.00	0.12
11.90	0.08	0.00	0.08	17.20	0.12	0.00	0.12
12.00	0.08	0.00	0.08	17.30	0.11	0.00	0.11
12.10	0.08	0.00	0.08	17.40	0.11	0.00	0.11
12.20	0.08	0.00	0.08	17.50	0.10	0.00	0.10
12.30	0.08	0.00	0.08	17.60	0.10	0.00	0.10
12.40	0.08	0.00	0.08	17.70	0.09	0.00	0.09
12.50	0.08	0.00	0.08	17.80	0.09	0.00	0.09
12.60	0.08	0.00	0.08	17.90	0.09	0.00	0.09
12.70	0.09	0.00	0.09	18.00	0.08	0.00	0.08
12.80	0.09	0.00	0.09	18.10	0.08	0.00	0.08
12.90	0.09	0.00	0.09	18.20	0.08	0.00	0.08
13.00	0.09	0.00	0.09	18.30	0.08	0.00	0.08
13.10	0.09	0.00	0.09	18.40	0.07	0.00	0.07
13.20	0.09	0.00	0.09	18.50	0.07	0.00	0.07
13.30	0.10	0.00	0.10	18.60	0.07	0.00	0.07
13.40	0.10	0.00	0.10	18.70	0.07	0.00	0.07
13.50	0.10	0.00	0.10	18.80	0.07	0.00	0.07
13.60	0.10	0.00	0.10	18.90	0.07	0.00	0.07
13.70	0.10	0.00	0.10	19.00	0.07	0.00	0.07
13.80	0.11	0.00	0.11	19.10	0.06	0.00	0.06
13.90	0.11	0.00	0.11	19.20	0.06	0.00	0.06
14.00	0.11	0.00	0.11	19.30	0.06	0.00	0.06
14.10	0.11	0.00	0.11	19.40	0.06	0.00	0.06
14.20	0.11	0.00	0.11	19.50	0.06	0.00	0.06
14.30	0.12	0.00	0.12	19.60	0.06	0.00	0.06
14.40	0.12	0.00	0.12	19.70	0.06	0.00	0.06
14.50	0.12	0.00	0.12	19.80	0.06	0.00	0.06
14.60	0.13	0.00	0.13	19.90	0.06	0.00	0.06
14.70	0.13	0.00	0.13	20.00	0.06	0.00	0.06
14.80	0.14	0.00	0.14	20.10	0.05	0.00	0.05
14.90	0.14	0.00	0.14	20.20	0.05	0.00	0.05
15.00	0.15	0.00	0.15	20.30	0.05	0.00	0.05
15.10	0.16	0.00	0.16	20.40	0.05	0.00	0.05
15.20	0.16	0.00	0.16	20.50	0.05	0.00	0.05
15.30	0.18	0.00	0.18	20.60	0.05	0.00	0.05
15.40	0.19	0.00	0.19	20.70	0.05	0.00	0.05
15.50	0.22	0.00	0.22	20.80	0.05	0.00	0.05
15.60	0.25	0.00	0.25	20.90	0.05	0.00	0.05
15.70	0.28	0.00	0.28	21.00	0.05	0.00	0.05
15.80	0.31	0.00	0.31	21.10	0.05	0.00	0.05

Hydrograph for Link 2L: NODE 301-10 YEAR (continued)

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
21.20	0.05	0.00	0.05
21.30	0.05	0.00	0.05
21.40	0.05	0.00	0.05
21.50	0.05	0.00	0.05
21.60	0.05	0.00	0.05
21.70	0.05	0.00	0.05
21.80	0.04	0.00	0.04
21.90	0.04	0.00	0.04
22.00	0.04	0.00	0.04
22.10	0.04	0.00	0.04
22.20	0.04	0.00	0.04
22.30	0.04	0.00	0.04
22.40	0.04	0.00	0.04
22.50	0.04	0.00	0.04
22.60	0.04	0.00	0.04
22.70	0.04	0.00	0.04
22.80	0.04	0.00	0.04
22.90	0.04	0.00	0.04
23.00	0.04	0.00	0.04
23.10	0.04	0.00	0.04
23.20	0.04	0.00	0.04
23.30	0.04	0.00	0.04
23.40	0.04	0.00	0.04
23.50	0.04	0.00	0.04
23.60	0.04	0.00	0.04
23.70	0.04	0.00	0.04
23.80	0.04	0.00	0.04
23.90	0.04	0.00	0.04
24.00	0.04	0.00	0.04
24.10	0.00	0.00	0.00
24.20	0.00	0.00	0.00
24.30	0.00	0.00	0.00
24.40	0.00	0.00	0.00
24.50	0.00	0.00	0.00
24.60	0.00	0.00	0.00
24.70	0.00	0.00	0.00
24.80	0.00	0.00	0.00
24.90	0.00	0.00	0.00
25.00	0.00	0.00	0.00
25.10	0.00	0.00	0.00
25.20	0.00	0.00	0.00
25.30	0.00	0.00	0.00
25.40	0.00	0.00	0.00
25.50	0.00	0.00	0.00
25.60	0.00	0.00	0.00
25.70	0.00	0.00	0.00
25.80	0.00	0.00	0.00
25.90	0.00	0.00	0.00
26.00	0.00	0.00	0.00
26.10	0.00	0.00	0.00
26.20	0.00	0.00	0.00
26.30	0.00	0.00	0.00
26.40	0.00	0.00	0.00
26.50	0.00	0.00	0.00
26.60	0.00	0.00	0.00
26.70	0.00	0.00	0.00
26.80	0.00	0.00	0.00
26.90	0.00	0.00	0.00
27.00	0.00	0.00	0.00
27.10	0.00	0.00	0.00
27.20	0.00	0.00	0.00
27.30	0.00	0.00	0.00
27.40	0.00	0.00	0.00
27.50	0.00	0.00	0.00
27.60	0.00	0.00	0.00
27.70	0.00	0.00	0.00
27.80	0.00	0.00	0.00
27.90	0.00	0.00	0.00
28.00	0.00	0.00	0.00

FTH STREET
WIDE PUBLIC R/W)

FIFTH STREET

BASIS OF BEARINGS

PONDING LEVEL 1171.86 FOR
10-YEAR 24-HR STORM EVENT

CB

2,450 SF

1,250 SF

PONDING LEVEL 1171.86 FOR
10-YEAR 24-HR STORM EVENT

HYDRODYNAMIC
SEPARATOR (HDS)

DIVERSION
MANHOLE

INF #1
PROPOSED
INFILTRATION/DETENTION
SYSTEM

CB

INF #2
PROPOSED
INFILTRATION/DETENTION
SYSTEM

BUBBLER

CB

PARKWAY
CULVERT

THIRD STREET
(100' WIDE PUBLIC R/W)

THIRD STREET

N87°17'19"W 2649.58'

NORTH

0 15 30 60 90

Scale 1" = 30'

LEGEND

TRIBUTARY AREA LIMITS

DIRECTION OF FLOW

NODE
AREA

NO.	REVISION	BY

REGISTERED PROFESSIONAL ENGINEER
DAVID G. READER
No. 76867
CIVIL
STATE OF CALIFORNIA

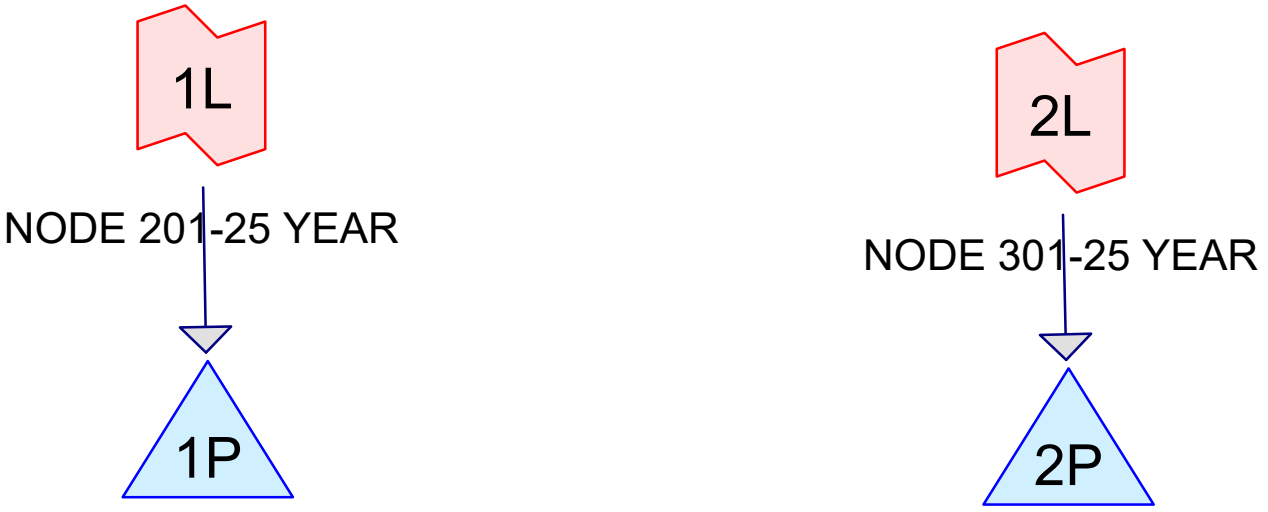
KIER+WRIGHT
163 Technology Drive
Irvine, CA 92620
Phone: (949) 508-0202
www.kierwright.com

10-YR 24-HR STORM EVENT PONDING EXHIBIT
OF
EAST BUILDING
E. 3RD STREET & CENTRAL AVENUE
FOR
CROW HOLDINGS
HIGHLAND, CALIFORNIA

DATE	JANUARY, 2023
SCALE	AS SHOWN
DESIGNER	JO
DRAWN BY	STAFF
JOB NO.	A22078-1
SHEET	

C:\Users\jmcmahon\appdata\local\temp\AcPublish_13368\A22078-1-PO-HYDRO - PONDING EXHIBIT.dwg 2-24-23 11:08:09 AM jmcmahon

25-YEAR STORM EVENT
iNFILTRATION SYSTEM



Infiltration System - CMP

INFILTRATION SYTEM INF#1

Infiltration System - CMP

INFILTRATION SYTEM INF#2

Subcat Reach Pond Link

Routing Diagram for A22078-1 EAST BUILDING - 25 YEAR-AV
Prepared by Kier + Wright, Printed 2/24/2023
HydroCAD® 10.10-5a s/n 02379 © 2020 HydroCAD Software Solutions LLC

Time span=0.00-28.00 hrs, dt=0.05 hrs, 561 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Pond 1P: Infiltration System - CMP Peak Elev=1,172.09' Storage=51,354 cf Inflow=18.67 cfs 3.088 af
Discarded=0.26 cfs 0.596 af Primary=14.24 cfs 1.443 af Outflow=14.50 cfs 2.039 af

Pond 2P: Infiltration System - CMP Peak Elev=1,170.47' Storage=2,806 cf Inflow=1.33 cfs 0.203 af
Discarded=0.02 cfs 0.046 af Primary=1.39 cfs 0.099 af Outflow=1.41 cfs 0.145 af

Link 1L: NODE 201-25 25 YR Imported from P201-A220781Q-COMBINED.csv Inflow=18.67 cfs 3.088 af
Primary=18.67 cfs 3.088 af

Link 2L: NODE 301-25 YEAR 25 YR Imported from P301-A220781Q-COMBINED.csv Inflow=1.33 cfs 0.203 af
Primary=1.33 cfs 0.203 af

Summary for Pond 1P: Infiltration System - CMP

Inflow	=	18.67 cfs @	16.24 hrs,	Volume=	3.088 af
Outflow	=	14.50 cfs @	16.31 hrs,	Volume=	2.039 af, Atten= 22%, Lag= 4.5 min
Discarded	=	0.26 cfs @	0.45 hrs,	Volume=	0.596 af
Primary	=	14.24 cfs @	16.31 hrs,	Volume=	1.443 af

Routing by Stor-Ind method, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs
Peak Elev= 1,172.09' @ 16.31 hrs Surf.Area= 19,646 sf Storage= 51,354 cf

Plug-Flow detention time= 314.3 min calculated for 2.039 af (66% of inflow)
Center-of-Mass det. time= 163.4 min (986.2 - 822.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	1,160.50'	14,521 cf	**69.00'W x 129.00'L x 8.00'H Field A** 71,208 cf Overall - 34,905 cf Embedded = 36,303 cf x 40.0% Voids
#2A	1,161.00'	34,905 cf	**CMP Round 84** x 42 Inside #1 Effective Size= 84.0"W x 84.0"H => 38.48 sf x 20.00'L = 769.7 cf Overall Size= 84.0"W x 84.0"H x 20.00'L 42 Chambers in 7 Rows 67.00' Header x 38.48 sf x 1 = 2,578.5 cf Inside
#3	1,171.50'	7,351 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)
		56,777 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,171.50	0	0	0
1,171.60	16	1	1
1,171.70	588	30	31
1,171.80	2,141	136	167
1,171.90	4,639	339	506
1,172.00	7,721	618	1,124
1,172.10	11,197	946	2,070
1,172.20	15,143	1,317	3,387
1,172.30	19,652	1,740	5,127
1,172.40	24,817	2,223	7,351

Device	Routing	Invert	Outlet Devices
#1	Device 2	1,167.00'	**27.0" Round Culvert** L= 560.0' Ke= 1.000 Inlet / Outlet Invert= 1,167.00' / 1,164.00' S= 0.0054 '/' Cc= 0.900 n= 0.013, Flow Area= 3.98 sf
#2	Primary	1,170.50'	**2.0" x 1.7" Horiz. Orifice/Grate X 115.00** C= 0.600 in 36.0" x 36.0" Grate (30% open area) Limited to weir flow at low heads
#3	Discarded	1,160.50'	**0.26 cfs Exfiltration at all elevations**

Discarded OutFlow Max=0.26 cfs @ 0.45 hrs HW=1,160.63' (Free Discharge)
└**3=Exfiltration** (Exfiltration Controls 0.26 cfs)

Primary OutFlow Max=14.22 cfs @ 16.31 hrs HW=1,172.08' TW=1,170.50' (Fixed TW Elev= 1,170.50')
└**2=Orifice/Grate** (Passes 14.22 cfs of 16.44 cfs potential flow)
└**1=Culvert** (Outlet Controls 14.22 cfs @ 3.58 fps)

Peak flow with mitigation with infiltration system

Bubbler outlet elevation

Pond 1P: Infiltration System - CMP - Chamber Wizard Field A

Chamber Model = CMP Round 84 (Round Corrugated Metal Pipe)
Effective Size= 84.0"W x 84.0"H => 38.48 sf x 20.00'L = 769.7 cf
Overall Size= 84.0"W x 84.0"H x 20.00'L

84.0" Wide + 36.0" Spacing = 120.0" C-C Row Spacing

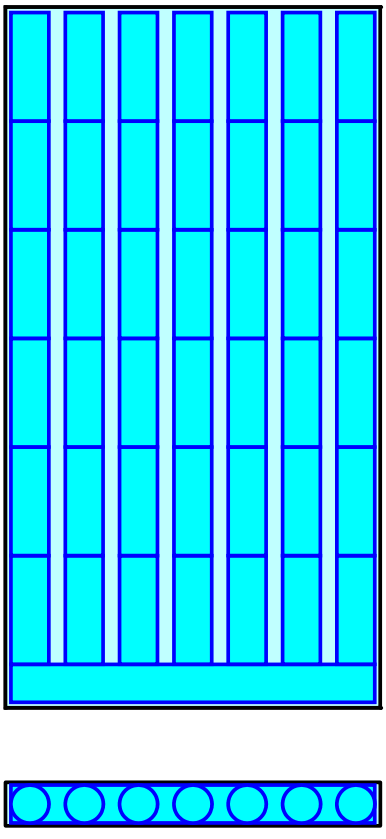
6 Chambers/Row x 20.00' Long +7.00' Header x 1 = 127.00' Row Length +12.0" End Stone x 2 = 129.00' Base Length
7 Rows x 84.0" Wide + 36.0" Spacing x 6 + 12.0" Side Stone x 2 = 69.00' Base Width
6.0" Stone Base + 84.0" Chamber Height + 6.0" Stone Cover = 8.00' Field Height

42 Chambers x 769.7 cf + 67.00' Header x 38.48 sf = 34,905.5 cf Chamber Storage

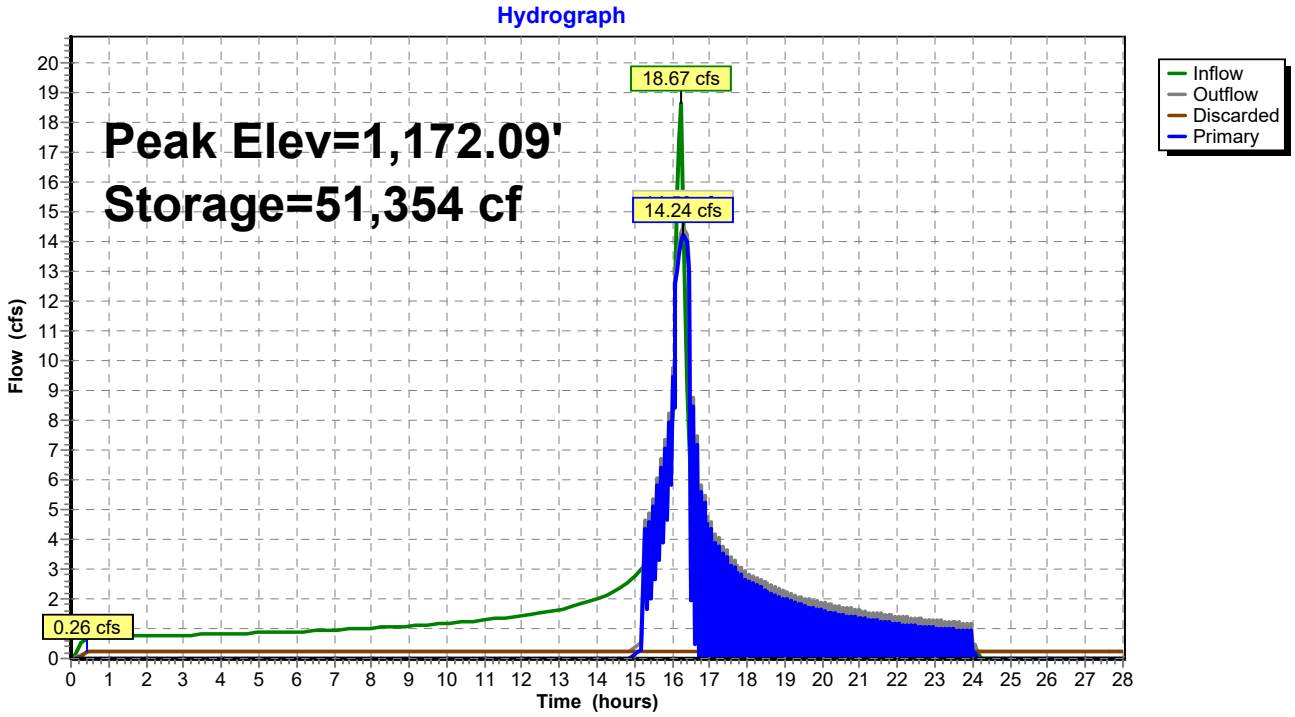
71,208.0 cf Field - 34,905.5 cf Chambers = 36,302.5 cf Stone x 40.0% Voids = 14,521.0 cf Stone Storage

Chamber Storage + Stone Storage = 49,426.5 cf = 1.135 af
Overall Storage Efficiency = 69.4%
Overall System Size = 129.00' x 69.00' x 8.00'

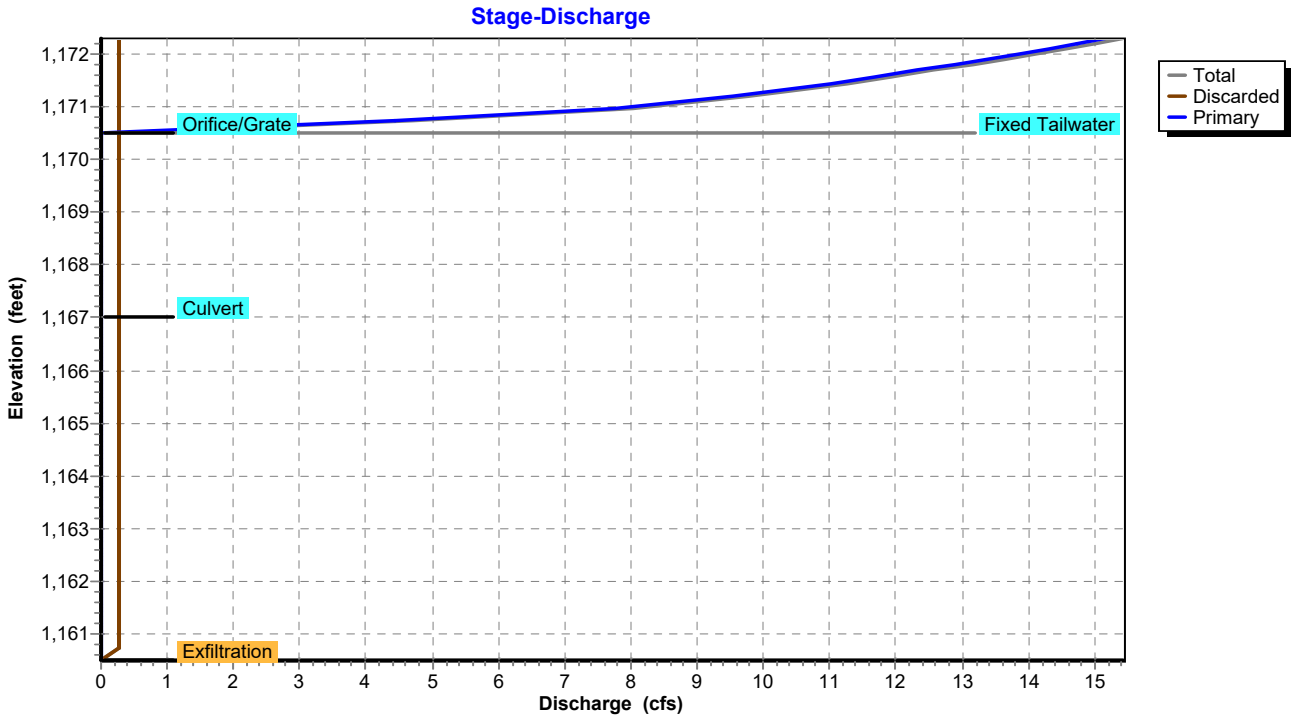
42 Chambers
2,637.3 cy Field
1,344.5 cy Stone



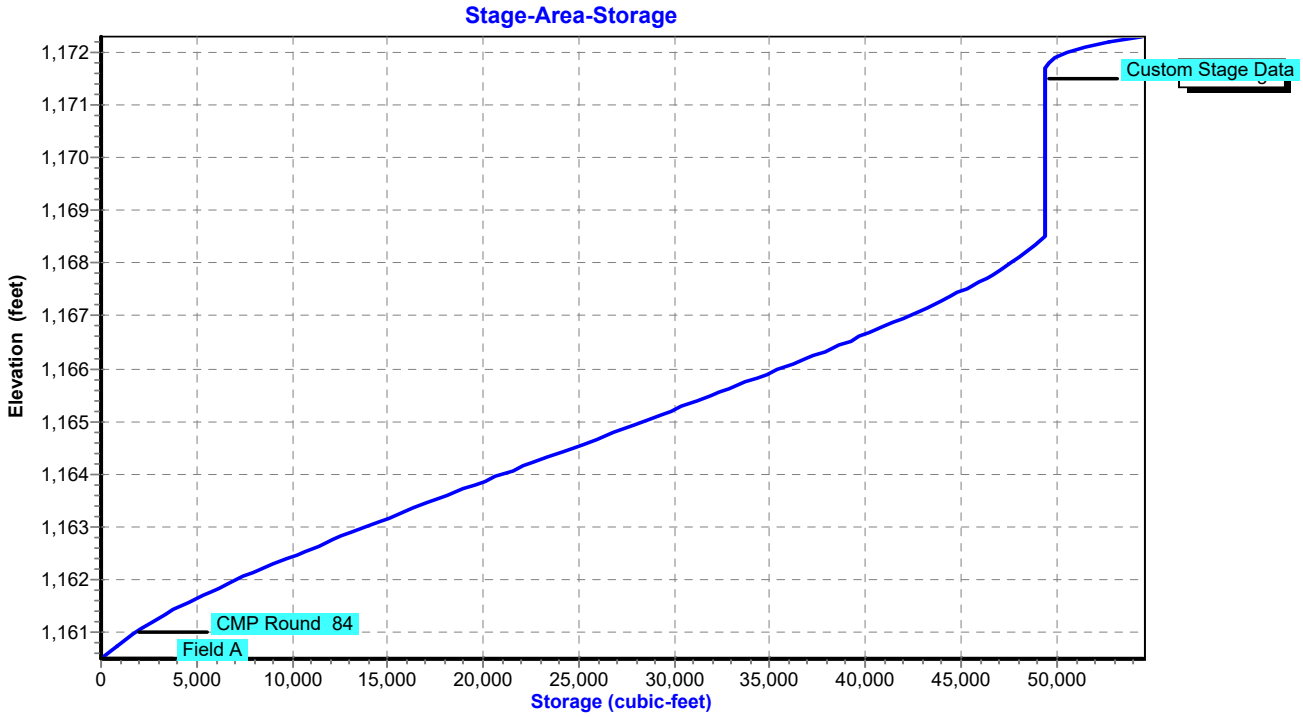
Pond 1P: Infiltration System - CMP



Pond 1P: Infiltration System - CMP



Pond 1P: Infiltration System - CMP



Hydrograph for Pond 1P: Infiltration System - CMP

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
0.00	0.00	0	1,160.50	0.00	0.00	0.00
0.10	0.07	6	1,160.50	0.00	0.00	0.00
0.20	0.32	65	1,160.52	0.04	0.04	0.00
0.30	0.58	205	1,160.56	0.13	0.13	0.00
0.40	0.68	372	1,160.60	0.23	**0.23**	0.00
0.50	0.71	532	1,160.65	0.26	**0.26**	0.00
0.60	0.72	696	1,160.70	0.26	0.26	0.00
0.70	0.72	862	1,160.74	0.26	0.26	0.00
0.80	0.72	1,027	1,160.79	0.26	0.26	0.00
0.90	0.73	1,194	1,160.84	0.26	0.26	0.00
1.00	0.73	1,363	1,160.88	0.26	0.26	0.00
1.10	0.73	1,532	1,160.93	0.26	0.26	0.00
1.20	0.73	1,701	1,160.98	0.26	0.26	0.00
1.30	0.74	1,871	1,161.02	0.26	0.26	0.00
1.40	0.74	2,044	1,161.07	0.26	0.26	0.00
1.50	0.74	2,216	1,161.10	0.26	0.26	0.00
1.60	0.74	2,389	1,161.14	0.26	0.26	0.00
1.70	0.74	2,562	1,161.18	0.26	0.26	0.00
1.80	0.75	2,738	1,161.22	0.26	0.26	0.00
1.90	0.75	2,915	1,161.25	0.26	0.26	0.00
2.00	0.75	3,091	1,161.29	0.26	0.26	0.00
2.10	0.76	3,269	1,161.32	0.26	0.26	0.00
2.20	0.76	3,449	1,161.36	0.26	0.26	0.00
2.30	0.76	3,629	1,161.39	0.26	0.26	0.00
2.40	0.77	3,810	1,161.42	0.26	0.26	0.00
2.50	0.77	3,994	1,161.46	0.26	0.26	0.00
2.60	0.77	4,177	1,161.49	0.26	0.26	0.00
2.70	0.77	4,361	1,161.52	0.26	0.26	0.00
2.80	0.78	4,548	1,161.56	0.26	0.26	0.00
2.90	0.78	4,735	1,161.59	0.26	0.26	0.00
3.00	0.78	4,922	1,161.62	0.26	0.26	0.00
3.10	0.79	5,112	1,161.66	0.26	0.26	0.00
3.20	0.79	5,302	1,161.69	0.26	0.26	0.00
3.30	0.80	5,494	1,161.72	0.26	0.26	0.00
3.40	0.80	5,688	1,161.76	0.26	0.26	0.00
3.50	0.80	5,882	1,161.79	0.26	0.26	0.00
3.60	0.80	6,077	1,161.82	0.26	0.26	0.00
3.70	0.81	6,274	1,161.85	0.26	0.26	0.00
3.80	0.81	6,472	1,161.89	0.26	0.26	0.00
3.90	0.82	6,671	1,161.92	0.26	0.26	0.00
4.00	0.82	6,872	1,161.95	0.26	0.26	0.00
4.10	0.82	7,074	1,161.98	0.26	0.26	0.00
4.20	0.82	7,276	1,162.02	0.26	0.26	0.00
4.30	0.83	7,480	1,162.05	0.26	0.26	0.00
4.40	0.83	7,686	1,162.08	0.26	0.26	0.00
4.50	0.84	7,892	1,162.11	0.26	0.26	0.00
4.60	0.84	8,101	1,162.15	0.26	0.26	0.00
4.70	0.84	8,310	1,162.18	0.26	0.26	0.00
4.80	0.85	8,522	1,162.21	0.26	0.26	0.00
4.90	0.85	8,735	1,162.25	0.26	0.26	0.00
5.00	0.86	8,949	1,162.28	0.26	0.26	0.00
5.10	0.86	9,165	1,162.31	0.26	0.26	0.00
5.20	0.86	9,381	1,162.34	0.26	0.26	0.00

Hydrograph for Pond 1P: Infiltration System - CMP (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
5.30	0.87	9,600	1,162.38	0.26	0.26	0.00
5.40	0.87	9,820	1,162.41	0.26	0.26	0.00
5.50	0.88	10,041	1,162.44	0.26	0.26	0.00
5.60	0.88	10,264	1,162.48	0.26	0.26	0.00
5.70	0.89	10,490	1,162.51	0.26	0.26	0.00
5.80	0.89	10,717	1,162.55	0.26	0.26	0.00
5.90	0.90	10,945	1,162.58	0.26	0.26	0.00
6.00	0.90	11,175	1,162.61	0.26	0.26	0.00
6.10	0.91	11,407	1,162.65	0.26	0.26	0.00
6.20	0.91	11,641	1,162.68	0.26	0.26	0.00
6.30	0.92	11,876	1,162.72	0.26	0.26	0.00
6.40	0.92	12,113	1,162.75	0.26	0.26	0.00
6.50	0.93	12,352	1,162.79	0.26	0.26	0.00
6.60	0.93	12,594	1,162.82	0.26	0.26	0.00
6.70	0.93	12,835	1,162.86	0.26	0.26	0.00
6.80	0.94	13,079	1,162.89	0.26	0.26	0.00
6.90	0.95	13,325	1,162.93	0.26	0.26	0.00
7.00	0.95	13,573	1,162.96	0.26	0.26	0.00
7.10	0.96	13,824	1,163.00	0.26	0.26	0.00
7.20	0.96	14,076	1,163.03	0.26	0.26	0.00
7.30	0.97	14,331	1,163.07	0.26	0.26	0.00
7.40	0.98	14,588	1,163.11	0.26	0.26	0.00
7.50	0.98	14,847	1,163.14	0.26	0.26	0.00
7.60	0.99	15,108	1,163.18	0.26	0.26	0.00
7.70	0.99	15,371	1,163.22	0.26	0.26	0.00
7.80	1.00	15,637	1,163.25	0.26	0.26	0.00
7.90	1.01	15,905	1,163.29	0.26	0.26	0.00
8.00	1.01	16,174	1,163.33	0.26	0.26	0.00
8.10	1.02	16,446	1,163.37	0.26	0.26	0.00
8.20	1.02	16,720	1,163.41	0.26	0.26	0.00
8.30	1.04	16,998	1,163.44	0.26	0.26	0.00
8.40	1.04	17,278	1,163.48	0.26	0.26	0.00
8.50	1.05	17,560	1,163.52	0.26	0.26	0.00
8.60	1.05	17,845	1,163.56	0.26	0.26	0.00
8.70	1.06	18,132	1,163.60	0.26	0.26	0.00
8.80	1.07	18,423	1,163.64	0.26	0.26	0.00
8.90	1.08	18,716	1,163.68	0.26	0.26	0.00
9.00	1.09	19,013	1,163.72	0.26	0.26	0.00
9.10	1.09	19,312	1,163.76	0.26	0.26	0.00
9.20	1.10	19,613	1,163.81	0.26	0.26	0.00
9.30	1.11	19,919	1,163.85	0.26	0.26	0.00
9.40	1.12	20,226	1,163.89	0.26	0.26	0.00
9.50	1.13	20,537	1,163.93	0.26	0.26	0.00
9.60	1.14	20,852	1,163.98	0.26	0.26	0.00
9.70	1.14	21,169	1,164.02	0.26	0.26	0.00
9.80	1.16	21,490	1,164.06	0.26	0.26	0.00
9.90	1.17	21,814	1,164.11	0.26	0.26	0.00
10.00	1.18	22,143	1,164.15	0.26	0.26	0.00
10.10	1.19	22,477	1,164.20	0.26	0.26	0.00
10.20	1.19	22,812	1,164.24	0.26	0.26	0.00
10.30	1.21	23,150	1,164.29	0.26	0.26	0.00
10.40	1.22	23,493	1,164.33	0.26	0.26	0.00
10.50	1.23	23,840	1,164.38	0.26	0.26	0.00

Hydrograph for Pond 1P: Infiltration System - CMP (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
10.60	1.24	24,191	1,164.43	0.26	0.26	0.00
10.70	1.25	24,547	1,164.48	0.26	0.26	0.00
10.80	1.27	24,907	1,164.53	0.26	0.26	0.00
10.90	1.28	25,271	1,164.58	0.26	0.26	0.00
11.00	1.29	25,640	1,164.63	0.26	0.26	0.00
11.10	1.30	26,013	1,164.68	0.26	0.26	0.00
11.20	1.32	26,393	1,164.73	0.26	0.26	0.00
11.30	1.34	26,778	1,164.78	0.26	0.26	0.00
11.40	1.35	27,168	1,164.83	0.26	0.26	0.00
11.50	1.37	27,563	1,164.89	0.26	0.26	0.00
11.60	1.38	27,965	1,164.94	0.26	0.26	0.00
11.70	1.40	28,371	1,165.00	0.26	0.26	0.00
11.80	1.42	28,785	1,165.05	0.26	0.26	0.00
11.90	1.44	29,204	1,165.11	0.26	0.26	0.00
12.00	1.45	29,630	1,165.17	0.26	0.26	0.00
12.10	1.46	30,061	1,165.23	0.26	0.26	0.00
12.20	1.47	30,496	1,165.29	0.26	0.26	0.00
12.30	1.48	30,934	1,165.35	0.26	0.26	0.00
12.40	1.50	31,376	1,165.41	0.26	0.26	0.00
12.50	1.52	31,825	1,165.47	0.26	0.26	0.00
12.60	1.54	32,283	1,165.54	0.26	0.26	0.00
12.70	1.57	32,749	1,165.60	0.26	0.26	0.00
12.80	1.59	33,225	1,165.67	0.26	0.26	0.00
12.90	1.62	33,708	1,165.73	0.26	0.26	0.00
13.00	1.64	34,201	1,165.80	0.26	0.26	0.00
13.10	1.67	34,704	1,165.87	0.26	0.26	0.00
13.20	1.70	35,218	1,165.95	0.26	0.26	0.00
13.30	1.73	35,743	1,166.02	0.26	0.26	0.00
13.40	1.76	36,278	1,166.10	0.26	0.26	0.00
13.50	1.80	36,826	1,166.18	0.26	0.26	0.00
13.60	1.84	37,387	1,166.26	0.26	0.26	0.00
13.70	1.88	37,961	1,166.34	0.26	0.26	0.00
13.80	1.92	38,551	1,166.43	0.26	0.26	0.00
13.90	1.96	39,155	1,166.52	0.26	0.26	0.00
14.00	2.01	39,777	1,166.61	0.26	0.26	0.00
14.10	2.06	40,415	1,166.71	0.26	0.26	0.00
14.20	2.10	41,071	1,166.81	0.26	0.26	0.00
14.30	2.14	41,741	1,166.92	0.26	0.26	0.00
14.40	2.21	42,430	1,167.03	0.26	0.26	0.00
14.50	2.27	43,143	1,167.15	0.26	0.26	0.00
14.60	2.35	43,881	1,167.27	0.26	0.26	0.00
14.70	2.43	44,648	1,167.40	0.26	0.26	0.00
14.80	2.53	45,447	1,167.54	0.26	0.26	0.00
14.90	2.63	46,282	1,167.70	0.26	0.26	0.00
15.00	2.75	47,157	1,167.88	0.26	0.26	0.00
15.10	2.88	48,077	1,168.12	0.26	0.26	0.00
15.20	3.04	49,049	1,168.39	0.26	0.26	0.00
15.30	3.22	49,426	1,170.73	4.64	0.26	4.38
15.40	3.46	49,426	1,170.74	4.88	0.26	4.62
15.50	3.95	49,426	1,170.77	5.37	0.26	5.11
15.60	4.66	49,426	1,170.81	6.09	0.26	5.83
15.70	5.28	49,426	1,170.84	6.70	0.26	6.44
15.80	5.92	49,426	1,170.89	7.34	0.26	7.08

Hydrograph for Pond 1P: Infiltration System - CMP (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
15.90	6.81	49,426	1,171.00	8.23	0.26	7.97
16.00	8.34	49,426	1,171.21	9.76	0.26	9.50
16.10	12.33	49,509	1,171.74	12.84	0.26	12.58
16.20	**17.38**	50,191	1,171.95	13.85	0.26	13.59
16.30	**15.26**	**51,343**	**1,172.08**	**14.49**	0.26	**14.23**
16.40	9.35	50,570	1,172.00	14.12	0.26	13.86
16.50	5.86	49,426	1,170.63	2.20	0.26	1.94
16.60	4.38	49,426	1,170.53	0.72	0.26	0.46
16.70	3.42	49,382	1,168.49	0.26	0.26	0.00
16.80	2.99	49,426	1,170.50	0.32	0.26	0.06
16.90	2.69	49,405	1,168.49	0.26	0.26	0.00
17.00	2.48	49,426	1,170.50	0.28	0.26	0.02
17.10	2.32	49,413	1,168.50	0.26	0.26	0.00
17.20	2.18	49,426	1,170.50	0.27	0.26	0.01
17.30	2.08	49,418	1,168.50	0.26	0.26	0.00
17.40	1.99	49,426	1,168.50	0.26	0.26	0.00
17.50	1.89	49,418	1,168.50	0.26	0.26	0.00
17.60	1.82	49,426	1,170.50	0.28	0.26	0.02
17.70	1.75	49,422	1,168.50	0.26	0.26	0.00
17.80	1.68	49,425	1,168.50	0.26	0.26	0.00
17.90	1.63	49,423	1,168.50	0.26	0.26	0.00
18.00	1.57	49,425	1,168.50	0.26	0.26	0.00
18.10	1.53	49,425	1,168.50	0.26	0.26	0.00
18.20	1.50	49,425	1,168.50	0.26	0.26	0.00
18.30	1.47	49,425	1,168.50	0.26	0.26	0.00
18.40	1.44	49,425	1,168.50	0.26	0.26	0.00
18.50	1.40	49,425	1,168.50	0.26	0.26	0.00
18.60	1.37	49,426	1,168.50	0.26	0.26	0.00
18.70	1.34	49,424	1,168.50	0.26	0.26	0.00
18.80	1.31	49,426	1,168.50	0.26	0.26	0.00
18.90	1.28	49,425	1,168.50	0.26	0.26	0.00
19.00	1.26	49,426	1,168.50	0.26	0.26	0.00
19.10	1.24	49,425	1,168.50	0.26	0.26	0.00
19.20	1.21	49,426	1,168.50	0.26	0.26	0.00
19.30	1.19	49,425	1,168.50	0.26	0.26	0.00
19.40	1.17	49,426	1,170.50	0.26	0.26	0.00
19.50	1.15	49,425	1,168.50	0.26	0.26	0.00
19.60	1.14	49,426	1,170.50	0.26	0.26	0.00
19.70	1.12	49,425	1,168.50	0.26	0.26	0.00
19.80	1.10	49,426	1,168.50	0.26	0.26	0.00
19.90	1.08	49,425	1,168.50	0.26	0.26	0.00
20.00	1.07	49,426	1,170.50	0.26	0.26	0.00
20.10	1.05	49,425	1,168.50	0.26	0.26	0.00
20.20	1.04	49,426	1,170.50	0.27	0.26	0.01
20.30	1.02	49,426	1,168.50	0.26	0.26	0.00
20.40	1.01	49,426	1,168.50	0.26	0.26	0.00
20.50	1.00	49,426	1,168.50	0.26	0.26	0.00
20.60	0.99	49,426	1,168.50	0.26	0.26	0.00
20.70	0.98	49,426	1,168.50	0.26	0.26	0.00
20.80	0.96	49,426	1,168.50	0.26	0.26	0.00
20.90	0.95	49,426	1,168.50	0.26	0.26	0.00
21.00	0.94	49,426	1,168.50	0.26	0.26	0.00
21.10	0.93	49,426	1,168.50	0.26	0.26	0.00

Hydrograph for Pond 1P: Infiltration System - CMP (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
21.20	0.92	49,426	1,168.50	0.26	0.26	0.00
21.30	0.90	49,426	1,168.50	0.26	0.26	0.00
21.40	0.90	49,426	1,170.50	0.26	0.26	0.00
21.50	0.89	49,426	1,168.50	0.26	0.26	0.00
21.60	0.88	49,426	1,168.50	0.26	0.26	0.00
21.70	0.87	49,426	1,168.50	0.26	0.26	0.00
21.80	0.86	49,426	1,168.50	0.26	0.26	0.00
21.90	0.85	49,425	1,168.50	0.26	0.26	0.00
22.00	0.85	49,426	1,170.50	0.27	0.26	0.01
22.10	0.84	49,426	1,168.50	0.26	0.26	0.00
22.20	0.83	49,426	1,168.50	0.26	0.26	0.00
22.30	0.82	49,426	1,168.50	0.26	0.26	0.00
22.40	0.81	49,425	1,168.50	0.26	0.26	0.00
22.50	0.81	49,426	1,170.50	0.27	0.26	0.01
22.60	0.80	49,426	1,168.50	0.26	0.26	0.00
22.70	0.80	49,426	1,168.50	0.26	0.26	0.00
22.80	0.79	49,426	1,168.50	0.26	0.26	0.00
22.90	0.78	49,426	1,168.50	0.26	0.26	0.00
23.00	0.78	49,426	1,170.50	0.26	0.26	0.00
23.10	0.77	49,426	1,168.50	0.26	0.26	0.00
23.20	0.77	49,426	1,170.50	0.26	0.26	0.00
23.30	0.76	49,426	1,168.50	0.26	0.26	0.00
23.40	0.75	49,426	1,168.50	0.26	0.26	0.00
23.50	0.75	49,426	1,170.50	0.26	0.26	0.00
23.60	0.74	49,426	1,168.50	0.26	0.26	0.00
23.70	0.74	49,426	1,170.50	0.26	0.26	0.00
23.80	0.73	49,426	1,168.50	0.26	0.26	0.00
23.90	0.72	49,426	1,168.50	0.26	0.26	0.00
24.00	0.72	49,426	1,170.50	0.26	0.26	0.00
24.10	0.00	49,362	1,168.48	0.26	0.26	0.00
24.20	0.00	49,268	1,168.46	0.26	0.26	0.00
24.30	0.00	49,175	1,168.43	0.26	0.26	0.00
24.40	0.00	49,081	1,168.40	0.26	0.26	0.00
24.50	0.00	48,988	1,168.38	0.26	0.26	0.00
24.60	0.00	48,894	1,168.35	0.26	0.26	0.00
24.70	0.00	48,800	1,168.32	0.26	0.26	0.00
24.80	0.00	48,707	1,168.30	0.26	0.26	0.00
24.90	0.00	48,613	1,168.27	0.26	0.26	0.00
25.00	0.00	48,520	1,168.25	0.26	0.26	0.00
25.10	0.00	48,426	1,168.22	0.26	0.26	0.00
25.20	0.00	48,332	1,168.19	0.26	0.26	0.00
25.30	0.00	48,239	1,168.17	0.26	0.26	0.00
25.40	0.00	48,145	1,168.14	0.26	0.26	0.00
25.50	0.00	48,052	1,168.11	0.26	0.26	0.00
25.60	0.00	47,958	1,168.09	0.26	0.26	0.00
25.70	0.00	47,864	1,168.06	0.26	0.26	0.00
25.80	0.00	47,771	1,168.03	0.26	0.26	0.00
25.90	0.00	47,677	1,168.01	0.26	0.26	0.00
26.00	0.00	47,584	1,167.99	0.26	0.26	0.00
26.10	0.00	47,490	1,167.96	0.26	0.26	0.00
26.20	0.00	47,396	1,167.94	0.26	0.26	0.00
26.30	0.00	47,303	1,167.92	0.26	0.26	0.00
26.40	0.00	47,209	1,167.90	0.26	0.26	0.00

Hydrograph for Pond 1P: Infiltration System - CMP (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
26.50	0.00	47,116	1,167.87	0.26	0.26	0.00
26.60	0.00	47,022	1,167.85	0.26	0.26	0.00
26.70	0.00	46,928	1,167.83	0.26	0.26	0.00
26.80	0.00	46,835	1,167.82	0.26	0.26	0.00
26.90	0.00	46,741	1,167.80	0.26	0.26	0.00
27.00	0.00	46,648	1,167.78	0.26	0.26	0.00
27.10	0.00	46,554	1,167.76	0.26	0.26	0.00
27.20	0.00	46,460	1,167.74	0.26	0.26	0.00
27.30	0.00	46,367	1,167.72	0.26	0.26	0.00
27.40	0.00	46,273	1,167.70	0.26	0.26	0.00
27.50	0.00	46,180	1,167.68	0.26	0.26	0.00
27.60	0.00	46,086	1,167.67	0.26	0.26	0.00
27.70	0.00	45,992	1,167.65	0.26	0.26	0.00
27.80	0.00	45,899	1,167.63	0.26	0.26	0.00
27.90	0.00	45,805	1,167.61	0.26	0.26	0.00
28.00	0.00	45,712	1,167.59	0.26	0.26	0.00

Stage-Discharge for Pond 1P: Infiltration System - CMP

Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)	Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)
1,160.50	0.00	**0.00**	0.00	1,165.80	0.26	0.26	0.00
1,160.60	0.26	**0.26**	0.00	1,165.90	0.26	0.26	0.00
1,160.70	0.26	0.26	0.00	1,166.00	0.26	0.26	0.00
1,160.80	0.26	0.26	0.00	1,166.10	0.26	0.26	0.00
1,160.90	0.26	0.26	0.00	1,166.20	0.26	0.26	0.00
1,161.00	0.26	0.26	0.00	1,166.30	0.26	0.26	0.00
1,161.10	0.26	0.26	0.00	1,166.40	0.26	0.26	0.00
1,161.20	0.26	0.26	0.00	1,166.50	0.26	0.26	0.00
1,161.30	0.26	0.26	0.00	1,166.60	0.26	0.26	0.00
1,161.40	0.26	0.26	0.00	1,166.70	0.26	0.26	0.00
1,161.50	0.26	0.26	0.00	1,166.80	0.26	0.26	0.00
1,161.60	0.26	0.26	0.00	1,166.90	0.26	0.26	0.00
1,161.70	0.26	0.26	0.00	1,167.00	0.26	0.26	0.00
1,161.80	0.26	0.26	0.00	1,167.10	0.26	0.26	0.00
1,161.90	0.26	0.26	0.00	1,167.20	0.26	0.26	0.00
1,162.00	0.26	0.26	0.00	1,167.30	0.26	0.26	0.00
1,162.10	0.26	0.26	0.00	1,167.40	0.26	0.26	0.00
1,162.20	0.26	0.26	0.00	1,167.50	0.26	0.26	0.00
1,162.30	0.26	0.26	0.00	1,167.60	0.26	0.26	0.00
1,162.40	0.26	0.26	0.00	1,167.70	0.26	0.26	0.00
1,162.50	0.26	0.26	0.00	1,167.80	0.26	0.26	0.00
1,162.60	0.26	0.26	0.00	1,167.90	0.26	0.26	0.00
1,162.70	0.26	0.26	0.00	1,168.00	0.26	0.26	0.00
1,162.80	0.26	0.26	0.00	1,168.10	0.26	0.26	0.00
1,162.90	0.26	0.26	0.00	1,168.20	0.26	0.26	0.00
1,163.00	0.26	0.26	0.00	1,168.30	0.26	0.26	0.00
1,163.10	0.26	0.26	0.00	1,168.40	0.26	0.26	0.00
1,163.20	0.26	0.26	0.00	1,168.50	0.26	0.26	0.00
1,163.30	0.26	0.26	0.00	1,168.60	0.26	0.26	0.00
1,163.40	0.26	0.26	0.00	1,168.70	0.26	0.26	0.00
1,163.50	0.26	0.26	0.00	1,168.80	0.26	0.26	0.00
1,163.60	0.26	0.26	0.00	1,168.90	0.26	0.26	0.00
1,163.70	0.26	0.26	0.00	1,169.00	0.26	0.26	0.00
1,163.80	0.26	0.26	0.00	1,169.10	0.26	0.26	0.00
1,163.90	0.26	0.26	0.00	1,169.20	0.26	0.26	0.00
1,164.00	0.26	0.26	0.00	1,169.30	0.26	0.26	0.00
1,164.10	0.26	0.26	0.00	1,169.40	0.26	0.26	0.00
1,164.20	0.26	0.26	0.00	1,169.50	0.26	0.26	0.00
1,164.30	0.26	0.26	0.00	1,169.60	0.26	0.26	0.00
1,164.40	0.26	0.26	0.00	1,169.70	0.26	0.26	0.00
1,164.50	0.26	0.26	0.00	1,169.80	0.26	0.26	0.00
1,164.60	0.26	0.26	0.00	1,169.90	0.26	0.26	0.00
1,164.70	0.26	0.26	0.00	1,170.00	0.26	0.26	0.00
1,164.80	0.26	0.26	0.00	1,170.10	0.26	0.26	0.00
1,164.90	0.26	0.26	0.00	1,170.20	0.26	0.26	0.00
1,165.00	0.26	0.26	0.00	1,170.30	0.26	0.26	0.00
1,165.10	0.26	0.26	0.00	1,170.40	0.26	0.26	0.00
1,165.20	0.26	0.26	0.00	1,170.50	0.26	0.26	0.00
1,165.30	0.26	0.26	0.00	1,170.60	1.50	0.26	1.24
1,165.40	0.26	0.26	0.00	1,170.70	3.77	0.26	3.51
1,165.50	0.26	0.26	0.00	1,170.80	6.45	0.26	6.19
1,165.60	0.26	0.26	0.00	1,170.90	7.41	0.26	7.15
1,165.70	0.26	0.26	0.00	1,171.00	8.25	0.26	7.99

Stage-Discharge for Pond 1P: Infiltration System - CMP (continued)

Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)
1,171.10	9.02	0.26	8.76
1,171.20	9.72	0.26	9.46
1,171.30	10.37	0.26	10.11
1,171.40	10.99	0.26	10.73
1,171.50	11.57	0.26	11.31
1,171.60	12.12	0.26	11.86
1,171.70	12.64	0.26	12.38
1,171.80	13.15	0.26	12.89
1,171.90	13.64	0.26	13.38
1,172.00	14.11	0.26	13.85
1,172.10	14.56	0.26	14.30
1,172.20	15.00	0.26	14.74
1,172.30	15.43	0.26	15.17
1,172.40	**15.84**	0.26	**15.58**

Stage-Area-Storage for Pond 1P: Infiltration System - CMP

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
1,160.50	0	1,165.80	34,178	1,171.10	49,426
1,160.60	356	1,165.90	34,885	1,171.20	49,426
1,160.70	712	1,166.00	35,588	1,171.30	49,426
1,160.80	1,068	1,166.10	36,285	1,171.40	49,426
1,160.90	1,424	1,166.20	36,977	1,171.50	49,426
1,161.00	1,780	1,166.30	37,663	1,171.60	49,427
1,161.10	2,196	1,166.40	38,343	1,171.70	49,457
1,161.20	2,662	1,166.50	39,015	1,171.80	49,594
1,161.30	3,160	1,166.60	39,680	1,171.90	49,933
1,161.40	3,682	1,166.70	40,336	1,172.00	50,551
1,161.50	4,224	1,166.80	40,984	1,172.10	51,497
1,161.60	4,785	1,166.90	41,623	1,172.20	52,814
1,161.70	5,362	1,167.00	42,251	1,172.30	54,554
1,161.80	5,954	1,167.10	42,868	1,172.40	**56,777**
1,161.90	6,559	1,167.20	43,472		
1,162.00	7,176	1,167.30	44,064		
1,162.10	7,804	1,167.40	44,641		
1,162.20	8,442	1,167.50	45,202		
1,162.30	9,090	1,167.60	45,745		
1,162.40	9,747	1,167.70	46,267		
1,162.50	10,411	1,167.80	46,764		
1,162.60	11,084	1,167.90	47,229		
1,162.70	11,763	1,168.00	47,646		
1,162.80	12,449	1,168.10	48,002		
1,162.90	13,141	1,168.20	48,358		
1,163.00	13,839	1,168.30	48,714		
1,163.10	14,541	1,168.40	49,070		
1,163.20	15,249	1,168.50	49,426		
1,163.30	15,961	1,168.60	49,426		
1,163.40	16,676	1,168.70	49,426		
1,163.50	17,396	1,168.80	49,426		
1,163.60	18,119	1,168.90	49,426		
1,163.70	18,844	1,169.00	49,426		
1,163.80	19,572	1,169.10	49,426		
1,163.90	20,303	1,169.20	49,426		
1,164.00	21,035	1,169.30	49,426		
1,164.10	21,769	1,169.40	49,426		
1,164.20	22,504	1,169.50	49,426		
1,164.30	23,240	1,169.60	49,426		
1,164.40	23,976	1,169.70	49,426		
1,164.50	24,713	1,169.80	49,426		
1,164.60	25,450	1,169.90	49,426		
1,164.70	26,187	1,170.00	49,426		
1,164.80	26,923	1,170.10	49,426		
1,164.90	27,658	1,170.20	49,426		
1,165.00	28,392	1,170.30	49,426		
1,165.10	29,124	1,170.40	49,426		
1,165.20	29,854	1,170.50	49,426		
1,165.30	30,582	1,170.60	49,426		
1,165.40	31,308	1,170.70	49,426		
1,165.50	32,031	1,170.80	49,426		
1,165.60	32,750	1,170.90	49,426		
1,165.70	33,466	1,171.00	49,426		

Summary for Pond 2P: Infiltration System - CMP

Inflow	=	1.33 cfs @	16.21 hrs, Volume=	0.203 af
Outflow	=	1.41 cfs @	16.25 hrs, Volume=	0.145 af, Atten= 0%, Lag= 2.6 min
Discarded	=	0.02 cfs @	0.40 hrs, Volume=	0.046 af
Primary	=	1.39 cfs @	16.25 hrs, Volume=	0.099 af

Routing by Stor-Ind method, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs
Peak Elev= 1,170.47' @ 16.25 hrs Surf.Area= 578 sf Storage= 2,806 cf

Plug-Flow detention time= 274.9 min calculated for 0.145 af (71% of inflow)
Center-of-Mass det. time= 149.0 min (971.5 - 822.6)

Volume	Invert	Avail.Storage	Storage Description
#1A	1,161.00'	827 cf	**17.00'W x 34.00'L x 7.00'H Field A** 4,046 cf Overall - 1,979 cf Embedded = 2,067 cf x 40.0% Voids
#2A	1,161.50'	1,979 cf	**CMP Round 72** x 2 Inside #1 Effective Size= 72.0"W x 72.0"H => 28.27 sf x 20.00'L = 565.5 cf Overall Size= 72.0"W x 72.0"H x 20.00'L 2 Chambers in 2 Rows 15.00' Header x 28.27 sf x 2 = 848.2 cf Inside
		2,806 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	1,166.00'	**18.0" Round Culvert** L= 54.0' Ke= 1.000 Inlet / Outlet Invert= 1,165.60' / 1,166.00' S= -0.0074 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#2	Discarded	1,161.00'	**0.02 cfs Exfiltration at all elevations**

Discarded OutFlow Max=0.02 cfs @ 0.40 hrs HW=1,161.11' (Free Discharge)
└**2=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=1.65 cfs @ 16.25 hrs HW=1,170.47' TW=1,170.40' (Fixed TW Elev= 1,170.40')
└**1=Culvert** (Inlet Controls 1.65 cfs @ 0.93 fps)

Peak flow with mitigation with infiltration system

Overflow elevation at driveway

Pond 2P: Infiltration System - CMP - Chamber Wizard Field A

Chamber Model = CMP Round 72 (Round Corrugated Metal Pipe)
Effective Size= 72.0"W x 72.0"H => 28.27 sf x 20.00'L = 565.5 cf
Overall Size= 72.0"W x 72.0"H x 20.00'L

72.0" Wide + 36.0" Spacing = 108.0" C-C Row Spacing

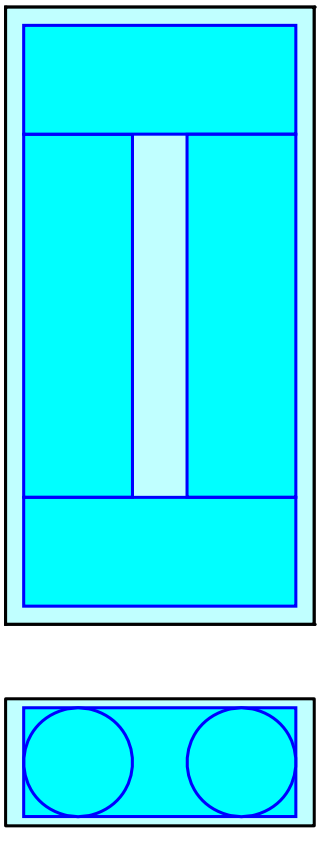
1 Chambers/Row x 20.00' Long +6.00' Header x 2 = 32.00' Row Length +12.0" End Stone x 2 = 34.00' Base Length
2 Rows x 72.0" Wide + 36.0" Spacing x 1 + 12.0" Side Stone x 2 = 17.00' Base Width
6.0" Stone Base + 72.0" Chamber Height + 6.0" Stone Cover = 7.00' Field Height

2 Chambers x 565.5 cf + 15.00' Header x 28.27 sf x 2 = 1,979.2 cf Chamber Storage

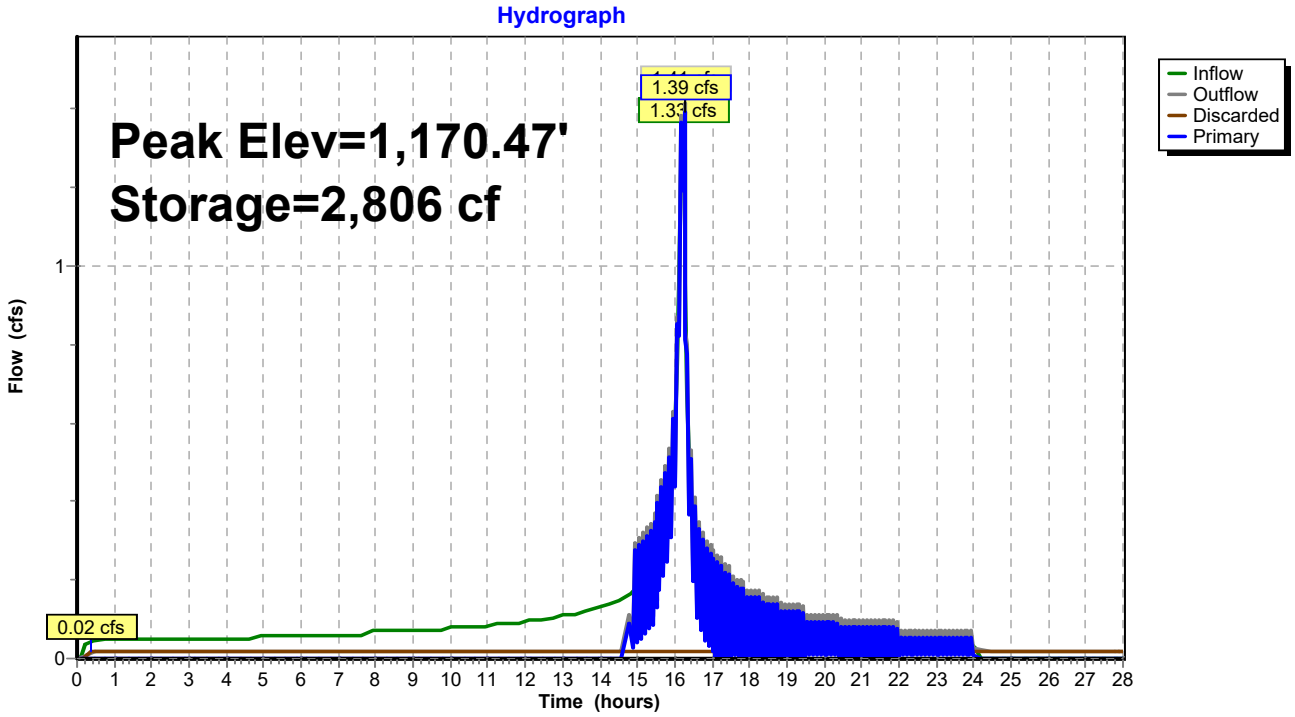
4,046.0 cf Field - 1,979.2 cf Chambers = 2,066.8 cf Stone x 40.0% Voids = 826.7 cf Stone Storage

Chamber Storage + Stone Storage = 2,805.9 cf = 0.064 af
Overall Storage Efficiency = 69.4%
Overall System Size = 34.00' x 17.00' x 7.00'

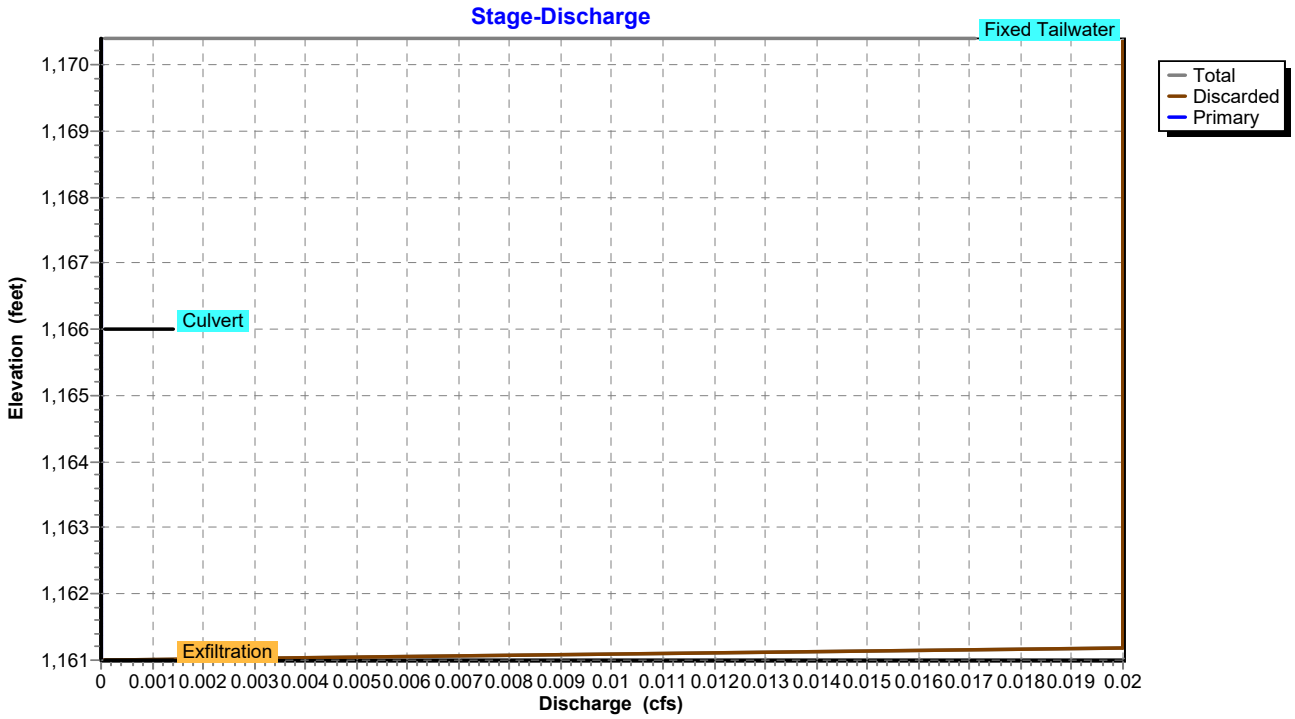
2 Chambers
149.9 cy Field
76.5 cy Stone



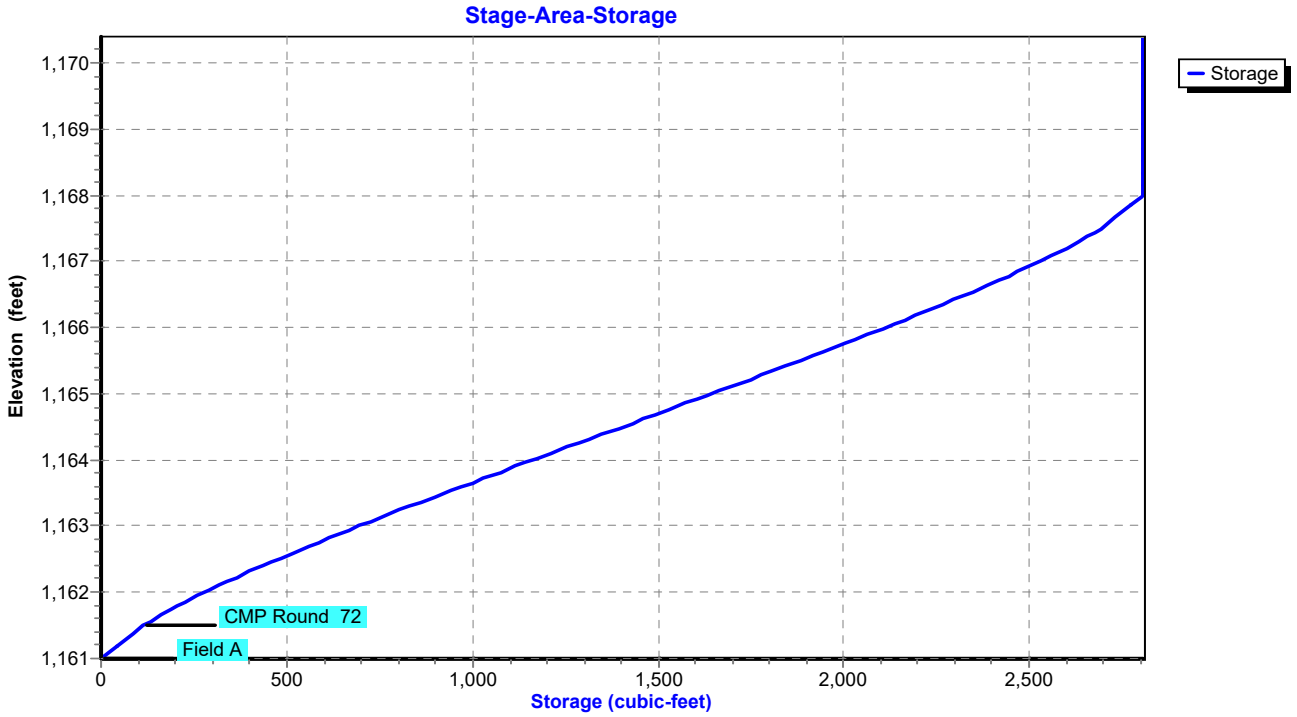
Pond 2P: Infiltration System - CMP



Pond 2P: Infiltration System - CMP



Pond 2P: Infiltration System - CMP



Hydrograph for Pond 2P: Infiltration System - CMP

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
0.00	0.00	0	1,161.00	0.00	0.00	0.00
0.10	0.00	0	1,161.00	0.00	0.00	0.00
0.20	0.03	5	1,161.02	0.00	0.00	0.00
0.30	0.04	15	1,161.07	0.01	0.01	0.00
0.40	0.05	24	1,161.11	0.02	**0.02**	0.00
0.50	0.05	35	1,161.15	0.02	0.02	0.00
0.60	0.05	46	1,161.20	0.02	0.02	0.00
0.70	0.05	57	1,161.24	0.02	0.02	0.00
0.80	0.05	67	1,161.29	0.02	0.02	0.00
0.90	0.05	78	1,161.34	0.02	0.02	0.00
1.00	0.05	89	1,161.38	0.02	0.02	0.00
1.10	0.05	100	1,161.43	0.02	0.02	0.00
1.20	0.05	111	1,161.48	0.02	0.02	0.00
1.30	0.05	121	1,161.52	0.02	0.02	0.00
1.40	0.05	132	1,161.56	0.02	0.02	0.00
1.50	0.05	143	1,161.60	0.02	0.02	0.00
1.60	0.05	154	1,161.64	0.02	0.02	0.00
1.70	0.05	165	1,161.67	0.02	0.02	0.00
1.80	0.05	175	1,161.70	0.02	0.02	0.00
1.90	0.05	186	1,161.74	0.02	0.02	0.00
2.00	0.05	197	1,161.77	0.02	0.02	0.00
2.10	0.05	208	1,161.80	0.02	0.02	0.00
2.20	0.05	219	1,161.83	0.02	0.02	0.00
2.30	0.05	229	1,161.86	0.02	0.02	0.00
2.40	0.05	240	1,161.89	0.02	0.02	0.00
2.50	0.05	251	1,161.92	0.02	0.02	0.00
2.60	0.05	262	1,161.95	0.02	0.02	0.00
2.70	0.05	273	1,161.98	0.02	0.02	0.00
2.80	0.05	283	1,162.01	0.02	0.02	0.00
2.90	0.05	294	1,162.04	0.02	0.02	0.00
3.00	0.05	305	1,162.07	0.02	0.02	0.00
3.10	0.05	316	1,162.10	0.02	0.02	0.00
3.20	0.05	327	1,162.13	0.02	0.02	0.00
3.30	0.05	337	1,162.16	0.02	0.02	0.00
3.40	0.05	348	1,162.18	0.02	0.02	0.00
3.50	0.05	359	1,162.21	0.02	0.02	0.00
3.60	0.05	370	1,162.24	0.02	0.02	0.00
3.70	0.05	381	1,162.26	0.02	0.02	0.00
3.80	0.05	391	1,162.29	0.02	0.02	0.00
3.90	0.05	402	1,162.32	0.02	0.02	0.00
4.00	0.05	413	1,162.35	0.02	0.02	0.00
4.10	0.05	424	1,162.37	0.02	0.02	0.00
4.20	0.05	435	1,162.40	0.02	0.02	0.00
4.30	0.05	445	1,162.42	0.02	0.02	0.00
4.40	0.05	456	1,162.45	0.02	0.02	0.00
4.50	0.05	467	1,162.48	0.02	0.02	0.00
4.60	0.05	478	1,162.50	0.02	0.02	0.00
4.70	0.05	489	1,162.53	0.02	0.02	0.00
4.80	0.06	500	1,162.55	0.02	0.02	0.00
4.90	0.06	514	1,162.59	0.02	0.02	0.00
5.00	0.06	528	1,162.62	0.02	0.02	0.00
5.10	0.06	543	1,162.66	0.02	0.02	0.00
5.20	0.06	557	1,162.69	0.02	0.02	0.00

Hydrograph for Pond 2P: Infiltration System - CMP (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
5.30	0.06	572	1,162.72	0.02	0.02	0.00
5.40	0.06	586	1,162.75	0.02	0.02	0.00
5.50	0.06	600	1,162.79	0.02	0.02	0.00
5.60	0.06	615	1,162.82	0.02	0.02	0.00
5.70	0.06	629	1,162.85	0.02	0.02	0.00
5.80	0.06	644	1,162.89	0.02	0.02	0.00
5.90	0.06	658	1,162.92	0.02	0.02	0.00
6.00	0.06	672	1,162.95	0.02	0.02	0.00
6.10	0.06	687	1,162.98	0.02	0.02	0.00
6.20	0.06	701	1,163.01	0.02	0.02	0.00
6.30	0.06	716	1,163.05	0.02	0.02	0.00
6.40	0.06	730	1,163.08	0.02	0.02	0.00
6.50	0.06	744	1,163.11	0.02	0.02	0.00
6.60	0.06	759	1,163.14	0.02	0.02	0.00
6.70	0.06	773	1,163.17	0.02	0.02	0.00
6.80	0.06	788	1,163.20	0.02	0.02	0.00
6.90	0.06	802	1,163.24	0.02	0.02	0.00
7.00	0.06	816	1,163.27	0.02	0.02	0.00
7.10	0.06	831	1,163.30	0.02	0.02	0.00
7.20	0.06	845	1,163.33	0.02	0.02	0.00
7.30	0.06	860	1,163.36	0.02	0.02	0.00
7.40	0.06	874	1,163.39	0.02	0.02	0.00
7.50	0.06	888	1,163.42	0.02	0.02	0.00
7.60	0.06	903	1,163.45	0.02	0.02	0.00
7.70	0.06	917	1,163.48	0.02	0.02	0.00
7.80	0.07	932	1,163.52	0.02	0.02	0.00
7.90	0.07	950	1,163.55	0.02	0.02	0.00
8.00	0.07	968	1,163.59	0.02	0.02	0.00
8.10	0.07	986	1,163.63	0.02	0.02	0.00
8.20	0.07	1,004	1,163.67	0.02	0.02	0.00
8.30	0.07	1,022	1,163.71	0.02	0.02	0.00
8.40	0.07	1,040	1,163.74	0.02	0.02	0.00
8.50	0.07	1,058	1,163.78	0.02	0.02	0.00
8.60	0.07	1,076	1,163.82	0.02	0.02	0.00
8.70	0.07	1,094	1,163.86	0.02	0.02	0.00
8.80	0.07	1,112	1,163.90	0.02	0.02	0.00
8.90	0.07	1,130	1,163.93	0.02	0.02	0.00
9.00	0.07	1,148	1,163.97	0.02	0.02	0.00
9.10	0.07	1,166	1,164.01	0.02	0.02	0.00
9.20	0.07	1,184	1,164.05	0.02	0.02	0.00
9.30	0.07	1,202	1,164.08	0.02	0.02	0.00
9.40	0.07	1,220	1,164.12	0.02	0.02	0.00
9.50	0.07	1,238	1,164.16	0.02	0.02	0.00
9.60	0.07	1,256	1,164.20	0.02	0.02	0.00
9.70	0.07	1,274	1,164.23	0.02	0.02	0.00
9.80	0.08	1,292	1,164.27	0.02	0.02	0.00
9.90	0.08	1,314	1,164.31	0.02	0.02	0.00
10.00	0.08	1,335	1,164.36	0.02	0.02	0.00
10.10	0.08	1,357	1,164.40	0.02	0.02	0.00
10.20	0.08	1,378	1,164.45	0.02	0.02	0.00
10.30	0.08	1,400	1,164.49	0.02	0.02	0.00
10.40	0.08	1,422	1,164.54	0.02	0.02	0.00
10.50	0.08	1,443	1,164.58	0.02	0.02	0.00

Hydrograph for Pond 2P: Infiltration System - CMP (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
10.60	0.08	1,465	1,164.63	0.02	0.02	0.00
10.70	0.08	1,486	1,164.67	0.02	0.02	0.00
10.80	0.08	1,508	1,164.72	0.02	0.02	0.00
10.90	0.08	1,530	1,164.76	0.02	0.02	0.00
11.00	0.08	1,551	1,164.81	0.02	0.02	0.00
11.10	0.08	1,573	1,164.85	0.02	0.02	0.00
11.20	0.09	1,597	1,164.90	0.02	0.02	0.00
11.30	0.09	1,622	1,164.95	0.02	0.02	0.00
11.40	0.09	1,647	1,165.01	0.02	0.02	0.00
11.50	0.09	1,673	1,165.06	0.02	0.02	0.00
11.60	0.09	1,698	1,165.11	0.02	0.02	0.00
11.70	0.09	1,723	1,165.17	0.02	0.02	0.00
11.80	0.09	1,748	1,165.22	0.02	0.02	0.00
11.90	0.09	1,773	1,165.27	0.02	0.02	0.00
12.00	0.09	1,799	1,165.32	0.02	0.02	0.00
12.10	0.10	1,826	1,165.38	0.02	0.02	0.00
12.20	0.10	1,855	1,165.44	0.02	0.02	0.00
12.30	0.10	1,883	1,165.50	0.02	0.02	0.00
12.40	0.10	1,912	1,165.57	0.02	0.02	0.00
12.50	0.10	1,941	1,165.63	0.02	0.02	0.00
12.60	0.10	1,970	1,165.69	0.02	0.02	0.00
12.70	0.10	1,999	1,165.75	0.02	0.02	0.00
12.80	0.10	2,027	1,165.82	0.02	0.02	0.00
12.90	0.11	2,057	1,165.88	0.02	0.02	0.00
13.00	0.11	2,090	1,165.95	0.02	0.02	0.00
13.10	0.11	2,122	1,166.02	0.02	0.02	0.00
13.20	0.11	2,154	1,166.10	0.02	0.02	0.00
13.30	0.11	2,187	1,166.17	0.02	0.02	0.00
13.40	0.12	2,220	1,166.25	0.02	0.02	0.00
13.50	0.12	2,256	1,166.33	0.02	0.02	0.00
13.60	0.12	2,292	1,166.41	0.02	0.02	0.00
13.70	0.12	2,328	1,166.50	0.02	0.02	0.00
13.80	0.13	2,365	1,166.59	0.02	0.02	0.00
13.90	0.13	2,404	1,166.68	0.02	0.02	0.00
14.00	0.13	2,443	1,166.78	0.02	0.02	0.00
14.10	0.13	2,483	1,166.88	0.02	0.02	0.00
14.20	0.14	2,525	1,166.99	0.02	0.02	0.00
14.30	0.14	2,569	1,167.11	0.02	0.02	0.00
14.40	0.14	2,612	1,167.24	0.02	0.02	0.00
14.50	0.15	2,657	1,167.38	0.02	0.02	0.00
14.60	0.15	2,704	1,167.56	0.02	0.02	0.00
14.70	0.16	2,753	1,167.77	0.02	0.02	0.00
14.80	0.17	**2,804**	1,167.99	0.02	0.02	0.00
14.90	0.17	**2,806**	1,170.40	0.05	0.02	0.03
15.00	0.18	2,806	1,170.40	0.06	0.02	0.04
15.10	0.19	2,806	1,170.40	0.07	0.02	0.05
15.20	0.20	2,806	1,170.40	0.08	0.02	0.06
15.30	0.22	2,806	1,170.40	0.09	0.02	0.07
15.40	0.23	2,806	1,170.40	0.11	0.02	0.09
15.50	0.27	2,806	1,170.41	0.15	0.02	0.13
15.60	0.32	2,806	1,170.41	0.19	0.02	0.17
15.70	0.35	2,806	1,170.41	0.23	0.02	0.21
15.80	0.39	2,806	1,170.41	0.27	0.02	0.25

Hydrograph for Pond 2P: Infiltration System - CMP (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
15.90	0.45	2,806	1,170.41	0.33	0.02	0.31
16.00	0.58	2,806	1,170.42	0.46	0.02	0.44
16.10	0.96	2,806	1,170.44	0.84	0.02	0.82
16.20	**1.33**	2,806	**1,170.46**	**1.21**	0.02	**1.19**
16.30	0.95	2,806	**1,170.44**	**0.83**	0.02	**0.81**
16.40	0.51	2,806	1,170.42	0.38	0.02	0.36
16.50	0.34	2,806	1,170.41	0.22	0.02	0.20
16.60	0.24	2,806	1,170.40	0.12	0.02	0.10
16.70	0.21	2,806	1,170.40	0.09	0.02	0.07
16.80	0.19	2,806	1,170.40	0.07	0.02	0.05
16.90	0.17	2,806	1,170.40	0.05	0.02	0.03
17.00	0.16	2,806	1,170.40	0.04	0.02	0.02
17.10	0.15	2,806	1,170.40	0.03	0.02	0.01
17.20	0.14	2,806	1,168.00	0.02	0.02	0.00
17.30	0.13	2,806	1,168.00	0.02	0.02	0.00
17.40	0.13	2,806	1,168.00	0.02	0.02	0.00
17.50	0.12	2,805	1,168.00	0.02	0.02	0.00
17.60	0.12	2,806	1,170.40	0.03	0.02	0.01
17.70	0.11	2,806	1,168.00	0.02	0.02	0.00
17.80	0.11	2,806	1,170.40	0.02	0.02	0.00
17.90	0.10	2,805	1,168.00	0.02	0.02	0.00
18.00	0.10	2,806	1,170.40	0.03	0.02	0.01
18.10	0.10	2,806	1,170.40	0.03	0.02	0.01
18.20	0.10	2,806	1,170.40	0.03	0.02	0.01
18.30	0.09	2,806	1,168.00	0.02	0.02	0.00
18.40	0.09	2,806	1,168.00	0.02	0.02	0.00
18.50	0.09	2,806	1,170.40	0.02	0.02	0.00
18.60	0.09	2,806	1,170.40	0.02	0.02	0.00
18.70	0.09	2,806	1,170.40	0.02	0.02	0.00
18.80	0.08	2,806	1,168.00	0.02	0.02	0.00
18.90	0.08	2,806	1,168.00	0.02	0.02	0.00
19.00	0.08	2,806	1,170.40	0.02	0.02	0.00
19.10	0.08	2,806	1,170.40	0.02	0.02	0.00
19.20	0.08	2,806	1,170.40	0.02	0.02	0.00
19.30	0.08	2,806	1,170.40	0.02	0.02	0.00
19.40	0.08	2,806	1,170.40	0.02	0.02	0.00
19.50	0.07	2,805	1,168.00	0.02	0.02	0.00
19.60	0.07	2,806	1,170.40	0.03	0.02	0.01
19.70	0.07	2,806	1,170.40	0.03	0.02	0.01
19.80	0.07	2,806	1,170.40	0.03	0.02	0.01
19.90	0.07	2,806	1,170.40	0.03	0.02	0.01
20.00	0.07	2,806	1,170.40	0.03	0.02	0.01
20.10	0.07	2,806	1,170.40	0.03	0.02	0.01
20.20	0.07	2,806	1,170.40	0.03	0.02	0.01
20.30	0.07	2,806	1,170.40	0.03	0.02	0.01
20.40	0.06	2,806	1,170.40	0.02	0.02	0.00
20.50	0.06	2,806	1,168.00	0.02	0.02	0.00
20.60	0.06	2,806	1,170.40	0.02	0.02	0.00
20.70	0.06	2,806	1,170.40	0.02	0.02	0.00
20.80	0.06	2,806	1,170.40	0.02	0.02	0.00
20.90	0.06	2,806	1,170.40	0.02	0.02	0.00
21.00	0.06	2,806	1,170.40	0.02	0.02	0.00
21.10	0.06	2,806	1,170.40	0.02	0.02	0.00

Hydrograph for Pond 2P: Infiltration System - CMP (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
21.20	0.06	2,806	1,170.40	0.02	0.02	0.00
21.30	0.06	2,806	1,170.40	0.02	0.02	0.00
21.40	0.06	2,806	1,170.40	0.02	0.02	0.00
21.50	0.06	2,806	1,170.40	0.02	0.02	0.00
21.60	0.06	2,806	1,170.40	0.02	0.02	0.00
21.70	0.06	2,806	1,170.40	0.02	0.02	0.00
21.80	0.06	2,806	1,170.40	0.02	0.02	0.00
21.90	0.06	2,806	1,170.40	0.02	0.02	0.00
22.00	0.05	2,805	1,168.00	0.02	0.02	0.00
22.10	0.05	2,806	1,170.40	0.03	0.02	0.01
22.20	0.05	2,806	1,170.40	0.03	0.02	0.01
22.30	0.05	2,806	1,170.40	0.03	0.02	0.01
22.40	0.05	2,806	1,170.40	0.03	0.02	0.01
22.50	0.05	2,806	1,170.40	0.03	0.02	0.01
22.60	0.05	2,806	1,170.40	0.03	0.02	0.01
22.70	0.05	2,806	1,170.40	0.03	0.02	0.01
22.80	0.05	2,806	1,170.40	0.03	0.02	0.01
22.90	0.05	2,806	1,170.40	0.03	0.02	0.01
23.00	0.05	2,806	1,170.40	0.03	0.02	0.01
23.10	0.05	2,806	1,170.40	0.03	0.02	0.01
23.20	0.05	2,806	1,170.40	0.03	0.02	0.01
23.30	0.05	2,806	1,170.40	0.03	0.02	0.01
23.40	0.05	2,806	1,170.40	0.03	0.02	0.01
23.50	0.05	2,806	1,170.40	0.03	0.02	0.01
23.60	0.05	2,806	1,170.40	0.03	0.02	0.01
23.70	0.05	2,806	1,170.40	0.03	0.02	0.01
23.80	0.05	2,806	1,170.40	0.03	0.02	0.01
23.90	0.05	2,806	1,170.40	0.03	0.02	0.01
24.00	0.05	2,806	1,170.40	0.03	0.02	0.01
24.10	0.00	2,802	1,167.98	0.02	0.02	0.00
24.20	0.00	2,795	1,167.95	0.02	0.02	0.00
24.30	0.00	2,788	1,167.92	0.02	0.02	0.00
24.40	0.00	2,781	1,167.89	0.02	0.02	0.00
24.50	0.00	2,773	1,167.86	0.02	0.02	0.00
24.60	0.00	2,766	1,167.83	0.02	0.02	0.00
24.70	0.00	2,759	1,167.80	0.02	0.02	0.00
24.80	0.00	2,752	1,167.77	0.02	0.02	0.00
24.90	0.00	2,745	1,167.73	0.02	0.02	0.00
25.00	0.00	2,737	1,167.70	0.02	0.02	0.00
25.10	0.00	2,730	1,167.67	0.02	0.02	0.00
25.20	0.00	2,723	1,167.64	0.02	0.02	0.00
25.30	0.00	2,716	1,167.61	0.02	0.02	0.00
25.40	0.00	2,709	1,167.58	0.02	0.02	0.00
25.50	0.00	2,701	1,167.55	0.02	0.02	0.00
25.60	0.00	2,694	1,167.52	0.02	0.02	0.00
25.70	0.00	2,687	1,167.49	0.02	0.02	0.00
25.80	0.00	2,680	1,167.46	0.02	0.02	0.00
25.90	0.00	2,673	1,167.43	0.02	0.02	0.00
26.00	0.00	2,665	1,167.41	0.02	0.02	0.00
26.10	0.00	2,658	1,167.38	0.02	0.02	0.00
26.20	0.00	2,651	1,167.36	0.02	0.02	0.00
26.30	0.00	2,644	1,167.34	0.02	0.02	0.00
26.40	0.00	2,637	1,167.31	0.02	0.02	0.00

Hydrograph for Pond 2P: Infiltration System - CMP (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
26.50	0.00	2,629	1,167.29	0.02	0.02	0.00
26.60	0.00	2,622	1,167.27	0.02	0.02	0.00
26.70	0.00	2,615	1,167.25	0.02	0.02	0.00
26.80	0.00	2,608	1,167.23	0.02	0.02	0.00
26.90	0.00	2,601	1,167.21	0.02	0.02	0.00
27.00	0.00	2,593	1,167.18	0.02	0.02	0.00
27.10	0.00	2,586	1,167.16	0.02	0.02	0.00
27.20	0.00	2,579	1,167.14	0.02	0.02	0.00
27.30	0.00	2,572	1,167.12	0.02	0.02	0.00
27.40	0.00	2,565	1,167.10	0.02	0.02	0.00
27.50	0.00	2,557	1,167.08	0.02	0.02	0.00
27.60	0.00	2,550	1,167.06	0.02	0.02	0.00
27.70	0.00	2,543	1,167.04	0.02	0.02	0.00
27.80	0.00	2,536	1,167.02	0.02	0.02	0.00
27.90	0.00	2,529	1,167.00	0.02	0.02	0.00
28.00	0.00	2,521	1,166.98	0.02	0.02	0.00

Stage-Discharge for Pond 2P: Infiltration System - CMP

Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)
1,161.00	0.00	**0.00**	0.00
1,161.10	0.02	**0.02**	0.00
1,161.20	0.02	0.02	0.00
1,161.30	0.02	0.02	0.00
1,161.40	0.02	0.02	0.00
1,161.50	0.02	0.02	0.00
1,161.60	0.02	0.02	0.00
1,161.70	0.02	0.02	0.00
1,161.80	0.02	0.02	0.00
1,161.90	0.02	0.02	0.00
1,162.00	0.02	0.02	0.00
1,162.10	0.02	0.02	0.00
1,162.20	0.02	0.02	0.00
1,162.30	0.02	0.02	0.00
1,162.40	0.02	0.02	0.00
1,162.50	0.02	0.02	0.00
1,162.60	0.02	0.02	0.00
1,162.70	0.02	0.02	0.00
1,162.80	0.02	0.02	0.00
1,162.90	0.02	0.02	0.00
1,163.00	0.02	0.02	0.00
1,163.10	0.02	0.02	0.00
1,163.20	0.02	0.02	0.00
1,163.30	0.02	0.02	0.00
1,163.40	0.02	0.02	0.00
1,163.50	0.02	0.02	0.00
1,163.60	0.02	0.02	0.00
1,163.70	0.02	0.02	0.00
1,163.80	0.02	0.02	0.00
1,163.90	0.02	0.02	0.00
1,164.00	0.02	0.02	0.00
1,164.10	0.02	0.02	0.00
1,164.20	0.02	0.02	0.00
1,164.30	0.02	0.02	0.00
1,164.40	0.02	0.02	0.00
1,164.50	0.02	0.02	0.00
1,164.60	0.02	0.02	0.00
1,164.70	0.02	0.02	0.00
1,164.80	0.02	0.02	0.00
1,164.90	0.02	0.02	0.00
1,165.00	0.02	0.02	0.00
1,165.10	0.02	0.02	0.00
1,165.20	0.02	0.02	0.00
1,165.30	0.02	0.02	0.00
1,165.40	0.02	0.02	0.00
1,165.50	0.02	0.02	0.00
1,165.60	0.02	0.02	0.00
1,165.70	0.02	0.02	0.00
1,165.80	0.02	0.02	0.00
1,165.90	0.02	0.02	0.00
1,166.00	0.02	0.02	0.00
1,166.10	0.02	0.02	0.00
1,166.20	0.02	0.02	0.00
1,166.30	0.02	0.02	0.00
1,166.40	0.02	0.02	0.00
1,166.50	0.02	0.02	0.00
1,166.60	0.02	0.02	0.00
1,166.70	0.02	0.02	0.00
1,166.80	0.02	0.02	0.00
1,166.90	0.02	0.02	0.00
1,167.00	0.02	0.02	0.00
1,167.10	0.02	0.02	0.00
1,167.20	0.02	0.02	0.00
1,167.30	0.02	0.02	0.00
1,167.40	0.02	0.02	0.00
1,167.50	0.02	0.02	0.00
1,167.60	0.02	0.02	0.00
1,167.70	0.02	0.02	0.00
1,167.80	0.02	0.02	0.00
1,167.90	0.02	0.02	0.00
1,168.00	0.02	0.02	0.00
1,168.10	0.02	0.02	0.00
1,168.20	0.02	0.02	0.00
1,168.30	0.02	0.02	0.00
1,168.40	0.02	0.02	0.00
1,168.50	0.02	0.02	0.00
1,168.60	0.02	0.02	0.00
1,168.70	0.02	0.02	0.00
1,168.80	0.02	0.02	0.00
1,168.90	0.02	0.02	0.00
1,169.00	0.02	0.02	0.00
1,169.10	0.02	0.02	0.00
1,169.20	0.02	0.02	0.00
1,169.30	0.02	0.02	0.00
1,169.40	0.02	0.02	0.00
1,169.50	0.02	0.02	0.00
1,169.60	0.02	0.02	0.00
1,169.70	0.02	0.02	0.00
1,169.80	0.02	0.02	0.00
1,169.90	0.02	0.02	0.00
1,170.00	0.02	0.02	0.00
1,170.10	0.02	0.02	0.00
1,170.20	0.02	0.02	0.00
1,170.30	0.02	0.02	0.00
1,170.40	**0.02**	0.02	**0.00**

Stage-Area-Storage for Pond 2P: Infiltration System - CMP

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
1,161.00	0	1,166.30	2,244
1,161.10	23	1,166.40	2,287
1,161.20	46	1,166.50	2,329
1,161.30	69	1,166.60	2,371
1,161.40	92	1,166.70	2,411
1,161.50	116	1,166.80	2,451
1,161.60	143	1,166.90	2,490
1,161.70	174	1,167.00	2,527
1,161.80	207	1,167.10	2,564
1,161.90	242	1,167.20	2,599
1,162.00	278	1,167.30	2,632
1,162.10	316	1,167.40	2,663
1,162.20	355	1,167.50	2,690
1,162.30	395	1,167.60	2,713
1,162.40	435	1,167.70	2,737
1,162.50	477	1,167.80	2,760
1,162.60	519	1,167.90	2,783
1,162.70	562	1,168.00	**2,806**
1,162.80	606	1,168.10	2,806
1,162.90	650	1,168.20	2,806
1,163.00	695	1,168.30	2,806
1,163.10	740	1,168.40	2,806
1,163.20	785	1,168.50	2,806
1,163.30	831	1,168.60	2,806
1,163.40	878	1,168.70	2,806
1,163.50	925	1,168.80	2,806
1,163.60	972	1,168.90	2,806
1,163.70	1,019	1,169.00	2,806
1,163.80	1,066	1,169.10	2,806
1,163.90	1,114	1,169.20	2,806
1,164.00	1,162	1,169.30	2,806
1,164.10	1,210	1,169.40	2,806
1,164.20	1,258	1,169.50	2,806
1,164.30	1,306	1,169.60	2,806
1,164.40	1,355	1,169.70	2,806
1,164.50	1,403	1,169.80	2,806
1,164.60	1,451	1,169.90	2,806
1,164.70	1,500	1,170.00	2,806
1,164.80	1,548	1,170.10	2,806
1,164.90	1,596	1,170.20	2,806
1,165.00	1,644	1,170.30	2,806
1,165.10	1,692	1,170.40	2,806
1,165.20	1,740		
1,165.30	1,787		
1,165.40	1,834		
1,165.50	1,881		
1,165.60	1,928		
1,165.70	1,975		
1,165.80	2,021		
1,165.90	2,066		
1,166.00	2,111		
1,166.10	2,156		
1,166.20	2,200		

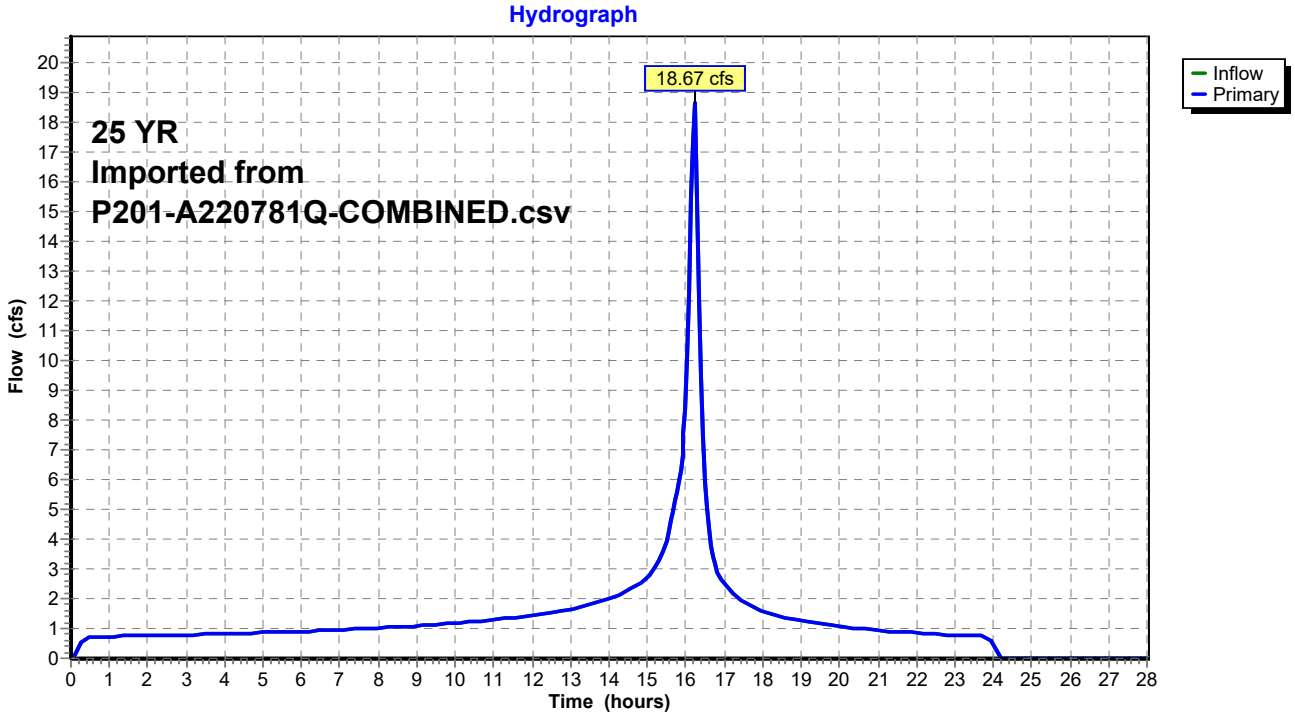
Summary for Link 1L: NODE 201-25 YEAR

Inflow = 18.67 cfs @ 16.24 hrs, Volume= 3.088 af
Primary = 18.67 cfs @ 16.24 hrs, Volume= 3.088 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs

25 YR Imported from P201-A220781Q-COMBINED.csv

Link 1L: NODE 201-25 YEAR



Hydrograph for Link 1L: NODE 201-25 YEAR

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	**0.00**	0.00	5.30	0.87	0.00	0.87
0.10	0.07	0.00	0.07	5.40	0.87	0.00	0.87
0.20	0.32	0.00	0.32	5.50	0.88	0.00	0.88
0.30	0.58	0.00	0.58	5.60	0.88	0.00	0.88
0.40	0.68	0.00	0.68	5.70	0.89	0.00	0.89
0.50	0.71	0.00	0.71	5.80	0.89	0.00	0.89
0.60	0.72	0.00	0.72	5.90	0.90	0.00	0.90
0.70	0.72	0.00	0.72	6.00	0.90	0.00	0.90
0.80	0.72	0.00	0.72	6.10	0.91	0.00	0.91
0.90	0.73	0.00	0.73	6.20	0.91	0.00	0.91
1.00	0.73	0.00	0.73	6.30	0.92	0.00	0.92
1.10	0.73	0.00	0.73	6.40	0.92	0.00	0.92
1.20	0.73	0.00	0.73	6.50	0.93	0.00	0.93
1.30	0.74	0.00	0.74	6.60	0.93	0.00	0.93
1.40	0.74	0.00	0.74	6.70	0.93	0.00	0.93
1.50	0.74	0.00	0.74	6.80	0.94	0.00	0.94
1.60	0.74	0.00	0.74	6.90	0.95	0.00	0.95
1.70	0.74	0.00	0.74	7.00	0.95	0.00	0.95
1.80	0.75	0.00	0.75	7.10	0.96	0.00	0.96
1.90	0.75	0.00	0.75	7.20	0.96	0.00	0.96
2.00	0.75	0.00	0.75	7.30	0.97	0.00	0.97
2.10	0.76	0.00	0.76	7.40	0.98	0.00	0.98
2.20	0.76	0.00	0.76	7.50	0.98	0.00	0.98
2.30	0.76	0.00	0.76	7.60	0.99	0.00	0.99
2.40	0.77	0.00	0.77	7.70	0.99	0.00	0.99
2.50	0.77	0.00	0.77	7.80	1.00	0.00	1.00
2.60	0.77	0.00	0.77	7.90	1.01	0.00	1.01
2.70	0.77	0.00	0.77	8.00	1.01	0.00	1.01
2.80	0.78	0.00	0.78	8.10	1.02	0.00	1.02
2.90	0.78	0.00	0.78	8.20	1.02	0.00	1.02
3.00	0.78	0.00	0.78	8.30	1.04	0.00	1.04
3.10	0.79	0.00	0.79	8.40	1.04	0.00	1.04
3.20	0.79	0.00	0.79	8.50	1.05	0.00	1.05
3.30	0.80	0.00	0.80	8.60	1.05	0.00	1.05
3.40	0.80	0.00	0.80	8.70	1.06	0.00	1.06
3.50	0.80	0.00	0.80	8.80	1.07	0.00	1.07
3.60	0.80	0.00	0.80	8.90	1.08	0.00	1.08
3.70	0.81	0.00	0.81	9.00	1.09	0.00	1.09
3.80	0.81	0.00	0.81	9.10	1.09	0.00	1.09
3.90	0.82	0.00	0.82	9.20	1.10	0.00	1.10
4.00	0.82	0.00	0.82	9.30	1.11	0.00	1.11
4.10	0.82	0.00	0.82	9.40	1.12	0.00	1.12
4.20	0.82	0.00	0.82	9.50	1.13	0.00	1.13
4.30	0.83	0.00	0.83	9.60	1.14	0.00	1.14
4.40	0.83	0.00	0.83	9.70	1.14	0.00	1.14
4.50	0.84	0.00	0.84	9.80	1.16	0.00	1.16
4.60	0.84	0.00	0.84	9.90	1.17	0.00	1.17
4.70	0.84	0.00	0.84	10.00	1.18	0.00	1.18
4.80	0.85	0.00	0.85	10.10	1.19	0.00	1.19
4.90	0.85	0.00	0.85	10.20	1.19	0.00	1.19
5.00	0.86	0.00	0.86	10.30	1.21	0.00	1.21
5.10	0.86	0.00	0.86	10.40	1.22	0.00	1.22
5.20	0.86	0.00	0.86	10.50	1.23	0.00	1.23

Hydrograph for Link 1L: NODE 201-25 YEAR (continued)

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
10.60	1.24	0.00	1.24	15.90	6.81	0.00	6.81
10.70	1.25	0.00	1.25	16.00	8.34	0.00	8.34
10.80	1.27	0.00	1.27	16.10	12.33	0.00	12.33
10.90	1.28	0.00	1.28	16.20	**17.38**	0.00	**17.38**
11.00	1.29	0.00	1.29	16.30	**15.26**	0.00	**15.26**
11.10	1.30	0.00	1.30	16.40	9.35	0.00	9.35
11.20	1.32	0.00	1.32	16.50	5.86	0.00	5.86
11.30	1.34	0.00	1.34	16.60	4.38	0.00	4.38
11.40	1.35	0.00	1.35	16.70	3.42	0.00	3.42
11.50	1.37	0.00	1.37	16.80	2.99	0.00	2.99
11.60	1.38	0.00	1.38	16.90	2.69	0.00	2.69
11.70	1.40	0.00	1.40	17.00	2.48	0.00	2.48
11.80	1.42	0.00	1.42	17.10	2.32	0.00	2.32
11.90	1.44	0.00	1.44	17.20	2.18	0.00	2.18
12.00	1.45	0.00	1.45	17.30	2.08	0.00	2.08
12.10	1.46	0.00	1.46	17.40	1.99	0.00	1.99
12.20	1.47	0.00	1.47	17.50	1.89	0.00	1.89
12.30	1.48	0.00	1.48	17.60	1.82	0.00	1.82
12.40	1.50	0.00	1.50	17.70	1.75	0.00	1.75
12.50	1.52	0.00	1.52	17.80	1.68	0.00	1.68
12.60	1.54	0.00	1.54	17.90	1.63	0.00	1.63
12.70	1.57	0.00	1.57	18.00	1.57	0.00	1.57
12.80	1.59	0.00	1.59	18.10	1.53	0.00	1.53
12.90	1.62	0.00	1.62	18.20	1.50	0.00	1.50
13.00	1.64	0.00	1.64	18.30	1.47	0.00	1.47
13.10	1.67	0.00	1.67	18.40	1.44	0.00	1.44
13.20	1.70	0.00	1.70	18.50	1.40	0.00	1.40
13.30	1.73	0.00	1.73	18.60	1.37	0.00	1.37
13.40	1.76	0.00	1.76	18.70	1.34	0.00	1.34
13.50	1.80	0.00	1.80	18.80	1.31	0.00	1.31
13.60	1.84	0.00	1.84	18.90	1.28	0.00	1.28
13.70	1.88	0.00	1.88	19.00	1.26	0.00	1.26
13.80	1.92	0.00	1.92	19.10	1.24	0.00	1.24
13.90	1.96	0.00	1.96	19.20	1.21	0.00	1.21
14.00	2.01	0.00	2.01	19.30	1.19	0.00	1.19
14.10	2.06	0.00	2.06	19.40	1.17	0.00	1.17
14.20	2.10	0.00	2.10	19.50	1.15	0.00	1.15
14.30	2.14	0.00	2.14	19.60	1.14	0.00	1.14
14.40	2.21	0.00	2.21	19.70	1.12	0.00	1.12
14.50	2.27	0.00	2.27	19.80	1.10	0.00	1.10
14.60	2.35	0.00	2.35	19.90	1.08	0.00	1.08
14.70	2.43	0.00	2.43	20.00	1.07	0.00	1.07
14.80	2.53	0.00	2.53	20.10	1.05	0.00	1.05
14.90	2.63	0.00	2.63	20.20	1.04	0.00	1.04
15.00	2.75	0.00	2.75	20.30	1.02	0.00	1.02
15.10	2.88	0.00	2.88	20.40	1.01	0.00	1.01
15.20	3.04	0.00	3.04	20.50	1.00	0.00	1.00
15.30	3.22	0.00	3.22	20.60	0.99	0.00	0.99
15.40	3.46	0.00	3.46	20.70	0.98	0.00	0.98
15.50	3.95	0.00	3.95	20.80	0.96	0.00	0.96
15.60	4.66	0.00	4.66	20.90	0.95	0.00	0.95
15.70	5.28	0.00	5.28	21.00	0.94	0.00	0.94
15.80	5.92	0.00	5.92	21.10	0.93	0.00	0.93

Hydrograph for Link 1L: NODE 201-25 YEAR (continued)

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
21.20	0.92	0.00	0.92
21.30	0.90	0.00	0.90
21.40	0.90	0.00	0.90
21.50	0.89	0.00	0.89
21.60	0.88	0.00	0.88
21.70	0.87	0.00	0.87
21.80	0.86	0.00	0.86
21.90	0.85	0.00	0.85
22.00	0.85	0.00	0.85
22.10	0.84	0.00	0.84
22.20	0.83	0.00	0.83
22.30	0.82	0.00	0.82
22.40	0.81	0.00	0.81
22.50	0.81	0.00	0.81
22.60	0.80	0.00	0.80
22.70	0.80	0.00	0.80
22.80	0.79	0.00	0.79
22.90	0.78	0.00	0.78
23.00	0.78	0.00	0.78
23.10	0.77	0.00	0.77
23.20	0.77	0.00	0.77
23.30	0.76	0.00	0.76
23.40	0.75	0.00	0.75
23.50	0.75	0.00	0.75
23.60	0.74	0.00	0.74
23.70	0.74	0.00	0.74
23.80	0.73	0.00	0.73
23.90	0.72	0.00	0.72
24.00	0.72	0.00	0.72
24.10	0.00	0.00	0.00
24.20	0.00	0.00	0.00
24.30	0.00	0.00	0.00
24.40	0.00	0.00	0.00
24.50	0.00	0.00	0.00
24.60	0.00	0.00	0.00
24.70	0.00	0.00	0.00
24.80	0.00	0.00	0.00
24.90	0.00	0.00	0.00
25.00	0.00	0.00	0.00
25.10	0.00	0.00	0.00
25.20	0.00	0.00	0.00
25.30	0.00	0.00	0.00
25.40	0.00	0.00	0.00
25.50	0.00	0.00	0.00
25.60	0.00	0.00	0.00
25.70	0.00	0.00	0.00
25.80	0.00	0.00	0.00
25.90	0.00	0.00	0.00
26.00	0.00	0.00	0.00
26.10	0.00	0.00	0.00
26.20	0.00	0.00	0.00
26.30	0.00	0.00	0.00
26.40	0.00	0.00	0.00
26.50	0.00	0.00	0.00
26.60	0.00	0.00	0.00
26.70	0.00	0.00	0.00
26.80	0.00	0.00	0.00
26.90	0.00	0.00	0.00
27.00	0.00	0.00	0.00
27.10	0.00	0.00	0.00
27.20	0.00	0.00	0.00
27.30	0.00	0.00	0.00
27.40	0.00	0.00	0.00
27.50	0.00	0.00	0.00
27.60	0.00	0.00	0.00
27.70	0.00	0.00	0.00
27.80	0.00	0.00	0.00
27.90	0.00	0.00	0.00
28.00	0.00	0.00	0.00

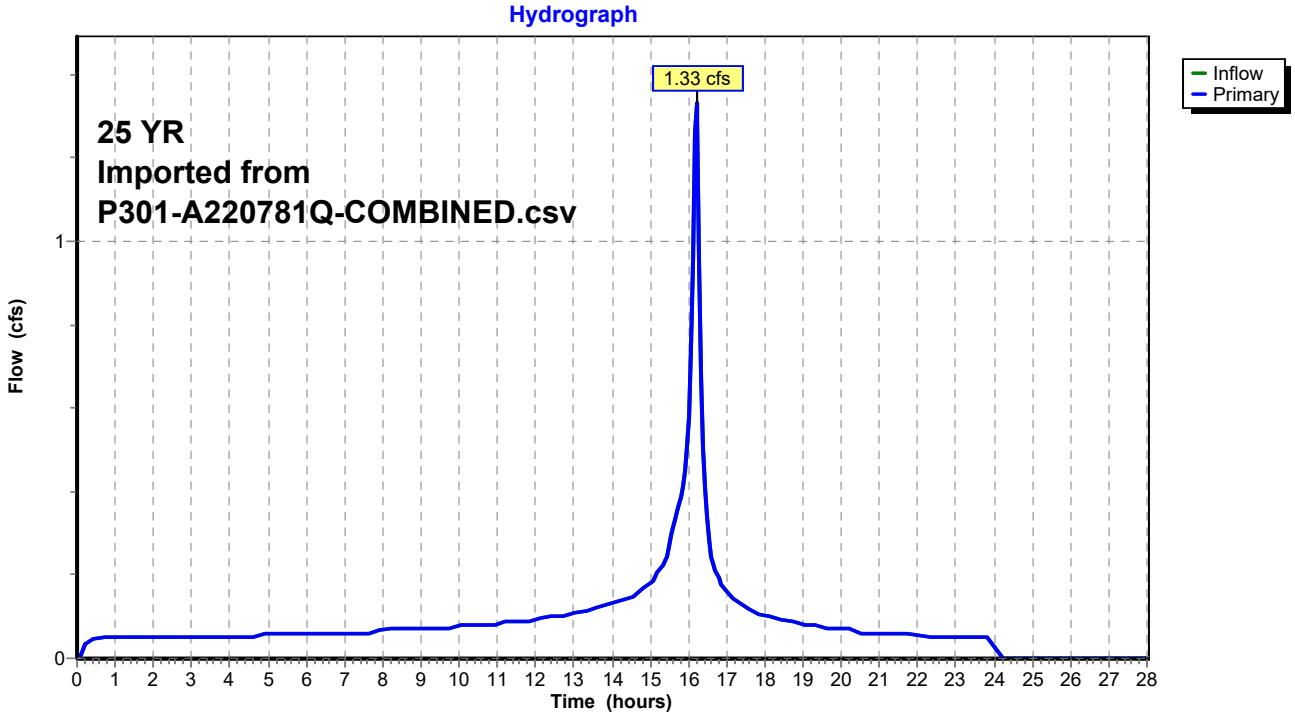
Summary for Link 2L: NODE 301-25 YEAR

Inflow = 1.33 cfs @ 16.21 hrs, Volume= 0.203 af
Primary = 1.33 cfs @ 16.21 hrs, Volume= 0.203 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs

25 YR Imported from P301-A220781Q-COMBINED.csv

Link 2L: NODE 301-25 YEAR



Hydrograph for Link 2L: NODE 301-25 YEAR

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	**0.00**	0.00	5.30	0.06	0.00	0.06
0.10	0.00	0.00	0.00	5.40	0.06	0.00	0.06
0.20	0.03	0.00	0.03	5.50	0.06	0.00	0.06
0.30	0.04	0.00	0.04	5.60	0.06	0.00	0.06
0.40	0.05	0.00	0.05	5.70	0.06	0.00	0.06
0.50	0.05	0.00	0.05	5.80	0.06	0.00	0.06
0.60	0.05	0.00	0.05	5.90	0.06	0.00	0.06
0.70	0.05	0.00	0.05	6.00	0.06	0.00	0.06
0.80	0.05	0.00	0.05	6.10	0.06	0.00	0.06
0.90	0.05	0.00	0.05	6.20	0.06	0.00	0.06
1.00	0.05	0.00	0.05	6.30	0.06	0.00	0.06
1.10	0.05	0.00	0.05	6.40	0.06	0.00	0.06
1.20	0.05	0.00	0.05	6.50	0.06	0.00	0.06
1.30	0.05	0.00	0.05	6.60	0.06	0.00	0.06
1.40	0.05	0.00	0.05	6.70	0.06	0.00	0.06
1.50	0.05	0.00	0.05	6.80	0.06	0.00	0.06
1.60	0.05	0.00	0.05	6.90	0.06	0.00	0.06
1.70	0.05	0.00	0.05	7.00	0.06	0.00	0.06
1.80	0.05	0.00	0.05	7.10	0.06	0.00	0.06
1.90	0.05	0.00	0.05	7.20	0.06	0.00	0.06
2.00	0.05	0.00	0.05	7.30	0.06	0.00	0.06
2.10	0.05	0.00	0.05	7.40	0.06	0.00	0.06
2.20	0.05	0.00	0.05	7.50	0.06	0.00	0.06
2.30	0.05	0.00	0.05	7.60	0.06	0.00	0.06
2.40	0.05	0.00	0.05	7.70	0.06	0.00	0.06
2.50	0.05	0.00	0.05	7.80	0.07	0.00	0.07
2.60	0.05	0.00	0.05	7.90	0.07	0.00	0.07
2.70	0.05	0.00	0.05	8.00	0.07	0.00	0.07
2.80	0.05	0.00	0.05	8.10	0.07	0.00	0.07
2.90	0.05	0.00	0.05	8.20	0.07	0.00	0.07
3.00	0.05	0.00	0.05	8.30	0.07	0.00	0.07
3.10	0.05	0.00	0.05	8.40	0.07	0.00	0.07
3.20	0.05	0.00	0.05	8.50	0.07	0.00	0.07
3.30	0.05	0.00	0.05	8.60	0.07	0.00	0.07
3.40	0.05	0.00	0.05	8.70	0.07	0.00	0.07
3.50	0.05	0.00	0.05	8.80	0.07	0.00	0.07
3.60	0.05	0.00	0.05	8.90	0.07	0.00	0.07
3.70	0.05	0.00	0.05	9.00	0.07	0.00	0.07
3.80	0.05	0.00	0.05	9.10	0.07	0.00	0.07
3.90	0.05	0.00	0.05	9.20	0.07	0.00	0.07
4.00	0.05	0.00	0.05	9.30	0.07	0.00	0.07
4.10	0.05	0.00	0.05	9.40	0.07	0.00	0.07
4.20	0.05	0.00	0.05	9.50	0.07	0.00	0.07
4.30	0.05	0.00	0.05	9.60	0.07	0.00	0.07
4.40	0.05	0.00	0.05	9.70	0.07	0.00	0.07
4.50	0.05	0.00	0.05	9.80	0.08	0.00	0.08
4.60	0.05	0.00	0.05	9.90	0.08	0.00	0.08
4.70	0.05	0.00	0.05	10.00	0.08	0.00	0.08
4.80	0.06	0.00	0.06	10.10	0.08	0.00	0.08
4.90	0.06	0.00	0.06	10.20	0.08	0.00	0.08
5.00	0.06	0.00	0.06	10.30	0.08	0.00	0.08
5.10	0.06	0.00	0.06	10.40	0.08	0.00	0.08
5.20	0.06	0.00	0.06	10.50	0.08	0.00	0.08

Hydrograph for Link 2L: NODE 301-25 YEAR (continued)

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
10.60	0.08	0.00	0.08	15.90	0.45	0.00	0.45
10.70	0.08	0.00	0.08	16.00	0.58	0.00	0.58
10.80	0.08	0.00	0.08	16.10	0.96	0.00	0.96
10.90	0.08	0.00	0.08	16.20	**1.33**	0.00	**1.33**
11.00	0.08	0.00	0.08	16.30	0.95	0.00	0.95
11.10	0.08	0.00	0.08	16.40	0.51	0.00	0.51
11.20	0.09	0.00	0.09	16.50	0.34	0.00	0.34
11.30	0.09	0.00	0.09	16.60	0.24	0.00	0.24
11.40	0.09	0.00	0.09	16.70	0.21	0.00	0.21
11.50	0.09	0.00	0.09	16.80	0.19	0.00	0.19
11.60	0.09	0.00	0.09	16.90	0.17	0.00	0.17
11.70	0.09	0.00	0.09	17.00	0.16	0.00	0.16
11.80	0.09	0.00	0.09	17.10	0.15	0.00	0.15
11.90	0.09	0.00	0.09	17.20	0.14	0.00	0.14
12.00	0.09	0.00	0.09	17.30	0.13	0.00	0.13
12.10	0.10	0.00	0.10	17.40	0.13	0.00	0.13
12.20	0.10	0.00	0.10	17.50	0.12	0.00	0.12
12.30	0.10	0.00	0.10	17.60	0.12	0.00	0.12
12.40	0.10	0.00	0.10	17.70	0.11	0.00	0.11
12.50	0.10	0.00	0.10	17.80	0.11	0.00	0.11
12.60	0.10	0.00	0.10	17.90	0.10	0.00	0.10
12.70	0.10	0.00	0.10	18.00	0.10	0.00	0.10
12.80	0.10	0.00	0.10	18.10	0.10	0.00	0.10
12.90	0.11	0.00	0.11	18.20	0.10	0.00	0.10
13.00	0.11	0.00	0.11	18.30	0.09	0.00	0.09
13.10	0.11	0.00	0.11	18.40	0.09	0.00	0.09
13.20	0.11	0.00	0.11	18.50	0.09	0.00	0.09
13.30	0.11	0.00	0.11	18.60	0.09	0.00	0.09
13.40	0.12	0.00	0.12	18.70	0.09	0.00	0.09
13.50	0.12	0.00	0.12	18.80	0.08	0.00	0.08
13.60	0.12	0.00	0.12	18.90	0.08	0.00	0.08
13.70	0.12	0.00	0.12	19.00	0.08	0.00	0.08
13.80	0.13	0.00	0.13	19.10	0.08	0.00	0.08
13.90	0.13	0.00	0.13	19.20	0.08	0.00	0.08
14.00	0.13	0.00	0.13	19.30	0.08	0.00	0.08
14.10	0.13	0.00	0.13	19.40	0.08	0.00	0.08
14.20	0.14	0.00	0.14	19.50	0.07	0.00	0.07
14.30	0.14	0.00	0.14	19.60	0.07	0.00	0.07
14.40	0.14	0.00	0.14	19.70	0.07	0.00	0.07
14.50	0.15	0.00	0.15	19.80	0.07	0.00	0.07
14.60	0.15	0.00	0.15	19.90	0.07	0.00	0.07
14.70	0.16	0.00	0.16	20.00	0.07	0.00	0.07
14.80	0.17	0.00	0.17	20.10	0.07	0.00	0.07
14.90	0.17	0.00	0.17	20.20	0.07	0.00	0.07
15.00	0.18	0.00	0.18	20.30	0.07	0.00	0.07
15.10	0.19	0.00	0.19	20.40	0.06	0.00	0.06
15.20	0.20	0.00	0.20	20.50	0.06	0.00	0.06
15.30	0.22	0.00	0.22	20.60	0.06	0.00	0.06
15.40	0.23	0.00	0.23	20.70	0.06	0.00	0.06
15.50	0.27	0.00	0.27	20.80	0.06	0.00	0.06
15.60	0.32	0.00	0.32	20.90	0.06	0.00	0.06
15.70	0.35	0.00	0.35	21.00	0.06	0.00	0.06
15.80	0.39	0.00	0.39	21.10	0.06	0.00	0.06

Hydrograph for Link 2L: NODE 301-25 YEAR (continued)

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
21.20	0.06	0.00	0.06
21.30	0.06	0.00	0.06
21.40	0.06	0.00	0.06
21.50	0.06	0.00	0.06
21.60	0.06	0.00	0.06
21.70	0.06	0.00	0.06
21.80	0.06	0.00	0.06
21.90	0.06	0.00	0.06
22.00	0.05	0.00	0.05
22.10	0.05	0.00	0.05
22.20	0.05	0.00	0.05
22.30	0.05	0.00	0.05
22.40	0.05	0.00	0.05
22.50	0.05	0.00	0.05
22.60	0.05	0.00	0.05
22.70	0.05	0.00	0.05
22.80	0.05	0.00	0.05
22.90	0.05	0.00	0.05
23.00	0.05	0.00	0.05
23.10	0.05	0.00	0.05
23.20	0.05	0.00	0.05
23.30	0.05	0.00	0.05
23.40	0.05	0.00	0.05
23.50	0.05	0.00	0.05
23.60	0.05	0.00	0.05
23.70	0.05	0.00	0.05
23.80	0.05	0.00	0.05
23.90	0.05	0.00	0.05
24.00	0.05	0.00	0.05
24.10	0.00	0.00	0.00
24.20	0.00	0.00	0.00
24.30	0.00	0.00	0.00
24.40	0.00	0.00	0.00
24.50	0.00	0.00	0.00
24.60	0.00	0.00	0.00
24.70	0.00	0.00	0.00
24.80	0.00	0.00	0.00
24.90	0.00	0.00	0.00
25.00	0.00	0.00	0.00
25.10	0.00	0.00	0.00
25.20	0.00	0.00	0.00
25.30	0.00	0.00	0.00
25.40	0.00	0.00	0.00
25.50	0.00	0.00	0.00
25.60	0.00	0.00	0.00
25.70	0.00	0.00	0.00
25.80	0.00	0.00	0.00
25.90	0.00	0.00	0.00
26.00	0.00	0.00	0.00
26.10	0.00	0.00	0.00
26.20	0.00	0.00	0.00
26.30	0.00	0.00	0.00
26.40	0.00	0.00	0.00
26.50	0.00	0.00	0.00
26.60	0.00	0.00	0.00
26.70	0.00	0.00	0.00
26.80	0.00	0.00	0.00
26.90	0.00	0.00	0.00
27.00	0.00	0.00	0.00
27.10	0.00	0.00	0.00
27.20	0.00	0.00	0.00
27.30	0.00	0.00	0.00
27.40	0.00	0.00	0.00
27.50	0.00	0.00	0.00
27.60	0.00	0.00	0.00
27.70	0.00	0.00	0.00
27.80	0.00	0.00	0.00
27.90	0.00	0.00	0.00
28.00	0.00	0.00	0.00

FTH STREET
WIDE PUBLIC R/W)

FIFTH STREET

BASIS OF BEARINGS

PONDING LEVEL 1172.08 FOR
25-YEAR 24-HR STORM EVENT

CB

7,510 SF

3,170 SF

HYDRODYNAMIC
SEPARATOR (HDS)

DIVERSION
MANHOLE

PONDING LEVEL 1172.08 FOR
25-YEAR 24-HR STORM EVENT

INF #1
PROPOSED
INFILTRATION/DETENTION
SYSTEM

CB

INF #2
PROPOSED
INFILTRATION/DETENTION
SYSTEM

BUBBLER

CB

PARKWAY
CULVERT

THIRD STREET
(100' WIDE PUBLIC R/W)

THIRD STREET

N87°17'19"W 2649.58'

NORTH

0 15 30 60 90

Scale 1" = 30'

LEGEND

TRIBUTARY AREA LIMITS

DIRECTION OF FLOW

NODE
AREA

NO.	REVISION	BY

NO.	REVISION	BY

REGISTERED PROFESSIONAL ENGINEER
DAVID G. READER
No. 76867
CIVIL
STATE OF CALIFORNIA

KIER+WRIGHT
163 Technology Drive
Irvine, CA 92620
Phone: (949) 508-0202
www.kierwright.com

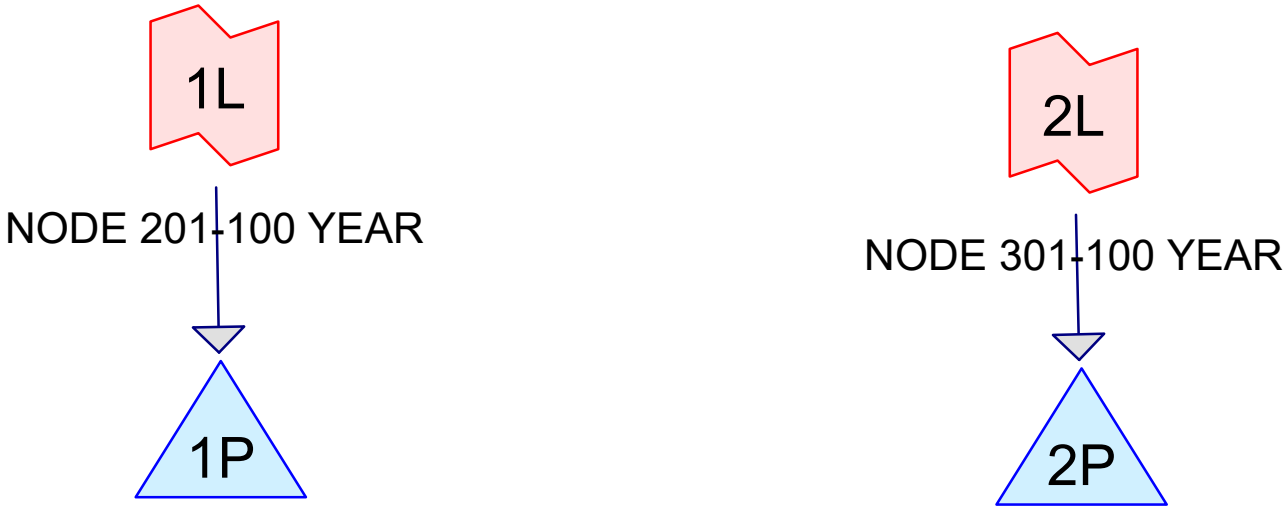
25-YR 24-HR STORM EVENT PONDING EXHIBIT
EAST BUILDING
OF
E. 3RD STREET & CENTRAL AVENUE
FOR
CROW HOLDINGS

HIGHLAND, CALIFORNIA

DATE	JANUARY, 2023
SCALE	AS SHOWN
DESIGNER	JO
DRAWN BY	STAFF
JOB NO.	A22078-1
SHEET	

C:\Users\jmcmahon\appdata\Local\Temp\AcPublish_13388\A22078-1-PO-HYDRO - PONDING EXHIBIT.dwg 2-24-23 11:08:12 AM jmcmahon

100-YEAR STORM EVENT
iNFILTRATION SYSTEM



Infiltration System - CMP
INFILTRATION SYTEM INF#1

Infiltration System - CMP
INFILTRATION SYTEM INF#2

Subcat Reach Pond Link

Routing Diagram for A22078-1 EAST BUILDING - 100 YEAR-AV
Prepared by Kier + Wright, Printed 2/24/2023
HydroCAD® 10.10-5a s/n 02379 © 2020 HydroCAD Software Solutions LLC

Time span=0.00-28.00 hrs, dt=0.05 hrs, 561 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Pond 1P: Infiltration System - CMP Peak Elev=1,172.36' Storage=55,790 cf Inflow=25.02 cfs 4.039 af
Outflow=15.41 cfs 2.919 af

Pond 2P: Infiltration System - CMP Peak Elev=1,170.49' Storage=2,806 cf Inflow=1.84 cfs 0.275 af
18.0" Round Culvert n=0.013 L=54.0' S=-0.0074 '/' Outflow=1.85 cfs 0.210 af

Link 1L: NODE 201-100 100 YR Imported from P201-A220781Q-COMBINED.csv Inflow=25.02 cfs 4.039 af
Primary=25.02 cfs 4.039 af

Link 2L: NODE 301-100 100 YR Imported from P301-A220781Q-COMBINED.csv Inflow=1.84 cfs 0.275 af
Primary=1.84 cfs 0.275 af

Summary for Pond 1P: Infiltration System - CMP

Inflow = 25.02 cfs @ 16.24 hrs, Volume= 4.039 af
Outflow = 15.41 cfs @ 16.36 hrs, Volume= 2.919 af, Atten= 38%, Lag= 7.5 min
Primary = 15.41 cfs @ 16.36 hrs, Volume= 2.919 af

Routing by Stor-Ind method, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs
Peak Elev= 1,172.36' @ 16.36 hrs Surf.Area= 31,571 sf Storage= 55,790 cf

Plug-Flow detention time= 295.0 min calculated for 2.913 af (72% of inflow)
Center-of-Mass det. time= 172.2 min (995.7 - 823.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	1,160.50'	14,521 cf	**69.00'W x 129.00'L x 8.00'H Field A** 71,208 cf Overall - 34,905 cf Embedded = 36,303 cf x 40.0% Voids
#2A	1,161.00'	34,905 cf	**CMP Round 84** x 42 Inside #1 Effective Size= 84.0"W x 84.0"H => 38.48 sf x 20.00'L = 769.7 cf Overall Size= 84.0"W x 84.0"H x 20.00'L 42 Chambers in 7 Rows 67.00' Header x 38.48 sf x 1 = 2,578.5 cf Inside
#3	1,171.50'	7,351 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)
		56,777 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,171.50	0	0	0
1,171.60	16	1	1
1,171.70	588	30	31
1,171.80	2,141	136	167
1,171.90	4,639	339	506
1,172.00	7,721	618	1,124
1,172.10	11,197	946	2,070
1,172.20	15,143	1,317	3,387
1,172.30	19,652	1,740	5,127
1,172.40	24,817	2,223	7,351

Device	Routing	Invert	Outlet Devices
#1	Device 2	1,167.00'	**27.0" Round Culvert** L= 560.0' Ke= 1.000 Inlet / Outlet Invert= 1,167.00' / 1,164.00' S= 0.0054 '/' Cc= 0.900 n= 0.013, Flow Area= 3.98 sf
#2	Primary	1,170.50'	**2.0" x 1.7" Horiz. Orifice/Grate X 115.00** C= 0.600 in 36.0" x 36.0" Grate (30% open area) Limited to weir flow at low heads

Primary OutFlow Max=15.40 cfs @ 16.36 hrs HW=1,172.36' TW=1,170.50' (Fixed TW Elev= 1,170.50')
└**2=Orifice/Grate** (Passes 15.40 cfs of 17.81 cfs potential flow)
└**1=Culvert** (Outlet Controls 15.40 cfs @ 3.87 fps)

Peak flow with mitigation with infiltration system

Bubbler outlet elevation

Pond 1P: Infiltration System - CMP - Chamber Wizard Field A

Chamber Model = CMP Round 84 (Round Corrugated Metal Pipe)
Effective Size= 84.0"W x 84.0"H => 38.48 sf x 20.00'L = 769.7 cf
Overall Size= 84.0"W x 84.0"H x 20.00'L

84.0" Wide + 36.0" Spacing = 120.0" C-C Row Spacing

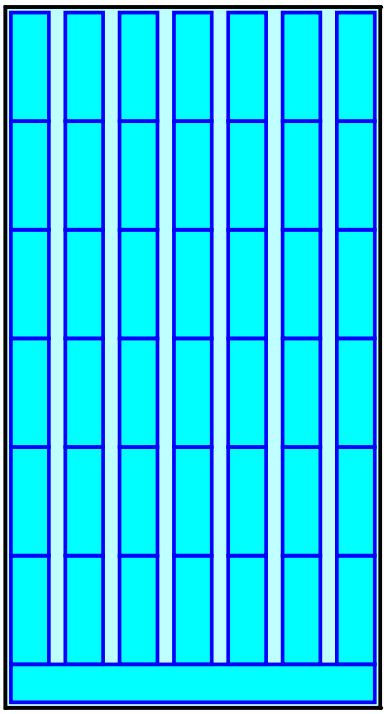
6 Chambers/Row x 20.00' Long +7.00' Header x 1 = 127.00' Row Length +12.0" End Stone x 2 = 129.00' Base Length
7 Rows x 84.0" Wide + 36.0" Spacing x 6 + 12.0" Side Stone x 2 = 69.00' Base Width
6.0" Stone Base + 84.0" Chamber Height + 6.0" Stone Cover = 8.00' Field Height

42 Chambers x 769.7 cf + 67.00' Header x 38.48 sf = 34,905.5 cf Chamber Storage

71,208.0 cf Field - 34,905.5 cf Chambers = 36,302.5 cf Stone x 40.0% Voids = 14,521.0 cf Stone Storage

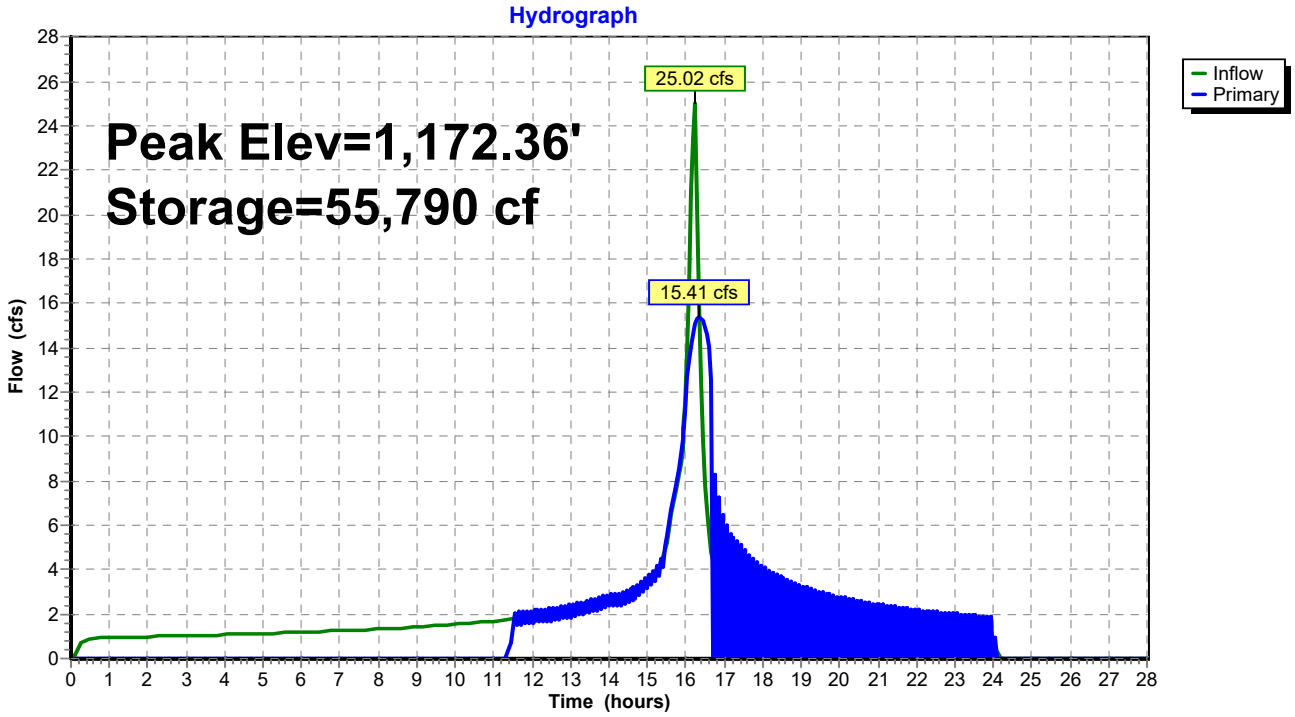
Chamber Storage + Stone Storage = 49,426.5 cf = 1.135 af
Overall Storage Efficiency = 69.4%
Overall System Size = 129.00' x 69.00' x 8.00'

42 Chambers
2,637.3 cy Field
1,344.5 cy Stone

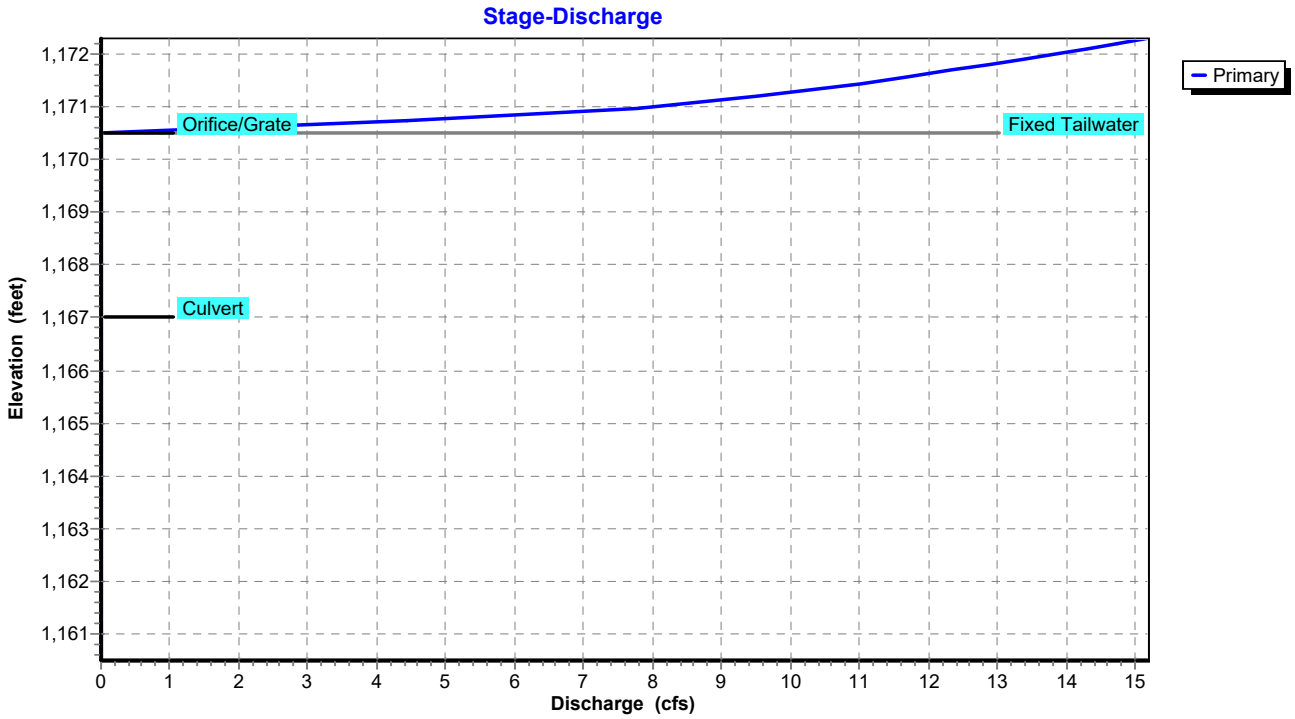




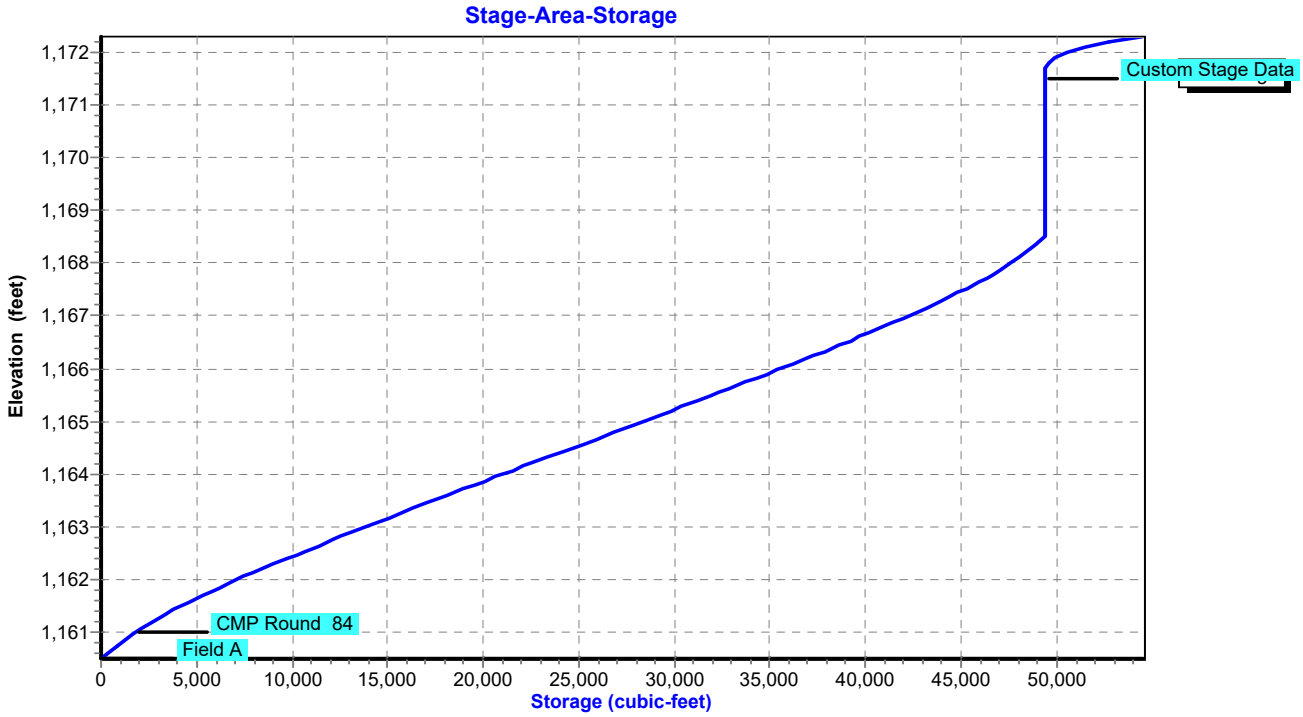
Pond 1P: Infiltration System - CMP



Pond 1P: Infiltration System - CMP



Pond 1P: Infiltration System - CMP



Hydrograph for Pond 1P: Infiltration System - CMP

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	1,160.50	0.00
0.10	0.09	8	1,160.50	0.00
0.20	0.43	98	1,160.53	0.00
0.30	0.76	323	1,160.59	0.00
0.40	0.89	625	1,160.68	0.00
0.50	0.92	951	1,160.77	0.00
0.60	0.93	1,285	1,160.86	0.00
0.70	0.93	1,620	1,160.95	0.00
0.80	0.94	1,958	1,161.05	0.00
0.90	0.94	2,296	1,161.12	0.00
1.00	0.95	2,636	1,161.19	0.00
1.10	0.95	2,978	1,161.26	0.00
1.20	0.95	3,320	1,161.33	0.00
1.30	0.96	3,663	1,161.40	0.00
1.40	0.96	4,008	1,161.46	0.00
1.50	0.96	4,353	1,161.52	0.00
1.60	0.97	4,701	1,161.59	0.00
1.70	0.97	5,050	1,161.65	0.00
1.80	0.98	5,400	1,161.71	0.00
1.90	0.98	5,752	1,161.77	0.00
2.00	0.98	6,105	1,161.83	0.00
2.10	0.98	6,458	1,161.88	0.00
2.20	0.99	6,814	1,161.94	0.00
2.30	0.99	7,170	1,162.00	0.00
2.40	1.00	7,527	1,162.06	0.00
2.50	1.00	7,887	1,162.11	0.00
2.60	1.00	8,247	1,162.17	0.00
2.70	1.01	8,610	1,162.23	0.00
2.80	1.01	8,974	1,162.28	0.00
2.90	1.02	9,338	1,162.34	0.00
3.00	1.02	9,705	1,162.39	0.00
3.10	1.02	10,073	1,162.45	0.00
3.20	1.03	10,442	1,162.50	0.00
3.30	1.03	10,813	1,162.56	0.00
3.40	1.04	11,185	1,162.61	0.00
3.50	1.04	11,559	1,162.67	0.00
3.60	1.05	11,936	1,162.73	0.00
3.70	1.05	12,314	1,162.78	0.00
3.80	1.06	12,692	1,162.84	0.00
3.90	1.06	13,073	1,162.89	0.00
4.00	1.07	13,457	1,162.95	0.00
4.10	1.07	13,842	1,163.00	0.00
4.20	1.07	14,227	1,163.06	0.00
4.30	1.08	14,616	1,163.11	0.00
4.40	1.09	15,006	1,163.17	0.00
4.50	1.09	15,398	1,163.22	0.00
4.60	1.09	15,790	1,163.28	0.00
4.70	1.10	16,185	1,163.33	0.00
4.80	1.11	16,582	1,163.39	0.00
4.90	1.11	16,981	1,163.44	0.00
5.00	1.12	17,382	1,163.50	0.00
5.10	1.12	17,785	1,163.55	0.00
5.20	1.12	18,189	1,163.61	0.00

Hydrograph for Pond 1P: Infiltration System - CMP (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
5.30	1.13	18,595	1,163.67	0.00
5.40	1.14	19,003	1,163.72	0.00
5.50	1.14	19,413	1,163.78	0.00
5.60	1.15	19,826	1,163.83	0.00
5.70	1.15	20,240	1,163.89	0.00
5.80	1.16	20,657	1,163.95	0.00
5.90	1.17	21,076	1,164.01	0.00
6.00	1.17	21,497	1,164.06	0.00
6.10	1.18	21,920	1,164.12	0.00
6.20	1.18	22,345	1,164.18	0.00
6.30	1.19	22,773	1,164.24	0.00
6.40	1.20	23,203	1,164.29	0.00
6.50	1.21	23,636	1,164.35	0.00
6.60	1.21	24,072	1,164.41	0.00
6.70	1.22	24,510	1,164.47	0.00
6.80	1.23	24,950	1,164.53	0.00
6.90	1.23	25,392	1,164.59	0.00
7.00	1.24	25,836	1,164.65	0.00
7.10	1.25	26,285	1,164.71	0.00
7.20	1.25	26,735	1,164.77	0.00
7.30	1.27	27,189	1,164.84	0.00
7.40	1.27	27,646	1,164.90	0.00
7.50	1.28	28,104	1,164.96	0.00
7.60	1.28	28,565	1,165.02	0.00
7.70	1.29	29,029	1,165.09	0.00
7.80	1.31	29,497	1,165.15	0.00
7.90	1.31	29,968	1,165.22	0.00
8.00	1.32	30,442	1,165.28	0.00
8.10	1.33	30,919	1,165.35	0.00
8.20	1.33	31,398	1,165.41	0.00
8.30	1.35	31,880	1,165.48	0.00
8.40	1.36	32,367	1,165.55	0.00
8.50	1.37	32,858	1,165.62	0.00
8.60	1.37	33,351	1,165.68	0.00
8.70	1.38	33,848	1,165.75	0.00
8.80	1.40	34,348	1,165.82	0.00
8.90	1.41	34,853	1,165.90	0.00
9.00	1.42	35,362	1,165.97	0.00
9.10	1.42	35,873	1,166.04	0.00
9.20	1.43	36,387	1,166.11	0.00
9.30	1.45	36,906	1,166.19	0.00
9.40	1.46	37,428	1,166.27	0.00
9.50	1.47	37,955	1,166.34	0.00
9.60	1.48	38,487	1,166.42	0.00
9.70	1.49	39,022	1,166.50	0.00
9.80	1.51	39,562	1,166.58	0.00
9.90	1.52	40,107	1,166.66	0.00
10.00	1.53	40,655	1,166.75	0.00
10.10	1.55	41,210	1,166.84	0.00
10.20	1.56	41,771	1,166.92	0.00
10.30	1.58	42,336	1,167.01	0.00
10.40	1.59	42,906	1,167.11	0.00
10.50	1.61	43,481	1,167.20	0.00

Hydrograph for Pond 1P: Infiltration System - CMP (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
10.60	1.62	44,063	1,167.30	0.00
10.70	1.63	44,649	1,167.40	0.00
10.80	1.65	45,240	1,167.51	0.00
10.90	1.67	45,838	1,167.62	0.00
11.00	1.69	46,442	1,167.73	0.00
11.10	1.70	47,053	1,167.86	0.00
11.20	1.72	47,670	1,168.01	0.00
11.30	1.74	48,294	1,168.18	0.00
11.40	1.76	48,924	1,168.36	0.00
11.50	1.78	49,426	1,170.61	1.49
11.60	1.80	49,426	1,170.61	1.52
11.70	1.82	49,426	1,170.62	1.54
11.80	1.84	49,426	1,170.62	1.55
11.90	1.87	49,426	1,170.62	1.58
12.00	1.89	49,426	1,170.62	1.60
12.10	1.91	49,426	1,170.62	1.62
12.20	1.92	49,426	1,170.62	1.63
12.30	1.93	49,426	1,170.62	1.64
12.40	1.96	49,426	1,170.62	1.67
12.50	1.98	49,426	1,170.62	1.69
12.60	2.01	49,426	1,170.62	1.72
12.70	2.04	49,426	1,170.62	1.75
12.80	2.07	49,426	1,170.63	1.78
12.90	2.10	49,426	1,170.63	1.82
13.00	2.14	49,426	1,170.63	1.85
13.10	2.18	49,426	1,170.63	1.89
13.20	2.22	49,426	1,170.63	1.93
13.30	2.26	49,426	1,170.63	1.97
13.40	2.30	49,426	1,170.63	2.01
13.50	2.35	49,426	1,170.64	2.06
13.60	2.40	49,426	1,170.64	2.11
13.70	2.45	49,426	1,170.64	2.16
13.80	2.50	49,426	1,170.64	2.22
13.90	2.56	49,426	1,170.65	2.27
14.00	2.63	49,426	1,170.65	2.34
14.10	2.67	49,426	1,170.65	2.38
14.20	2.66	49,426	1,170.65	2.37
14.30	2.66	49,426	1,170.65	2.37
14.40	2.71	49,426	1,170.65	2.42
14.50	2.80	49,426	1,170.66	2.51
14.60	2.90	49,426	1,170.66	2.61
14.70	3.01	49,426	1,170.66	2.72
14.80	3.13	49,426	1,170.67	2.84
14.90	3.27	49,426	1,170.67	2.98
15.00	3.41	49,426	1,170.68	3.12
15.10	3.59	49,426	1,170.69	3.30
15.20	3.79	49,426	1,170.70	3.50
15.30	4.03	49,426	1,170.71	3.74
15.40	4.38	49,426	1,170.72	4.09
15.50	5.20	49,426	1,170.76	4.91
15.60	6.43	49,426	1,170.82	6.15
15.70	7.37	49,426	1,170.89	7.09
15.80	8.26	49,426	1,171.00	7.97

Hydrograph for Pond 1P: Infiltration System - CMP (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
15.90	9.42	49,426	1,171.15	9.13
16.00	11.45	49,426	1,171.48	11.16
16.10	16.79	49,951	1,171.90	13.39
16.20	**23.44**	52,323	1,172.17	14.59
16.30	**20.30**	**55,326**	**1,172.33**	**15.31**
16.40	12.47	**55,635**	**1,172.35**	**15.37**
16.50	7.83	53,768	1,172.26	14.98
16.60	5.65	50,940	1,172.05	14.05
16.70	4.32	49,426	1,170.50	0.00
16.80	3.72	49,426	1,170.50	0.00
16.90	3.33	49,426	1,170.50	0.00
17.00	3.05	49,426	1,170.50	0.00
17.10	2.85	49,426	1,170.50	0.00
17.20	2.75	49,426	1,170.50	0.00
17.30	2.68	49,426	1,170.50	0.00
17.40	2.58	49,426	1,170.50	0.00
17.50	2.46	49,426	1,170.50	0.00
17.60	2.36	49,426	1,170.50	0.00
17.70	2.27	49,426	1,170.50	0.00
17.80	2.19	49,426	1,170.50	0.00
17.90	2.11	49,426	1,170.50	0.00
18.00	2.05	49,426	1,170.50	0.00
18.10	1.99	49,426	1,170.50	0.00
18.20	1.95	49,426	1,170.50	0.00
18.30	1.92	49,426	1,170.50	0.00
18.40	1.88	49,426	1,170.50	0.00
18.50	1.83	49,426	1,170.50	0.00
18.60	1.78	49,426	1,170.50	0.00
18.70	1.75	49,426	1,170.50	0.00
18.80	1.71	49,426	1,170.50	0.00
18.90	1.68	49,426	1,170.50	0.00
19.00	1.64	49,426	1,170.50	0.00
19.10	1.61	49,426	1,170.50	0.00
19.20	1.58	49,426	1,170.50	0.00
19.30	1.55	49,426	1,170.50	0.00
19.40	1.52	49,426	1,170.50	0.00
19.50	1.50	49,426	1,170.50	0.00
19.60	1.48	49,426	1,170.50	0.00
19.70	1.45	49,426	1,170.50	0.00
19.80	1.43	49,426	1,170.50	0.00
19.90	1.40	49,426	1,170.50	0.00
20.00	1.39	49,426	1,170.50	0.00
20.10	1.37	49,426	1,170.50	0.00
20.20	1.35	49,426	1,170.50	0.00
20.30	1.33	49,426	1,170.50	0.00
20.40	1.31	49,426	1,170.50	0.00
20.50	1.30	49,426	1,170.50	0.00
20.60	1.28	49,426	1,170.50	0.00
20.70	1.27	49,426	1,170.50	0.00
20.80	1.25	49,426	1,170.50	0.00
20.90	1.23	49,426	1,170.50	0.00
21.00	1.22	49,426	1,170.50	0.00
21.10	1.21	49,426	1,170.50	0.00

Hydrograph for Pond 1P: Infiltration System - CMP (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
21.20	1.20	49,426	1,170.50	0.00
21.30	1.18	49,426	1,170.50	0.00
21.40	1.17	49,426	1,170.50	0.00
21.50	1.16	49,426	1,170.50	0.00
21.60	1.15	49,426	1,170.50	0.00
21.70	1.14	49,426	1,170.50	0.00
21.80	1.12	49,426	1,170.50	0.00
21.90	1.11	49,426	1,170.50	0.00
22.00	1.10	49,426	1,170.50	0.00
22.10	1.09	49,426	1,170.50	0.00
22.20	1.08	49,426	1,170.50	0.00
22.30	1.07	49,426	1,170.50	0.00
22.40	1.06	49,426	1,170.50	0.00
22.50	1.05	49,426	1,170.50	0.00
22.60	1.04	49,426	1,170.50	0.00
22.70	1.04	49,426	1,170.50	0.00
22.80	1.02	49,426	1,170.50	0.00
22.90	1.02	49,426	1,170.50	0.00
23.00	1.01	49,426	1,170.50	0.00
23.10	1.00	49,426	1,170.50	0.00
23.20	1.00	49,426	1,170.50	0.00
23.30	0.98	49,426	1,170.50	0.00
23.40	0.98	49,426	1,170.50	0.00
23.50	0.97	49,426	1,170.50	0.00
23.60	0.97	49,426	1,170.50	0.00
23.70	0.96	49,426	1,170.50	0.00
23.80	0.95	49,426	1,170.50	0.00
23.90	0.94	49,426	1,170.50	0.00
24.00	0.94	49,426	1,170.50	0.00
24.10	0.00	49,426	1,170.50	0.00
24.20	0.00	49,426	1,170.50	0.00
24.30	0.00	49,426	1,170.50	0.00
24.40	0.00	49,426	1,170.50	0.00
24.50	0.00	49,426	1,170.50	0.00
24.60	0.00	49,426	1,170.50	0.00
24.70	0.00	49,426	1,170.50	0.00
24.80	0.00	49,426	1,170.50	0.00
24.90	0.00	49,426	1,170.50	0.00
25.00	0.00	49,426	1,170.50	0.00
25.10	0.00	49,426	1,170.50	0.00
25.20	0.00	49,426	1,170.50	0.00
25.30	0.00	49,426	1,170.50	0.00
25.40	0.00	49,426	1,170.50	0.00
25.50	0.00	49,426	1,170.50	0.00
25.60	0.00	49,426	1,170.50	0.00
25.70	0.00	49,426	1,170.50	0.00
25.80	0.00	49,426	1,170.50	0.00
25.90	0.00	49,426	1,170.50	0.00
26.00	0.00	49,426	1,170.50	0.00
26.10	0.00	49,426	1,170.50	0.00
26.20	0.00	49,426	1,170.50	0.00
26.30	0.00	49,426	1,170.50	0.00
26.40	0.00	49,426	1,170.50	0.00

Hydrograph for Pond 1P: Infiltration System - CMP (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
26.50	0.00	49,426	1,170.50	0.00
26.60	0.00	49,426	1,170.50	0.00
26.70	0.00	49,426	1,170.50	0.00
26.80	0.00	49,426	1,170.50	0.00
26.90	0.00	49,426	1,170.50	0.00
27.00	0.00	49,426	1,170.50	0.00
27.10	0.00	49,426	1,170.50	0.00
27.20	0.00	49,426	1,170.50	0.00
27.30	0.00	49,426	1,170.50	0.00
27.40	0.00	49,426	1,170.50	0.00
27.50	0.00	49,426	1,170.50	0.00
27.60	0.00	49,426	1,170.50	0.00
27.70	0.00	49,426	1,170.50	0.00
27.80	0.00	49,426	1,170.50	0.00
27.90	0.00	49,426	1,170.50	0.00
28.00	0.00	49,426	1,170.50	0.00

Stage-Discharge for Pond 1P: Infiltration System - CMP

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
1,160.50	0.00	1,165.80	0.00	1,171.10	8.76
1,160.60	0.00	1,165.90	0.00	1,171.20	9.46
1,160.70	0.00	1,166.00	0.00	1,171.30	10.11
1,160.80	0.00	1,166.10	0.00	1,171.40	10.73
1,160.90	0.00	1,166.20	0.00	1,171.50	11.31
1,161.00	0.00	1,166.30	0.00	1,171.60	11.86
1,161.10	0.00	1,166.40	0.00	1,171.70	12.38
1,161.20	0.00	1,166.50	0.00	1,171.80	12.89
1,161.30	0.00	1,166.60	0.00	1,171.90	13.38
1,161.40	0.00	1,166.70	0.00	1,172.00	13.85
1,161.50	0.00	1,166.80	0.00	1,172.10	14.30
1,161.60	0.00	1,166.90	0.00	1,172.20	14.74
1,161.70	0.00	1,167.00	0.00	1,172.30	15.17
1,161.80	0.00	1,167.10	0.00	1,172.40	**15.58**
1,161.90	0.00	1,167.20	0.00		
1,162.00	0.00	1,167.30	0.00		
1,162.10	0.00	1,167.40	0.00		
1,162.20	0.00	1,167.50	0.00		
1,162.30	0.00	1,167.60	0.00		
1,162.40	0.00	1,167.70	0.00		
1,162.50	0.00	1,167.80	0.00		
1,162.60	0.00	1,167.90	0.00		
1,162.70	0.00	1,168.00	0.00		
1,162.80	0.00	1,168.10	0.00		
1,162.90	0.00	1,168.20	0.00		
1,163.00	0.00	1,168.30	0.00		
1,163.10	0.00	1,168.40	0.00		
1,163.20	0.00	1,168.50	0.00		
1,163.30	0.00	1,168.60	0.00		
1,163.40	0.00	1,168.70	0.00		
1,163.50	0.00	1,168.80	0.00		
1,163.60	0.00	1,168.90	0.00		
1,163.70	0.00	1,169.00	0.00		
1,163.80	0.00	1,169.10	0.00		
1,163.90	0.00	1,169.20	0.00		
1,164.00	0.00	1,169.30	0.00		
1,164.10	0.00	1,169.40	0.00		
1,164.20	0.00	1,169.50	0.00		
1,164.30	0.00	1,169.60	0.00		
1,164.40	0.00	1,169.70	0.00		
1,164.50	0.00	1,169.80	0.00		
1,164.60	0.00	1,169.90	0.00		
1,164.70	0.00	1,170.00	0.00		
1,164.80	0.00	1,170.10	0.00		
1,164.90	0.00	1,170.20	0.00		
1,165.00	0.00	1,170.30	0.00		
1,165.10	0.00	1,170.40	0.00		
1,165.20	0.00	1,170.50	0.00		
1,165.30	0.00	1,170.60	1.24		
1,165.40	0.00	1,170.70	3.51		
1,165.50	0.00	1,170.80	6.19		
1,165.60	0.00	1,170.90	7.15		
1,165.70	0.00	1,171.00	7.99		

Stage-Area-Storage for Pond 1P: Infiltration System - CMP

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
1,160.50	0	1,165.80	34,178	1,171.10	49,426
1,160.60	356	1,165.90	34,885	1,171.20	49,426
1,160.70	712	1,166.00	35,588	1,171.30	49,426
1,160.80	1,068	1,166.10	36,285	1,171.40	49,426
1,160.90	1,424	1,166.20	36,977	1,171.50	49,426
1,161.00	1,780	1,166.30	37,663	1,171.60	49,427
1,161.10	2,196	1,166.40	38,343	1,171.70	49,457
1,161.20	2,662	1,166.50	39,015	1,171.80	49,594
1,161.30	3,160	1,166.60	39,680	1,171.90	49,933
1,161.40	3,682	1,166.70	40,336	1,172.00	50,551
1,161.50	4,224	1,166.80	40,984	1,172.10	51,497
1,161.60	4,785	1,166.90	41,623	1,172.20	52,814
1,161.70	5,362	1,167.00	42,251	1,172.30	54,554
1,161.80	5,954	1,167.10	42,868	1,172.40	**56,777**
1,161.90	6,559	1,167.20	43,472		
1,162.00	7,176	1,167.30	44,064		
1,162.10	7,804	1,167.40	44,641		
1,162.20	8,442	1,167.50	45,202		
1,162.30	9,090	1,167.60	45,745		
1,162.40	9,747	1,167.70	46,267		
1,162.50	10,411	1,167.80	46,764		
1,162.60	11,084	1,167.90	47,229		
1,162.70	11,763	1,168.00	47,646		
1,162.80	12,449	1,168.10	48,002		
1,162.90	13,141	1,168.20	48,358		
1,163.00	13,839	1,168.30	48,714		
1,163.10	14,541	1,168.40	49,070		
1,163.20	15,249	1,168.50	49,426		
1,163.30	15,961	1,168.60	49,426		
1,163.40	16,676	1,168.70	49,426		
1,163.50	17,396	1,168.80	49,426		
1,163.60	18,119	1,168.90	49,426		
1,163.70	18,844	1,169.00	49,426		
1,163.80	19,572	1,169.10	49,426		
1,163.90	20,303	1,169.20	49,426		
1,164.00	21,035	1,169.30	49,426		
1,164.10	21,769	1,169.40	49,426		
1,164.20	22,504	1,169.50	49,426		
1,164.30	23,240	1,169.60	49,426		
1,164.40	23,976	1,169.70	49,426		
1,164.50	24,713	1,169.80	49,426		
1,164.60	25,450	1,169.90	49,426		
1,164.70	26,187	1,170.00	49,426		
1,164.80	26,923	1,170.10	49,426		
1,164.90	27,658	1,170.20	49,426		
1,165.00	28,392	1,170.30	49,426		
1,165.10	29,124	1,170.40	49,426		
1,165.20	29,854	1,170.50	49,426		
1,165.30	30,582	1,170.60	49,426		
1,165.40	31,308	1,170.70	49,426		
1,165.50	32,031	1,170.80	49,426		
1,165.60	32,750	1,170.90	49,426		
1,165.70	33,466	1,171.00	49,426		

Summary for Pond 2P: Infiltration System - CMP

Inflow	=	1.84 cfs @	16.21 hrs, Volume=	0.275 af
Outflow	=	1.85 cfs @	16.20 hrs, Volume=	0.210 af, Atten= 0%, Lag= 0.0 min
Primary	=	1.85 cfs @	16.20 hrs, Volume=	0.210 af

Routing by Stor-Ind method, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs
Peak Elev= 1,170.49' @ 16.20 hrs Surf.Area= 578 sf Storage= 2,806 cf

Plug-Flow detention time= 254.7 min calculated for 0.210 af (76% of inflow)
Center-of-Mass det. time= 149.2 min (973.2 - 824.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	1,161.00'	827 cf	**17.00'W x 34.00'L x 7.00'H Field A** 4,046 cf Overall - 1,979 cf Embedded = 2,067 cf x 40.0% Voids
#2A	1,161.50'	1,979 cf	**CMP Round 72** x 2 Inside #1 Effective Size= 72.0"W x 72.0"H => 28.27 sf x 20.00'L = 565.5 cf Overall Size= 72.0"W x 72.0"H x 20.00'L 2 Chambers in 2 Rows 15.00' Header x 28.27 sf x 2 = 848.2 cf Inside
		2,806 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	1,166.00'	**18.0" Round Culvert** L= 54.0' Ke= 1.000 Inlet / Outlet Invert= 1,165.60' / 1,166.00' S= -0.0074 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=1.90 cfs @ 16.20 hrs HW=1,170.49' TW=1,170.40' (Fixed TW Elev= 1,170.40')
↳**1=Culvert** (Inlet Controls 1.90 cfs @ 1.07 fps)

Peak flow with mitigation with infiltration system

Overflow elevation at driveway

Pond 2P: Infiltration System - CMP - Chamber Wizard Field A

Chamber Model = CMP Round 72 (Round Corrugated Metal Pipe)
Effective Size= 72.0"W x 72.0"H => 28.27 sf x 20.00'L = 565.5 cf
Overall Size= 72.0"W x 72.0"H x 20.00'L

72.0" Wide + 36.0" Spacing = 108.0" C-C Row Spacing

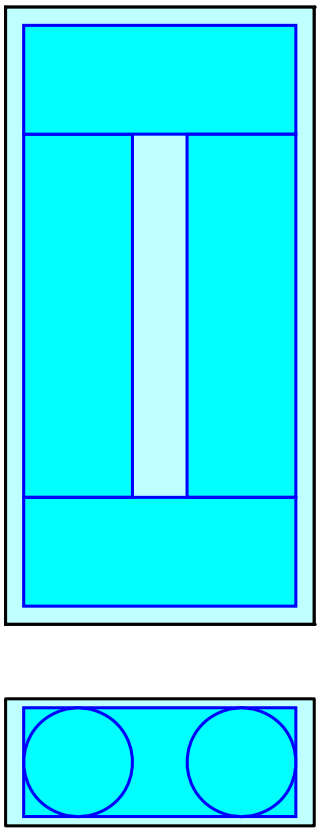
1 Chambers/Row x 20.00' Long +6.00' Header x 2 = 32.00' Row Length +12.0" End Stone x 2 = 34.00' Base Length
2 Rows x 72.0" Wide + 36.0" Spacing x 1 + 12.0" Side Stone x 2 = 17.00' Base Width
6.0" Stone Base + 72.0" Chamber Height + 6.0" Stone Cover = 7.00' Field Height

2 Chambers x 565.5 cf + 15.00' Header x 28.27 sf x 2 = 1,979.2 cf Chamber Storage

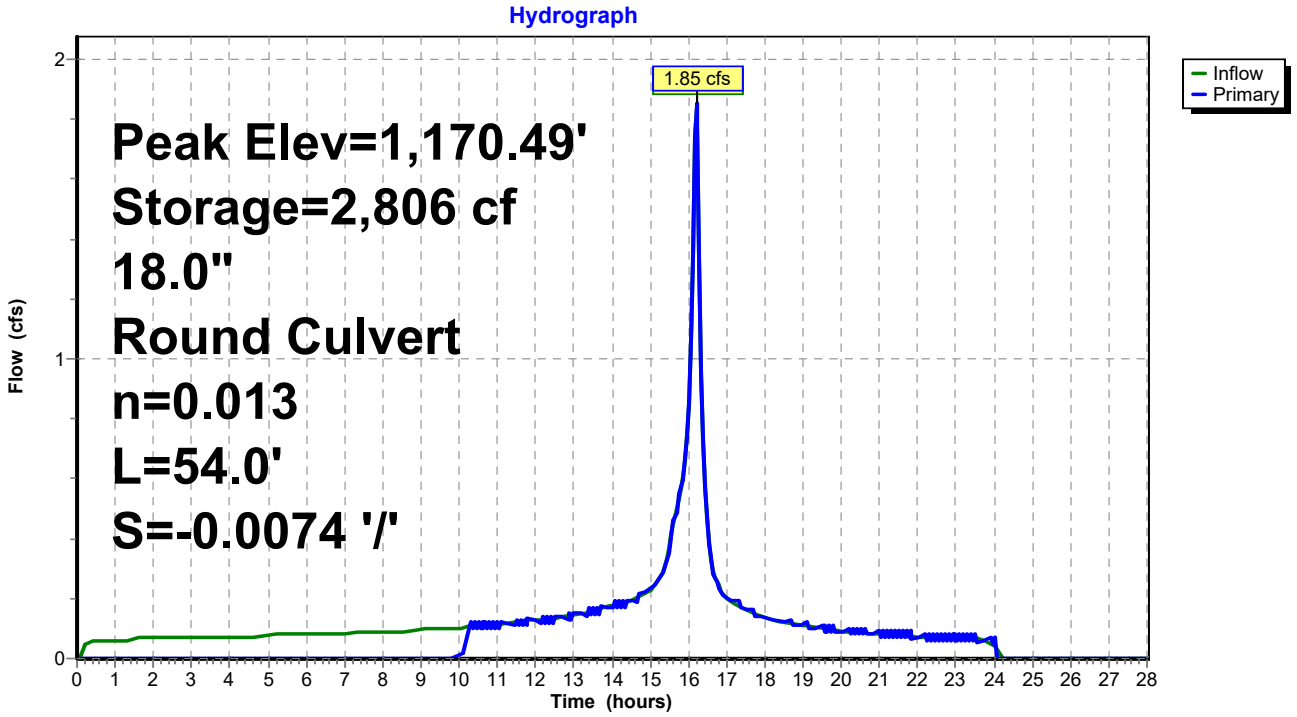
4,046.0 cf Field - 1,979.2 cf Chambers = 2,066.8 cf Stone x 40.0% Voids = 826.7 cf Stone Storage

Chamber Storage + Stone Storage = 2,805.9 cf = 0.064 af
Overall Storage Efficiency = 69.4%
Overall System Size = 34.00' x 17.00' x 7.00'

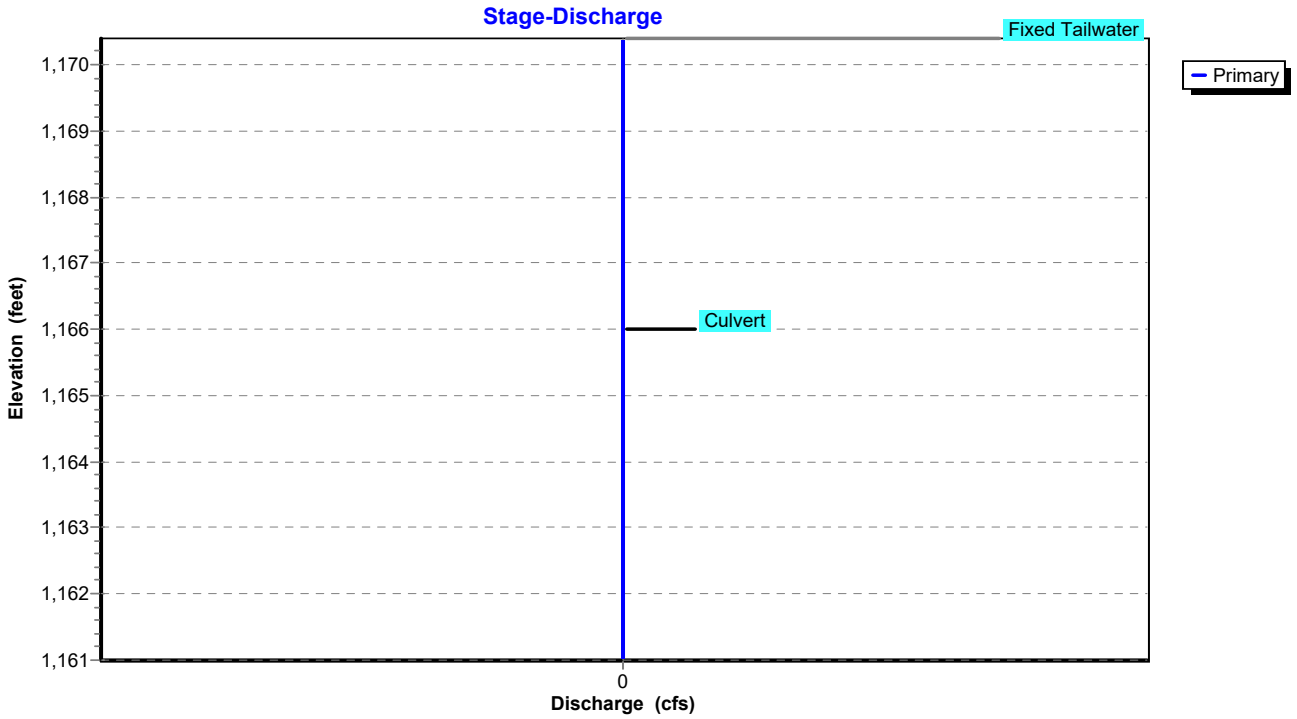
2 Chambers
149.9 cy Field
76.5 cy Stone



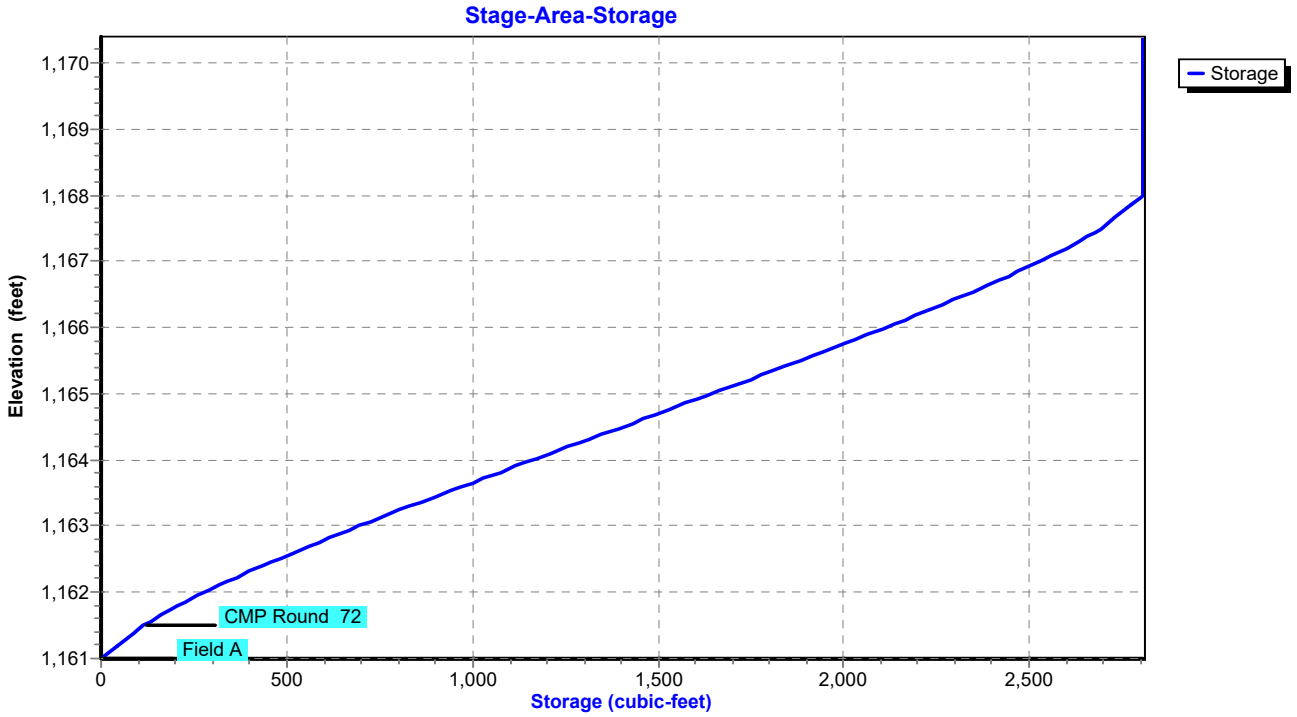
Pond 2P: Infiltration System - CMP



Pond 2P: Infiltration System - CMP



Pond 2P: Infiltration System - CMP



Hydrograph for Pond 2P: Infiltration System - CMP

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	1,161.00	0.00
0.10	0.01	1	1,161.00	0.00
0.20	0.04	9	1,161.04	0.00
0.30	0.06	26	1,161.11	0.00
0.40	0.06	48	1,161.21	0.00
0.50	0.06	69	1,161.30	0.00
0.60	0.06	91	1,161.39	0.00
0.70	0.06	112	1,161.49	0.00
0.80	0.06	134	1,161.57	0.00
0.90	0.06	156	1,161.64	0.00
1.00	0.06	177	1,161.71	0.00
1.10	0.06	199	1,161.77	0.00
1.20	0.06	220	1,161.84	0.00
1.30	0.06	242	1,161.90	0.00
1.40	0.06	264	1,161.96	0.00
1.50	0.06	285	1,162.02	0.00
1.60	0.07	309	1,162.08	0.00
1.70	0.07	334	1,162.15	0.00
1.80	0.07	359	1,162.21	0.00
1.90	0.07	384	1,162.27	0.00
2.00	0.07	410	1,162.34	0.00
2.10	0.07	435	1,162.40	0.00
2.20	0.07	460	1,162.46	0.00
2.30	0.07	485	1,162.52	0.00
2.40	0.07	510	1,162.58	0.00
2.50	0.07	536	1,162.64	0.00
2.60	0.07	561	1,162.70	0.00
2.70	0.07	586	1,162.75	0.00
2.80	0.07	611	1,162.81	0.00
2.90	0.07	636	1,162.87	0.00
3.00	0.07	662	1,162.93	0.00
3.10	0.07	687	1,162.98	0.00
3.20	0.07	712	1,163.04	0.00
3.30	0.07	737	1,163.09	0.00
3.40	0.07	762	1,163.15	0.00
3.50	0.07	788	1,163.20	0.00
3.60	0.07	813	1,163.26	0.00
3.70	0.07	838	1,163.31	0.00
3.80	0.07	863	1,163.37	0.00
3.90	0.07	888	1,163.42	0.00
4.00	0.07	914	1,163.48	0.00
4.10	0.07	939	1,163.53	0.00
4.20	0.07	964	1,163.58	0.00
4.30	0.07	989	1,163.64	0.00
4.40	0.07	1,014	1,163.69	0.00
4.50	0.07	1,040	1,163.74	0.00
4.60	0.07	1,065	1,163.80	0.00
4.70	0.07	1,090	1,163.85	0.00
4.80	0.07	1,115	1,163.90	0.00
4.90	0.07	1,140	1,163.95	0.00
5.00	0.08	1,167	1,164.01	0.00
5.10	0.08	1,196	1,164.07	0.00
5.20	0.08	1,225	1,164.13	0.00

Hydrograph for Pond 2P: Infiltration System - CMP (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
5.30	0.08	1,254	1,164.19	0.00
5.40	0.08	1,282	1,164.25	0.00
5.50	0.08	1,311	1,164.31	0.00
5.60	0.08	1,340	1,164.37	0.00
5.70	0.08	1,369	1,164.43	0.00
5.80	0.08	1,398	1,164.49	0.00
5.90	0.08	1,426	1,164.55	0.00
6.00	0.08	1,455	1,164.61	0.00
6.10	0.08	1,484	1,164.67	0.00
6.20	0.08	1,513	1,164.73	0.00
6.30	0.08	1,542	1,164.79	0.00
6.40	0.08	1,570	1,164.85	0.00
6.50	0.08	1,599	1,164.91	0.00
6.60	0.08	1,628	1,164.97	0.00
6.70	0.08	1,657	1,165.03	0.00
6.80	0.08	1,686	1,165.09	0.00
6.90	0.08	1,714	1,165.15	0.00
7.00	0.08	1,743	1,165.21	0.00
7.10	0.08	1,772	1,165.27	0.00
7.20	0.08	1,801	1,165.33	0.00
7.30	0.09	1,830	1,165.39	0.00
7.40	0.09	1,862	1,165.46	0.00
7.50	0.09	1,895	1,165.53	0.00
7.60	0.09	1,927	1,165.60	0.00
7.70	0.09	1,959	1,165.67	0.00
7.80	0.09	1,992	1,165.74	0.00
7.90	0.09	2,024	1,165.81	0.00
8.00	0.09	2,057	1,165.88	0.00
8.10	0.09	2,089	1,165.95	0.00
8.20	0.09	2,121	1,166.02	0.00
8.30	0.09	2,154	1,166.09	0.00
8.40	0.09	2,186	1,166.17	0.00
8.50	0.09	2,219	1,166.24	0.00
8.60	0.09	2,251	1,166.32	0.00
8.70	0.09	2,283	1,166.39	0.00
8.80	0.09	2,316	1,166.47	0.00
8.90	0.09	2,348	1,166.55	0.00
9.00	0.10	2,382	1,166.63	0.00
9.10	0.10	2,418	1,166.72	0.00
9.20	0.10	2,454	1,166.81	0.00
9.30	0.10	2,490	1,166.90	0.00
9.40	0.10	2,526	1,167.00	0.00
9.50	0.10	2,562	1,167.10	0.00
9.60	0.10	2,598	1,167.20	0.00
9.70	0.10	2,634	1,167.31	0.00
9.80	0.10	2,670	1,167.43	0.00
9.90	0.10	2,706	1,167.57	0.00
10.00	0.10	2,742	1,167.72	0.00
10.10	0.10	2,778	1,167.88	0.00
10.20	0.11	**2,806**	1,170.41	0.12
10.30	0.11	2,806	1,170.41	0.12
10.40	0.11	2,806	1,170.41	0.12
10.50	0.11	2,806	1,170.41	0.12

Hydrograph for Pond 2P: Infiltration System - CMP (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
10.60	0.11	2,806	1,170.41	0.12
10.70	0.11	2,806	1,170.41	0.12
10.80	0.11	2,806	1,170.41	0.12
10.90	0.11	2,806	1,170.41	0.12
11.00	0.11	2,806	1,170.41	0.12
11.10	0.11	2,806	1,170.41	0.12
11.20	0.12	2,806	1,170.41	0.13
11.30	0.12	2,806	1,170.41	0.13
11.40	0.12	2,806	1,170.41	0.13
11.50	0.12	2,806	1,170.41	0.13
11.60	0.12	2,806	1,170.41	0.13
11.70	0.12	2,806	1,170.41	0.13
11.80	0.13	2,806	1,170.41	0.14
11.90	0.13	2,806	1,170.41	0.14
12.00	0.13	2,806	1,170.41	0.14
12.10	0.13	2,806	1,170.41	0.14
12.20	0.13	2,806	1,170.41	0.14
12.30	0.13	2,806	1,170.41	0.14
12.40	0.13	2,806	1,170.41	0.14
12.50	0.13	2,806	1,170.41	0.14
12.60	0.14	2,806	1,170.41	0.15
12.70	0.14	2,806	1,170.41	0.15
12.80	0.14	2,806	1,170.41	0.15
12.90	0.14	2,806	1,170.41	0.15
13.00	0.14	2,806	1,170.41	0.15
13.10	0.15	2,806	1,170.41	0.16
13.20	0.15	2,806	1,170.41	0.16
13.30	0.15	2,806	1,170.41	0.16
13.40	0.16	2,806	1,170.41	0.17
13.50	0.16	2,806	1,170.41	0.17
13.60	0.16	2,806	1,170.41	0.17
13.70	0.16	2,806	1,170.41	0.18
13.80	0.17	2,806	1,170.41	0.18
13.90	0.17	2,806	1,170.41	0.18
14.00	0.18	2,806	1,170.41	0.19
14.10	0.18	2,806	1,170.41	0.19
14.20	0.18	2,806	1,170.41	0.19
14.30	0.18	2,806	1,170.41	0.19
14.40	0.18	2,806	1,170.41	0.19
14.50	0.19	2,806	1,170.41	0.20
14.60	0.20	2,806	1,170.41	0.21
14.70	0.20	2,806	1,170.41	0.22
14.80	0.22	2,806	1,170.41	0.23
14.90	0.22	2,806	1,170.41	0.23
15.00	0.23	2,806	1,170.41	0.24
15.10	0.24	2,806	1,170.41	0.25
15.20	0.26	2,806	1,170.41	0.27
15.30	0.28	2,806	1,170.41	0.29
15.40	0.30	2,806	1,170.42	0.32
15.50	0.37	2,806	1,170.42	0.38
15.60	0.45	2,806	1,170.42	0.46
15.70	0.50	2,806	1,170.42	0.51
15.80	0.57	2,806	1,170.43	0.58

Hydrograph for Pond 2P: Infiltration System - CMP (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
15.90	0.66	2,806	1,170.43	0.67
16.00	0.85	2,806	1,170.44	0.86
16.10	1.34	2,806	1,170.47	1.36
16.20	**1.84**	2,806	**1,170.49**	**1.85**
16.30	1.33	2,806	1,170.46	1.34
16.40	0.73	2,806	1,170.44	0.74
16.50	0.47	2,806	1,170.42	0.48
16.60	0.33	2,806	1,170.42	0.34
16.70	0.27	2,806	1,170.41	0.28
16.80	0.24	2,806	1,170.41	0.25
16.90	0.21	2,806	1,170.41	0.23
17.00	0.20	2,806	1,170.41	0.21
17.10	0.19	2,806	1,170.41	0.20
17.20	0.19	2,806	1,170.41	0.20
17.30	0.18	2,806	1,170.41	0.19
17.40	0.17	2,806	1,170.41	0.18
17.50	0.16	2,806	1,170.41	0.17
17.60	0.16	2,806	1,170.41	0.17
17.70	0.15	2,806	1,170.41	0.16
17.80	0.14	2,806	1,170.41	0.16
17.90	0.14	2,806	1,170.41	0.15
18.00	0.14	2,806	1,170.41	0.15
18.10	0.13	2,806	1,170.41	0.14
18.20	0.13	2,806	1,170.41	0.14
18.30	0.13	2,806	1,170.41	0.14
18.40	0.12	2,806	1,170.41	0.13
18.50	0.12	2,806	1,170.41	0.13
18.60	0.12	2,806	1,170.41	0.13
18.70	0.12	2,806	1,170.41	0.13
18.80	0.11	2,806	1,170.41	0.13
18.90	0.11	2,806	1,170.41	0.12
19.00	0.11	2,806	1,170.41	0.12
19.10	0.11	2,806	1,170.41	0.12
19.20	0.11	2,806	1,170.41	0.12
19.30	0.10	2,806	1,170.41	0.11
19.40	0.10	2,806	1,170.41	0.11
19.50	0.10	2,806	1,170.41	0.11
19.60	0.10	2,806	1,170.41	0.11
19.70	0.10	2,806	1,170.41	0.11
19.80	0.10	2,806	1,170.41	0.11
19.90	0.09	2,806	1,170.40	0.10
20.00	0.09	2,806	1,170.40	0.10
20.10	0.09	2,806	1,170.40	0.10
20.20	0.09	2,806	1,170.40	0.10
20.30	0.09	2,806	1,170.40	0.10
20.40	0.09	2,806	1,170.40	0.10
20.50	0.09	2,806	1,170.40	0.10
20.60	0.09	2,806	1,170.40	0.10
20.70	0.09	2,806	1,170.40	0.10
20.80	0.08	2,806	1,170.40	0.09
20.90	0.08	2,806	1,170.40	0.09
21.00	0.08	2,806	1,170.40	0.09
21.10	0.08	2,806	1,170.40	0.09

Hydrograph for Pond 2P: Infiltration System - CMP (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
21.20	0.08	2,806	1,170.40	0.09
21.30	0.08	2,806	1,170.40	0.09
21.40	0.08	2,806	1,170.40	0.09
21.50	0.08	2,806	1,170.40	0.09
21.60	0.08	2,806	1,170.40	0.09
21.70	0.08	2,806	1,170.40	0.09
21.80	0.08	2,806	1,170.40	0.09
21.90	0.07	2,806	1,170.40	0.08
22.00	0.07	2,806	1,170.40	0.08
22.10	0.07	2,806	1,170.40	0.08
22.20	0.07	2,806	1,170.40	0.08
22.30	0.07	2,806	1,170.40	0.08
22.40	0.07	2,806	1,170.40	0.08
22.50	0.07	2,806	1,170.40	0.08
22.60	0.07	2,806	1,170.40	0.08
22.70	0.07	2,806	1,170.40	0.08
22.80	0.07	2,806	1,170.40	0.08
22.90	0.07	2,806	1,170.40	0.08
23.00	0.07	2,806	1,170.40	0.08
23.10	0.07	2,806	1,170.40	0.08
23.20	0.07	2,806	1,170.40	0.08
23.30	0.07	2,806	1,170.40	0.08
23.40	0.07	2,806	1,170.40	0.08
23.50	0.07	2,806	1,170.40	0.08
23.60	0.06	2,806	1,170.40	0.07
23.70	0.06	2,806	1,170.40	0.07
23.80	0.06	2,806	1,170.40	0.07
23.90	0.06	2,806	1,170.40	0.07
24.00	0.06	2,806	1,170.40	0.07
24.10	0.00	2,806	1,170.31	0.00
24.20	0.00	2,806	1,170.31	0.00
24.30	0.00	2,806	1,170.31	0.00
24.40	0.00	2,806	1,170.31	0.00
24.50	0.00	2,806	1,170.31	0.00
24.60	0.00	2,806	1,170.31	0.00
24.70	0.00	2,806	1,170.31	0.00
24.80	0.00	2,806	1,170.31	0.00
24.90	0.00	2,806	1,170.31	0.00
25.00	0.00	2,806	1,170.31	0.00
25.10	0.00	2,806	1,170.31	0.00
25.20	0.00	2,806	1,170.31	0.00
25.30	0.00	2,806	1,170.31	0.00
25.40	0.00	2,806	1,170.31	0.00
25.50	0.00	2,806	1,170.31	0.00
25.60	0.00	2,806	1,170.31	0.00
25.70	0.00	2,806	1,170.31	0.00
25.80	0.00	2,806	1,170.31	0.00
25.90	0.00	2,806	1,170.31	0.00
26.00	0.00	2,806	1,170.31	0.00
26.10	0.00	2,806	1,170.31	0.00
26.20	0.00	2,806	1,170.31	0.00
26.30	0.00	2,806	1,170.31	0.00
26.40	0.00	2,806	1,170.31	0.00

Hydrograph for Pond 2P: Infiltration System - CMP (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
26.50	0.00	2,806	1,170.31	0.00
26.60	0.00	2,806	1,170.31	0.00
26.70	0.00	2,806	1,170.31	0.00
26.80	0.00	2,806	1,170.31	0.00
26.90	0.00	2,806	1,170.31	0.00
27.00	0.00	2,806	1,170.31	0.00
27.10	0.00	2,806	1,170.31	0.00
27.20	0.00	2,806	1,170.31	0.00
27.30	0.00	2,806	1,170.31	0.00
27.40	0.00	2,806	1,170.31	0.00
27.50	0.00	2,806	1,170.31	0.00
27.60	0.00	2,806	1,170.31	0.00
27.70	0.00	2,806	1,170.31	0.00
27.80	0.00	2,806	1,170.31	0.00
27.90	0.00	2,806	1,170.31	0.00
28.00	0.00	2,806	1,170.31	0.00

Stage-Discharge for Pond 2P: Infiltration System - CMP

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
1,161.00	0.00	1,166.30	0.00
1,161.10	0.00	1,166.40	0.00
1,161.20	0.00	1,166.50	0.00
1,161.30	0.00	1,166.60	0.00
1,161.40	0.00	1,166.70	0.00
1,161.50	0.00	1,166.80	0.00
1,161.60	0.00	1,166.90	0.00
1,161.70	0.00	1,167.00	0.00
1,161.80	0.00	1,167.10	0.00
1,161.90	0.00	1,167.20	0.00
1,162.00	0.00	1,167.30	0.00
1,162.10	0.00	1,167.40	0.00
1,162.20	0.00	1,167.50	0.00
1,162.30	0.00	1,167.60	0.00
1,162.40	0.00	1,167.70	0.00
1,162.50	0.00	1,167.80	0.00
1,162.60	0.00	1,167.90	0.00
1,162.70	0.00	1,168.00	0.00
1,162.80	0.00	1,168.10	0.00
1,162.90	0.00	1,168.20	0.00
1,163.00	0.00	1,168.30	0.00
1,163.10	0.00	1,168.40	0.00
1,163.20	0.00	1,168.50	0.00
1,163.30	0.00	1,168.60	0.00
1,163.40	0.00	1,168.70	0.00
1,163.50	0.00	1,168.80	0.00
1,163.60	0.00	1,168.90	0.00
1,163.70	0.00	1,169.00	0.00
1,163.80	0.00	1,169.10	0.00
1,163.90	0.00	1,169.20	0.00
1,164.00	0.00	1,169.30	0.00
1,164.10	0.00	1,169.40	0.00
1,164.20	0.00	1,169.50	0.00
1,164.30	0.00	1,169.60	0.00
1,164.40	0.00	1,169.70	0.00
1,164.50	0.00	1,169.80	0.00
1,164.60	0.00	1,169.90	0.00
1,164.70	0.00	1,170.00	0.00
1,164.80	0.00	1,170.10	0.00
1,164.90	0.00	1,170.20	0.00
1,165.00	0.00	1,170.30	0.00
1,165.10	0.00	1,170.40	**0.00**
1,165.20	0.00		
1,165.30	0.00		
1,165.40	0.00		
1,165.50	0.00		
1,165.60	0.00		
1,165.70	0.00		
1,165.80	0.00		
1,165.90	0.00		
1,166.00	0.00		
1,166.10	0.00		
1,166.20	0.00		

Stage-Area-Storage for Pond 2P: Infiltration System - CMP

Elevation (feet)	Storage (cubic-feet)
1,161.00	0
1,161.10	23
1,161.20	46
1,161.30	69
1,161.40	92
1,161.50	116
1,161.60	143
1,161.70	174
1,161.80	207
1,161.90	242
1,162.00	278
1,162.10	316
1,162.20	355
1,162.30	395
1,162.40	435
1,162.50	477
1,162.60	519
1,162.70	562
1,162.80	606
1,162.90	650
1,163.00	695
1,163.10	740
1,163.20	785
1,163.30	831
1,163.40	878
1,163.50	925
1,163.60	972
1,163.70	1,019
1,163.80	1,066
1,163.90	1,114
1,164.00	1,162
1,164.10	1,210
1,164.20	1,258
1,164.30	1,306
1,164.40	1,355
1,164.50	1,403
1,164.60	1,451
1,164.70	1,500
1,164.80	1,548
1,164.90	1,596
1,165.00	1,644
1,165.10	1,692
1,165.20	1,740
1,165.30	1,787
1,165.40	1,834
1,165.50	1,881
1,165.60	1,928
1,165.70	1,975
1,165.80	2,021
1,165.90	2,066
1,166.00	2,111
1,166.10	2,156
1,166.20	2,200
1,166.30	2,244
1,166.40	2,287
1,166.50	2,329
1,166.60	2,371
1,166.70	2,411
1,166.80	2,451
1,166.90	2,490
1,167.00	2,527
1,167.10	2,564
1,167.20	2,599
1,167.30	2,632
1,167.40	2,663
1,167.50	2,690
1,167.60	2,713
1,167.70	2,737
1,167.80	2,760
1,167.90	2,783
1,168.00	**2,806**
1,168.10	2,806
1,168.20	2,806
1,168.30	2,806
1,168.40	2,806
1,168.50	2,806
1,168.60	2,806
1,168.70	2,806
1,168.80	2,806
1,168.90	2,806
1,169.00	2,806
1,169.10	2,806
1,169.20	2,806
1,169.30	2,806
1,169.40	2,806
1,169.50	2,806
1,169.60	2,806
1,169.70	2,806
1,169.80	2,806
1,169.90	2,806
1,170.00	2,806
1,170.10	2,806
1,170.20	2,806
1,170.30	2,806
1,170.40	2,806

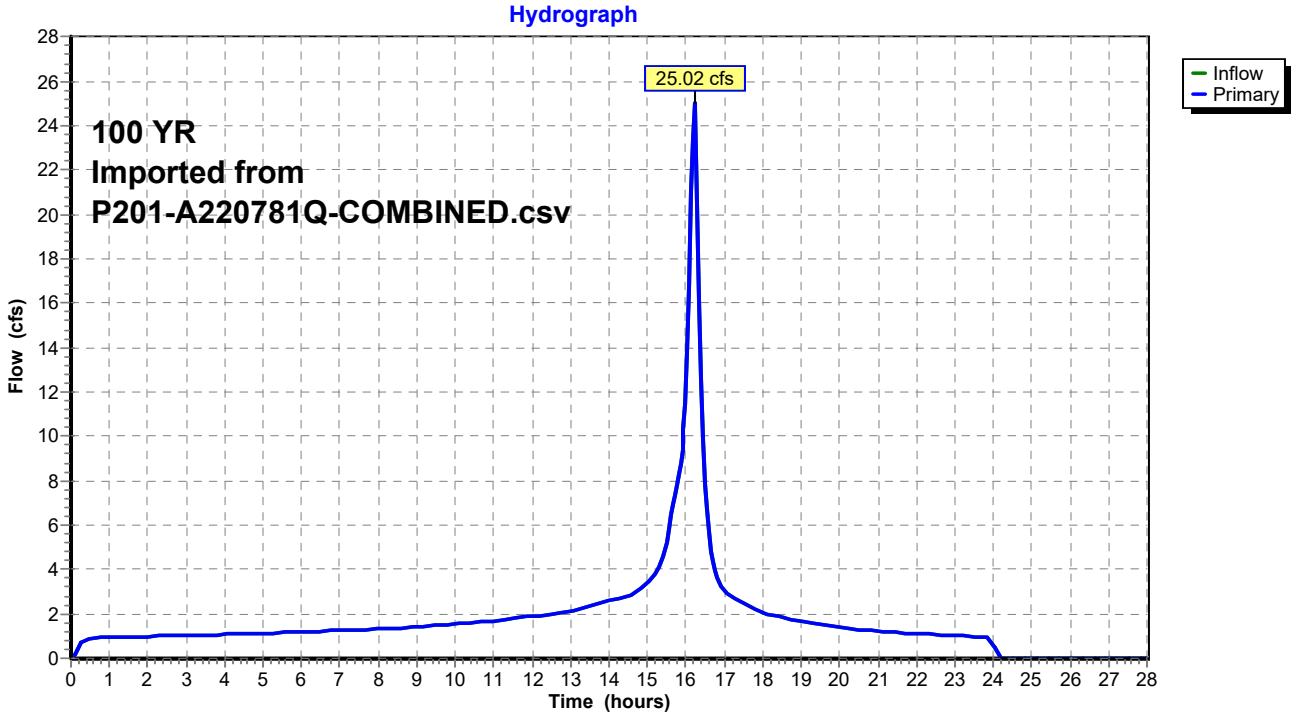
Summary for Link 1L: NODE 201-100 YEAR

Inflow = 25.02 cfs @ 16.24 hrs, Volume= 4.039 af
Primary = 25.02 cfs @ 16.24 hrs, Volume= 4.039 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs

100 YR Imported from P201-A220781Q-COMBINED.csv

Link 1L: NODE 201-100 YEAR



Hydrograph for Link 1L: NODE 201-100 YEAR

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	**0.00**	0.00	5.30	1.13	0.00	1.13
0.10	0.09	0.00	0.09	5.40	1.14	0.00	1.14
0.20	0.43	0.00	0.43	5.50	1.14	0.00	1.14
0.30	0.76	0.00	0.76	5.60	1.15	0.00	1.15
0.40	0.89	0.00	0.89	5.70	1.15	0.00	1.15
0.50	0.92	0.00	0.92	5.80	1.16	0.00	1.16
0.60	0.93	0.00	0.93	5.90	1.17	0.00	1.17
0.70	0.93	0.00	0.93	6.00	1.17	0.00	1.17
0.80	0.94	0.00	0.94	6.10	1.18	0.00	1.18
0.90	0.94	0.00	0.94	6.20	1.18	0.00	1.18
1.00	0.95	0.00	0.95	6.30	1.19	0.00	1.19
1.10	0.95	0.00	0.95	6.40	1.20	0.00	1.20
1.20	0.95	0.00	0.95	6.50	1.21	0.00	1.21
1.30	0.96	0.00	0.96	6.60	1.21	0.00	1.21
1.40	0.96	0.00	0.96	6.70	1.22	0.00	1.22
1.50	0.96	0.00	0.96	6.80	1.23	0.00	1.23
1.60	0.97	0.00	0.97	6.90	1.23	0.00	1.23
1.70	0.97	0.00	0.97	7.00	1.24	0.00	1.24
1.80	0.98	0.00	0.98	7.10	1.25	0.00	1.25
1.90	0.98	0.00	0.98	7.20	1.25	0.00	1.25
2.00	0.98	0.00	0.98	7.30	1.27	0.00	1.27
2.10	0.98	0.00	0.98	7.40	1.27	0.00	1.27
2.20	0.99	0.00	0.99	7.50	1.28	0.00	1.28
2.30	0.99	0.00	0.99	7.60	1.28	0.00	1.28
2.40	1.00	0.00	1.00	7.70	1.29	0.00	1.29
2.50	1.00	0.00	1.00	7.80	1.31	0.00	1.31
2.60	1.00	0.00	1.00	7.90	1.31	0.00	1.31
2.70	1.01	0.00	1.01	8.00	1.32	0.00	1.32
2.80	1.01	0.00	1.01	8.10	1.33	0.00	1.33
2.90	1.02	0.00	1.02	8.20	1.33	0.00	1.33
3.00	1.02	0.00	1.02	8.30	1.35	0.00	1.35
3.10	1.02	0.00	1.02	8.40	1.36	0.00	1.36
3.20	1.03	0.00	1.03	8.50	1.37	0.00	1.37
3.30	1.03	0.00	1.03	8.60	1.37	0.00	1.37
3.40	1.04	0.00	1.04	8.70	1.38	0.00	1.38
3.50	1.04	0.00	1.04	8.80	1.40	0.00	1.40
3.60	1.05	0.00	1.05	8.90	1.41	0.00	1.41
3.70	1.05	0.00	1.05	9.00	1.42	0.00	1.42
3.80	1.06	0.00	1.06	9.10	1.42	0.00	1.42
3.90	1.06	0.00	1.06	9.20	1.43	0.00	1.43
4.00	1.07	0.00	1.07	9.30	1.45	0.00	1.45
4.10	1.07	0.00	1.07	9.40	1.46	0.00	1.46
4.20	1.07	0.00	1.07	9.50	1.47	0.00	1.47
4.30	1.08	0.00	1.08	9.60	1.48	0.00	1.48
4.40	1.09	0.00	1.09	9.70	1.49	0.00	1.49
4.50	1.09	0.00	1.09	9.80	1.51	0.00	1.51
4.60	1.09	0.00	1.09	9.90	1.52	0.00	1.52
4.70	1.10	0.00	1.10	10.00	1.53	0.00	1.53
4.80	1.11	0.00	1.11	10.10	1.55	0.00	1.55
4.90	1.11	0.00	1.11	10.20	1.56	0.00	1.56
5.00	1.12	0.00	1.12	10.30	1.58	0.00	1.58
5.10	1.12	0.00	1.12	10.40	1.59	0.00	1.59
5.20	1.12	0.00	1.12	10.50	1.61	0.00	1.61

Hydrograph for Link 1L: NODE 201-100 YEAR (continued)

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
10.60	1.62	0.00	1.62	15.90	9.42	0.00	9.42
10.70	1.63	0.00	1.63	16.00	11.45	0.00	11.45
10.80	1.65	0.00	1.65	16.10	16.79	0.00	16.79
10.90	1.67	0.00	1.67	16.20	**23.44**	0.00	**23.44**
11.00	1.69	0.00	1.69	16.30	**20.30**	0.00	**20.30**
11.10	1.70	0.00	1.70	16.40	12.47	0.00	12.47
11.20	1.72	0.00	1.72	16.50	7.83	0.00	7.83
11.30	1.74	0.00	1.74	16.60	5.65	0.00	5.65
11.40	1.76	0.00	1.76	16.70	4.32	0.00	4.32
11.50	1.78	0.00	1.78	16.80	3.72	0.00	3.72
11.60	1.80	0.00	1.80	16.90	3.33	0.00	3.33
11.70	1.82	0.00	1.82	17.00	3.05	0.00	3.05
11.80	1.84	0.00	1.84	17.10	2.85	0.00	2.85
11.90	1.87	0.00	1.87	17.20	2.75	0.00	2.75
12.00	1.89	0.00	1.89	17.30	2.68	0.00	2.68
12.10	1.91	0.00	1.91	17.40	2.58	0.00	2.58
12.20	1.92	0.00	1.92	17.50	2.46	0.00	2.46
12.30	1.93	0.00	1.93	17.60	2.36	0.00	2.36
12.40	1.96	0.00	1.96	17.70	2.27	0.00	2.27
12.50	1.98	0.00	1.98	17.80	2.19	0.00	2.19
12.60	2.01	0.00	2.01	17.90	2.11	0.00	2.11
12.70	2.04	0.00	2.04	18.00	2.05	0.00	2.05
12.80	2.07	0.00	2.07	18.10	1.99	0.00	1.99
12.90	2.10	0.00	2.10	18.20	1.95	0.00	1.95
13.00	2.14	0.00	2.14	18.30	1.92	0.00	1.92
13.10	2.18	0.00	2.18	18.40	1.88	0.00	1.88
13.20	2.22	0.00	2.22	18.50	1.83	0.00	1.83
13.30	2.26	0.00	2.26	18.60	1.78	0.00	1.78
13.40	2.30	0.00	2.30	18.70	1.75	0.00	1.75
13.50	2.35	0.00	2.35	18.80	1.71	0.00	1.71
13.60	2.40	0.00	2.40	18.90	1.68	0.00	1.68
13.70	2.45	0.00	2.45	19.00	1.64	0.00	1.64
13.80	2.50	0.00	2.50	19.10	1.61	0.00	1.61
13.90	2.56	0.00	2.56	19.20	1.58	0.00	1.58
14.00	2.63	0.00	2.63	19.30	1.55	0.00	1.55
14.10	2.67	0.00	2.67	19.40	1.52	0.00	1.52
14.20	2.66	0.00	2.66	19.50	1.50	0.00	1.50
14.30	2.66	0.00	2.66	19.60	1.48	0.00	1.48
14.40	2.71	0.00	2.71	19.70	1.45	0.00	1.45
14.50	2.80	0.00	2.80	19.80	1.43	0.00	1.43
14.60	2.90	0.00	2.90	19.90	1.40	0.00	1.40
14.70	3.01	0.00	3.01	20.00	1.39	0.00	1.39
14.80	3.13	0.00	3.13	20.10	1.37	0.00	1.37
14.90	3.27	0.00	3.27	20.20	1.35	0.00	1.35
15.00	3.41	0.00	3.41	20.30	1.33	0.00	1.33
15.10	3.59	0.00	3.59	20.40	1.31	0.00	1.31
15.20	3.79	0.00	3.79	20.50	1.30	0.00	1.30
15.30	4.03	0.00	4.03	20.60	1.28	0.00	1.28
15.40	4.38	0.00	4.38	20.70	1.27	0.00	1.27
15.50	5.20	0.00	5.20	20.80	1.25	0.00	1.25
15.60	6.43	0.00	6.43	20.90	1.23	0.00	1.23
15.70	7.37	0.00	7.37	21.00	1.22	0.00	1.22
15.80	8.26	0.00	8.26	21.10	1.21	0.00	1.21

Hydrograph for Link 1L: NODE 201-100 YEAR (continued)

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
21.20	1.20	0.00	1.20
21.30	1.18	0.00	1.18
21.40	1.17	0.00	1.17
21.50	1.16	0.00	1.16
21.60	1.15	0.00	1.15
21.70	1.14	0.00	1.14
21.80	1.12	0.00	1.12
21.90	1.11	0.00	1.11
22.00	1.10	0.00	1.10
22.10	1.09	0.00	1.09
22.20	1.08	0.00	1.08
22.30	1.07	0.00	1.07
22.40	1.06	0.00	1.06
22.50	1.05	0.00	1.05
22.60	1.04	0.00	1.04
22.70	1.04	0.00	1.04
22.80	1.02	0.00	1.02
22.90	1.02	0.00	1.02
23.00	1.01	0.00	1.01
23.10	1.00	0.00	1.00
23.20	1.00	0.00	1.00
23.30	0.98	0.00	0.98
23.40	0.98	0.00	0.98
23.50	0.97	0.00	0.97
23.60	0.97	0.00	0.97
23.70	0.96	0.00	0.96
23.80	0.95	0.00	0.95
23.90	0.94	0.00	0.94
24.00	0.94	0.00	0.94
24.10	0.00	0.00	0.00
24.20	0.00	0.00	0.00
24.30	0.00	0.00	0.00
24.40	0.00	0.00	0.00
24.50	0.00	0.00	0.00
24.60	0.00	0.00	0.00
24.70	0.00	0.00	0.00
24.80	0.00	0.00	0.00
24.90	0.00	0.00	0.00
25.00	0.00	0.00	0.00
25.10	0.00	0.00	0.00
25.20	0.00	0.00	0.00
25.30	0.00	0.00	0.00
25.40	0.00	0.00	0.00
25.50	0.00	0.00	0.00
25.60	0.00	0.00	0.00
25.70	0.00	0.00	0.00
25.80	0.00	0.00	0.00
25.90	0.00	0.00	0.00
26.00	0.00	0.00	0.00
26.10	0.00	0.00	0.00
26.20	0.00	0.00	0.00
26.30	0.00	0.00	0.00
26.40	0.00	0.00	0.00
26.50	0.00	0.00	0.00
26.60	0.00	0.00	0.00
26.70	0.00	0.00	0.00
26.80	0.00	0.00	0.00
26.90	0.00	0.00	0.00
27.00	0.00	0.00	0.00
27.10	0.00	0.00	0.00
27.20	0.00	0.00	0.00
27.30	0.00	0.00	0.00
27.40	0.00	0.00	0.00
27.50	0.00	0.00	0.00
27.60	0.00	0.00	0.00
27.70	0.00	0.00	0.00
27.80	0.00	0.00	0.00
27.90	0.00	0.00	0.00
28.00	0.00	0.00	0.00

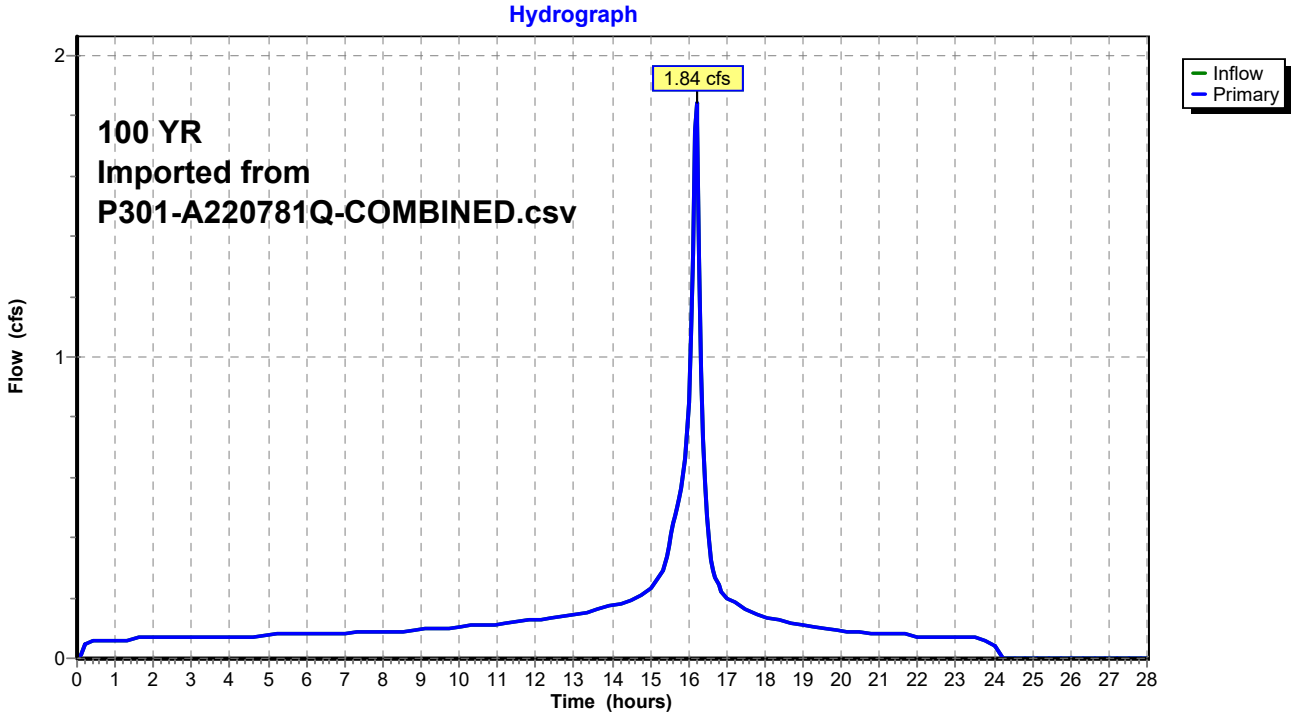
Summary for Link 2L: NODE 301-100 YEAR

Inflow = 1.84 cfs @ 16.21 hrs, Volume= 0.275 af
Primary = 1.84 cfs @ 16.21 hrs, Volume= 0.275 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs

100 YR Imported from P301-A220781Q-COMBINED.csv

Link 2L: NODE 301-100 YEAR



Hydrograph for Link 2L: NODE 301-100 YEAR

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	**0.00**	0.00	5.30	0.08	0.00	0.08
0.10	0.01	0.00	0.01	5.40	0.08	0.00	0.08
0.20	0.04	0.00	0.04	5.50	0.08	0.00	0.08
0.30	0.06	0.00	0.06	5.60	0.08	0.00	0.08
0.40	0.06	0.00	0.06	5.70	0.08	0.00	0.08
0.50	0.06	0.00	0.06	5.80	0.08	0.00	0.08
0.60	0.06	0.00	0.06	5.90	0.08	0.00	0.08
0.70	0.06	0.00	0.06	6.00	0.08	0.00	0.08
0.80	0.06	0.00	0.06	6.10	0.08	0.00	0.08
0.90	0.06	0.00	0.06	6.20	0.08	0.00	0.08
1.00	0.06	0.00	0.06	6.30	0.08	0.00	0.08
1.10	0.06	0.00	0.06	6.40	0.08	0.00	0.08
1.20	0.06	0.00	0.06	6.50	0.08	0.00	0.08
1.30	0.06	0.00	0.06	6.60	0.08	0.00	0.08
1.40	0.06	0.00	0.06	6.70	0.08	0.00	0.08
1.50	0.06	0.00	0.06	6.80	0.08	0.00	0.08
1.60	0.07	0.00	0.07	6.90	0.08	0.00	0.08
1.70	0.07	0.00	0.07	7.00	0.08	0.00	0.08
1.80	0.07	0.00	0.07	7.10	0.08	0.00	0.08
1.90	0.07	0.00	0.07	7.20	0.08	0.00	0.08
2.00	0.07	0.00	0.07	7.30	0.09	0.00	0.09
2.10	0.07	0.00	0.07	7.40	0.09	0.00	0.09
2.20	0.07	0.00	0.07	7.50	0.09	0.00	0.09
2.30	0.07	0.00	0.07	7.60	0.09	0.00	0.09
2.40	0.07	0.00	0.07	7.70	0.09	0.00	0.09
2.50	0.07	0.00	0.07	7.80	0.09	0.00	0.09
2.60	0.07	0.00	0.07	7.90	0.09	0.00	0.09
2.70	0.07	0.00	0.07	8.00	0.09	0.00	0.09
2.80	0.07	0.00	0.07	8.10	0.09	0.00	0.09
2.90	0.07	0.00	0.07	8.20	0.09	0.00	0.09
3.00	0.07	0.00	0.07	8.30	0.09	0.00	0.09
3.10	0.07	0.00	0.07	8.40	0.09	0.00	0.09
3.20	0.07	0.00	0.07	8.50	0.09	0.00	0.09
3.30	0.07	0.00	0.07	8.60	0.09	0.00	0.09
3.40	0.07	0.00	0.07	8.70	0.09	0.00	0.09
3.50	0.07	0.00	0.07	8.80	0.09	0.00	0.09
3.60	0.07	0.00	0.07	8.90	0.09	0.00	0.09
3.70	0.07	0.00	0.07	9.00	0.10	0.00	0.10
3.80	0.07	0.00	0.07	9.10	0.10	0.00	0.10
3.90	0.07	0.00	0.07	9.20	0.10	0.00	0.10
4.00	0.07	0.00	0.07	9.30	0.10	0.00	0.10
4.10	0.07	0.00	0.07	9.40	0.10	0.00	0.10
4.20	0.07	0.00	0.07	9.50	0.10	0.00	0.10
4.30	0.07	0.00	0.07	9.60	0.10	0.00	0.10
4.40	0.07	0.00	0.07	9.70	0.10	0.00	0.10
4.50	0.07	0.00	0.07	9.80	0.10	0.00	0.10
4.60	0.07	0.00	0.07	9.90	0.10	0.00	0.10
4.70	0.07	0.00	0.07	10.00	0.10	0.00	0.10
4.80	0.07	0.00	0.07	10.10	0.10	0.00	0.10
4.90	0.07	0.00	0.07	10.20	0.11	0.00	0.11
5.00	0.08	0.00	0.08	10.30	0.11	0.00	0.11
5.10	0.08	0.00	0.08	10.40	0.11	0.00	0.11
5.20	0.08	0.00	0.08	10.50	0.11	0.00	0.11

Hydrograph for Link 2L: NODE 301-100 YEAR (continued)

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
10.60	0.11	0.00	0.11	15.90	0.66	0.00	0.66
10.70	0.11	0.00	0.11	16.00	0.85	0.00	0.85
10.80	0.11	0.00	0.11	16.10	1.34	0.00	1.34
10.90	0.11	0.00	0.11	16.20	**1.84**	0.00	**1.84**
11.00	0.11	0.00	0.11	16.30	1.33	0.00	1.33
11.10	0.11	0.00	0.11	16.40	0.73	0.00	0.73
11.20	0.12	0.00	0.12	16.50	0.47	0.00	0.47
11.30	0.12	0.00	0.12	16.60	0.33	0.00	0.33
11.40	0.12	0.00	0.12	16.70	0.27	0.00	0.27
11.50	0.12	0.00	0.12	16.80	0.24	0.00	0.24
11.60	0.12	0.00	0.12	16.90	0.21	0.00	0.21
11.70	0.12	0.00	0.12	17.00	0.20	0.00	0.20
11.80	0.13	0.00	0.13	17.10	0.19	0.00	0.19
11.90	0.13	0.00	0.13	17.20	0.19	0.00	0.19
12.00	0.13	0.00	0.13	17.30	0.18	0.00	0.18
12.10	0.13	0.00	0.13	17.40	0.17	0.00	0.17
12.20	0.13	0.00	0.13	17.50	0.16	0.00	0.16
12.30	0.13	0.00	0.13	17.60	0.16	0.00	0.16
12.40	0.13	0.00	0.13	17.70	0.15	0.00	0.15
12.50	0.13	0.00	0.13	17.80	0.14	0.00	0.14
12.60	0.14	0.00	0.14	17.90	0.14	0.00	0.14
12.70	0.14	0.00	0.14	18.00	0.14	0.00	0.14
12.80	0.14	0.00	0.14	18.10	0.13	0.00	0.13
12.90	0.14	0.00	0.14	18.20	0.13	0.00	0.13
13.00	0.14	0.00	0.14	18.30	0.13	0.00	0.13
13.10	0.15	0.00	0.15	18.40	0.12	0.00	0.12
13.20	0.15	0.00	0.15	18.50	0.12	0.00	0.12
13.30	0.15	0.00	0.15	18.60	0.12	0.00	0.12
13.40	0.16	0.00	0.16	18.70	0.12	0.00	0.12
13.50	0.16	0.00	0.16	18.80	0.11	0.00	0.11
13.60	0.16	0.00	0.16	18.90	0.11	0.00	0.11
13.70	0.16	0.00	0.16	19.00	0.11	0.00	0.11
13.80	0.17	0.00	0.17	19.10	0.11	0.00	0.11
13.90	0.17	0.00	0.17	19.20	0.11	0.00	0.11
14.00	0.18	0.00	0.18	19.30	0.10	0.00	0.10
14.10	0.18	0.00	0.18	19.40	0.10	0.00	0.10
14.20	0.18	0.00	0.18	19.50	0.10	0.00	0.10
14.30	0.18	0.00	0.18	19.60	0.10	0.00	0.10
14.40	0.18	0.00	0.18	19.70	0.10	0.00	0.10
14.50	0.19	0.00	0.19	19.80	0.10	0.00	0.10
14.60	0.20	0.00	0.20	19.90	0.09	0.00	0.09
14.70	0.20	0.00	0.20	20.00	0.09	0.00	0.09
14.80	0.22	0.00	0.22	20.10	0.09	0.00	0.09
14.90	0.22	0.00	0.22	20.20	0.09	0.00	0.09
15.00	0.23	0.00	0.23	20.30	0.09	0.00	0.09
15.10	0.24	0.00	0.24	20.40	0.09	0.00	0.09
15.20	0.26	0.00	0.26	20.50	0.09	0.00	0.09
15.30	0.28	0.00	0.28	20.60	0.09	0.00	0.09
15.40	0.30	0.00	0.30	20.70	0.09	0.00	0.09
15.50	0.37	0.00	0.37	20.80	0.08	0.00	0.08
15.60	0.45	0.00	0.45	20.90	0.08	0.00	0.08
15.70	0.50	0.00	0.50	21.00	0.08	0.00	0.08
15.80	0.57	0.00	0.57	21.10	0.08	0.00	0.08

Hydrograph for Link 2L: NODE 301-100 YEAR (continued)

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
21.20	0.08	0.00	0.08
21.30	0.08	0.00	0.08
21.40	0.08	0.00	0.08
21.50	0.08	0.00	0.08
21.60	0.08	0.00	0.08
21.70	0.08	0.00	0.08
21.80	0.08	0.00	0.08
21.90	0.07	0.00	0.07
22.00	0.07	0.00	0.07
22.10	0.07	0.00	0.07
22.20	0.07	0.00	0.07
22.30	0.07	0.00	0.07
22.40	0.07	0.00	0.07
22.50	0.07	0.00	0.07
22.60	0.07	0.00	0.07
22.70	0.07	0.00	0.07
22.80	0.07	0.00	0.07
22.90	0.07	0.00	0.07
23.00	0.07	0.00	0.07
23.10	0.07	0.00	0.07
23.20	0.07	0.00	0.07
23.30	0.07	0.00	0.07
23.40	0.07	0.00	0.07
23.50	0.07	0.00	0.07
23.60	0.06	0.00	0.06
23.70	0.06	0.00	0.06
23.80	0.06	0.00	0.06
23.90	0.06	0.00	0.06
24.00	0.06	0.00	0.06
24.10	0.00	0.00	0.00
24.20	0.00	0.00	0.00
24.30	0.00	0.00	0.00
24.40	0.00	0.00	0.00
24.50	0.00	0.00	0.00
24.60	0.00	0.00	0.00
24.70	0.00	0.00	0.00
24.80	0.00	0.00	0.00
24.90	0.00	0.00	0.00
25.00	0.00	0.00	0.00
25.10	0.00	0.00	0.00
25.20	0.00	0.00	0.00
25.30	0.00	0.00	0.00
25.40	0.00	0.00	0.00
25.50	0.00	0.00	0.00
25.60	0.00	0.00	0.00
25.70	0.00	0.00	0.00
25.80	0.00	0.00	0.00
25.90	0.00	0.00	0.00
26.00	0.00	0.00	0.00
26.10	0.00	0.00	0.00
26.20	0.00	0.00	0.00
26.30	0.00	0.00	0.00
26.40	0.00	0.00	0.00
26.50	0.00	0.00	0.00
26.60	0.00	0.00	0.00
26.70	0.00	0.00	0.00
26.80	0.00	0.00	0.00
26.90	0.00	0.00	0.00
27.00	0.00	0.00	0.00
27.10	0.00	0.00	0.00
27.20	0.00	0.00	0.00
27.30	0.00	0.00	0.00
27.40	0.00	0.00	0.00
27.50	0.00	0.00	0.00
27.60	0.00	0.00	0.00
27.70	0.00	0.00	0.00
27.80	0.00	0.00	0.00
27.90	0.00	0.00	0.00
28.00	0.00	0.00	0.00

FTH STREET
WIDE PUBLIC R/W)

FIFTH STREET

BASIS OF BEARINGS

PONDING LEVEL 1172.36 FOR
100-YEAR 24-HR STORM EVENT

CB

16,625 SF

5,785 SF

HYDRODYNAMIC
SEPARATOR (HDS)

DIVERSION
MANHOLE

PONDING LEVEL 1172.36 FOR
100-YEAR 24-HR STORM EVENT

INF #1
PROPOSED
INFILTRATION/DETENTION
SYSTEM

CB

INF #2
PROPOSED
INFILTRATION/DETENTION
SYSTEM

BUBBLER

CB

PARKWAY
CULVERT

THIRD STREET
(100' WIDE PUBLIC R/W)

THIRD STREET

N87°17'19"W 2649.58'

NORTH

0 15 30 60 90

Scale 1" = 30'

LEGEND

TRIBUTARY AREA LIMITS

DIRECTION OF FLOW

NODE
AREA

REVISION BY NO.

REVISION BY NO.

REGISTERED PROFESSIONAL ENGINEER
DAVID G. READER
No. 76867
CIVIL
STATE OF CALIFORNIA

KIER+WRIGHT
163 Technology Drive
Irvine, CA 92620
Phone: (949) 508-0202
www.kierwright.com

100-YR 24-HR STORM EVENT PONDING EXHIBIT
OF
EAST BUILDING
E. 3RD STREET & CENTRAL AVENUE
FOR
CROW HOLDINGS
HIGHLAND, CALIFORNIA

DATE	JANUARY, 2023
SCALE	AS SHOWN
DESIGNER	JO
DRAWN BY	STAFF
JOB NO.	A22078-1
SHEET	

C:\Users\jmcmahon\appdata\local\temp\AcPublish_13368\A22078-1-PO-HYDRO - PONDING EXHIBIT.dwg 2-24-23 11:08:15 AM jmcmahon

NOAA Atlas 14, Volume 6, Version 2
Location name: Highland, California, USA*
Latitude: 34.1065°, Longitude: -117.2176°
Elevation: 1165.61 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	0.103 (0.086-0.125)	0.135 (0.112-0.164)	0.178 (0.148-0.217)	0.215 (0.176-0.264)	0.266 (0.211-0.338)	0.306 (0.238-0.398)	0.349 (0.264-0.465)	0.394 (0.290-0.541)	0.458 (0.323-0.656)	0.510 (0.348-0.756)
10-min	0.147 (0.123-0.179)	0.193 (0.161-0.235)	0.256 (0.212-0.312)	0.308 (0.253-0.378)	0.381 (0.302-0.484)	0.439 (0.341-0.571)	0.500 (0.379-0.667)	0.565 (0.416-0.775)	0.657 (0.464-0.940)	0.731 (0.498-1.08)
15-min	0.178 (0.148-0.217)	0.234 (0.194-0.285)	0.309 (0.256-0.377)	0.372 (0.306-0.457)	0.460 (0.366-0.586)	0.531 (0.413-0.690)	0.605 (0.458-0.806)	0.683 (0.503-0.938)	0.794 (0.561-1.14)	0.884 (0.602-1.31)
30-min	0.268 (0.223-0.326)	0.352 (0.292-0.428)	0.465 (0.385-0.567)	0.560 (0.460-0.688)	0.693 (0.550-0.881)	0.799 (0.621-1.04)	0.910 (0.690-1.21)	1.03 (0.757-1.41)	1.20 (0.843-1.71)	1.33 (0.906-1.97)
60-min	0.393 (0.327-0.477)	0.515 (0.428-0.627)	0.681 (0.564-0.830)	0.819 (0.673-1.01)	1.01 (0.805-1.29)	1.17 (0.909-1.52)	1.33 (1.01-1.78)	1.51 (1.11-2.07)	1.75 (1.24-2.50)	1.95 (1.33-2.89)
2-hr	0.564 (0.469-0.684)	0.725 (0.602-0.882)	0.941 (0.779-1.15)	1.12 (0.919-1.38)	1.37 (1.08-1.74)	1.56 (1.21-2.03)	1.76 (1.33-2.35)	1.97 (1.45-2.70)	2.26 (1.59-3.23)	2.49 (1.69-3.69)
3-hr	0.692 (0.575-0.840)	0.884 (0.734-1.08)	1.14 (0.943-1.39)	1.35 (1.11-1.66)	1.64 (1.30-2.08)	1.86 (1.45-2.42)	2.09 (1.59-2.79)	2.33 (1.72-3.20)	2.66 (1.88-3.81)	2.92 (1.99-4.33)
6-hr	0.966 (0.803-1.17)	1.23 (1.02-1.49)	1.58 (1.31-1.92)	1.86 (1.53-2.28)	2.24 (1.78-2.86)	2.54 (1.98-3.31)	2.85 (2.16-3.79)	3.16 (2.33-4.33)	3.59 (2.53-5.13)	3.92 (2.67-5.81)
12-hr	1.28 (1.06-1.55)	1.64 (1.37-2.00)	2.12 (1.75-2.58)	2.50 (2.06-3.08)	3.03 (2.40-3.85)	3.43 (2.66-4.45)	3.83 (2.90-5.11)	4.25 (3.13-5.83)	4.81 (3.39-6.88)	5.24 (3.57-7.77)
24-hr	1.73 (1.53-1.99)	2.25 (1.99-2.60)	2.93 (2.59-3.39)	3.49 (3.05-4.07)	4.24 (3.59-5.10)	4.81 (3.99-5.91)	5.38 (4.36-6.78)	5.97 (4.71-7.73)	6.77 (5.12-9.13)	7.38 (5.40-10.3)
2-day	2.12 (1.88-2.45)	2.81 (2.48-3.24)	3.70 (3.26-4.28)	4.43 (3.88-5.17)	5.42 (4.60-6.54)	6.19 (5.14-7.61)	6.97 (5.65-8.78)	7.77 (6.13-10.1)	8.86 (6.71-12.0)	9.71 (7.10-13.5)
3-day	2.30 (2.04-2.66)	3.07 (2.72-3.55)	4.09 (3.61-4.74)	4.93 (4.32-5.75)	6.09 (5.16-7.34)	6.99 (5.80-8.59)	7.91 (6.41-9.96)	8.86 (6.99-11.5)	10.2 (7.70-13.7)	11.2 (8.19-15.6)
4-day	2.47 (2.19-2.85)	3.33 (2.94-3.84)	4.46 (3.94-5.16)	5.40 (4.73-6.30)	6.70 (5.68-8.07)	7.72 (6.40-9.49)	8.76 (7.10-11.0)	9.86 (7.77-12.8)	11.4 (8.60-15.3)	12.5 (9.18-17.5)
7-day	2.83 (2.50-3.26)	3.86 (3.41-4.45)	5.24 (4.62-6.06)	6.39 (5.59-7.45)	7.99 (6.76-9.62)	9.24 (7.67-11.4)	10.5 (8.54-13.3)	11.9 (9.38-15.4)	13.8 (10.4-18.6)	15.3 (11.2-21.3)
10-day	3.06 (2.71-3.52)	4.21 (3.73-4.86)	5.77 (5.09-6.67)	7.06 (6.18-8.24)	8.87 (7.51-10.7)	10.3 (8.54-12.7)	11.8 (9.53-14.8)	13.3 (10.5-17.2)	15.5 (11.7-20.9)	17.2 (12.6-24.0)
20-day	3.76 (3.33-4.34)	5.25 (4.64-6.05)	7.26 (6.40-8.40)	8.95 (7.83-10.4)	11.3 (9.58-13.6)	13.2 (10.9-16.2)	15.1 (12.3-19.1)	17.2 (13.6-22.3)	20.1 (15.2-27.1)	22.4 (16.4-31.2)
30-day	4.43 (3.93-5.11)	6.18 (5.47-7.13)	8.56 (7.55-9.90)	10.6 (9.24-12.3)	13.4 (11.3-16.1)	15.6 (13.0-19.2)	17.9 (14.5-22.6)	20.4 (16.1-26.4)	23.9 (18.1-32.2)	26.6 (19.5-37.2)
45-day	5.33 (4.72-6.14)	7.36 (6.51-8.49)	10.1 (8.94-11.7)	12.5 (10.9-14.6)	15.8 (13.4-19.0)	18.4 (15.3-22.7)	21.2 (17.2-26.7)	24.1 (19.0-31.2)	28.2 (21.4-38.1)	31.5 (23.1-44.0)
60-day	6.26 (5.54-7.21)	8.55 (7.56-9.86)	11.7 (10.3-13.5)	14.3 (12.5-16.7)	18.1 (15.3-21.7)	21.0 (17.5-25.9)	24.2 (19.6-30.4)	27.5 (21.7-35.6)	32.2 (24.3-43.4)	35.9 (26.3-50.1)

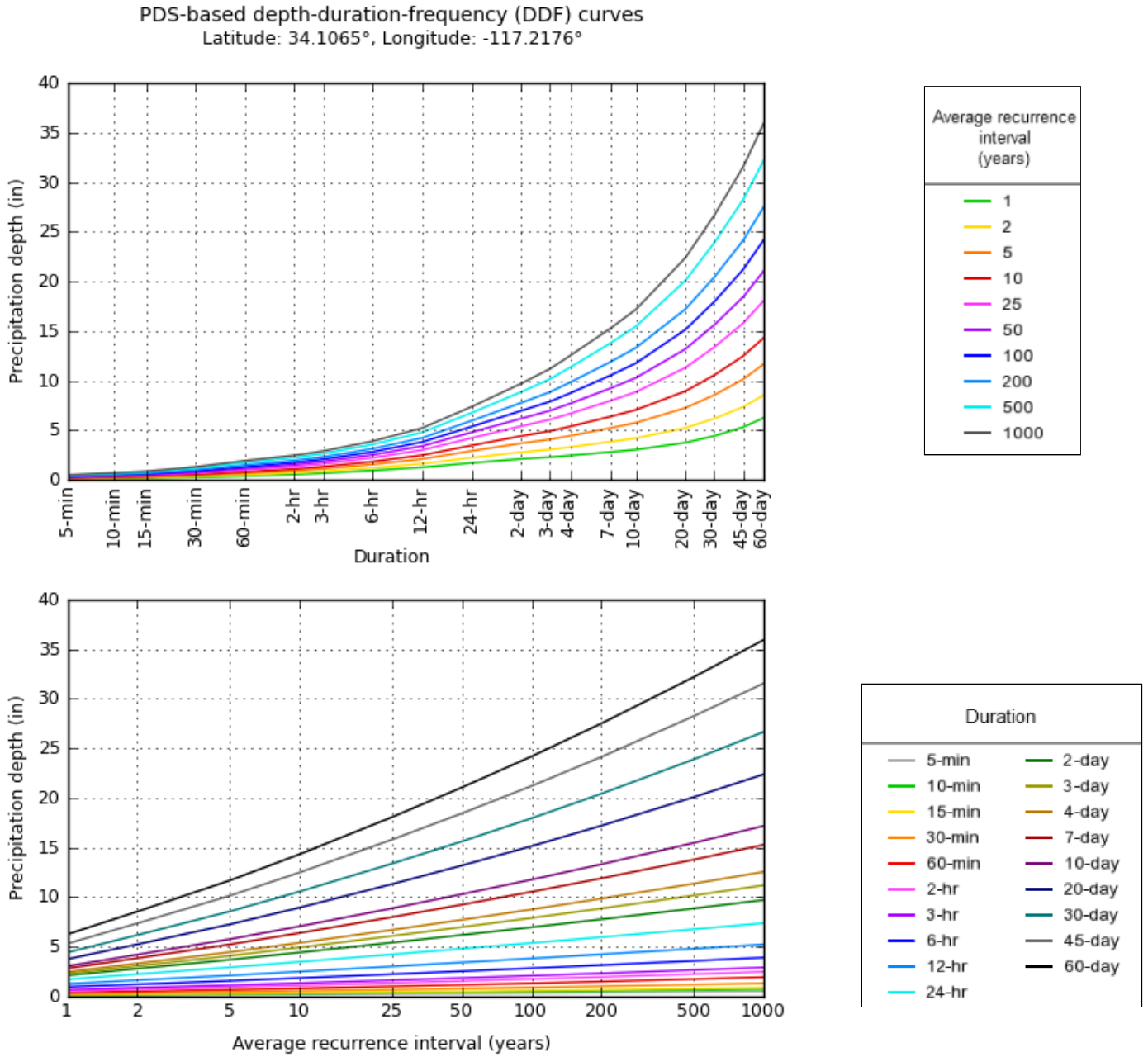
[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

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



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Maps & aerials

Small scale terrain



Large scale terrain



Large scale map



Large scale aerial



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