Preliminary
Water Quality Management Plan

For:

TENTATIVE PARCEL MAP 19756

CITY OF CHINO

Prepared for:

Richland Communities

4100 Newport Place, Suite 800

Newport Beach, CA 92660

949-261-7010

Prepared by:

PROACTIVE ENGINEERING CONSULTANTS INC.

200 South Main Street, Suite 300

Corona, CA 92882

951-280-3300

Approval Date:_____

Project Owner's Certification

This Water Quality Management Plan (WQMP) has been prepared for Richland Communities by Proactive Engineering. The WQMP is intended to comply with the requirements of the City of Chino and the NPDES Areawide 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):	PL16-0456 TPM 19756 PL16-0457 Master Site Approval PL17-0042 Special Conditional Use Permit PL17-0044 Site Approval	Grading Permit Number(s):	TBD
Tract/Parcel Map Number(s):	TPM 19756	Building Permit Number(s):	TBD
CUP, SUP, and/or APN (Specify Lot Numbers if Portions of Tract):			TBD

Owner's Signature	
Owner Name: John H. Schafer	
Title	Senior Vice President
Company	Oakville Reserve, Ltd.
Address	3161 Michelson Drive, Suite 425 Irvine, CA 92612
Email	Jschafer@richlandcommunities.com

Telephone #	949-383-4127	
Signature	Date	

Preparer's Certification

Project Data			
Permit/Application Number(s):	PL16-0456 TPM 19756 PL16-0457 Master Site Approval PL17-0042 Special Conditional Use Permit PL17-0044 Site Approval	Grading Permit Number(s):	TBD
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CUP, SUP, and/or APN (Specify Lot Numbers if Portions of Tract):			TBD

"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: Thomas E Braun, P.E.		PE Stamp Below
Title	Principal	
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Signature		
Date	2/1/19	



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Section 1 Discretionary Permit(s)

Form 1-1 Project Information

Project Name	Tentative Parcel Map 19756				
Project Owner Contact Name:	John H. Schafer				
Mailing Address:	3161 Michelson Drive, Suite 425 Newport Beach, CA 92660	E-mail Address:	jschafer@richlandcommunities.com	Telephone:	949-383-4127
Permit/Application Number(s):	PL16-0456 TPM 19756 PL16-0457 Master Site Approval PL17-0042 Special Conditional Use Permit PL17-0044 Site Approval		Tract/Parcel Map Number(s):	TPM 19756	
Additional Information/ Comments:	TBD				
Description of Project:	Tentative Parcel Map 19756 will be constructed as a new industrial development. TPM 19756 is approximately 72 acres and was included in The Preserve Specific Plan. The proposed development will consist of industrial buildings. The vacant lot located on the northeast corner of the Mayhew/Bickmore intersection will remain as it currently exists, grassy open space. The Chino Airport is located immediately north of TPM 19576, across Kimball Avenue. The proposed condition just described is known as the developed condition and it is the condition evaluated in this Water Quality Management Plan (WQMP). In the existing condition, TPM 19756 is also grassy open space and was likely used for dairy farm purposes in the past. There are no existing structures. The entire site slopes gently from the northeast corner to the southwest corner at approximately 0.9-1.2%. Runoff from TPM 19756 flows south towards Bickmore Avenue and ultimately towards an existing earthen ditch in Mayhew Avenue. In the proposed conditions, drainage is primarily retained within TPM 19756 by a network of detention basins. See Detention Basin Configuration (Exhibit B) in Appendix A. The Preserve Specific Plan proposed that a 78” storm drain line be built in Mayhew Avenue, which borders Parcel 2 on the south. The 78” storm drain would lead to a detention/water quality basin that would discharge into Prado Park Lake; however, this storm drain line and water quality basin have not been built. As part of this project, the portion of the 78" storm drain line in Mayhew Avenue will be built and water discharged into an existing drainage ditch in Mayhew Avenue after going through on-site infiltration basins (for water quality purposes) and storm drain lines.				

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 ft² or more of impervious surface on an already developed site	☒ New development involving the creation of 10,000 ft² 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 ft² or more
☐ Hillside developments of 5,000 ft² 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 ft² 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 ft² or more exposed to storm water	☐ Retail gasoline outlets that are either 5,000 ft² 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):	3,155,295	**3** Number of Dwelling Units:	18 BLDGS	**4** SIC Code:	6552 Land Subdividers & Developers

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:

Industrial Areas: (DA No. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10)

Stormwater facilities for the industrial areas will be maintained by the property owners. Once the project is built, the project will be subdivided into separate parcels. These parcels will be sold separately. The debeloper will be responsible for the maintenance of all BMP's until all parcels are sold.

BMP Maintenance Contact:

Jonh H. Schafer

(949) 383-4127

Senior Vice President

3161 Michelson Drive, Suite 425

Irvine, CA 92612

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 ☐	
Phosphorous	E ☒	N ☐	
Nitrogen	E ☒	N ☐	
Sediment	E ☒	N ☐	
Metals	E ☒	N ☐	
Oil and Grease	E ☒	N ☐	
Trash/Debris	E ☒	N ☐	
Pesticides / Herbicides	E ☒	N ☐	
Organic Compounds	E ☒	N ☐	
Other: Oxygen Demanding Compounds	E ☒	N ☐	
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 % 0 *(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

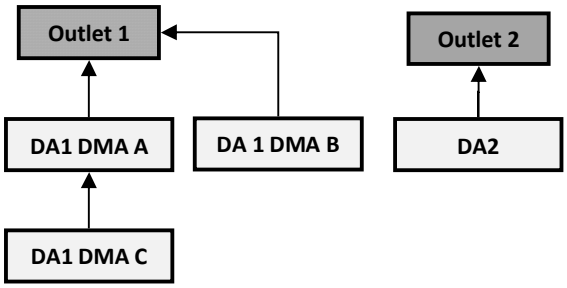
Describe the project site conditions that will facilitate the selection of BMP through an analysis of the physical conditions and limitations of the site and its receiving waters. Identify distinct drainage areas (DA) that collect flow from a portion of the site and describe how runoff from each DA (and 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 33°57'58.11"N	Longitude 117°38'38.96"W	Thomas Bros Map page TBD

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*



Example only – modify for project specific WQMP using additional form

Conveyance	Briefly describe on-site drainage features to convey runoff that is not retained within a DMA

Refer to DA Schematic (Exhibit C) for drainage areas used in this project. See Appendix A.

DA1 DMA A to Outlet 1	
DA1 DMA B to Outlet 1	
DA2 to Outlet 2	

Form 3-2 Existing Hydrologic Characteristics for Drainage Area 1

For Drainage Area 1's sub-watershed DMA, provide the following characteristics	REFER TO DRAINAGE EXHIBITS FOR DETAILS AND HYDROLGOY CALCULATIONS IN APPENDIX A
1 DMA drainage area (ft^2)	
2 Existing site impervious area (ft^2)	
3 Antecedent moisture condition *For desert areas, use* *http://www.sbcounty.gov/dpw/floodcontrol/pdf/20100412_map.pdf*	
4 Hydrologic soil group *Refer to Watershed Mapping Tool –* *http://sbcounty.permitrack.com/WAP*	
5 Longest flowpath length (ft)	
6 Longest flowpath slope (ft/ft)	
7 Current land cover type(s) *Select from Fig C-3 of Hydrology Manual*	
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*	

Form 3-2 Existing Hydrologic Characteristics for Drainage Area 1 (use only as needed for additional DMA w/in DA 1)				
For Drainage Area 1's sub-watershed DMA, provide the following characteristics	DMA E	DMA F	DMA G	DMA H
1 DMA drainage area (ft^2)				
2 Existing site impervious area (ft^2)				
3 Antecedent moisture condition *For desert areas, use http://www.sbcounty.gov/dpw/floodcontrol/pdf/20100412_map.pdf*				
4 Hydrologic soil group *Refer to Watershed Mapping Tool – http://sbcounty.permitrack.com/WAP*				
5 Longest flowpath length (ft)				
6 Longest flowpath slope (ft/ft)				
7 Current land cover type(s) *Select from Fig C-3 of Hydrology Manual*				
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*				

Form 3-3 Watershed Description for Drainage Area

Receiving waters *Refer to Watershed Mapping Tool -* *http://sbcounty.permitrack.com/WAP* *See 'Drainage Facilities" link at this website*	Santa Ana Watershed
Applicable TMDLs *Refer to Local Implementation Plan*	(A) TMDL Still Required (B)Being Addressed by USEPA >Chino Creek Reach 1A - Nutrients (A), Pathogens (B) >Chino Creek Reach 1B - Nutrients (A), Pathogens (B), Chemical Oxygen Demand (A) >Santa River Reach 2 - Indicator Bacteria (A)
303(d) listed impairments *Refer to Local Implementation Plan and Watershed Mapping Tool –* *http://sbcounty.permitrack.com/WAP and State Water Resources Control Board website – http://www.waterboards.ca.gov/santaana/water_issues/programs/tmdl/index.shtml*	>Chino Creek Reach 1A - Nutrients, Pathogens >Chino Creek Reach 1B - Nutrients, Pathogens, Chemical Oxygen Demand >Santa River Reach 2 - Indicator Bacteria
Environmentally Sensitive Areas (ESA) *Refer to Watershed Mapping Tool –* *http://sbcounty.permitrack.com/WAP*	Riparian/Wetland
Unlined Downstream Water Bodies *Refer to Watershed Mapping Tool –* *http://sbcounty.permitrack.com/WAP*	Cypress Channel - EHM Lowest reach of Cypress Channel - Non-EHM
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
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	☒	☐	Residential BMP packets will be given to all first time homeowners as part of the disclosure exhibits distributed by home builder. BMP handouts are included in Appendix C.
N2	Activity Restrictions	☒	☐	Home owners must prevent pollutant runoff.
N3	Landscape Management BMPs	☒	☐	The POA will maintain landscape areas.
N4	BMP Maintenance	☒	☐	BMP'S will be maintained by the POA.
N5	Title 22 CCR Compliance (How development will comply)	☐	☒	Title 22 applies to communitiy care facilities regulated by the Community Care Licensing Division.
N6	Local Water Quality Ordinances	☒	☐	Ordinance No 2009 04 is implemented by the City of Chino and limits water within the City.
N7	Spill Contingency Plan	☒	☐	This Plan is prepared by the building operator for use by specified types of building or suite occupancies. The Plan mandates stockpiling of cleanup materials, notification of responsible agencies, disposal of cleanup materials, documentation, etc.
N8	Underground Storage Tank Compliance	☐	☒	There will not be any subtances within the proposed project that will require to be contained in underground storage tanks.
N9	Hazardous Materials Disclosure Compliance	☒	☐	POA and tenenants will be responsible for management of hazardous materials in accordance with local ordinances.

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	☒	☐	Hazardous materials will be handled in accordance with Uniform Fire Code
N11	Litter/Debris Control Program	☒	☐	POA will provide litter/debris control of common areas, parking lots and streets.
N12	Employee Training	☒	☐	A copy of this WQMP will be on file at the POA office and board of members will be educated on it. This WQMP is one of their guidelines and should be reviewed alongside the CASQA Stormwater BMP Handbook for New Development and Redevelopment by personnel prior to performing BMP maintenance. Training should be both formal and informal, occur on an ongoing basis whe it is appropiate and convinient, and should include training/workshops offered by the SWRCB, RWQCB, or other locally recognized agencies or professional organzations.
N13	Housekeeping of Loading Docks	☒	☐	Housekeeping of loading docks to be conducted by tenants.
N14	Catch Basin Inspection Program	☒	☐	POA to maintain private SD catch basins. City of Chino PW to maintain public catch basins.
N15	Vacuum Sweeping of Private Streets and Parking Lots	☒	☐	POA to maintain private streets and parking lots. City of Chino PW to maintain public streets and parking lots.
N16	Other Non-structural Measures for Public Agency Projects	☐	☒	Not Applicable
N17	Comply with all other applicable NPDES permits	☒	☐	Compliance under California CGP obtained WDID.

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)	☒	☐	SD stenciling to be applied to private catch basins.
S2	Design and construct outdoor material storage areas to reduce pollution introduction (CASQA New Development BMP Handbook SD-34)	☐	☒	No proposed outdoor material storage areas.
S3	Design and construct trash and waste storage areas to reduce pollution introduction (CASQA New Development BMP Handbook SD-32)	☒	☐	Trash enclousure areas will be provided.
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)	☒	☐	Developer will provide compliance with CASQA BMP fact sheet SD-12.
S5	Finish grade of landscaped areas at a minimum of 1-2 inches below top of curb, sidewalk, or pavement	☒	☐	Landscape areas will be 1" or more below the top of curb.
S6	Protect slopes and channels and provide energy dissipation (CASQA New Development BMP Handbook SD-10)	☐	☒	No proposed slopes or channels
S7	Covered dock areas (CASQA New Development BMP Handbook SD-31)	☒	☐	The proposed project avoids direct conections into storm drains from depressed loading ducks. Runoff from loading dock areas is sent to engineered Infiltration type Water Quality BMP's.
S8	Covered maintenance bays with spill containment plans (CASQA New Development BMP Handbook SD-31)	☐	☒	No proposed maintenance bays
S9	Vehicle wash areas with spill containment plans (CASQA New Development BMP Handbook SD-33)	☐	☒	No proposed vehicle wash areas

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

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)	☐	☒	There are no proposed equipment wash areas within the project limits.
S12	Fueling areas (CASQA New Development BMP Handbook SD-30)	☐	☒	There are no proposed fueling areas within the project limits.
S13	Hillside landscaping (CASQA New Development BMP Handbook SD-10)	☐	☒	No hillside landscaping within the project limits
S14	Wash water control for food preparation areas	☐	☒	There are no proposed food establishments within the project limits.
S15	Community car wash racks (CASQA New Development BMP Handbook SD-33)	☐	☒	No proposed vehicle wash areas

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: The project will include landscape areas and open spaces to optimize pervious surfaces.
Maximize natural infiltration capacity: Yes ☒ No ☐ Explanation: Roof drains will drain to pervious areas where possible to maximize infiltration.
Preserve existing drainage patterns and time of concentration: Yes ☒ No ☒ Explanation: The site will preserve existing drainage patterns.
Disconnect impervious areas: Yes ☒ No ☐ Explanation: Runoff from roof structures will outlet to splash blocks and onto landscape areas prior to entering the storm drain system.
Protect existing vegetation and sensitive areas: Yes ☐ No ☒ Explanation: There is no existing vegetation on site.
Re-vegetate disturbed areas: Yes ☐ No ☒ Explanation: Not Applicable
Minimize unnecessary compaction in stormwater retention/infiltration basin/trench areas: Yes ☒ No ☐ Explanation: Appropiate grading and construction activities will be utilized for this site.
Utilize vegetated drainage swales in place of underground piping or imperviously lined swales: Yes ☐ No ☒ Explanation: There are no opportunities to use vegetated drainage swales.
Stake off areas that will be used for landscaping to minimize compaction during construction : Yes ☒ No ☐ Explanation: Appropiate grading and construction activities will be utilized for this site.

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 mi²), 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

DMA 1A

1 Project area DA 1 (ft²): 1,273,245	**2** Imperviousness after applying preventative site design practices (Imp%): 87%	**3** Runoff Coefficient (Rc): _0.69 *$R_c = 0.858(Imp\%)^{\wedge 3} - 0.78(Imp\%)^{\wedge 2} + 0.774(Imp\%) + 0.04$*
4 Determine 1-hour rainfall depth for a 2-year return period $P_{2yr\text{-}1hr}$ (in): 0.564 *http://hdsc.nws.noaa.gov/hdsc/pfds/sa/sca_pfds.html*		
5 Compute P_6, Mean 6-hr Precipitation (inches): 0.835 *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 (ft³): 119,669 *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
DMA 1B

1 Project area DA 1 (ft^2): 199,403	**2** Imperviousness after applying preventative site design practices (Imp%): 90%	**3** Runoff Coefficient (Rc): _0.73 *$R_c = 0.858(Imp\%)^{\wedge 3}-0.78(Imp\%)^{\wedge 2}+0.774(Imp\%)+0.04$*

4 Determine 1-hour rainfall depth for a 2-year return period $P_{2yr\text{-}1hr}$ (in): 0.564 http://hdsc.nws.noaa.gov/hdsc/pfds/sa/sca_pfds.html

5 Compute P_6, Mean 6-hr Precipitation (inches): 0.835

*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): 19,893

*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

DMA 1C

1 Project area DA 1 (ft^2): 104,945	**2** Imperviousness after applying preventative site design practices (Imp%): 90%	**3** Runoff Coefficient (Rc): _0.73 *$R_c = 0.858(Imp\%)^{\wedge 3} - 0.78(Imp\%)^{\wedge 2} + 0.774(Imp\%) + 0.04$*

4 Determine 1-hour rainfall depth for a 2-year return period $P_{2yr\text{-}1hr}$ (in): 0.564 http://hdsc.nws.noaa.gov/hdsc/pfds/sa/sca_pfds.html

5 Compute P_6, Mean 6-hr Precipitation (inches): 0.835

*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): 10,470

*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 2)

1 Project area DA 1 (ft^2): 135,853	**2** Imperviousness after applying preventative site design practices (Imp%): 90%	**3** Runoff Coefficient (Rc): _0.73 *$R_c = 0.858(Imp\%)^{\wedge 3} - 0.78(Imp\%)^{\wedge 2} + 0.774(Imp\%) + 0.04$*

4 Determine 1-hour rainfall depth for a 2-year return period $P_{2yr\text{-}1hr}$ (in): 0.564 *http://hdsc.nws.noaa.gov/hdsc/pfds/sa/sca_pfds.html*

5 Compute P_6, Mean 6-hr Precipitation (inches): 0.835

*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): 13,553

*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 3)

1 Project area DA 1 (ft^2): 130,602	**2** Imperviousness after applying preventative site design practices (Imp%): 90%	**3** Runoff Coefficient (Rc): _0.73 *$R_c = 0.858(Imp\%)^{\wedge 3}-0.78(Imp\%)^{\wedge 2}+0.774(Imp\%)+0.04$*

4 Determine 1-hour rainfall depth for a 2-year return period $P_{2yr\text{-}1hr}$ (in): 0.564 http://hdsc.nws.noaa.gov/hdsc/pfds/sa/sca_pfds.html

5 Compute P_6, Mean 6-hr Precipitation (inches): 0.835

*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): 13,029

*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 4)

1 Project area DA (ft^2): 430,218	**2** Imperviousness after applying preventative site design practices (Imp%): 76%	**3** Runoff Coefficient (Rc): _0.55 *$R_c = 0.858(Imp\%)^{\wedge 3} - 0.78(Imp\%)^{\wedge 2} + 0.774(Imp\%) + 0.04$*

4 Determine 1-hour rainfall depth for a 2-year return period $P_{2yr\text{-}1hr}$ (in): 0.564 http://hdsc.nws.noaa.gov/hdsc/pfds/sa/sca_pfds.html

5 Compute P_6, Mean 6-hr Precipitation (inches): 0.835

*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): 32,580

*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 5)

1 Project area DA 1 (ft^2): 79,637	**2** Imperviousness after applying preventative site design practices (Imp%): 90%	**3** Runoff Coefficient (Rc): _0.73 *$R_c = 0.858(Imp\%)^{\wedge 3}-0.78(Imp\%)^{\wedge 2}+0.774(Imp\%)+0.04$*

4 Determine 1-hour rainfall depth for a 2-year return period $P_{2yr\text{-}1hr}$ (in): 0.564 *http://hdsc.nws.noaa.gov/hdsc/pfds/sa/sca_pfds.html*

5 Compute P_6, Mean 6-hr Precipitation (inches): 0.835

*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): 7,944

*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 6)

1 Project area DA 1 (ft^2): 116,046	**2** Imperviousness after applying preventative site design practices (Imp%): 90%	**3** Runoff Coefficient (Rc): _0.73 *$R_c = 0.858(Imp\%)^{\wedge 3}-0.78(Imp\%)^{\wedge 2}+0.774(Imp\%)+0.04$*

4 Determine 1-hour rainfall depth for a 2-year return period $P_{2yr\text{-}1hr}$ (in): 0.564 *http://hdsc.nws.noaa.gov/hdsc/pfds/sa/sca_pfds.html*

5 Compute P_6, Mean 6-hr Precipitation (inches): 0.835

*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): 11,577

*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 7)

1 Project area DA 1 (ft^2): 98,426	**2** Imperviousness after applying preventative site design practices (Imp%): 90%	**3** Runoff Coefficient (Rc): _0.73 *$R_c = 0.858(Imp\%)^{\wedge 3}-0.78(Imp\%)^{\wedge 2}+0.774(Imp\%)+0.04$*

4 Determine 1-hour rainfall depth for a 2-year return period $P_{2yr\text{-}1hr}$ (in): 0.564 *http://hdsc.nws.noaa.gov/hdsc/pfds/sa/sca_pfds.html*

5 Compute P_6, Mean 6-hr Precipitation (inches): 0.835

*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): 9,819

*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 8)

1 Project area DA 1 (ft^2): 145,596	**2** Imperviousness after applying preventative site design practices (Imp%): 90%	**3** Runoff Coefficient (Rc): _0.73 *$R_c = 0.858(Imp\%)^{\wedge 3} - 0.78(Imp\%)^{\wedge 2} + 0.774(Imp\%) + 0.04$*

4 Determine 1-hour rainfall depth for a 2-year return period $P_{2yr\text{-}1hr}$ (in): 0.564 *http://hdsc.nws.noaa.gov/hdsc/pfds/sa/sca_pfds.html*

5 Compute P_6, Mean 6-hr Precipitation (inches): 0.835

*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): 14,525

*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 9)

1 Project area DA 1 (ft^2): 52,440	**2** Imperviousness after applying preventative site design practices (Imp%): 90%	**3** Runoff Coefficient (Rc): _0.73 *$R_c = 0.858(Imp\%)^{\wedge 3}-0.78(Imp\%)^{\wedge 2}+0.774(Imp\%)+0.04$*

4 Determine 1-hour rainfall depth for a 2-year return period $P_{2yr\text{-}1hr}$ (in): 0.564 http://hdsc.nws.noaa.gov/hdsc/pfds/sa/sca_pfds.html

5 Compute P_6, Mean 6-hr Precipitation (inches): 0.835

*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): 5,232

*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 10)

1 Project area DA 1 (ft^2): 166,488	**2** Imperviousness after applying preventative site design practices (Imp%): 90%	**3** Runoff Coefficient (Rc): _17,904 *$R_c = 0.858(Imp\%)^{\wedge 3} - 0.78(Imp\%)^{\wedge 2} + 0.774(Imp\%) + 0.04$*

4 Determine 1-hour rainfall depth for a 2-year return period $P_{2yr\text{-}1hr}$ (in): 0.564 http://hdsc.nws.noaa.gov/hdsc/pfds/sa/sca_pfds.html

5 Compute P_6, Mean 6-hr Precipitation (inches): 0.835

*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): 16,609

*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 - DA 10)

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

Go to: *http://sbcounty.permitrack.com/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** 227,832 *Form 4.2-3 Item 12*	**2** 22.6 * *Form 4.2-4 Item 13*	**3** 56.2 *Form 4.2-5 Item 10*
Post-developed	**4** 635,235 *Form 4.2-3 Item 13*	**5** 14.7 ** *Form 4.2-4 Item 14*	**6** 30.6 *Form 4.2-5 Item 14*
Difference	**7** 407,403 *Item 4 – Item 1*	**8** 7.9 *Item 5 – Item 2*	**9** 25.6 *Item 6 – Item 3*
Difference (as % of pre-developed)	**10** 179 % *Item 7 / Item 1*	**11** 35 % *Item 8 / Item 2*	**12** 46 % *Item 9 / Item 3*

RUNOFF VOLUME:
UNIT HYDROGRAPH CALCULATIONS

EXISTING CONDITION

BASIN A = 43,303 CU-FT
BASIN B = 31,668 CU - FT
BASIN C = 152,861 CU-FT
TOTAL = 227,832 CU-FT

DEVELOPED CONDITION

BASIN A = 281,824 CU-FT
BASIN B = 173,369 CU - FT
BASIN C = 46,130 CU-FT
BASIN CX = 44,810 CU-FT
BASIN CC = 89,102 CU-FT
TOTAL = 635,235 CU-FT

PEAK RUNOFF:
RATIONAL METHOD CALCULATIONS

EXISTING CONDITION

BASIN A =13.1 CFS
BASIN B =7.6 CFS
BASIN C = 35.5 CU-FT
TOTAL = 56.2 CU-FT

PEAK RUNOFF:
FLOOD ROUTING CALCULATIONS

EXISTING CONDITION

PROJECT OUTLET = 30.6 CFS

NOTES:
***BASIN A TC = 15.7 MIN**
(LONGEST FLOW PATH WITHIN DRAINAGE AREA)
****BASIN A TC = 14.7 MIN**

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 14 * 0.95) – Item 13*								

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 (ft^2) *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 9 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 DMA BMP Type N/A	DA DMA BMP Type	DA DMA BMP Type *(Use additional forms for more BMPs)*
2 Total impervious area draining to pervious area (ft^2)	N/A		
3 Ratio of pervious area receiving runoff to impervious area	N/A		
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*	N/A		
5 Sum of retention volume achieved from impervious area dispersion (ft^3): N/A *$V_{retention}$ =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 N/A	DA DMA BMP Type	DA DMA BMP Type *(Use additional forms for more BMPs)*
7 Ponding surface area (ft^2)	N/A		
8 Ponding depth (ft)	N/A		
9 Surface area of amended soil/gravel (ft^2)	N/A		
10 Average depth of amended soil/gravel (ft)	N/A		
11 Average porosity of amended soil/gravel	N/A		
12 Retention volume achieved from on-lot infiltration (ft^3) *$V_{retention}$ = (Item 7 *Item 8) + (Item 9 * Item 10 * Item 11)*	N/A		
13 Runoff volume retention from on-lot infiltration (ft^3): N/A *$V_{retention}$ =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 N/A BMP Type N/A	DA DMA BMP Type	DA DMA BMP Type *(Use additional forms for more BMPs)*
15 Rooftop area planned for ET BMP (ft^2)	N/A		
16 Average wet season ET demand (in/day) *Use local values, typical ~ 0.1*	N/A		
17 Daily ET demand (ft^3/day) *Item 15 * (Item 16 / 12)*	N/A		
18 Drawdown time (hrs) *Copy Item 6 in Form 4.2-1*	N/A		
19 Retention Volume (ft^3) $V_{retention}$ = *Item 17 * (Item 18 / 24)*	N/A		
20 Runoff volume retention from evapotranspiration BMPs (ft^3): N/A $V_{retention}$ *=Sum of Item 19 for all BMPs*			
21 Implementation of Street Trees: Yes ☐ No ☐ *If yes, complete Items 20-2. If no, proceed to Item 24*	DA 1 DMA A BMP Type Landscape	DA DMA BMP Type	DA DMA BMP Type *(Use additional forms for more BMPs)*
22 Number of Street Trees	TBD		
23 Average canopy cover over impervious area (ft^2)	TBD		
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*	TBD		
25 Runoff volume retention from street tree BMPs (ft^3): TBD $V_{retention}$ = *Sum of Item 24 for all BMPs*			
26 Implementation of residential rain barrels/cisterns: Yes☐ No ☐ *If yes, complete Items 27-28; If no, proceed to Item 29*	DA DMA N/A BMP Type N/A	DA DMA BMP Type	DA DMA BMP Type *(Use additional forms for more BMPs)*
27 Number of rain barrels/cisterns	N/A		
28 Runoff volume retention from rain barrels/cisterns (ft^3) $V_{retention}$ = *Item 27 * 3*	N/A		
29 Runoff volume retention from residential rain barrels/Cisterns (ft3): N/A $V_{retention}$ *=Sum of Item 28 for all BMPs*			
30 Total Retention Volume from Site Design Hydrologic Source Control BMPs: TBD *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).

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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): 119,669 *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 Basin	DA DMA BMP Type	DA DMA BMP Type *(Use additional forms for more BMPs)*
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*	1.1		
3 Infiltration safety factor *See TGD Section 5.4.2 and Appendix D*	3		
4 Design percolation rate (in/hr) *P_{design} = Item 2 / Item 3*	0.37		
5 Ponded water drawdown time (hr) *Copy Item 6 in Form 4.2-1*	48		
6 Maximum ponding depth (ft) *BMP specific, see Table 5-4 of the TGD for WQMP for BMP design details*	N/A		
7 Ponding Depth (ft) *d_{BMP} = Minimum of (1/12*Item 4*Item 5) or Item 6*	N/A		
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*	28,534		
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		
10 Amended soil porosity	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		
12 Gravel porosity	0.40		
13 Duration of storm as basin is filling (hrs) *Typical ~ 3hrs*	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))]*	N/A		
15 Underground Retention Volume (ft^3) *Volume determined using manufacturer's specifications and calculations*	120,005		

16 Total Retention Volume from LID Infiltration BMPs: 120,005 *(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 on-site with combination of hydrologic source control and LID retention and 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.

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): N/A

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 0 DMA N/A BMP Type N/A	DA DMA BMP Type	DA DMA BMP Type *(Use additional forms for more BMPs)*
2 Describe cistern or runoff detention facility	N/A		
3 Storage volume for proposed detention type (ft^3) *Volume of cistern*	N/A		
4 Landscaped area planned for use of harvested stormwater (ft^2)	N/A		
5 Average wet season daily irrigation demand (in/day) Use local values, typical ~ 0.1 in/day	N/A		
6 Daily water demand (ft^3/day) *Item 4 * (Item 5 / 12)*	N/A		
7 Drawdown time (hrs) *Copy Item 6 from Form 4.2-1*	N/A		
8 Retention Volume (ft^3) *$V_{retention}$ = Minimum of (Item 3) or (Item 6 * (Item 7 / 24))*	N/A		

9 Total Retention Volume (ft^3) from Harvest and Use BMPN/A *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 and 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.

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

1 Remaining LID DCV not met by site design HSC BMP (ft^3): 19,893 *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 Basin	DA DMA BMP Type	DA DMA BMP Type *(Use additional forms for more BMPs)*
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*	1.1		
3 Infiltration safety factor *See TGD Section 5.4.2 and Appendix D*	3		
4 Design percolation rate (in/hr) *P_{design} = Item 2 / Item 3*	0.37		
5 Ponded water drawdown time (hr) *Copy Item 6 in Form 4.2-1*	48		
6 Maximum ponding depth (ft) *BMP specific, see Table 5-4 of the TGD for WQMP for BMP design details*	N/A		
7 Ponding Depth (ft) *d_{BMP} = Minimum of (1/12*Item 4*Item 5) or Item 6*	N/A		
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*	4,340		
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		
10 Amended soil porosity	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		
12 Gravel porosity	0.40		
13 Duration of storm as basin is filling (hrs) *Typical ~ 3hrs*	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))]*	N/A		
15 Underground Retention Volume (ft^3) *Volume determined using manufacturer's specifications and calculations*	20,071		

16 Total Retention Volume from LID Infiltration BMPs: 20,071 *(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 on-site with combination of hydrologic source control and LID retention and 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.

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

1 Remaining LID DCV not met by site design HSC BMP (ft^3): 10,470 *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 Basin	DA DMA BMP Type	DA DMA BMP Type *(Use additional forms for more BMPs)*
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*	1.1		
3 Infiltration safety factor *See TGD Section 5.4.2 and Appendix D*	3		
4 Design percolation rate (in/hr) *P_{design} = Item 2 / Item 3*	0.37		
5 Ponded water drawdown time (hr) *Copy Item 6 in Form 4.2-1*	48		
6 Maximum ponding depth (ft) *BMP specific, see Table 5-4 of the TGD for WQMP for BMP design details*	N/A		
7 Ponding Depth (ft) *d_{BMP} = Minimum of (1/12*Item 4*Item 5) or Item 6*	N/A		
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*	2,363		
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		
10 Amended soil porosity	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		
12 Gravel porosity	0.40		
13 Duration of storm as basin is filling (hrs) *Typical ~ 3hrs*	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))]*	N/A		
15 Underground Retention Volume (ft^3) *Volume determined using manufacturer's specifications and calculations*	10,649		

16 Total Retention Volume from LID Infiltration BMPs: 10,649 *(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 on-site with combination of hydrologic source control and LID retention and 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.

Form 4.3-3 Infiltration LID BMP - including underground BMPs (DA 2)

1 Remaining LID DCV not met by site design HSC BMP (ft^3): 13,553 *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 2 DMA A BMP Type Infiltration Trench	DA DMA BMP Type	DA DMA BMP Type *(Use additional forms for more BMPs)*
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*	1.1		
3 Infiltration safety factor *See TGD Section 5.4.2 and Appendix D*	3		
4 Design percolation rate (in/hr) *P_{design} = Item 2 / Item 3*	0.37		
5 Ponded water drawdown time (hr) *Copy Item 6 in Form 4.2-1*	48		
6 Maximum ponding depth (ft) *BMP specific, see Table 5-4 of the TGD for WQMP for BMP design details*	N/A		
7 Ponding Depth (ft) *d_{BMP} = Minimum of (1/12*Item 4*Item 5) or Item 6*	N/A		
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*	6,160		
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		
10 Amended soil porosity	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		
12 Gravel porosity	0.40		
13 Duration of storm as basin is filling (hrs) *Typical ~ 3hrs*	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))]*	N/A		
15 Underground Retention Volume (ft^3) *Volume determined using manufacturer's specifications and calculations*	17,671		

16 Total Retention Volume from LID Infiltration BMPs: 13,353 *(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 on-site with combination of hydrologic source control and LID retention and 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.

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

1 Remaining LID DCV not met by site design HSC BMP (ft^3): 13,029 *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 3 DMA A BMP Type Underground Infiltration Basin	DA DMA BMP Type	DA DMA BMP Type *(Use additional forms for more BMPs)*
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*	1.1		
3 Infiltration safety factor *See TGD Section 5.4.2 and Appendix D*	3		
4 Design percolation rate (in/hr) *P_{design} = Item 2 / Item 3*	0.37		
5 Ponded water drawdown time (hr) *Copy Item 6 in Form 4.2-1*	48		
6 Maximum ponding depth (ft) *BMP specific, see Table 5-4 of the TGD for WQMP for BMP design details*	N/A		
7 Ponding Depth (ft) *d_{BMP} = Minimum of (1/12*Item 4*Item 5) or Item 6*	N/A		
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*	2,544		
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		
10 Amended soil porosity	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		
12 Gravel porosity	0.40		
13 Duration of storm as basin is filling (hrs) *Typical ~ 3hrs*	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))]*	N/A		
15 Underground Retention Volume (ft^3) *Volume determined using manufacturer's specifications and calculations*	13,373		

16 Total Retention Volume from LID Infiltration BMPs: 13,373 *(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 on-site with combination of hydrologic source control and LID retention and 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.

Form 4.3-3 Infiltration LID BMP - including underground BMPs (DA 4)

1 Remaining LID DCV not met by site design HSC BMP (ft^3): 32,580 *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 4 DMA A BMP Type Infiltration Trench	DA DMA BMP Type	DA DMA BMP Type *(Use additional forms for more BMPs)*
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*	1.1		
3 Infiltration safety factor *See TGD Section 5.4.2 and Appendix D*	3		
4 Design percolation rate (in/hr) *P_{design} = Item 2 / Item 3*	0.37		
5 Ponded water drawdown time (hr) *Copy Item 6 in Form 4.2-1*	48		
6 Maximum ponding depth (ft) *BMP specific, see Table 5-4 of the TGD for WQMP for BMP design details*	N/A		
7 Ponding Depth (ft) *d_{BMP} = Minimum of (1/12*Item 4*Item 5) or Item 6*	N/A		
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*	32,580		
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		
10 Amended soil porosity	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		
12 Gravel porosity	0.40		
13 Duration of storm as basin is filling (hrs) *Typical ~ 3hrs*	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))]*	N/A		
15 Underground Retention Volume (ft^3) *Volume determined using manufacturer's specifications and calculations*	32,580		

16 Total Retention Volume from LID Infiltration BMPs: 32,580 *(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 on-site with combination of hydrologic source control and LID retention and 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.

Form 4.3-3 Infiltration LID BMP - including underground BMPs (DA 5)

1 Remaining LID DCV not met by site design HSC BMP (ft^3): 7,944 *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 5 DMA A BMP Type Infiltration Trench	DA DMA BMP Type	DA DMA BMP Type *(Use additional forms for more BMPs)*
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*	1.1		
3 Infiltration safety factor *See TGD Section 5.4.2 and Appendix D*	3		
4 Design percolation rate (in/hr) *P_{design} = Item 2 / Item 3*	0.37		
5 Ponded water drawdown time (hr) *Copy Item 6 in Form 4.2-1*	48		
6 Maximum ponding depth (ft) *BMP specific, see Table 5-4 of the TGD for WQMP for BMP design details*	N/A		
7 Ponding Depth (ft) *d_{BMP} = Minimum of (1/12*Item 4*Item 5) or Item 6*	N/A		
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*	3,611		
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		
10 Amended soil porosity	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		
12 Gravel porosity	0.40		
13 Duration of storm as basin is filling (hrs) *Typical ~ 3hrs*	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))]*	N/A		
15 Underground Retention Volume (ft^3) *Volume determined using manufacturer's specifications and calculations*	7,944		

16 Total Retention Volume from LID Infiltration BMPs: 7,944 *(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 on-site with combination of hydrologic source control and LID retention and 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.

Form 4.3-3 Infiltration LID BMP - including underground BMPs (DA 6)

1 Remaining LID DCV not met by site design HSC BMP (ft^3): 11,577 *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 6 DMA A BMP Type Underground Infiltration Basin	DA DMA BMP Type	DA DMA BMP Type *(Use additional forms for more BMPs)*
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*	1.0		
3 Infiltration safety factor *See TGD Section 5.4.2 and Appendix D*	3		
4 Design percolation rate (in/hr) *P_{design} = Item 2 / Item 3*	0.33		
5 Ponded water drawdown time (hr) *Copy Item 6 in Form 4.2-1*	48		
6 Maximum ponding depth (ft) *BMP specific, see Table 5-4 of the TGD for WQMP for BMP design details*	N/A		
7 Ponding Depth (ft) *d_{BMP} = Minimum of (1/12*Item 4*Item 5) or Item 6*	N/A		
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*	2,232		
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		
10 Amended soil porosity	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		
12 Gravel porosity	0.40		
13 Duration of storm as basin is filling (hrs) *Typical ~ 3hrs*	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))]*	N/A		
15 Underground Retention Volume (ft^3) *Volume determined using manufacturer's specifications and calculations*	11,733		

16 Total Retention Volume from LID Infiltration BMPs: 11,733 *(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 on-site with combination of hydrologic source control and LID retention and 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.

Form 4.3-3 Infiltration LID BMP - including underground BMPs (DA 7)

1 Remaining LID DCV not met by site design HSC BMP (ft^3): 9,819 *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 7 DMA A BMP Type Infiltration Trench	DA DMA BMP Type	DA DMA BMP Type *(Use additional forms for more BMPs)*
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*	1.0		
3 Infiltration safety factor *See TGD Section 5.4.2 and Appendix D*	3		
4 Design percolation rate (in/hr) *P_{design} = Item 2 / Item 3*	0.33		
5 Ponded water drawdown time (hr) *Copy Item 6 in Form 4.2-1*	48		
6 Maximum ponding depth (ft) *BMP specific, see Table 5-4 of the TGD for WQMP for BMP design details*	N/A		
7 Ponding Depth (ft) *d_{BMP} = Minimum of (1/12*Item 4*Item 5) or Item 6*	N/A		
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*	4,910		
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		
10 Amended soil porosity	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		
12 Gravel porosity	0.40		
13 Duration of storm as basin is filling (hrs) *Typical ~ 3hrs*	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))]*	N/A		
15 Underground Retention Volume (ft^3) *Volume determined using manufacturer's specifications and calculations*	9,819		

16 Total Retention Volume from LID Infiltration BMPs: 9,819 *(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 on-site with combination of hydrologic source control and LID retention and 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.

Form 4.3-3 Infiltration LID BMP - including underground BMPs (DA 8)

1 Remaining LID DCV not met by site design HSC BMP (ft^3): 14,525 *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 8 DMA A BMP Type Underground Infiltration Basin	DA DMA BMP Type	DA DMA BMP Type *(Use additional forms for more BMPs)*
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*	1.0		
3 Infiltration safety factor *See TGD Section 5.4.2 and Appendix D*	3		
4 Design percolation rate (in/hr) *P_{design} = Item 2 / Item 3*	0.33		
5 Ponded water drawdown time (hr) *Copy Item 6 in Form 4.2-1*	48		
6 Maximum ponding depth (ft) *BMP specific, see Table 5-4 of the TGD for WQMP for BMP design details*	N/A		
7 Ponding Depth (ft) *d_{BMP} = Minimum of (1/12*Item 4*Item 5) or Item 6*	N/A		
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*	2,856		
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		
10 Amended soil porosity	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		
12 Gravel porosity	0.40		
13 Duration of storm as basin is filling (hrs) *Typical ~ 3hrs*	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))]*	N/A		
15 Underground Retention Volume (ft^3) *Volume determined using manufacturer's specifications and calculations*	15,013		

16 Total Retention Volume from LID Infiltration BMPs: 15,013 *(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 on-site with combination of hydrologic source control and LID retention and 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.

Form 4.3-3 Infiltration LID BMP - including underground BMPs (DA 9)

1 Remaining LID DCV not met by site design HSC BMP (ft^3): 5,232 *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 9 DMA A BMP Type Underground Infiltration Basin	DA DMA BMP Type	DA DMA BMP Type *(Use additional forms for more BMPs)*
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*	1.0		
3 Infiltration safety factor *See TGD Section 5.4.2 and Appendix D*	3		
4 Design percolation rate (in/hr) *P_{design} = Item 2 / Item 3*	0.33		
5 Ponded water drawdown time (hr) *Copy Item 6 in Form 4.2-1*	48		
6 Maximum ponding depth (ft) *BMP specific, see Table 5-4 of the TGD for WQMP for BMP design details*	N/A		
7 Ponding Depth (ft) *d_{BMP} = Minimum of (1/12*Item 4*Item 5) or Item 6*	N/A		
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*	1,032		
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		
10 Amended soil porosity	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		
12 Gravel porosity	0.40		
13 Duration of storm as basin is filling (hrs) *Typical ~ 3hrs*	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))]*	N/A		
15 Underground Retention Volume (ft^3) *Volume determined using manufacturer's specifications and calculations*	5,425		

16 Total Retention Volume from LID Infiltration BMPs: 5,425 *(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 on-site with combination of hydrologic source control and LID retention and 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.

Form 4.3-3 Infiltration LID BMP - including underground BMPs (DA 10)

1 Remaining LID DCV not met by site design HSC BMP (ft^3): 16,609 *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 10 DMA A BMP Type Underground Infiltration Basin	DA DMA BMP Type	DA DMA BMP Type *(Use additional forms for more BMPs)*
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*	1.0		
3 Infiltration safety factor *See TGD Section 5.4.2 and Appendix D*	3		
4 Design percolation rate (in/hr) *P_{design} = Item 2 / Item 3*	0.33		
5 Ponded water drawdown time (hr) *Copy Item 6 in Form 4.2-1*	48		
6 Maximum ponding depth (ft) *BMP specific, see Table 5-4 of the TGD for WQMP for BMP design details*	N/A		
7 Ponding Depth (ft) *d_{BMP} = Minimum of (1/12*Item 4*Item 5) or Item 6*	N/A		
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*	3,192		
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		
10 Amended soil porosity	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		
12 Gravel porosity	0.40		
13 Duration of storm as basin is filling (hrs) *Typical ~ 3hrs*	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))]*	N/A		
15 Underground Retention Volume (ft^3) *Volume determined using manufacturer's specifications and calculations*	17,139		

16 Total Retention Volume from LID Infiltration BMPs: 18,115 *(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 on-site with combination of hydrologic source control and LID retention and 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.

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): N/A *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.* N/A	
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): N/A *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): N/A *Item 1 – Item 3*	**5** Remaining fraction of LID DCV for sizing flow based biotreatment BMP: N/A% *Item 4 / Item 1*
6 Flow-based biotreatment BMP capacity provided (cfs): N/A *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 N/A BMP Type N/A	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*	N/A		
2 Amended soil infiltration rate *Typical ~ 5.0*	N/A		
3 Amended soil infiltration safety factor *Typical ~ 2.0*	N/A		
4 Amended soil design percolation rate (in/hr) P_{design} *= Item 2 / Item 3*	N/A		
5 Ponded water drawdown time (hr) *Copy Item 6 from Form 4.2-1*	N/A		
6 Maximum ponding depth (ft) *see Table 5-6 of the TGD for WQMP for reference to BMP design details*	N/A		
7 Ponding Depth (ft) d_{BMP} *= Minimum of (1/12 * Item 4 * Item 5) or Item 6*	N/A		
8 Amended soil surface area (ft^2)	N/A		
9 Amended soil depth (ft) *see Table 5-6 of the TGD for WQMP for reference to BMP design details*	N/A		
10 Amended soil porosity, *n*	N/A		
11 Gravel depth (ft) *see Table 5-6 of the TGD for WQMP for reference to BMP design details*	N/A		
12 Gravel porosity, *n*	N/A		
13 Duration of storm as basin is filling (hrs) *Typical ~ 3hrs*	N/A		
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))]*	N/A		
15 Total biotreated volume from bioretention and/or planter box with underdrains BMP: N/A *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 N/A BMP Type N/A		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*	N/A	N/A		
2 Bottom width (ft)	N/A	N/A		
3 Bottom length (ft)	N/A	N/A		
4 Bottom area (ft^2) A_{bottom} = *Item 2 * Item 3*	N/A	N/A		
5 Side slope (ft/ft)	N/A	N/A		
6 Depth of storage (ft)	N/A	N/A		
7 Water surface area (ft^2) $A_{surface}$ =*(Item 2 + (2 * Item 5 * Item 6)) * (Item 3 + (2 * Item 5 * Item 6))*	N/A	N/A		
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]*	N/A	N/A		
9 Drawdown Time (hrs) *Copy Item 6 from Form 2.1*	N/A			
10 Outflow rate (cfs) Q_{BMP} = *(Item* $8_{forebay}$ *+ Item* 8_{basin}*) / (Item 9 * 3600)*	N/A			
11 Duration of design storm event (hrs)	N/A			
12 Biotreated Volume (ft^3) $V_{biotreated}$ = *(Item* $8_{forebay}$ *+ Item* 8_{basin}*) +(Item 10 * Item 11 * 3600)*	N/A			
13 Total biotreated volume from constructed wetlands, extended dry detention, or extended wet detention : N/A *(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 N/A BMP Type N/A	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*	N/A		
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*	N/A		
3 Bed slope (ft/ft) *BMP specific, see Table 5-6 of the TGD for WQMP for reference to BMP design details*	N/A		
4 Manning's roughness coefficient	N/A		
5 Bottom width (ft) b_w *= (Form 4.3-5 Item 6 * Item 4) / (1.49 * Item 2^1.67 * Item 3^0.5)*	N/A		
6 Side Slope (ft/ft) *BMP specific, see Table 5-6 of the TGD for WQMP for reference to BMP design details*	N/A		
7 Cross sectional area (ft^2) *A = (Item 5 * Item 2) + (Item 6 * Item 2^2)*	N/A		
8 Water quality flow velocity (ft/sec) *V = Form 4.3-5 Item 6 / Item 7*	N/A		
9 Hydraulic residence time (min) *Pollutant specific, see Table 5-6 of the TGD for WQMP for reference to BMP design details*	N/A		
10 Length of flow based BMP (ft) *L = Item 8 * Item 9 * 60*	N/A		
11 Water surface area at water quality flow depth (ft^2) SA_{top} *= (Item 5 + (2 * Item 2 * Item 6)) * Item 10*	N/A		

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): 119,669 *Copy Item 7 in Form 4.2-1*

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

3 On-site retention with LID infiltration BMP (ft^3): 120,005 *Copy Item 16 in Form 4.3-3*

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

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

6 Flow capacity provided by flow based biotreatment BMP (cfs): N/A *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

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

1 Total LID DCV for the Project DA 2 (ft^3): 19,893 *Copy Item 7 in Form 4.2-1*

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

3 On-site retention with LID infiltration BMP (ft^3): 20,071 *Copy Item 16 in Form 4.3-3*

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

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

6 Flow capacity provided by flow based biotreatment BMP (cfs): N/A *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

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

1 Total LID DCV for the Project DA 2 (ft^3): 10,470 *Copy Item 7 in Form 4.2-1*

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

3 On-site retention with LID infiltration BMP (ft^3): 10,649 *Copy Item 16 in Form 4.3-3*

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

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

6 Flow capacity provided by flow based biotreatment BMP (cfs): N/A *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

Form 4.3-9 Conformance Summary and Alternative Compliance Volume Estimate (DA 2)

1 Total LID DCV for the Project DA 2 (ft^3): 13,553 *Copy Item 7 in Form 4.2-1*

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

3 On-site retention with LID infiltration BMP (ft^3): 17,671 *Copy Item 16 in Form 4.3-3*

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

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

6 Flow capacity provided by flow based biotreatment BMP (cfs): N/A *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

Form 4.3-9 Conformance Summary and Alternative Compliance Volume Estimate (DA 3)

1 Total LID DCV for the Project DA 3 (ft^3): 13,029 *Copy Item 7 in Form 4.2-1*

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

3 On-site retention with LID infiltration BMP (ft^3): 13,373 *Copy Item 16 in Form 4.3-3*

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

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

6 Flow capacity provided by flow based biotreatment BMP (cfs): N/A *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

Form 4.3-9 Conformance Summary and Alternative Compliance Volume Estimate (DA 4)

1 Total LID DCV for the Project DA 4 (ft^3): 32,580 *Copy Item 7 in Form 4.2-1*

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

3 On-site retention with LID infiltration BMP (ft^3): 32,580 *Copy Item 16 in Form 4.3-3*

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

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

6 Flow capacity provided by flow based biotreatment BMP (cfs): N/A *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

Form 4.3-9 Conformance Summary and Alternative Compliance Volume Estimate (DA 5)

1 Total LID DCV for the Project DA 5 (ft^3): 7,944 *Copy Item 7 in Form 4.2-1*

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

3 On-site retention with LID infiltration BMP (ft^3): 7,944 *Copy Item 16 in Form 4.3-3*

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

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

6 Flow capacity provided by flow based biotreatment BMP (cfs): N/A *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

Form 4.3-9 Conformance Summary and Alternative Compliance Volume Estimate (DA 6)

1 Total LID DCV for the Project DA 6 (ft^3): 11,577 *Copy Item 7 in Form 4.2-1*

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

3 On-site retention with LID infiltration BMP (ft^3): 11,733 *Copy Item 16 in Form 4.3-3*

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

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

6 Flow capacity provided by flow based biotreatment BMP (cfs): N/A *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

Form 4.3-9 Conformance Summary and Alternative Compliance Volume Estimate (DA 7)

1 Total LID DCV for the Project DA 7 (ft^3): 9,819 *Copy Item 7 in Form 4.2-1*

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

3 On-site retention with LID infiltration BMP (ft^3): 9,819 *Copy Item 16 in Form 4.3-3*

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

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

6 Flow capacity provided by flow based biotreatment BMP (cfs): N/A *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

Form 4.3-9 Conformance Summary and Alternative Compliance Volume Estimate (DA 8)

1 Total LID DCV for the Project DA 8 (ft^3): 14,525 *Copy Item 7 in Form 4.2-1*

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

3 On-site retention with LID infiltration BMP (ft^3): 15,013 *Copy Item 16 in Form 4.3-3*

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

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

6 Flow capacity provided by flow based biotreatment BMP (cfs): N/A *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

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

1 Total LID DCV for the Project DA 9 (ft^3): 5,232 *Copy Item 7 in Form 4.2-1*

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

3 On-site retention with LID infiltration BMP (ft^3): 5,425 *Copy Item 16 in Form 4.3-3*

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

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

6 Flow capacity provided by flow based biotreatment BMP (cfs): N/A *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

Form 4.3-9 Conformance Summary and Alternative Compliance Volume Estimate (DA 10)

1 Total LID DCV for the Project DA 10 (ft^3): 16,609 *Copy Item 7 in Form 4.2-1*

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

3 On-site retention with LID infiltration BMP (ft^3): 17,139 *Copy Item 16 in Form 4.3-3*

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

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

6 Flow capacity provided by flow based biotreatment BMP (cfs): N/A *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): 375,641 *(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): 281,482 *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): 94,159 *Item 1 – Item 2*	**4** Volume capture provided by incorporating additional on-site or off-site retention BMPs (ft^3): 801,939 *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 ☐

HCOC IS MITIGATED BY IMPLEMENTING DETENTION BASINS WITHIN THE PROJECT SITE. THE 2-YR STORM FLOWS ARE REDUCED TO BE 80% OF EXISTING CONDITION STORM EVENT.

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
Undergro und Infiltratio n Basins	Richland Communities	Schedule semiannual inspection for the beginning and end of the wet season for standing water, slope stability, sediment accumulation, trash and debris. Remove accumulated trash and debris in the basin during the semiannual inspections. See additional maintanance guidelines in attached BMP sheet in Appendix C.	Semiannual
Detention Basin	Richland Communities	Schedule semiannual inspection for the beginning and end of the wet season for standing water, slope stability, sediment accumulation, trash and debris, and presence of burrows. Remove accumulated trash and debris in the basin and around the riser pipe during the semiannual inspections. Trim vegetation at the beginning and end of the wet season and inspect monthly to prevent establishment of woody vegetation and for the asthetic and vector reasons. Remove accumulated sediment and re-grade about every 10 years or when the accumulated sediment volume exceeds 10 percent of the basin volume. Inspect the basin each year for	Semiannual

		accumulated sediment volume.	
Infiltration Trench	Richland Communities	Maintain adjacent landscaped areas. Remove clippings from landscape maintenance activities. Frequency: every two weeks or as necessary. Remove trash & debris.Frequency: Every two weeks or as necessary. Check for surface ponding 3 days after storm. If ponding is only above the trench, remove, wash and replace pea gravel. May be needed every 5-10 years. Check observation well for ponding 3 days after major storm. If the trench becomes plugged, remove rock materials. Provide a fresh infiltration surface by excavating an additional 2-4 inches of soil. Replace the rock materials.	See description on left.
Catch basins anti-dumping signage	Richland Communities	See attached BMP sheet for details in Appendix C. Inspect and maintain legibility.	See attached BMP sheet for details in Appendix C.
Catch basins filter inserts	Richland Communities	Schedule semiannual inspection for the beginning and end of the wet season for standing water, slope stability, sediment accumulation, trash and debris. Remove accumulated trash and debris in the basin during the semiannual inspections. See additional maintanance guidelines in attached BMP sheet in Appendix C.	Semiannual

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

APPENDIX A

DRAINAGE PLAN

EXHIBIT A

KIMBALL AVE

EXISTING AIRPORT SOUTH BASIN

DA '1'
29.23 AC

DA '1B'
4.58 AC

DA '1C'
2.41 AC

DA '2'
3.12 AC

DA '3'
3.00 AC

DA '4'
9.88 AC

DA '5'
1.83 AC

DA '6'
2.66 AC

DA '7'
2.26 AC

DA '8'
3.34 AC

DA '9'
20 AC

DA '10'
3.82 AC

UIB #1

UIB #2

UIB #3

UIB #4

UIB #6

UIB #7

DIB #1

DIB #2

DB #1

EXISTING SD LINE TO BE ABANDONED.

EXISTING SD LINE TO BE ABANDONED.

FUTURE RESIDENTIAL

MAYHEW AVE

BICKMORE AVE

MEADOWHOUSE AVE

STREET "D" (PRIVATE)

STREET "A" (PRIVATE)

STREET "B" (PRIVATE)

STREET "C" (PRIVATE)

HOLLAND PARK

LEGEND

	DRAINAGE AREA BOUNDARY
DA '1'	DRAINAGE AREA ID
*	CONNECTION TO MAIN STORM DRAIN LINE
CB #1	CATCH BASIN NUMBER
DIB #1	DETENTION/INFILTRATION BASIN NUMBER
DB #1	DETENTION BASIN NUMBER
UIB #1	UNDERGROUND INFILTRATION BASIN NUMBER
	INFILTRATION TRENCH LOCATION
	UNDERGROUND INFILTRATION BASIN LOCATION

80' 40' 0' 80'
SCALE: 1" = 80'

DRAINAGE PLAN

EXHIBIT A
CHINO BUSINESS CENTER
CITY OF CHINO 8/7/2017

DRAINAGE PLAN

DRAINAGE SCHEMATIC

EXHIBIT B

DRAINAGE AREA 1 SCHEMATIC

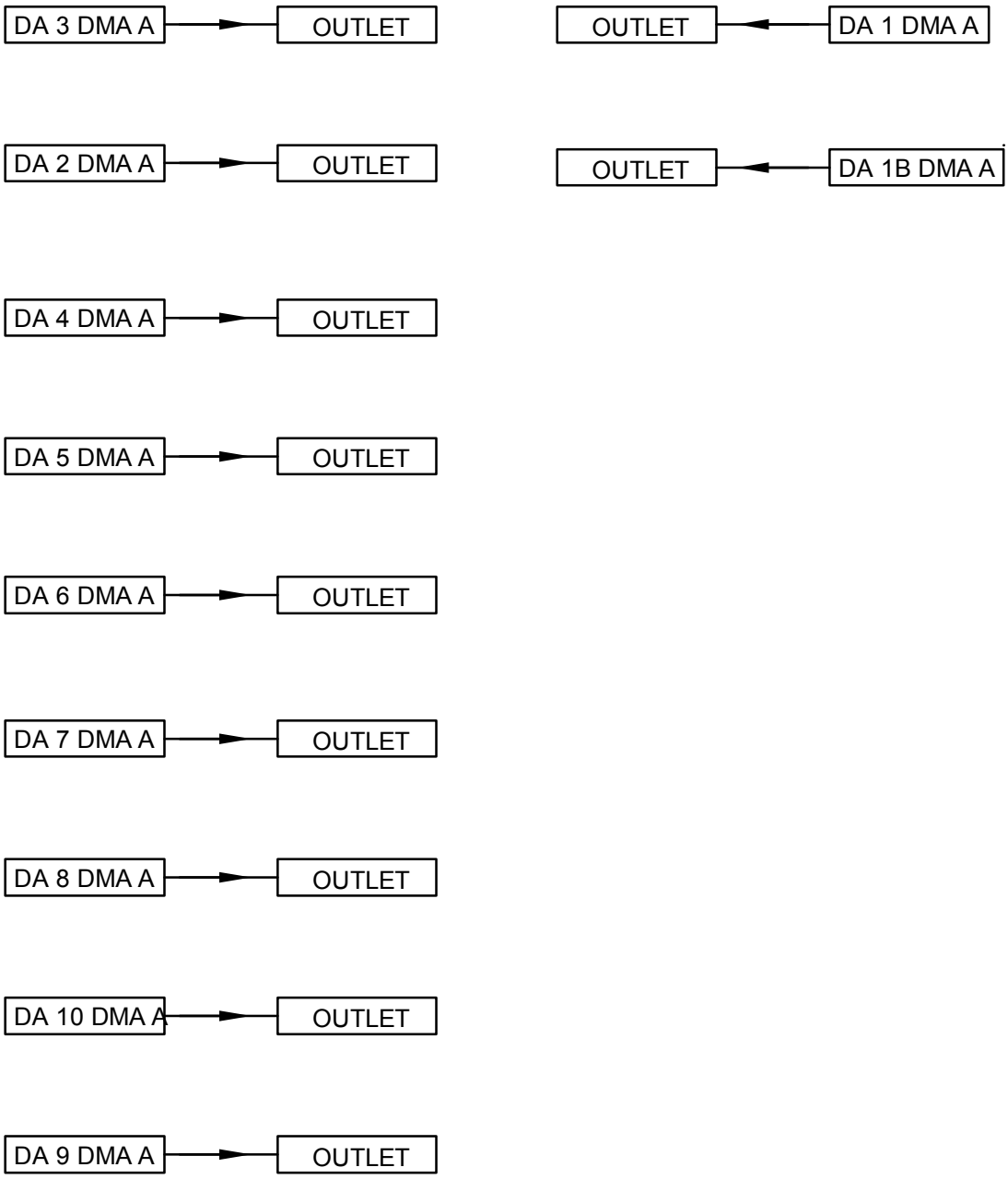

EXHIBIT B

Plotted: Feb 01, 2019 - 11:44am by: Sam AguilarDrawing Name: Z:\06.025.000 bruechert\Hydro\CHINO BUSINESS CENTER HYDRO\WQMP\EXHIBITS\EXHIBIT B DA SCHEMATIC.dwg

RAINFALL DATA

NOAA Atlas 14, Volume 6, Version 2
Location name: Chino, California, USA*
Latitude: 33.9652°, Longitude: -117.6469°
Elevation: 588.45 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	**0.115** (0.096-0.140)	**0.152** (0.127-0.184)	**0.200** (0.166-0.243)	**0.239** (0.197-0.293)	**0.293** (0.233-0.372)	**0.335** (0.261-0.434)	**0.378** (0.287-0.503)	**0.423** (0.312-0.579)	**0.484** (0.342-0.693)	**0.532** (0.363-0.790)
10-min	**0.166** (0.138-0.200)	**0.218** (0.182-0.263)	**0.286** (0.238-0.348)	**0.343** (0.283-0.420)	**0.420** (0.335-0.533)	**0.480** (0.374-0.622)	**0.542** (0.411-0.721)	**0.606** (0.447-0.830)	**0.694** (0.490-0.993)	**0.763** (0.520-1.13)
15-min	**0.200** (0.167-0.242)	**0.263** (0.220-0.319)	**0.346** (0.288-0.420)	**0.415** (0.342-0.508)	**0.508** (0.405-0.644)	**0.581** (0.452-0.753)	**0.655** (0.498-0.872)	**0.733** (0.540-1.00)	**0.839** (0.592-1.20)	**0.923** (0.628-1.37)
30-min	**0.292** (0.244-0.353)	**0.384** (0.320-0.465)	**0.505** (0.420-0.613)	**0.605** (0.499-0.740)	**0.741** (0.590-0.940)	**0.847** (0.660-1.10)	**0.956** (0.726-1.27)	**1.07** (0.788-1.46)	**1.22** (0.864-1.75)	**1.35** (0.917-2.00)
60-min	**0.429** (0.358-0.518)	**0.564** (0.471-0.682)	**0.742** (0.617-0.900)	**0.888** (0.732-1.09)	**1.09** (0.867-1.38)	**1.24** (0.969-1.61)	**1.40** (1.07-1.87)	**1.57** (1.16-2.15)	**1.80** (1.27-2.57)	**1.98** (1.35-2.93)
2-hr	**0.640** (0.535-0.773)	**0.841** (0.702-1.02)	**1.10** (0.915-1.33)	**1.31** (1.08-1.60)	**1.59** (1.27-2.02)	**1.80** (1.41-2.34)	**2.02** (1.53-2.69)	**2.24** (1.65-3.07)	**2.54** (1.79-3.63)	**2.77** (1.89-4.10)
3-hr	**0.802** (0.670-0.970)	**1.05** (0.879-1.27)	**1.38** (1.14-1.67)	**1.63** (1.35-2.00)	**1.98** (1.58-2.51)	**2.24** (1.75-2.90)	**2.50** (1.90-3.33)	**2.77** (2.04-3.79)	**3.13** (2.21-4.47)	**3.40** (2.32-5.05)
6-hr	**1.12** (0.938-1.36)	**1.48** (1.23-1.78)	**1.92** (1.60-2.33)	**2.28** (1.88-2.79)	**2.76** (2.20-3.50)	**3.12** (2.43-4.04)	**3.48** (2.64-4.63)	**3.85** (2.83-5.27)	**4.33** (3.06-6.20)	**4.71** (3.21-6.98)
12-hr	**1.47** (1.23-1.78)	**1.94** (1.62-2.35)	**2.54** (2.12-3.08)	**3.02** (2.50-3.70)	**3.67** (2.92-4.65)	**4.16** (3.24-5.39)	**4.65** (3.53-6.18)	**5.15** (3.79-7.05)	**5.82** (4.11-8.32)	**6.33** (4.31-9.38)
24-hr	**1.94** (1.71-2.23)	**2.57** (2.27-2.97)	**3.40** (3.00-3.93)	**4.07** (3.56-4.75)	**4.97** (4.21-5.99)	**5.66** (4.70-6.97)	**6.36** (5.15-8.02)	**7.08** (5.58-9.17)	**8.05** (6.09-10.9)	**8.81** (6.44-12.3)
2-day	**2.35** (2.08-2.71)	**3.18** (2.81-3.67)	**4.26** (3.76-4.94)	**5.16** (4.51-6.02)	**6.38** (5.40-7.70)	**7.33** (6.08-9.03)	**8.31** (6.73-10.5)	**9.33** (7.35-12.1)	**10.7** (8.11-14.5)	**11.8** (8.64-16.5)
3-day	**2.53** (2.24-2.92)	**3.46** (3.06-4.00)	**4.70** (4.14-5.44)	**5.72** (5.00-6.68)	**7.14** (6.04-8.60)	**8.24** (6.84-10.1)	**9.39** (7.60-11.8)	**10.6** (8.34-13.7)	**12.2** (9.27-16.5)	**13.6** (9.92-18.9)
4-day	**2.74** (2.43-3.16)	**3.77** (3.34-4.36)	**5.15** (4.54-5.97)	**6.29** (5.50-7.35)	**7.88** (6.67-9.49)	**9.11** (7.56-11.2)	**10.4** (8.42-13.1)	**11.7** (9.25-15.2)	**13.6** (10.3-18.3)	**15.1** (11.0-21.0)
7-day	**3.14** (2.78-3.63)	**4.34** (3.84-5.01)	**5.94** (5.24-6.88)	**7.26** (6.35-8.47)	**9.08** (7.69-10.9)	**10.5** (8.71-12.9)	**12.0** (9.70-15.1)	**13.5** (10.6-17.5)	**15.6** (11.8-21.1)	**17.3** (12.6-24.1)
10-day	**3.42** (3.03-3.94)	**4.74** (4.19-5.47)	**6.49** (5.72-7.51)	**7.94** (6.94-9.27)	**9.94** (8.41-12.0)	**11.5** (9.54-14.2)	**13.1** (10.6-16.5)	**14.8** (11.7-19.1)	**17.1** (12.9-23.1)	**18.9** (13.8-26.4)
20-day	**4.09** (3.62-4.72)	**5.72** (5.05-6.60)	**7.91** (6.97-9.15)	**9.73** (8.51-11.4)	**12.3** (10.4-14.8)	**14.3** (11.8-17.6)	**16.4** (13.3-20.6)	**18.6** (14.6-24.0)	**21.6** (16.4-29.2)	**24.1** (17.6-33.6)
30-day	**4.86** (4.30-5.61)	**6.81** (6.02-7.86)	**9.46** (8.34-11.0)	**11.7** (10.2-13.7)	**14.9** (12.6-17.9)	**17.4** (14.4-21.4)	**20.1** (16.2-25.3)	**22.9** (18.0-29.6)	**26.9** (20.3-36.2)	**30.1** (22.0-41.9)
45-day	**5.75** (5.09-6.63)	**8.03** (7.10-9.28)	**11.2** (9.87-13.0)	**13.9** (12.2-16.2)	**17.8** (15.1-21.5)	**21.0** (17.4-25.8)	**24.4** (19.7-30.7)	**28.0** (22.1-36.3)	**33.2** (25.1-44.8)	**37.5** (27.4-52.3)
60-day	**6.63** (5.87-7.65)	**9.20** (8.13-10.6)	**12.8** (11.3-14.8)	**16.0** (14.0-18.6)	**20.5** (17.4-24.8)	**24.3** (20.2-29.9)	**28.4** (23.0-35.8)	**32.8** (25.9-42.5)	**39.2** (29.7-52.9)	**44.6** (32.6-62.2)

[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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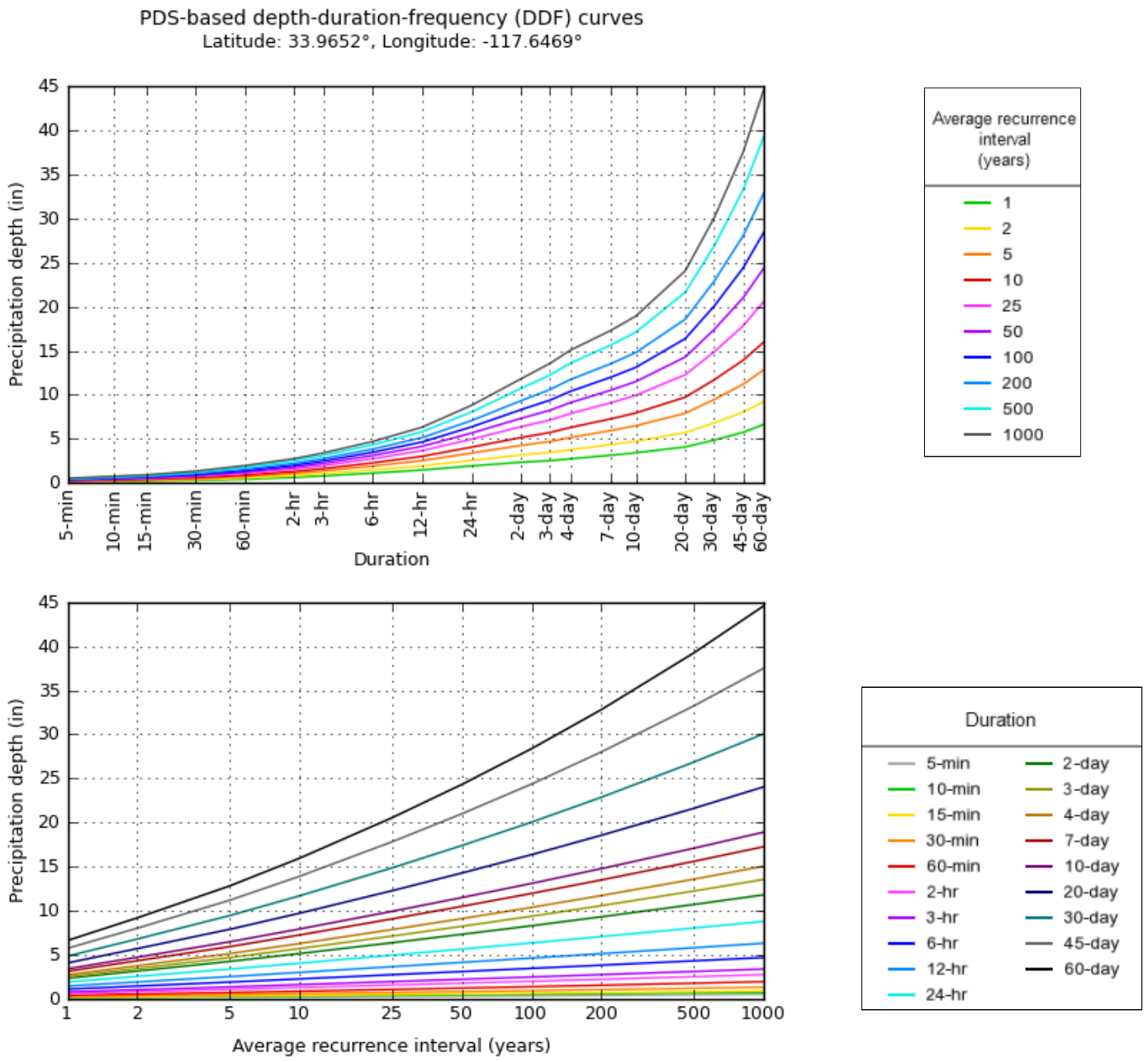
PF graphical



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Created (GMT): Fri Feb 10 15:00:25 2017

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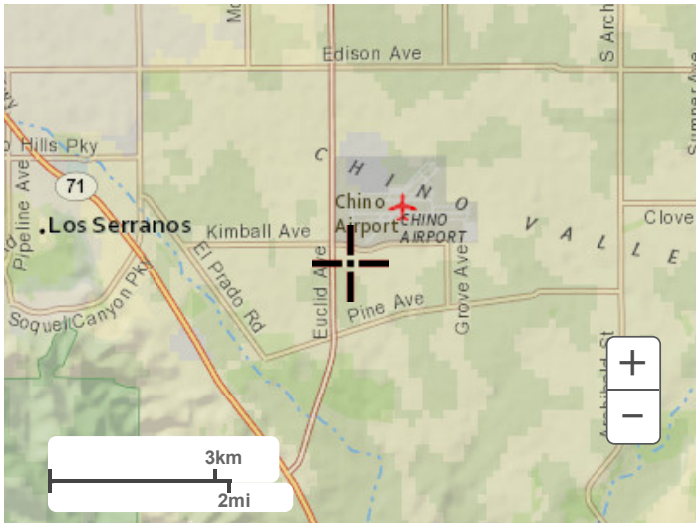
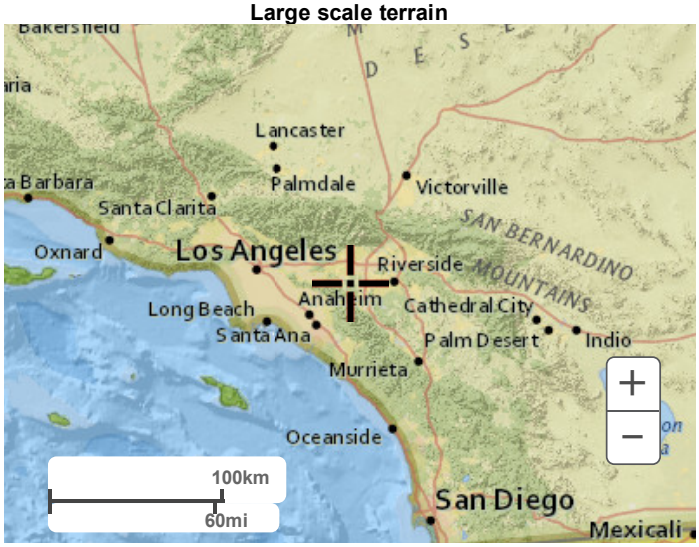
Maps & aerials

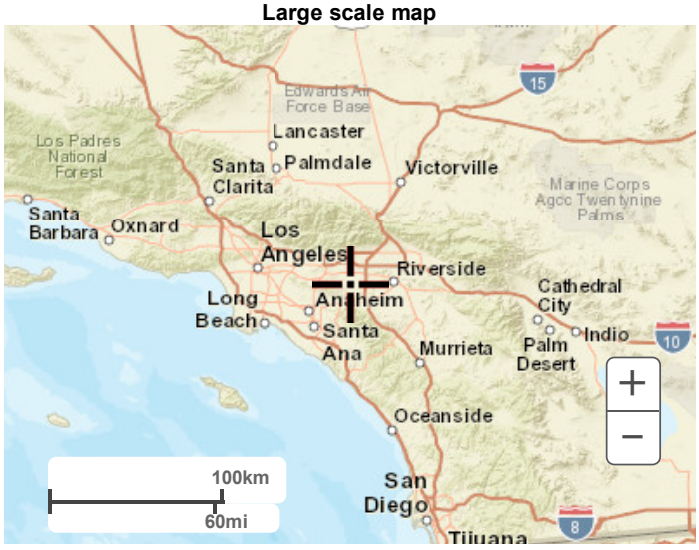
Small scale terrain



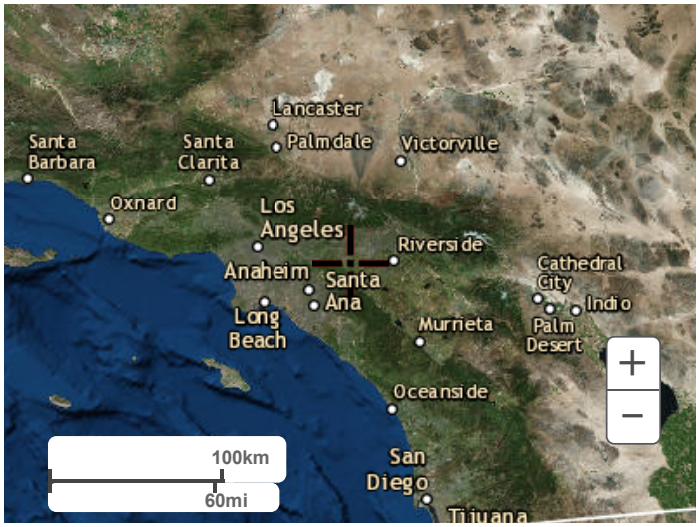
Large scale terrain



Large scale map



Large scale aerial



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US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
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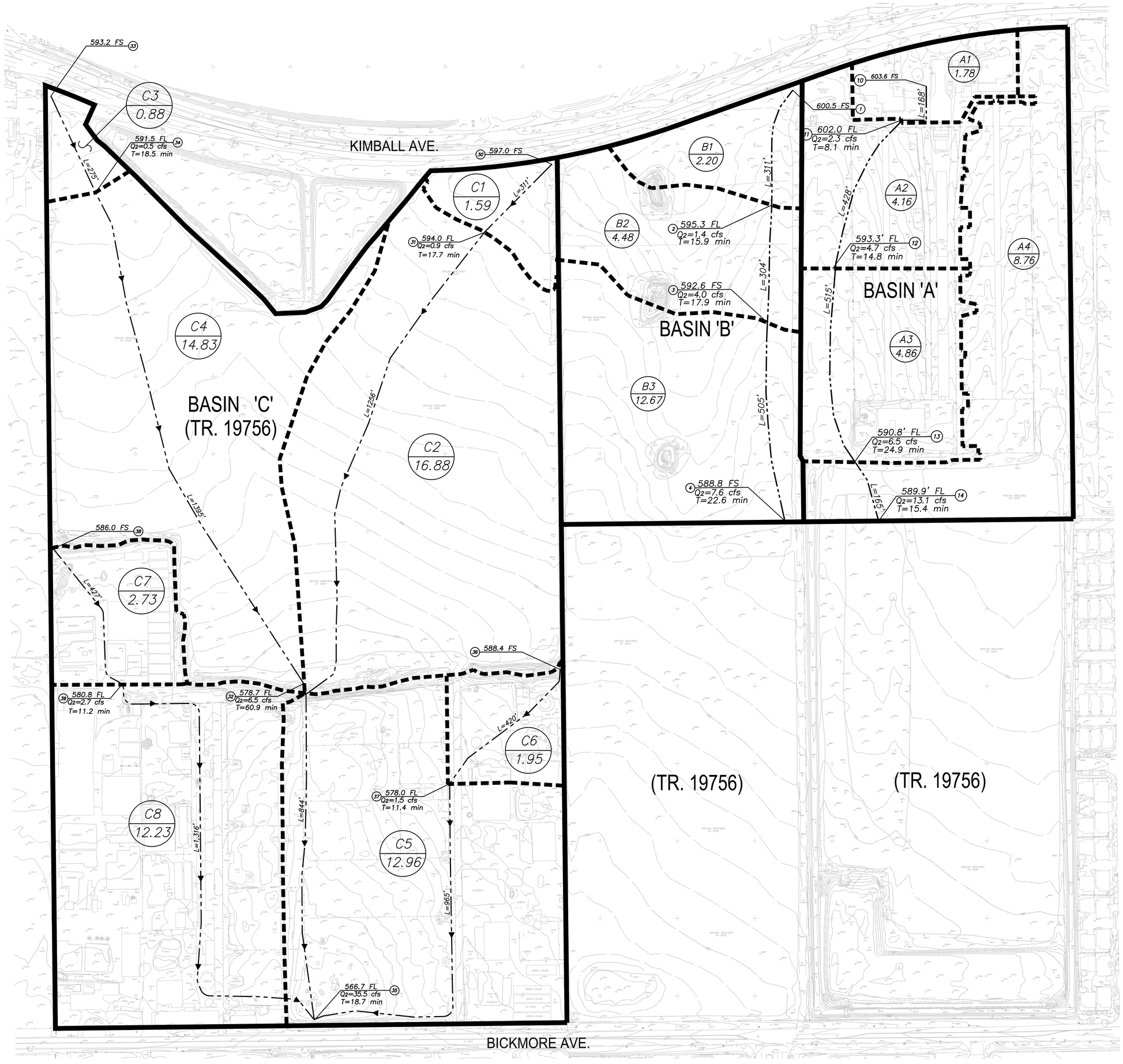
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

Disclaimer

HYDROLOGY CALCULATIONS

HYDROLOGY EXHIBITS



PREPARED BY:
PROACTIVE
ENGINEERING CONSULTANTS
200 SOUTH MAIN ST, SUITE 920 • LOS ANGELES, CA. 92801
(213)624-2300

LEGEND

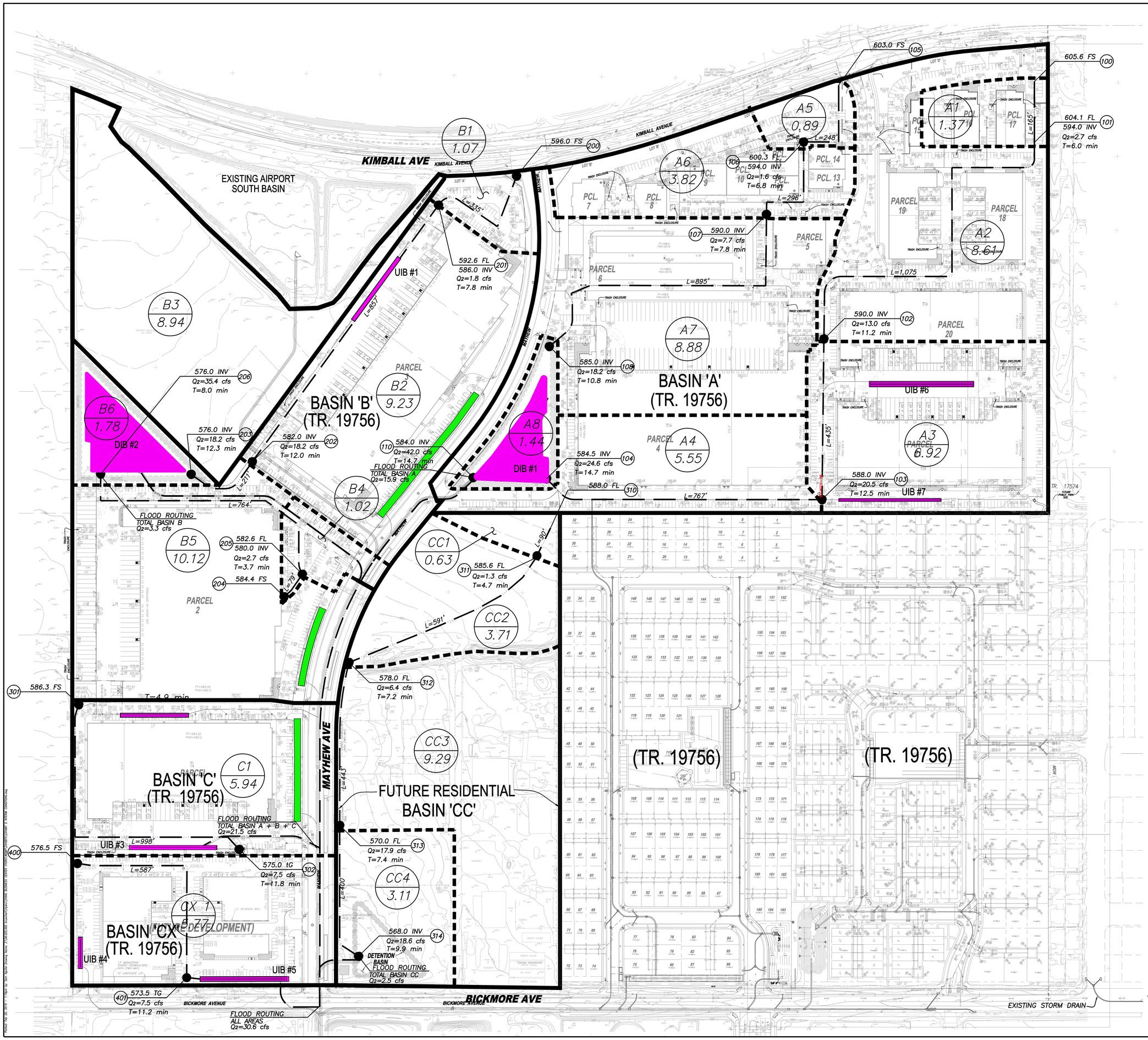
▬▬▬	MAJOR DRAINAGE AREA BOUNDARY
- - - -	SUB-DRAINAGE AREA BOUNDARY
L=100'	FLOW PATH WITH LENGTH
B2 / 1.21	DRAINAGE AREA DESIGNATION / AREA IN ACRES
(12)	NODE NUMBER
335.40 FS	FINISHED SURFACE ELEVATION
327.50 FL	FLOWLINE ELEVATION
Q2=1.6 cfs	FLOW RATE OF 2 YEAR STORM (cfs)
T=9.8 min	TIME IN CONCENTRATION, Tc (min)
BASIN 'A'	DRAINAGE BASIN AREA

80' 40' 0' 80'
SCALE: 1" = 80'

EXISTING HYDROLOGY MAP

EXHIBIT C
TENTATIVE PARCEL MAP 19756
CITY OF CHINO
1/31/2019

Plotted: Feb 20, 2019 - 1:23pm by: Gino Aguilar Drawing Name: Z:\06-025-000 Documents\Hydro\CHINO BUSINESS CENTER HYDRO\MCMAP\EXHIBITS\EXHIBIT C - EXISTING CONDITIONS.dwg



PREPARED BY:
PROACTIVE ENGINEERING CONSULTANTS

LEGEND

	DRAINAGE AREA BOUNDARY
	SUB-DRAINAGE AREA BOUNDARY
L=100'	FLOW PATH WITH LENGTH
DA '1'	DRAINAGE AREA ID
B2 / 1.21	DRAINAGE AREA DESIGNATION / AREA IN ACRES
12	NODE NUMBER
335.40 FS	FINISHED SURFACE ELEVATION
327.50 FL	FLOWLINE ELEVATION
Q2=1.6 cfs	FLOW RATE OF 2 YEAR STORM (cfs)
T=9.8 min	TIME IN CONCENTRATION, Tc (min)
CB #1	CATCH BASIN NUMBER
DIB #1	DETENTION/INFILTRATION BASIN NUMBER
DB #1	DETENTION BASIN NUMBER
UIB #1	UNDERGROUND INFILTRATION BASIN NUMBER
	INFILTRATION TRENCH LOCATION
	UNDERGROUND INFILTRATION BASIN LOCATION
*	CONNECTION TO PUBLIC SD

SCALE: 1" = 80'

DEVELOPED HYDROLOGY MAP

EXHIBIT D
TENTATIVE TRACT MAP 19756
CITY OF CHINO

1/31/2019

BASIN A – DETENTION BASIN A

Project Report

Date:9/2/17		**Sheet** 1 **of** 2
Project: Kimball		**Job No.:**
RE: Detention Basin		**By:** MWN
Basin A		

Detention Basin Size

Stage vs. Volume

Elevation	Depth (FT)	Area (SF)	Storage (CF)	Storage (AF)	Total Storage (AF)
577.5	0.0	0	0	0.00	0.00
578.5	1.0	49000	24500	0.56	0.56
579.5	2.0	50935	49968	1.15	1.71
580.5	3.0	52890	51913	1.19	2.90
581.5	4.0	54880	53885	1.24	4.14
582.5	5.0	56905	55893	1.28	5.42
583.5	6.0	58970	57938	1.33	6.75

Project Report

Date: 9/2/17	**Sheet** 2 **of** 2
Project: Kimball	**Job No.:**
RE: Detention Basin A	

Detention Basin Outlet
Stage vs. Discharge

Side Outlet (Orifice
Q=CA(2gH)^0.5
C= 0.61
A1= 2.00 49000
A2= 1.00 50935
A3= 0.50 52890
A4= 0.50 54880
12 - 3" x 8" opening at 577.5 (A1)
6 - 3" x 8" opening at 578.5 (A2)
3 - 3" x 8" opening at 579.5 (A3)
3 - 3" x 8" opening at 580.5 (A4)

Riser Top Outlet (Weir)
Q=LCH^1.5
C= 3.0
L= 9.42
36" Diameter Riser

Top of Riser set at 582.5

Elev.	Depth (ft)	Depth (H) above 1st row of orifice	Q1 (Orifice) (cfs)	Depth (H) above 2nd row of orifice	Q2 (Orifice) (cfs)	Depth (H) above 3rd row of orifice	Q3 (Orifice) (cfs)	Depth (H) above 4th row of orifice	Q4 (Orifice) (cfs)	Depth (H) above top of riser	Q5 (Weir) (cfs)	Q Total (cfs)
577.5	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
578.5	1.0	0.67	8.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.01
579.5	2.0	1.67	12.65	0.67	4.01	0.00	0.00	0.00	0.00	0.00	0.00	16.66
580.5	3.0	2.67	16.00	1.67	6.33	0.67	2.00	0.00	0.00	0.00	0.00	24.33
581.5	4.0	3.67	18.76	2.67	8.00	1.67	3.16	0.67	2.00	0.00	0.00	31.92
582.5	5.0	4.67	21.16	3.67	9.38	2.67	4.00	1.67	3.16	0.00	0.00	37.70
583.5	6.0	5.67	23.31	4.67	10.58	3.67	4.69	2.67	4.00	1.00	28.26	70.84

BASIN B – DETENTION BASIN B

Date: 9/2/17		**Sheet** 1 **of** 2
Project: Kimball		**Job No.:**
RE: Detention Basin		**By:** MWN
Basin B		

Detention Basin Size

Stage vs. Volume

Elevation	Depth (FT)	Area (SF)	Storage (CF)	Storage (AF)	Total Storage (AF)
575.0	0.0	0	0	0.00	0.00
576.0	1.0	38152	19076	0.44	0.44
577.0	2.0	40977	39565	0.91	1.35
578.0	3.0	43878	42428	0.97	2.32
579.0	4.0	46956	45417	1.04	3.36
580.0	5.0	50141	48549	1.11	4.48
581.0	6.0	53382	51762	1.19	5.67
582.0	7.0	56679	55031	1.26	6.93
583.0	8.0	60033	58356	1.34	8.27
584.0	9.0	63700	61867	1.42	9.69

Project Report

Date: 9/2/17	**Sheet** 2 **of** 2
Project: Kimball	**Job No.:**
RE: Detention Basin B	

Detention Basin Outlet

Stage vs. Discharge

Side Outlet (Orifice

Q=CA(2gH)^0.5

C= 0.61

A1= 0.20

A2= 0.20

A3= 0.20

A4= 0.20

10 - 2" dia. opening at 575.0 (A1)

10 - 2" dia. opening at 576.0 (A2)

10 - 2" dia. opening at 577.0 (A3)

10 - 2" dia. opening at 578.0 (A4)

Riser Top Outlet (Weir)

Q=LCH^1.5

C= 3.0

L= 9.42

36" Diameter Riser

Top of Riser set at 583

Elev.	Depth (ft)	Depth (H) above 1st row of orifice	Q1 (Orifice) (cfs)	Depth (H) above 2nd row of orifice	Q2 (Orifice) (cfs)	Depth (H) above 3rd row of orifice	Q3 (Orifice) (cfs)	Depth (H) above 4th row of orifice	Q4 (Orifice) (cfs)	Depth (H) above top of riser	Q5 (Weir) (cfs)	Q Total (cfs)
575.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
576.0	1.0	0.96	0.96	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.96
577.0	2.0	1.96	1.37	0.96	0.96	0.00	0.00	0.00	0.00	0.00	0.00	2.33
578.0	3.0	2.96	1.68	1.96	1.37	0.96	0.96	0.00	0.00	0.00	0.00	4.01
579.0	4.0	3.96	1.95	2.96	1.68	1.96	1.37	0.96	0.96	0.00	0.00	5.96
580.0	5.0	4.96	2.18	3.96	1.95	2.96	1.68	1.96	1.37	0.00	0.00	7.18
581.0	6.0	5.96	2.39	4.96	2.18	3.96	1.95	2.96	1.68	0.00	0.00	8.20
582.0	7.0	6.96	2.58	5.96	2.39	4.96	2.18	3.96	1.95	0.00	0.00	9.10
583.0	8.0	7.96	2.76	6.96	2.58	5.96	2.39	4.96	2.18	0.00	0.00	9.92
584.0	9.0	8.96	2.93	7.96	2.76	6.96	2.58	5.96	2.39	1.00	28.26	38.93

BASIN CC- DETENTION BASIN CC

Project Report

Date: 1/9/19		**Sheet** 1 **of** 2
Project: Kimball		**Job No.:**
RE: Detention Basin		**By:** MWN
Basin CC		

Detention Basin Size

Stage vs. Volume

Elevation	Depth (FT)	Area (SF)	Storage (CF)	Storage (AF)	Total Storage (AF)
568.0	0.0	0	0	0.00	0.00
569.0	1.0	12000	6000	0.14	0.14
570.0	2.0	13483	12742	0.29	0.43
571.0	3.0	15052	14268	0.33	0.76
572.0	4.0	16708	15880	0.36	1.12
573.0	5.0	18451	17580	0.40	1.53
574.0	6.0	20280	19366	0.44	1.97

Project Report

Date: 1/9/19	**Sheet** 2 **of** 2
Project: Kimball	**Job No.:**
RE: Detention Basin CC	

Detention Basin Outlet
Stage vs. Discharge

Side Outlet (Orifice
Q=CA(2gH)^0.5
C= 0.61
A1= 0.50
A2= 0.50
A3= 1.00
A4= 1.00
3 - 3" x 8" opening at 568.0 (A1)
3 - 3" x 8" opening at 569.0 (A2)
6 - 3" x 8" opening at 570.0 (A3)
6 - 3" x 8" opening at 571.0 (A4)

Riser Top Outlet (Weir)
Q=LCH^1.5
C= 3.0
L= 9.42
36" Diameter Riser

Top of Riser set at 573

Elev.	Depth (ft)	Depth (H) above 1st row of orifice	Q1 (Orifice) (cfs)	Depth (H) above 2nd row of orifice	Q2 (Orifice) (cfs)	Depth (H) above 3rd row of orifice	Q3 (Orifice) (cfs)	Depth (H) above 4th row of orifice	Q4 (Orifice) (cfs)	Depth (H) above top of riser	Q5 (Weir) (cfs)	Q Total (cfs)
568.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
569.0	1.0	0.67	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.00
570.0	2.0	1.67	3.16	0.67	2.00	0.00	0.00	0.00	0.00	0.00	0.00	5.17
571.0	3.0	2.67	4.00	1.67	3.16	0.67	4.01	0.00	0.00	0.00	0.00	11.17
572.0	4.0	3.67	4.69	2.67	4.00	1.67	6.33	0.67	4.01	0.00	0.00	19.02
573.0	5.0	4.67	5.29	3.67	4.69	2.67	8.00	1.67	6.33	0.00	0.00	24.30
574.0	6.0	5.67	5.83	4.67	5.29	3.67	9.38	2.67	8.00	1.00	28.26	56.75

2-Year Rational Method Calculations

Existing Condition

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2005 Version 7.1
Rational Hydrology Study Date: 02/19/19

'BASIN A
EXISTING CONDITIONS
2 YR STORM 1HR

Program License Serial Number 6094

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

Rational hydrology study storm event year is 2.0
Computed rainfall intensity:
Storm year = 2.00 1 hour rainfall = 0.561 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 2

++
Process from Point/Station 10.000 to Point/Station 11.000
**** INITIAL AREA EVALUATION ****

RESIDENTIAL(3 - 4 dwl/acre)
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 56.00
Pervious ratio(Ap) = 0.6000 Max loss rate(Fm)= 0.440(In/Hr)
Initial subarea data:
Initial area flow distance = 168.000(Ft.)
Top (of initial area) elevation = 603.600(Ft.)
Bottom (of initial area) elevation = 602.000(Ft.)
Difference in elevation = 1.600(Ft.)
Slope = 0.00952 s(%)= 0.95
TC = k(0.412)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 8.114 min.
Rainfall intensity = 1.863(In/Hr) for a 2.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.687
Subarea runoff = 2.280(CFS)
Total initial stream area = 1.780(Ac.)
Pervious area fraction = 0.600
Initial area Fm value = 0.440(In/Hr)

++
Process from Point/Station 11.000 to Point/Station 12.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****

Depth of flow = 0.090(Ft.), Average velocity = 1.071(Ft/s)

```
      ******* Irregular Channel Data ***********
-----------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              0.38
      2            100.00              0.00
      3            200.00              0.38
Manning's 'N' friction factor =   0.025
-----------------------------------------------------------------
Sub-Channel flow  =      2.280(CFS)
  '     '    flow top width =     47.324(Ft.)
  '     '     velocity=    1.071(Ft/s)
  '     '    area =      2.128(Sq.Ft)
  '     '    Froude number =     0.891

Upstream point elevation =   602.000(Ft.)
Downstream point elevation =   593.300(Ft.)
Flow length =   428.000(Ft.)
Travel time  =    6.66 min.
Time of concentration =   14.77 min.
Depth of flow =   0.090(Ft.)
Average velocity =   1.071(Ft/s)
Total irregular channel flow =     2.280(CFS)
Irregular channel normal depth above invert elev. =   0.090(Ft.)
Average velocity of channel(s) =   1.071(Ft/s)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       11.000 to Point/Station       12.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      1.780(Ac.)
Runoff from this stream =      2.280(CFS)
Time of concentration =   14.77 min.
Rainfall intensity =     1.301(In/Hr)
Area averaged loss rate (Fm) =    0.4404(In/Hr)
Area averaged Pervious ratio (Ap) = 0.6000
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       11.000 to Point/Station       12.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
UNDEVELOPED (average cover) subarea
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 69.00
Pervious ratio(Ap) = 1.0000     Max loss rate(Fm)=     0.548(In/Hr)
Initial subarea data:
Initial area flow distance =   428.000(Ft.)
Top (of initial area) elevation =   602.000(Ft.)
Bottom (of initial area) elevation =   593.300(Ft.)
Difference in elevation =     8.700(Ft.)
Slope =    0.02033  s(%)=       2.03
TC = k(0.706)*[(length^3)/(elevation change)]^0.2
```

```
Initial area time of concentration =   17.369 min.
Rainfall intensity =      1.180(In/Hr) for a     2.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.482
Subarea runoff =      2.368(CFS)
Total initial stream area =        4.160(Ac.)
Pervious area fraction = 1.000
Initial area Fm value =    0.548(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       11.000 to Point/Station       12.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      4.160(Ac.)
Runoff from this stream =      2.368(CFS)
Time of concentration =   17.37 min.
Rainfall intensity =     1.180(In/Hr)
Area averaged loss rate (Fm) =    0.5479(In/Hr)
Area averaged Pervious ratio (Ap) = 1.0000
Summary of stream data:

Stream Flow rate    Area    TC     Fm       Rainfall Intensity
 No.    (CFS)    (Ac.)       (min) (In/Hr)     (In/Hr)


1      2.28     1.780     14.77    0.440      1.301
2      2.37     4.160     17.37    0.548      1.180
Qmax(1) =
         1.000 *    1.000 *     2.280) +
         1.190 *    0.850 *     2.368) + =       4.677
Qmax(2) =
         0.860 *    1.000 *     2.280) +
         1.000 *    1.000 *     2.368) + =       4.328

Total of 2 main streams to confluence:
Flow rates before confluence point:
       3.280       3.368
Maximum flow rates at confluence using above data:
        4.677        4.328
Area of streams before confluence:
        1.780        4.160
Effective area values after confluence:
        5.318        5.940


Results of confluence:
Total flow rate =      4.677(CFS)
Time of concentration =    14.772 min.
Effective stream area after confluence  =      5.318(Ac.)
Study area average Pervious fraction(Ap) =  0.880
Study area average soil loss rate(Fm) =    0.516(In/Hr)
Study area total =       5.94(Ac.)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Process from Point/Station       12.000 to Point/Station       13.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
________________________________________________________________________
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```
Depth of flow =   0.154(Ft.), Average velocity =   0.750(Ft/s)
     ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
     1              0.00              0.38
     2            100.00              0.00
     3            200.00              0.38
Manning's 'N' friction factor =   0.025
------------------------------------------------------------------
Sub-Channel flow  =      4.677(CFS)
  '     '   flow top width =     81.046(Ft.)
  '     '    velocity=    0.750(Ft/s)
  '     '   area =      6.240(Sq.Ft)
  '     '   Froude number =     0.476

Upstream point elevation =   593.300(Ft.)
Downstream point elevation =   590.800(Ft.)
Flow length =   515.000(Ft.)
Travel time  =   11.45 min.
Time of concentration =   26.22 min.
Depth of flow =   0.154(Ft.)
Average velocity =   0.750(Ft/s)
Total irregular channel flow =     4.677(CFS)
Irregular channel normal depth above invert elev. =   0.154(Ft.)
Average velocity of channel(s) =   0.750(Ft/s)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       12.000 to Point/Station       13.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      5.318(Ac.)
Runoff from this stream =      4.677(CFS)
Time of concentration =   26.22 min.
Rainfall intensity =     0.922(In/Hr)
Area averaged loss rate (Fm) =    0.5157(In/Hr)
Area averaged Pervious ratio (Ap) = 0.8801
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       12.000 to Point/Station       13.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________
UNDEVELOPED (average cover) subarea
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 69.00
Pervious ratio(Ap) = 1.0000     Max loss rate(Fm)=     0.548(In/Hr)
Initial subarea data:
Initial area flow distance =   515.000(Ft.)
Top (of initial area) elevation =   593.300(Ft.)
Bottom (of initial area) elevation =   590.800(Ft.)
Difference in elevation =     2.500(Ft.)
Slope =    0.00485  s(%)=       0.49
```

```
TC = k(0.706)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   24.906 min.
Rainfall intensity =      0.951(In/Hr) for a     2.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.381
Subarea runoff =      1.762(CFS)
Total initial stream area =        4.860(Ac.)
Pervious area fraction = 1.000
Initial area Fm value =    0.548(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       12.000 to Point/Station       13.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      4.860(Ac.)
Runoff from this stream =      1.762(CFS)
Time of concentration =   24.91 min.
Rainfall intensity =     0.951(In/Hr)
Area averaged loss rate (Fm) =    0.5479(In/Hr)
Area averaged Pervious ratio (Ap) = 1.0000
Summary of stream data:

Stream Flow rate    Area    TC     Fm       Rainfall Intensity
 No.    (CFS)   (Ac.)        (min) (In/Hr)     (In/Hr)


1      4.68     5.318     26.22    0.516      0.922
2      1.76     4.860     24.91    0.548      0.951
Qmax(1) =
         1.000 *    1.000 *     4.677) +
         0.928 *    1.000 *     1.762) + =       6.312
Qmax(2) =
         1.071 *    0.950 *     4.677) +
         1.000 *    1.000 *     1.762) + =       6.521

Total of 2 main streams to confluence:
Flow rates before confluence point:
       5.677       2.762
Maximum flow rates at confluence using above data:
        6.312        6.521
Area of streams before confluence:
        5.318        4.860
Effective area values after confluence:
       10.178        9.911


Results of confluence:
Total flow rate =      6.521(CFS)
Time of concentration =    24.906 min.
Effective stream area after confluence  =      9.911(Ac.)
Study area average Pervious fraction(Ap) =  0.937
Study area average soil loss rate(Fm) =    0.531(In/Hr)
Study area total =      10.18(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       13.000 to Point/Station       14.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
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```
Depth of flow =   0.171(Ft.), Average velocity =   0.851(Ft/s)
      ******* Irregular Channel Data ***********
--------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              0.38
      2            100.00              0.00
      3            200.00              0.38
Manning's 'N' friction factor =   0.025
--------------------------------------------------------------
Sub-Channel flow  =      6.521(CFS)
  '     '    flow top width =     89.818(Ft.)
  '     '     velocity=    0.851(Ft/s)
  '     '    area =      7.664(Sq.Ft)
  '     '    Froude number =     0.513

Upstream point elevation =   590.800(Ft.)
Downstream point elevation =   589.900(Ft.)
Flow length =   165.000(Ft.)
Travel time  =    3.23 min.
Time of concentration =   28.14 min.
Depth of flow =   0.171(Ft.)
Average velocity =   0.851(Ft/s)
Total irregular channel flow =     6.521(CFS)
Irregular channel normal depth above invert elev. =   0.171(Ft.)
Average velocity of channel(s) =   0.851(Ft/s)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       13.000 to Point/Station       14.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      9.911(Ac.)
Runoff from this stream =      6.521(CFS)
Time of concentration =   28.14 min.
Rainfall intensity =     0.884(In/Hr)
Area averaged loss rate (Fm) =    0.5311(In/Hr)
Area averaged Pervious ratio (Ap) = 0.9374
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       13.000 to Point/Station       14.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________
UNDEVELOPED (average cover) subarea
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 69.00
Pervious ratio(Ap) = 1.0000     Max loss rate(Fm)=     0.548(In/Hr)
Initial subarea data:
Initial area flow distance =   165.000(Ft.)
Top (of initial area) elevation =   590.800(Ft.)
Bottom (of initial area) elevation =   589.900(Ft.)
Difference in elevation =     0.900(Ft.)
```

```
Slope =    0.00545  s(%)=       0.55
TC = k(0.706)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   15.433 min.
Rainfall intensity =      1.267(In/Hr) for a     2.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.511
Subarea runoff =      5.670(CFS)
Total initial stream area =        8.760(Ac.)
Pervious area fraction = 1.000
Initial area Fm value =    0.548(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       13.000 to Point/Station       14.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      8.760(Ac.)
Runoff from this stream =      5.670(CFS)
Time of concentration =   15.43 min.
Rainfall intensity =     1.267(In/Hr)
Area averaged loss rate (Fm) =    0.5479(In/Hr)
Area averaged Pervious ratio (Ap) = 1.0000
Summary of stream data:

Stream Flow rate    Area    TC     Fm       Rainfall Intensity
 No.    (CFS)    (Ac.)       (min) (In/Hr)     (In/Hr)


1      6.52     9.911     28.14    0.531      0.884
2      5.67     8.760     15.43    0.548      1.267
Qmax(1) =
         1.000 *    1.000 *     6.521) +
         0.467 *    1.000 *     5.670) + =       9.168
Qmax(2) =
         2.087 *    0.548 *     6.521) +
         1.000 *    1.000 *     5.670) + =      13.135

Total of 2 main streams to confluence:
Flow rates before confluence point:
       7.521       6.670
Maximum flow rates at confluence using above data:
        9.168       13.135
Area of streams before confluence:
        9.911        8.760
Effective area values after confluence:
       18.671       14.196


Results of confluence:
Total flow rate =     13.135(CFS)
Time of concentration =    15.433 min.
Effective stream area after confluence  =     14.196(Ac.)
Study area average Pervious fraction(Ap) =  0.967
Study area average soil loss rate(Fm) =    0.539(In/Hr)
Study area total =      18.67(Ac.)
End of computations, Total Study Area =           19.56 (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) = 0.964
Area averaged SCS curve number = 67.8

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2005 Version 7.1
Rational Hydrology Study Date: 02/19/19

BASIN B
EXISTING CONDITIONS
2 YR STORM 1HR

Program License Serial Number 6094

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

Rational hydrology study storm event year is 2.0
Computed rainfall intensity:
Storm year = 2.00 1 hour rainfall = 0.564 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 2

++
Process from Point/Station 1.000 to Point/Station 2.000
**** INITIAL AREA EVALUATION ****

UNDEVELOPED (average cover) subarea
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 69.00
Pervious ratio(Ap) = 1.0000 Max loss rate(Fm)= 0.548(In/Hr)
Initial subarea data:
Initial area flow distance = 311.000(Ft.)
Top (of initial area) elevation = 600.500(Ft.)
Bottom (of initial area) elevation = 595.300(Ft.)
Difference in elevation = 5.200(Ft.)
Slope = 0.01672 s(%)= 1.67
TC = k(0.706)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 15.895 min.
Rainfall intensity = 1.251(In/Hr) for a 2.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.506
Subarea runoff = 1.393(CFS)
Total initial stream area = 2.200(Ac.)
Pervious area fraction = 1.000
Initial area Fm value = 0.548(In/Hr)

++
Process from Point/Station 2.000 to Point/Station 3.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****

Depth of flow = 0.036(Ft.), Average velocity = 0.744(Ft/s)

```
      ******* Irregular Channel Data ***********
-----------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              1.00
      2             62.00              0.00
      3            112.00              0.00
      4            164.00              1.00
Manning's 'N' friction factor =   0.020
-----------------------------------------------------------------
Sub-Channel flow  =      1.393(CFS)
  '     '    flow top width =     54.102(Ft.)
  '     '     velocity=    0.744(Ft/s)
  '     '    area =      1.873(Sq.Ft)
  '     '    Froude number =     0.704

Upstream point elevation =   595.300(Ft.)
Downstream point elevation =   592.600(Ft.)
Flow length =   304.000(Ft.)
Travel time  =    6.81 min.
Time of concentration =   22.71 min.
Depth of flow =   0.036(Ft.)
Average velocity =   0.744(Ft/s)
Total irregular channel flow =     1.393(CFS)
Irregular channel normal depth above invert elev. =   0.036(Ft.)
Average velocity of channel(s) =   0.744(Ft/s)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        2.000 to Point/Station        3.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      2.200(Ac.)
Runoff from this stream =      1.393(CFS)
Time of concentration =   22.71 min.
Rainfall intensity =     1.010(In/Hr)
Area averaged loss rate (Fm) =    0.5479(In/Hr)
Area averaged Pervious ratio (Ap) = 1.0000
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        2.000 to Point/Station        3.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
UNDEVELOPED (average cover) subarea
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 69.00
Pervious ratio(Ap) = 1.0000     Max loss rate(Fm)=     0.548(In/Hr)
Initial subarea data:
Initial area flow distance =   304.000(Ft.)
Top (of initial area) elevation =   595.300(Ft.)
Bottom (of initial area) elevation =   592.600(Ft.)
Difference in elevation =     2.700(Ft.)
Slope =    0.00888  s(%)=       0.89
```

```
TC = k(0.706)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   17.875 min.
Rainfall intensity =      1.166(In/Hr) for a     2.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.477
Subarea runoff =      2.493(CFS)
Total initial stream area =        4.480(Ac.)
Pervious area fraction = 1.000
Initial area Fm value =    0.548(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        2.000 to Point/Station        3.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      4.480(Ac.)
Runoff from this stream =      2.493(CFS)
Time of concentration =   17.88 min.
Rainfall intensity =     1.166(In/Hr)
Area averaged loss rate (Fm) =    0.5479(In/Hr)
Area averaged Pervious ratio (Ap) = 1.0000
Summary of stream data:

Stream Flow rate    Area    TC     Fm       Rainfall Intensity
 No.    (CFS)   (Ac.)        (min) (In/Hr)     (In/Hr)


1      1.39     2.200     22.71    0.548      1.010
2      2.49     4.480     17.88    0.548      1.166
Qmax(1) =
         1.000 *    1.000 *     1.393) +
         0.748 *    1.000 *     2.493) + =       3.258
Qmax(2) =
         1.337 *    0.787 *     1.393) +
         1.000 *    1.000 *     2.493) + =       3.960

Total of 2 main streams to confluence:
Flow rates before confluence point:
       2.393       3.493
Maximum flow rates at confluence using above data:
        3.258        3.960
Area of streams before confluence:
        2.200        4.480
Effective area values after confluence:
        6.680        6.212


Results of confluence:
Total flow rate =      3.960(CFS)
Time of concentration =    17.875 min.
Effective stream area after confluence  =      6.212(Ac.)
Study area average Pervious fraction(Ap) =  1.000
Study area average soil loss rate(Fm) =    0.548(In/Hr)
Study area total =       6.68(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        3.000 to Point/Station        4.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
```

```
Depth of flow =   0.070(Ft.), Average velocity =   1.045(Ft/s)
      ******* Irregular Channel Data ***********
-----------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              1.00
      2             62.00              0.00
      3            112.00              0.00
      4            164.00              1.00
Manning's 'N' friction factor =   0.020
-----------------------------------------------------------------
Sub-Channel flow  =      3.960(CFS)
  '     '    flow top width =     57.998(Ft.)
  '     '     velocity=    1.045(Ft/s)
  '     '    area =      3.788(Sq.Ft)
  '     '    Froude number =     0.721

Upstream point elevation =   592.600(Ft.)
Downstream point elevation =   588.800(Ft.)
Flow length =   505.000(Ft.)
Travel time  =    8.05 min.
Time of concentration =   25.93 min.
Depth of flow =   0.070(Ft.)
Average velocity =   1.045(Ft/s)
Total irregular channel flow =     3.960(CFS)
Irregular channel normal depth above invert elev. =   0.070(Ft.)
Average velocity of channel(s) =   1.045(Ft/s)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        3.000 to Point/Station        4.000
**** CONFLUENCE OF MAIN STREAMS ****
_________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      6.212(Ac.)
Runoff from this stream =      3.960(CFS)
Time of concentration =   25.93 min.
Rainfall intensity =     0.933(In/Hr)
Area averaged loss rate (Fm) =    0.5479(In/Hr)
Area averaged Pervious ratio (Ap) = 1.0000
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        3.000 to Point/Station        4.000
**** INITIAL AREA EVALUATION ****
_________________________________________________________________________
UNDEVELOPED (average cover) subarea
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 69.00
Pervious ratio(Ap) = 1.0000     Max loss rate(Fm)=     0.548(In/Hr)
Initial subarea data:
Initial area flow distance =   505.000(Ft.)
Top (of initial area) elevation =   592.600(Ft.)
Bottom (of initial area) elevation =   588.800(Ft.)
```

```
Difference in elevation =     3.800(Ft.)
Slope =    0.00752  s(%)=       0.75
TC = k(0.706)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   22.637 min.
Rainfall intensity =      1.012(In/Hr) for a     2.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.413
Subarea runoff =      3.422(CFS)
Total initial stream area =        8.190(Ac.)
Pervious area fraction = 1.000
Initial area Fm value =    0.548(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        3.000 to Point/Station        4.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      8.190(Ac.)
Runoff from this stream =      3.422(CFS)
Time of concentration =   22.64 min.
Rainfall intensity =     1.012(In/Hr)
Area averaged loss rate (Fm) =    0.5479(In/Hr)
Area averaged Pervious ratio (Ap) = 1.0000
Summary of stream data:

Stream Flow rate    Area    TC     Fm       Rainfall Intensity
 No.    (CFS)    (Ac.)       (min) (In/Hr)     (In/Hr)


1      3.96     6.212     25.93    0.548      0.933
2      3.42     8.190     22.64    0.548      1.012
Qmax(1) =
         1.000 *    1.000 *     3.960) +
         0.830 *    1.000 *     3.422) + =       6.799
Qmax(2) =
         1.205 *    0.873 *     3.960) +
         1.000 *    1.000 *     3.422) + =       7.590

Total of 2 main streams to confluence:
Flow rates before confluence point:
       4.960       4.422
Maximum flow rates at confluence using above data:
        6.799        7.590
Area of streams before confluence:
        6.212        8.190
Effective area values after confluence:
       14.402       13.614


Results of confluence:
Total flow rate =      7.590(CFS)
Time of concentration =    22.637 min.
Effective stream area after confluence  =     13.614(Ac.)
Study area average Pervious fraction(Ap) =  1.000
Study area average soil loss rate(Fm) =    0.548(In/Hr)
Study area total =      14.40(Ac.)
End of computations, Total Study Area =           14.87 (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) = 1.000
Area averaged SCS curve number = 69.0

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2005 Version 7.1
Rational Hydrology Study Date: 01/10/19

BASIN C
EXISTING CONDITIONS
2 YR STORM 1HR

Program License Serial Number 6094

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

Rational hydrology study storm event year is 2.0
Computed rainfall intensity:
Storm year = 2.00 1 hour rainfall = 0.564 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 2

++
Process from Point/Station 30.000 to Point/Station 31.000
**** INITIAL AREA EVALUATION ****

UNDEVELOPED (average cover) subarea
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 69.00
Pervious ratio(Ap) = 1.0000 Max loss rate(Fm)= 0.548(In/Hr)
Initial subarea data:
Initial area flow distance = 311.000(Ft.)
Top (of initial area) elevation = 597.000(Ft.)
Bottom (of initial area) elevation = 594.000(Ft.)
Difference in elevation = 3.000(Ft.)
Slope = 0.00965 s(%)= 0.96
TC = k(0.706)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 17.743 min.
Rainfall intensity = 1.172(In/Hr) for a 2.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.479
Subarea runoff = 0.892(CFS)
Total initial stream area = 1.590(Ac.)
Pervious area fraction = 1.000
Initial area Fm value = 0.548(In/Hr)

++
Process from Point/Station 31.000 to Point/Station 32.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****

Estimated mean flow rate at midpoint of channel = 0.000(CFS)

```
Depth of flow =   0.063(Ft.), Average velocity =   0.820(Ft/s)
      ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              0.50
      2            250.00              0.00
      3            500.00              0.50
Manning's 'N' friction factor =   0.020
------------------------------------------------------------------
Sub-Channel flow  =      1.637(CFS)
  '     '   flow top width =     63.200(Ft.)
  '     '    velocity=    0.820(Ft/s)
  '     '   area =      1.997(Sq.Ft)
  '     '   Froude number =     0.813

Upstream point elevation =   594.000(Ft.)
Downstream point elevation =   578.700(Ft.)
Flow length =  1256.000(Ft.)
Travel time  =   25.54 min.
Time of concentration =   43.28 min.
Depth of flow =   0.063(Ft.)
Average velocity =   0.820(Ft/s)
Total irregular channel flow =     1.637(CFS)
Irregular channel normal depth above invert elev. =   0.063(Ft.)
Average velocity of channel(s) =   0.820(Ft/s)
 Adding area flow to channel
UNDEVELOPED (average cover) subarea
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 69.00
Pervious ratio(Ap) = 1.0000     Max loss rate(Fm)=     0.548(In/Hr)
Rainfall intensity =      0.686(In/Hr) for a     2.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.181
Subarea runoff =      1.405(CFS) for   16.880(Ac.)
Total runoff =      2.297(CFS)
Effective area this stream =       18.47(Ac.)
Total Study Area (Main Stream No. 1) =       18.47(Ac.)
Area averaged Fm value =    0.548(In/Hr)
Depth of flow =   0.072(Ft.), Average velocity =   0.892(Ft/s)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       31.000 to Point/Station       32.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =     18.470(Ac.)
Runoff from this stream =      2.297(CFS)
Time of concentration =   43.28 min.
Rainfall intensity =     0.686(In/Hr)
Area averaged loss rate (Fm) =    0.5479(In/Hr)
Area averaged Pervious ratio (Ap) = 1.0000
Program is now starting with Main Stream No. 2
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       33.000 to Point/Station       34.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
UNDEVELOPED (average cover) subarea
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 69.00
Pervious ratio(Ap) = 1.0000     Max loss rate(Fm)=     0.548(In/Hr)
Initial subarea data:
Initial area flow distance =   275.000(Ft.)
Top (of initial area) elevation =   593.200(Ft.)
Bottom (of initial area) elevation =   591.500(Ft.)
Difference in elevation =     1.700(Ft.)
Slope =    0.00618  s(%)=       0.62
TC = k(0.706)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   18.464 min.
Rainfall intensity =      1.144(In/Hr) for a     2.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.469
Subarea runoff =      0.472(CFS)
Total initial stream area =        0.880(Ac.)
Pervious area fraction = 1.000
Initial area Fm value =    0.548(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       34.000 to Point/Station       32.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
------------------------------------------------------------------------
Estimated mean flow rate at midpoint of channel =      0.000(CFS)
Depth of flow =   0.043(Ft.), Average velocity =   0.548(Ft/s)
      ******* Irregular Channel Data ***********
-------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              0.50
      2            250.00              0.00
      3            500.00              0.50
Manning's 'N' friction factor =   0.020
-------------------------------------------------------------
Sub-Channel flow  =      0.500(CFS)
  '     '    flow top width =     42.730(Ft.)
  '     '     velocity=    0.548(Ft/s)
  '     '    area =      0.913(Sq.Ft)
  '     '    Froude number =     0.661

Upstream point elevation =   591.500(Ft.)
Downstream point elevation =   578.700(Ft.)
Flow length =  1395.000(Ft.)
Travel time  =   42.43 min.
Time of concentration =   60.89 min.
Depth of flow =   0.043(Ft.)
Average velocity =   0.548(Ft/s)
Total irregular channel flow =     0.500(CFS)
Irregular channel normal depth above invert elev. =   0.043(Ft.)
Average velocity of channel(s) =   0.548(Ft/s)
 Adding area flow to channel
UNDEVELOPED (average cover) subarea
```

```
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 69.00
Pervious ratio(Ap) = 1.0000     Max loss rate(Fm)=     0.548(In/Hr)
The area added to the existing stream causes a
a lower flow rate of Q =      0.157(CFS)
therefore the upstream flow rate of Q =      0.472(CFS) is being used
Rainfall intensity =      0.559(In/Hr) for a     2.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.018
Subarea runoff =      0.000(CFS) for   14.830(Ac.)
Total runoff =      0.472(CFS)
Effective area this stream =       15.71(Ac.)
Total Study Area (Main Stream No. 2) =       34.18(Ac.)
Area averaged Fm value =    0.548(In/Hr)
Depth of flow =   0.042(Ft.), Average velocity =   0.540(Ft/s)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       34.000 to Point/Station       32.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     15.710(Ac.)
Runoff from this stream =      0.472(CFS)
Time of concentration =   60.89 min.
Rainfall intensity =     0.559(In/Hr)
Area averaged loss rate (Fm) =    0.5479(In/Hr)
Area averaged Pervious ratio (Ap) = 1.0000
Summary of stream data:

Stream Flow rate    Area    TC     Fm       Rainfall Intensity
 No.    (CFS)    (Ac.)       (min) (In/Hr)     (In/Hr)


1      2.30    18.470     43.28    0.548      0.686
2      0.47    15.710     60.89    0.548      0.559
Qmax(1) =
         1.000 *    1.000 *     2.297) +
        12.439 *    0.711 *     0.472) + =       6.470
Qmax(2) =
         0.080 *    1.000 *     2.297) +
         1.000 *    1.000 *     0.472) + =       0.657

Total of 2 main streams to confluence:
Flow rates before confluence point:
       3.297       1.472
Maximum flow rates at confluence using above data:
        6.470        0.657
Area of streams before confluence:
       18.470       15.710
Effective area values after confluence:
       29.637       34.180


Results of confluence:
Total flow rate =      6.470(CFS)
```

```
Time of concentration =    43.283 min.
Effective stream area after confluence  =     29.637(Ac.)
Study area average Pervious fraction(Ap) =  1.000
Study area average soil loss rate(Fm) =    0.548(In/Hr)
Study area total =      34.18(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       32.000 to Point/Station       35.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
________________________________________________________________________
Estimated mean flow rate at midpoint of channel =      0.000(CFS)
Depth of flow =   0.089(Ft.), Average velocity =   1.331(Ft/s)
      ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              1.00
      2             62.00              0.00
      3            112.00              0.00
      4            164.00              1.00
Manning's 'N' friction factor =   0.025
------------------------------------------------------------------
Sub-Channel flow  =      6.515(CFS)
  '     '    flow top width =     60.132(Ft.)
  '     '     velocity=    1.331(Ft/s)
  '     '    area =      4.894(Sq.Ft)
  '     '    Froude number =     0.822

Upstream point elevation =   578.700(Ft.)
Downstream point elevation =   566.700(Ft.)
Flow length =   844.000(Ft.)
Travel time  =   10.57 min.
Time of concentration =   53.85 min.
Depth of flow =   0.089(Ft.)
Average velocity =   1.331(Ft/s)
Total irregular channel flow =     6.515(CFS)
Irregular channel normal depth above invert elev. =   0.089(Ft.)
Average velocity of channel(s) =   1.331(Ft/s)
 Adding area flow to channel
UNDEVELOPED (average cover) subarea
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 69.00
Pervious ratio(Ap) = 1.0000     Max loss rate(Fm)=     0.548(In/Hr)
The area added to the existing stream causes a
a lower flow rate of Q =      2.066(CFS)
therefore the upstream flow rate of Q =      6.470(CFS) is being used
Rainfall intensity =      0.602(In/Hr) for a     2.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.081
Subarea runoff =      0.000(CFS) for   12.960(Ac.)
Total runoff =      6.470(CFS)
Effective area this stream =       42.60(Ac.)
Total Study Area (Main Stream No. 1) =       47.14(Ac.)
Area averaged Fm value =    0.548(In/Hr)
Depth of flow =   0.089(Ft.), Average velocity =   1.328(Ft/s)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       32.000 to Point/Station       35.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =     42.597(Ac.)
Runoff from this stream =      6.470(CFS)
Time of concentration =   53.85 min.
Rainfall intensity =     0.602(In/Hr)
Area averaged loss rate (Fm) =    0.5479(In/Hr)
Area averaged Pervious ratio (Ap) = 1.0000
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       36.000 to Point/Station       37.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
RESIDENTIAL(2.5 acre lot)
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 56.00
Pervious ratio(Ap) = 0.9000     Max loss rate(Fm)=     0.661(In/Hr)
Initial subarea data:
Initial area flow distance =   420.000(Ft.)
Top (of initial area) elevation =   588.400(Ft.)
Bottom (of initial area) elevation =   578.000(Ft.)
Difference in elevation =    10.400(Ft.)
Slope =    0.02476  s(%)=       2.48
TC = k(0.487)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   11.431 min.
Rainfall intensity =      1.525(In/Hr) for a     2.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.510
Subarea runoff =      1.517(CFS)
Total initial stream area =        1.950(Ac.)
Pervious area fraction = 0.900
Initial area Fm value =    0.661(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       37.000 to Point/Station       35.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
________________________________________________________________________
Depth of flow =   0.106(Ft.), Average velocity =   1.770(Ft/s)
      ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              2.00
      2              2.00              0.00
      3             10.00              0.00
      4             12.00              2.00
Manning's 'N' friction factor =   0.020
------------------------------------------------------------------
Sub-Channel flow  =      1.517(CFS)
  '     '    flow top width =      8.212(Ft.)
```

```
  '     '    velocity=    1.770(Ft/s)
  '     '   area =      0.857(Sq.Ft)
  '     '   Froude number =     0.965

Upstream point elevation =   578.000(Ft.)
Downstream point elevation =   566.700(Ft.)
Flow length =   965.000(Ft.)
Travel time  =    9.09 min.
Time of concentration =   20.52 min.
Depth of flow =   0.106(Ft.)
Average velocity =   1.770(Ft/s)
Total irregular channel flow =     1.517(CFS)
Irregular channel normal depth above invert elev. =   0.106(Ft.)
Average velocity of channel(s) =   1.770(Ft/s)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       37.000 to Point/Station       35.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      1.950(Ac.)
Runoff from this stream =      1.517(CFS)
Time of concentration =   20.52 min.
Rainfall intensity =     1.074(In/Hr)
Area averaged loss rate (Fm) =    0.6605(In/Hr)
Area averaged Pervious ratio (Ap) = 0.9000
Program is now starting with Main Stream No. 3


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       38.000 to Point/Station       39.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
RESIDENTIAL(3 - 4 dwl/acre)
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 56.00
Pervious ratio(Ap) = 0.6000     Max loss rate(Fm)=     0.440(In/Hr)
Initial subarea data:
Initial area flow distance =   427.000(Ft.)
Top (of initial area) elevation =   586.000(Ft.)
Bottom (of initial area) elevation =   580.800(Ft.)
Difference in elevation =     5.200(Ft.)
Slope =    0.01218  s(%)=       1.22
TC = k(0.412)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   11.219 min.
Rainfall intensity =      1.542(In/Hr) for a     2.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.643
Subarea runoff =      2.708(CFS)
Total initial stream area =        2.730(Ac.)
Pervious area fraction = 0.600
Initial area Fm value =    0.440(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       39.000 to Point/Station       35.000
```

```
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
_____________________________________________________________________
Estimated mean flow rate at midpoint of channel =      0.000(CFS)
Depth of flow =   0.250(Ft.), Average velocity =   2.945(Ft/s)
      ******* Irregular Channel Data ***********
-----------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              2.00
      2              2.00              0.00
      3             10.00              0.00
      4             12.00              2.00
Manning's 'N' friction factor =   0.020
-----------------------------------------------------------------
Sub-Channel flow  =      6.079(CFS)
  '     '    flow top width =      8.500(Ft.)
  '     '     velocity=    2.945(Ft/s)
  '     '    area =      2.064(Sq.Ft)
  '     '    Froude number =     1.053

Upstream point elevation =   580.800(Ft.)
Downstream point elevation =   566.700(Ft.)
Flow length =  1316.000(Ft.)
Travel time  =    7.45 min.
Time of concentration =   18.67 min.
Depth of flow =   0.250(Ft.)
Average velocity =   2.945(Ft/s)
Total irregular channel flow =     6.078(CFS)
Irregular channel normal depth above invert elev. =   0.250(Ft.)
Average velocity of channel(s) =   2.945(Ft/s)
 Adding area flow to channel
RESIDENTIAL(3 - 4 dwl/acre)
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 56.00
Pervious ratio(Ap) = 0.6000     Max loss rate(Fm)=     0.440(In/Hr)
Rainfall intensity =      1.136(In/Hr) for a     2.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.551
Subarea runoff =      6.664(CFS) for   12.230(Ac.)
Total runoff =      9.372(CFS)
Effective area this stream =       14.96(Ac.)
Total Study Area (Main Stream No. 3) =       64.05(Ac.)
Area averaged Fm value =    0.440(In/Hr)
Depth of flow =   0.325(Ft.), Average velocity =   3.469(Ft/s)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       39.000 to Point/Station       35.000
**** CONFLUENCE OF MAIN STREAMS ****
_____________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 3
Stream flow area =     14.960(Ac.)
Runoff from this stream =      9.372(CFS)
Time of concentration =   18.67 min.
Rainfall intensity =     1.136(In/Hr)
Area averaged loss rate (Fm) =    0.4404(In/Hr)
```

Area averaged Pervious ratio (Ap) = 0.6000
Summary of stream data:

Stream No.	Flow rate (CFS)	Area (Ac.)	TC (min)	Fm (In/Hr)	Rainfall Intensity (In/Hr)
1	6.47	42.597	53.85	0.548	0.602
2	1.52	1.950	20.52	0.661	1.074
3	9.37	14.960	18.67	0.440	1.136

```
Qmax(1) =
        1.000 *    1.000 *     6.470) +
Fm Value exceeds Rainfall Intensity in one of the streams
Summing flow rates for conflunce solution
        1.000 *    1.000 *     1.517) +
        0.232 *    1.000 *     9.372) + =      10.161
Qmax(2) =
        9.757 *    0.381 *     6.470) +
        1.000 *    1.000 *     1.517) +
        0.910 *    1.000 *     9.372) + =      34.098
Qmax(3) =
       10.920 *    0.347 *     6.470) +
        1.152 *    0.910 *     1.517) +
        1.000 *    1.000 *     9.372) + =      35.452

Total of 3 main streams to confluence:
Flow rates before confluence point:
      7.470       2.517      10.372
Maximum flow rates at confluence using above data:
      10.161       34.098       35.452
Area of streams before confluence:
      42.597        1.950       14.960
Effective area values after confluence:
      59.507       33.139       31.499


Results of confluence:
Total flow rate =     35.452(CFS)
Time of concentration =    18.666 min.
Effective stream area after confluence  =     31.499(Ac.)
Study area average Pervious fraction(Ap) =  0.896
Study area average soil loss rate(Fm) =    0.525(In/Hr)
Study area total =      59.51(Ac.)
End of computations, Total Study Area =           64.05 (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) = 0.904
Area averaged SCS curve number =  65.6
```

2-Year Rational Method Calculations

Developed Condition

BASIN A
INTERIM
24HR

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2005 Version 7.1
Rational Hydrology Study Date: 01/12/19

Tract 19756
Kimball
Interim Condition
Basin A

Program License Serial Number 6094

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

Rational hydrology study storm event year is 2.0
Computed rainfall intensity:
Storm year = 2.00 1 hour rainfall = 0.564 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 1

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

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 56.00
Adjusted SCS curve number for AMC 1 = 36.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.095(In/Hr)
Initial subarea data:
Initial area flow distance = 165.000(Ft.)
Top (of initial area) elevation = 605.600(Ft.)
Bottom (of initial area) elevation = 604.100(Ft.)
Difference in elevation = 1.500(Ft.)
Slope = 0.00909 s(%)= 0.91
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 6.000 min.
Rainfall intensity = 2.245(In/Hr) for a 2.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.862
Subarea runoff = 2.651(CFS)
Total initial stream area = 1.370(Ac.)
Pervious area fraction = 0.100
Initial area Fm value = 0.095(In/Hr)

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      101.000 to Point/Station      102.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =   594.000(Ft.)
Downstream point/station elevation =   590.000(Ft.)
Pipe length  =  1075.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     2.651(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     2.651(CFS)
Normal flow depth in pipe =    9.01(In.)
Flow top width inside pipe =   14.69(In.)
Critical Depth =    7.84(In.)
Pipe flow velocity =      3.45(Ft/s)
Travel time through pipe =    5.20 min.
Time of concentration (TC) =    11.20 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      101.000 to Point/Station      102.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------------
COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 56.00
Adjusted SCS curve number for AMC 1 = 36.00
Pervious ratio(Ap) = 0.1000     Max loss rate(Fm)=     0.095(In/Hr)
Time of concentration =    11.20 min.
Rainfall intensity =      1.544(In/Hr) for a     2.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.845
Subarea runoff =     10.362(CFS) for    8.610(Ac.)
Total runoff =     13.013(CFS)
Effective area this stream =        9.98(Ac.)
Total Study Area (Main Stream No. 1) =        9.98(Ac.)
Area averaged Fm value =    0.095(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      102.000 to Point/Station      103.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =   590.000(Ft.)
Downstream point/station elevation =   588.000(Ft.)
Pipe length  =   435.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    13.013(CFS)
Nearest computed pipe diameter  =     24.00(In.)
Calculated individual pipe flow  =    13.013(CFS)
Normal flow depth in pipe =   16.97(In.)
Flow top width inside pipe =   21.85(In.)
Critical Depth =   15.58(In.)
Pipe flow velocity =      5.48(Ft/s)
Travel time through pipe =    1.32 min.
```

```
Time of concentration (TC) =    12.52 min.

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      102.000 to Point/Station      103.000
**** SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------------
COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 56.00
Adjusted SCS curve number for AMC 1 = 36.00
Pervious ratio(Ap) = 0.1000     Max loss rate(Fm)=     0.095(In/Hr)
Time of concentration =    12.52 min.
Rainfall intensity =      1.444(In/Hr) for a     2.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.841
Subarea runoff =      7.502(CFS) for    6.920(Ac.)
Total runoff =     20.515(CFS)
Effective area this stream =       16.90(Ac.)
Total Study Area (Main Stream No. 1) =       16.90(Ac.)
Area averaged Fm value =    0.095(In/Hr)

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      103.000 to Point/Station      104.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
----------------------------------------------------------------------------
Upstream point/station elevation =   588.000(Ft.)
Downstream point/station elevation =   584.500(Ft.)
Pipe length  =   767.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    20.515(CFS)
Nearest computed pipe diameter  =     27.00(In.)
Calculated individual pipe flow  =    20.515(CFS)
Normal flow depth in pipe =   21.66(In.)
Flow top width inside pipe =   21.52(In.)
Critical Depth =   19.03(In.)
Pipe flow velocity =      6.00(Ft/s)
Travel time through pipe =    2.13 min.
Time of concentration (TC) =    14.66 min.

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      103.000 to Point/Station      104.000
**** SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------------
COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 56.00
Adjusted SCS curve number for AMC 1 = 36.00
Pervious ratio(Ap) = 0.1000     Max loss rate(Fm)=     0.095(In/Hr)
```

```
Time of concentration =    14.66 min.
Rainfall intensity =      1.314(In/Hr) for a     2.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.835
Subarea runoff =      4.112(CFS) for    5.550(Ac.)
Total runoff =     24.627(CFS)
Effective area this stream =       22.45(Ac.)
Total Study Area (Main Stream No. 1) =       22.45(Ac.)
Area averaged Fm value =    0.095(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      103.000 to Point/Station      104.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 1
Stream flow area =     22.450(Ac.)
Runoff from this stream =     24.627(CFS)
Time of concentration =   14.66 min.
Rainfall intensity =     1.314(In/Hr)
Area averaged loss rate (Fm) =    0.0951(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      105.000 to Point/Station      106.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 56.00
Adjusted SCS curve number for AMC 1 = 36.00
Pervious ratio(Ap) = 0.1000     Max loss rate(Fm)=     0.095(In/Hr)
Initial subarea data:
Initial area flow distance =   248.000(Ft.)
Top (of initial area) elevation =   603.000(Ft.)
Bottom (of initial area) elevation =   600.300(Ft.)
Difference in elevation =     2.700(Ft.)
Slope =    0.01089  s(%)=       1.09
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    6.812 min.
Rainfall intensity =      2.081(In/Hr) for a     2.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.859
Subarea runoff =      1.590(CFS)
Total initial stream area =        0.890(Ac.)
Pervious area fraction = 0.100
Initial area Fm value =    0.095(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      106.000 to Point/Station      107.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
```

```
Upstream point/station elevation =   594.000(Ft.)
Downstream point/station elevation =   590.000(Ft.)
Pipe length  =   296.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     1.590(CFS)
Nearest computed pipe diameter  =      9.00(In.)
Calculated individual pipe flow  =     1.590(CFS)
Normal flow depth in pipe =    6.25(In.)
Flow top width inside pipe =    8.29(In.)
Critical Depth =    6.96(In.)
Pipe flow velocity =      4.87(Ft/s)
Travel time through pipe =    1.01 min.
Time of concentration (TC) =     7.83 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      106.000 to Point/Station      107.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------------
COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 56.00
Adjusted SCS curve number for AMC 1 = 36.00
Pervious ratio(Ap) = 0.1000     Max loss rate(Fm)=     0.095(In/Hr)
Time of concentration =     7.83 min.
Rainfall intensity =      1.914(In/Hr) for a     2.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.855
Subarea runoff =      6.122(CFS) for    3.820(Ac.)
Total runoff =      7.712(CFS)
Effective area this stream =        4.71(Ac.)
Total Study Area (Main Stream No. 1) =       27.16(Ac.)
Area averaged Fm value =    0.095(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      107.000 to Point/Station      108.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =   590.000(Ft.)
Downstream point/station elevation =   585.000(Ft.)
Pipe length  =   895.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     7.712(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =     7.712(CFS)
Normal flow depth in pipe =   14.48(In.)
Flow top width inside pipe =   14.27(In.)
Critical Depth =   12.91(In.)
Pipe flow velocity =      5.06(Ft/s)
Travel time through pipe =    2.95 min.
Time of concentration (TC) =    10.77 min.


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

```
Process from Point/Station      107.000 to Point/Station      108.000
**** SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------
COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 56.00
Adjusted SCS curve number for AMC 1 = 36.00
Pervious ratio(Ap) = 0.1000     Max loss rate(Fm)=     0.095(In/Hr)
Time of concentration =    10.77 min.
Rainfall intensity =      1.581(In/Hr) for a     2.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.846
Subarea runoff =     10.457(CFS) for    8.880(Ac.)
Total runoff =     18.169(CFS)
Effective area this stream =       13.59(Ac.)
Total Study Area (Main Stream No. 1) =       36.04(Ac.)
Area averaged Fm value =    0.095(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      108.000 to Point/Station      110.000
**** IMPROVED CHANNEL TRAVEL TIME ****
----------------------------------------------------------------------
Upstream point elevation =   585.000(Ft.)
Downstream point elevation =   584.000(Ft.)
Channel length thru subarea  =   500.000(Ft.)
Channel base width     =   50.000(Ft.)
Slope or 'Z' of left channel bank =   2.000
Slope or 'Z' of right channel bank =   2.000
Estimated mean flow rate at midpoint of channel =     18.199(CFS)
Manning's 'N'    = 0.020
Maximum depth of channel  =    5.000(Ft.)
Flow(q) thru subarea =     18.199(CFS)
Depth of flow =   0.265(Ft.), Average velocity =   1.359(Ft/s)
Channel flow top width =   51.060(Ft.)
Flow Velocity =    1.36(Ft/s)
Travel time  =    6.13 min.
Time of concentration =   16.90 min.
Critical depth =      0.160(Ft.)
 Adding area flow to channel
PARK subarea
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 56.00
Adjusted SCS curve number for AMC 1 = 36.00
Pervious ratio(Ap) = 0.8500     Max loss rate(Fm)=     0.808(In/Hr)
The area added to the existing stream causes a
a lower flow rate of Q =     14.105(CFS)
therefore the upstream flow rate of Q =     18.169(CFS) is being used
Rainfall intensity =      1.206(In/Hr) for a     2.0 year storm
Effective runoff coefficient used for area,(total area with modified
```

```
rational method)(Q=KCIA) is C = 0.778
Subarea runoff =      0.000(CFS) for    1.440(Ac.)
Total runoff =     18.169(CFS)
Effective area this stream =       15.03(Ac.)
Total Study Area (Main Stream No. 1) =       37.48(Ac.)
Area averaged Fm value =    0.163(In/Hr)
Depth of flow =   0.265(Ft.), Average velocity =   1.358(Ft/s)
Critical depth =      0.160(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      108.000 to Point/Station      110.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 2
Stream flow area =     15.030(Ac.)
Runoff from this stream =     18.169(CFS)
Time of concentration =   16.90 min.
Rainfall intensity =     1.206(In/Hr)
Area averaged loss rate (Fm) =    0.1634(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1719
Summary of stream data:

Stream Flow rate    Area     TC     Fm       Rainfall Intensity
 No.    (CFS)    (Ac.)       (min) (In/Hr)     (In/Hr)


1     24.63    22.450     14.66    0.095      1.314
2     18.17    15.030     16.90    0.163      1.206
Qmax(1) =
         1.000 *    1.000 *    24.627) +
         1.103 *    0.867 *    18.169) + =      42.009
Qmax(2) =
         0.912 *    1.000 *    24.627) +
         1.000 *    1.000 *    18.169) + =      40.618

Total of 2 streams to confluence:
Flow rates before confluence point:
      24.627      18.169
Maximum flow rates at confluence using above data:
       42.009       40.618
Area of streams before confluence:
       22.450       15.030
Effective area values after confluence:
       35.482       37.480
Results of confluence:
Total flow rate =     42.009(CFS)
Time of concentration =    14.655 min.
Effective stream area after confluence =     35.482(Ac.)
Study area average Pervious fraction(Ap) =  0.129
Study area average soil loss rate(Fm) =    0.122(In/Hr)
Study area total (this main stream) =      37.48(Ac.)
End of computations, Total Study Area =           37.48 (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) = 0.129
Area averaged SCS curve number = 56.0

BASIN B
INTERIM
24R

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2005 Version 7.1
Rational Hydrology Study Date: 01/12/19

Tract 19756
Kimball
Interim Condition
Basin B

Program License Serial Number 6094

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

Rational hydrology study storm event year is 2.0
Computed rainfall intensity:
Storm year = 2.00 1 hour rainfall = 0.564 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 1

++
Process from Point/Station 200.000 to Point/Station 201.000
**** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 56.00
Adjusted SCS curve number for AMC 1 = 36.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.095(In/Hr)
Initial subarea data:
Initial area flow distance = 335.000(Ft.)
Top (of initial area) elevation = 596.000(Ft.)
Bottom (of initial area) elevation = 592.600(Ft.)
Difference in elevation = 3.400(Ft.)
Slope = 0.01015 s(%)= 1.01
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 7.791 min.
Rainfall intensity = 1.920(In/Hr) for a 2.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.855
Subarea runoff = 1.757(CFS)
Total initial stream area = 1.070(Ac.)
Pervious area fraction = 0.100
Initial area Fm value = 0.095(In/Hr)

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      201.000 to Point/Station      202.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

------------------------------------------------------------------------------
Upstream point/station elevation =   586.000(Ft.)
Downstream point/station elevation =   582.000(Ft.)
Pipe length  =   857.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     1.757(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     1.757(CFS)
Normal flow depth in pipe =    7.55(In.)
Flow top width inside pipe =   11.59(In.)
Critical Depth =    6.76(In.)
Pipe flow velocity =      3.37(Ft/s)
Travel time through pipe =    4.23 min.
Time of concentration (TC) =    12.02 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      201.000 to Point/Station      202.000
**** SUBAREA FLOW ADDITION ****

------------------------------------------------------------------------------
COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 56.00
Adjusted SCS curve number for AMC 1 = 36.00
Pervious ratio(Ap) = 0.1000     Max loss rate(Fm)=     0.095(In/Hr)
Time of concentration =    12.02 min.
Rainfall intensity =      1.480(In/Hr) for a     2.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.842
Subarea runoff =     11.078(CFS) for    9.230(Ac.)
Total runoff =     12.835(CFS)
Effective area this stream =       10.30(Ac.)
Total Study Area (Main Stream No. 1) =       10.30(Ac.)
Area averaged Fm value =    0.095(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      201.000 to Point/Station      202.000
**** SUBAREA FLOW ADDITION ****

------------------------------------------------------------------------------
UNDEVELOPED (average cover) subarea
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 69.00
Adjusted SCS curve number for AMC 1 = 49.80
Pervious ratio(Ap) = 1.0000     Max loss rate(Fm)=     0.812(In/Hr)
Time of concentration =    12.02 min.
Rainfall intensity =      1.480(In/Hr) for a     2.0 year storm
Effective runoff coefficient used for area,(total area with modified
```

```
rational method)(Q=KCIA) is C = 0.640
Subarea runoff =      5.372(CFS) for    8.940(Ac.)
Total runoff =     18.207(CFS)
Effective area this stream =       19.24(Ac.)
Total Study Area (Main Stream No. 1) =       19.24(Ac.)
Area averaged Fm value =    0.428(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      202.000 to Point/Station      203.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =   582.000(Ft.)
Downstream point/station elevation =   576.000(Ft.)
Pipe length  =   211.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    18.207(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =    18.207(CFS)
Normal flow depth in pipe =   12.71(In.)
Flow top width inside pipe =   20.53(In.)
Critical Depth =   18.60(In.)
Pipe flow velocity =     11.95(Ft/s)
Travel time through pipe =    0.29 min.
Time of concentration (TC) =    12.32 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      202.000 to Point/Station      203.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 1
Stream flow area =     19.240(Ac.)
Runoff from this stream =     18.207(CFS)
Time of concentration =   12.32 min.
Rainfall intensity =     1.458(In/Hr)
Area averaged loss rate (Fm) =    0.4282(In/Hr)
Area averaged Pervious ratio (Ap) = 0.5182


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      204.000 to Point/Station      205.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------------
COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 56.00
Adjusted SCS curve number for AMC 1 = 36.00
Pervious ratio(Ap) = 0.1000     Max loss rate(Fm)=     0.095(In/Hr)
Initial subarea data:
Initial area flow distance =    79.000(Ft.)
Top (of initial area) elevation =   584.400(Ft.)
Bottom (of initial area) elevation =   582.600(Ft.)
Difference in elevation =     1.800(Ft.)
```

```
Slope =    0.02278  s(%)=       2.28
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    3.719 min.
Rainfall intensity =      2.992(In/Hr) for a     2.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.871
Subarea runoff =      2.659(CFS)
Total initial stream area =        1.020(Ac.)
Pervious area fraction = 0.100
Initial area Fm value =    0.095(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      205.000 to Point/Station      206.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =   578.000(Ft.)
Downstream point/station elevation =   576.000(Ft.)
Pipe length  =   764.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     2.659(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     2.659(CFS)
Normal flow depth in pipe =   10.20(In.)
Flow top width inside pipe =   14.00(In.)
Critical Depth =    7.84(In.)
Pipe flow velocity =      3.00(Ft/s)
Travel time through pipe =    4.25 min.
Time of concentration (TC) =     7.97 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      205.000 to Point/Station      206.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 56.00
Adjusted SCS curve number for AMC 1 = 36.00
Pervious ratio(Ap) = 0.1000     Max loss rate(Fm)=     0.095(In/Hr)
Time of concentration =     7.97 min.
Rainfall intensity =      1.894(In/Hr) for a     2.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.855
Subarea runoff =     15.374(CFS) for   10.120(Ac.)
Total runoff =     18.033(CFS)
Effective area this stream =       11.14(Ac.)
Total Study Area (Main Stream No. 1) =       30.38(Ac.)
Area averaged Fm value =    0.095(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      205.000 to Point/Station      206.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------
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Along Main Stream number: 1 in normal stream number 2
Stream flow area =     11.140(Ac.)
Runoff from this stream =     18.033(CFS)
Time of concentration =    7.97 min.
Rainfall intensity =     1.894(In/Hr)
Area averaged loss rate (Fm) =    0.0951(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1000
Summary of stream data:

Stream Flow rate    Area    TC     Fm       Rainfall Intensity
 No.    (CFS)    (Ac.)       (min) (In/Hr)     (In/Hr)


1     18.21    19.240     12.32    0.428      1.458
2     18.03    11.140      7.97    0.095      1.894
Qmax(1) =
         1.000 *    1.000 *    18.207) +
         0.758 *    1.000 *    18.033) + =      31.875
Qmax(2) =
         1.423 *    0.647 *    18.207) +
         1.000 *    1.000 *    18.033) + =      34.792

Total of 2 streams to confluence:
Flow rates before confluence point:
      18.207      18.033
Maximum flow rates at confluence using above data:
       31.875       34.792
Area of streams before confluence:
       19.240       11.140
Effective area values after confluence:
       30.380       23.588
Results of confluence:
Total flow rate =     34.792(CFS)
Time of concentration =     7.969 min.
Effective stream area after confluence =     23.588(Ac.)
Study area average Pervious fraction(Ap) =  0.365
Study area average soil loss rate(Fm) =    0.306(In/Hr)
Study area total (this main stream) =      30.38(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      205.000 to Point/Station      206.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------------
PARK subarea
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 56.00
Adjusted SCS curve number for AMC 1 = 36.00
Pervious ratio(Ap) = 0.8500     Max loss rate(Fm)=     0.808(In/Hr)
Time of concentration =     7.97 min.
Rainfall intensity =      1.894(In/Hr) for a     2.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.738
```

Subarea runoff = 0.653(CFS) for 1.780(Ac.)
Total runoff = 35.445(CFS)
Effective area this stream = 25.37(Ac.)
Total Study Area (Main Stream No. 1) = 32.16(Ac.)
Area averaged Fm value = 0.341(In/Hr)
End of computations, Total Study Area = 32.16 (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) = 0.392
Area averaged SCS curve number = 59.6

BASIN C
INTERIM
2 YR

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2005 Version 7.1
Rational Hydrology Study Date: 01/12/19

Tract 19756
Kimball
Interim Condition
Basin C

Program License Serial Number 6094

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

Rational hydrology study storm event year is 2.0
Computed rainfall intensity:
Storm year = 2.00 1 hour rainfall = 0.564 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 1

++
Process from Point/Station 301.000 to Point/Station 302.000
**** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 56.00
Adjusted SCS curve number for AMC 1 = 36.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.095(In/Hr)
Initial subarea data:
Initial area flow distance = 998.000(Ft.)
Top (of initial area) elevation = 586.300(Ft.)
Bottom (of initial area) elevation = 575.000(Ft.)
Difference in elevation = 11.300(Ft.)
Slope = 0.01132 s(%)= 1.13
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 11.796 min.
Rainfall intensity = 1.497(In/Hr) for a 2.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.843
Subarea runoff = 7.493(CFS)
Total initial stream area = 5.940(Ac.)
Pervious area fraction = 0.100
Initial area Fm value = 0.095(In/Hr)
End of computations, Total Study Area = 5.94 (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 = 56.0

BASIN CX
INTERIM
24R

San Bernardino County Rational Hydrology Program

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Rational Hydrology Study Date: 01/12/19

Tract 19756
Kimball
Interim Condition
Basin CX

Program License Serial Number 6094

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

Rational hydrology study storm event year is 2.0
Computed rainfall intensity:
Storm year = 2.00 1 hour rainfall = 0.564 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 1

++
Process from Point/Station 400.000 to Point/Station 401.000
**** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 56.00
Adjusted SCS curve number for AMC 1 = 36.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.095(In/Hr)
Initial subarea data:
Initial area flow distance = 587.000(Ft.)
Top (of initial area) elevation = 576.500(Ft.)
Bottom (of initial area) elevation = 573.500(Ft.)
Difference in elevation = 3.000(Ft.)
Slope = 0.00511 s(%)= 0.51
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 11.185 min.
Rainfall intensity = 1.545(In/Hr) for a 2.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.845
Subarea runoff = 7.531(CFS)
Total initial stream area = 5.770(Ac.)
Pervious area fraction = 0.100
Initial area Fm value = 0.095(In/Hr)
End of computations, Total Study Area = 5.77 (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 = 56.0

BASIN CC
INTERIM
2 YR

San Bernardino County Rational Hydrology Program

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CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2005 Version 7.1
Rational Hydrology Study Date: 01/12/19

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tract 19756
Kimball
Interim Condition
Basin CC

Program License Serial Number 6094

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

Rational hydrology study storm event year is 2.0
Computed rainfall intensity:
Storm year = 2.00 1 hour rainfall = 0.564 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 1

++
Process from Point/Station 310.000 to Point/Station 311.000
**** INITIAL AREA EVALUATION ****

RESIDENTIAL(8 - 10 dwl/acre)
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 56.00
Adjusted SCS curve number for AMC 1 = 36.00
Pervious ratio(Ap) = 0.4000 Max loss rate(Fm)= 0.380(In/Hr)
Initial subarea data:
Initial area flow distance = 90.000(Ft.)
Top (of initial area) elevation = 588.000(Ft.)
Bottom (of initial area) elevation = 585.600(Ft.)
Difference in elevation = 2.400(Ft.)
Slope = 0.02667 s(%)= 2.67
TC = k(0.374)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 4.671 min.
Rainfall intensity = 2.609(In/Hr) for a 2.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.769
Subarea runoff = 1.264(CFS)
Total initial stream area = 0.630(Ac.)
Pervious area fraction = 0.400
Initial area Fm value = 0.380(In/Hr)

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      311.000 to Point/Station      312.000
**** IMPROVED CHANNEL TRAVEL TIME ****

------------------------------------------------------------------------------
Upstream point elevation =   585.600(Ft.)
Downstream point elevation =   578.000(Ft.)
Channel length thru subarea  =   591.000(Ft.)
Channel base width     =    2.000(Ft.)
Slope or 'Z' of left channel bank =   2.000
Slope or 'Z' of right channel bank =   2.000
Estimated mean flow rate at midpoint of channel =      3.874(CFS)
Manning's 'N'    = 0.018
Maximum depth of channel  =    3.000(Ft.)
Flow(q) thru subarea =      3.874(CFS)
Depth of flow =   0.362(Ft.), Average velocity =   3.933(Ft/s)
Channel flow top width =    3.447(Ft.)
Flow Velocity =    3.93(Ft/s)
Travel time  =    2.50 min.
Time of concentration =    7.18 min.
Critical depth =      0.422(Ft.)
 Adding area flow to channel
RESIDENTIAL(8 - 10 dwl/acre)
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 56.00
Adjusted SCS curve number for AMC 1 = 36.00
Pervious ratio(Ap) = 0.4000     Max loss rate(Fm)=     0.380(In/Hr)
Rainfall intensity =      2.017(In/Hr) for a     2.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.730
Subarea runoff =      5.128(CFS) for    3.710(Ac.)
Total runoff =      6.392(CFS)
Effective area this stream =        4.34(Ac.)
Total Study Area (Main Stream No. 1) =        4.34(Ac.)
Area averaged Fm value =    0.380(In/Hr)
Depth of flow =   0.475(Ft.), Average velocity =   4.559(Ft/s)
Critical depth =      0.563(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      312.000 to Point/Station      313.000
**** IMPROVED CHANNEL TRAVEL TIME ****

------------------------------------------------------------------------------
Upstream point elevation =   578.000(Ft.)
Downstream point elevation =   570.000(Ft.)
Channel length thru subarea  =   443.000(Ft.)
Channel base width     =    2.000(Ft.)
Slope or 'Z' of left channel bank =   2.000
Slope or 'Z' of right channel bank =   2.000
Estimated mean flow rate at midpoint of channel =     12.180(CFS)
Manning's 'N'    = 0.018
Maximum depth of channel  =    3.000(Ft.)
Flow(q) thru subarea =     12.180(CFS)
Depth of flow =   0.611(Ft.), Average velocity =   6.183(Ft/s)
```

```
Channel flow top width =    4.445(Ft.)
Flow Velocity =    6.18(Ft/s)
Travel time  =    1.19 min.
Time of concentration =    8.37 min.
Critical depth =      0.797(Ft.)
 Adding area flow to channel
RESIDENTIAL(8 - 10 dwl/acre)
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 56.00
Adjusted SCS curve number for AMC 1 = 36.00
Pervious ratio(Ap) = 0.4000     Max loss rate(Fm)=     0.380(In/Hr)
Rainfall intensity =      1.839(In/Hr) for a     2.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.714
Subarea runoff =     11.500(CFS) for    9.290(Ac.)
Total runoff =     17.893(CFS)
Effective area this stream =       13.63(Ac.)
Total Study Area (Main Stream No. 1) =       13.63(Ac.)
Area averaged Fm value =    0.380(In/Hr)
Depth of flow =   0.745(Ft.), Average velocity =   6.876(Ft/s)
Critical depth =      0.984(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      313.000 to Point/Station      314.000
**** IMPROVED CHANNEL TRAVEL TIME ****
------------------------------------------------------------------------------
Upstream point elevation =   570.000(Ft.)
Downstream point elevation =   568.000(Ft.)
Channel length thru subarea  =   400.000(Ft.)
Channel base width     =    2.000(Ft.)
Slope or 'Z' of left channel bank =   2.000
Slope or 'Z' of right channel bank =   2.000
Estimated mean flow rate at midpoint of channel =     18.647(CFS)
Manning's 'N'    = 0.018
Maximum depth of channel  =    3.000(Ft.)
Flow(q) thru subarea =     18.647(CFS)
Depth of flow =   1.048(Ft.), Average velocity =   4.344(Ft/s)
Channel flow top width =    6.192(Ft.)
Flow Velocity =    4.34(Ft/s)
Travel time  =    1.53 min.
Time of concentration =    9.90 min.
Critical depth =      1.000(Ft.)
 Adding area flow to channel
RESIDENTIAL(8 - 10 dwl/acre)
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 56.00
Adjusted SCS curve number for AMC 1 = 36.00
Pervious ratio(Ap) = 0.4000     Max loss rate(Fm)=     0.380(In/Hr)
Rainfall intensity =      1.662(In/Hr) for a     2.0 year storm
```

Effective runoff coefficient used for area,(total area with modified rational method)(Q=KCIA) is C = 0.694
Subarea runoff = 1.421(CFS) for 3.110(Ac.)
Total runoff = 19.313(CFS)
Effective area this stream = 16.74(Ac.)
Total Study Area (Main Stream No. 1) = 16.74(Ac.)
Area averaged Fm value = 0.380(In/Hr)
Depth of flow = 1.066(Ft.), Average velocity = 4.384(Ft/s)
Critical depth = 1.023(Ft.)
End of computations, Total Study Area = 16.74 (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) = 0.400
Area averaged SCS curve number = 56.0

2-Year Unit Hydrograph Calculations

Existing Condition

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 02/19/19

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

Program License Serial Number 6094

AREA A
EXISTING CONDITIONS
2 YR STORM

Storm Event Year = 2

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 2		
19.56	1	0.56
Rainfall data for year 2		
19.56	6	1.48
Rainfall data for year 2		
19.56	24	2.57

++

******** 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)
67.8	67.8	19.56	1.000	0.566	0.964	0.546

Area-averaged adjusted loss rate Fm (In/Hr) = 0.546

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

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC2)	S	Pervious Yield Fr
18.86	0.964	67.8	67.8	4.75	0.160
0.70	0.036	98.0	98.0	0.20	0.911

Area-averaged catchment yield fraction, Y = 0.187
Area-averaged low loss fraction, Yb = 0.813
User entry of time of concentration = 0.260 (hours)
++
Watershed area = 19.56(Ac.)
Catchment Lag time = 0.208 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 40.0641
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.546(In/Hr)
Average low loss rate fraction (Yb) = 0.813 (decimal)
VALLEY UNDEVELOPED S-Graph Selected
Computed peak 5-minute rainfall = 0.207(In)
Computed peak 30-minute rainfall = 0.424(In)
Specified peak 1-hour rainfall = 0.560(In)
Computed peak 3-hour rainfall = 1.016(In)
Specified peak 6-hour rainfall = 1.480(In)
Specified peak 24-hour rainfall = 2.570(In)

Rainfall depth area reduction factors:
Using a total area of 19.56(Ac.) (Ref: fig. E-4)

5-minute factor = 0.999 Adjusted rainfall = 0.207(In)
30-minute factor = 0.999 Adjusted rainfall = 0.424(In)
1-hour factor = 0.999 Adjusted rainfall = 0.559(In)
3-hour factor = 1.000 Adjusted rainfall = 1.016(In)
6-hour factor = 1.000 Adjusted rainfall = 1.480(In)
24-hour factor = 1.000 Adjusted rainfall = 2.570(In)

U n i t H y d r o g r a p h
++

Interval Number	'S' Graph Mean values	Unit Hydrograph ((CFS))
(K = 236.55 (CFS))		
1	4.367	10.330
2	22.305	42.433
3	49.092	63.367
4	66.507	41.194
5	75.013	20.121
6	80.383	12.704
7	84.397	9.494
8	87.472	7.273
9	89.910	5.769
10	91.847	4.581
11	93.362	3.583
12	94.620	2.977
13	95.781	2.746
14	96.693	2.158
15	97.457	1.806

16	98.094	1.507
17	98.607	1.213
18	99.011	0.957
19	99.412	0.948
20	100.000	0.474

Total soil rain loss = 1.96(In)
Total effective rainfall = 0.61(In)
Peak flow rate in flood hydrograph = 11.92(CFS)

++

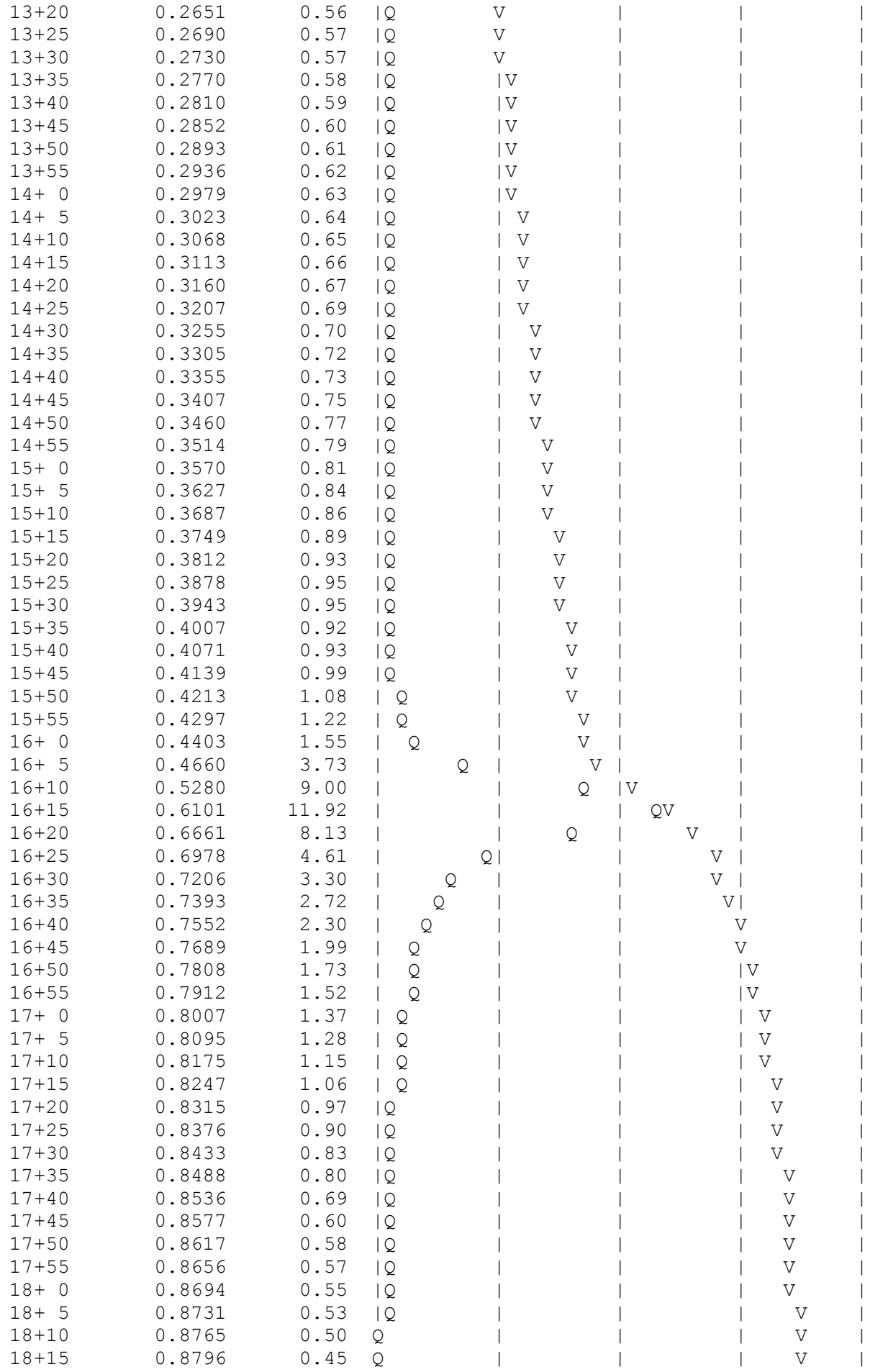
24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

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	0.0000	0.01	Q				
0+10	0.0003	0.04	Q				
0+15	0.0008	0.08	Q				
0+20	0.0015	0.11	Q				
0+25	0.0024	0.12	Q				
0+30	0.0032	0.13	Q				
0+35	0.0042	0.13	Q				
0+40	0.0051	0.14	Q				
0+45	0.0061	0.14	Q				
0+50	0.0071	0.15	Q				
0+55	0.0082	0.15	Q				
1+ 0	0.0092	0.15	Q				
1+ 5	0.0103	0.16	Q				
1+10	0.0114	0.16	Q				
1+15	0.0125	0.16	Q				
1+20	0.0136	0.16	Q				
1+25	0.0147	0.16	Q				
1+30	0.0158	0.16	Q				
1+35	0.0169	0.16	Q				
1+40	0.0181	0.17	Q				
1+45	0.0192	0.17	Q				
1+50	0.0204	0.17	Q				
1+55	0.0215	0.17	Q				
2+ 0	0.0227	0.17	Q				
2+ 5	0.0238	0.17	Q				
2+10	0.0250	0.17	QV				
2+15	0.0262	0.17	QV				
2+20	0.0273	0.17	QV				
2+25	0.0285	0.17	QV				
2+30	0.0297	0.17	QV				
2+35	0.0308	0.17	QV				
2+40	0.0320	0.17	QV				
2+45	0.0332	0.17	QV				
2+50	0.0344	0.17	QV				
2+55	0.0356	0.17	QV				
3+ 0	0.0368	0.17	QV				
3+ 5	0.0380	0.18	QV				
3+10	0.0392	0.18	QV				
3+15	0.0405	0.18	QV				

3+20	0.0417	0.18	QV	|	|	|	|
3+25	0.0429	0.18	QV	|	|	|	|
3+30	0.0441	0.18	QV	|	|	|	|
3+35	0.0454	0.18	QV	|	|	|	|
3+40	0.0466	0.18	QV	|	|	|	|
3+45	0.0479	0.18	QV	|	|	|	|
3+50	0.0491	0.18	QV	|	|	|	|
3+55	0.0504	0.18	Q V	|	|	|	|
4+ 0	0.0516	0.18	Q V	|	|	|	|
4+ 5	0.0529	0.18	Q V	|	|	|	|
4+10	0.0542	0.18	Q V	|	|	|	|
4+15	0.0554	0.19	Q V	|	|	|	|
4+20	0.0567	0.19	Q V	|	|	|	|
4+25	0.0580	0.19	Q V	|	|	|	|
4+30	0.0593	0.19	Q V	|	|	|	|
4+35	0.0606	0.19	Q V	|	|	|	|
4+40	0.0619	0.19	Q V	|	|	|	|
4+45	0.0632	0.19	Q V	|	|	|	|
4+50	0.0645	0.19	Q V	|	|	|	|
4+55	0.0659	0.19	Q V	|	|	|	|
5+ 0	0.0672	0.19	Q V	|	|	|	|
5+ 5	0.0685	0.19	Q V	|	|	|	|
5+10	0.0698	0.19	Q V	|	|	|	|
5+15	0.0712	0.20	Q V	|	|	|	|
5+20	0.0725	0.20	Q V	|	|	|	|
5+25	0.0739	0.20	Q V	|	|	|	|
5+30	0.0753	0.20	Q V	|	|	|	|
5+35	0.0766	0.20	Q V	|	|	|	|
5+40	0.0780	0.20	Q V	|	|	|	|
5+45	0.0794	0.20	Q V	|	|	|	|
5+50	0.0808	0.20	Q V	|	|	|	|
5+55	0.0822	0.20	Q V	|	|	|	|
6+ 0	0.0836	0.20	Q V	|	|	|	|
6+ 5	0.0850	0.20	Q V	|	|	|	|
6+10	0.0864	0.21	Q V	|	|	|	|
6+15	0.0878	0.21	Q V	|	|	|	|
6+20	0.0893	0.21	Q V	|	|	|	|
6+25	0.0907	0.21	Q V	|	|	|	|
6+30	0.0921	0.21	Q V	|	|	|	|
6+35	0.0936	0.21	Q V	|	|	|	|
6+40	0.0950	0.21	Q V	|	|	|	|
6+45	0.0965	0.21	Q V	|	|	|	|
6+50	0.0980	0.21	Q V	|	|	|	|
6+55	0.0995	0.22	Q V	|	|	|	|
7+ 0	0.1010	0.22	Q V	|	|	|	|
7+ 5	0.1025	0.22	Q V	|	|	|	|
7+10	0.1040	0.22	Q V	|	|	|	|
7+15	0.1055	0.22	Q V	|	|	|	|
7+20	0.1070	0.22	Q V	|	|	|	|
7+25	0.1085	0.22	Q V	|	|	|	|
7+30	0.1101	0.22	Q V	|	|	|	|
7+35	0.1116	0.22	Q V	|	|	|	|
7+40	0.1132	0.23	Q V	|	|	|	|
7+45	0.1148	0.23	Q V	|	|	|	|
7+50	0.1163	0.23	Q V	|	|	|	|
7+55	0.1179	0.23	Q V	|	|	|	|
8+ 0	0.1195	0.23	Q V	|	|	|	|
8+ 5	0.1211	0.23	Q V	|	|	|	|
8+10	0.1227	0.23	Q V	|	|	|	|
8+15	0.1244	0.24	Q V	|	|	|	|

8+20	0.1260	0.24	Q	V	|	|	|	|
8+25	0.1276	0.24	Q	V	|	|	|	|
8+30	0.1293	0.24	Q	V	|	|	|	|
8+35	0.1310	0.24	Q	V	|	|	|	|
8+40	0.1326	0.24	Q	V	|	|	|	|
8+45	0.1343	0.25	Q	V	|	|	|	|
8+50	0.1360	0.25	Q	V	|	|	|	|
8+55	0.1377	0.25	Q	V	|	|	|	|
9+ 0	0.1395	0.25	Q	V	|	|	|	|
9+ 5	0.1412	0.25	Q	V	|	|	|	|
9+10	0.1429	0.25	Q	V	|	|	|	|
9+15	0.1447	0.26	Q	V	|	|	|	|
9+20	0.1465	0.26	Q	V	|	|	|	|
9+25	0.1483	0.26	Q	V	|	|	|	|
9+30	0.1500	0.26	Q	V	|	|	|	|
9+35	0.1519	0.26	Q	V	|	|	|	|
9+40	0.1537	0.26	Q	V	|	|	|	|
9+45	0.1555	0.27	Q	V	|	|	|	|
9+50	0.1574	0.27	Q	V	|	|	|	|
9+55	0.1592	0.27	Q	V	|	|	|	|
10+ 0	0.1611	0.27	Q	V	|	|	|	|
10+ 5	0.1630	0.28	Q	V	|	|	|	|
10+10	0.1649	0.28	Q	V	|	|	|	|
10+15	0.1669	0.28	Q	V	|	|	|	|
10+20	0.1688	0.28	Q	V	|	|	|	|
10+25	0.1708	0.28	Q	V	|	|	|	|
10+30	0.1727	0.29	Q	V	|	|	|	|
10+35	0.1747	0.29	Q	V	|	|	|	|
10+40	0.1767	0.29	Q	V	|	|	|	|
10+45	0.1788	0.29	Q	V	|	|	|	|
10+50	0.1808	0.30	Q	V	|	|	|	|
10+55	0.1829	0.30	Q	V	|	|	|	|
11+ 0	0.1850	0.30	Q	V	|	|	|	|
11+ 5	0.1871	0.31	Q	V	|	|	|	|
11+10	0.1892	0.31	Q	V	|	|	|	|
11+15	0.1913	0.31	Q	V	|	|	|	|
11+20	0.1935	0.31	Q	V	|	|	|	|
11+25	0.1957	0.32	Q	V	|	|	|	|
11+30	0.1979	0.32	Q	V	|	|	|	|
11+35	0.2001	0.32	Q	V	|	|	|	|
11+40	0.2024	0.33	Q	V	|	|	|	|
11+45	0.2047	0.33	Q	V	|	|	|	|
11+50	0.2070	0.34	Q	V	|	|	|	|
11+55	0.2093	0.34	Q	V	|	|	|	|
12+ 0	0.2117	0.34	Q	V	|	|	|	|
12+ 5	0.2141	0.35	Q	V	|	|	|	|
12+10	0.2167	0.38	Q	V	|	|	|	|
12+15	0.2196	0.42	Q	V	|	|	|	|
12+20	0.2227	0.45	Q	V	|	|	|	|
12+25	0.2259	0.46	Q	V	|	|	|	|
12+30	0.2292	0.48	Q	V	|	|	|	|
12+35	0.2325	0.49	Q	V	|	|	|	|
12+40	0.2359	0.49	Q	V	|	|	|	|
12+45	0.2394	0.50	|Q	V	|	|	|	|
12+50	0.2429	0.51	|Q	V	|	|	|	|
12+55	0.2465	0.52	|Q	V	|	|	|	|
13+ 0	0.2501	0.53	|Q	V	|	|	|	|
13+ 5	0.2538	0.53	|Q	V	|	|	|	|
13+10	0.2575	0.54	|Q	V	|	|	|	|
13+15	0.2613	0.55	|Q	V	|	|	|	|


13+20 0.2651 0.56
13+25 0.2690 0.57
13+30 0.2730 0.57
13+35 0.2770 0.58
13+40 0.2810 0.59
13+45 0.2852 0.60
13+50 0.2893 0.61
13+55 0.2936 0.62
14+ 0 0.2979 0.63
14+ 5 0.3023 0.64
14+10 0.3068 0.65
14+15 0.3113 0.66
14+20 0.3160 0.67
14+25 0.3207 0.69
14+30 0.3255 0.70
14+35 0.3305 0.72
14+40 0.3355 0.73
14+45 0.3407 0.75
14+50 0.3460 0.77
14+55 0.3514 0.79
15+ 0 0.3570 0.81
15+ 5 0.3627 0.84
15+10 0.3687 0.86
15+15 0.3749 0.89
15+20 0.3812 0.93
15+25 0.3878 0.95
15+30 0.3943 0.95
15+35 0.4007 0.92
15+40 0.4071 0.93
15+45 0.4139 0.99
15+50 0.4213 1.08
15+55 0.4297 1.22
16+ 0 0.4403 1.55
16+ 5 0.4660 3.73
16+10 0.5280 9.00
16+15 0.6101 11.92
16+20 0.6661 8.13
16+25 0.6978 4.61
16+30 0.7206 3.30
16+35 0.7393 2.72
16+40 0.7552 2.30
16+45 0.7689 1.99
16+50 0.7808 1.73
16+55 0.7912 1.52
17+ 0 0.8007 1.37
17+ 5 0.8095 1.28
17+10 0.8175 1.15
17+15 0.8247 1.06
17+20 0.8315 0.97
17+25 0.8376 0.90
17+30 0.8433 0.83
17+35 0.8488 0.80
17+40 0.8536 0.69
17+45 0.8577 0.60
17+50 0.8617 0.58
17+55 0.8656 0.57
18+ 0 0.8694 0.55
18+ 5 0.8731 0.53
18+10 0.8765 0.50
18+15 0.8796 0.45

18+20	0.8824	0.42	Q	|	|	|	V |
18+25	0.8852	0.39	Q	|	|	|	V |
18+30	0.8878	0.38	Q	|	|	|	V |
18+35	0.8903	0.36	Q	|	|	|	V |
18+40	0.8927	0.35	Q	|	|	|	V |
18+45	0.8951	0.34	Q	|	|	|	V |
18+50	0.8973	0.33	Q	|	|	|	V |
18+55	0.8996	0.32	Q	|	|	|	V |
19+ 0	0.9018	0.32	Q	|	|	|	V |
19+ 5	0.9039	0.31	Q	|	|	|	V |
19+10	0.9060	0.30	Q	|	|	|	V |
19+15	0.9080	0.30	Q	|	|	|	V |
19+20	0.9100	0.29	Q	|	|	|	V |
19+25	0.9119	0.28	Q	|	|	|	V |
19+30	0.9138	0.28	Q	|	|	|	V |
19+35	0.9157	0.27	Q	|	|	|	V |
19+40	0.9176	0.27	Q	|	|	|	V |
19+45	0.9194	0.26	Q	|	|	|	V |
19+50	0.9212	0.26	Q	|	|	|	V |
19+55	0.9230	0.26	Q	|	|	|	V |
20+ 0	0.9247	0.25	Q	|	|	|	V |
20+ 5	0.9264	0.25	Q	|	|	|	V |
20+10	0.9281	0.25	Q	|	|	|	V |
20+15	0.9298	0.24	Q	|	|	|	V |
20+20	0.9315	0.24	Q	|	|	|	V |
20+25	0.9331	0.24	Q	|	|	|	V |
20+30	0.9347	0.23	Q	|	|	|	V |
20+35	0.9363	0.23	Q	|	|	|	V |
20+40	0.9379	0.23	Q	|	|	|	V |
20+45	0.9395	0.23	Q	|	|	|	V |
20+50	0.9410	0.22	Q	|	|	|	V |
20+55	0.9425	0.22	Q	|	|	|	V |
21+ 0	0.9440	0.22	Q	|	|	|	V |
21+ 5	0.9455	0.22	Q	|	|	|	V |
21+10	0.9470	0.21	Q	|	|	|	V |
21+15	0.9484	0.21	Q	|	|	|	V |
21+20	0.9499	0.21	Q	|	|	|	V |
21+25	0.9513	0.21	Q	|	|	|	V |
21+30	0.9527	0.21	Q	|	|	|	V |
21+35	0.9541	0.20	Q	|	|	|	V |
21+40	0.9555	0.20	Q	|	|	|	V |
21+45	0.9569	0.20	Q	|	|	|	V |
21+50	0.9583	0.20	Q	|	|	|	V |
21+55	0.9596	0.20	Q	|	|	|	V |
22+ 0	0.9609	0.19	Q	|	|	|	V |
22+ 5	0.9623	0.19	Q	|	|	|	V |
22+10	0.9636	0.19	Q	|	|	|	V |
22+15	0.9649	0.19	Q	|	|	|	V |
22+20	0.9662	0.19	Q	|	|	|	V |
22+25	0.9675	0.19	Q	|	|	|	V |
22+30	0.9687	0.18	Q	|	|	|	V |
22+35	0.9700	0.18	Q	|	|	|	V|
22+40	0.9712	0.18	Q	|	|	|	V|
22+45	0.9725	0.18	Q	|	|	|	V|
22+50	0.9737	0.18	Q	|	|	|	V|
22+55	0.9749	0.18	Q	|	|	|	V|
23+ 0	0.9761	0.18	Q	|	|	|	V|
23+ 5	0.9773	0.17	Q	|	|	|	V|
23+10	0.9785	0.17	Q	|	|	|	V|
23+15	0.9797	0.17	Q	|	|	|	V|

23+20	0.9809	0.17	Q	|	|	|	V|
23+25	0.9821	0.17	Q	|	|	|	V|
23+30	0.9832	0.17	Q	|	|	|	V|
23+35	0.9844	0.17	Q	|	|	|	V|
23+40	0.9855	0.17	Q	|	|	|	V|
23+45	0.9867	0.16	Q	|	|	|	V|
23+50	0.9878	0.16	Q	|	|	|	V|
23+55	0.9889	0.16	Q	|	|	|	V|
24+ 0	0.9900	0.16	Q	|	|	|	V|
24+ 5	0.9911	0.15	Q	|	|	|	V|
24+10	0.9919	0.12	Q	|	|	|	V|
24+15	0.9925	0.08	Q	|	|	|	V|
24+20	0.9929	0.05	Q	|	|	|	V|
24+25	0.9931	0.04	Q	|	|	|	V|
24+30	0.9934	0.03	Q	|	|	|	V|
24+35	0.9935	0.02	Q	|	|	|	V|
24+40	0.9937	0.02	Q	|	|	|	V|
24+45	0.9938	0.02	Q	|	|	|	V|
24+50	0.9939	0.01	Q	|	|	|	V|
24+55	0.9939	0.01	Q	|	|	|	V|
25+ 0	0.9940	0.01	Q	|	|	|	V|
25+ 5	0.9940	0.01	Q	|	|	|	V|
25+10	0.9940	0.00	Q	|	|	|	V|
25+15	0.9941	0.00	Q	|	|	|	V|
25+20	0.9941	0.00	Q	|	|	|	V|
25+25	0.9941	0.00	Q	|	|	|	V|
25+30	0.9941	0.00	Q	|	|	|	V|
25+35	0.9941	0.00	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 02/19/19

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

Program License Serial Number 6094

BASIN B
EXISTING CONDITIONS
2 YR STORM

Storm Event Year = 2

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 2		
14.87	1	0.56
Rainfall data for year 2		
14.87	6	1.48
Rainfall data for year 2		
14.87	24	2.57

++

******** 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)
69.0	69.0	14.87	1.000	0.548	1.000	0.548

Area-averaged adjusted loss rate Fm (In/Hr) = 0.548

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

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC2)	S	Pervious Yield Fr
14.87	1.000	69.0	69.0	4.49	0.176

Area-averaged catchment yield fraction, Y = 0.176
Area-averaged low loss fraction, Yb = 0.824
User entry of time of concentration = 0.380 (hours)
++
Watershed area = 14.87(Ac.)
Catchment Lag time = 0.304 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 27.4123
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.548(In/Hr)
Average low loss rate fraction (Yb) = 0.824 (decimal)
VALLEY UNDEVELOPED S-Graph Selected
Computed peak 5-minute rainfall = 0.207(In)
Computed peak 30-minute rainfall = 0.424(In)
Specified peak 1-hour rainfall = 0.560(In)
Computed peak 3-hour rainfall = 1.016(In)
Specified peak 6-hour rainfall = 1.480(In)
Specified peak 24-hour rainfall = 2.570(In)

Rainfall depth area reduction factors:
Using a total area of 14.87(Ac.) (Ref: fig. E-4)

5-minute factor = 0.999 Adjusted rainfall = 0.207(In)
30-minute factor = 0.999 Adjusted rainfall = 0.424(In)
1-hour factor = 0.999 Adjusted rainfall = 0.560(In)
3-hour factor = 1.000 Adjusted rainfall = 1.016(In)
6-hour factor = 1.000 Adjusted rainfall = 1.480(In)
24-hour factor = 1.000 Adjusted rainfall = 2.570(In)

U n i t H y d r o g r a p h
++

Interval Number	'S' Graph Mean values	Unit Hydrograph ((CFS))
(K = 179.83 (CFS))		
1	2.576	4.632
2	11.593	16.216
3	27.617	28.816
4	46.751	34.410
5	61.026	25.672
6	69.457	15.163
7	74.726	9.475
8	78.637	7.034
9	81.789	5.667
10	84.414	4.722
11	86.623	3.972
12	88.414	3.222
13	90.047	2.937
14	91.383	2.402
15	92.562	2.120
16	93.496	1.681

17	94.364	1.561
18	95.191	1.487
19	95.950	1.365
20	96.560	1.096
21	97.115	0.998
22	97.608	0.887
23	98.035	0.768
24	98.414	0.682
25	98.716	0.543
26	98.990	0.493
27	99.264	0.493
28	99.538	0.493
29	99.813	0.493
30	100.000	0.337

Total soil rain loss = 1.98(In)
Total effective rainfall = 0.59(In)
Peak flow rate in flood hydrograph = 6.74(CFS)

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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	0.01	Q				
0+15	0.0003	0.03	Q				
0+20	0.0007	0.05	Q				
0+25	0.0012	0.07	Q				
0+30	0.0017	0.08	Q				
0+35	0.0023	0.09	Q				
0+40	0.0029	0.09	Q				
0+45	0.0036	0.09	Q				
0+50	0.0042	0.10	Q				
0+55	0.0049	0.10	Q				
1+ 0	0.0056	0.10	Q				
1+ 5	0.0063	0.10	Q				
1+10	0.0071	0.11	Q				
1+15	0.0078	0.11	Q				
1+20	0.0085	0.11	Q				
1+25	0.0093	0.11	Q				
1+30	0.0101	0.11	Q				
1+35	0.0109	0.11	Q				
1+40	0.0116	0.11	Q				
1+45	0.0124	0.12	Q				
1+50	0.0132	0.12	Q				
1+55	0.0140	0.12	Q				
2+ 0	0.0148	0.12	Q				
2+ 5	0.0157	0.12	Q				
2+10	0.0165	0.12	Q				
2+15	0.0173	0.12	Q				
2+20	0.0181	0.12	Q				
2+25	0.0190	0.12	QV				
2+30	0.0198	0.12	QV				

2+35	0.0207	0.12	QV	|	|	|	|
2+40	0.0215	0.12	QV	|	|	|	|
2+45	0.0224	0.12	QV	|	|	|	|
2+50	0.0232	0.12	QV	|	|	|	|
2+55	0.0241	0.12	QV	|	|	|	|
3+ 0	0.0249	0.12	QV	|	|	|	|
3+ 5	0.0258	0.13	QV	|	|	|	|
3+10	0.0267	0.13	QV	|	|	|	|
3+15	0.0275	0.13	QV	|	|	|	|
3+20	0.0284	0.13	QV	|	|	|	|
3+25	0.0293	0.13	QV	|	|	|	|
3+30	0.0301	0.13	QV	|	|	|	|
3+35	0.0310	0.13	QV	|	|	|	|
3+40	0.0319	0.13	QV	|	|	|	|
3+45	0.0328	0.13	QV	|	|	|	|
3+50	0.0337	0.13	QV	|	|	|	|
3+55	0.0346	0.13	QV	|	|	|	|
4+ 0	0.0355	0.13	QV	|	|	|	|
4+ 5	0.0364	0.13	Q V	|	|	|	|
4+10	0.0373	0.13	Q V	|	|	|	|
4+15	0.0382	0.13	Q V	|	|	|	|
4+20	0.0391	0.13	Q V	|	|	|	|
4+25	0.0400	0.13	Q V	|	|	|	|
4+30	0.0410	0.13	Q V	|	|	|	|
4+35	0.0419	0.13	Q V	|	|	|	|
4+40	0.0428	0.13	Q V	|	|	|	|
4+45	0.0438	0.14	Q V	|	|	|	|
4+50	0.0447	0.14	Q V	|	|	|	|
4+55	0.0456	0.14	Q V	|	|	|	|
5+ 0	0.0466	0.14	Q V	|	|	|	|
5+ 5	0.0475	0.14	Q V	|	|	|	|
5+10	0.0485	0.14	Q V	|	|	|	|
5+15	0.0494	0.14	Q V	|	|	|	|
5+20	0.0504	0.14	Q V	|	|	|	|
5+25	0.0514	0.14	Q V	|	|	|	|
5+30	0.0523	0.14	Q V	|	|	|	|
5+35	0.0533	0.14	Q V	|	|	|	|
5+40	0.0543	0.14	Q V	|	|	|	|
5+45	0.0553	0.14	Q V	|	|	|	|
5+50	0.0563	0.14	Q V	|	|	|	|
5+55	0.0573	0.14	Q V	|	|	|	|
6+ 0	0.0583	0.15	Q V	|	|	|	|
6+ 5	0.0593	0.15	Q V	|	|	|	|
6+10	0.0603	0.15	Q V	|	|	|	|
6+15	0.0613	0.15	Q V	|	|	|	|
6+20	0.0623	0.15	Q V	|	|	|	|
6+25	0.0633	0.15	Q V	|	|	|	|
6+30	0.0644	0.15	Q V	|	|	|	|
6+35	0.0654	0.15	Q V	|	|	|	|
6+40	0.0664	0.15	Q V	|	|	|	|
6+45	0.0675	0.15	Q V	|	|	|	|
6+50	0.0685	0.15	Q V	|	|	|	|
6+55	0.0696	0.15	Q V	|	|	|	|
7+ 0	0.0706	0.15	Q V	|	|	|	|
7+ 5	0.0717	0.15	Q V	|	|	|	|
7+10	0.0728	0.16	Q V	|	|	|	|
7+15	0.0739	0.16	Q V	|	|	|	|
7+20	0.0749	0.16	Q V	|	|	|	|
7+25	0.0760	0.16	Q V	|	|	|	|
7+30	0.0771	0.16	Q V	|	|	|	|

7+35	0.0782	0.16	Q	V	|	|	|	|
7+40	0.0793	0.16	Q	V	|	|	|	|
7+45	0.0805	0.16	Q	V	|	|	|	|
7+50	0.0816	0.16	Q	V	|	|	|	|
7+55	0.0827	0.16	Q	V	|	|	|	|
8+ 0	0.0838	0.16	Q	V	|	|	|	|
8+ 5	0.0850	0.17	Q	V	|	|	|	|
8+10	0.0861	0.17	Q	V	|	|	|	|
8+15	0.0873	0.17	Q	V	|	|	|	|
8+20	0.0885	0.17	Q	V	|	|	|	|
8+25	0.0896	0.17	Q	V	|	|	|	|
8+30	0.0908	0.17	Q	V	|	|	|	|
8+35	0.0920	0.17	Q	V	|	|	|	|
8+40	0.0932	0.17	Q	V	|	|	|	|
8+45	0.0944	0.17	Q	V	|	|	|	|
8+50	0.0956	0.18	Q	V	|	|	|	|
8+55	0.0968	0.18	Q	V	|	|	|	|
9+ 0	0.0980	0.18	Q	V	|	|	|	|
9+ 5	0.0992	0.18	Q	V	|	|	|	|
9+10	0.1005	0.18	Q	V	|	|	|	|
9+15	0.1017	0.18	Q	V	|	|	|	|
9+20	0.1030	0.18	Q	V	|	|	|	|
9+25	0.1043	0.18	Q	V	|	|	|	|
9+30	0.1055	0.19	Q	V	|	|	|	|
9+35	0.1068	0.19	Q	V	|	|	|	|
9+40	0.1081	0.19	Q	V	|	|	|	|
9+45	0.1094	0.19	Q	V	|	|	|	|
9+50	0.1107	0.19	Q	V	|	|	|	|
9+55	0.1121	0.19	Q	V	|	|	|	|
10+ 0	0.1134	0.19	Q	V	|	|	|	|
10+ 5	0.1147	0.20	Q	V	|	|	|	|
10+10	0.1161	0.20	Q	V	|	|	|	|
10+15	0.1175	0.20	Q	V	|	|	|	|
10+20	0.1188	0.20	Q	V	|	|	|	|
10+25	0.1202	0.20	Q	V	|	|	|	|
10+30	0.1216	0.20	Q	V	|	|	|	|
10+35	0.1230	0.20	Q	V	|	|	|	|
10+40	0.1245	0.21	Q	V	|	|	|	|
10+45	0.1259	0.21	Q	V	|	|	|	|
10+50	0.1273	0.21	Q	V	|	|	|	|
10+55	0.1288	0.21	Q	V	|	|	|	|
11+ 0	0.1303	0.21	Q	V	|	|	|	|
11+ 5	0.1318	0.22	Q	V	|	|	|	|
11+10	0.1333	0.22	Q	V	|	|	|	|
11+15	0.1348	0.22	Q	V	|	|	|	|
11+20	0.1363	0.22	Q	V	|	|	|	|
11+25	0.1379	0.22	Q	V	|	|	|	|
11+30	0.1394	0.23	Q	V	|	|	|	|
11+35	0.1410	0.23	Q	V	|	|	|	|
11+40	0.1426	0.23	Q	V	|	|	|	|
11+45	0.1442	0.23	Q	V	|	|	|	|
11+50	0.1458	0.24	Q	V	|	|	|	|
11+55	0.1475	0.24	Q	V	|	|	|	|
12+ 0	0.1491	0.24	Q	V	|	|	|	|
12+ 5	0.1508	0.25	Q	V	|	|	|	|
12+10	0.1526	0.26	|Q	V	|	|	|	|
12+15	0.1545	0.28	|Q	V	|	|	|	|
12+20	0.1566	0.30	|Q	V	|	|	|	|
12+25	0.1587	0.31	|Q	V	|	|	|	|
12+30	0.1610	0.33	|Q	V	|	|	|	|

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12+35       0.1633      0.33  |Q      V |          |          |          |
12+40       0.1656      0.34  |Q       V|          |          |          |
12+45       0.1680      0.35  |Q       V|          |          |          |
12+50       0.1705      0.35  |Q       V|          |          |          |
12+55       0.1729      0.36  |Q       V|          |          |          |
13+ 0       0.1754      0.37  |Q       V|          |          |          |
13+ 5       0.1780      0.37  |Q       V|          |          |          |
13+10       0.1806      0.38  |Q       V|          |          |          |
13+15       0.1832      0.38  |Q        V          |          |          |
13+20       0.1859      0.39  |Q        V          |          |          |
13+25       0.1886      0.39  |Q        V          |          |          |
13+30       0.1914      0.40  |Q        V          |          |          |
13+35       0.1942      0.41  |Q        V          |          |          |
13+40       0.1970      0.41  |Q        V          |          |          |
13+45       0.1999      0.42  |Q        V          |          |          |
13+50       0.2028      0.42  |Q        |V         |          |          |
13+55       0.2058      0.43  |Q        |V         |          |          |
14+ 0       0.2088      0.44  |Q        |V         |          |          |
14+ 5       0.2119      0.45  |Q        |V         |          |          |
14+10       0.2150      0.45  |Q        |V         |          |          |
14+15       0.2182      0.46  |Q        | V        |          |          |
14+20       0.2214      0.47  |Q        | V        |          |          |
14+25       0.2247      0.48  |Q        | V        |          |          |
14+30       0.2281      0.49  |Q        | V        |          |          |
14+35       0.2315      0.50  |Q        | V        |          |          |
14+40       0.2350      0.51  | Q       | V        |          |          |
14+45       0.2386      0.52  | Q       |  V       |          |          |
14+50       0.2423      0.53  | Q       |  V       |          |          |
14+55       0.2460      0.55  | Q       |  V       |          |          |
15+ 0       0.2499      0.56  | Q       |  V       |          |          |
15+ 5       0.2538      0.58  | Q       |  V       |          |          |
15+10       0.2579      0.59  | Q       |   V      |          |          |
15+15       0.2622      0.61  | Q       |   V      |          |          |
15+20       0.2665      0.63  | Q       |   V      |          |          |
15+25       0.2710      0.65  | Q       |   V      |          |          |
15+30       0.2756      0.66  | Q       |    V     |          |          |
15+35       0.2801      0.66  | Q       |    V     |          |          |
15+40       0.2847      0.66  | Q       |    V     |          |          |
15+45       0.2893      0.67  | Q       |    V     |          |          |
15+50       0.2943      0.72  | Q       |     V    |          |          |
15+55       0.2997      0.79  |  Q      |     V    |          |          |
16+ 0       0.3062      0.95  |  Q      |     V    |          |          |
16+ 5       0.3195      1.93  |      Q  |      V   |          |          |
16+10       0.3469      3.97  |         |    Q   V |          |          |
16+15       0.3883      6.02  |         |          |V  Q      |          |
16+20       0.4348      6.74  |         |          |  V  Q    |          |
16+25       0.4705      5.19  |         |          Q    V    |          |
16+30       0.4939      3.40  |         |  Q       |      V   |          |
16+35       0.5106      2.43  |        Q|          |       V  |          |
16+40       0.5243      1.99  |      Q  |          |       V  |          |
16+45       0.5362      1.72  |     Q   |          |        V |          |
16+50       0.5467      1.53  |     Q   |          |         V          |
16+55       0.5561      1.36  |    Q    |          |         V          |
17+ 0       0.5644      1.21  |   Q     |          |         |V         |
17+ 5       0.5722      1.13  |   Q     |          |         |V         |
17+10       0.5791      1.01  |   Q     |          |         |V         |
17+15       0.5856      0.94  |  Q      |          |         | V        |
17+20       0.5914      0.84  |  Q      |          |         | V        |
17+25       0.5969      0.80  |  Q      |          |         | V        |
17+30       0.6022      0.77  |  Q      |          |         |  V       |
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17+35	0.6073	0.73	| Q	|	|	| V	|
17+40	0.6119	0.67	| Q	|	|	| V	|
17+45	0.6163	0.64	| Q	|	|	| V	|
17+50	0.6204	0.60	| Q	|	|	| V	|
17+55	0.6244	0.57	| Q	|	|	| V	|
18+ 0	0.6281	0.54	| Q	|	|	| V	|
18+ 5	0.6316	0.51	| Q	|	|	| V	|
18+10	0.6349	0.48	|Q	|	|	| V	|
18+15	0.6381	0.46	|Q	|	|	| V	|
18+20	0.6410	0.43	|Q	|	|	| V	|
18+25	0.6438	0.40	|Q	|	|	| V	|
18+30	0.6462	0.36	|Q	|	|	| V	|
18+35	0.6482	0.29	|Q	|	|	| V	|
18+40	0.6502	0.28	|Q	|	|	| V	|
18+45	0.6520	0.27	|Q	|	|	| V	|
18+50	0.6538	0.26	|Q	|	|	| V	|
18+55	0.6555	0.25	|Q	|	|	| V	|
19+ 0	0.6572	0.25	Q	|	|	| V	|
19+ 5	0.6589	0.24	Q	|	|	| V	|
19+10	0.6605	0.23	Q	|	|	| V	|
19+15	0.6620	0.23	Q	|	|	| V	|
19+20	0.6636	0.22	Q	|	|	| V	|
19+25	0.6650	0.22	Q	|	|	| V	|
19+30	0.6665	0.21	Q	|	|	| V	|
19+35	0.6679	0.21	Q	|	|	| V	|
19+40	0.6693	0.20	Q	|	|	| V	|
19+45	0.6707	0.20	Q	|	|	| V	|
19+50	0.6721	0.20	Q	|	|	| V	|
19+55	0.6734	0.19	Q	|	|	| V	|
20+ 0	0.6747	0.19	Q	|	|	| V	|
20+ 5	0.6760	0.19	Q	|	|	| V	|
20+10	0.6772	0.18	Q	|	|	| V	|
20+15	0.6785	0.18	Q	|	|	| V	|
20+20	0.6797	0.18	Q	|	|	| V	|
20+25	0.6809	0.18	Q	|	|	| V	|
20+30	0.6821	0.17	Q	|	|	| V	|
20+35	0.6833	0.17	Q	|	|	| V	|
20+40	0.6845	0.17	Q	|	|	| V	|
20+45	0.6856	0.17	Q	|	|	| V	|
20+50	0.6867	0.16	Q	|	|	| V	|
20+55	0.6879	0.16	Q	|	|	| V	|
21+ 0	0.6890	0.16	Q	|	|	| V	|
21+ 5	0.6901	0.16	Q	|	|	| V	|
21+10	0.6911	0.16	Q	|	|	| V	|
21+15	0.6922	0.16	Q	|	|	| V	|
21+20	0.6933	0.15	Q	|	|	| V	|
21+25	0.6943	0.15	Q	|	|	| V	|
21+30	0.6954	0.15	Q	|	|	| V	|
21+35	0.6964	0.15	Q	|	|	| V	|
21+40	0.6974	0.15	Q	|	|	| V	|
21+45	0.6984	0.15	Q	|	|	| V	|
21+50	0.6994	0.14	Q	|	|	| V	|
21+55	0.7004	0.14	Q	|	|	| V	|
22+ 0	0.7014	0.14	Q	|	|	| V	|
22+ 5	0.7023	0.14	Q	|	|	| V	|
22+10	0.7033	0.14	Q	|	|	| V	|
22+15	0.7043	0.14	Q	|	|	| V	|
22+20	0.7052	0.14	Q	|	|	| V	|
22+25	0.7061	0.14	Q	|	|	| V	|
22+30	0.7071	0.13	Q	|	|	| V	|

22+35	0.7080	0.13	Q	|	|	|	V |
22+40	0.7089	0.13	Q	|	|	|	V|
22+45	0.7098	0.13	Q	|	|	|	V|
22+50	0.7107	0.13	Q	|	|	|	V|
22+55	0.7116	0.13	Q	|	|	|	V|
23+ 0	0.7125	0.13	Q	|	|	|	V|
23+ 5	0.7133	0.13	Q	|	|	|	V|
23+10	0.7142	0.13	Q	|	|	|	V|
23+15	0.7151	0.13	Q	|	|	|	V|
23+20	0.7159	0.12	Q	|	|	|	V|
23+25	0.7168	0.12	Q	|	|	|	V|
23+30	0.7176	0.12	Q	|	|	|	V|
23+35	0.7185	0.12	Q	|	|	|	V|
23+40	0.7193	0.12	Q	|	|	|	V|
23+45	0.7201	0.12	Q	|	|	|	V|
23+50	0.7210	0.12	Q	|	|	|	V|
23+55	0.7218	0.12	Q	|	|	|	V|
24+ 0	0.7226	0.12	Q	|	|	|	V|
24+ 5	0.7234	0.11	Q	|	|	|	V|
24+10	0.7241	0.10	Q	|	|	|	V|
24+15	0.7247	0.08	Q	|	|	|	V|
24+20	0.7251	0.06	Q	|	|	|	V|
24+25	0.7254	0.05	Q	|	|	|	V|
24+30	0.7256	0.04	Q	|	|	|	V|
24+35	0.7258	0.03	Q	|	|	|	V|
24+40	0.7260	0.03	Q	|	|	|	V|
24+45	0.7262	0.02	Q	|	|	|	V|
24+50	0.7263	0.02	Q	|	|	|	V|
24+55	0.7264	0.02	Q	|	|	|	V|
25+ 0	0.7265	0.01	Q	|	|	|	V|
25+ 5	0.7266	0.01	Q	|	|	|	V|
25+10	0.7266	0.01	Q	|	|	|	V|
25+15	0.7267	0.01	Q	|	|	|	V|
25+20	0.7268	0.01	Q	|	|	|	V|
25+25	0.7268	0.01	Q	|	|	|	V|
25+30	0.7268	0.01	Q	|	|	|	V|
25+35	0.7269	0.00	Q	|	|	|	V|
25+40	0.7269	0.00	Q	|	|	|	V|
25+45	0.7269	0.00	Q	|	|	|	V|
25+50	0.7269	0.00	Q	|	|	|	V|
25+55	0.7270	0.00	Q	|	|	|	V|
26+ 0	0.7270	0.00	Q	|	|	|	V|
26+ 5	0.7270	0.00	Q	|	|	|	V|
26+10	0.7270	0.00	Q	|	|	|	V|
26+15	0.7270	0.00	Q	|	|	|	V|
26+20	0.7270	0.00	Q	|	|	|	V|
26+25	0.7270	0.00	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 02/19/19

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

Program License Serial Number 6094

BASIN C
EXISTING CONDITIONS
2 YR STORM

Storm Event Year = 2

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 2		
64.05	1	0.56
Rainfall data for year 2		
64.05	6	1.48
Rainfall data for year 2		
64.05	24	2.57

++

******** 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)
65.6	65.6	64.05	1.000	0.599	0.904	0.542

Area-averaged adjusted loss rate Fm (In/Hr) = 0.542

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

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC2)	S	Pervious Yield Fr
57.90	0.904	65.6	65.6	5.24	0.133
6.15	0.096	98.0	98.0	0.20	0.911

Area-averaged catchment yield fraction, Y = 0.208
Area-averaged low loss fraction, Yb = 0.792
User entry of time of concentration = 0.310 (hours)
++
Watershed area = 64.05(Ac.)
Catchment Lag time = 0.248 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 33.6022
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.542(In/Hr)
Average low loss rate fraction (Yb) = 0.792 (decimal)
VALLEY UNDEVELOPED S-Graph Selected
Computed peak 5-minute rainfall = 0.207(In)
Computed peak 30-minute rainfall = 0.424(In)
Specified peak 1-hour rainfall = 0.560(In)
Computed peak 3-hour rainfall = 1.016(In)
Specified peak 6-hour rainfall = 1.480(In)
Specified peak 24-hour rainfall = 2.570(In)

Rainfall depth area reduction factors:
Using a total area of 64.05(Ac.) (Ref: fig. E-4)

5-minute factor = 0.997 Adjusted rainfall = 0.207(In)
30-minute factor = 0.997 Adjusted rainfall = 0.423(In)
1-hour factor = 0.997 Adjusted rainfall = 0.558(In)
3-hour factor = 1.000 Adjusted rainfall = 1.016(In)
6-hour factor = 1.000 Adjusted rainfall = 1.480(In)
24-hour factor = 1.000 Adjusted rainfall = 2.570(In)

U n i t H y d r o g r a p h
++

Interval Number	'S' Graph Mean values	Unit Hydrograph ((CFS))
(K = 774.60 (CFS))		
1	3.388	26.240
2	16.457	101.233
3	38.500	170.750
4	58.501	154.927
5	69.493	85.144
6	75.735	48.354
7	80.179	34.420
8	83.638	26.799
9	86.454	21.813
10	88.653	17.032
11	90.578	14.907
12	92.101	11.798
13	93.341	9.605
14	94.404	8.233
15	95.415	7.834

16	96.258	6.532
17	96.971	5.518
18	97.583	4.745
19	98.103	4.025
20	98.544	3.420
21	98.888	2.664
22	99.224	2.603
23	99.560	2.603
24	100.000	1.301

Total soil rain loss = 1.91(In)
Total effective rainfall = 0.66(In)
Peak flow rate in flood hydrograph = 33.86(CFS)

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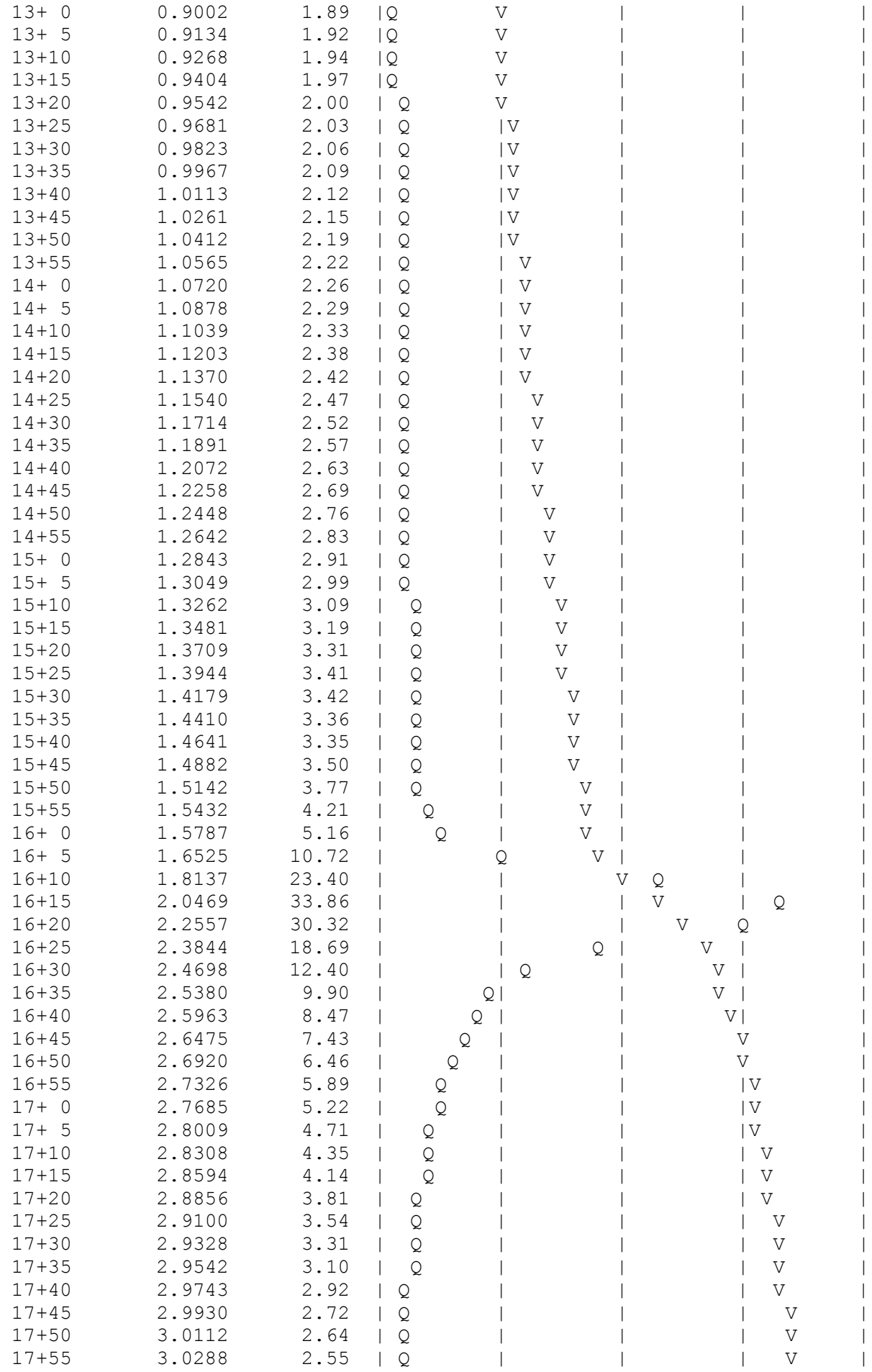
24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	10.0	20.0	30.0	40.0
0+ 5	0.0001	0.02	Q				
0+10	0.0008	0.09	Q				
0+15	0.0023	0.22	Q				
0+20	0.0046	0.34	Q				
0+25	0.0074	0.40	Q				
0+30	0.0104	0.44	Q				
0+35	0.0136	0.46	Q				
0+40	0.0169	0.48	Q				
0+45	0.0204	0.50	Q				
0+50	0.0239	0.52	Q				
0+55	0.0276	0.53	Q				
1+ 0	0.0313	0.54	Q				
1+ 5	0.0351	0.55	Q				
1+10	0.0389	0.56	Q				
1+15	0.0428	0.56	Q				
1+20	0.0467	0.57	Q				
1+25	0.0507	0.58	Q				
1+30	0.0547	0.58	Q				
1+35	0.0587	0.59	Q				
1+40	0.0628	0.59	Q				
1+45	0.0669	0.60	Q				
1+50	0.0710	0.60	Q				
1+55	0.0752	0.60	Q				
2+ 0	0.0794	0.61	Q				
2+ 5	0.0836	0.61	Q				
2+10	0.0878	0.61	QV				
2+15	0.0920	0.61	QV				
2+20	0.0962	0.62	QV				
2+25	0.1005	0.62	QV				
2+30	0.1048	0.62	QV				
2+35	0.1090	0.62	QV				
2+40	0.1133	0.62	QV				
2+45	0.1177	0.63	QV				
2+50	0.1220	0.63	QV				
2+55	0.1263	0.63	QV				

3+ 0	0.1307	0.63	QV	|	|	|	|
3+ 5	0.1351	0.64	QV	|	|	|	|
3+10	0.1395	0.64	QV	|	|	|	|
3+15	0.1439	0.64	QV	|	|	|	|
3+20	0.1483	0.64	QV	|	|	|	|
3+25	0.1528	0.65	QV	|	|	|	|
3+30	0.1572	0.65	QV	|	|	|	|
3+35	0.1617	0.65	QV	|	|	|	|
3+40	0.1662	0.65	QV	|	|	|	|
3+45	0.1707	0.66	QV	|	|	|	|
3+50	0.1753	0.66	QV	|	|	|	|
3+55	0.1798	0.66	Q V	|	|	|	|
4+ 0	0.1844	0.66	Q V	|	|	|	|
4+ 5	0.1890	0.67	Q V	|	|	|	|
4+10	0.1936	0.67	Q V	|	|	|	|
4+15	0.1982	0.67	Q V	|	|	|	|
4+20	0.2028	0.67	Q V	|	|	|	|
4+25	0.2075	0.68	Q V	|	|	|	|
4+30	0.2122	0.68	Q V	|	|	|	|
4+35	0.2169	0.68	Q V	|	|	|	|
4+40	0.2216	0.69	Q V	|	|	|	|
4+45	0.2264	0.69	Q V	|	|	|	|
4+50	0.2311	0.69	Q V	|	|	|	|
4+55	0.2359	0.70	Q V	|	|	|	|
5+ 0	0.2407	0.70	Q V	|	|	|	|
5+ 5	0.2456	0.70	Q V	|	|	|	|
5+10	0.2504	0.70	Q V	|	|	|	|
5+15	0.2553	0.71	Q V	|	|	|	|
5+20	0.2602	0.71	Q V	|	|	|	|
5+25	0.2651	0.71	Q V	|	|	|	|
5+30	0.2700	0.72	Q V	|	|	|	|
5+35	0.2750	0.72	Q V	|	|	|	|
5+40	0.2800	0.72	Q V	|	|	|	|
5+45	0.2850	0.73	Q V	|	|	|	|
5+50	0.2900	0.73	Q V	|	|	|	|
5+55	0.2951	0.73	Q V	|	|	|	|
6+ 0	0.3002	0.74	Q V	|	|	|	|
6+ 5	0.3053	0.74	Q V	|	|	|	|
6+10	0.3104	0.74	Q V	|	|	|	|
6+15	0.3155	0.75	Q V	|	|	|	|
6+20	0.3207	0.75	Q V	|	|	|	|
6+25	0.3259	0.76	Q V	|	|	|	|
6+30	0.3312	0.76	Q V	|	|	|	|
6+35	0.3364	0.76	Q V	|	|	|	|
6+40	0.3417	0.77	Q V	|	|	|	|
6+45	0.3470	0.77	Q V	|	|	|	|
6+50	0.3524	0.78	Q V	|	|	|	|
6+55	0.3577	0.78	Q V	|	|	|	|
7+ 0	0.3631	0.78	Q V	|	|	|	|
7+ 5	0.3686	0.79	Q V	|	|	|	|
7+10	0.3740	0.79	Q V	|	|	|	|
7+15	0.3795	0.80	Q V	|	|	|	|
7+20	0.3850	0.80	Q V	|	|	|	|
7+25	0.3906	0.81	Q V	|	|	|	|
7+30	0.3961	0.81	Q V	|	|	|	|
7+35	0.4018	0.81	Q V	|	|	|	|
7+40	0.4074	0.82	Q V	|	|	|	|
7+45	0.4131	0.82	Q V	|	|	|	|
7+50	0.4188	0.83	Q V	|	|	|	|
7+55	0.4245	0.83	Q V	|	|	|	|

8+ 0	0.4303	0.84	Q V	|	|	|	|
8+ 5	0.4361	0.84	Q V	|	|	|	|
8+10	0.4419	0.85	Q V	|	|	|	|
8+15	0.4478	0.85	Q V	|	|	|	|
8+20	0.4537	0.86	Q V	|	|	|	|
8+25	0.4597	0.86	Q V	|	|	|	|
8+30	0.4657	0.87	Q V	|	|	|	|
8+35	0.4717	0.88	Q V	|	|	|	|
8+40	0.4778	0.88	Q V	|	|	|	|
8+45	0.4839	0.89	Q V	|	|	|	|
8+50	0.4901	0.89	Q V	|	|	|	|
8+55	0.4962	0.90	Q V	|	|	|	|
9+ 0	0.5025	0.90	Q V	|	|	|	|
9+ 5	0.5088	0.91	Q V	|	|	|	|
9+10	0.5151	0.92	Q V	|	|	|	|
9+15	0.5214	0.92	Q V	|	|	|	|
9+20	0.5278	0.93	Q V	|	|	|	|
9+25	0.5343	0.94	Q V	|	|	|	|
9+30	0.5408	0.94	Q V	|	|	|	|
9+35	0.5473	0.95	Q V	|	|	|	|
9+40	0.5539	0.96	Q V	|	|	|	|
9+45	0.5606	0.96	Q V	|	|	|	|
9+50	0.5673	0.97	Q V	|	|	|	|
9+55	0.5740	0.98	Q V	|	|	|	|
10+ 0	0.5808	0.99	Q V	|	|	|	|
10+ 5	0.5877	1.00	Q V	|	|	|	|
10+10	0.5946	1.00	|Q V	|	|	|	|
10+15	0.6015	1.01	|Q V	|	|	|	|
10+20	0.6086	1.02	|Q V	|	|	|	|
10+25	0.6157	1.03	|Q V	|	|	|	|
10+30	0.6228	1.04	|Q V	|	|	|	|
10+35	0.6300	1.05	|Q V	|	|	|	|
10+40	0.6373	1.05	|Q V	|	|	|	|
10+45	0.6446	1.06	|Q V	|	|	|	|
10+50	0.6520	1.07	|Q V	|	|	|	|
10+55	0.6594	1.08	|Q V	|	|	|	|
11+ 0	0.6670	1.09	|Q V	|	|	|	|
11+ 5	0.6746	1.10	|Q V	|	|	|	|
11+10	0.6822	1.11	|Q V	|	|	|	|
11+15	0.6900	1.13	|Q V	|	|	|	|
11+20	0.6978	1.14	|Q V	|	|	|	|
11+25	0.7057	1.15	|Q V	|	|	|	|
11+30	0.7137	1.16	|Q V	|	|	|	|
11+35	0.7218	1.17	|Q V	|	|	|	|
11+40	0.7299	1.18	|Q V	|	|	|	|
11+45	0.7382	1.20	|Q V	|	|	|	|
11+50	0.7465	1.21	|Q V	|	|	|	|
11+55	0.7549	1.22	|Q V	|	|	|	|
12+ 0	0.7634	1.24	|Q V	|	|	|	|
12+ 5	0.7722	1.27	|Q V	|	|	|	|
12+10	0.7814	1.34	|Q V	|	|	|	|
12+15	0.7915	1.47	|Q V|	|	|	|	|
12+20	0.8024	1.58	|Q V|	|	|	|	|
12+25	0.8137	1.65	|Q V|	|	|	|	|
12+30	0.8254	1.69	|Q V|	|	|	|	|
12+35	0.8373	1.73	|Q V|	|	|	|	|
12+40	0.8495	1.77	|Q V|	|	|	|	|
12+45	0.8618	1.80	|Q V|	|	|	|	|
12+50	0.8744	1.83	|Q V|	|	|	|	|
12+55	0.8872	1.86	|Q V	|	|	|	|



18+ 0	3.0444	2.27	| Q	|	|	| V	|
18+ 5	3.0582	2.00	|Q	|	|	| V	|
18+10	3.0711	1.88	|Q	|	|	| V	|
18+15	3.0830	1.73	|Q	|	|	| V	|
18+20	3.0940	1.59	|Q	|	|	| V	|
18+25	3.1043	1.50	|Q	|	|	| V	|
18+30	3.1141	1.43	|Q	|	|	| V	|
18+35	3.1236	1.38	|Q	|	|	| V	|
18+40	3.1328	1.33	|Q	|	|	| V	|
18+45	3.1416	1.29	|Q	|	|	| V	|
18+50	3.1502	1.25	|Q	|	|	| V	|
18+55	3.1586	1.21	|Q	|	|	| V	|
19+ 0	3.1667	1.18	|Q	|	|	| V	|
19+ 5	3.1747	1.15	|Q	|	|	| V	|
19+10	3.1824	1.13	|Q	|	|	| V	|
19+15	3.1900	1.10	|Q	|	|	| V	|
19+20	3.1974	1.08	|Q	|	|	| V	|
19+25	3.2047	1.06	|Q	|	|	| V	|
19+30	3.2118	1.03	|Q	|	|	| V	|
19+35	3.2188	1.02	|Q	|	|	| V	|
19+40	3.2257	1.00	Q	|	|	| V	|
19+45	3.2324	0.98	Q	|	|	| V	|
19+50	3.2391	0.96	Q	|	|	| V	|
19+55	3.2456	0.95	Q	|	|	| V	|
20+ 0	3.2520	0.93	Q	|	|	| V	|
20+ 5	3.2584	0.92	Q	|	|	| V	|
20+10	3.2646	0.91	Q	|	|	| V	|
20+15	3.2708	0.90	Q	|	|	| V	|
20+20	3.2769	0.88	Q	|	|	| V	|
20+25	3.2829	0.87	Q	|	|	| V	|
20+30	3.2888	0.86	Q	|	|	| V	|
20+35	3.2946	0.85	Q	|	|	| V	|
20+40	3.3004	0.84	Q	|	|	| V	|
20+45	3.3061	0.83	Q	|	|	| V	|
20+50	3.3118	0.82	Q	|	|	| V	|
20+55	3.3174	0.81	Q	|	|	| V	|
21+ 0	3.3229	0.80	Q	|	|	| V	|
21+ 5	3.3284	0.79	Q	|	|	| V	|
21+10	3.3338	0.78	Q	|	|	| V	|
21+15	3.3391	0.78	Q	|	|	| V	|
21+20	3.3444	0.77	Q	|	|	| V	|
21+25	3.3497	0.76	Q	|	|	| V	|
21+30	3.3548	0.75	Q	|	|	| V	|
21+35	3.3600	0.75	Q	|	|	| V	|
21+40	3.3651	0.74	Q	|	|	| V	|
21+45	3.3701	0.73	Q	|	|	| V	|
21+50	3.3751	0.72	Q	|	|	| V	|
21+55	3.3800	0.72	Q	|	|	| V	|
22+ 0	3.3849	0.71	Q	|	|	| V	|
22+ 5	3.3898	0.70	Q	|	|	| V	|
22+10	3.3946	0.70	Q	|	|	| V	|
22+15	3.3994	0.69	Q	|	|	| V	|
22+20	3.4041	0.69	Q	|	|	| V	|
22+25	3.4088	0.68	Q	|	|	| V	|
22+30	3.4134	0.67	Q	|	|	| V	|
22+35	3.4180	0.67	Q	|	|	| V	|
22+40	3.4226	0.66	Q	|	|	| V	|
22+45	3.4271	0.66	Q	|	|	| V	|
22+50	3.4316	0.65	Q	|	|	| V	|
22+55	3.4361	0.65	Q	|	|	| V	|

23+ 0	3.4405	0.64	Q	|	|	|	V|
23+ 5	3.4449	0.64	Q	|	|	|	V|
23+10	3.4493	0.63	Q	|	|	|	V|
23+15	3.4536	0.63	Q	|	|	|	V|
23+20	3.4579	0.62	Q	|	|	|	V|
23+25	3.4622	0.62	Q	|	|	|	V|
23+30	3.4664	0.62	Q	|	|	|	V|
23+35	3.4706	0.61	Q	|	|	|	V|
23+40	3.4748	0.61	Q	|	|	|	V|
23+45	3.4790	0.60	Q	|	|	|	V|
23+50	3.4831	0.60	Q	|	|	|	V|
23+55	3.4872	0.59	Q	|	|	|	V|
24+ 0	3.4913	0.59	Q	|	|	|	V|
24+ 5	3.4952	0.57	Q	|	|	|	V|
24+10	3.4985	0.49	Q	|	|	|	V|
24+15	3.5010	0.36	Q	|	|	|	V|
24+20	3.5027	0.24	Q	|	|	|	V|
24+25	3.5039	0.18	Q	|	|	|	V|
24+30	3.5049	0.14	Q	|	|	|	V|
24+35	3.5057	0.12	Q	|	|	|	V|
24+40	3.5063	0.10	Q	|	|	|	V|
24+45	3.5069	0.08	Q	|	|	|	V|
24+50	3.5073	0.07	Q	|	|	|	V|
24+55	3.5077	0.05	Q	|	|	|	V|
25+ 0	3.5080	0.04	Q	|	|	|	V|
25+ 5	3.5083	0.04	Q	|	|	|	V|
25+10	3.5085	0.03	Q	|	|	|	V|
25+15	3.5087	0.03	Q	|	|	|	V|
25+20	3.5088	0.02	Q	|	|	|	V|
25+25	3.5089	0.02	Q	|	|	|	V|
25+30	3.5090	0.01	Q	|	|	|	V|
25+35	3.5091	0.01	Q	|	|	|	V|
25+40	3.5091	0.01	Q	|	|	|	V|
25+45	3.5091	0.00	Q	|	|	|	V|
25+50	3.5092	0.00	Q	|	|	|	V|
25+55	3.5092	0.00	Q	|	|	|	V

2-Year Unit Hydrograph Calculations

Developed Condition

Basin A - Detention Basin A

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 01/12/19

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

Program License Serial Number 6094

Tract 19756
Kimball
Interim Condition
Basin A

Storm Event Year = 2

Antecedent Moisture Condition = 1

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 2		
37.48	1	0.56
Rainfall data for year 2		
37.48	6	1.48
Rainfall data for year 2		
37.48	24	2.57

++

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

SCS curve No.(AMCII)	SCS curve NO.(AMC 1)	Area (Ac.)	Area Fraction	Fp(Fig C6) (In/Hr)	Ap (dec.)	Fm (In/Hr)
56.0	36.0	37.48	1.000	0.951	0.130	0.124

Area-averaged adjusted loss rate Fm (In/Hr) = 0.124

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

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC1)	S	Pervious Yield Fr
4.87	0.130	56.0	36.0	12.85	0.000
32.61	0.870	98.0	98.0	0.20	0.911

Area-averaged catchment yield fraction, Y = 0.792
Area-averaged low loss fraction, Yb = 0.208
User entry of time of concentration = 0.240 (hours)
++
Watershed area = 37.48(Ac.)
Catchment Lag time = 0.192 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 43.4028
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.124(In/Hr)
Average low loss rate fraction (Yb) = 0.208 (decimal)
VALLEY DEVELOPED S-Graph Selected
Computed peak 5-minute rainfall = 0.209(In)
Computed peak 30-minute rainfall = 0.427(In)
Specified peak 1-hour rainfall = 0.564(In)
Computed peak 3-hour rainfall = 1.019(In)
Specified peak 6-hour rainfall = 1.480(In)
Specified peak 24-hour rainfall = 2.570(In)

Rainfall depth area reduction factors:
Using a total area of 37.48(Ac.) (Ref: fig. E-4)

5-minute factor = 0.998 Adjusted rainfall = 0.208(In)
30-minute factor = 0.998 Adjusted rainfall = 0.427(In)
1-hour factor = 0.998 Adjusted rainfall = 0.563(In)
3-hour factor = 1.000 Adjusted rainfall = 1.019(In)
6-hour factor = 1.000 Adjusted rainfall = 1.480(In)
24-hour factor = 1.000 Adjusted rainfall = 2.570(In)

U n i t H y d r o g r a p h
++

Interval Number	'S' Graph Mean values	Unit Hydrograph ((CFS))
(K = 453.27 (CFS))		
1	3.509	15.904
2	22.844	87.640
3	56.917	154.448
4	82.930	117.907
5	93.799	49.266
6	97.837	18.303
7	98.878	4.721
8	99.652	3.508
9	100.000	1.577

Total soil rain loss = 0.50(In)

Total effective rainfall = 2.07(In)
Peak flow rate in flood hydrograph = 42.90(CFS)

++

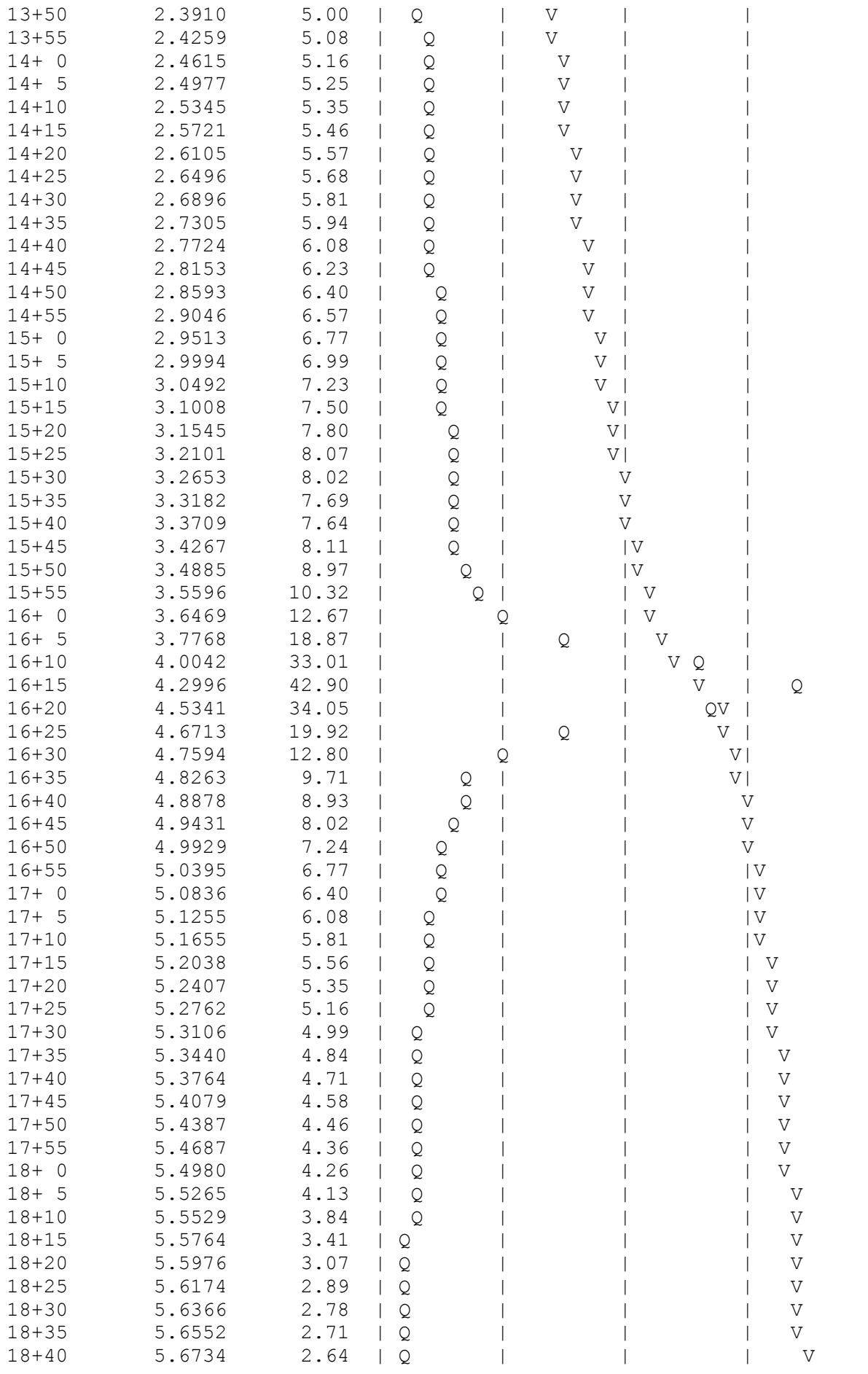
24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	12.5	25.0	37.5	50.0
0+ 5	0.0003	0.04	Q				
0+10	0.0023	0.29	Q				
0+15	0.0073	0.73	Q				
0+20	0.0146	1.06	Q				
0+25	0.0229	1.20	Q				
0+30	0.0316	1.26	VQ				
0+35	0.0404	1.28	VQ				
0+40	0.0493	1.29	VQ				
0+45	0.0582	1.30	VQ				
0+50	0.0672	1.30	VQ				
0+55	0.0762	1.31	VQ				
1+ 0	0.0853	1.31	VQ				
1+ 5	0.0943	1.32	VQ				
1+10	0.1034	1.32	VQ				
1+15	0.1125	1.33	VQ				
1+20	0.1217	1.33	VQ				
1+25	0.1309	1.33	VQ				
1+30	0.1401	1.34	VQ				
1+35	0.1494	1.34	VQ				
1+40	0.1586	1.35	VQ				
1+45	0.1680	1.35	|Q				
1+50	0.1773	1.36	|Q				
1+55	0.1867	1.36	|Q				
2+ 0	0.1961	1.37	|Q				
2+ 5	0.2055	1.37	|Q				
2+10	0.2150	1.38	|Q				
2+15	0.2245	1.38	|Q				
2+20	0.2341	1.39	|Q				
2+25	0.2437	1.39	|Q				
2+30	0.2533	1.40	|Q				
2+35	0.2629	1.40	|Q				
2+40	0.2726	1.41	|Q				
2+45	0.2823	1.41	|Q				
2+50	0.2921	1.42	|Q				
2+55	0.3019	1.42	|Q				
3+ 0	0.3117	1.43	|Q				
3+ 5	0.3216	1.43	|Q				
3+10	0.3315	1.44	|QV				
3+15	0.3415	1.44	|QV				
3+20	0.3514	1.45	|QV				
3+25	0.3615	1.46	|QV				
3+30	0.3715	1.46	|QV				
3+35	0.3816	1.47	|QV				
3+40	0.3918	1.47	|QV				
3+45	0.4020	1.48	|QV				
3+50	0.4122	1.48	|QV				
3+55	0.4224	1.49	|QV				

4+ 0	0.4327	1.50	|QV	|	|	|	|
4+ 5	0.4431	1.50	|QV	|	|	|	|
4+10	0.4535	1.51	|QV	|	|	|	|
4+15	0.4639	1.52	|QV	|	|	|	|
4+20	0.4744	1.52	|QV	|	|	|	|
4+25	0.4849	1.53	|QV	|	|	|	|
4+30	0.4955	1.53	|Q V	|	|	|	|
4+35	0.5061	1.54	|Q V	|	|	|	|
4+40	0.5168	1.55	|Q V	|	|	|	|
4+45	0.5275	1.55	|Q V	|	|	|	|
4+50	0.5382	1.56	|Q V	|	|	|	|
4+55	0.5490	1.57	|Q V	|	|	|	|
5+ 0	0.5599	1.58	|Q V	|	|	|	|
5+ 5	0.5708	1.58	|Q V	|	|	|	|
5+10	0.5817	1.59	|Q V	|	|	|	|
5+15	0.5927	1.60	|Q V	|	|	|	|
5+20	0.6038	1.60	|Q V	|	|	|	|
5+25	0.6149	1.61	|Q V	|	|	|	|
5+30	0.6260	1.62	|Q V	|	|	|	|
5+35	0.6372	1.63	|Q V	|	|	|	|
5+40	0.6485	1.63	|Q V	|	|	|	|
5+45	0.6598	1.64	|Q V	|	|	|	|
5+50	0.6711	1.65	|Q V	|	|	|	|
5+55	0.6826	1.66	|Q V	|	|	|	|
6+ 0	0.6940	1.67	|Q V	|	|	|	|
6+ 5	0.7056	1.67	|Q V	|	|	|	|
6+10	0.7171	1.68	|Q V	|	|	|	|
6+15	0.7288	1.69	|Q V	|	|	|	|
6+20	0.7405	1.70	|Q V	|	|	|	|
6+25	0.7523	1.71	|Q V	|	|	|	|
6+30	0.7641	1.72	|Q V	|	|	|	|
6+35	0.7760	1.73	|Q V	|	|	|	|
6+40	0.7879	1.73	|Q V	|	|	|	|
6+45	0.7999	1.74	|Q V	|	|	|	|
6+50	0.8120	1.75	|Q V	|	|	|	|
6+55	0.8241	1.76	|Q V	|	|	|	|
7+ 0	0.8363	1.77	|Q V	|	|	|	|
7+ 5	0.8486	1.78	|Q V	|	|	|	|
7+10	0.8609	1.79	|Q V	|	|	|	|
7+15	0.8733	1.80	|Q V	|	|	|	|
7+20	0.8858	1.81	|Q V	|	|	|	|
7+25	0.8984	1.82	|Q V	|	|	|	|
7+30	0.9110	1.83	|Q V	|	|	|	|
7+35	0.9237	1.84	|Q V	|	|	|	|
7+40	0.9364	1.85	|Q V	|	|	|	|
7+45	0.9493	1.86	|Q V	|	|	|	|
7+50	0.9622	1.88	|Q V	|	|	|	|
7+55	0.9752	1.89	|Q V	|	|	|	|
8+ 0	0.9882	1.90	|Q V	|	|	|	|
8+ 5	1.0014	1.91	|Q V	|	|	|	|
8+10	1.0146	1.92	|Q V	|	|	|	|
8+15	1.0279	1.93	|Q V	|	|	|	|
8+20	1.0413	1.95	|Q V	|	|	|	|
8+25	1.0548	1.96	|Q V	|	|	|	|
8+30	1.0684	1.97	|Q V	|	|	|	|
8+35	1.0820	1.98	|Q V	|	|	|	|
8+40	1.0958	2.00	|Q V	|	|	|	|
8+45	1.1096	2.01	|Q V	|	|	|	|
8+50	1.1236	2.02	|Q V	|	|	|	|

8+55	1.1376	2.04	Q V				
9+ 0	1.1517	2.05	Q V				
9+ 5	1.1659	2.07	Q V				
9+10	1.1803	2.08	Q V				
9+15	1.1947	2.09	Q V				
9+20	1.2092	2.11	Q V				
9+25	1.2238	2.12	Q V				
9+30	1.2386	2.14	Q V				
9+35	1.2534	2.16	Q V				
9+40	1.2684	2.17	Q V				
9+45	1.2835	2.19	Q V				
9+50	1.2987	2.21	Q V				
9+55	1.3140	2.22	Q V				
10+ 0	1.3294	2.24	Q V				
10+ 5	1.3450	2.26	Q V				
10+10	1.3607	2.28	Q V				
10+15	1.3765	2.30	Q V				
10+20	1.3925	2.32	Q V				
10+25	1.4086	2.34	Q V				
10+30	1.4248	2.36	Q V				
10+35	1.4412	2.38	Q V				
10+40	1.4577	2.40	Q V				
10+45	1.4744	2.42	Q V				
10+50	1.4912	2.44	Q V				
10+55	1.5082	2.47	Q V				
11+ 0	1.5253	2.49	Q V				
11+ 5	1.5426	2.51	Q V				
11+10	1.5601	2.54	Q V				
11+15	1.5777	2.56	Q V				
11+20	1.5956	2.59	Q V				
11+25	1.6136	2.62	Q V				
11+30	1.6318	2.64	Q V				
11+35	1.6502	2.67	Q V				
11+40	1.6688	2.70	Q V				
11+45	1.6876	2.73	Q V				
11+50	1.7066	2.76	Q V				
11+55	1.7258	2.79	Q V				
12+ 0	1.7453	2.83	Q V				
12+ 5	1.7652	2.90	Q V				
12+10	1.7868	3.13	Q V				
12+15	1.8110	3.52	Q V				
12+20	1.8374	3.83	Q V				
12+25	1.8648	3.98	Q V				
12+30	1.8928	4.06	Q V				
12+35	1.9211	4.12	Q V				
12+40	1.9498	4.17	Q V				
12+45	1.9789	4.22	Q V				
12+50	2.0082	4.26	Q V				
12+55	2.0379	4.31	Q V				
13+ 0	2.0680	4.36	Q V				
13+ 5	2.0984	4.41	Q V				
13+10	2.1292	4.47	Q V				
13+15	2.1603	4.53	Q V				
13+20	2.1919	4.58	Q V				
13+25	2.2239	4.65	Q V				
13+30	2.2564	4.71	Q V				
13+35	2.2893	4.78	Q V				
13+40	2.3226	4.85	Q V				
13+45	2.3565	4.92	Q V				



18+45	5.6912	2.59	Q				V
18+50	5.7087	2.53	Q				V
18+55	5.7258	2.49	Q				V
19+ 0	5.7426	2.44	Q				V
19+ 5	5.7591	2.40	Q				V
19+10	5.7753	2.35	Q				V
19+15	5.7913	2.31	Q				V
19+20	5.8070	2.28	Q				V
19+25	5.8224	2.24	Q				V
19+30	5.8376	2.20	Q				V
19+35	5.8525	2.17	Q				V
19+40	5.8672	2.14	Q				V
19+45	5.8817	2.11	Q				V
19+50	5.8961	2.08	Q				V
19+55	5.9102	2.05	Q				V
20+ 0	5.9241	2.02	Q				V
20+ 5	5.9378	1.99	Q				V
20+10	5.9514	1.97	Q				V
20+15	5.9648	1.94	Q				V
20+20	5.9780	1.92	Q				V
20+25	5.9910	1.90	Q				V
20+30	6.0039	1.87	Q				V
20+35	6.0167	1.85	Q				V
20+40	6.0293	1.83	Q				V
20+45	6.0418	1.81	Q				V
20+50	6.0541	1.79	Q				V
20+55	6.0663	1.77	Q				V
21+ 0	6.0783	1.75	Q				V
21+ 5	6.0903	1.73	Q				V
21+10	6.1021	1.72	Q				V
21+15	6.1138	1.70	Q				V
21+20	6.1254	1.68	Q				V
21+25	6.1368	1.66	Q				V
21+30	6.1482	1.65	Q				V
21+35	6.1594	1.63	Q				V
21+40	6.1706	1.62	Q				V
21+45	6.1816	1.60	Q				V
21+50	6.1925	1.59	Q				V
21+55	6.2034	1.57	Q				V
22+ 0	6.2141	1.56	Q				V
22+ 5	6.2248	1.55	Q				V
22+10	6.2353	1.53	Q				V
22+15	6.2458	1.52	Q				V
22+20	6.2562	1.51	Q				V
22+25	6.2665	1.50	Q				V
22+30	6.2767	1.48	Q				V
22+35	6.2869	1.47	Q				V
22+40	6.2969	1.46	Q				V
22+45	6.3069	1.45	Q				V
22+50	6.3168	1.44	Q				V
22+55	6.3266	1.43	Q				V
23+ 0	6.3364	1.42	Q				V
23+ 5	6.3461	1.41	Q				V
23+10	6.3557	1.40	Q				V
23+15	6.3652	1.39	Q				V
23+20	6.3747	1.38	Q				V
23+25	6.3841	1.37	Q				V
23+30	6.3934	1.36	Q				V
23+35	6.4027	1.35	Q				V

23+40	6.4119	1.34	|Q	|	|	|	V|
23+45	6.4211	1.33	|Q	|	|	|	V|
23+50	6.4302	1.32	|Q	|	|	|	V|
23+55	6.4392	1.31	|Q	|	|	|	V|
24+ 0	6.4482	1.30	|Q	|	|	|	V|
24+ 5	6.4568	1.25	Q	|	|	|	V|
24+10	6.4636	1.00	Q	|	|	|	V|
24+15	6.4674	0.55	Q	|	|	|	V|
24+20	6.4690	0.22	Q	|	|	|	V|
24+25	6.4695	0.08	Q	|	|	|	V|
24+30	6.4697	0.03	Q	|	|	|	V|
24+35	6.4698	0.01	Q	|	|	|	V|
24+40	6.4698	0.00	Q	|	|	|	V|

Basin B - Detention Basin B

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 01/12/19

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

Program License Serial Number 6094

Tract 19756
Kimball
Interim Condition
Basin B

Storm Event Year = 2

Antecedent Moisture Condition = 1

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 2		
32.16	1	0.56
Rainfall data for year 2		
32.16	6	1.48
Rainfall data for year 2		
32.16	24	2.57

++

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

SCS curve No.(AMCII)	SCS curve NO.(AMC 1)	Area (Ac.)	Area Fraction	Fp(Fig C6) (In/Hr)	Ap (dec.)	Fm (In/Hr)
59.6	39.6	32.16	1.000	0.920	0.392	0.361

Area-averaged adjusted loss rate Fm (In/Hr) = 0.361

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

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC1)	S	Pervious Yield Fr
12.61	0.392	59.6	39.6	12.85	0.000
19.55	0.608	98.0	98.0	0.20	0.911

Area-averaged catchment yield fraction, Y = 0.554
Area-averaged low loss fraction, Yb = 0.446
User entry of time of concentration = 0.130 (hours)
++
Watershed area = 32.16(Ac.)
Catchment Lag time = 0.104 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 80.1282
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.361(In/Hr)
Average low loss rate fraction (Yb) = 0.446 (decimal)
VALLEY DEVELOPED S-Graph Selected
Computed peak 5-minute rainfall = 0.209(In)
Computed peak 30-minute rainfall = 0.427(In)
Specified peak 1-hour rainfall = 0.564(In)
Computed peak 3-hour rainfall = 1.019(In)
Specified peak 6-hour rainfall = 1.480(In)
Specified peak 24-hour rainfall = 2.570(In)

Rainfall depth area reduction factors:
Using a total area of 32.16(Ac.) (Ref: fig. E-4)

5-minute factor = 0.998 Adjusted rainfall = 0.208(In)
30-minute factor = 0.998 Adjusted rainfall = 0.427(In)
1-hour factor = 0.998 Adjusted rainfall = 0.563(In)
3-hour factor = 1.000 Adjusted rainfall = 1.019(In)
6-hour factor = 1.000 Adjusted rainfall = 1.480(In)
24-hour factor = 1.000 Adjusted rainfall = 2.570(In)

U n i t H y d r o g r a p h
++

Interval Number	'S' Graph Mean values	Unit Hydrograph ((CFS))
(K = 388.93 (CFS))		
1	11.341	44.110
2	63.902	204.427
3	94.008	117.092
4	98.848	18.827
5	100.000	4.480

Total soil rain loss = 1.08(In)
Total effective rainfall = 1.49(In)
Peak flow rate in flood hydrograph = 42.33(CFS)

++

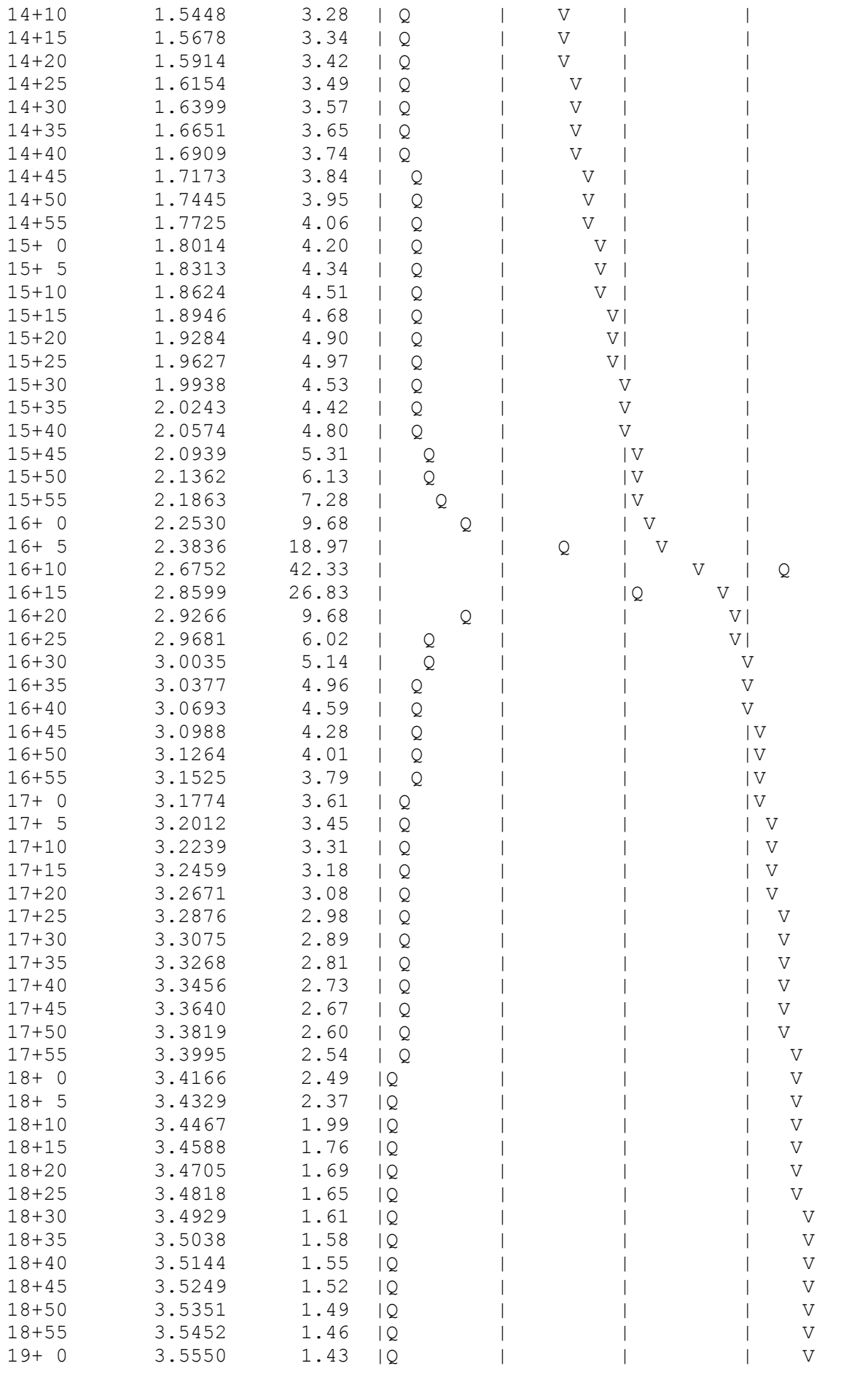
24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	12.5	25.0	37.5	50.0
0+ 5	0.0006	0.09	Q	|	|	|	|
0+10	0.0040	0.49	Q	|	|	|	|
0+15	0.0089	0.72	Q	|	|	|	|
0+20	0.0142	0.76	Q	|	|	|	|
0+25	0.0195	0.77	Q	|	|	|	|
0+30	0.0248	0.77	Q	|	|	|	|
0+35	0.0302	0.78	Q	|	|	|	|
0+40	0.0355	0.78	Q	|	|	|	|
0+45	0.0409	0.78	Q	|	|	|	|
0+50	0.0463	0.78	Q	|	|	|	|
0+55	0.0518	0.79	Q	|	|	|	|
1+ 0	0.0572	0.79	Q	|	|	|	|
1+ 5	0.0626	0.79	Q	|	|	|	|
1+10	0.0681	0.79	Q	|	|	|	|
1+15	0.0736	0.80	Q	|	|	|	|
1+20	0.0791	0.80	Q	|	|	|	|
1+25	0.0847	0.80	Q	|	|	|	|
1+30	0.0902	0.81	Q	|	|	|	|
1+35	0.0958	0.81	Q	|	|	|	|
1+40	0.1014	0.81	QV	|	|	|	|
1+45	0.1070	0.81	QV	|	|	|	|
1+50	0.1126	0.82	QV	|	|	|	|
1+55	0.1182	0.82	QV	|	|	|	|
2+ 0	0.1239	0.82	QV	|	|	|	|
2+ 5	0.1296	0.83	QV	|	|	|	|
2+10	0.1353	0.83	QV	|	|	|	|
2+15	0.1410	0.83	QV	|	|	|	|
2+20	0.1468	0.83	QV	|	|	|	|
2+25	0.1525	0.84	QV	|	|	|	|
2+30	0.1583	0.84	QV	|	|	|	|
2+35	0.1641	0.84	QV	|	|	|	|
2+40	0.1700	0.85	QV	|	|	|	|
2+45	0.1758	0.85	QV	|	|	|	|
2+50	0.1817	0.85	QV	|	|	|	|
2+55	0.1876	0.86	QV	|	|	|	|
3+ 0	0.1935	0.86	QV	|	|	|	|
3+ 5	0.1995	0.86	Q V	|	|	|	|
3+10	0.2054	0.87	Q V	|	|	|	|
3+15	0.2114	0.87	Q V	|	|	|	|
3+20	0.2174	0.87	Q V	|	|	|	|
3+25	0.2235	0.88	Q V	|	|	|	|
3+30	0.2295	0.88	Q V	|	|	|	|
3+35	0.2356	0.88	Q V	|	|	|	|
3+40	0.2417	0.89	Q V	|	|	|	|
3+45	0.2479	0.89	Q V	|	|	|	|
3+50	0.2540	0.89	Q V	|	|	|	|
3+55	0.2602	0.90	Q V	|	|	|	|
4+ 0	0.2664	0.90	Q V	|	|	|	|
4+ 5	0.2727	0.91	Q V	|	|	|	|
4+10	0.2789	0.91	Q V	|	|	|	|
4+15	0.2852	0.91	Q V	|	|	|	|

4+20	0.2915	0.92	Q V	|	|	|	|
4+25	0.2979	0.92	Q V	|	|	|	|
4+30	0.3042	0.92	Q V	|	|	|	|
4+35	0.3106	0.93	Q V	|	|	|	|
4+40	0.3170	0.93	Q V	|	|	|	|
4+45	0.3235	0.94	Q V	|	|	|	|
4+50	0.3300	0.94	Q V	|	|	|	|
4+55	0.3365	0.94	Q V	|	|	|	|
5+ 0	0.3430	0.95	Q V	|	|	|	|
5+ 5	0.3496	0.95	Q V	|	|	|	|
5+10	0.3562	0.96	Q V	|	|	|	|
5+15	0.3628	0.96	Q V	|	|	|	|
5+20	0.3695	0.97	Q V	|	|	|	|
5+25	0.3762	0.97	Q V	|	|	|	|
5+30	0.3829	0.98	Q V	|	|	|	|
5+35	0.3896	0.98	Q V	|	|	|	|
5+40	0.3964	0.99	Q V	|	|	|	|
5+45	0.4032	0.99	Q V	|	|	|	|
5+50	0.4101	0.99	Q V	|	|	|	|
5+55	0.4170	1.00	Q V	|	|	|	|
6+ 0	0.4239	1.00	Q V	|	|	|	|
6+ 5	0.4308	1.01	Q V	|	|	|	|
6+10	0.4378	1.01	Q V	|	|	|	|
6+15	0.4448	1.02	Q V	|	|	|	|
6+20	0.4519	1.02	Q V	|	|	|	|
6+25	0.4590	1.03	Q V	|	|	|	|
6+30	0.4661	1.04	Q V	|	|	|	|
6+35	0.4733	1.04	Q V	|	|	|	|
6+40	0.4805	1.05	Q V	|	|	|	|
6+45	0.4877	1.05	Q V	|	|	|	|
6+50	0.4950	1.06	Q V	|	|	|	|
6+55	0.5023	1.06	Q V	|	|	|	|
7+ 0	0.5097	1.07	Q V	|	|	|	|
7+ 5	0.5171	1.07	Q V	|	|	|	|
7+10	0.5245	1.08	Q V	|	|	|	|
7+15	0.5320	1.09	Q V	|	|	|	|
7+20	0.5396	1.09	Q V	|	|	|	|
7+25	0.5471	1.10	Q V	|	|	|	|
7+30	0.5547	1.11	Q V	|	|	|	|
7+35	0.5624	1.11	Q V	|	|	|	|
7+40	0.5701	1.12	Q V	|	|	|	|
7+45	0.5779	1.12	Q V	|	|	|	|
7+50	0.5856	1.13	Q V	|	|	|	|
7+55	0.5935	1.14	Q V	|	|	|	|
8+ 0	0.6014	1.15	Q V	|	|	|	|
8+ 5	0.6093	1.15	Q V	|	|	|	|
8+10	0.6173	1.16	Q V	|	|	|	|
8+15	0.6253	1.17	Q V	|	|	|	|
8+20	0.6334	1.17	Q V	|	|	|	|
8+25	0.6416	1.18	Q V	|	|	|	|
8+30	0.6498	1.19	Q V	|	|	|	|
8+35	0.6580	1.20	Q V	|	|	|	|
8+40	0.6663	1.21	Q V	|	|	|	|
8+45	0.6747	1.21	Q V	|	|	|	|
8+50	0.6831	1.22	Q V	|	|	|	|
8+55	0.6916	1.23	Q V	|	|	|	|
9+ 0	0.7001	1.24	Q V	|	|	|	|
9+ 5	0.7087	1.25	Q V	|	|	|	|
9+10	0.7174	1.26	|Q V	|	|	|	|

9+15	0.7261	1.27	Q	V			
9+20	0.7349	1.28	Q	V			
9+25	0.7437	1.28	Q	V			
9+30	0.7526	1.29	Q	V			
9+35	0.7616	1.30	Q	V			
9+40	0.7707	1.31	Q	V			
9+45	0.7798	1.32	Q	V			
9+50	0.7890	1.34	Q	V			
9+55	0.7982	1.35	Q	V			
10+ 0	0.8076	1.36	Q	V			
10+ 5	0.8170	1.37	Q	V			
10+10	0.8265	1.38	Q	V			
10+15	0.8361	1.39	Q	V			
10+20	0.8457	1.40	Q	V			
10+25	0.8555	1.41	Q	V			
10+30	0.8653	1.43	Q	V			
10+35	0.8752	1.44	Q	V			
10+40	0.8852	1.45	Q	V			
10+45	0.8953	1.47	Q	V			
10+50	0.9055	1.48	Q	V			
10+55	0.9158	1.49	Q	V			
11+ 0	0.9262	1.51	Q	V			
11+ 5	0.9367	1.52	Q	V			
11+10	0.9473	1.54	Q	V			
11+15	0.9580	1.55	Q	V			
11+20	0.9688	1.57	Q	V			
11+25	0.9797	1.59	Q	V			
11+30	0.9908	1.60	Q	V			
11+35	1.0019	1.62	Q	V			
11+40	1.0132	1.64	Q	V			
11+45	1.0246	1.66	Q	V			
11+50	1.0362	1.68	Q	V			
11+55	1.0479	1.70	Q	V			
12+ 0	1.0597	1.72	Q	V			
12+ 5	1.0721	1.81	Q	V			
12+10	1.0870	2.16	Q	V			
12+15	1.1033	2.37	Q	V			
12+20	1.1200	2.42	Q	V			
12+25	1.1368	2.45	Q	V			
12+30	1.1539	2.48	Q	V			
12+35	1.1712	2.50	Q	V			
12+40	1.1886	2.53	Q	V			
12+45	1.2062	2.56	Q	V			
12+50	1.2240	2.59	Q	V			
12+55	1.2421	2.62	Q	V			
13+ 0	1.2603	2.65	Q	V			
13+ 5	1.2788	2.68	Q	V			
13+10	1.2975	2.72	Q	V			
13+15	1.3165	2.75	Q	V			
13+20	1.3357	2.79	Q	V			
13+25	1.3552	2.83	Q	V			
13+30	1.3749	2.87	Q	V			
13+35	1.3950	2.91	Q	V			
13+40	1.4153	2.96	Q	V			
13+45	1.4360	3.00	Q	V			
13+50	1.4570	3.05	Q	V			
13+55	1.4784	3.10	Q	V			
14+ 0	1.5001	3.16	Q	V			
14+ 5	1.5222	3.21	Q	V			



19+ 5	3.5647	1.41	|Q	|	|	|	V |
19+10	3.5743	1.38	|Q	|	|	|	V |
19+15	3.5837	1.36	|Q	|	|	|	V |
19+20	3.5929	1.34	|Q	|	|	|	V |
19+25	3.6020	1.32	|Q	|	|	|	V |
19+30	3.6109	1.30	|Q	|	|	|	V |
19+35	3.6197	1.28	|Q	|	|	|	V |
19+40	3.6284	1.26	|Q	|	|	|	V |
19+45	3.6370	1.24	Q	|	|	|	V |
19+50	3.6454	1.23	Q	|	|	|	V |
19+55	3.6538	1.21	Q	|	|	|	V |
20+ 0	3.6620	1.19	Q	|	|	|	V |
20+ 5	3.6701	1.18	Q	|	|	|	V |
20+10	3.6781	1.16	Q	|	|	|	V |
20+15	3.6860	1.15	Q	|	|	|	V |
20+20	3.6938	1.14	Q	|	|	|	V |
20+25	3.7016	1.12	Q	|	|	|	V |
20+30	3.7092	1.11	Q	|	|	|	V |
20+35	3.7167	1.10	Q	|	|	|	V |
20+40	3.7242	1.08	Q	|	|	|	V |
20+45	3.7316	1.07	Q	|	|	|	V |
20+50	3.7389	1.06	Q	|	|	|	V |
20+55	3.7461	1.05	Q	|	|	|	V |
21+ 0	3.7533	1.04	Q	|	|	|	V |
21+ 5	3.7603	1.03	Q	|	|	|	V |
21+10	3.7673	1.02	Q	|	|	|	V |
21+15	3.7743	1.01	Q	|	|	|	V |
21+20	3.7811	1.00	Q	|	|	|	V |
21+25	3.7879	0.99	Q	|	|	|	V |
21+30	3.7947	0.98	Q	|	|	|	V |
21+35	3.8013	0.97	Q	|	|	|	V |
21+40	3.8079	0.96	Q	|	|	|	V |
21+45	3.8145	0.95	Q	|	|	|	V |
21+50	3.8210	0.94	Q	|	|	|	V |
21+55	3.8274	0.93	Q	|	|	|	V |
22+ 0	3.8338	0.93	Q	|	|	|	V |
22+ 5	3.8401	0.92	Q	|	|	|	V |
22+10	3.8464	0.91	Q	|	|	|	V |
22+15	3.8526	0.90	Q	|	|	|	V |
22+20	3.8588	0.90	Q	|	|	|	V |
22+25	3.8649	0.89	Q	|	|	|	V |
22+30	3.8710	0.88	Q	|	|	|	V |
22+35	3.8770	0.87	Q	|	|	|	V |
22+40	3.8830	0.87	Q	|	|	|	V|
22+45	3.8889	0.86	Q	|	|	|	V|
22+50	3.8948	0.85	Q	|	|	|	V|
22+55	3.9007	0.85	Q	|	|	|	V|
23+ 0	3.9065	0.84	Q	|	|	|	V|
23+ 5	3.9122	0.84	Q	|	|	|	V|
23+10	3.9179	0.83	Q	|	|	|	V|
23+15	3.9236	0.82	Q	|	|	|	V|
23+20	3.9292	0.82	Q	|	|	|	V|
23+25	3.9348	0.81	Q	|	|	|	V|
23+30	3.9404	0.81	Q	|	|	|	V|
23+35	3.9459	0.80	Q	|	|	|	V|
23+40	3.9514	0.80	Q	|	|	|	V|
23+45	3.9568	0.79	Q	|	|	|	V|
23+50	3.9623	0.79	Q	|	|	|	V|
23+55	3.9676	0.78	Q	|	|	|	V|

```
   24+ 0       3.9730      0.78  Q          |          |          |         V|
   24+ 5       3.9777      0.68  Q          |          |          |         V|
   24+10       3.9796      0.28  Q          |          |          |         V|
   24+15       3.9799      0.05  Q          |          |          |         V|
   24+20       3.9800      0.01  Q          |          |          |          V
-------------------------------------------------------------------------------
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Basin C

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 01/09/19

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

Program License Serial Number 6094

Tract 19756
Kimball
Interim Condition
Basin C

Storm Event Year = 2

Antecedent Moisture Condition = 1

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 2		
5.94	1	0.56
Rainfall data for year 2		
5.94	6	1.48
Rainfall data for year 2		
5.94	24	2.57

++

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

SCS curve No.(AMCII)	SCS curve NO.(AMC 1)	Area (Ac.)	Area Fraction	Fp(Fig C6) (In/Hr)	Ap (dec.)	Fm (In/Hr)
56.0	36.0	5.94	1.000	0.951	0.100	0.095

Area-averaged adjusted loss rate Fm (In/Hr) = 0.095

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

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC1)	S	Pervious Yield Fr
0.59	0.100	56.0	36.0	12.85	0.000
5.35	0.900	98.0	98.0	0.20	0.911

Area-averaged catchment yield fraction, Y = 0.820
Area-averaged low loss fraction, Yb = 0.180
User entry of time of concentration = 0.200 (hours)
++
Watershed area = 5.94(Ac.)
Catchment Lag time = 0.160 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 52.0833
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.095(In/Hr)
Average low loss rate fraction (Yb) = 0.180 (decimal)
VALLEY DEVELOPED S-Graph Selected
Computed peak 5-minute rainfall = 0.207(In)
Computed peak 30-minute rainfall = 0.424(In)
Specified peak 1-hour rainfall = 0.560(In)
Computed peak 3-hour rainfall = 1.016(In)
Specified peak 6-hour rainfall = 1.480(In)
Specified peak 24-hour rainfall = 2.570(In)

Rainfall depth area reduction factors:
Using a total area of 5.94(Ac.) (Ref: fig. E-4)

5-minute factor = 1.000 Adjusted rainfall = 0.207(In)
30-minute factor = 1.000 Adjusted rainfall = 0.424(In)
1-hour factor = 1.000 Adjusted rainfall = 0.560(In)
3-hour factor = 1.000 Adjusted rainfall = 1.016(In)
6-hour factor = 1.000 Adjusted rainfall = 1.480(In)
24-hour factor = 1.000 Adjusted rainfall = 2.570(In)

U n i t H y d r o g r a p h
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Interval Number	'S' Graph Mean values	Unit Hydrograph ((CFS))
(K = 71.84 (CFS))		
1	4.951	3.556
2	32.173	19.556
3	71.993	28.606
4	91.514	14.023
5	97.565	4.346
6	98.956	1.000
7	100.000	0.750

Total soil rain loss = 0.43(In)
Total effective rainfall = 2.14(In)
Peak flow rate in flood hydrograph = 7.45(CFS)

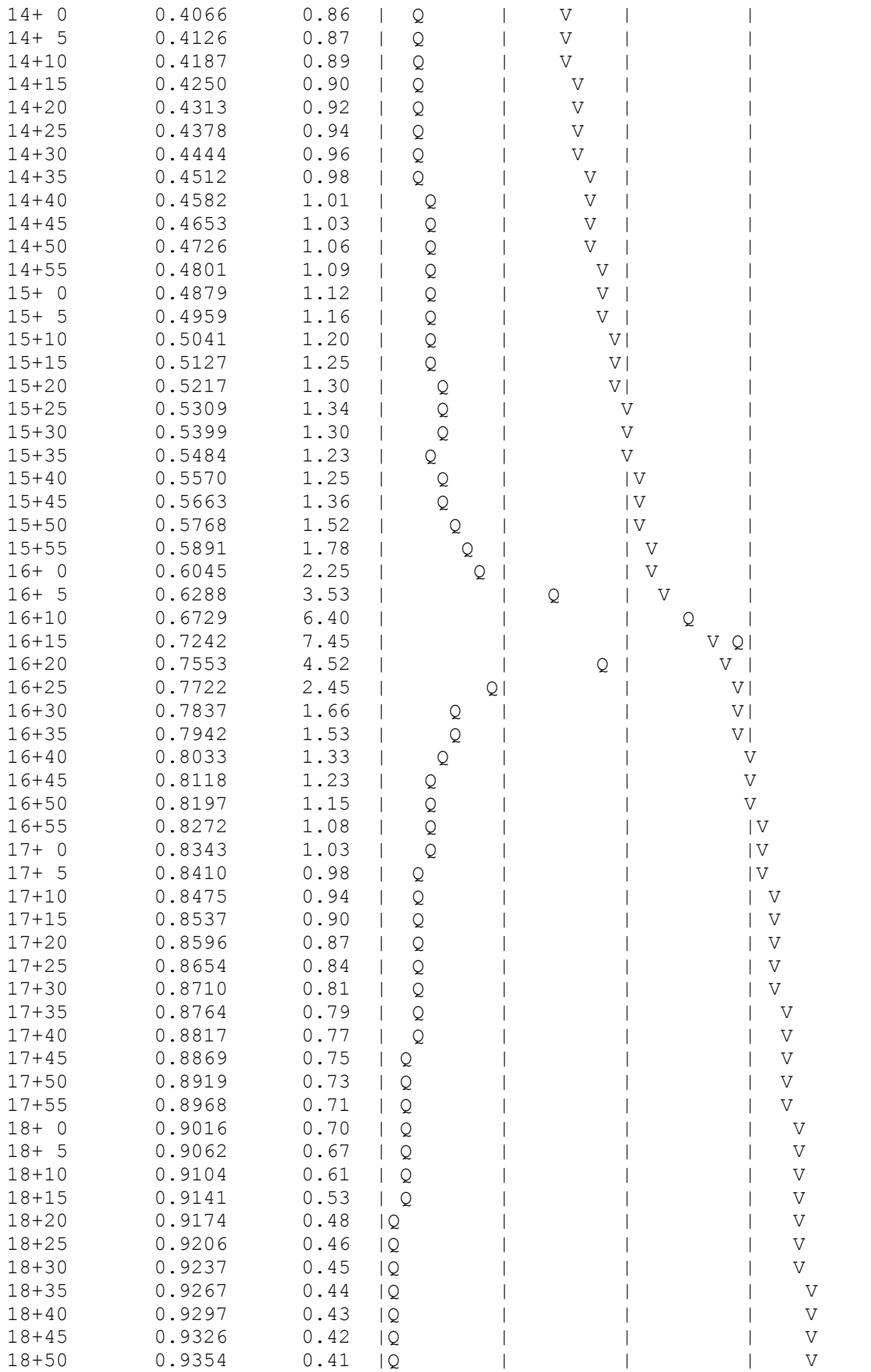
24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

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	0.0001	0.01	Q				
0+10	0.0005	0.07	Q				
0+15	0.0016	0.15	Q				
0+20	0.0029	0.19	Q				
0+25	0.0043	0.21	Q				
0+30	0.0058	0.21	Q				
0+35	0.0072	0.21	Q				
0+40	0.0087	0.21	Q				
0+45	0.0101	0.21	Q				
0+50	0.0116	0.21	Q				
0+55	0.0131	0.21	Q				
1+ 0	0.0146	0.22	Q				
1+ 5	0.0161	0.22	Q				
1+10	0.0176	0.22	Q				
1+15	0.0191	0.22	Q				
1+20	0.0206	0.22	Q				
1+25	0.0221	0.22	Q				
1+30	0.0236	0.22	Q				
1+35	0.0251	0.22	Q				
1+40	0.0266	0.22	QV				
1+45	0.0282	0.22	QV				
1+50	0.0297	0.22	QV				
1+55	0.0312	0.22	QV				
2+ 0	0.0328	0.22	QV				
2+ 5	0.0343	0.23	QV				
2+10	0.0359	0.23	QV				
2+15	0.0374	0.23	QV				
2+20	0.0390	0.23	QV				
2+25	0.0406	0.23	QV				
2+30	0.0422	0.23	QV				
2+35	0.0438	0.23	QV				
2+40	0.0453	0.23	QV				
2+45	0.0469	0.23	QV				
2+50	0.0485	0.23	QV				
2+55	0.0501	0.23	QV				
3+ 0	0.0518	0.23	QV				
3+ 5	0.0534	0.24	Q V				
3+10	0.0550	0.24	Q V				
3+15	0.0566	0.24	Q V				
3+20	0.0583	0.24	Q V				
3+25	0.0599	0.24	Q V				
3+30	0.0616	0.24	Q V				
3+35	0.0632	0.24	Q V				
3+40	0.0649	0.24	Q V				
3+45	0.0666	0.24	Q V				
3+50	0.0683	0.24	Q V				
3+55	0.0699	0.24	Q V				
4+ 0	0.0716	0.25	Q V				
4+ 5	0.0733	0.25	Q V				

4+10	0.0750	0.25	Q V	|	|	|	|
4+15	0.0768	0.25	Q V	|	|	|	|
4+20	0.0785	0.25	Q V	|	|	|	|
4+25	0.0802	0.25	|Q V	|	|	|	|
4+30	0.0819	0.25	|Q V	|	|	|	|
4+35	0.0837	0.25	|Q V	|	|	|	|
4+40	0.0854	0.25	|Q V	|	|	|	|
4+45	0.0872	0.26	|Q V	|	|	|	|
4+50	0.0890	0.26	|Q V	|	|	|	|
4+55	0.0907	0.26	|Q V	|	|	|	|
5+ 0	0.0925	0.26	|Q V	|	|	|	|
5+ 5	0.0943	0.26	|Q V	|	|	|	|
5+10	0.0961	0.26	|Q V	|	|	|	|
5+15	0.0979	0.26	|Q V	|	|	|	|
5+20	0.0997	0.26	|Q V	|	|	|	|
5+25	0.1015	0.26	|Q V	|	|	|	|
5+30	0.1034	0.27	|Q V	|	|	|	|
5+35	0.1052	0.27	|Q V	|	|	|	|
5+40	0.1071	0.27	|Q V	|	|	|	|
5+45	0.1089	0.27	|Q V	|	|	|	|
5+50	0.1108	0.27	|Q V	|	|	|	|
5+55	0.1127	0.27	|Q V	|	|	|	|
6+ 0	0.1145	0.27	|Q V	|	|	|	|
6+ 5	0.1164	0.27	|Q V	|	|	|	|
6+10	0.1183	0.28	|Q V	|	|	|	|
6+15	0.1203	0.28	|Q V	|	|	|	|
6+20	0.1222	0.28	|Q V	|	|	|	|
6+25	0.1241	0.28	|Q V	|	|	|	|
6+30	0.1261	0.28	|Q V	|	|	|	|
6+35	0.1280	0.28	|Q V	|	|	|	|
6+40	0.1300	0.28	|Q V	|	|	|	|
6+45	0.1319	0.29	|Q V	|	|	|	|
6+50	0.1339	0.29	|Q V	|	|	|	|
6+55	0.1359	0.29	|Q V	|	|	|	|
7+ 0	0.1379	0.29	|Q V	|	|	|	|
7+ 5	0.1399	0.29	|Q V	|	|	|	|
7+10	0.1420	0.29	|Q V	|	|	|	|
7+15	0.1440	0.30	|Q V	|	|	|	|
7+20	0.1461	0.30	|Q V	|	|	|	|
7+25	0.1481	0.30	|Q V	|	|	|	|
7+30	0.1502	0.30	|Q V	|	|	|	|
7+35	0.1523	0.30	|Q V	|	|	|	|
7+40	0.1544	0.30	|Q V	|	|	|	|
7+45	0.1565	0.31	|Q V	|	|	|	|
7+50	0.1586	0.31	|Q V	|	|	|	|
7+55	0.1607	0.31	|Q V	|	|	|	|
8+ 0	0.1629	0.31	|Q V	|	|	|	|
8+ 5	0.1650	0.31	|Q V	|	|	|	|
8+10	0.1672	0.32	|Q V	|	|	|	|
8+15	0.1694	0.32	|Q V	|	|	|	|
8+20	0.1716	0.32	|Q V	|	|	|	|
8+25	0.1738	0.32	|Q V	|	|	|	|
8+30	0.1761	0.32	|Q V	|	|	|	|
8+35	0.1783	0.33	|Q V	|	|	|	|
8+40	0.1806	0.33	|Q V	|	|	|	|
8+45	0.1828	0.33	|Q V	|	|	|	|
8+50	0.1851	0.33	|Q V	|	|	|	|
8+55	0.1874	0.33	|Q V	|	|	|	|
9+ 0	0.1898	0.34	|Q V	|	|	|	|

9+ 5	0.1921	0.34	Q V				
9+10	0.1945	0.34	Q V				
9+15	0.1968	0.34	Q V				
9+20	0.1992	0.35	Q V				
9+25	0.2016	0.35	Q V				
9+30	0.2040	0.35	Q V				
9+35	0.2065	0.35	Q V				
9+40	0.2089	0.36	Q V				
9+45	0.2114	0.36	Q V				
9+50	0.2139	0.36	Q V				
9+55	0.2164	0.37	Q V				
10+ 0	0.2190	0.37	Q V				
10+ 5	0.2215	0.37	Q V				
10+10	0.2241	0.37	Q V				
10+15	0.2267	0.38	Q V				
10+20	0.2294	0.38	Q V				
10+25	0.2320	0.38	Q V				
10+30	0.2347	0.39	Q V				
10+35	0.2374	0.39	Q V				
10+40	0.2401	0.39	Q V				
10+45	0.2428	0.40	Q V				
10+50	0.2456	0.40	Q V				
10+55	0.2484	0.41	Q V				
11+ 0	0.2512	0.41	Q V				
11+ 5	0.2541	0.41	Q V				
11+10	0.2569	0.42	Q V				
11+15	0.2598	0.42	Q V				
11+20	0.2628	0.43	Q V				
11+25	0.2657	0.43	Q V				
11+30	0.2687	0.44	Q V				
11+35	0.2718	0.44	Q V				
11+40	0.2748	0.44	Q V				
11+45	0.2779	0.45	Q V				
11+50	0.2811	0.45	Q V				
11+55	0.2842	0.46	Q V				
12+ 0	0.2874	0.47	Q V				
12+ 5	0.2907	0.48	Q V				
12+10	0.2944	0.53	Q V				
12+15	0.2986	0.61	Q V				
12+20	0.3031	0.65	Q V				
12+25	0.3077	0.67	Q V				
12+30	0.3123	0.68	Q V				
12+35	0.3170	0.68	Q V				
12+40	0.3218	0.69	Q V				
12+45	0.3266	0.70	Q V				
12+50	0.3315	0.71	Q V				
12+55	0.3364	0.71	Q V				
13+ 0	0.3414	0.72	Q V				
13+ 5	0.3464	0.73	Q V				
13+10	0.3515	0.74	Q V				
13+15	0.3567	0.75	Q V				
13+20	0.3619	0.76	Q V				
13+25	0.3672	0.77	Q V				
13+30	0.3726	0.78	Q V				
13+35	0.3781	0.79	Q V				
13+40	0.3836	0.80	Q V				
13+45	0.3892	0.82	Q V				
13+50	0.3949	0.83	Q V				
13+55	0.4007	0.84	Q V				



18+55	0.9382	0.40	Q				V
19+ 0	0.9409	0.40	Q				V
19+ 5	0.9436	0.39	Q				V
19+10	0.9462	0.38	Q				V
19+15	0.9488	0.38	Q				V
19+20	0.9514	0.37	Q				V
19+25	0.9539	0.36	Q				V
19+30	0.9564	0.36	Q				V
19+35	0.9588	0.35	Q				V
19+40	0.9612	0.35	Q				V
19+45	0.9636	0.34	Q				V
19+50	0.9659	0.34	Q				V
19+55	0.9682	0.33	Q				V
20+ 0	0.9705	0.33	Q				V
20+ 5	0.9727	0.33	Q				V
20+10	0.9749	0.32	Q				V
20+15	0.9771	0.32	Q				V
20+20	0.9793	0.31	Q				V
20+25	0.9814	0.31	Q				V
20+30	0.9835	0.31	Q				V
20+35	0.9856	0.30	Q				V
20+40	0.9876	0.30	Q				V
20+45	0.9897	0.30	Q				V
20+50	0.9917	0.29	Q				V
20+55	0.9937	0.29	Q				V
21+ 0	0.9956	0.29	Q				V
21+ 5	0.9976	0.28	Q				V
21+10	0.9995	0.28	Q				V
21+15	1.0014	0.28	Q				V
21+20	1.0033	0.27	Q				V
21+25	1.0052	0.27	Q				V
21+30	1.0070	0.27	Q				V
21+35	1.0089	0.27	Q				V
21+40	1.0107	0.26	Q				V
21+45	1.0125	0.26	Q				V
21+50	1.0143	0.26	Q				V
21+55	1.0161	0.26	Q				V
22+ 0	1.0178	0.25	Q				V
22+ 5	1.0196	0.25	Q				V
22+10	1.0213	0.25	Q				V
22+15	1.0230	0.25	Q				V
22+20	1.0247	0.25	Q				V
22+25	1.0264	0.24	Q				V
22+30	1.0280	0.24	Q				V
22+35	1.0297	0.24	Q				V
22+40	1.0313	0.24	Q				V
22+45	1.0330	0.24	Q				V
22+50	1.0346	0.23	Q				V
22+55	1.0362	0.23	Q				V
23+ 0	1.0378	0.23	Q				V
23+ 5	1.0394	0.23	Q				V
23+10	1.0409	0.23	Q				V
23+15	1.0425	0.23	Q				V
23+20	1.0441	0.22	Q				V
23+25	1.0456	0.22	Q				V
23+30	1.0471	0.22	Q				V
23+35	1.0486	0.22	Q				V
23+40	1.0501	0.22	Q				V
23+45	1.0516	0.22	Q				V

23+50	1.0531	0.22	Q	|	|	|	V|
23+55	1.0546	0.21	Q	|	|	|	V|
24+ 0	1.0561	0.21	Q	|	|	|	V|
24+ 5	1.0575	0.20	Q	|	|	|	V|
24+10	1.0584	0.14	Q	|	|	|	V|
24+15	1.0588	0.06	Q	|	|	|	V|
24+20	1.0590	0.02	Q	|	|	|	V|
24+25	1.0590	0.01	Q	|	|	|	V|
24+30	1.0590	0.00	Q	|	|	|	V|

Basin CX

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 01/09/19

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

Program License Serial Number 6094

Tract 19756
Kimball
Interim Condition
Basin CX

Storm Event Year = 2

Antecedent Moisture Condition = 1

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 2		
5.77	1	0.56
Rainfall data for year 2		
5.77	6	1.48
Rainfall data for year 2		
5.77	24	2.57

++

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

SCS curve No.(AMCII)	SCS curve NO.(AMC 1)	Area (Ac.)	Area Fraction	Fp(Fig C6) (In/Hr)	Ap (dec.)	Fm (In/Hr)
56.0	36.0	5.77	1.000	0.951	0.100	0.095

Area-averaged adjusted loss rate Fm (In/Hr) = 0.095

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

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC1)	S	Pervious Yield Fr
0.58	0.100	56.0	36.0	12.85	0.000
5.19	0.900	98.0	98.0	0.20	0.911

Area-averaged catchment yield fraction, Y = 0.820
Area-averaged low loss fraction, Yb = 0.180
User entry of time of concentration = 0.190 (hours)
++
Watershed area = 5.77(Ac.)
Catchment Lag time = 0.152 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 54.8246
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.095(In/Hr)
Average low loss rate fraction (Yb) = 0.180 (decimal)
VALLEY DEVELOPED S-Graph Selected
Computed peak 5-minute rainfall = 0.207(In)
Computed peak 30-minute rainfall = 0.424(In)
Specified peak 1-hour rainfall = 0.560(In)
Computed peak 3-hour rainfall = 1.016(In)
Specified peak 6-hour rainfall = 1.480(In)
Specified peak 24-hour rainfall = 2.570(In)

Rainfall depth area reduction factors:
Using a total area of 5.77(Ac.) (Ref: fig. E-4)

5-minute factor = 1.000 Adjusted rainfall = 0.207(In)
30-minute factor = 1.000 Adjusted rainfall = 0.424(In)
1-hour factor = 1.000 Adjusted rainfall = 0.560(In)
3-hour factor = 1.000 Adjusted rainfall = 1.016(In)
6-hour factor = 1.000 Adjusted rainfall = 1.480(In)
24-hour factor = 1.000 Adjusted rainfall = 2.570(In)

U n i t H y d r o g r a p h
++

Interval Number	'S' Graph Mean values	Unit Hydrograph ((CFS))
	(K = 69.78 (CFS))	
1	5.469	3.816
2	35.337	20.842
3	75.925	28.323
4	93.130	12.006
5	98.077	3.452
6	99.228	0.803
7	100.000	0.539

Total soil rain loss = 0.43(In)
Total effective rainfall = 2.14(In)
Peak flow rate in flood hydrograph = 7.27(CFS)

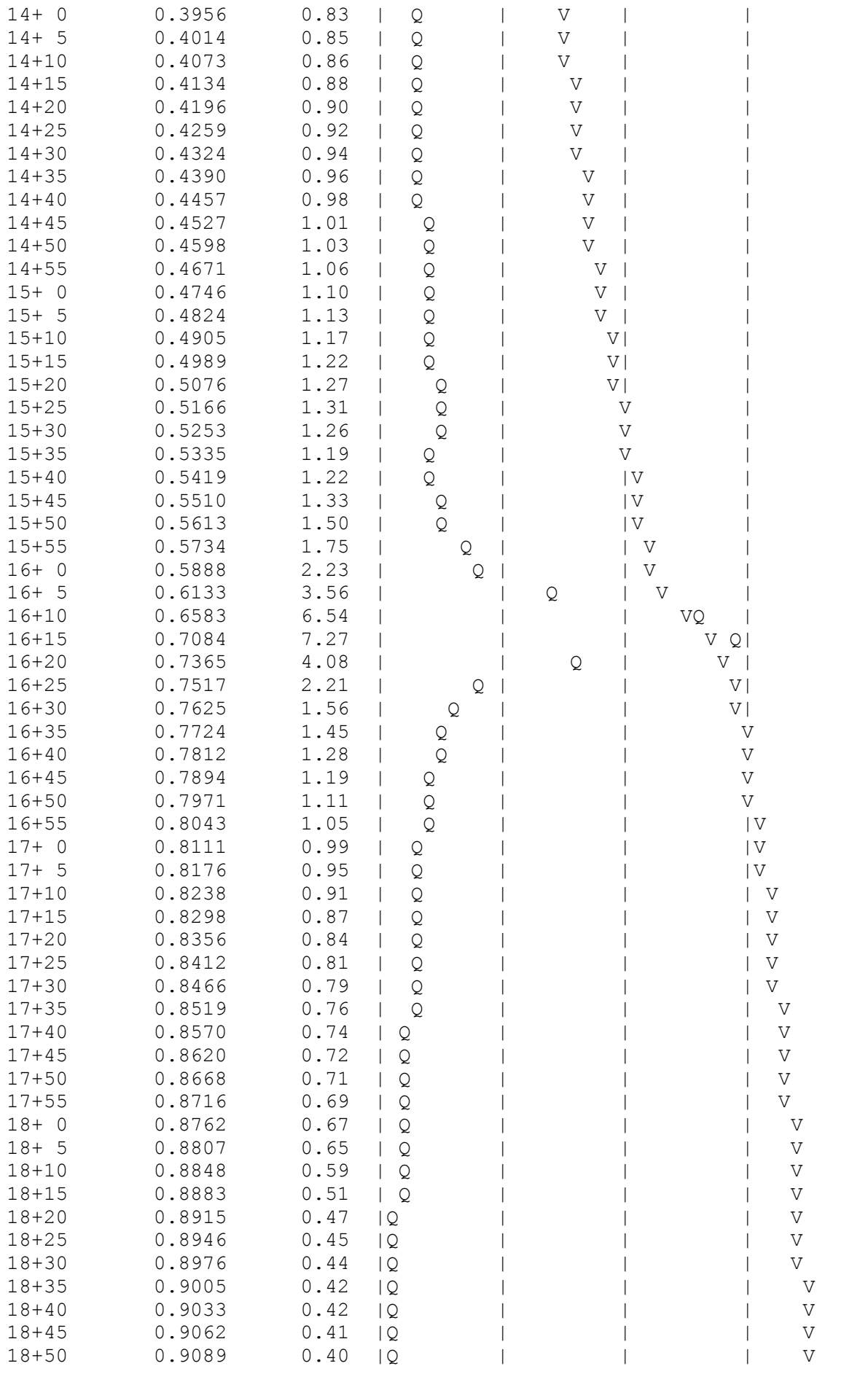
24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

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	0.0001	0.01	Q				
0+10	0.0006	0.07	Q				
0+15	0.0016	0.15	Q				
0+20	0.0029	0.19	Q				
0+25	0.0043	0.20	Q				
0+30	0.0057	0.20	Q				
0+35	0.0071	0.21	Q				
0+40	0.0086	0.21	Q				
0+45	0.0100	0.21	Q				
0+50	0.0114	0.21	Q				
0+55	0.0129	0.21	Q				
1+ 0	0.0143	0.21	Q				
1+ 5	0.0158	0.21	Q				
1+10	0.0172	0.21	Q				
1+15	0.0187	0.21	Q				
1+20	0.0201	0.21	Q				
1+25	0.0216	0.21	Q				
1+30	0.0231	0.21	Q				
1+35	0.0245	0.21	Q				
1+40	0.0260	0.21	QV				
1+45	0.0275	0.22	QV				
1+50	0.0290	0.22	QV				
1+55	0.0305	0.22	QV				
2+ 0	0.0320	0.22	QV				
2+ 5	0.0335	0.22	QV				
2+10	0.0350	0.22	QV				
2+15	0.0365	0.22	QV				
2+20	0.0380	0.22	QV				
2+25	0.0396	0.22	QV				
2+30	0.0411	0.22	QV				
2+35	0.0427	0.22	QV				
2+40	0.0442	0.22	QV				
2+45	0.0457	0.23	QV				
2+50	0.0473	0.23	QV				
2+55	0.0489	0.23	QV				
3+ 0	0.0504	0.23	QV				
3+ 5	0.0520	0.23	Q V				
3+10	0.0536	0.23	Q V				
3+15	0.0552	0.23	Q V				
3+20	0.0568	0.23	Q V				
3+25	0.0584	0.23	Q V				
3+30	0.0600	0.23	Q V				
3+35	0.0616	0.23	Q V				
3+40	0.0632	0.23	Q V				
3+45	0.0648	0.24	Q V				
3+50	0.0665	0.24	Q V				
3+55	0.0681	0.24	Q V				
4+ 0	0.0697	0.24	Q V				
4+ 5	0.0714	0.24	Q V				

4+10	0.0731	0.24	Q V	|	|	|	|
4+15	0.0747	0.24	Q V	|	|	|	|
4+20	0.0764	0.24	Q V	|	|	|	|
4+25	0.0781	0.24	Q V	|	|	|	|
4+30	0.0798	0.24	Q V	|	|	|	|
4+35	0.0815	0.25	Q V	|	|	|	|
4+40	0.0832	0.25	Q V	|	|	|	|
4+45	0.0849	0.25	Q V	|	|	|	|
4+50	0.0866	0.25	Q V	|	|	|	|
4+55	0.0883	0.25	|Q V	|	|	|	|
5+ 0	0.0900	0.25	|Q V	|	|	|	|
5+ 5	0.0918	0.25	|Q V	|	|	|	|
5+10	0.0935	0.25	|Q V	|	|	|	|
5+15	0.0953	0.25	|Q V	|	|	|	|
5+20	0.0970	0.26	|Q V	|	|	|	|
5+25	0.0988	0.26	|Q V	|	|	|	|
5+30	0.1006	0.26	|Q V	|	|	|	|
5+35	0.1024	0.26	|Q V	|	|	|	|
5+40	0.1042	0.26	|Q V	|	|	|	|
5+45	0.1060	0.26	|Q V	|	|	|	|
5+50	0.1078	0.26	|Q V	|	|	|	|
5+55	0.1096	0.26	|Q V	|	|	|	|
6+ 0	0.1115	0.27	|Q V	|	|	|	|
6+ 5	0.1133	0.27	|Q V	|	|	|	|
6+10	0.1151	0.27	|Q V	|	|	|	|
6+15	0.1170	0.27	|Q V	|	|	|	|
6+20	0.1189	0.27	|Q V	|	|	|	|
6+25	0.1207	0.27	|Q V	|	|	|	|
6+30	0.1226	0.27	|Q V	|	|	|	|
6+35	0.1245	0.28	|Q V	|	|	|	|
6+40	0.1264	0.28	|Q V	|	|	|	|
6+45	0.1284	0.28	|Q V	|	|	|	|
6+50	0.1303	0.28	|Q V	|	|	|	|
6+55	0.1322	0.28	|Q V	|	|	|	|
7+ 0	0.1342	0.28	|Q V	|	|	|	|
7+ 5	0.1361	0.28	|Q V	|	|	|	|
7+10	0.1381	0.29	|Q V	|	|	|	|
7+15	0.1401	0.29	|Q V	|	|	|	|
7+20	0.1421	0.29	|Q V	|	|	|	|
7+25	0.1441	0.29	|Q V	|	|	|	|
7+30	0.1461	0.29	|Q V	|	|	|	|
7+35	0.1481	0.29	|Q V	|	|	|	|
7+40	0.1502	0.30	|Q V	|	|	|	|
7+45	0.1522	0.30	|Q V	|	|	|	|
7+50	0.1543	0.30	|Q V	|	|	|	|
7+55	0.1563	0.30	|Q V	|	|	|	|
8+ 0	0.1584	0.30	|Q V	|	|	|	|
8+ 5	0.1605	0.31	|Q V	|	|	|	|
8+10	0.1626	0.31	|Q V	|	|	|	|
8+15	0.1648	0.31	|Q V	|	|	|	|
8+20	0.1669	0.31	|Q V	|	|	|	|
8+25	0.1691	0.31	|Q V	|	|	|	|
8+30	0.1712	0.31	|Q V	|	|	|	|
8+35	0.1734	0.32	|Q V	|	|	|	|
8+40	0.1756	0.32	|Q V	|	|	|	|
8+45	0.1778	0.32	|Q V	|	|	|	|
8+50	0.1801	0.32	|Q V	|	|	|	|
8+55	0.1823	0.33	|Q V	|	|	|	|
9+ 0	0.1846	0.33	|Q V	|	|	|	|

9+ 5	0.1868	0.33	Q	V			
9+10	0.1891	0.33	Q	V			
9+15	0.1914	0.33	Q	V			
9+20	0.1937	0.34	Q	V			
9+25	0.1961	0.34	Q	V			
9+30	0.1984	0.34	Q	V			
9+35	0.2008	0.34	Q	V			
9+40	0.2032	0.35	Q	V			
9+45	0.2056	0.35	Q	V			
9+50	0.2080	0.35	Q	V			
9+55	0.2105	0.36	Q	V			
10+ 0	0.2130	0.36	Q	V			
10+ 5	0.2155	0.36	Q	V			
10+10	0.2180	0.36	Q	V			
10+15	0.2205	0.37	Q	V			
10+20	0.2230	0.37	Q	V			
10+25	0.2256	0.37	Q	V			
10+30	0.2282	0.38	Q	V			
10+35	0.2308	0.38	Q	V			
10+40	0.2335	0.38	Q	V			
10+45	0.2361	0.39	Q	V			
10+50	0.2388	0.39	Q	V			
10+55	0.2416	0.39	Q	V			
11+ 0	0.2443	0.40	Q	V			
11+ 5	0.2471	0.40	Q	V			
11+10	0.2499	0.41	Q	V			
11+15	0.2527	0.41	Q	V			
11+20	0.2555	0.41	Q	V			
11+25	0.2584	0.42	Q	V			
11+30	0.2613	0.42	Q	V			
11+35	0.2643	0.43	Q	V			
11+40	0.2673	0.43	Q	V			
11+45	0.2703	0.44	Q	V			
11+50	0.2733	0.44	Q	V			
11+55	0.2764	0.45	Q	V			
12+ 0	0.2795	0.45	Q	V			
12+ 5	0.2827	0.47	Q	V			
12+10	0.2863	0.52	Q	V			
12+15	0.2905	0.60	Q	V			
12+20	0.2948	0.63	Q	V			
12+25	0.2993	0.65	Q	V			
12+30	0.3038	0.66	Q	V			
12+35	0.3084	0.67	Q	V			
12+40	0.3130	0.67	Q	V			
12+45	0.3177	0.68	Q	V			
12+50	0.3224	0.69	Q	V			
12+55	0.3272	0.70	Q	V			
13+ 0	0.3321	0.70	Q	V			
13+ 5	0.3370	0.71	Q	V			
13+10	0.3419	0.72	Q	V			
13+15	0.3470	0.73	Q	V			
13+20	0.3521	0.74	Q	V			
13+25	0.3572	0.75	Q	V			
13+30	0.3625	0.76	Q	V			
13+35	0.3678	0.77	Q	V			
13+40	0.3732	0.78	Q	V			
13+45	0.3786	0.79	Q	V			
13+50	0.3842	0.81	Q	V			
13+55	0.3898	0.82	Q	V			



18+55	0.9116	0.39	Q				V
19+ 0	0.9143	0.38	Q				V
19+ 5	0.9169	0.38	Q				V
19+10	0.9194	0.37	Q				V
19+15	0.9219	0.37	Q				V
19+20	0.9244	0.36	Q				V
19+25	0.9268	0.35	Q				V
19+30	0.9292	0.35	Q				V
19+35	0.9316	0.34	Q				V
19+40	0.9339	0.34	Q				V
19+45	0.9362	0.33	Q				V
19+50	0.9385	0.33	Q				V
19+55	0.9407	0.32	Q				V
20+ 0	0.9429	0.32	Q				V
20+ 5	0.9451	0.32	Q				V
20+10	0.9472	0.31	Q				V
20+15	0.9494	0.31	Q				V
20+20	0.9515	0.30	Q				V
20+25	0.9535	0.30	Q				V
20+30	0.9556	0.30	Q				V
20+35	0.9576	0.29	Q				V
20+40	0.9596	0.29	Q				V
20+45	0.9615	0.29	Q				V
20+50	0.9635	0.28	Q				V
20+55	0.9654	0.28	Q				V
21+ 0	0.9673	0.28	Q				V
21+ 5	0.9692	0.27	Q				V
21+10	0.9711	0.27	Q				V
21+15	0.9730	0.27	Q				V
21+20	0.9748	0.27	Q				V
21+25	0.9766	0.26	Q				V
21+30	0.9784	0.26	Q				V
21+35	0.9802	0.26	Q				V
21+40	0.9820	0.26	Q				V
21+45	0.9837	0.25	Q				V
21+50	0.9854	0.25	Q				V
21+55	0.9872	0.25	Q				V
22+ 0	0.9889	0.25	Q				V
22+ 5	0.9905	0.25	Q				V
22+10	0.9922	0.24	Q				V
22+15	0.9939	0.24	Q				V
22+20	0.9955	0.24	Q				V
22+25	0.9972	0.24	Q				V
22+30	0.9988	0.24	Q				V
22+35	1.0004	0.23	Q				V
22+40	1.0020	0.23	Q				V
22+45	1.0036	0.23	Q				V
22+50	1.0051	0.23	Q				V
22+55	1.0067	0.23	Q				V
23+ 0	1.0082	0.22	Q				V
23+ 5	1.0098	0.22	Q				V
23+10	1.0113	0.22	Q				V
23+15	1.0128	0.22	Q				V
23+20	1.0143	0.22	Q				V
23+25	1.0158	0.22	Q				V
23+30	1.0173	0.22	Q				V
23+35	1.0188	0.21	Q				V
23+40	1.0202	0.21	Q				V
23+45	1.0217	0.21	Q				V

```
   23+50       1.0231      0.21  Q          |          |          |         V|
   23+55       1.0246      0.21  Q          |          |          |         V|
   24+ 0       1.0260      0.21  Q          |          |          |         V|
   24+ 5       1.0273      0.19  Q          |          |          |         V|
   24+10       1.0282      0.13  Q          |          |          |         V|
   24+15       1.0286      0.05  Q          |          |          |         V|
   24+20       1.0287      0.01  Q          |          |          |         V|
   24+25       1.0287      0.00  Q          |          |          |         V|
   24+30       1.0287      0.00  Q          |          |          |          V
-------------------------------------------------------------------------------
```

Basin CC - Detention Basin CC

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 - 2004, Version 7.0

Study date 01/12/19

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

Program License Serial Number 6094

Tract 19756
Kimball
Interim Condition
Basin CC

Storm Event Year = 2

Antecedent Moisture Condition = 1

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 2		
16.74	1	0.56
Rainfall data for year 2		
16.74	6	1.48
Rainfall data for year 2		
16.74	24	2.57

++

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

SCS curve No.(AMCII)	SCS curve NO.(AMC 1)	Area (Ac.)	Area Fraction	Fp(Fig C6) (In/Hr)	Ap (dec.)	Fm (In/Hr)
56.0	36.0	16.74	1.000	0.951	0.400	0.380

Area-averaged adjusted loss rate Fm (In/Hr) = 0.380

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

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC1)	S	Pervious Yield Fr
6.70	0.400	56.0	36.0	12.85	0.000
10.04	0.600	98.0	98.0	0.20	0.911

Area-averaged catchment yield fraction, Y = 0.546
Area-averaged low loss fraction, Yb = 0.454
User entry of time of concentration = 0.170 (hours)
++
Watershed area = 16.74(Ac.)
Catchment Lag time = 0.136 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 61.2745
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.380(In/Hr)
Average low loss rate fraction (Yb) = 0.454 (decimal)
VALLEY DEVELOPED S-Graph Selected
Computed peak 5-minute rainfall = 0.209(In)
Computed peak 30-minute rainfall = 0.427(In)
Specified peak 1-hour rainfall = 0.564(In)
Computed peak 3-hour rainfall = 1.019(In)
Specified peak 6-hour rainfall = 1.480(In)
Specified peak 24-hour rainfall = 2.570(In)

Rainfall depth area reduction factors:
Using a total area of 16.74(Ac.) (Ref: fig. E-4)

5-minute factor = 0.999 Adjusted rainfall = 0.209(In)
30-minute factor = 0.999 Adjusted rainfall = 0.427(In)
1-hour factor = 0.999 Adjusted rainfall = 0.564(In)
3-hour factor = 1.000 Adjusted rainfall = 1.019(In)
6-hour factor = 1.000 Adjusted rainfall = 1.480(In)
24-hour factor = 1.000 Adjusted rainfall = 2.570(In)

U n i t H y d r o g r a p h
++

Interval Number	'S' Graph Mean values	Unit Hydrograph ((CFS))
(K = 202.45 (CFS))		
1	6.789	13.745
2	43.210	73.734
3	82.892	80.336
4	95.987	26.510
5	98.763	5.620
6	100.000	2.504

Total soil rain loss = 1.10(In)
Total effective rainfall = 1.47(In)
Peak flow rate in flood hydrograph = 17.17(CFS)

++

24 - H O U R S T O R M

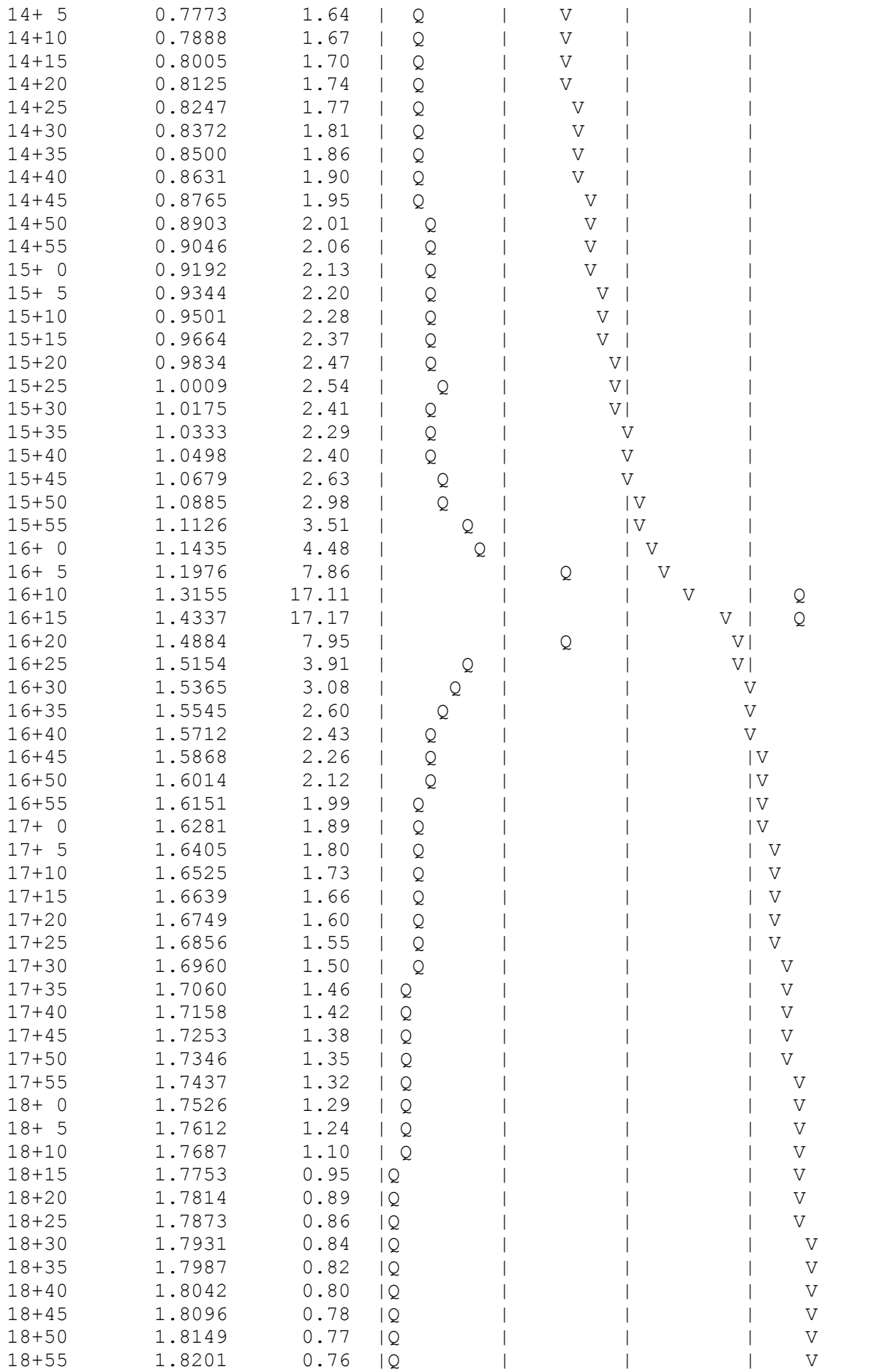
R u n o f f H y d r o g r a p h

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	0.0014	0.17	Q	|	|	|	|
0+15	0.0036	0.33	Q	|	|	|	|
0+20	0.0062	0.38	Q	|	|	|	|
0+25	0.0089	0.39	Q	|	|	|	|
0+30	0.0116	0.40	Q	|	|	|	|
0+35	0.0144	0.40	Q	|	|	|	|
0+40	0.0171	0.40	Q	|	|	|	|
0+45	0.0199	0.40	Q	|	|	|	|
0+50	0.0227	0.40	Q	|	|	|	|
0+55	0.0255	0.40	Q	|	|	|	|
1+ 0	0.0282	0.41	Q	|	|	|	|
1+ 5	0.0310	0.41	Q	|	|	|	|
1+10	0.0339	0.41	Q	|	|	|	|
1+15	0.0367	0.41	Q	|	|	|	|
1+20	0.0395	0.41	Q	|	|	|	|
1+25	0.0423	0.41	Q	|	|	|	|
1+30	0.0452	0.41	Q	|	|	|	|
1+35	0.0480	0.41	Q	|	|	|	|
1+40	0.0509	0.42	Q	|	|	|	|
1+45	0.0538	0.42	QV	|	|	|	|
1+50	0.0567	0.42	QV	|	|	|	|
1+55	0.0596	0.42	QV	|	|	|	|
2+ 0	0.0625	0.42	QV	|	|	|	|
2+ 5	0.0654	0.42	QV	|	|	|	|
2+10	0.0683	0.43	QV	|	|	|	|
2+15	0.0713	0.43	QV	|	|	|	|
2+20	0.0742	0.43	QV	|	|	|	|
2+25	0.0772	0.43	QV	|	|	|	|
2+30	0.0801	0.43	QV	|	|	|	|
2+35	0.0831	0.43	QV	|	|	|	|
2+40	0.0861	0.43	QV	|	|	|	|
2+45	0.0891	0.44	QV	|	|	|	|
2+50	0.0921	0.44	QV	|	|	|	|
2+55	0.0951	0.44	QV	|	|	|	|
3+ 0	0.0982	0.44	QV	|	|	|	|
3+ 5	0.1012	0.44	QV	|	|	|	|
3+10	0.1043	0.44	Q V	|	|	|	|
3+15	0.1074	0.45	Q V	|	|	|	|
3+20	0.1104	0.45	Q V	|	|	|	|
3+25	0.1135	0.45	Q V	|	|	|	|
3+30	0.1166	0.45	Q V	|	|	|	|
3+35	0.1198	0.45	Q V	|	|	|	|
3+40	0.1229	0.45	Q V	|	|	|	|
3+45	0.1260	0.46	Q V	|	|	|	|
3+50	0.1292	0.46	Q V	|	|	|	|
3+55	0.1324	0.46	Q V	|	|	|	|
4+ 0	0.1356	0.46	Q V	|	|	|	|
4+ 5	0.1388	0.46	Q V	|	|	|	|
4+10	0.1420	0.47	Q V	|	|	|	|

4+15	0.1452	0.47	Q V	|	|	|	|
4+20	0.1484	0.47	Q V	|	|	|	|
4+25	0.1517	0.47	Q V	|	|	|	|
4+30	0.1549	0.47	Q V	|	|	|	|
4+35	0.1582	0.48	Q V	|	|	|	|
4+40	0.1615	0.48	Q V	|	|	|	|
4+45	0.1648	0.48	Q V	|	|	|	|
4+50	0.1681	0.48	Q V	|	|	|	|
4+55	0.1715	0.48	Q V	|	|	|	|
5+ 0	0.1748	0.49	Q V	|	|	|	|
5+ 5	0.1782	0.49	Q V	|	|	|	|
5+10	0.1816	0.49	Q V	|	|	|	|
5+15	0.1850	0.49	Q V	|	|	|	|
5+20	0.1884	0.50	Q V	|	|	|	|
5+25	0.1918	0.50	Q V	|	|	|	|
5+30	0.1953	0.50	|Q V	|	|	|	|
5+35	0.1987	0.50	|Q V	|	|	|	|
5+40	0.2022	0.51	|Q V	|	|	|	|
5+45	0.2057	0.51	|Q V	|	|	|	|
5+50	0.2092	0.51	|Q V	|	|	|	|
5+55	0.2127	0.51	|Q V	|	|	|	|
6+ 0	0.2163	0.51	|Q V	|	|	|	|
6+ 5	0.2199	0.52	|Q V	|	|	|	|
6+10	0.2234	0.52	|Q V	|	|	|	|
6+15	0.2270	0.52	|Q V	|	|	|	|
6+20	0.2307	0.53	|Q V	|	|	|	|
6+25	0.2343	0.53	|Q V	|	|	|	|
6+30	0.2379	0.53	|Q V	|	|	|	|
6+35	0.2416	0.53	|Q V	|	|	|	|
6+40	0.2453	0.54	|Q V	|	|	|	|
6+45	0.2490	0.54	|Q V	|	|	|	|
6+50	0.2528	0.54	|Q V	|	|	|	|
6+55	0.2565	0.54	|Q V	|	|	|	|
7+ 0	0.2603	0.55	|Q V	|	|	|	|
7+ 5	0.2641	0.55	|Q V	|	|	|	|
7+10	0.2679	0.55	|Q V	|	|	|	|
7+15	0.2717	0.56	|Q V	|	|	|	|
7+20	0.2756	0.56	|Q V	|	|	|	|
7+25	0.2795	0.56	|Q V	|	|	|	|
7+30	0.2834	0.57	|Q V	|	|	|	|
7+35	0.2873	0.57	|Q V	|	|	|	|
7+40	0.2912	0.57	|Q V	|	|	|	|
7+45	0.2952	0.58	|Q V	|	|	|	|
7+50	0.2992	0.58	|Q V	|	|	|	|
7+55	0.3032	0.58	|Q V	|	|	|	|
8+ 0	0.3073	0.59	|Q V	|	|	|	|
8+ 5	0.3113	0.59	|Q V	|	|	|	|
8+10	0.3154	0.59	|Q V	|	|	|	|
8+15	0.3195	0.60	|Q V	|	|	|	|
8+20	0.3237	0.60	|Q V	|	|	|	|
8+25	0.3279	0.61	|Q V	|	|	|	|
8+30	0.3321	0.61	|Q V	|	|	|	|
8+35	0.3363	0.61	|Q V	|	|	|	|
8+40	0.3405	0.62	|Q V	|	|	|	|
8+45	0.3448	0.62	|Q V	|	|	|	|
8+50	0.3491	0.63	|Q V	|	|	|	|
8+55	0.3535	0.63	|Q V	|	|	|	|
9+ 0	0.3579	0.63	|Q V	|	|	|	|
9+ 5	0.3623	0.64	|Q V	|	|	|	|

9+10	0.3667	0.64	Q V				
9+15	0.3712	0.65	Q V				
9+20	0.3757	0.65	Q V				
9+25	0.3802	0.66	Q V				
9+30	0.3847	0.66	Q V				
9+35	0.3893	0.67	Q V				
9+40	0.3940	0.67	Q V				
9+45	0.3987	0.68	Q V				
9+50	0.4034	0.68	Q V				
9+55	0.4081	0.69	Q V				
10+ 0	0.4129	0.69	Q V				
10+ 5	0.4177	0.70	Q V				
10+10	0.4226	0.71	Q V				
10+15	0.4275	0.71	Q V				
10+20	0.4324	0.72	Q V				
10+25	0.4374	0.72	Q V				
10+30	0.4424	0.73	Q V				
10+35	0.4475	0.74	Q V				
10+40	0.4526	0.74	Q V				
10+45	0.4578	0.75	Q V				
10+50	0.4630	0.76	Q V				
10+55	0.4683	0.76	Q V				
11+ 0	0.4736	0.77	Q V				
11+ 5	0.4790	0.78	Q V				
11+10	0.4844	0.79	Q V				
11+15	0.4899	0.80	Q V				
11+20	0.4954	0.80	Q V				
11+25	0.5010	0.81	Q V				
11+30	0.5066	0.82	Q V				
11+35	0.5123	0.83	Q V				
11+40	0.5181	0.84	Q V				
11+45	0.5239	0.85	Q V				
11+50	0.5299	0.86	Q V				
11+55	0.5358	0.87	Q V				
12+ 0	0.5419	0.88	Q V				
12+ 5	0.5481	0.91	Q V				
12+10	0.5553	1.04	Q V				
12+15	0.5634	1.18	Q V				
12+20	0.5718	1.23	Q V				
12+25	0.5804	1.25	Q V				
12+30	0.5892	1.27	Q V				
12+35	0.5980	1.28	Q V				
12+40	0.6069	1.29	Q V				
12+45	0.6159	1.31	Q V				
12+50	0.6250	1.32	Q V				
12+55	0.6343	1.34	Q V				
13+ 0	0.6436	1.35	Q V				
13+ 5	0.6530	1.37	Q V				
13+10	0.6626	1.39	Q V				
13+15	0.6723	1.41	Q V				
13+20	0.6821	1.43	Q V				
13+25	0.6921	1.44	Q V				
13+30	0.7021	1.47	Q V				
13+35	0.7124	1.49	Q V				
13+40	0.7228	1.51	Q V				
13+45	0.7333	1.53	Q V				
13+50	0.7440	1.56	Q V				
13+55	0.7549	1.58	Q V				
14+ 0	0.7660	1.61	Q V				



19+ 0	1.8252	0.74	Q				V
19+ 5	1.8302	0.73	Q				V
19+10	1.8352	0.72	Q				V
19+15	1.8400	0.70	Q				V
19+20	1.8448	0.69	Q				V
19+25	1.8495	0.68	Q				V
19+30	1.8541	0.67	Q				V
19+35	1.8587	0.66	Q				V
19+40	1.8632	0.65	Q				V
19+45	1.8676	0.64	Q				V
19+50	1.8719	0.63	Q				V
19+55	1.8762	0.62	Q				V
20+ 0	1.8805	0.62	Q				V
20+ 5	1.8847	0.61	Q				V
20+10	1.8888	0.60	Q				V
20+15	1.8929	0.59	Q				V
20+20	1.8969	0.59	Q				V
20+25	1.9009	0.58	Q				V
20+30	1.9049	0.57	Q				V
20+35	1.9088	0.57	Q				V
20+40	1.9126	0.56	Q				V
20+45	1.9164	0.55	Q				V
20+50	1.9202	0.55	Q				V
20+55	1.9239	0.54	Q				V
21+ 0	1.9276	0.54	Q				V
21+ 5	1.9312	0.53	Q				V
21+10	1.9349	0.52	Q				V
21+15	1.9384	0.52	Q				V
21+20	1.9420	0.51	Q				V
21+25	1.9455	0.51	Q				V
21+30	1.9490	0.50	Q				V
21+35	1.9524	0.50	Q				V
21+40	1.9558	0.49	Q				V
21+45	1.9592	0.49	Q				V
21+50	1.9625	0.49	Q				V
21+55	1.9658	0.48	Q				V
22+ 0	1.9691	0.48	Q				V
22+ 5	1.9724	0.47	Q				V
22+10	1.9756	0.47	Q				V
22+15	1.9788	0.47	Q				V
22+20	1.9820	0.46	Q				V
22+25	1.9852	0.46	Q				V
22+30	1.9883	0.45	Q				V
22+35	1.9914	0.45	Q				V
22+40	1.9945	0.45	Q				V
22+45	1.9975	0.44	Q				V
22+50	2.0006	0.44	Q				V
22+55	2.0036	0.44	Q				V
23+ 0	2.0066	0.43	Q				V
23+ 5	2.0095	0.43	Q				V
23+10	2.0125	0.43	Q				V
23+15	2.0154	0.42	Q				V
23+20	2.0183	0.42	Q				V
23+25	2.0212	0.42	Q				V
23+30	2.0241	0.42	Q				V
23+35	2.0269	0.41	Q				V
23+40	2.0297	0.41	Q				V
23+45	2.0325	0.41	Q				V
23+50	2.0353	0.40	Q				V

```
   23+55       2.0381      0.40  Q          |          |          |         V|
   24+ 0       2.0408      0.40  Q          |          |          |         V|
   24+ 5       2.0434      0.37  Q          |          |          |         V|
   24+10       2.0449      0.22  Q          |          |          |         V|
   24+15       2.0454      0.07  Q          |          |          |         V|
   24+20       2.0455      0.02  Q          |          |          |         V|
   24+25       2.0455      0.00  Q          |          |          |          V
-------------------------------------------------------------------------------
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2-Year Flood Routing Calculations

Developed Condition

FLOOD HYDROGRAPH ROUTING PROGRAM
Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2005
Study date: 02/19/19

Tract 19756
Kimball
Interim Condition
2 year

Program License Serial Number 6094

********** HYDROGRAPH INFORMATION **********

From study/file name: kima2.rte
**********HYDROGRAPH DATA**********
Number of intervals = 296
Time interval = 5.0 (Min.)
Maximum/Peak flow rate = 42.899 (CFS)
Total volume = 6.470 (Ac.Ft)

Status of hydrographs being held in storage

	Stream 1	Stream 2	Stream 3	Stream 4	Stream 5
Peak (CFS)	0.000	0.000	0.000	0.000	0.000
Vol (Ac.Ft)	0.000	0.000	0.000	0.000	0.000

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Process from Point/Station 1.000 to Point/Station 2.000
**** RETARDING BASIN ROUTING ****

User entry of depth-outflow-storage data

Total number of inflow hydrograph intervals = 296
Hydrograph time unit = 5.000 (Min.)
Initial depth in storage basin = 0.00(Ft.)

Initial basin depth = 0.00 (Ft.)
Initial basin storage = 0.00 (Ac.Ft)
Initial basin outflow = 0.00 (CFS)

Depth vs. Storage and Depth vs. Discharge data:

Basin Depth (Ft.)	Storage (Ac.Ft)	Outflow (CFS)	(S-O*dt/2) (Ac.Ft)	(S+O*dt/2) (Ac.Ft)
0.000	0.000	0.000	0.000	0.000
1.000	0.330	8.010	0.302	0.358
2.000	1.010	16.660	0.953	1.067
3.000	1.760	24.330	1.676	1.844

4.000	2.580	31.920	2.470	2.690
5.000	3.460	37.700	3.330	3.590
6.000	4.410	70.840	4.166	4.654

Hydrograph Detention Basin Routing

Graph values: 'I'= unit inflow; 'O'=outflow at time shown

Time (Hours)	Inflow (CFS)	Outflow (CFS)	Storage (Ac.Ft)	.0	10.7	21.45	32.17	42.90	Depth (Ft.)
0.083	0.04	0.00	0.000	O	|	|	|	|	0.00
0.167	0.29	0.03	0.001	O	|	|	|	|	0.00
0.250	0.73	0.10	0.004	O	|	|	|	|	0.01
0.333	1.06	0.23	0.009	O	|	|	|	|	0.03
0.417	1.20	0.37	0.015	O	|	|	|	|	0.05
0.500	1.26	0.50	0.021	O	|	|	|	|	0.06
0.583	1.28	0.62	0.025	O	|	|	|	|	0.08
0.667	1.29	0.72	0.030	O	|	|	|	|	0.09
0.750	1.30	0.81	0.033	O	|	|	|	|	0.10
0.833	1.30	0.88	0.036	O	|	|	|	|	0.11
0.917	1.31	0.95	0.039	O	|	|	|	|	0.12
1.000	1.31	1.01	0.041	O	|	|	|	|	0.13
1.083	1.32	1.05	0.043	O	|	|	|	|	0.13
1.167	1.32	1.09	0.045	O	|	|	|	|	0.14
1.250	1.33	1.13	0.047	O	|	|	|	|	0.14
1.333	1.33	1.16	0.048	O	|	|	|	|	0.14
1.417	1.33	1.19	0.049	O	|	|	|	|	0.15
1.500	1.34	1.21	0.050	O	|	|	|	|	0.15
1.583	1.34	1.23	0.051	OI	|	|	|	|	0.15
1.667	1.35	1.25	0.051	OI	|	|	|	|	0.16
1.750	1.35	1.26	0.052	OI	|	|	|	|	0.16
1.833	1.36	1.28	0.053	OI	|	|	|	|	0.16
1.917	1.36	1.29	0.053	OI	|	|	|	|	0.16
2.000	1.37	1.30	0.054	OI	|	|	|	|	0.16
2.083	1.37	1.31	0.054	OI	|	|	|	|	0.16
2.167	1.38	1.32	0.054	OI	|	|	|	|	0.16
2.250	1.38	1.33	0.055	OI	|	|	|	|	0.17
2.333	1.39	1.34	0.055	OI	|	|	|	|	0.17
2.417	1.39	1.35	0.055	|O	|	|	|	|	0.17
2.500	1.40	1.35	0.056	|O	|	|	|	|	0.17
2.583	1.40	1.36	0.056	|O	|	|	|	|	0.17
2.667	1.41	1.37	0.056	|O	|	|	|	|	0.17
2.750	1.41	1.37	0.057	|O	|	|	|	|	0.17
2.833	1.42	1.38	0.057	|O	|	|	|	|	0.17
2.917	1.42	1.39	0.057	|O	|	|	|	|	0.17
3.000	1.43	1.39	0.057	|O	|	|	|	|	0.17
3.083	1.43	1.40	0.058	|O	|	|	|	|	0.17
3.167	1.44	1.40	0.058	|O	|	|	|	|	0.18
3.250	1.44	1.41	0.058	|O	|	|	|	|	0.18
3.333	1.45	1.42	0.058	|O	|	|	|	|	0.18
3.417	1.46	1.42	0.059	|O	|	|	|	|	0.18
3.500	1.46	1.43	0.059	|O	|	|	|	|	0.18
3.583	1.47	1.43	0.059	|O	|	|	|	|	0.18
3.667	1.47	1.44	0.059	|O	|	|	|	|	0.18
3.750	1.48	1.44	0.059	|O	|	|	|	|	0.18
3.833	1.48	1.45	0.060	|O	|	|	|	|	0.18
3.917	1.49	1.46	0.060	|O	|	|	|	|	0.18
4.000	1.50	1.46	0.060	|O	|	|	|	|	0.18
4.083	1.50	1.47	0.060	|O	|	|	|	|	0.18

4.167	1.51	1.47	0.061	|O	|	|	|	|	0.18
4.250	1.52	1.48	0.061	|O	|	|	|	|	0.18
4.333	1.52	1.49	0.061	|O	|	|	|	|	0.19
4.417	1.53	1.49	0.061	|O	|	|	|	|	0.19
4.500	1.53	1.50	0.062	|O	|	|	|	|	0.19
4.583	1.54	1.50	0.062	|O	|	|	|	|	0.19
4.667	1.55	1.51	0.062	|O	|	|	|	|	0.19
4.750	1.55	1.52	0.062	|O	|	|	|	|	0.19
4.833	1.56	1.52	0.063	|O	|	|	|	|	0.19
4.917	1.57	1.53	0.063	|O	|	|	|	|	0.19
5.000	1.58	1.54	0.063	|O	|	|	|	|	0.19
5.083	1.58	1.54	0.064	|O	|	|	|	|	0.19
5.167	1.59	1.55	0.064	|O	|	|	|	|	0.19
5.250	1.60	1.56	0.064	|O	|	|	|	|	0.19
5.333	1.60	1.56	0.064	|O	|	|	|	|	0.20
5.417	1.61	1.57	0.065	|O	|	|	|	|	0.20
5.500	1.62	1.58	0.065	|O	|	|	|	|	0.20
5.583	1.63	1.58	0.065	|O	|	|	|	|	0.20
5.667	1.63	1.59	0.066	|O	|	|	|	|	0.20
5.750	1.64	1.60	0.066	|O	|	|	|	|	0.20
5.833	1.65	1.61	0.066	|O	|	|	|	|	0.20
5.917	1.66	1.61	0.066	|O	|	|	|	|	0.20
6.000	1.67	1.62	0.067	|O	|	|	|	|	0.20
6.083	1.67	1.63	0.067	|O	|	|	|	|	0.20
6.167	1.68	1.64	0.067	|O	|	|	|	|	0.20
6.250	1.69	1.64	0.068	|O	|	|	|	|	0.21
6.333	1.70	1.65	0.068	|O	|	|	|	|	0.21
6.417	1.71	1.66	0.068	|O	|	|	|	|	0.21
6.500	1.72	1.67	0.069	|O	|	|	|	|	0.21
6.583	1.73	1.68	0.069	|O	|	|	|	|	0.21
6.667	1.73	1.68	0.069	|O	|	|	|	|	0.21
6.750	1.74	1.69	0.070	|O	|	|	|	|	0.21
6.833	1.75	1.70	0.070	|O	|	|	|	|	0.21
6.917	1.76	1.71	0.070	|O	|	|	|	|	0.21
7.000	1.77	1.72	0.071	|O	|	|	|	|	0.21
7.083	1.78	1.73	0.071	|O	|	|	|	|	0.22
7.167	1.79	1.74	0.072	|O	|	|	|	|	0.22
7.250	1.80	1.75	0.072	|O	|	|	|	|	0.22
7.333	1.81	1.76	0.072	|O	|	|	|	|	0.22
7.417	1.82	1.76	0.073	|O	|	|	|	|	0.22
7.500	1.83	1.77	0.073	|O	|	|	|	|	0.22
7.583	1.84	1.78	0.073	|O	|	|	|	|	0.22
7.667	1.85	1.79	0.074	|O	|	|	|	|	0.22
7.750	1.86	1.80	0.074	|O	|	|	|	|	0.23
7.833	1.88	1.81	0.075	|O	|	|	|	|	0.23
7.917	1.89	1.82	0.075	|O	|	|	|	|	0.23
8.000	1.90	1.83	0.076	|O	|	|	|	|	0.23
8.083	1.91	1.85	0.076	|O	|	|	|	|	0.23
8.167	1.92	1.86	0.076	|O	|	|	|	|	0.23
8.250	1.93	1.87	0.077	|O	|	|	|	|	0.23
8.333	1.95	1.88	0.077	|O	|	|	|	|	0.23
8.417	1.96	1.89	0.078	|O	|	|	|	|	0.24
8.500	1.97	1.90	0.078	|O	|	|	|	|	0.24
8.583	1.98	1.91	0.079	|O	|	|	|	|	0.24
8.667	2.00	1.92	0.079	|O	|	|	|	|	0.24
8.750	2.01	1.94	0.080	|O	|	|	|	|	0.24
8.833	2.02	1.95	0.080	|O	|	|	|	|	0.24
8.917	2.04	1.96	0.081	|O	|	|	|	|	0.24
9.000	2.05	1.97	0.081	|O	|	|	|	|	0.25
9.083	2.07	1.99	0.082	|O	|	|	|	|	0.25

9.167	2.08	2.00	0.082	|O	|	|	|	|	0.25
9.250	2.09	2.01	0.083	|O	|	|	|	|	0.25
9.333	2.11	2.03	0.084	|O	|	|	|	|	0.25
9.417	2.12	2.04	0.084	|O	|	|	|	|	0.25
9.500	2.14	2.06	0.085	|O	|	|	|	|	0.26
9.583	2.16	2.07	0.085	|O	|	|	|	|	0.26
9.667	2.17	2.08	0.086	|O	|	|	|	|	0.26
9.750	2.19	2.10	0.086	|O	|	|	|	|	0.26
9.833	2.21	2.11	0.087	|O	|	|	|	|	0.26
9.917	2.22	2.13	0.088	|O	|	|	|	|	0.27
10.000	2.24	2.15	0.088	|O	|	|	|	|	0.27
10.083	2.26	2.16	0.089	|O	|	|	|	|	0.27
10.167	2.28	2.18	0.090	|O	|	|	|	|	0.27
10.250	2.30	2.20	0.090	|O	|	|	|	|	0.27
10.333	2.32	2.21	0.091	|O	|	|	|	|	0.28
10.417	2.34	2.23	0.092	|O	|	|	|	|	0.28
10.500	2.36	2.25	0.093	|O	|	|	|	|	0.28
10.583	2.38	2.27	0.093	|O	|	|	|	|	0.28
10.667	2.40	2.29	0.094	|O	|	|	|	|	0.29
10.750	2.42	2.30	0.095	|O	|	|	|	|	0.29
10.833	2.44	2.32	0.096	|O	|	|	|	|	0.29
10.917	2.47	2.34	0.097	|O	|	|	|	|	0.29
11.000	2.49	2.36	0.097	|O	|	|	|	|	0.30
11.083	2.51	2.39	0.098	|O	|	|	|	|	0.30
11.167	2.54	2.41	0.099	|O	|	|	|	|	0.30
11.250	2.56	2.43	0.100	|O	|	|	|	|	0.30
11.333	2.59	2.45	0.101	|O	|	|	|	|	0.31
11.417	2.62	2.48	0.102	|O	|	|	|	|	0.31
11.500	2.64	2.50	0.103	|O	|	|	|	|	0.31
11.583	2.67	2.52	0.104	|O	|	|	|	|	0.32
11.667	2.70	2.55	0.105	|OI	|	|	|	|	0.32
11.750	2.73	2.57	0.106	|OI	|	|	|	|	0.32
11.833	2.76	2.60	0.107	|OI	|	|	|	|	0.32
11.917	2.79	2.63	0.108	|OI	|	|	|	|	0.33
12.000	2.83	2.66	0.109	|OI	|	|	|	|	0.33
12.083	2.90	2.69	0.111	| O	|	|	|	|	0.34
12.167	3.13	2.74	0.113	| O	|	|	|	|	0.34
12.250	3.52	2.83	0.117	| O	|	|	|	|	0.35
12.333	3.83	2.96	0.122	| O	|	|	|	|	0.37
12.417	3.98	3.10	0.128	| O	|	|	|	|	0.39
12.500	4.06	3.25	0.134	| OI	|	|	|	|	0.41
12.583	4.12	3.38	0.139	| OI	|	|	|	|	0.42
12.667	4.17	3.49	0.144	| OI	|	|	|	|	0.44
12.750	4.22	3.60	0.148	| OI	|	|	|	|	0.45
12.833	4.26	3.70	0.152	| OI	|	|	|	|	0.46
12.917	4.31	3.79	0.156	| OI	|	|	|	|	0.47
13.000	4.36	3.88	0.160	| OI	|	|	|	|	0.48
13.083	4.41	3.95	0.163	| OI	|	|	|	|	0.49
13.167	4.47	4.03	0.166	| O	|	|	|	|	0.50
13.250	4.53	4.10	0.169	| O	|	|	|	|	0.51
13.333	4.58	4.17	0.172	| O	|	|	|	|	0.52
13.417	4.65	4.24	0.175	| O	|	|	|	|	0.53
13.500	4.71	4.31	0.177	| O	|	|	|	|	0.54
13.583	4.78	4.38	0.180	| O	|	|	|	|	0.55
13.667	4.85	4.44	0.183	| O	|	|	|	|	0.55
13.750	4.92	4.51	0.186	| O	|	|	|	|	0.56
13.833	5.00	4.58	0.189	| O	|	|	|	|	0.57
13.917	5.08	4.65	0.192	| O	|	|	|	|	0.58
14.000	5.16	4.72	0.195	| O	|	|	|	|	0.59
14.083	5.25	4.80	0.198	| O	|	|	|	|	0.60

14.167	5.35	4.88	0.201	O				0.61
14.250	5.46	4.96	0.204	OI				0.62
14.333	5.57	5.04	0.208	OI				0.63
14.417	5.68	5.13	0.211	OI				0.64
14.500	5.81	5.23	0.215	OI				0.65
14.583	5.94	5.33	0.219	OI				0.67
14.667	6.08	5.43	0.224	O				0.68
14.750	6.23	5.54	0.228	O				0.69
14.833	6.40	5.66	0.233	O				0.71
14.917	6.57	5.79	0.239	O				0.72
15.000	6.77	5.93	0.244	OI				0.74
15.083	6.99	6.07	0.250	OI				0.76
15.167	7.23	6.23	0.257	OI				0.78
15.250	7.50	6.41	0.264	OI				0.80
15.333	7.80	6.60	0.272	OI				0.82
15.417	8.07	6.81	0.280	OI				0.85
15.500	8.02	7.00	0.288	O				0.87
15.583	7.69	7.13	0.294	O				0.89
15.667	7.64	7.21	0.297	O				0.90
15.750	8.11	7.31	0.301	OI				0.91
15.833	8.97	7.50	0.309	OI				0.94
15.917	10.32	7.83	0.323	O I				0.98
16.000	12.67	8.22	0.347	O	I			1.02
16.083	18.87	8.85	0.396	O	I			1.10
16.167	33.01	10.29	0.509	O		I		1.26
16.250	42.90	12.61	0.692		O		I	1.53
16.333	34.05	14.78	0.862		O	I		1.78
16.417	19.92	15.81	0.943		O	I		1.90
16.500	12.80	15.85	0.946		I O			1.91
16.583	9.71	15.47	0.916	I	O			1.86
16.667	8.93	14.95	0.876	I	O			1.80
16.750	8.02	14.41	0.833	I	O			1.74
16.833	7.24	13.84	0.788	I	O			1.67
16.917	6.77	13.26	0.743	I	O			1.61
17.000	6.40	12.70	0.699	I	O			1.54
17.083	6.08	12.16	0.656	I	O			1.48
17.167	5.81	11.64	0.615	I	O			1.42
17.250	5.56	11.14	0.576	I	O			1.36
17.333	5.35	10.66	0.539	I	O			1.31
17.417	5.16	10.21	0.503	I	O			1.25
17.500	4.99	9.78	0.469	I	O			1.20
17.583	4.84	9.37	0.437	I	O			1.16
17.667	4.71	8.98	0.407	I	O			1.11
17.750	4.58	8.62	0.378	I	O			1.07
17.833	4.46	8.28	0.351	I	O			1.03
17.917	4.36	7.90	0.326	I	O			0.99
18.000	4.26	7.35	0.303	I	O			0.92
18.083	4.13	6.86	0.283	I	O			0.86
18.167	3.84	6.42	0.264	I	O			0.80
18.250	3.41	5.99	0.247	I	O			0.75
18.333	3.07	5.56	0.229	I	O			0.69
18.417	2.89	5.17	0.213	I	O			0.64
18.500	2.78	4.81	0.198	I	O			0.60
18.583	2.71	4.49	0.185	I	O			0.56
18.667	2.64	4.21	0.173	I	O			0.53
18.750	2.59	3.96	0.163	I	O			0.49
18.833	2.53	3.75	0.154	I	O			0.47
18.917	2.49	3.56	0.146	I	O			0.44
19.000	2.44	3.39	0.140	I	O			0.42
19.083	2.40	3.24	0.133	I	O			0.40

19.167	2.35	3.10	0.128	|IO	|	|	|	|	0.39
19.250	2.31	2.99	0.123	|IO	|	|	|	|	0.37
19.333	2.28	2.88	0.119	|IO	|	|	|	|	0.36
19.417	2.24	2.78	0.115	|IO	|	|	|	|	0.35
19.500	2.20	2.70	0.111	|IO	|	|	|	|	0.34
19.583	2.17	2.62	0.108	|O	|	|	|	|	0.33
19.667	2.14	2.55	0.105	|O	|	|	|	|	0.32
19.750	2.11	2.48	0.102	|O	|	|	|	|	0.31
19.833	2.08	2.42	0.100	|O	|	|	|	|	0.30
19.917	2.05	2.37	0.097	|O	|	|	|	|	0.30
20.000	2.02	2.31	0.095	|O	|	|	|	|	0.29
20.083	1.99	2.27	0.093	|O	|	|	|	|	0.28
20.167	1.97	2.22	0.092	|O	|	|	|	|	0.28
20.250	1.94	2.18	0.090	|O	|	|	|	|	0.27
20.333	1.92	2.14	0.088	|O	|	|	|	|	0.27
20.417	1.90	2.11	0.087	|O	|	|	|	|	0.26
20.500	1.87	2.07	0.085	|O	|	|	|	|	0.26
20.583	1.85	2.04	0.084	|O	|	|	|	|	0.25
20.667	1.83	2.01	0.083	|O	|	|	|	|	0.25
20.750	1.81	1.98	0.082	|O	|	|	|	|	0.25
20.833	1.79	1.95	0.080	|O	|	|	|	|	0.24
20.917	1.77	1.93	0.079	|O	|	|	|	|	0.24
21.000	1.75	1.90	0.078	|O	|	|	|	|	0.24
21.083	1.73	1.88	0.077	|O	|	|	|	|	0.23
21.167	1.72	1.85	0.076	|O	|	|	|	|	0.23
21.250	1.70	1.83	0.075	|O	|	|	|	|	0.23
21.333	1.68	1.81	0.075	|O	|	|	|	|	0.23
21.417	1.66	1.79	0.074	|O	|	|	|	|	0.22
21.500	1.65	1.77	0.073	|O	|	|	|	|	0.22
21.583	1.63	1.75	0.072	|O	|	|	|	|	0.22
21.667	1.62	1.73	0.071	|O	|	|	|	|	0.22
21.750	1.60	1.71	0.070	|O	|	|	|	|	0.21
21.833	1.59	1.69	0.070	|O	|	|	|	|	0.21
21.917	1.57	1.68	0.069	|O	|	|	|	|	0.21
22.000	1.56	1.66	0.068	|O	|	|	|	|	0.21
22.083	1.55	1.64	0.068	|O	|	|	|	|	0.21
22.167	1.53	1.63	0.067	|O	|	|	|	|	0.20
22.250	1.52	1.61	0.066	|O	|	|	|	|	0.20
22.333	1.51	1.60	0.066	|O	|	|	|	|	0.20
22.417	1.50	1.58	0.065	|O	|	|	|	|	0.20
22.500	1.48	1.57	0.065	|O	|	|	|	|	0.20
22.583	1.47	1.55	0.064	|O	|	|	|	|	0.19
22.667	1.46	1.54	0.063	|O	|	|	|	|	0.19
22.750	1.45	1.53	0.063	|O	|	|	|	|	0.19
22.833	1.44	1.51	0.062	|O	|	|	|	|	0.19
22.917	1.43	1.50	0.062	|O	|	|	|	|	0.19
23.000	1.42	1.49	0.061	|O	|	|	|	|	0.19
23.083	1.41	1.48	0.061	|O	|	|	|	|	0.18
23.167	1.40	1.47	0.060	|O	|	|	|	|	0.18
23.250	1.39	1.45	0.060	|O	|	|	|	|	0.18
23.333	1.38	1.44	0.059	|O	|	|	|	|	0.18
23.417	1.37	1.43	0.059	|O	|	|	|	|	0.18
23.500	1.36	1.42	0.059	|O	|	|	|	|	0.18
23.583	1.35	1.41	0.058	|O	|	|	|	|	0.18
23.667	1.34	1.40	0.058	IO	|	|	|	|	0.17
23.750	1.33	1.39	0.057	IO	|	|	|	|	0.17
23.833	1.32	1.38	0.057	IO	|	|	|	|	0.17
23.917	1.31	1.37	0.056	IO	|	|	|	|	0.17
24.000	1.30	1.36	0.056	IO	|	|	|	|	0.17
24.083	1.25	1.35	0.055	IO	|	|	|	|	0.17

24.167	1.00	1.31	0.054	O	|	|	|	|	0.16
24.250	0.55	1.23	0.051	O	|	|	|	|	0.15
24.333	0.22	1.10	0.045	O	|	|	|	|	0.14
24.417	0.08	0.95	0.039	O	|	|	|	|	0.12
24.500	0.03	0.81	0.034	O	|	|	|	|	0.10
24.583	0.01	0.69	0.029	O	|	|	|	|	0.09
24.667	0.00	0.59	0.024	O	|	|	|	|	0.07
24.750	0.00	0.50	0.020	O	|	|	|	|	0.06
24.833	0.00	0.42	0.017	O	|	|	|	|	0.05
24.917	0.00	0.36	0.015	O	|	|	|	|	0.04
25.000	0.00	0.30	0.012	O	|	|	|	|	0.04
25.083	0.00	0.25	0.010	O	|	|	|	|	0.03
25.167	0.00	0.21	0.009	O	|	|	|	|	0.03
25.250	0.00	0.18	0.007	O	|	|	|	|	0.02
25.333	0.00	0.15	0.006	O	|	|	|	|	0.02
25.417	0.00	0.13	0.005	O	|	|	|	|	0.02
25.500	0.00	0.11	0.005	O	|	|	|	|	0.01
25.583	0.00	0.09	0.004	O	|	|	|	|	0.01
25.667	0.00	0.08	0.003	O	|	|	|	|	0.01
25.750	0.00	0.07	0.003	O	|	|	|	|	0.01
25.833	0.00	0.06	0.002	O	|	|	|	|	0.01
25.917	0.00	0.05	0.002	O	|	|	|	|	0.01
26.000	0.00	0.04	0.002	O	|	|	|	|	0.01
26.083	0.00	0.03	0.001	O	|	|	|	|	0.00
26.167	0.00	0.03	0.001	O	|	|	|	|	0.00
26.250	0.00	0.02	0.001	O	|	|	|	|	0.00
26.333	0.00	0.02	0.001	O	|	|	|	|	0.00
26.417	0.00	0.02	0.001	O	|	|	|	|	0.00
26.500	0.00	0.01	0.001	O	|	|	|	|	0.00
26.583	0.00	0.01	0.001	O	|	|	|	|	0.00
26.667	0.00	0.01	0.000	O	|	|	|	|	0.00
26.750	0.00	0.01	0.000	O	|	|	|	|	0.00
26.833	0.00	0.01	0.000	O	|	|	|	|	0.00

**********HYDROGRAPH DATA**********

Number of intervals = 322
Time interval = 5.0 (Min.)
Maximum/Peak flow rate = 15.852 (CFS)
Total volume = 6.470 (Ac.Ft)

Status of hydrographs being held in storage

	Stream 1	Stream 2	Stream 3	Stream 4	Stream 5
Peak (CFS)	0.000	0.000	0.000	0.000	0.000
Vol (Ac.Ft)	0.000	0.000	0.000	0.000	0.000

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Process from Point/Station 2.000 to Point/Station 3.000

**** STREAM ROUTING SCS CONVEX METHOD ****

HYDROGRAPH STREAM ROUTING DATA:
Length of stream = 450.00 (Ft.)
Elevation difference = 2.25 (Ft.)
Slope of channel = 0.005000 (Vert/Horiz)
Channel type - Pipe

Pipe length = 450.00(Ft.) Elevation difference = 2.25(Ft.)

Manning's N = 0.013 No. of pipes = 1
Pipe evaluation using mean flow rate of hydrograph
Required pipe flow = 3.461(CFS)
Nearest computed pipe diameter = 15.00(In.)
Calculated individual pipe flow = 3.461(CFS)
Normal flow depth in pipe = 9.76(In.)
Flow top width inside pipe = 14.30(In.)
Critical Depth = 0.75(Ft.)
Pipe flow velocity = 4.09(Ft/s)
Travel time through pipe = 1.83 min.

Pipe length = 450.00(Ft.) Elevation difference = 2.25(Ft.)
Manning's N = 0.013 No. of pipes = 1
Pipe evaluation using maximum flow rate of hydrograph
Required pipe flow = 15.852(CFS)
Nearest computed pipe diameter = 24.00(In.)
Calculated individual pipe flow = 15.852(CFS)
Normal flow depth in pipe = 19.48(In.)
Flow top width inside pipe = 18.77(In.)
Critical Depth = 1.44(Ft.)
Pipe flow velocity = 5.80(Ft/s)
Travel time through pipe = 1.29 min.

********** SCS CONVEX CHANNEL ROUTING **********
Convex method of stream routing data items:
Using equation: Outflow =
O(t+dt) = (1-c*)O(t+dt-dt*) + Input(c*)
  where c* = 1 - (1-c)^e and dt = c(length)/velocity
  c(v/v+1.7) = 0.7735 Travel time = 1.29 (min.)
dt*(unit time interval) = 5.00(min.), e= 3.6688
dt(routing time-step) = 1.00 (min.), c* = 0.9957

Output hydrograph delayed by 0 unit time increments

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P R I N T O F S T O R M
R u n o f f H y d r o g r a p h

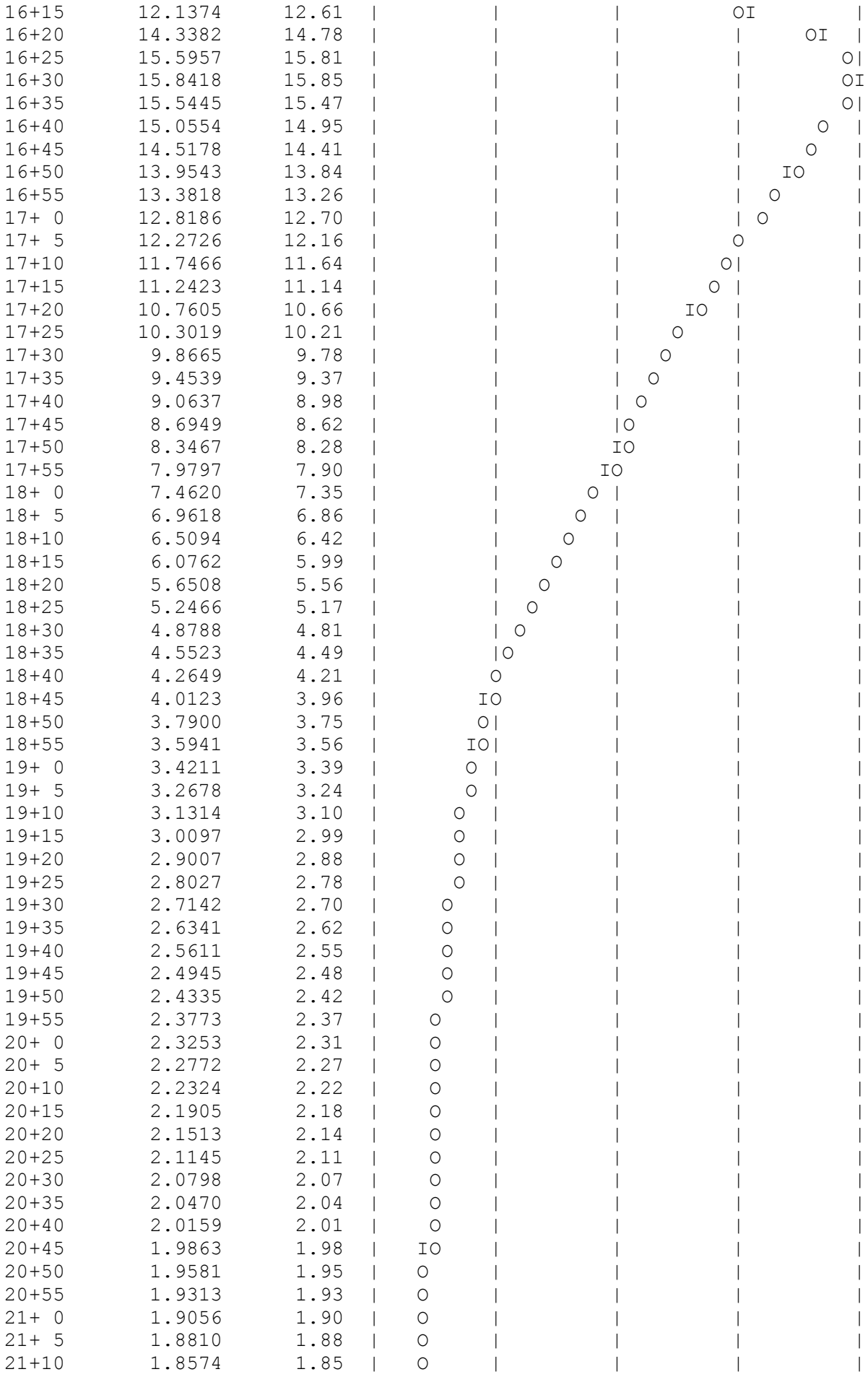
Hydrograph in 5 Minute intervals (CFS)

Time(h+m)	Out = O(CFS)	In = I	0	4.0	7.9	11.9	15.9
0+ 5	0.0028	0.00	O				
0+10	0.0237	0.03	O				
0+15	0.0880	0.10	O				
0+20	0.2003	0.23	O				
0+25	0.3367	0.37	O				
0+30	0.4716	0.50	|O				
0+35	0.5934	0.62	|O				
0+40	0.6994	0.72	|O				
0+45	0.7909	0.81	|OI				
0+50	0.8694	0.88	| O				
0+55	0.9366	0.95	| O				
1+ 0	0.9941	1.01	| O				
1+ 5	1.0433	1.05	| O				
1+10	1.0856	1.09	| O				

1+15	1.1221	1.13	O				
1+20	1.1536	1.16	O				
1+25	1.1810	1.19	O				
1+30	1.2048	1.21	O				
1+35	1.2257	1.23	O				
1+40	1.2440	1.25	O				
1+45	1.2602	1.26	O				
1+50	1.2747	1.28	O				
1+55	1.2876	1.29	O				
2+ 0	1.2993	1.30	O				
2+ 5	1.3099	1.31	O				
2+10	1.3196	1.32	O				
2+15	1.3286	1.33	O				
2+20	1.3369	1.34	O				
2+25	1.3448	1.35	O				
2+30	1.3522	1.35	O				
2+35	1.3592	1.36	O				
2+40	1.3660	1.37	O				
2+45	1.3725	1.37	O				
2+50	1.3788	1.38	O				
2+55	1.3849	1.39	O				
3+ 0	1.3909	1.39	O				
3+ 5	1.3969	1.40	O				
3+10	1.4027	1.40	O				
3+15	1.4085	1.41	O				
3+20	1.4143	1.42	O				
3+25	1.4200	1.42	O				
3+30	1.4257	1.43	O				
3+35	1.4314	1.43	O				
3+40	1.4372	1.44	O				
3+45	1.4429	1.44	O				
3+50	1.4487	1.45	O				
3+55	1.4545	1.46	O				
4+ 0	1.4604	1.46	O				
4+ 5	1.4662	1.47	O				
4+10	1.4722	1.47	O				
4+15	1.4781	1.48	O				
4+20	1.4842	1.49	O				
4+25	1.4902	1.49	O				
4+30	1.4964	1.50	O				
4+35	1.5026	1.50	O				
4+40	1.5088	1.51	O				
4+45	1.5152	1.52	O				
4+50	1.5216	1.52	O				
4+55	1.5280	1.53	O				
5+ 0	1.5345	1.54	O				
5+ 5	1.5411	1.54	O				
5+10	1.5478	1.55	O				
5+15	1.5546	1.56	O				
5+20	1.5614	1.56	O				
5+25	1.5683	1.57	O				
5+30	1.5753	1.58	O				
5+35	1.5823	1.58	O				
5+40	1.5895	1.59	O				
5+45	1.5967	1.60	O				
5+50	1.6041	1.61	O				
5+55	1.6115	1.61	O				
6+ 0	1.6190	1.62	O				
6+ 5	1.6266	1.63	O				
6+10	1.6343	1.64	O				

6+15	1.6421	1.64	O				
6+20	1.6500	1.65	O				
6+25	1.6580	1.66	O				
6+30	1.6661	1.67	O				
6+35	1.6743	1.68	O				
6+40	1.6826	1.68	O				
6+45	1.6910	1.69	O				
6+50	1.6995	1.70	O				
6+55	1.7082	1.71	O				
7+ 0	1.7170	1.72	O				
7+ 5	1.7259	1.73	O				
7+10	1.7349	1.74	O				
7+15	1.7440	1.75	O				
7+20	1.7533	1.76	O				
7+25	1.7627	1.76	O				
7+30	1.7723	1.77	O				
7+35	1.7819	1.78	O				
7+40	1.7918	1.79	O				
7+45	1.8017	1.80	O				
7+50	1.8119	1.81	O				
7+55	1.8221	1.82	O				
8+ 0	1.8326	1.83	O				
8+ 5	1.8431	1.85	O				
8+10	1.8539	1.86	O				
8+15	1.8648	1.87	O				
8+20	1.8759	1.88	O				
8+25	1.8872	1.89	O				
8+30	1.8987	1.90	O				
8+35	1.9103	1.91	O				
8+40	1.9221	1.92	O				
8+45	1.9342	1.94	O				
8+50	1.9464	1.95	O				
8+55	1.9589	1.96	O				
9+ 0	1.9715	1.97	O				
9+ 5	1.9844	1.99	O				
9+10	1.9975	2.00	O				
9+15	2.0109	2.01	O				
9+20	2.0245	2.03	O				
9+25	2.0383	2.04	O				
9+30	2.0524	2.06	O				
9+35	2.0668	2.07	O				
9+40	2.0814	2.08	O				
9+45	2.0963	2.10	O				
9+50	2.1115	2.11	O				
9+55	2.1270	2.13	O				
10+ 0	2.1428	2.15	O				
10+ 5	2.1589	2.16	O				
10+10	2.1753	2.18	O				
10+15	2.1921	2.20	O				
10+20	2.2093	2.21	O				
10+25	2.2268	2.23	O				
10+30	2.2446	2.25	O				
10+35	2.2629	2.27	O				
10+40	2.2816	2.29	O				
10+45	2.3007	2.30	O				
10+50	2.3202	2.32	O				
10+55	2.3402	2.34	O				
11+ 0	2.3606	2.36	O				
11+ 5	2.3815	2.39	O				
11+10	2.4029	2.41	O				

11+15	2.4249	2.43	| O |				
11+20	2.4474	2.45	| O |				
11+25	2.4704	2.48	| O |				
11+30	2.4941	2.50	| O |				
11+35	2.5184	2.52	| O |				
11+40	2.5433	2.55	| O |				
11+45	2.5688	2.57	| O |				
11+50	2.5951	2.60	| O |				
11+55	2.6222	2.63	| O |				
12+ 0	2.6499	2.66	| O |				
12+ 5	2.6808	2.69	| O |				
12+10	2.7272	2.74	| O |				
12+15	2.8097	2.83	| O |				
12+20	2.9321	2.96	| O |				
12+25	3.0747	3.10	| O |				
12+30	3.2171	3.25	| O |				
12+35	3.3495	3.38	| O |				
12+40	3.4701	3.49	| O |				
12+45	3.5799	3.60	| O|				
12+50	3.6803	3.70	| O|				
12+55	3.7725	3.79	| O|				
13+ 0	3.8581	3.88	| O|				
13+ 5	3.9384	3.95	| O|				
13+10	4.0144	4.03	| O |				
13+15	4.0872	4.10	| O |				
13+20	4.1576	4.17	| O |				
13+25	4.2263	4.24	| O |				
13+30	4.2941	4.31	| O |				
13+35	4.3614	4.38	|O |				
13+40	4.4288	4.44	|O |				
13+45	4.4967	4.51	|O |				
13+50	4.5657	4.58	|O |				
13+55	4.6361	4.65	|O |				
14+ 0	4.7084	4.72	|O |				
14+ 5	4.7829	4.80	| O |				
14+10	4.8603	4.88	| O |				
14+15	4.9411	4.96	| O |				
14+20	5.0260	5.04	| O |				
14+25	5.1150	5.13	| O |				
14+30	5.2085	5.23	| O |				
14+35	5.3069	5.33	| O |				
14+40	5.4108	5.43	| O |				
14+45	5.5209	5.54	| O |				
14+50	5.6381	5.66	| O |				
14+55	5.7633	5.79	| O |				
15+ 0	5.8978	5.93	| O |				
15+ 5	6.0428	6.07	| O |				
15+10	6.2000	6.23	| O |				
15+15	6.3715	6.41	| O |				
15+20	6.5598	6.60	| O |				
15+25	6.7631	6.81	| O |				
15+30	6.9570	7.00	| O |				
15+35	7.1008	7.13	| O |				
15+40	7.1937	7.21	| O |				
15+45	7.2923	7.31	| O |				
15+50	7.4637	7.50	| O |				
15+55	7.7655	7.83	| O|				
16+ 0	8.1420	8.22	| O |				
16+ 5	8.7257	8.85	| | O |			
16+10	9.9967	10.29	| | | O |			



21+15	1.8346	1.83	| O	|	|	|	|
21+20	1.8128	1.81	| O	|	|	|	|
21+25	1.7917	1.79	| O	|	|	|	|
21+30	1.7714	1.77	| O	|	|	|	|
21+35	1.7517	1.75	| O	|	|	|	|
21+40	1.7327	1.73	| O	|	|	|	|
21+45	1.7143	1.71	| O	|	|	|	|
21+50	1.6964	1.69	| O	|	|	|	|
21+55	1.6791	1.68	| O	|	|	|	|
22+ 0	1.6623	1.66	| O	|	|	|	|
22+ 5	1.6459	1.64	| O	|	|	|	|
22+10	1.6300	1.63	| O	|	|	|	|
22+15	1.6145	1.61	| O	|	|	|	|
22+20	1.5995	1.60	| O	|	|	|	|
22+25	1.5848	1.58	| O	|	|	|	|
22+30	1.5705	1.57	| O	|	|	|	|
22+35	1.5566	1.55	| O	|	|	|	|
22+40	1.5430	1.54	| O	|	|	|	|
22+45	1.5297	1.53	| O	|	|	|	|
22+50	1.5167	1.51	| O	|	|	|	|
22+55	1.5040	1.50	| O	|	|	|	|
23+ 0	1.4916	1.49	| O	|	|	|	|
23+ 5	1.4795	1.48	| O	|	|	|	|
23+10	1.4677	1.47	| O	|	|	|	|
23+15	1.4561	1.45	| O	|	|	|	|
23+20	1.4447	1.44	| O	|	|	|	|
23+25	1.4336	1.43	| O	|	|	|	|
23+30	1.4227	1.42	| O	|	|	|	|
23+35	1.4121	1.41	| O	|	|	|	|
23+40	1.4016	1.40	| O	|	|	|	|
23+45	1.3914	1.39	| O	|	|	|	|
23+50	1.3813	1.38	| O	|	|	|	|
23+55	1.3715	1.37	| O	|	|	|	|
24+ 0	1.3618	1.36	| O	|	|	|	|
24+ 5	1.3496	1.35	| O	|	|	|	|
24+10	1.3194	1.31	| O	|	|	|	|
24+15	1.2463	1.23	| O	|	|	|	|
24+20	1.1260	1.10	| O	|	|	|	|
24+25	0.9829	0.95	| O	|	|	|	|
24+30	0.8426	0.81	| O	|	|	|	|
24+35	0.7169	0.69	|O	|	|	|	|
24+40	0.6081	0.59	|O	|	|	|	|
24+45	0.5149	0.50	|O	|	|	|	|
24+50	0.4355	0.42	|O	|	|	|	|
24+55	0.3683	0.36	O	|	|	|	|
25+ 0	0.3115	0.30	O	|	|	|	|
25+ 5	0.2635	0.25	O	|	|	|	|
25+10	0.2228	0.21	O	|	|	|	|
25+15	0.1884	0.18	O	|	|	|	|
25+20	0.1594	0.15	O	|	|	|	|
25+25	0.1348	0.13	O	|	|	|	|
25+30	0.1140	0.11	O	|	|	|	|
25+35	0.0964	0.09	O	|	|	|	|
25+40	0.0815	0.08	O	|	|	|	|
25+45	0.0690	0.07	O	|	|	|	|
25+50	0.0583	0.06	O	|	|	|	|
25+55	0.0493	0.05	O	|	|	|	|
26+ 0	0.0417	0.04	O	|	|	|	|
26+ 5	0.0353	0.03	O	|	|	|	|
26+10	0.0298	0.03	O	|	|	|	|

```
  26+15       0.0252      0.02  O         |         |         |         |
  26+20       0.0213      0.02  O         |         |         |         |
  26+25       0.0180      0.02  O         |         |         |         |
  26+30       0.0153      0.01  O         |         |         |         |
  26+35       0.0129      0.01  O         |         |         |         |
  26+40       0.0109      0.01  O         |         |         |         |
  26+45       0.0092      0.01  O         |         |         |         |
  26+50       0.0078      0.01  O         |         |         |         |
  26+55       0.0015      0.00  O         |         |         |         |
  27+ 0       0.0000      0.00  O         |         |         |         |
--------------------------------------------------------------------------
     ****************************HYDROGRAPH DATA****************************
               Number of intervals =   324
               Time interval =    5.0 (Min.)
               Maximum/Peak flow rate =       15.842 (CFS)
               Total volume =       6.470 (Ac.Ft)
         Status of hydrographs being held in storage
                     Stream 1  Stream 2  Stream 3  Stream 4  Stream 5
         Peak (CFS)      0.000     0.000     0.000     0.000     0.000
         Vol (Ac.Ft)     0.000     0.000     0.000     0.000     0.000
     ************************************************************************

     ------------------------------------------------------------------------


     ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
     Process from Point/Station        2.000 to Point/Station        3.000
     **** STORE OR DELETE CURRENT HYDROGRAPH ****
     ________________________________________________________________________
     Current stream hydrograph of   5.0 minute
     intervals has been stored as stream number 1 with
     a starting time of   0.00 hours and ending time of  36.00 hours
     With a total volume of       6.47(Ac.Ft)
     ****************************HYDROGRAPH DATA****************************
               Number of intervals =     0
               Time interval =    0.0 (Min.)
               Maximum/Peak flow rate =        0.000 (CFS)
               Total volume =       0.000 (Ac.Ft)
         Status of hydrographs being held in storage
                     Stream 1  Stream 2  Stream 3  Stream 4  Stream 5
         Peak (CFS)     15.842     0.000     0.000     0.000     0.000
         Vol (Ac.Ft)     6.470     0.000     0.000     0.000     0.000
     ************************************************************************

     ------------------------------------------------------------------------


     ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
     Process from Point/Station        4.000 to Point/Station        3.000
     **** ADD/COMBINE/RECOVER HYDROGRAPHS ****
     ________________________________________________________________________
     ********************** HYDROGRAPH INFORMATION **********************

               From study/file name: kimb2.rte
     ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                      P R I N T  O F  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)	Add q(CFS)	Tot. Q	0	10.6	21.2	31.7	42.3
0+ 5	0.0869	0.09	Q	|	|	|	|
0+10	0.4896	0.49	Q	|	|	|	|
0+15	0.7213	0.72	Q	|	|	|	|
0+20	0.7608	0.76	Q	|	|	|	|
0+25	0.7719	0.77	Q	|	|	|	|
0+30	0.7745	0.77	Q	|	|	|	|
0+35	0.7768	0.78	Q	|	|	|	|
0+40	0.7795	0.78	Q	|	|	|	|
0+45	0.7819	0.78	Q	|	|	|	|
0+50	0.7846	0.78	Q	|	|	|	|
0+55	0.7870	0.79	Q	|	|	|	|
1+ 0	0.7897	0.79	Q	|	|	|	|
1+ 5	0.7922	0.79	Q	|	|	|	|
1+10	0.7950	0.79	Q	|	|	|	|
1+15	0.7975	0.80	Q	|	|	|	|
1+20	0.8004	0.80	Q	|	|	|	|
1+25	0.8029	0.80	Q	|	|	|	|
1+30	0.8058	0.81	Q	|	|	|	|
1+35	0.8084	0.81	Q	|	|	|	|
1+40	0.8114	0.81	Q	|	|	|	|
1+45	0.8140	0.81	Q	|	|	|	|
1+50	0.8170	0.82	Q	|	|	|	|
1+55	0.8198	0.82	Q	|	|	|	|
2+ 0	0.8228	0.82	Q	|	|	|	|
2+ 5	0.8256	0.83	Q	|	|	|	|
2+10	0.8287	0.83	Q	|	|	|	|
2+15	0.8315	0.83	Q	|	|	|	|
2+20	0.8347	0.83	Q	|	|	|	|
2+25	0.8376	0.84	Q	|	|	|	|
2+30	0.8408	0.84	Q	|	|	|	|
2+35	0.8437	0.84	Q	|	|	|	|
2+40	0.8470	0.85	Q	|	|	|	|
2+45	0.8500	0.85	Q	|	|	|	|
2+50	0.8534	0.85	Q	|	|	|	|
2+55	0.8564	0.86	Q	|	|	|	|
3+ 0	0.8598	0.86	Q	|	|	|	|
3+ 5	0.8630	0.86	Q	|	|	|	|
3+10	0.8664	0.87	Q	|	|	|	|
3+15	0.8696	0.87	Q	|	|	|	|
3+20	0.8732	0.87	Q	|	|	|	|
3+25	0.8764	0.88	Q	|	|	|	|
3+30	0.8801	0.88	Q	|	|	|	|
3+35	0.8834	0.88	Q	|	|	|	|
3+40	0.8871	0.89	Q	|	|	|	|
3+45	0.8905	0.89	Q	|	|	|	|
3+50	0.8943	0.89	Q	|	|	|	|
3+55	0.8978	0.90	Q	|	|	|	|
4+ 0	0.9017	0.90	Q	|	|	|	|
4+ 5	0.9052	0.91	Q	|	|	|	|
4+10	0.9092	0.91	Q	|	|	|	|
4+15	0.9128	0.91	Q	|	|	|	|
4+20	0.9169	0.92	Q	|	|	|	|
4+25	0.9206	0.92	Q	|	|	|	|
4+30	0.9247	0.92	Q	|	|	|	|
4+35	0.9285	0.93	Q	|	|	|	|
4+40	0.9327	0.93	Q	|	|	|	|
4+45	0.9366	0.94	Q	|	|	|	|

4+50	0.9410	0.94	Q				
4+55	0.9449	0.94	Q				
5+ 0	0.9494	0.95	Q				
5+ 5	0.9535	0.95	Q				
5+10	0.9580	0.96	Q				
5+15	0.9622	0.96	Q				
5+20	0.9668	0.97	Q				
5+25	0.9711	0.97	Q				
5+30	0.9759	0.98	Q				
5+35	0.9803	0.98	Q				
5+40	0.9852	0.99	Q				
5+45	0.9897	0.99	Q				
5+50	0.9947	0.99	Q				
5+55	0.9993	1.00	Q				
6+ 0	1.0045	1.00	Q				
6+ 5	1.0092	1.01	Q				
6+10	1.0145	1.01	Q				
6+15	1.0194	1.02	Q				
6+20	1.0248	1.02	Q				
6+25	1.0298	1.03	Q				
6+30	1.0354	1.04	Q				
6+35	1.0405	1.04	Q				
6+40	1.0463	1.05	Q				
6+45	1.0516	1.05	Q				
6+50	1.0575	1.06	Q				
6+55	1.0629	1.06	|Q				
7+ 0	1.0690	1.07	|Q				
7+ 5	1.0746	1.07	|Q				
7+10	1.0809	1.08	|Q				
7+15	1.0866	1.09	|Q				
7+20	1.0931	1.09	|Q				
7+25	1.0990	1.10	|Q				
7+30	1.1057	1.11	|Q				
7+35	1.1118	1.11	|Q				
7+40	1.1187	1.12	|Q				
7+45	1.1250	1.12	|Q				
7+50	1.1321	1.13	|Q				
7+55	1.1386	1.14	|Q				
8+ 0	1.1459	1.15	|Q				
8+ 5	1.1526	1.15	|Q				
8+10	1.1602	1.16	|Q				
8+15	1.1671	1.17	|Q				
8+20	1.1750	1.17	|Q				
8+25	1.1821	1.18	|Q				
8+30	1.1902	1.19	|Q				
8+35	1.1977	1.20	|Q				
8+40	1.2061	1.21	|Q				
8+45	1.2138	1.21	|Q				
8+50	1.2225	1.22	|Q				
8+55	1.2305	1.23	|Q				
9+ 0	1.2395	1.24	|Q				
9+ 5	1.2478	1.25	|Q				
9+10	1.2571	1.26	|Q				
9+15	1.2658	1.27	|Q				
9+20	1.2755	1.28	|Q				
9+25	1.2844	1.28	|Q				
9+30	1.2945	1.29	|Q				
9+35	1.3039	1.30	|Q				
9+40	1.3144	1.31	|Q				
9+45	1.3241	1.32	|Q				

9+50	1.3351	1.34	Q				
9+55	1.3452	1.35	Q				
10+ 0	1.3566	1.36	Q				
10+ 5	1.3672	1.37	Q				
10+10	1.3792	1.38	Q				
10+15	1.3902	1.39	Q				
10+20	1.4027	1.40	Q				
10+25	1.4143	1.41	Q				
10+30	1.4274	1.43	Q				
10+35	1.4395	1.44	Q				
10+40	1.4532	1.45	Q				
10+45	1.4659	1.47	Q				
10+50	1.4803	1.48	Q				
10+55	1.4937	1.49	Q				
11+ 0	1.5088	1.51	Q				
11+ 5	1.5229	1.52	Q				
11+10	1.5388	1.54	Q				
11+15	1.5537	1.55	Q				
11+20	1.5705	1.57	Q				
11+25	1.5862	1.59	Q				
11+30	1.6040	1.60	Q				
11+35	1.6205	1.62	Q				
11+40	1.6394	1.64	Q				
11+45	1.6569	1.66	Q				
11+50	1.6770	1.68	Q				
11+55	1.6956	1.70	Q				
12+ 0	1.7170	1.72	Q				
12+ 5	1.8074	1.81	Q				
12+10	2.1570	2.16	Q				
12+15	2.3658	2.37	Q				
12+20	2.4210	2.42	Q				
12+25	2.4515	2.45	Q				
12+30	2.4783	2.48	Q				
12+35	2.5033	2.50	Q				
12+40	2.5320	2.53	Q				
12+45	2.5587	2.56	Q				
12+50	2.5895	2.59	Q				
12+55	2.6183	2.62	Q				
13+ 0	2.6513	2.65	Q				
13+ 5	2.6824	2.68	Q				
13+10	2.7181	2.72	Q				
13+15	2.7517	2.75	Q				
13+20	2.7906	2.79	Q				
13+25	2.8271	2.83	Q				
13+30	2.8695	2.87	Q				
13+35	2.9095	2.91	Q				
13+40	2.9560	2.96	Q				
13+45	3.0000	3.00	Q				
13+50	3.0513	3.05	Q				
13+55	3.1000	3.10	Q				
14+ 0	3.1571	3.16	Q				
14+ 5	3.2122	3.21	Q				
14+10	3.2796	3.28	Q				
14+15	3.3428	3.34	Q				
14+20	3.4155	3.42	Q				
14+25	3.4853	3.49	Q				
14+30	3.5682	3.57	Q				
14+35	3.6485	3.65	Q				
14+40	3.7449	3.74	Q				
14+45	3.8388	3.84	Q				

14+50	3.9527	3.95	Q				
14+55	4.0647	4.06	Q				
15+ 0	4.2023	4.20	Q				
15+ 5	4.3392	4.34	Q				
15+10	4.5101	4.51	Q				
15+15	4.6830	4.68	Q				
15+20	4.9037	4.90	Q				
15+25	4.9717	4.97	Q				
15+30	4.5288	4.53	Q				
15+35	4.4234	4.42	Q				
15+40	4.8020	4.80	Q				
15+45	5.3093	5.31	Q				
15+50	6.1307	6.13	Q				
15+55	7.2803	7.28	Q				
16+ 0	9.6785	9.68	Q				
16+ 5	18.9719	18.97		Q			
16+10	42.3312	42.33					Q
16+15	26.8264	26.83			Q		
16+20	9.6803	9.68	Q				
16+25	6.0225	6.02	Q				
16+30	5.1448	5.14	Q				
16+35	4.9589	4.96	Q				
16+40	4.5937	4.59	Q				
16+45	4.2785	4.28	Q				
16+50	4.0133	4.01	Q				
16+55	3.7947	3.79	Q				
17+ 0	3.6101	3.61	Q				
17+ 5	3.4507	3.45	Q				
17+10	3.3090	3.31	Q				
17+15	3.1849	3.18	Q				
17+20	3.0758	3.08	Q				
17+25	2.9779	2.98	Q				
17+30	2.8893	2.89	Q				
17+35	2.8086	2.81	Q				
17+40	2.7346	2.73	Q				
17+45	2.6665	2.67	Q				
17+50	2.6035	2.60	Q				
17+55	2.5450	2.54	Q				
18+ 0	2.4904	2.49	Q				
18+ 5	2.3690	2.37	Q				
18+10	1.9948	1.99	Q				
18+15	1.7639	1.76	Q				
18+20	1.6931	1.69	Q				
18+25	1.6478	1.65	Q				
18+30	1.6119	1.61	Q				
18+35	1.5780	1.58	Q				
18+40	1.5459	1.55	Q				
18+45	1.5155	1.52	Q				
18+50	1.4867	1.49	Q				
18+55	1.4592	1.46	Q				
19+ 0	1.4331	1.43	Q				
19+ 5	1.4082	1.41	Q				
19+10	1.3844	1.38	Q				
19+15	1.3616	1.36	Q				
19+20	1.3399	1.34	Q				
19+25	1.3190	1.32	Q				
19+30	1.2989	1.30	Q				
19+35	1.2797	1.28	Q				
19+40	1.2612	1.26	Q				
19+45	1.2434	1.24	Q				

19+50	1.2262	1.23	|Q	|	|	|	|
19+55	1.2097	1.21	|Q	|	|	|	|
20+ 0	1.1937	1.19	|Q	|	|	|	|
20+ 5	1.1783	1.18	|Q	|	|	|	|
20+10	1.1634	1.16	|Q	|	|	|	|
20+15	1.1490	1.15	|Q	|	|	|	|
20+20	1.1351	1.14	|Q	|	|	|	|
20+25	1.1216	1.12	|Q	|	|	|	|
20+30	1.1085	1.11	|Q	|	|	|	|
20+35	1.0959	1.10	|Q	|	|	|	|
20+40	1.0836	1.08	|Q	|	|	|	|
20+45	1.0716	1.07	|Q	|	|	|	|
20+50	1.0600	1.06	|Q	|	|	|	|
20+55	1.0488	1.05	Q	|	|	|	|
21+ 0	1.0378	1.04	Q	|	|	|	|
21+ 5	1.0272	1.03	Q	|	|	|	|
21+10	1.0168	1.02	Q	|	|	|	|
21+15	1.0067	1.01	Q	|	|	|	|
21+20	0.9969	1.00	Q	|	|	|	|
21+25	0.9873	0.99	Q	|	|	|	|
21+30	0.9779	0.98	Q	|	|	|	|
21+35	0.9688	0.97	Q	|	|	|	|
21+40	0.9599	0.96	Q	|	|	|	|
21+45	0.9513	0.95	Q	|	|	|	|
21+50	0.9428	0.94	Q	|	|	|	|
21+55	0.9345	0.93	Q	|	|	|	|
22+ 0	0.9265	0.93	Q	|	|	|	|
22+ 5	0.9186	0.92	Q	|	|	|	|
22+10	0.9109	0.91	Q	|	|	|	|
22+15	0.9033	0.90	Q	|	|	|	|
22+20	0.8959	0.90	Q	|	|	|	|
22+25	0.8887	0.89	Q	|	|	|	|
22+30	0.8816	0.88	Q	|	|	|	|
22+35	0.8747	0.87	Q	|	|	|	|
22+40	0.8679	0.87	Q	|	|	|	|
22+45	0.8613	0.86	Q	|	|	|	|
22+50	0.8548	0.85	Q	|	|	|	|
22+55	0.8484	0.85	Q	|	|	|	|
23+ 0	0.8421	0.84	Q	|	|	|	|
23+ 5	0.8360	0.84	Q	|	|	|	|
23+10	0.8300	0.83	Q	|	|	|	|
23+15	0.8241	0.82	Q	|	|	|	|
23+20	0.8183	0.82	Q	|	|	|	|
23+25	0.8126	0.81	Q	|	|	|	|
23+30	0.8070	0.81	Q	|	|	|	|
23+35	0.8015	0.80	Q	|	|	|	|
23+40	0.7962	0.80	Q	|	|	|	|
23+45	0.7909	0.79	Q	|	|	|	|
23+50	0.7857	0.79	Q	|	|	|	|
23+55	0.7806	0.78	Q	|	|	|	|
24+ 0	0.7756	0.78	Q	|	|	|	|
24+ 5	0.6840	0.68	Q	|	|	|	|
24+10	0.2780	0.28	Q	|	|	|	|
24+15	0.0461	0.05	Q	|	|	|	|
24+20	0.0089	0.01	Q	|	|	|	|

**********HYDROGRAPH DATA**********

Number of intervals = 292
Time interval = 5.0 (Min.)
Maximum/Peak flow rate = 42.331 (CFS)

```
            Total volume =       3.980 (Ac.Ft)
      Status of hydrographs being held in storage
                 Stream 1  Stream 2  Stream 3  Stream 4  Stream 5
      Peak (CFS)     15.842     0.000     0.000     0.000     0.000
      Vol (Ac.Ft)     6.470     0.000     0.000     0.000     0.000
****************************************************************************

----------------------------------------------------------------------


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        4.000 to Point/Station        3.000
**** RETARDING BASIN ROUTING ****
______________________________________________________________________________

User entry of depth-outflow-storage data
----------------------------------------------------------------------
Total number of inflow hydrograph intervals = 292
Hydrograph time unit =  5.000 (Min.)
Initial depth in storage basin =   0.00(Ft.)
----------------------------------------------------------------------
----------------------------------------------------------------------
Initial basin depth =   0.00 (Ft.)
Initial basin storage =      0.00 (Ac.Ft)
Initial basin outflow =   0.00 (CFS)
----------------------------------------------------------------------
----------------------------------------------------------------------
Depth vs. Storage and Depth vs. Discharge data:
 Basin Depth  Storage    Outflow   (S-O*dt/2)   (S+O*dt/2)
     (Ft.)    (Ac.Ft)    (CFS)     (Ac.Ft)    (Ac.Ft)
----------------------------------------------------------------------
    0.000      0.000      0.000      0.000        0.000
    1.000      0.440      0.960      0.437        0.443
    2.000      1.350      2.330      1.342        1.358
    3.000      2.320      4.010      2.306        2.334
    4.000      3.360      5.960      3.339        3.381
    5.000      4.480      7.180      4.455        4.505
    6.000      5.670      8.200      5.642        5.698
    7.000      6.930      9.100      6.899        6.961
    8.000      8.270      9.920      8.236        8.304
    9.000      9.690     38.930      9.556        9.824
----------------------------------------------------------------------
            Hydrograph Detention Basin Routing
----------------------------------------------------------------------

    Graph values: 'I'= unit inflow; 'O'=outflow at time shown
    ----------------------------------------------------------------------
 Time   Inflow  Outflow    Storage                                        Depth
(Hours)  (CFS)    (CFS)     (Ac.Ft) .0      10.6   21.17   31.75   42.33 (Ft.)
 0.083    0.09    0.00      0.000  O       |       |       |       |     0.00
 0.167    0.49    0.00      0.002  O       |       |       |       |     0.01
 0.250    0.72    0.01      0.006  O       |       |       |       |     0.01
 0.333    0.76    0.02      0.011  O       |       |       |       |     0.03
 0.417    0.77    0.04      0.016  O       |       |       |       |     0.04
 0.500    0.77    0.05      0.021  O       |       |       |       |     0.05
 0.583    0.78    0.06      0.026  O       |       |       |       |     0.06
 0.667    0.78    0.07      0.031  O       |       |       |       |     0.07
 0.750    0.78    0.08      0.036  O       |       |       |       |     0.08
 0.833    0.78    0.09      0.041  O       |       |       |       |     0.09
 0.917    0.79    0.10      0.046  O       |       |       |       |     0.10
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1.000	0.79	0.11	0.051	O					0.11
1.083	0.79	0.12	0.055	O					0.13
1.167	0.79	0.13	0.060	O					0.14
1.250	0.80	0.14	0.064	O					0.15
1.333	0.80	0.15	0.069	O					0.16
1.417	0.80	0.16	0.073	O					0.17
1.500	0.81	0.17	0.078	O					0.18
1.583	0.81	0.18	0.082	O					0.19
1.667	0.81	0.19	0.086	O					0.20
1.750	0.81	0.20	0.091	O					0.21
1.833	0.82	0.21	0.095	O					0.22
1.917	0.82	0.22	0.099	O					0.23
2.000	0.82	0.23	0.103	O					0.23
2.083	0.83	0.23	0.107	O					0.24
2.167	0.83	0.24	0.111	O					0.25
2.250	0.83	0.25	0.115	O					0.26
2.333	0.83	0.26	0.119	O					0.27
2.417	0.84	0.27	0.123	O					0.28
2.500	0.84	0.28	0.127	O					0.29
2.583	0.84	0.29	0.131	O					0.30
2.667	0.85	0.29	0.135	O					0.31
2.750	0.85	0.30	0.139	O					0.32
2.833	0.85	0.31	0.142	O					0.32
2.917	0.86	0.32	0.146	O					0.33
3.000	0.86	0.33	0.150	O					0.34
3.083	0.86	0.33	0.153	O					0.35
3.167	0.87	0.34	0.157	O					0.36
3.250	0.87	0.35	0.161	O					0.37
3.333	0.87	0.36	0.164	O					0.37
3.417	0.88	0.37	0.168	O					0.38
3.500	0.88	0.37	0.171	O					0.39
3.583	0.88	0.38	0.175	O					0.40
3.667	0.89	0.39	0.178	O					0.40
3.750	0.89	0.40	0.182	O					0.41
3.833	0.89	0.40	0.185	O					0.42
3.917	0.90	0.41	0.188	O					0.43
4.000	0.90	0.42	0.192	O					0.44
4.083	0.91	0.43	0.195	O					0.44
4.167	0.91	0.43	0.198	O					0.45
4.250	0.91	0.44	0.202	O					0.46
4.333	0.92	0.45	0.205	O					0.47
4.417	0.92	0.45	0.208	O					0.47
4.500	0.92	0.46	0.211	O					0.48
4.583	0.93	0.47	0.214	O					0.49
4.667	0.93	0.47	0.218	O					0.49
4.750	0.94	0.48	0.221	O					0.50
4.833	0.94	0.49	0.224	O					0.51
4.917	0.94	0.50	0.227	O					0.52
5.000	0.95	0.50	0.230	O					0.52
5.083	0.95	0.51	0.233	O					0.53
5.167	0.96	0.52	0.236	O					0.54
5.250	0.96	0.52	0.239	O					0.54
5.333	0.97	0.53	0.242	O					0.55
5.417	0.97	0.54	0.245	O					0.56
5.500	0.98	0.54	0.248	O					0.56
5.583	0.98	0.55	0.251	O					0.57
5.667	0.99	0.55	0.254	O					0.58
5.750	0.99	0.56	0.257	O					0.58
5.833	0.99	0.57	0.260	O					0.59
5.917	1.00	0.57	0.263	O					0.60

6.000	1.00	0.58	0.266	O					0.60
6.083	1.01	0.59	0.269	O					0.61
6.167	1.01	0.59	0.272	O					0.62
6.250	1.02	0.60	0.275	O					0.62
6.333	1.02	0.61	0.278	O					0.63
6.417	1.03	0.61	0.280	O					0.64
6.500	1.04	0.62	0.283	O					0.64
6.583	1.04	0.62	0.286	O					0.65
6.667	1.05	0.63	0.289	O					0.66
6.750	1.05	0.64	0.292	O					0.66
6.833	1.06	0.64	0.295	O					0.67
6.917	1.06	0.65	0.298	O					0.68
7.000	1.07	0.66	0.300	O					0.68
7.083	1.07	0.66	0.303	O					0.69
7.167	1.08	0.67	0.306	O					0.70
7.250	1.09	0.67	0.309	O					0.70
7.333	1.09	0.68	0.312	O					0.71
7.417	1.10	0.69	0.315	O					0.72
7.500	1.11	0.69	0.318	O					0.72
7.583	1.11	0.70	0.320	O					0.73
7.667	1.12	0.71	0.323	O					0.73
7.750	1.12	0.71	0.326	O					0.74
7.833	1.13	0.72	0.329	O					0.75
7.917	1.14	0.72	0.332	O					0.75
8.000	1.15	0.73	0.335	O					0.76
8.083	1.15	0.74	0.337	O					0.77
8.167	1.16	0.74	0.340	O					0.77
8.250	1.17	0.75	0.343	O					0.78
8.333	1.17	0.76	0.346	O					0.79
8.417	1.18	0.76	0.349	O					0.79
8.500	1.19	0.77	0.352	O					0.80
8.583	1.20	0.77	0.355	O					0.81
8.667	1.21	0.78	0.358	O					0.81
8.750	1.21	0.79	0.361	O					0.82
8.833	1.22	0.79	0.364	O					0.83
8.917	1.23	0.80	0.367	O					0.83
9.000	1.24	0.81	0.370	O					0.84
9.083	1.25	0.81	0.373	O					0.85
9.167	1.26	0.82	0.376	O					0.85
9.250	1.27	0.83	0.379	O					0.86
9.333	1.28	0.83	0.382	O					0.87
9.417	1.28	0.84	0.385	O					0.87
9.500	1.29	0.85	0.388	O					0.88
9.583	1.30	0.85	0.391	O					0.89
9.667	1.31	0.86	0.394	O					0.90
9.750	1.32	0.87	0.397	OI					0.90
9.833	1.34	0.87	0.400	OI					0.91
9.917	1.35	0.88	0.403	OI					0.92
10.000	1.36	0.89	0.407	OI					0.92
10.083	1.37	0.89	0.410	OI					0.93
10.167	1.38	0.90	0.413	OI					0.94
10.250	1.39	0.91	0.417	OI					0.95
10.333	1.40	0.92	0.420	OI					0.95
10.417	1.41	0.92	0.423	OI					0.96
10.500	1.43	0.93	0.427	OI					0.97
10.583	1.44	0.94	0.430	OI					0.98
10.667	1.45	0.95	0.434	OI					0.99
10.750	1.47	0.95	0.437	OI					0.99
10.833	1.48	0.96	0.441	OI					1.00
10.917	1.49	0.97	0.444	OI					1.00

11.000	1.51	0.97	0.448	OI					1.01
11.083	1.52	0.98	0.452	OI					1.01
11.167	1.54	0.98	0.455	OI					1.02
11.250	1.55	0.99	0.459	OI					1.02
11.333	1.57	0.99	0.463	OI					1.03
11.417	1.59	1.00	0.467	OI					1.03
11.500	1.60	1.01	0.471	OI					1.03
11.583	1.62	1.01	0.475	OI					1.04
11.667	1.64	1.02	0.480	OI					1.04
11.750	1.66	1.03	0.484	OI					1.05
11.833	1.68	1.03	0.488	OI					1.05
11.917	1.70	1.04	0.493	OI					1.06
12.000	1.72	1.05	0.497	OI					1.06
12.083	1.81	1.05	0.502	OI					1.07
12.167	2.16	1.06	0.509	OI					1.08
12.250	2.37	1.08	0.517	OI					1.08
12.333	2.42	1.09	0.526	OI					1.09
12.417	2.45	1.10	0.535	OI					1.10
12.500	2.48	1.12	0.544	OI					1.11
12.583	2.50	1.13	0.554	OI					1.13
12.667	2.53	1.15	0.563	OI					1.14
12.750	2.56	1.16	0.573	OI					1.15
12.833	2.59	1.17	0.583	OI					1.16
12.917	2.62	1.19	0.592	OI					1.17
13.000	2.65	1.20	0.602	O I					1.18
13.083	2.68	1.22	0.612	O I					1.19
13.167	2.72	1.23	0.622	O I					1.20
13.250	2.75	1.25	0.633	O I					1.21
13.333	2.79	1.27	0.643	O I					1.22
13.417	2.83	1.28	0.654	O I					1.23
13.500	2.87	1.30	0.664	O I					1.25
13.583	2.91	1.31	0.675	O I					1.26
13.667	2.96	1.33	0.686	|OI					1.27
13.750	3.00	1.35	0.698	|OI					1.28
13.833	3.05	1.37	0.709	|OI					1.30
13.917	3.10	1.38	0.721	|OI					1.31
14.000	3.16	1.40	0.733	|OI					1.32
14.083	3.21	1.42	0.745	|OI					1.34
14.167	3.28	1.44	0.758	|OI					1.35
14.250	3.34	1.46	0.770	|OI					1.36
14.333	3.42	1.48	0.784	|OI					1.38
14.417	3.49	1.50	0.797	|OI					1.39
14.500	3.57	1.52	0.811	|OI					1.41
14.583	3.65	1.54	0.825	|OI					1.42
14.667	3.74	1.56	0.840	|OI					1.44
14.750	3.84	1.59	0.855	|OI					1.46
14.833	3.95	1.61	0.871	|OI					1.47
14.917	4.06	1.63	0.888	|O I					1.49
15.000	4.20	1.66	0.905	|O I					1.51
15.083	4.34	1.69	0.923	|O I					1.53
15.167	4.51	1.71	0.941	|O I					1.55
15.250	4.68	1.74	0.961	|O I					1.57
15.333	4.90	1.78	0.982	|O I					1.60
15.417	4.97	1.81	1.004	|O I					1.62
15.500	4.53	1.84	1.024	|O I					1.64
15.583	4.42	1.87	1.042	|O I					1.66
15.667	4.80	1.89	1.061	|O I					1.68
15.750	5.31	1.93	1.082	|O I					1.71
15.833	6.13	1.97	1.108	|O I					1.73
15.917	7.28	2.02	1.141	|O I					1.77

16.000	9.68	2.08	1.185	|O I|					1.82
16.083	18.97	2.21	1.269	|O |	I				1.91
16.167	42.33	2.53	1.464	|O |				I|	2.12
16.250	26.83	2.91	1.683	| O |		I			2.34
16.333	9.68	3.09	1.788	| O I|					2.45
16.417	6.02	3.15	1.821	| O I |					2.49
16.500	5.14	3.17	1.838	| OI |					2.50
16.583	4.96	3.20	1.851	| OI |					2.52
16.667	4.59	3.22	1.861	| OI |					2.53
16.750	4.28	3.23	1.870	| OI |					2.54
16.833	4.01	3.24	1.876	| OI |					2.54
16.917	3.79	3.25	1.881	| O |					2.55
17.000	3.61	3.25	1.884	| O |					2.55
17.083	3.45	3.26	1.886	| O |					2.55
17.167	3.31	3.26	1.886	| O |					2.55
17.250	3.18	3.26	1.886	| O |					2.55
17.333	3.08	3.26	1.885	| O |					2.55
17.417	2.98	3.25	1.884	| O |					2.55
17.500	2.89	3.25	1.882	| O |					2.55
17.583	2.81	3.25	1.879	| O |					2.55
17.667	2.73	3.24	1.876	| O |					2.54
17.750	2.67	3.23	1.872	| O |					2.54
17.833	2.60	3.23	1.868	|IO |					2.53
17.917	2.54	3.22	1.863	|IO |					2.53
18.000	2.49	3.21	1.859	|IO |					2.52
18.083	2.37	3.20	1.853	|IO |					2.52
18.167	1.99	3.19	1.846	|IO |					2.51
18.250	1.76	3.17	1.837	|IO |					2.50
18.333	1.69	3.16	1.827	|IO |					2.49
18.417	1.65	3.14	1.817	|IO |					2.48
18.500	1.61	3.12	1.807	|IO |					2.47
18.583	1.58	3.10	1.796	|IO |					2.46
18.667	1.55	3.08	1.786	|IO |					2.45
18.750	1.52	3.07	1.775	|IO |					2.44
18.833	1.49	3.05	1.764	|IO |					2.43
18.917	1.46	3.03	1.754	|IO |					2.42
19.000	1.43	3.01	1.743	|IO |					2.41
19.083	1.41	2.99	1.732	|IO |					2.39
19.167	1.38	2.97	1.721	|IO |					2.38
19.250	1.36	2.95	1.710	|IO |					2.37
19.333	1.34	2.93	1.699	|IO |					2.36
19.417	1.32	2.92	1.688	I O |					2.35
19.500	1.30	2.90	1.677	I O |					2.34
19.583	1.28	2.88	1.666	I O |					2.33
19.667	1.26	2.86	1.655	I O |					2.31
19.750	1.24	2.84	1.644	I O |					2.30
19.833	1.23	2.82	1.633	I O |					2.29
19.917	1.21	2.80	1.622	I O |					2.28
20.000	1.19	2.78	1.611	I O |					2.27
20.083	1.18	2.76	1.600	I O |					2.26
20.167	1.16	2.74	1.589	I O |					2.25
20.250	1.15	2.73	1.579	I O |					2.24
20.333	1.14	2.71	1.568	I O |					2.22
20.417	1.12	2.69	1.557	I O |					2.21
20.500	1.11	2.67	1.546	I O |					2.20
20.583	1.10	2.65	1.535	I O |					2.19
20.667	1.08	2.63	1.525	IO |					2.18
20.750	1.07	2.61	1.514	IO |					2.17
20.833	1.06	2.60	1.503	IO |					2.16
20.917	1.05	2.58	1.493	IO |					2.15

21.000	1.04	2.56	1.482	IO					2.14
21.083	1.03	2.54	1.472	IO					2.13
21.167	1.02	2.52	1.462	IO					2.11
21.250	1.01	2.51	1.451	IO					2.10
21.333	1.00	2.49	1.441	IO					2.09
21.417	0.99	2.47	1.431	IO					2.08
21.500	0.98	2.45	1.420	IO					2.07
21.583	0.97	2.43	1.410	IO					2.06
21.667	0.96	2.42	1.400	IO					2.05
21.750	0.95	2.40	1.390	IO					2.04
21.833	0.94	2.38	1.380	IO					2.03
21.917	0.93	2.37	1.370	IO					2.02
22.000	0.93	2.35	1.361	IO					2.01
22.083	0.92	2.33	1.351	IO					2.00
22.167	0.91	2.32	1.341	IO					1.99
22.250	0.90	2.30	1.331	IO					1.98
22.333	0.90	2.29	1.322	IO					1.97
22.417	0.89	2.27	1.312	IO					1.96
22.500	0.88	2.26	1.303	IO					1.95
22.583	0.87	2.24	1.293	IO					1.94
22.667	0.87	2.23	1.284	IO					1.93
22.750	0.86	2.22	1.275	IO					1.92
22.833	0.85	2.20	1.265	IO					1.91
22.917	0.85	2.19	1.256	IO					1.90
23.000	0.84	2.17	1.247	IO					1.89
23.083	0.84	2.16	1.238	IO					1.88
23.167	0.83	2.15	1.229	IO					1.87
23.250	0.82	2.13	1.220	IO					1.86
23.333	0.82	2.12	1.211	IO					1.85
23.417	0.81	2.11	1.202	IO					1.84
23.500	0.81	2.09	1.193	IO					1.83
23.583	0.80	2.08	1.184	IO					1.82
23.667	0.80	2.07	1.175	IO					1.81
23.750	0.79	2.05	1.166	IO					1.80
23.833	0.79	2.04	1.158	IO					1.79
23.917	0.78	2.03	1.149	IO					1.78
24.000	0.78	2.01	1.141	IO					1.77
24.083	0.68	2.00	1.132	IO					1.76
24.167	0.28	1.99	1.121	IO					1.75
24.250	0.05	1.97	1.109	IO					1.73
24.333	0.01	1.95	1.096	IO					1.72
24.417	0.00	1.93	1.082	IO					1.71
24.500	0.00	1.91	1.069	IO					1.69
24.583	0.00	1.89	1.056	IO					1.68
24.667	0.00	1.87	1.043	IO					1.66
24.750	0.00	1.85	1.030	IO					1.65
24.833	0.00	1.83	1.018	IO					1.63
24.917	0.00	1.81	1.005	IO					1.62
25.000	0.00	1.79	0.993	IO					1.61
25.083	0.00	1.77	0.980	IO					1.59
25.167	0.00	1.76	0.968	IO					1.58
25.250	0.00	1.74	0.956	IO					1.57
25.333	0.00	1.72	0.944	IO					1.55
25.417	0.00	1.70	0.932	IO					1.54
25.500	0.00	1.68	0.921	IO					1.53
25.583	0.00	1.67	0.909	IO					1.52
25.667	0.00	1.65	0.898	IO					1.50
25.750	0.00	1.63	0.887	IO					1.49
25.833	0.00	1.62	0.875	IO					1.48
25.917	0.00	1.60	0.864	IO					1.47

26.000	0.00	1.58	0.853	IO					1.45
26.083	0.00	1.57	0.843	IO					1.44
26.167	0.00	1.55	0.832	IO					1.43
26.250	0.00	1.53	0.821	IO					1.42
26.333	0.00	1.52	0.811	IO					1.41
26.417	0.00	1.50	0.800	IO					1.40
26.500	0.00	1.49	0.790	IO					1.38
26.583	0.00	1.47	0.780	IO					1.37
26.667	0.00	1.46	0.770	IO					1.36
26.750	0.00	1.44	0.760	IO					1.35
26.833	0.00	1.43	0.750	IO					1.34
26.917	0.00	1.41	0.740	IO					1.33
27.000	0.00	1.40	0.730	IO					1.32
27.083	0.00	1.38	0.721	IO					1.31
27.167	0.00	1.37	0.711	IO					1.30
27.250	0.00	1.35	0.702	IO					1.29
27.333	0.00	1.34	0.693	IO					1.28
27.417	0.00	1.33	0.684	IO					1.27
27.500	0.00	1.31	0.674	O					1.26
27.583	0.00	1.30	0.665	O					1.25
27.667	0.00	1.29	0.657	O					1.24
27.750	0.00	1.27	0.648	O					1.23
27.833	0.00	1.26	0.639	O					1.22
27.917	0.00	1.25	0.630	O					1.21
28.000	0.00	1.23	0.622	O					1.20
28.083	0.00	1.22	0.613	O					1.19
28.167	0.00	1.21	0.605	O					1.18
28.250	0.00	1.20	0.597	O					1.17
28.333	0.00	1.18	0.589	O					1.16
28.417	0.00	1.17	0.580	O					1.15
28.500	0.00	1.16	0.572	O					1.15
28.583	0.00	1.15	0.564	O					1.14
28.667	0.00	1.14	0.557	O					1.13
28.750	0.00	1.12	0.549	O					1.12
28.833	0.00	1.11	0.541	O					1.11
28.917	0.00	1.10	0.533	O					1.10
29.000	0.00	1.09	0.526	O					1.09
29.083	0.00	1.08	0.518	O					1.09
29.167	0.00	1.07	0.511	O					1.08
29.250	0.00	1.06	0.504	O					1.07
29.333	0.00	1.05	0.497	O					1.06
29.417	0.00	1.03	0.489	O					1.05
29.500	0.00	1.02	0.482	O					1.05
29.583	0.00	1.01	0.475	O					1.04
29.667	0.00	1.00	0.468	O					1.03
29.750	0.00	0.99	0.461	O					1.02
29.833	0.00	0.98	0.455	O					1.02
29.917	0.00	0.97	0.448	O					1.01
30.000	0.00	0.96	0.441	O					1.00
30.083	0.00	0.95	0.435	O					0.99
30.167	0.00	0.93	0.428	O					0.97
30.250	0.00	0.92	0.422	O					0.96
30.333	0.00	0.91	0.416	O					0.94
30.417	0.00	0.89	0.409	O					0.93
30.500	0.00	0.88	0.403	O					0.92
30.583	0.00	0.87	0.397	O					0.90
30.667	0.00	0.85	0.391	O					0.89
30.750	0.00	0.84	0.385	O					0.88
30.833	0.00	0.83	0.380	O					0.86
30.917	0.00	0.82	0.374	O					0.85

31.000	0.00	0.80	0.368	O					0.84
31.083	0.00	0.79	0.363	O					0.82
31.167	0.00	0.78	0.358	O					0.81
31.250	0.00	0.77	0.352	O					0.80
31.333	0.00	0.76	0.347	O					0.79
31.417	0.00	0.75	0.342	O					0.78
31.500	0.00	0.73	0.337	O					0.77
31.583	0.00	0.72	0.332	O					0.75
31.667	0.00	0.71	0.327	O					0.74
31.750	0.00	0.70	0.322	O					0.73
31.833	0.00	0.69	0.317	O					0.72
31.917	0.00	0.68	0.312	O					0.71
32.000	0.00	0.67	0.308	O					0.70
32.083	0.00	0.66	0.303	O					0.69
32.167	0.00	0.65	0.299	O					0.68
32.250	0.00	0.64	0.294	O					0.67
32.333	0.00	0.63	0.290	O					0.66
32.417	0.00	0.62	0.285	O					0.65
32.500	0.00	0.61	0.281	O					0.64
32.583	0.00	0.60	0.277	O					0.63
32.667	0.00	0.60	0.273	O					0.62
32.750	0.00	0.59	0.269	O					0.61
32.833	0.00	0.58	0.265	O					0.60
32.917	0.00	0.57	0.261	O					0.59
33.000	0.00	0.56	0.257	O					0.58
33.083	0.00	0.55	0.253	O					0.58
33.167	0.00	0.54	0.249	O					0.57
33.250	0.00	0.54	0.246	O					0.56
33.333	0.00	0.53	0.242	O					0.55
33.417	0.00	0.52	0.238	O					0.54
33.500	0.00	0.51	0.235	O					0.53
33.583	0.00	0.50	0.231	O					0.53
33.667	0.00	0.50	0.228	O					0.52
33.750	0.00	0.49	0.224	O					0.51
33.833	0.00	0.48	0.221	O					0.50
33.917	0.00	0.48	0.218	O					0.49
34.000	0.00	0.47	0.215	O					0.49
34.083	0.00	0.46	0.211	O					0.48
34.167	0.00	0.45	0.208	O					0.47
34.250	0.00	0.45	0.205	O					0.47
34.333	0.00	0.44	0.202	O					0.46
34.417	0.00	0.43	0.199	O					0.45
34.500	0.00	0.43	0.196	O					0.45
34.583	0.00	0.42	0.193	O					0.44
34.667	0.00	0.42	0.190	O					0.43
34.750	0.00	0.41	0.187	O					0.43
34.833	0.00	0.40	0.185	O					0.42
34.917	0.00	0.40	0.182	O					0.41
35.000	0.00	0.39	0.179	O					0.41
35.083	0.00	0.39	0.176	O					0.40
35.167	0.00	0.38	0.174	O					0.40
35.250	0.00	0.37	0.171	O					0.39
35.333	0.00	0.37	0.169	O					0.38
35.417	0.00	0.36	0.166	O					0.38
35.500	0.00	0.36	0.164	O					0.37
35.583	0.00	0.35	0.161	O					0.37
35.667	0.00	0.35	0.159	O					0.36
35.750	0.00	0.34	0.156	O					0.36
35.833	0.00	0.34	0.154	O					0.35
35.917	0.00	0.33	0.152	O					0.35

36.000	0.00	0.33	0.150	O	|	|	|	|	0.34
36.083	0.00	0.32	0.147	O	|	|	|	|	0.33
36.167	0.00	0.32	0.145	O	|	|	|	|	0.33
36.250	0.00	0.31	0.143	O	|	|	|	|	0.32
36.333	0.00	0.31	0.141	O	|	|	|	|	0.32
36.417	0.00	0.30	0.139	O	|	|	|	|	0.32
36.500	0.00	0.30	0.137	O	|	|	|	|	0.31
36.583	0.00	0.29	0.135	O	|	|	|	|	0.31
36.667	0.00	0.29	0.133	O	|	|	|	|	0.30
36.750	0.00	0.29	0.131	O	|	|	|	|	0.30
36.833	0.00	0.28	0.129	O	|	|	|	|	0.29
36.917	0.00	0.28	0.127	O	|	|	|	|	0.29
37.000	0.00	0.27	0.125	O	|	|	|	|	0.28
37.083	0.00	0.27	0.123	O	|	|	|	|	0.28
37.167	0.00	0.26	0.121	O	|	|	|	|	0.28
37.250	0.00	0.26	0.119	O	|	|	|	|	0.27
37.333	0.00	0.26	0.118	O	|	|	|	|	0.27
37.417	0.00	0.25	0.116	O	|	|	|	|	0.26
37.500	0.00	0.25	0.114	O	|	|	|	|	0.26
37.583	0.00	0.25	0.112	O	|	|	|	|	0.26
37.667	0.00	0.24	0.111	O	|	|	|	|	0.25
37.750	0.00	0.24	0.109	O	|	|	|	|	0.25
37.833	0.00	0.23	0.107	O	|	|	|	|	0.24
37.917	0.00	0.23	0.106	O	|	|	|	|	0.24
38.000	0.00	0.23	0.104	O	|	|	|	|	0.24
38.083	0.00	0.22	0.103	O	|	|	|	|	0.23
38.167	0.00	0.22	0.101	O	|	|	|	|	0.23
38.250	0.00	0.22	0.100	O	|	|	|	|	0.23
38.333	0.00	0.21	0.098	O	|	|	|	|	0.22
38.417	0.00	0.21	0.097	O	|	|	|	|	0.22
38.500	0.00	0.21	0.095	O	|	|	|	|	0.22
38.583	0.00	0.20	0.094	O	|	|	|	|	0.21
38.667	0.00	0.20	0.092	O	|	|	|	|	0.21
38.750	0.00	0.20	0.091	O	|	|	|	|	0.21
38.833	0.00	0.20	0.090	O	|	|	|	|	0.20
38.917	0.00	0.19	0.088	O	|	|	|	|	0.20
39.000	0.00	0.19	0.087	O	|	|	|	|	0.20
39.083	0.00	0.19	0.086	O	|	|	|	|	0.19
39.167	0.00	0.18	0.085	O	|	|	|	|	0.19
39.250	0.00	0.18	0.083	O	|	|	|	|	0.19
39.333	0.00	0.18	0.082	O	|	|	|	|	0.19
39.417	0.00	0.18	0.081	O	|	|	|	|	0.18
39.500	0.00	0.17	0.080	O	|	|	|	|	0.18
39.583	0.00	0.17	0.078	O	|	|	|	|	0.18
39.667	0.00	0.17	0.077	O	|	|	|	|	0.18
39.750	0.00	0.17	0.076	O	|	|	|	|	0.17
39.833	0.00	0.16	0.075	O	|	|	|	|	0.17
39.917	0.00	0.16	0.074	O	|	|	|	|	0.17
40.000	0.00	0.16	0.073	O	|	|	|	|	0.17
40.083	0.00	0.16	0.072	O	|	|	|	|	0.16
40.167	0.00	0.15	0.071	O	|	|	|	|	0.16
40.250	0.00	0.15	0.070	O	|	|	|	|	0.16
40.333	0.00	0.15	0.068	O	|	|	|	|	0.16
40.417	0.00	0.15	0.067	O	|	|	|	|	0.15
40.500	0.00	0.14	0.066	O	|	|	|	|	0.15
40.583	0.00	0.14	0.065	O	|	|	|	|	0.15
40.667	0.00	0.14	0.064	O	|	|	|	|	0.15
40.750	0.00	0.14	0.064	O	|	|	|	|	0.14
40.833	0.00	0.14	0.063	O	|	|	|	|	0.14
40.917	0.00	0.13	0.062	O	|	|	|	|	0.14

41.000	0.00	0.13	0.061	O					0.14
41.083	0.00	0.13	0.060	O					0.14
41.167	0.00	0.13	0.059	O					0.13
41.250	0.00	0.13	0.058	O					0.13
41.333	0.00	0.12	0.057	O					0.13
41.417	0.00	0.12	0.056	O					0.13
41.500	0.00	0.12	0.055	O					0.13
41.583	0.00	0.12	0.055	O					0.12
41.667	0.00	0.12	0.054	O					0.12
41.750	0.00	0.12	0.053	O					0.12
41.833	0.00	0.11	0.052	O					0.12
41.917	0.00	0.11	0.051	O					0.12
42.000	0.00	0.11	0.051	O					0.12
42.083	0.00	0.11	0.050	O					0.11
42.167	0.00	0.11	0.049	O					0.11
42.250	0.00	0.11	0.048	O					0.11
42.333	0.00	0.10	0.048	O					0.11
42.417	0.00	0.10	0.047	O					0.11
42.500	0.00	0.10	0.046	O					0.11
42.583	0.00	0.10	0.046	O					0.10
42.667	0.00	0.10	0.045	O					0.10
42.750	0.00	0.10	0.044	O					0.10
42.833	0.00	0.10	0.044	O					0.10
42.917	0.00	0.09	0.043	O					0.10
43.000	0.00	0.09	0.042	O					0.10
43.083	0.00	0.09	0.042	O					0.09
43.167	0.00	0.09	0.041	O					0.09
43.250	0.00	0.09	0.040	O					0.09
43.333	0.00	0.09	0.040	O					0.09
43.417	0.00	0.09	0.039	O					0.09
43.500	0.00	0.08	0.039	O					0.09
43.583	0.00	0.08	0.038	O					0.09
43.667	0.00	0.08	0.038	O					0.09
43.750	0.00	0.08	0.037	O					0.08
43.833	0.00	0.08	0.036	O					0.08
43.917	0.00	0.08	0.036	O					0.08
44.000	0.00	0.08	0.035	O					0.08
44.083	0.00	0.08	0.035	O					0.08
44.167	0.00	0.07	0.034	O					0.08
44.250	0.00	0.07	0.034	O					0.08
44.333	0.00	0.07	0.033	O					0.08
44.417	0.00	0.07	0.033	O					0.07
44.500	0.00	0.07	0.032	O					0.07
44.583	0.00	0.07	0.032	O					0.07
44.667	0.00	0.07	0.031	O					0.07
44.750	0.00	0.07	0.031	O					0.07
44.833	0.00	0.07	0.030	O					0.07
44.917	0.00	0.07	0.030	O					0.07
45.000	0.00	0.06	0.030	O					0.07
45.083	0.00	0.06	0.029	O					0.07
45.167	0.00	0.06	0.029	O					0.07
45.250	0.00	0.06	0.028	O					0.06
45.333	0.00	0.06	0.028	O					0.06
45.417	0.00	0.06	0.027	O					0.06
45.500	0.00	0.06	0.027	O					0.06
45.583	0.00	0.06	0.027	O					0.06
45.667	0.00	0.06	0.026	O					0.06
45.750	0.00	0.06	0.026	O					0.06
45.833	0.00	0.06	0.025	O					0.06
45.917	0.00	0.05	0.025	O					0.06

46.000	0.00	0.05	0.025	O					0.06
46.083	0.00	0.05	0.024	O					0.06
46.167	0.00	0.05	0.024	O					0.05
46.250	0.00	0.05	0.024	O					0.05
46.333	0.00	0.05	0.023	O					0.05
46.417	0.00	0.05	0.023	O					0.05
46.500	0.00	0.05	0.023	O					0.05
46.583	0.00	0.05	0.022	O					0.05
46.667	0.00	0.05	0.022	O					0.05
46.750	0.00	0.05	0.022	O					0.05
46.833	0.00	0.05	0.021	O					0.05
46.917	0.00	0.05	0.021	O					0.05
47.000	0.00	0.04	0.021	O					0.05
47.083	0.00	0.04	0.020	O					0.05
47.167	0.00	0.04	0.020	O					0.05
47.250	0.00	0.04	0.020	O					0.04
47.333	0.00	0.04	0.019	O					0.04
47.417	0.00	0.04	0.019	O					0.04
47.500	0.00	0.04	0.019	O					0.04
47.583	0.00	0.04	0.019	O					0.04
47.667	0.00	0.04	0.018	O					0.04
47.750	0.00	0.04	0.018	O					0.04
47.833	0.00	0.04	0.018	O					0.04
47.917	0.00	0.04	0.017	O					0.04
48.000	0.00	0.04	0.017	O					0.04
48.083	0.00	0.04	0.017	O					0.04
48.167	0.00	0.04	0.017	O					0.04
48.250	0.00	0.04	0.016	O					0.04
48.333	0.00	0.04	0.016	O					0.04
48.417	0.00	0.03	0.016	O					0.04
48.500	0.00	0.03	0.016	O					0.04
48.583	0.00	0.03	0.015	O					0.04
48.667	0.00	0.03	0.015	O					0.03
48.750	0.00	0.03	0.015	O					0.03
48.833	0.00	0.03	0.015	O					0.03
48.917	0.00	0.03	0.015	O					0.03
49.000	0.00	0.03	0.014	O					0.03
49.083	0.00	0.03	0.014	O					0.03
49.167	0.00	0.03	0.014	O					0.03
49.250	0.00	0.03	0.014	O					0.03
49.333	0.00	0.03	0.014	O					0.03
49.417	0.00	0.03	0.013	O					0.03
49.500	0.00	0.03	0.013	O					0.03
49.583	0.00	0.03	0.013	O					0.03
49.667	0.00	0.03	0.013	O					0.03
49.750	0.00	0.03	0.013	O					0.03
49.833	0.00	0.03	0.012	O					0.03
49.917	0.00	0.03	0.012	O					0.03
50.000	0.00	0.03	0.012	O					0.03
50.083	0.00	0.03	0.012	O					0.03
50.167	0.00	0.03	0.012	O					0.03
50.250	0.00	0.02	0.011	O					0.03
50.333	0.00	0.02	0.011	O					0.03
50.417	0.00	0.02	0.011	O					0.03
50.500	0.00	0.02	0.011	O					0.02
50.583	0.00	0.02	0.011	O					0.02
50.667	0.00	0.02	0.011	O					0.02
50.750	0.00	0.02	0.010	O					0.02
50.833	0.00	0.02	0.010	O					0.02
50.917	0.00	0.02	0.010	O					0.02

51.000	0.00	0.02	0.010	O					0.02
51.083	0.00	0.02	0.010	O					0.02
51.167	0.00	0.02	0.010	O					0.02
51.250	0.00	0.02	0.010	O					0.02
51.333	0.00	0.02	0.009	O					0.02
51.417	0.00	0.02	0.009	O					0.02
51.500	0.00	0.02	0.009	O					0.02
51.583	0.00	0.02	0.009	O					0.02
51.667	0.00	0.02	0.009	O					0.02
51.750	0.00	0.02	0.009	O					0.02
51.833	0.00	0.02	0.009	O					0.02
51.917	0.00	0.02	0.008	O					0.02
52.000	0.00	0.02	0.008	O					0.02
52.083	0.00	0.02	0.008	O					0.02
52.167	0.00	0.02	0.008	O					0.02
52.250	0.00	0.02	0.008	O					0.02
52.333	0.00	0.02	0.008	O					0.02
52.417	0.00	0.02	0.008	O					0.02
52.500	0.00	0.02	0.008	O					0.02
52.583	0.00	0.02	0.008	O					0.02
52.667	0.00	0.02	0.007	O					0.02
52.750	0.00	0.02	0.007	O					0.02
52.833	0.00	0.02	0.007	O					0.02
52.917	0.00	0.02	0.007	O					0.02
53.000	0.00	0.02	0.007	O					0.02
53.083	0.00	0.01	0.007	O					0.02
53.167	0.00	0.01	0.007	O					0.02
53.250	0.00	0.01	0.007	O					0.02
53.333	0.00	0.01	0.007	O					0.01
53.417	0.00	0.01	0.006	O					0.01
53.500	0.00	0.01	0.006	O					0.01
53.583	0.00	0.01	0.006	O					0.01
53.667	0.00	0.01	0.006	O					0.01
53.750	0.00	0.01	0.006	O					0.01
53.833	0.00	0.01	0.006	O					0.01
53.917	0.00	0.01	0.006	O					0.01
54.000	0.00	0.01	0.006	O					0.01
54.083	0.00	0.01	0.006	O					0.01
54.167	0.00	0.01	0.006	O					0.01
54.250	0.00	0.01	0.006	O					0.01
54.333	0.00	0.01	0.005	O					0.01
54.417	0.00	0.01	0.005	O					0.01
54.500	0.00	0.01	0.005	O					0.01
54.583	0.00	0.01	0.005	O					0.01
54.667	0.00	0.01	0.005	O					0.01
54.750	0.00	0.01	0.005	O					0.01
54.833	0.00	0.01	0.005	O					0.01
54.917	0.00	0.01	0.005	O					0.01
55.000	0.00	0.01	0.005	O					0.01
55.083	0.00	0.01	0.005	O					0.01
55.167	0.00	0.01	0.005	O					0.01
55.250	0.00	0.01	0.005	O					0.01
55.333	0.00	0.01	0.005	O					0.01
55.417	0.00	0.01	0.005	O					0.01
55.500	0.00	0.01	0.004	O					0.01
55.583	0.00	0.01	0.004	O					0.01
55.667	0.00	0.01	0.004	O					0.01
55.750	0.00	0.01	0.004	O					0.01
55.833	0.00	0.01	0.004	O					0.01
55.917	0.00	0.01	0.004	O					0.01

56.000	0.00	0.01	0.004	O					0.01
56.083	0.00	0.01	0.004	O					0.01
56.167	0.00	0.01	0.004	O					0.01
56.250	0.00	0.01	0.004	O					0.01
56.333	0.00	0.01	0.004	O					0.01
56.417	0.00	0.01	0.004	O					0.01
56.500	0.00	0.01	0.004	O					0.01
56.583	0.00	0.01	0.004	O					0.01
56.667	0.00	0.01	0.004	O					0.01
56.750	0.00	0.01	0.004	O					0.01
56.833	0.00	0.01	0.003	O					0.01
56.917	0.00	0.01	0.003	O					0.01
57.000	0.00	0.01	0.003	O					0.01
57.083	0.00	0.01	0.003	O					0.01
57.167	0.00	0.01	0.003	O					0.01
57.250	0.00	0.01	0.003	O					0.01
57.333	0.00	0.01	0.003	O					0.01
57.417	0.00	0.01	0.003	O					0.01
57.500	0.00	0.01	0.003	O					0.01
57.583	0.00	0.01	0.003	O					0.01
57.667	0.00	0.01	0.003	O					0.01
57.750	0.00	0.01	0.003	O					0.01
57.833	0.00	0.01	0.003	O					0.01
57.917	0.00	0.01	0.003	O					0.01
58.000	0.00	0.01	0.003	O					0.01
58.083	0.00	0.01	0.003	O					0.01
58.167	0.00	0.01	0.003	O					0.01
58.250	0.00	0.01	0.003	O					0.01
58.333	0.00	0.01	0.003	O					0.01
58.417	0.00	0.01	0.003	O					0.01
58.500	0.00	0.01	0.003	O					0.01
58.583	0.00	0.01	0.003	O					0.01
58.667	0.00	0.01	0.003	O					0.01
58.750	0.00	0.01	0.002	O					0.01
58.833	0.00	0.01	0.002	O					0.01
58.917	0.00	0.01	0.002	O					0.01
59.000	0.00	0.01	0.002	O					0.01
59.083	0.00	0.01	0.002	O					0.01
59.167	0.00	0.01	0.002	O					0.01
59.250	0.00	0.00	0.002	O					0.01
59.333	0.00	0.00	0.002	O					0.01
59.417	0.00	0.00	0.002	O					0.00
59.500	0.00	0.00	0.002	O					0.00
59.583	0.00	0.00	0.002	O					0.00
59.667	0.00	0.00	0.002	O					0.00
59.750	0.00	0.00	0.002	O					0.00
59.833	0.00	0.00	0.002	O					0.00
59.917	0.00	0.00	0.002	O					0.00
60.000	0.00	0.00	0.002	O					0.00
60.083	0.00	0.00	0.002	O					0.00
60.167	0.00	0.00	0.002	O					0.00
60.250	0.00	0.00	0.002	O					0.00
60.333	0.00	0.00	0.002	O					0.00
60.417	0.00	0.00	0.002	O					0.00
60.500	0.00	0.00	0.002	O					0.00
60.583	0.00	0.00	0.002	O					0.00
60.667	0.00	0.00	0.002	O					0.00
60.750	0.00	0.00	0.002	O					0.00
60.833	0.00	0.00	0.002	O					0.00
60.917	0.00	0.00	0.002	O					0.00

61.000	0.00	0.00	0.002	O					0.00
61.083	0.00	0.00	0.002	O					0.00
61.167	0.00	0.00	0.002	O					0.00
61.250	0.00	0.00	0.002	O					0.00
61.333	0.00	0.00	0.002	O					0.00
61.417	0.00	0.00	0.002	O					0.00
61.500	0.00	0.00	0.002	O					0.00
61.583	0.00	0.00	0.001	O					0.00
61.667	0.00	0.00	0.001	O					0.00
61.750	0.00	0.00	0.001	O					0.00
61.833	0.00	0.00	0.001	O					0.00
61.917	0.00	0.00	0.001	O					0.00
62.000	0.00	0.00	0.001	O					0.00
62.083	0.00	0.00	0.001	O					0.00
62.167	0.00	0.00	0.001	O					0.00
62.250	0.00	0.00	0.001	O					0.00
62.333	0.00	0.00	0.001	O					0.00
62.417	0.00	0.00	0.001	O					0.00
62.500	0.00	0.00	0.001	O					0.00
62.583	0.00	0.00	0.001	O					0.00
62.667	0.00	0.00	0.001	O					0.00
62.750	0.00	0.00	0.001	O					0.00
62.833	0.00	0.00	0.001	O					0.00
62.917	0.00	0.00	0.001	O					0.00
63.000	0.00	0.00	0.001	O					0.00
63.083	0.00	0.00	0.001	O					0.00
63.167	0.00	0.00	0.001	O					0.00
63.250	0.00	0.00	0.001	O					0.00
63.333	0.00	0.00	0.001	O					0.00
63.417	0.00	0.00	0.001	O					0.00
63.500	0.00	0.00	0.001	O					0.00
63.583	0.00	0.00	0.001	O					0.00
63.667	0.00	0.00	0.001	O					0.00
63.750	0.00	0.00	0.001	O					0.00
63.833	0.00	0.00	0.001	O					0.00
63.917	0.00	0.00	0.001	O					0.00
64.000	0.00	0.00	0.001	O					0.00
64.083	0.00	0.00	0.001	O					0.00
64.167	0.00	0.00	0.001	O					0.00
64.250	0.00	0.00	0.001	O					0.00
64.333	0.00	0.00	0.001	O					0.00
64.417	0.00	0.00	0.001	O					0.00
64.500	0.00	0.00	0.001	O					0.00
64.583	0.00	0.00	0.001	O					0.00
64.667	0.00	0.00	0.001	O					0.00
64.750	0.00	0.00	0.001	O					0.00
64.833	0.00	0.00	0.001	O					0.00
64.917	0.00	0.00	0.001	O					0.00
65.000	0.00	0.00	0.001	O					0.00
65.083	0.00	0.00	0.001	O					0.00
65.167	0.00	0.00	0.001	O					0.00
65.250	0.00	0.00	0.001	O					0.00
65.333	0.00	0.00	0.001	O					0.00
65.417	0.00	0.00	0.001	O					0.00
65.500	0.00	0.00	0.001	O					0.00
65.583	0.00	0.00	0.001	O					0.00
65.667	0.00	0.00	0.001	O					0.00
65.750	0.00	0.00	0.001	O					0.00
65.833	0.00	0.00	0.001	O					0.00
65.917	0.00	0.00	0.001	O					0.00

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66.000    0.00    0.00      0.001  O       |       |       |       |     0.00
66.083    0.00    0.00      0.001  O       |       |       |       |     0.00
66.167    0.00    0.00      0.001  O       |       |       |       |     0.00
66.250    0.00    0.00      0.001  O       |       |       |       |     0.00
66.333    0.00    0.00      0.001  O       |       |       |       |     0.00
66.417    0.00    0.00      0.001  O       |       |       |       |     0.00
66.500    0.00    0.00      0.001  O       |       |       |       |     0.00
66.583    0.00    0.00      0.001  O       |       |       |       |     0.00
66.667    0.00    0.00      0.001  O       |       |       |       |     0.00
66.750    0.00    0.00      0.001  O       |       |       |       |     0.00
66.833    0.00    0.00      0.001  O       |       |       |       |     0.00
66.917    0.00    0.00      0.001  O       |       |       |       |     0.00
67.000    0.00    0.00      0.001  O       |       |       |       |     0.00
67.083    0.00    0.00      0.001  O       |       |       |       |     0.00
67.167    0.00    0.00      0.001  O       |       |       |       |     0.00
67.250    0.00    0.00      0.001  O       |       |       |       |     0.00
67.333    0.00    0.00      0.001  O       |       |       |       |     0.00
67.417    0.00    0.00      0.001  O       |       |       |       |     0.00
67.500    0.00    0.00      0.001  O       |       |       |       |     0.00
67.583    0.00    0.00      0.001  O       |       |       |       |     0.00
67.667    0.00    0.00      0.000  O       |       |       |       |     0.00
67.750    0.00    0.00      0.000  O       |       |       |       |     0.00
67.833    0.00    0.00      0.000  O       |       |       |       |     0.00
67.917    0.00    0.00      0.000  O       |       |       |       |     0.00
68.000    0.00    0.00      0.000  O       |       |       |       |     0.00
68.083    0.00    0.00      0.000  O       |       |       |       |     0.00
68.167    0.00    0.00      0.000  O       |       |       |       |     0.00

    ****************************HYDROGRAPH DATA****************************
            Number of intervals =   818
            Time interval =    5.0 (Min.)
            Maximum/Peak flow rate =        3.259 (CFS)
            Total volume =       3.980 (Ac.Ft)
      Status of hydrographs being held in storage
                 Stream 1  Stream 2  Stream 3  Stream 4  Stream 5
      Peak (CFS)     15.842     0.000     0.000     0.000     0.000
      Vol (Ac.Ft)      6.470     0.000     0.000     0.000     0.000
    ***********************************************************************

    ----------------------------------------------------------------------


    ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
    Process from Point/Station        4.000 to Point/Station        3.000
    **** ADD/COMBINE/RECOVER HYDROGRAPHS ****
    ______________________________________________________________________
    From stored stream number 1 the total
    volume of       6.47 (Ac.Ft) is being added to the
    current hydrograph at its original rate from user
    with a delay time to start of addition of    0.00 hours.
    ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                      P R I N T  O F  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) Add q(CFS)  Tot. Q   0        4.8       9.5      14.3      19.0
 ----------------------------------------------------------------------
   0+ 5       0.0028      0.00  Q         |         |         |         |
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0+10       0.0237      0.03  Q          |          |          |          |
0+15       0.0880      0.10  Q          |          |          |          |
0+20       0.2003      0.23  Q          |          |          |          |
0+25       0.3367      0.37  Q          |          |          |          |
0+30       0.4716      0.52  qQ         |          |          |          |
0+35       0.5934      0.65  |Q         |          |          |          |
0+40       0.6994      0.77  |Q         |          |          |          |
0+45       0.7909      0.87  |Q         |          |          |          |
0+50       0.8694      0.96  |qQ        |          |          |          |
0+55       0.9366      1.04  |qQ        |          |          |          |
1+ 0       0.9941      1.10  | Q        |          |          |          |
1+ 5       1.0433      1.16  | Q        |          |          |          |
1+10       1.0856      1.22  | Q        |          |          |          |
1+15       1.1221      1.26  | Q        |          |          |          |
1+20       1.1536      1.30  | Q        |          |          |          |
1+25       1.1810      1.34  | Q        |          |          |          |
1+30       1.2048      1.37  | Q        |          |          |          |
1+35       1.2257      1.40  | Q        |          |          |          |
1+40       1.2440      1.43  | qQ       |          |          |          |
1+45       1.2602      1.46  | qQ       |          |          |          |
1+50       1.2747      1.48  | qQ       |          |          |          |
1+55       1.2876      1.50  | qQ       |          |          |          |
2+ 0       1.2993      1.52  | qQ       |          |          |          |
2+ 5       1.3099      1.54  | qQ       |          |          |          |
2+10       1.3196      1.56  | qQ       |          |          |          |
2+15       1.3286      1.58  | qQ       |          |          |          |
2+20       1.3369      1.60  | qQ       |          |          |          |
2+25       1.3448      1.61  | qQ       |          |          |          |
2+30       1.3522      1.63  | qQ       |          |          |          |
2+35       1.3592      1.65  | qQ       |          |          |          |
2+40       1.3660      1.66  | qQ       |          |          |          |
2+45       1.3725      1.67  | qQ       |          |          |          |
2+50       1.3788      1.69  | qQ       |          |          |          |
2+55       1.3849      1.70  | qQ       |          |          |          |
3+ 0       1.3909      1.72  | qQ       |          |          |          |
3+ 5       1.3969      1.73  | qQ       |          |          |          |
3+10       1.4027      1.75  | qQ       |          |          |          |
3+15       1.4085      1.76  | qQ       |          |          |          |
3+20       1.4143      1.77  | qQ       |          |          |          |
3+25       1.4200      1.79  | qQ       |          |          |          |
3+30       1.4257      1.80  | qQ       |          |          |          |
3+35       1.4314      1.81  |  Q       |          |          |          |
3+40       1.4372      1.83  |  Q       |          |          |          |
3+45       1.4429      1.84  |  Q       |          |          |          |
3+50       1.4487      1.85  |  Q       |          |          |          |
3+55       1.4545      1.87  |  Q       |          |          |          |
4+ 0       1.4604      1.88  |  Q       |          |          |          |
4+ 5       1.4662      1.89  |  Q       |          |          |          |
4+10       1.4722      1.90  |  qQ      |          |          |          |
4+15       1.4781      1.92  |  qQ      |          |          |          |
4+20       1.4842      1.93  |  qQ      |          |          |          |
4+25       1.4902      1.94  |  qQ      |          |          |          |
4+30       1.4964      1.96  |  qQ      |          |          |          |
4+35       1.5026      1.97  |  qQ      |          |          |          |
4+40       1.5088      1.98  |  qQ      |          |          |          |
4+45       1.5152      2.00  |  qQ      |          |          |          |
4+50       1.5216      2.01  |  qQ      |          |          |          |
4+55       1.5280      2.02  |  qQ      |          |          |          |
5+ 0       1.5345      2.04  |  qQ      |          |          |          |
5+ 5       1.5411      2.05  |  qQ      |          |          |          |
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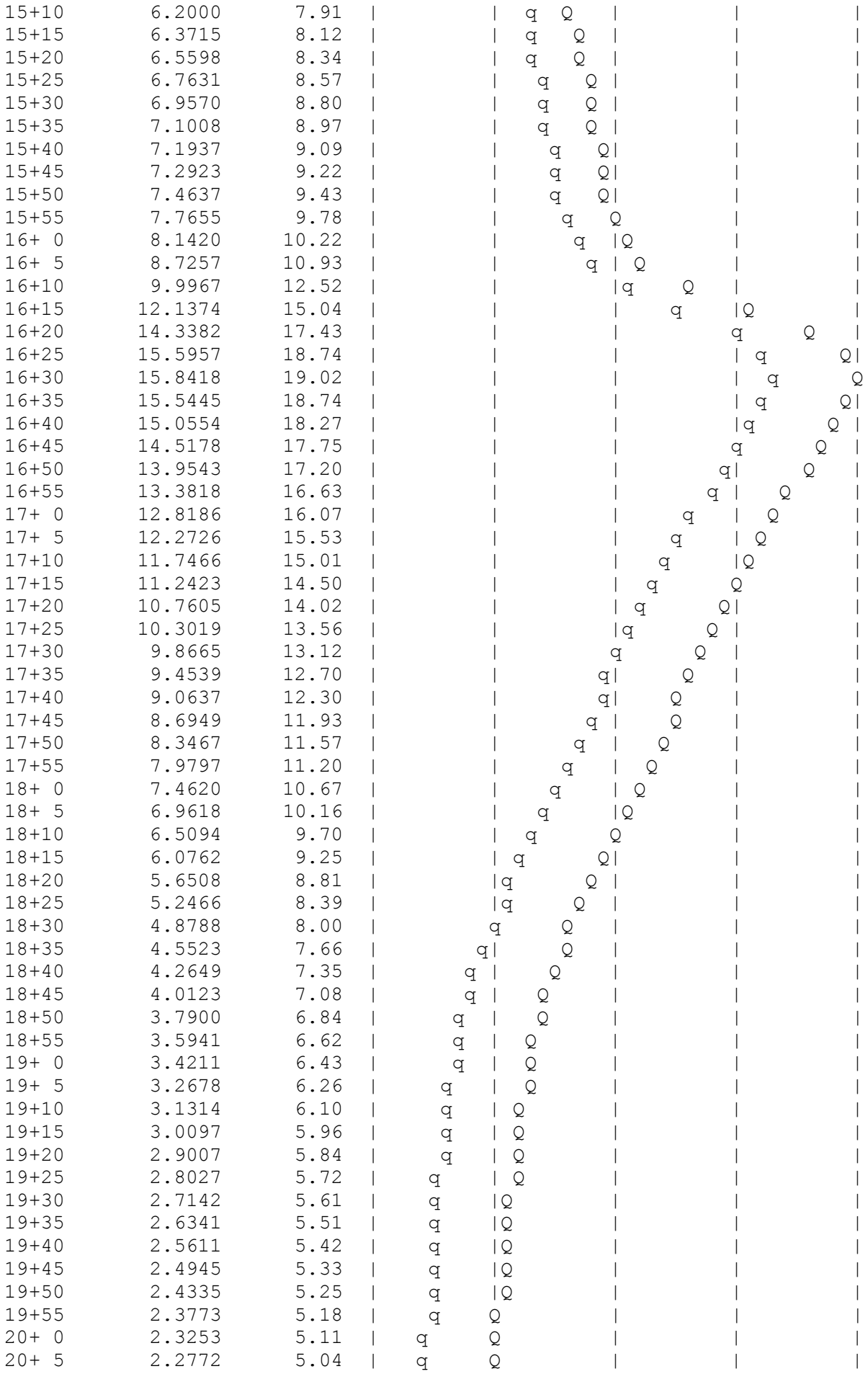
5+10	1.5478	2.06	qQ			
5+15	1.5546	2.08	qQ			
5+20	1.5614	2.09	qQ			
5+25	1.5683	2.10	qQ			
5+30	1.5753	2.12	qQ			
5+35	1.5823	2.13	qQ			
5+40	1.5895	2.14	qQ			
5+45	1.5967	2.16	qQ			
5+50	1.6041	2.17	qQ			
5+55	1.6115	2.19	qQ			
6+ 0	1.6190	2.20	qQ			
6+ 5	1.6266	2.21	qQ			
6+10	1.6343	2.23	qQ			
6+15	1.6421	2.24	qQ			
6+20	1.6500	2.26	qQ			
6+25	1.6580	2.27	qQ			
6+30	1.6661	2.28	qQ			
6+35	1.6743	2.30	qQ			
6+40	1.6826	2.31	qQ			
6+45	1.6910	2.33	qQ			
6+50	1.6995	2.34	qQ			
6+55	1.7082	2.36	qQ			
7+ 0	1.7170	2.37	qQ			
7+ 5	1.7259	2.39	q Q			
7+10	1.7349	2.40	q Q			
7+15	1.7440	2.42	q Q			
7+20	1.7533	2.43	q Q			
7+25	1.7627	2.45	q Q			
7+30	1.7723	2.47	q Q			
7+35	1.7819	2.48	q Q			
7+40	1.7918	2.50	q Q			
7+45	1.8017	2.51	q Q			
7+50	1.8119	2.53	q Q			
7+55	1.8221	2.55	q Q			
8+ 0	1.8326	2.56	q Q			
8+ 5	1.8431	2.58	q Q			
8+10	1.8539	2.60	q Q			
8+15	1.8648	2.61	q Q			
8+20	1.8759	2.63	q Q			
8+25	1.8872	2.65	q Q			
8+30	1.8987	2.67	q Q			
8+35	1.9103	2.68	qQ			
8+40	1.9221	2.70	qQ			
8+45	1.9342	2.72	qQ			
8+50	1.9464	2.74	qQ			
8+55	1.9589	2.76	qQ			
9+ 0	1.9715	2.78	qQ			
9+ 5	1.9844	2.80	qQ			
9+10	1.9975	2.82	qQ			
9+15	2.0109	2.84	qQ			
9+20	2.0245	2.86	q Q			
9+25	2.0383	2.88	q Q			
9+30	2.0524	2.90	q Q			
9+35	2.0668	2.92	q Q			
9+40	2.0814	2.94	q Q			
9+45	2.0963	2.96	q Q			
9+50	2.1115	2.98	q Q			
9+55	2.1270	3.01	q Q			
10+ 0	2.1428	3.03	q Q			
10+ 5	2.1589	3.05	q Q			

10+10	2.1753	3.08	q Q				
10+15	2.1921	3.10	q Q				
10+20	2.2093	3.13	q Q				
10+25	2.2268	3.15	q Q				
10+30	2.2446	3.18	q Q				
10+35	2.2629	3.20	q Q				
10+40	2.2816	3.23	q Q				
10+45	2.3007	3.25	q Q				
10+50	2.3202	3.28	q Q				
10+55	2.3402	3.31	q Q				
11+ 0	2.3606	3.33	q Q				
11+ 5	2.3815	3.36	q Q				
11+10	2.4029	3.39	q Q				
11+15	2.4249	3.41	q Q				
11+20	2.4474	3.44	q Q				
11+25	2.4704	3.47	q Q				
11+30	2.4941	3.50	q Q				
11+35	2.5184	3.53	q Q				
11+40	2.5433	3.56	q Q				
11+45	2.5688	3.59	q Q				
11+50	2.5951	3.63	q Q				
11+55	2.6222	3.66	q Q				
12+ 0	2.6499	3.70	q Q				
12+ 5	2.6808	3.73	q Q				
12+10	2.7272	3.79	q Q				
12+15	2.8097	3.89	q Q				
12+20	2.9321	4.02	q Q				
12+25	3.0747	4.18	q Q				
12+30	3.2171	4.33	q Q				
12+35	3.3495	4.48	q Q				
12+40	3.4701	4.62	q Q				
12+45	3.5799	4.74	q Q				
12+50	3.6803	4.85	q Q				
12+55	3.7725	4.96	q Q				
13+ 0	3.8581	5.06	q Q				
13+ 5	3.9384	5.16	q Q				
13+10	4.0144	5.25	q Q				
13+15	4.0872	5.34	q Q				
13+20	4.1576	5.42	q Q				
13+25	4.2263	5.51	q Q				
13+30	4.2941	5.59	q Q				
13+35	4.3614	5.68	q Q				
13+40	4.4288	5.76	q Q				
13+45	4.4967	5.84	q Q				
13+50	4.5657	5.93	q Q				
13+55	4.6361	6.02	q Q				
14+ 0	4.7084	6.11	q Q				
14+ 5	4.7829	6.20	q Q				
14+10	4.8603	6.30	q Q				
14+15	4.9411	6.40	q Q				
14+20	5.0260	6.50	q Q				
14+25	5.1150	6.61	q Q				
14+30	5.2085	6.73	q Q				
14+35	5.3069	6.85	q Q				
14+40	5.4108	6.97	q Q				
14+45	5.5209	7.11	q Q				
14+50	5.6381	7.25	q Q				
14+55	5.7633	7.40	q Q				
15+ 0	5.8978	7.56	q Q				
15+ 5	6.0428	7.73	q Q				



20+10	2.2324	4.98	| q Q |	|	|
20+15	2.1905	4.92	| q Q |	|	|
20+20	2.1513	4.86	| q Q |	|	|
20+25	2.1145	4.80	| q Q |	|	|
20+30	2.0798	4.75	| q Q|	|	|
20+35	2.0470	4.70	| q Q|	|	|
20+40	2.0159	4.65	| q Q|	|	|
20+45	1.9863	4.60	| q Q|	|	|
20+50	1.9581	4.55	| q Q|	|	|
20+55	1.9313	4.51	| q Q|	|	|
21+ 0	1.9056	4.46	| q Q|	|	|
21+ 5	1.8810	4.42	| q Q|	|	|
21+10	1.8574	4.38	| q Q|	|	|
21+15	1.8346	4.34	| q Q|	|	|
21+20	1.8128	4.30	| q Q|	|	|
21+25	1.7917	4.26	| q Q |	|	|
21+30	1.7714	4.22	| q Q |	|	|
21+35	1.7517	4.19	| q Q |	|	|
21+40	1.7327	4.15	| q Q |	|	|
21+45	1.7143	4.11	| q Q |	|	|
21+50	1.6964	4.08	| q Q |	|	|
21+55	1.6791	4.04	| q Q |	|	|
22+ 0	1.6623	4.01	| q Q |	|	|
22+ 5	1.6459	3.98	| q Q |	|	|
22+10	1.6300	3.95	| q Q |	|	|
22+15	1.6145	3.92	| q Q |	|	|
22+20	1.5995	3.89	| q Q |	|	|
22+25	1.5848	3.86	| q Q |	|	|
22+30	1.5705	3.83	| q Q |	|	|
22+35	1.5566	3.80	| q Q |	|	|
22+40	1.5430	3.77	| q Q |	|	|
22+45	1.5297	3.75	| q Q |	|	|
22+50	1.5167	3.72	| q Q |	|	|
22+55	1.5040	3.69	| q Q |	|	|
23+ 0	1.4916	3.67	| q Q |	|	|
23+ 5	1.4795	3.64	| q Q |	|	|
23+10	1.4677	3.61	| q Q |	|	|
23+15	1.4561	3.59	| q Q |	|	|
23+20	1.4447	3.56	| q Q |	|	|
23+25	1.4336	3.54	| q Q |	|	|
23+30	1.4227	3.52	| q Q |	|	|
23+35	1.4121	3.49	| q Q |	|	|
23+40	1.4016	3.47	| q Q |	|	|
23+45	1.3914	3.44	| q Q |	|	|
23+50	1.3813	3.42	| q Q |	|	|
23+55	1.3715	3.40	| q Q |	|	|
24+ 0	1.3618	3.38	| q Q |	|	|
24+ 5	1.3496	3.35	| q Q |	|	|
24+10	1.3194	3.31	| q Q |	|	|
24+15	1.2463	3.21	| q Q |	|	|
24+20	1.1260	3.07	| q Q |	|	|
24+25	0.9829	2.91	| q Q |	|	|
24+30	0.8426	2.75	|q Q |	|	|
24+35	0.7169	2.60	|q Q |	|	|
24+40	0.6081	2.48	|q Q |	|	|
24+45	0.5149	2.36	|q Q |	|	|
24+50	0.4355	2.27	q Q |	|	|
24+55	0.3683	2.18	q Q |	|	|
25+ 0	0.3115	2.10	q Q |	|	|
25+ 5	0.2635	2.04	q Q |	|	|

25+10	0.2228	1.98	q Q	|	|	|	|
25+15	0.1884	1.93	q Q	|	|	|	|
25+20	0.1594	1.88	q Q	|	|	|	|
25+25	0.1348	1.84	q Q	|	|	|	|
25+30	0.1140	1.80	q Q	|	|	|	|
25+35	0.0964	1.76	q Q	|	|	|	|
25+40	0.0815	1.73	q Q	|	|	|	|
25+45	0.0690	1.70	q Q	|	|	|	|
25+50	0.0583	1.67	q Q	|	|	|	|
25+55	0.0493	1.65	q Q	|	|	|	|
26+ 0	0.0417	1.62	q Q	|	|	|	|
26+ 5	0.0353	1.60	q Q	|	|	|	|
26+10	0.0298	1.58	q Q	|	|	|	|
26+15	0.0252	1.56	q Q	|	|	|	|
26+20	0.0213	1.54	q Q	|	|	|	|
26+25	0.0180	1.52	q Q	|	|	|	|
26+30	0.0153	1.50	q Q	|	|	|	|
26+35	0.0129	1.48	q Q	|	|	|	|
26+40	0.0109	1.47	q Q	|	|	|	|
26+45	0.0092	1.45	q Q	|	|	|	|
26+50	0.0078	1.43	q Q	|	|	|	|
26+55	0.0015	1.41	q Q	|	|	|	|
27+ 0	0.0000	1.40	q Q	|	|	|	|
27+ 5	0.0000	1.38	q Q	|	|	|	|
27+10	0.0000	1.37	q Q	|	|	|	|
27+15	0.0000	1.35	q Q	|	|	|	|
27+20	0.0000	1.34	q Q	|	|	|	|
27+25	0.0000	1.33	q Q	|	|	|	|
27+30	0.0000	1.31	q Q	|	|	|	|
27+35	0.0000	1.30	q Q	|	|	|	|
27+40	0.0000	1.29	q Q	|	|	|	|
27+45	0.0000	1.27	q Q	|	|	|	|
27+50	0.0000	1.26	q Q	|	|	|	|
27+55	0.0000	1.25	q Q	|	|	|	|
28+ 0	0.0000	1.23	q Q	|	|	|	|
28+ 5	0.0000	1.22	q Q	|	|	|	|
28+10	0.0000	1.21	q Q	|	|	|	|
28+15	0.0000	1.20	q Q	|	|	|	|
28+20	0.0000	1.18	q Q	|	|	|	|
28+25	0.0000	1.17	q Q	|	|	|	|
28+30	0.0000	1.16	q Q	|	|	|	|
28+35	0.0000	1.15	q Q	|	|	|	|
28+40	0.0000	1.14	q Q	|	|	|	|
28+45	0.0000	1.12	q Q	|	|	|	|
28+50	0.0000	1.11	q Q	|	|	|	|
28+55	0.0000	1.10	q Q	|	|	|	|
29+ 0	0.0000	1.09	q Q	|	|	|	|
29+ 5	0.0000	1.08	q Q	|	|	|	|
29+10	0.0000	1.07	q Q	|	|	|	|
29+15	0.0000	1.06	q Q	|	|	|	|
29+20	0.0000	1.05	q Q	|	|	|	|
29+25	0.0000	1.03	q Q	|	|	|	|
29+30	0.0000	1.02	q Q	|	|	|	|
29+35	0.0000	1.01	q Q	|	|	|	|
29+40	0.0000	1.00	q Q	|	|	|	|
29+45	0.0000	0.99	q Q	|	|	|	|
29+50	0.0000	0.98	q Q	|	|	|	|
29+55	0.0000	0.97	q Q	|	|	|	|
30+ 0	0.0000	0.96	q Q	|	|	|	|
30+ 5	0.0000	0.95	qQ	|	|	|	|

30+10	0.0000	0.93	qQ				
30+15	0.0000	0.92	qQ				
30+20	0.0000	0.91	qQ				
30+25	0.0000	0.89	qQ				
30+30	0.0000	0.88	qQ				
30+35	0.0000	0.87	qQ				
30+40	0.0000	0.85	qQ				
30+45	0.0000	0.84	qQ				
30+50	0.0000	0.83	qQ				
30+55	0.0000	0.82	qQ				
31+ 0	0.0000	0.80	qQ				
31+ 5	0.0000	0.79	qQ				
31+10	0.0000	0.78	qQ				
31+15	0.0000	0.77	qQ				
31+20	0.0000	0.76	qQ				
31+25	0.0000	0.75	qQ				
31+30	0.0000	0.73	qQ				
31+35	0.0000	0.72	qQ				
31+40	0.0000	0.71	qQ				
31+45	0.0000	0.70	qQ				
31+50	0.0000	0.69	qQ				
31+55	0.0000	0.68	qQ				
32+ 0	0.0000	0.67	qQ				
32+ 5	0.0000	0.66	qQ				
32+10	0.0000	0.65	qQ				
32+15	0.0000	0.64	qQ				
32+20	0.0000	0.63	qQ				
32+25	0.0000	0.62	qQ				
32+30	0.0000	0.61	qQ				
32+35	0.0000	0.60	qQ				
32+40	0.0000	0.60	qQ				
32+45	0.0000	0.59	qQ				
32+50	0.0000	0.58	qQ				
32+55	0.0000	0.57	qQ				
33+ 0	0.0000	0.56	qQ				
33+ 5	0.0000	0.55	qQ				
33+10	0.0000	0.54	qQ				
33+15	0.0000	0.54	qQ				
33+20	0.0000	0.53	qQ				
33+25	0.0000	0.52	qQ				
33+30	0.0000	0.51	qQ				
33+35	0.0000	0.50	qQ				
33+40	0.0000	0.50	qQ				
33+45	0.0000	0.49	qQ				
33+50	0.0000	0.48	qQ				
33+55	0.0000	0.48	Q				
34+ 0	0.0000	0.47	Q				
34+ 5	0.0000	0.46	Q				
34+10	0.0000	0.45	Q				
34+15	0.0000	0.45	Q				
34+20	0.0000	0.44	Q				
34+25	0.0000	0.43	Q				
34+30	0.0000	0.43	Q				
34+35	0.0000	0.42	Q				
34+40	0.0000	0.42	Q				
34+45	0.0000	0.41	Q				
34+50	0.0000	0.40	Q				
34+55	0.0000	0.40	Q				
35+ 0	0.0000	0.39	Q				
35+ 5	0.0000	0.39	Q				

35+10	0.0000	0.38	Q				
35+15	0.0000	0.37	Q				
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35+25	0.0000	0.36	Q				
35+30	0.0000	0.36	Q				
35+35	0.0000	0.35	Q				
35+40	0.0000	0.35	Q				
35+45	0.0000	0.34	Q				
35+50	0.0000	0.34	Q				
35+55	0.0000	0.33	Q				
36+ 0	0.0000	0.33	Q				
36+ 5	0.0000	0.32	Q				
36+10	0.0000	0.32	Q				
36+15	0.0000	0.31	Q				
36+20	0.0000	0.31	Q				
36+25	0.0000	0.30	Q				
36+30	0.0000	0.30	Q				
36+35	0.0000	0.29	Q				
36+40	0.0000	0.29	Q				
36+45	0.0000	0.29	Q				
36+50	0.0000	0.28	Q				
36+55	0.0000	0.28	Q				
37+ 0	0.0000	0.27	Q				
37+ 5	0.0000	0.27	Q				
37+10	0.0000	0.26	Q				
37+15	0.0000	0.26	Q				
37+20	0.0000	0.26	Q				
37+25	0.0000	0.25	Q				
37+30	0.0000	0.25	Q				
37+35	0.0000	0.25	Q				
37+40	0.0000	0.24	Q				
37+45	0.0000	0.24	Q				
37+50	0.0000	0.23	Q				
37+55	0.0000	0.23	Q				
38+ 0	0.0000	0.23	Q				
38+ 5	0.0000	0.22	Q				
38+10	0.0000	0.22	Q				
38+15	0.0000	0.22	Q				
38+20	0.0000	0.21	Q				
38+25	0.0000	0.21	Q				
38+30	0.0000	0.21	Q				
38+35	0.0000	0.20	Q				
38+40	0.0000	0.20	Q				
38+45	0.0000	0.20	Q				
38+50	0.0000	0.20	Q				
38+55	0.0000	0.19	Q				
39+ 0	0.0000	0.19	Q				
39+ 5	0.0000	0.19	Q				
39+10	0.0000	0.18	Q				
39+15	0.0000	0.18	Q				
39+20	0.0000	0.18	Q				
39+25	0.0000	0.18	Q				
39+30	0.0000	0.17	Q				
39+35	0.0000	0.17	Q				
39+40	0.0000	0.17	Q				
39+45	0.0000	0.17	Q				
39+50	0.0000	0.16	Q				
39+55	0.0000	0.16	Q				
40+ 0	0.0000	0.16	Q				
40+ 5	0.0000	0.16	Q				

40+10	0.0000	0.15	Q				
40+15	0.0000	0.15	Q				
40+20	0.0000	0.15	Q				
40+25	0.0000	0.15	Q				
40+30	0.0000	0.14	Q				
40+35	0.0000	0.14	Q				
40+40	0.0000	0.14	Q				
40+45	0.0000	0.14	Q				
40+50	0.0000	0.14	Q				
40+55	0.0000	0.13	Q				
41+ 0	0.0000	0.13	Q				
41+ 5	0.0000	0.13	Q				
41+10	0.0000	0.13	Q				
41+15	0.0000	0.13	Q				
41+20	0.0000	0.12	Q				
41+25	0.0000	0.12	Q				
41+30	0.0000	0.12	Q				
41+35	0.0000	0.12	Q				
41+40	0.0000	0.12	Q				
41+45	0.0000	0.12	Q				
41+50	0.0000	0.11	Q				
41+55	0.0000	0.11	Q				
42+ 0	0.0000	0.11	Q				
42+ 5	0.0000	0.11	Q				
42+10	0.0000	0.11	Q				
42+15	0.0000	0.11	Q				
42+20	0.0000	0.10	Q				
42+25	0.0000	0.10	Q				
42+30	0.0000	0.10	Q				
42+35	0.0000	0.10	Q				
42+40	0.0000	0.10	Q				
42+45	0.0000	0.10	Q				
42+50	0.0000	0.10	Q				
42+55	0.0000	0.09	Q				
43+ 0	0.0000	0.09	Q				
43+ 5	0.0000	0.09	Q				
43+10	0.0000	0.09	Q				
43+15	0.0000	0.09	Q				
43+20	0.0000	0.09	Q				
43+25	0.0000	0.09	Q				
43+30	0.0000	0.08	Q				
43+35	0.0000	0.08	Q				
43+40	0.0000	0.08	Q				
43+45	0.0000	0.08	Q				
43+50	0.0000	0.08	Q				
43+55	0.0000	0.08	Q				
44+ 0	0.0000	0.08	Q				
44+ 5	0.0000	0.08	Q				
44+10	0.0000	0.07	Q				
44+15	0.0000	0.07	Q				
44+20	0.0000	0.07	Q				
44+25	0.0000	0.07	Q				
44+30	0.0000	0.07	Q				
44+35	0.0000	0.07	Q				
44+40	0.0000	0.07	Q				
44+45	0.0000	0.07	Q				
44+50	0.0000	0.07	Q				
44+55	0.0000	0.07	Q				
45+ 0	0.0000	0.06	Q				
45+ 5	0.0000	0.06	Q				

45+10	0.0000	0.06	Q				
45+15	0.0000	0.06	Q				
45+20	0.0000	0.06	Q				
45+25	0.0000	0.06	Q				
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45+40	0.0000	0.06	Q				
45+45	0.0000	0.06	Q				
45+50	0.0000	0.06	Q				
45+55	0.0000	0.05	Q				
46+ 0	0.0000	0.05	Q				
46+ 5	0.0000	0.05	Q				
46+10	0.0000	0.05	Q				
46+15	0.0000	0.05	Q				
46+20	0.0000	0.05	Q				
46+25	0.0000	0.05	Q				
46+30	0.0000	0.05	Q				
46+35	0.0000	0.05	Q				
46+40	0.0000	0.05	Q				
46+45	0.0000	0.05	Q				
46+50	0.0000	0.05	Q				
46+55	0.0000	0.05	Q				
47+ 0	0.0000	0.04	Q				
47+ 5	0.0000	0.04	Q				
47+10	0.0000	0.04	Q				
47+15	0.0000	0.04	Q				
47+20	0.0000	0.04	Q				
47+25	0.0000	0.04	Q				
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47+40	0.0000	0.04	Q				
47+45	0.0000	0.04	Q				
47+50	0.0000	0.04	Q				
47+55	0.0000	0.04	Q				
48+ 0	0.0000	0.04	Q				
48+ 5	0.0000	0.04	Q				
48+10	0.0000	0.04	Q				
48+15	0.0000	0.04	Q				
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48+40	0.0000	0.03	Q				
48+45	0.0000	0.03	Q				
48+50	0.0000	0.03	Q				
48+55	0.0000	0.03	Q				
49+ 0	0.0000	0.03	Q				
49+ 5	0.0000	0.03	Q				
49+10	0.0000	0.03	Q				
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49+20	0.0000	0.03	Q				
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49+30	0.0000	0.03	Q				
49+35	0.0000	0.03	Q				
49+40	0.0000	0.03	Q				
49+45	0.0000	0.03	Q				
49+50	0.0000	0.03	Q				
49+55	0.0000	0.03	Q				
50+ 0	0.0000	0.03	Q				
50+ 5	0.0000	0.03	Q				

50+10	0.0000	0.03	Q				
50+15	0.0000	0.02	Q				
50+20	0.0000	0.02	Q				
50+25	0.0000	0.02	Q				
50+30	0.0000	0.02	Q				
50+35	0.0000	0.02	Q				
50+40	0.0000	0.02	Q				
50+45	0.0000	0.02	Q				
50+50	0.0000	0.02	Q				
50+55	0.0000	0.02	Q				
51+ 0	0.0000	0.02	Q				
51+ 5	0.0000	0.02	Q				
51+10	0.0000	0.02	Q				
51+15	0.0000	0.02	Q				
51+20	0.0000	0.02	Q				
51+25	0.0000	0.02	Q				
51+30	0.0000	0.02	Q				
51+35	0.0000	0.02	Q				
51+40	0.0000	0.02	Q				
51+45	0.0000	0.02	Q				
51+50	0.0000	0.02	Q				
51+55	0.0000	0.02	Q				
52+ 0	0.0000	0.02	Q				
52+ 5	0.0000	0.02	Q				
52+10	0.0000	0.02	Q				
52+15	0.0000	0.02	Q				
52+20	0.0000	0.02	Q				
52+25	0.0000	0.02	Q				
52+30	0.0000	0.02	Q				
52+35	0.0000	0.02	Q				
52+40	0.0000	0.02	Q				
52+45	0.0000	0.02	Q				
52+50	0.0000	0.02	Q				
52+55	0.0000	0.02	Q				
53+ 0	0.0000	0.02	Q				
53+ 5	0.0000	0.01	Q				
53+10	0.0000	0.01	Q				
53+15	0.0000	0.01	Q				
53+20	0.0000	0.01	Q				
53+25	0.0000	0.01	Q				
53+30	0.0000	0.01	Q				
53+35	0.0000	0.01	Q				
53+40	0.0000	0.01	Q				
53+45	0.0000	0.01	Q				
53+50	0.0000	0.01	Q				
53+55	0.0000	0.01	Q				
54+ 0	0.0000	0.01	Q				
54+ 5	0.0000	0.01	Q				
54+10	0.0000	0.01	Q				
54+15	0.0000	0.01	Q				
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54+25	0.0000	0.01	Q				
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54+50	0.0000	0.01	Q				
54+55	0.0000	0.01	Q				
55+ 0	0.0000	0.01	Q				
55+ 5	0.0000	0.01	Q				

55+10	0.0000	0.01	Q				
55+15	0.0000	0.01	Q				
55+20	0.0000	0.01	Q				
55+25	0.0000	0.01	Q				
55+30	0.0000	0.01	Q				
55+35	0.0000	0.01	Q				
55+40	0.0000	0.01	Q				
55+45	0.0000	0.01	Q				
55+50	0.0000	0.01	Q				
55+55	0.0000	0.01	Q				
56+ 0	0.0000	0.01	Q				
56+ 5	0.0000	0.01	Q				
56+10	0.0000	0.01	Q				
56+15	0.0000	0.01	Q				
56+20	0.0000	0.01	Q				
56+25	0.0000	0.01	Q				
56+30	0.0000	0.01	Q				
56+35	0.0000	0.01	Q				
56+40	0.0000	0.01	Q				
56+45	0.0000	0.01	Q				
56+50	0.0000	0.01	Q				
56+55	0.0000	0.01	Q				
57+ 0	0.0000	0.01	Q				
57+ 5	0.0000	0.01	Q				
57+10	0.0000	0.01	Q				
57+15	0.0000	0.01	Q				
57+20	0.0000	0.01	Q				
57+25	0.0000	0.01	Q				
57+30	0.0000	0.01	Q				
57+35	0.0000	0.01	Q				
57+40	0.0000	0.01	Q				
57+45	0.0000	0.01	Q				
57+50	0.0000	0.01	Q				
57+55	0.0000	0.01	Q				
58+ 0	0.0000	0.01	Q				
58+ 5	0.0000	0.01	Q				
58+10	0.0000	0.01	Q				
58+15	0.0000	0.01	Q				
58+20	0.0000	0.01	Q				
58+25	0.0000	0.01	Q				
58+30	0.0000	0.01	Q				
58+35	0.0000	0.01	Q				
58+40	0.0000	0.01	Q				
58+45	0.0000	0.01	Q				
58+50	0.0000	0.01	Q				
58+55	0.0000	0.01	Q				
59+ 0	0.0000	0.01	Q				
59+ 5	0.0000	0.01	Q				
59+10	0.0000	0.01	Q				
59+15	0.0000	0.00	Q				
59+20	0.0000	0.00	Q				
59+25	0.0000	0.00	Q				
59+30	0.0000	0.00	Q				
59+35	0.0000	0.00	Q				
59+40	0.0000	0.00	Q				
59+45	0.0000	0.00	Q				
59+50	0.0000	0.00	Q				
59+55	0.0000	0.00	Q				
60+ 0	0.0000	0.00	Q				
60+ 5	0.0000	0.00	Q				

60+10	0.0000	0.00	Q				
60+15	0.0000	0.00	Q				
60+20	0.0000	0.00	Q				
60+25	0.0000	0.00	Q				
60+30	0.0000	0.00	Q				
60+35	0.0000	0.00	Q				
60+40	0.0000	0.00	Q				
60+45	0.0000	0.00	Q				
60+50	0.0000	0.00	Q				
60+55	0.0000	0.00	Q				
61+ 0	0.0000	0.00	Q				
61+ 5	0.0000	0.00	Q				
61+10	0.0000	0.00	Q				
61+15	0.0000	0.00	Q				
61+20	0.0000	0.00	Q				
61+25	0.0000	0.00	Q				
61+30	0.0000	0.00	Q				
61+35	0.0000	0.00	Q				
61+40	0.0000	0.00	Q				
61+45	0.0000	0.00	Q				
61+50	0.0000	0.00	Q				
61+55	0.0000	0.00	Q				
62+ 0	0.0000	0.00	Q				
62+ 5	0.0000	0.00	Q				
62+10	0.0000	0.00	Q				
62+15	0.0000	0.00	Q				
62+20	0.0000	0.00	Q				
62+25	0.0000	0.00	Q				
62+30	0.0000	0.00	Q				
62+35	0.0000	0.00	Q				
62+40	0.0000	0.00	Q				
62+45	0.0000	0.00	Q				
62+50	0.0000	0.00	Q				
62+55	0.0000	0.00	Q				
63+ 0	0.0000	0.00	Q				
63+ 5	0.0000	0.00	Q				
63+10	0.0000	0.00	Q				
63+15	0.0000	0.00	Q				
63+20	0.0000	0.00	Q				
63+25	0.0000	0.00	Q				
63+30	0.0000	0.00	Q				
63+35	0.0000	0.00	Q				
63+40	0.0000	0.00	Q				
63+45	0.0000	0.00	Q				
63+50	0.0000	0.00	Q				
63+55	0.0000	0.00	Q				
64+ 0	0.0000	0.00	Q				
64+ 5	0.0000	0.00	Q				
64+10	0.0000	0.00	Q				
64+15	0.0000	0.00	Q				
64+20	0.0000	0.00	Q				
64+25	0.0000	0.00	Q				
64+30	0.0000	0.00	Q				
64+35	0.0000	0.00	Q				
64+40	0.0000	0.00	Q				
64+45	0.0000	0.00	Q				
64+50	0.0000	0.00	Q				
64+55	0.0000	0.00	Q				
65+ 0	0.0000	0.00	Q				
65+ 5	0.0000	0.00	Q				

65+10	0.0000	0.00	Q				
65+15	0.0000	0.00	Q				
65+20	0.0000	0.00	Q				
65+25	0.0000	0.00	Q				
65+30	0.0000	0.00	Q				
65+35	0.0000	0.00	Q				
65+40	0.0000	0.00	Q				
65+45	0.0000	0.00	Q				
65+50	0.0000	0.00	Q				
65+55	0.0000	0.00	Q				
66+ 0	0.0000	0.00	Q				
66+ 5	0.0000	0.00	Q				
66+10	0.0000	0.00	Q				
66+15	0.0000	0.00	Q				
66+20	0.0000	0.00	Q				
66+25	0.0000	0.00	Q				
66+30	0.0000	0.00	Q				
66+35	0.0000	0.00	Q				
66+40	0.0000	0.00	Q				
66+45	0.0000	0.00	Q				
66+50	0.0000	0.00	Q				
66+55	0.0000	0.00	Q				
67+ 0	0.0000	0.00	Q				
67+ 5	0.0000	0.00	Q				
67+10	0.0000	0.00	Q				
67+15	0.0000	0.00	Q				
67+20	0.0000	0.00	Q				
67+25	0.0000	0.00	Q				
67+30	0.0000	0.00	Q				
67+35	0.0000	0.00	Q				
67+40	0.0000	0.00	Q				
67+45	0.0000	0.00	Q				
67+50	0.0000	0.00	Q				
67+55	0.0000	0.00	Q				
68+ 0	0.0000	0.00	Q				
68+ 5	0.0000	0.00	Q				
68+10	0.0000	0.00	Q				

**********HYDROGRAPH DATA**********

Number of intervals = 818
Time interval = 5.0 (Min.)
Maximum/Peak flow rate = 19.016 (CFS)
Total volume = 10.449 (Ac.Ft)

Status of hydrographs being held in storage

	Stream 1	Stream 2	Stream 3	Stream 4	Stream 5
Peak (CFS)	0.000	0.000	0.000	0.000	0.000
Vol (Ac.Ft)	0.000	0.000	0.000	0.000	0.000

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Process from Point/Station 3.000 to Point/Station 5.000

**** STREAM ROUTING SCS CONVEX METHOD ****

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HYDROGRAPH STREAM ROUTING DATA:

Length of stream = 1142.00 (Ft.)
Elevation difference = 12.00 (Ft.)
Slope of channel = 0.010508 (Vert/Horiz)

Channel type - Pipe

Pipe length = 1142.00(Ft.) Elevation difference = 12.00(Ft.)
Manning's N = 0.013 No. of pipes = 1
Pipe evaluation using mean flow rate of hydrograph
Required pipe flow = 4.591(CFS)
Nearest computed pipe diameter = 15.00(In.)
Calculated individual pipe flow = 4.591(CFS)
Normal flow depth in pipe = 9.19(In.)
Flow top width inside pipe = 14.62(In.)
Critical Depth = 0.87(Ft.)
Pipe flow velocity = 5.83(Ft/s)
Travel time through pipe = 3.27 min.

Pipe length = 1142.00(Ft.) Elevation difference = 12.00(Ft.)
Manning's N = 0.013 No. of pipes = 1
Pipe evaluation using maximum flow rate of hydrograph
Required pipe flow = 19.016(CFS)
Nearest computed pipe diameter = 24.00(In.)
Calculated individual pipe flow = 19.016(CFS)
Normal flow depth in pipe = 16.55(In.)
Flow top width inside pipe = 22.21(In.)
Critical Depth = 1.57(Ft.)
Pipe flow velocity = 8.24(Ft/s)
Travel time through pipe = 2.31 min.

********** SCS CONVEX CHANNEL ROUTING **********
Convex method of stream routing data items:
Using equation: Outflow =
O(t+dt) = (1-c*)O(t+dt-dt*) + Input(c*)
where c* = 1 - (1-c)^e and dt = c(length)/velocity
c(v/v+1.7) = 0.8289 Travel time = 2.31 (min.)
dt*(unit time interval) = 5.00(min.), e= 2.0738
dt(routing time-step) = 1.92 (min.), c* = 0.9743

Output hydrograph delayed by 0 unit time increments

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P R I N T O F S T O R M
R u n o f f H y d r o g r a p h

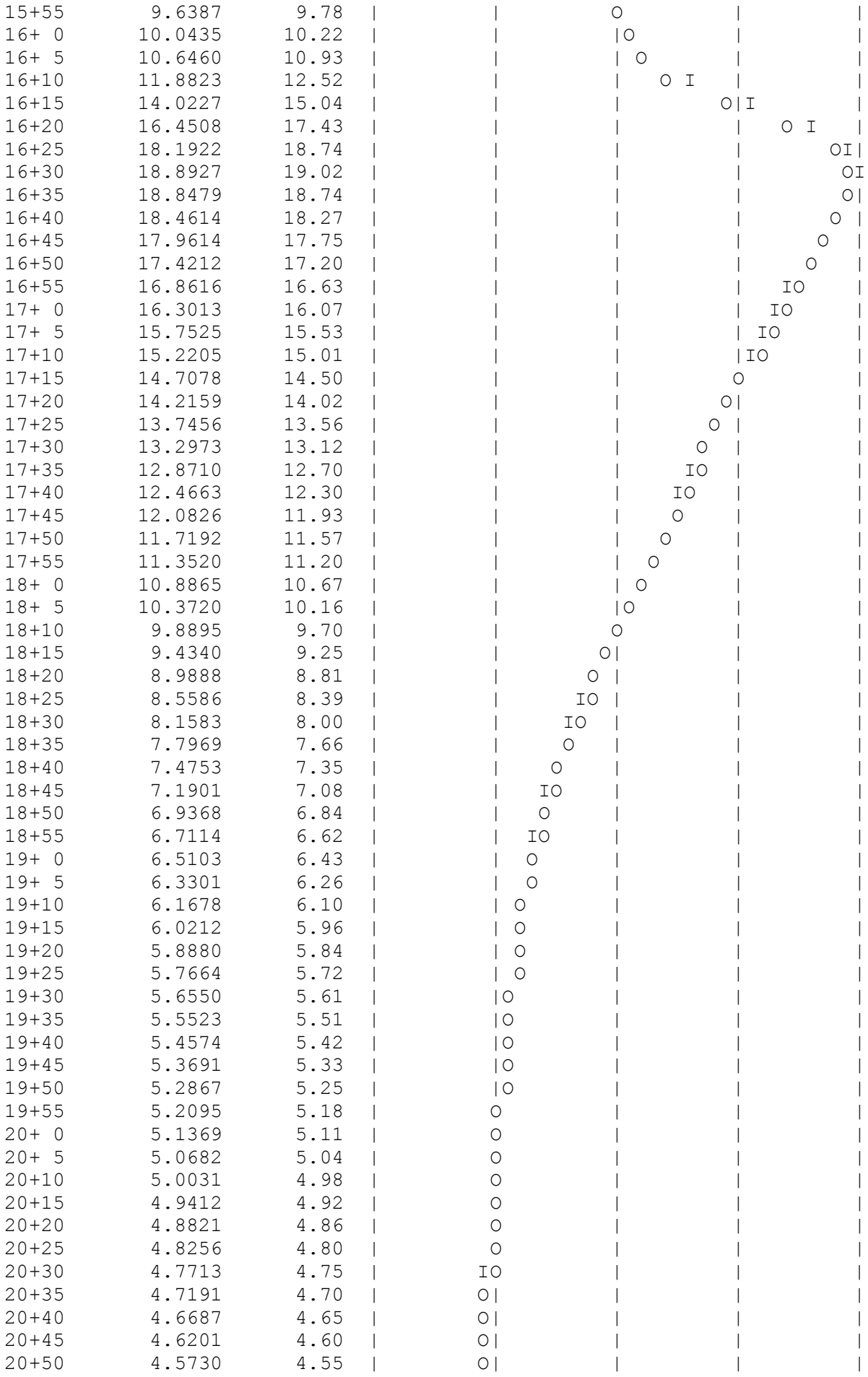
Hydrograph in 5 Minute intervals (CFS)

Time(h+m)	Out = O(CFS)	In = I	0	4.8	9.5	14.3	19.0
0+ 5	0.0020	0.00	O				
0+10	0.0185	0.03	O				
0+15	0.0724	0.10	O				
0+20	0.1752	0.23	O				
0+25	0.3124	0.37	O				
0+30	0.4587	0.52	OI				
0+35	0.5966	0.65	|O				
0+40	0.7198	0.77	|O				
0+45	0.8279	0.87	|O				
0+50	0.9224	0.96	|OI				

0+55	1.0047	1.04	O				
1+ 0	1.0764	1.10	O				
1+ 5	1.1392	1.16	O				
1+10	1.1945	1.22	O				
1+15	1.2434	1.26	O				
1+20	1.2868	1.30	O				
1+25	1.3256	1.34	O				
1+30	1.3606	1.37	O				
1+35	1.3922	1.40	O				
1+40	1.4210	1.43	OI				
1+45	1.4474	1.46	O				
1+50	1.4719	1.48	O				
1+55	1.4946	1.50	O				
2+ 0	1.5158	1.52	O				
2+ 5	1.5359	1.54	O				
2+10	1.5548	1.56	O				
2+15	1.5729	1.58	O				
2+20	1.5902	1.60	O				
2+25	1.6069	1.61	O				
2+30	1.6230	1.63	O				
2+35	1.6387	1.65	O				
2+40	1.6539	1.66	O				
2+45	1.6688	1.67	O				
2+50	1.6834	1.69	O				
2+55	1.6978	1.70	O				
3+ 0	1.7119	1.72	O				
3+ 5	1.7259	1.73	O				
3+10	1.7397	1.75	O				
3+15	1.7534	1.76	O				
3+20	1.7670	1.77	O				
3+25	1.7804	1.79	O				
3+30	1.7938	1.80	O				
3+35	1.8072	1.81	O				
3+40	1.8204	1.83	O				
3+45	1.8337	1.84	O				
3+50	1.8469	1.85	O				
3+55	1.8600	1.87	O				
4+ 0	1.8732	1.88	O				
4+ 5	1.8863	1.89	O				
4+10	1.8994	1.90	OI				
4+15	1.9125	1.92	O				
4+20	1.9256	1.93	O				
4+25	1.9387	1.94	O				
4+30	1.9519	1.96	O				
4+35	1.9650	1.97	O				
4+40	1.9782	1.98	O				
4+45	1.9913	2.00	O				
4+50	2.0045	2.01	O				
4+55	2.0177	2.02	O				
5+ 0	2.0310	2.04	O				
5+ 5	2.0443	2.05	O				
5+10	2.0576	2.06	O				
5+15	2.0710	2.08	O				
5+20	2.0844	2.09	O				
5+25	2.0979	2.10	O				
5+30	2.1114	2.12	O				
5+35	2.1249	2.13	O				
5+40	2.1385	2.14	O				
5+45	2.1522	2.16	O				
5+50	2.1659	2.17	O				

5+55	2.1797	2.19	O				
6+ 0	2.1936	2.20	O				
6+ 5	2.2075	2.21	O				
6+10	2.2215	2.23	O				
6+15	2.2356	2.24	O				
6+20	2.2498	2.26	O				
6+25	2.2640	2.27	O				
6+30	2.2784	2.28	O				
6+35	2.2928	2.30	O				
6+40	2.3073	2.31	O				
6+45	2.3219	2.33	O				
6+50	2.3367	2.34	O				
6+55	2.3515	2.36	O				
7+ 0	2.3664	2.37	O				
7+ 5	2.3815	2.39	O				
7+10	2.3967	2.40	O				
7+15	2.4119	2.42	O				
7+20	2.4274	2.43	O				
7+25	2.4429	2.45	O				
7+30	2.4586	2.47	O				
7+35	2.4744	2.48	O				
7+40	2.4904	2.50	O				
7+45	2.5065	2.51	O				
7+50	2.5228	2.53	O				
7+55	2.5392	2.55	O				
8+ 0	2.5558	2.56	O				
8+ 5	2.5726	2.58	O				
8+10	2.5896	2.60	O				
8+15	2.6067	2.61	O				
8+20	2.6240	2.63	O				
8+25	2.6415	2.65	O				
8+30	2.6592	2.67	O				
8+35	2.6771	2.68	O				
8+40	2.6953	2.70	O				
8+45	2.7136	2.72	O				
8+50	2.7322	2.74	O				
8+55	2.7510	2.76	O				
9+ 0	2.7701	2.78	O				
9+ 5	2.7894	2.80	O				
9+10	2.8089	2.82	O				
9+15	2.8288	2.84	O				
9+20	2.8489	2.86	OI				
9+25	2.8693	2.88	O				
9+30	2.8899	2.90	O				
9+35	2.9109	2.92	O				
9+40	2.9322	2.94	O				
9+45	2.9539	2.96	O				
9+50	2.9758	2.98	O				
9+55	2.9981	3.01	O				
10+ 0	3.0208	3.03	O				
10+ 5	3.0438	3.05	O				
10+10	3.0673	3.08	O				
10+15	3.0911	3.10	O				
10+20	3.1153	3.13	O				
10+25	3.1400	3.15	O				
10+30	3.1651	3.18	O				
10+35	3.1907	3.20	O				
10+40	3.2167	3.23	O				
10+45	3.2433	3.25	O				
10+50	3.2701	3.28	O				

10+55	3.2961	3.31	O				
11+ 0	3.3218	3.33	OI				
11+ 5	3.3481	3.36	O				
11+10	3.3750	3.39	O				
11+15	3.4025	3.41	O				
11+20	3.4306	3.44	O				
11+25	3.4594	3.47	O				
11+30	3.4889	3.50	O				
11+35	3.5191	3.53	O				
11+40	3.5501	3.56	O				
11+45	3.5818	3.59	O				
11+50	3.6144	3.63	O				
11+55	3.6478	3.66	O				
12+ 0	3.6821	3.70	O				
12+ 5	3.7189	3.73	O				
12+10	3.7678	3.79	O				
12+15	3.8470	3.89	O				
12+20	3.9661	4.02	O				
12+25	4.1140	4.18	O				
12+30	4.2703	4.33	OI				
12+35	4.4208	4.48	O				
12+40	4.5604	4.62	O				
12+45	4.6890	4.74	O				
12+50	4.8078	4.85	O				
12+55	4.9181	4.96	O				
13+ 0	5.0212	5.06	O				
13+ 5	5.1187	5.16	O				
13+10	5.2117	5.25	OI				
13+15	5.3012	5.34	O				
13+20	5.3882	5.42	O				
13+25	5.4734	5.51	O				
13+30	5.5577	5.59	O				
13+35	5.6414	5.68	O				
13+40	5.7254	5.76	O				
13+45	5.8100	5.84	O				
13+50	5.8957	5.93	O				
13+55	5.9831	6.02	O				
14+ 0	6.0724	6.11	O				
14+ 5	6.1643	6.20	OI				
14+10	6.2591	6.30	O				
14+15	6.3577	6.40	O				
14+20	6.4605	6.50	O				
14+25	6.5680	6.61	O				
14+30	6.6803	6.73	O				
14+35	6.7980	6.85	O				
14+40	6.9216	6.97	O				
14+45	7.0519	7.11	O				
14+50	7.1897	7.25	O				
14+55	7.3360	7.40	O				
15+ 0	7.4921	7.56	O				
15+ 5	7.6593	7.73	O				
15+10	7.8392	7.91	O				
15+15	8.0340	8.12	OI				
15+20	8.2462	8.34	O				
15+25	8.4755	8.57	OI				
15+30	8.7042	8.80	O				
15+35	8.8966	8.97	O				
15+40	9.0382	9.09	O				
15+45	9.1659	9.22	O				
15+50	9.3447	9.43	O				



20+55	4.5273	4.51	| O|	|	|	|
21+ 0	4.4829	4.46	| O|	|	|	|
21+ 5	4.4397	4.42	| O|	|	|	|
21+10	4.3976	4.38	| O|	|	|	|
21+15	4.3565	4.34	| O|	|	|	|
21+20	4.3165	4.30	| O|	|	|	|
21+25	4.2773	4.26	| O |	|	|	|
21+30	4.2390	4.22	| O |	|	|	|
21+35	4.2015	4.19	| O |	|	|	|
21+40	4.1647	4.15	| O |	|	|	|
21+45	4.1287	4.11	| O |	|	|	|
21+50	4.0933	4.08	| O |	|	|	|
21+55	4.0586	4.04	| O |	|	|	|
22+ 0	4.0245	4.01	| O |	|	|	|
22+ 5	3.9910	3.98	| O |	|	|	|
22+10	3.9593	3.95	| O |	|	|	|
22+15	3.9290	3.92	| O |	|	|	|
22+20	3.8993	3.89	| O |	|	|	|
22+25	3.8700	3.86	| O |	|	|	|
22+30	3.8412	3.83	| O |	|	|	|
22+35	3.8128	3.80	| IO |	|	|	|
22+40	3.7849	3.77	| O |	|	|	|
22+45	3.7574	3.75	| O |	|	|	|
22+50	3.7302	3.72	| O |	|	|	|
22+55	3.7034	3.69	| O |	|	|	|
23+ 0	3.6770	3.67	| O |	|	|	|
23+ 5	3.6510	3.64	| O |	|	|	|
23+10	3.6253	3.61	| O |	|	|	|
23+15	3.6000	3.59	| O |	|	|	|
23+20	3.5749	3.56	| O |	|	|	|
23+25	3.5502	3.54	| O |	|	|	|
23+30	3.5259	3.52	| O |	|	|	|
23+35	3.5018	3.49	| O |	|	|	|
23+40	3.4780	3.47	| O |	|	|	|
23+45	3.4545	3.44	| O |	|	|	|
23+50	3.4313	3.42	| O |	|	|	|
23+55	3.4084	3.40	| O |	|	|	|
24+ 0	3.3857	3.38	| O |	|	|	|
24+ 5	3.3614	3.35	| O |	|	|	|
24+10	3.3237	3.31	| O |	|	|	|
24+15	3.2503	3.21	| O |	|	|	|
24+20	3.1298	3.07	| O |	|	|	|
24+25	2.9763	2.91	| O |	|	|	|
24+30	2.8152	2.75	| O |	|	|	|
24+35	2.6639	2.60	| O |	|	|	|
24+40	2.5287	2.48	| O |	|	|	|
24+45	2.4097	2.36	| IO |	|	|	|
24+50	2.3055	2.27	| O |	|	|	|
24+55	2.2144	2.18	| O |	|	|	|
25+ 0	2.1345	2.10	| O |	|	|	|
25+ 5	2.0643	2.04	| O |	|	|	|
25+10	2.0022	1.98	| O |	|	|	|
25+15	1.9471	1.93	| O |	|	|	|
25+20	1.8978	1.88	| O |	|	|	|
25+25	1.8536	1.84	| O |	|	|	|
25+30	1.8136	1.80	| O |	|	|	|
25+35	1.7773	1.76	| O |	|	|	|
25+40	1.7440	1.73	| O |	|	|	|
25+45	1.7134	1.70	| O |	|	|	|
25+50	1.6851	1.67	| O |	|	|	|

25+55	1.6587	1.65	| O	|	|	|	|
26+ 0	1.6339	1.62	| O	|	|	|	|
26+ 5	1.6106	1.60	| O	|	|	|	|
26+10	1.5885	1.58	| O	|	|	|	|
26+15	1.5675	1.56	| O	|	|	|	|
26+20	1.5475	1.54	| O	|	|	|	|
26+25	1.5282	1.52	| O	|	|	|	|
26+30	1.5096	1.50	| O	|	|	|	|
26+35	1.4917	1.48	| O	|	|	|	|
26+40	1.4743	1.47	| O	|	|	|	|
26+45	1.4574	1.45	| O	|	|	|	|
26+50	1.4410	1.43	| O	|	|	|	|
26+55	1.4218	1.41	| O	|	|	|	|
27+ 0	1.4038	1.40	| O	|	|	|	|
27+ 5	1.3887	1.38	| O	|	|	|	|
27+10	1.3744	1.37	| O	|	|	|	|
27+15	1.3602	1.35	| O	|	|	|	|
27+20	1.3462	1.34	| O	|	|	|	|
27+25	1.3323	1.33	| O	|	|	|	|
27+30	1.3185	1.31	| O	|	|	|	|
27+35	1.3049	1.30	| O	|	|	|	|
27+40	1.2915	1.29	| O	|	|	|	|
27+45	1.2781	1.27	| O	|	|	|	|
27+50	1.2650	1.26	| O	|	|	|	|
27+55	1.2519	1.25	| O	|	|	|	|
28+ 0	1.2390	1.23	| O	|	|	|	|
28+ 5	1.2262	1.22	| O	|	|	|	|
28+10	1.2136	1.21	| O	|	|	|	|
28+15	1.2011	1.20	| O	|	|	|	|
28+20	1.1887	1.18	| O	|	|	|	|
28+25	1.1764	1.17	| O	|	|	|	|
28+30	1.1643	1.16	| O	|	|	|	|
28+35	1.1523	1.15	| O	|	|	|	|
28+40	1.1404	1.14	| O	|	|	|	|
28+45	1.1286	1.12	| O	|	|	|	|
28+50	1.1170	1.11	| O	|	|	|	|
28+55	1.1055	1.10	| O	|	|	|	|
29+ 0	1.0940	1.09	| O	|	|	|	|
29+ 5	1.0828	1.08	| O	|	|	|	|
29+10	1.0716	1.07	| O	|	|	|	|
29+15	1.0605	1.06	| O	|	|	|	|
29+20	1.0496	1.05	| O	|	|	|	|
29+25	1.0388	1.03	| O	|	|	|	|
29+30	1.0281	1.02	| O	|	|	|	|
29+35	1.0175	1.01	| O	|	|	|	|
29+40	1.0070	1.00	| O	|	|	|	|
29+45	0.9966	0.99	| O	|	|	|	|
29+50	0.9863	0.98	| O	|	|	|	|
29+55	0.9761	0.97	| O	|	|	|	|
30+ 0	0.9661	0.96	| O	|	|	|	|
30+ 5	0.9539	0.95	|IO	|	|	|	|
30+10	0.9401	0.93	|O	|	|	|	|
30+15	0.9261	0.92	|O	|	|	|	|
30+20	0.9123	0.91	|O	|	|	|	|
30+25	0.8987	0.89	|O	|	|	|	|
30+30	0.8853	0.88	|O	|	|	|	|
30+35	0.8721	0.87	|O	|	|	|	|
30+40	0.8591	0.85	|O	|	|	|	|
30+45	0.8463	0.84	|O	|	|	|	|
30+50	0.8336	0.83	|O	|	|	|	|

30+55	0.8212	0.82	|O	|	|	|	|
31+ 0	0.8090	0.80	|O	|	|	|	|
31+ 5	0.7969	0.79	|O	|	|	|	|
31+10	0.7850	0.78	|O	|	|	|	|
31+15	0.7733	0.77	|O	|	|	|	|
31+20	0.7618	0.76	|O	|	|	|	|
31+25	0.7504	0.75	|O	|	|	|	|
31+30	0.7392	0.73	|O	|	|	|	|
31+35	0.7282	0.72	|O	|	|	|	|
31+40	0.7173	0.71	|O	|	|	|	|
31+45	0.7066	0.70	|O	|	|	|	|
31+50	0.6961	0.69	|O	|	|	|	|
31+55	0.6857	0.68	|O	|	|	|	|
32+ 0	0.6755	0.67	|O	|	|	|	|
32+ 5	0.6654	0.66	|O	|	|	|	|
32+10	0.6555	0.65	|O	|	|	|	|
32+15	0.6457	0.64	|O	|	|	|	|
32+20	0.6361	0.63	|O	|	|	|	|
32+25	0.6266	0.62	|O	|	|	|	|
32+30	0.6172	0.61	|O	|	|	|	|
32+35	0.6080	0.60	|O	|	|	|	|
32+40	0.5990	0.60	|O	|	|	|	|
32+45	0.5900	0.59	|O	|	|	|	|
32+50	0.5812	0.58	|O	|	|	|	|
32+55	0.5726	0.57	|O	|	|	|	|
33+ 0	0.5640	0.56	|O	|	|	|	|
33+ 5	0.5556	0.55	|O	|	|	|	|
33+10	0.5473	0.54	|O	|	|	|	|
33+15	0.5392	0.54	|O	|	|	|	|
33+20	0.5311	0.53	|O	|	|	|	|
33+25	0.5232	0.52	|O	|	|	|	|
33+30	0.5154	0.51	|O	|	|	|	|
33+35	0.5077	0.50	|O	|	|	|	|
33+40	0.5001	0.50	|O	|	|	|	|
33+45	0.4927	0.49	|O	|	|	|	|
33+50	0.4853	0.48	|O	|	|	|	|
33+55	0.4781	0.48	IO	|	|	|	|
34+ 0	0.4710	0.47	O	|	|	|	|
34+ 5	0.4639	0.46	O	|	|	|	|
34+10	0.4570	0.45	O	|	|	|	|
34+15	0.4502	0.45	O	|	|	|	|
34+20	0.4435	0.44	O	|	|	|	|
34+25	0.4369	0.43	O	|	|	|	|
34+30	0.4304	0.43	O	|	|	|	|
34+35	0.4239	0.42	O	|	|	|	|
34+40	0.4176	0.42	O	|	|	|	|
34+45	0.4114	0.41	O	|	|	|	|
34+50	0.4053	0.40	O	|	|	|	|
34+55	0.3992	0.40	O	|	|	|	|
35+ 0	0.3933	0.39	O	|	|	|	|
35+ 5	0.3874	0.39	O	|	|	|	|
35+10	0.3816	0.38	O	|	|	|	|
35+15	0.3759	0.37	O	|	|	|	|
35+20	0.3703	0.37	O	|	|	|	|
35+25	0.3648	0.36	O	|	|	|	|
35+30	0.3594	0.36	O	|	|	|	|
35+35	0.3540	0.35	O	|	|	|	|
35+40	0.3487	0.35	O	|	|	|	|
35+45	0.3435	0.34	O	|	|	|	|
35+50	0.3384	0.34	O	|	|	|	|

35+55	0.3333	0.33	O				
36+ 0	0.3284	0.33	O				
36+ 5	0.3235	0.32	O				
36+10	0.3186	0.32	O				
36+15	0.3139	0.31	O				
36+20	0.3092	0.31	O				
36+25	0.3046	0.30	O				
36+30	0.3001	0.30	O				
36+35	0.2956	0.29	O				
36+40	0.2912	0.29	O				
36+45	0.2868	0.29	O				
36+50	0.2826	0.28	O				
36+55	0.2783	0.28	O				
37+ 0	0.2742	0.27	O				
37+ 5	0.2701	0.27	O				
37+10	0.2661	0.26	O				
37+15	0.2621	0.26	O				
37+20	0.2582	0.26	O				
37+25	0.2543	0.25	O				
37+30	0.2506	0.25	O				
37+35	0.2468	0.25	O				
37+40	0.2431	0.24	O				
37+45	0.2395	0.24	O				
37+50	0.2359	0.23	O				
37+55	0.2324	0.23	O				
38+ 0	0.2290	0.23	O				
38+ 5	0.2255	0.22	O				
38+10	0.2222	0.22	O				
38+15	0.2189	0.22	O				
38+20	0.2156	0.21	O				
38+25	0.2124	0.21	O				
38+30	0.2092	0.21	O				
38+35	0.2061	0.20	O				
38+40	0.2030	0.20	O				
38+45	0.2000	0.20	O				
38+50	0.1970	0.20	O				
38+55	0.1941	0.19	O				
39+ 0	0.1912	0.19	O				
39+ 5	0.1883	0.19	O				
39+10	0.1855	0.18	O				
39+15	0.1827	0.18	O				
39+20	0.1800	0.18	O				
39+25	0.1773	0.18	O				
39+30	0.1747	0.17	O				
39+35	0.1721	0.17	O				
39+40	0.1695	0.17	O				
39+45	0.1670	0.17	O				
39+50	0.1645	0.16	O				
39+55	0.1620	0.16	O				
40+ 0	0.1596	0.16	O				
40+ 5	0.1573	0.16	O				
40+10	0.1549	0.15	O				
40+15	0.1526	0.15	O				
40+20	0.1503	0.15	O				
40+25	0.1481	0.15	O				
40+30	0.1459	0.14	O				
40+35	0.1437	0.14	O				
40+40	0.1416	0.14	O				
40+45	0.1394	0.14	O				
40+50	0.1374	0.14	O				

40+55	0.1353	0.13	O				
41+ 0	0.1333	0.13	O				
41+ 5	0.1313	0.13	O				
41+10	0.1293	0.13	O				
41+15	0.1274	0.13	O				
41+20	0.1255	0.12	O				
41+25	0.1236	0.12	O				
41+30	0.1218	0.12	O				
41+35	0.1200	0.12	O				
41+40	0.1182	0.12	O				
41+45	0.1164	0.12	O				
41+50	0.1147	0.11	O				
41+55	0.1130	0.11	O				
42+ 0	0.1113	0.11	O				
42+ 5	0.1096	0.11	O				
42+10	0.1080	0.11	O				
42+15	0.1064	0.11	O				
42+20	0.1048	0.10	O				
42+25	0.1032	0.10	O				
42+30	0.1017	0.10	O				
42+35	0.1002	0.10	O				
42+40	0.0987	0.10	O				
42+45	0.0972	0.10	O				
42+50	0.0958	0.10	O				
42+55	0.0943	0.09	O				
43+ 0	0.0929	0.09	O				
43+ 5	0.0915	0.09	O				
43+10	0.0902	0.09	O				
43+15	0.0888	0.09	O				
43+20	0.0875	0.09	O				
43+25	0.0862	0.09	O				
43+30	0.0849	0.08	O				
43+35	0.0837	0.08	O				
43+40	0.0824	0.08	O				
43+45	0.0812	0.08	O				
43+50	0.0800	0.08	O				
43+55	0.0788	0.08	O				
44+ 0	0.0776	0.08	O				
44+ 5	0.0764	0.08	O				
44+10	0.0753	0.07	O				
44+15	0.0742	0.07	O				
44+20	0.0731	0.07	O				
44+25	0.0720	0.07	O				
44+30	0.0709	0.07	O				
44+35	0.0699	0.07	O				
44+40	0.0688	0.07	O				
44+45	0.0678	0.07	O				
44+50	0.0668	0.07	O				
44+55	0.0658	0.07	O				
45+ 0	0.0648	0.06	O				
45+ 5	0.0638	0.06	O				
45+10	0.0629	0.06	O				
45+15	0.0619	0.06	O				
45+20	0.0610	0.06	O				
45+25	0.0601	0.06	O				
45+30	0.0592	0.06	O				
45+35	0.0583	0.06	O				
45+40	0.0575	0.06	O				
45+45	0.0566	0.06	O				
45+50	0.0558	0.06	O				

45+55	0.0549	0.05	O				
46+ 0	0.0541	0.05	O				
46+ 5	0.0533	0.05	O				
46+10	0.0525	0.05	O				
46+15	0.0517	0.05	O				
46+20	0.0510	0.05	O				
46+25	0.0502	0.05	O				
46+30	0.0494	0.05	O				
46+35	0.0487	0.05	O				
46+40	0.0480	0.05	O				
46+45	0.0473	0.05	O				
46+50	0.0466	0.05	O				
46+55	0.0459	0.05	O				
47+ 0	0.0452	0.04	O				
47+ 5	0.0445	0.04	O				
47+10	0.0438	0.04	O				
47+15	0.0432	0.04	O				
47+20	0.0425	0.04	O				
47+25	0.0419	0.04	O				
47+30	0.0413	0.04	O				
47+35	0.0407	0.04	O				
47+40	0.0401	0.04	O				
47+45	0.0395	0.04	O				
47+50	0.0389	0.04	O				
47+55	0.0383	0.04	O				
48+ 0	0.0377	0.04	O				
48+ 5	0.0372	0.04	O				
48+10	0.0366	0.04	O				
48+15	0.0361	0.04	O				
48+20	0.0355	0.04	O				
48+25	0.0350	0.03	O				
48+30	0.0345	0.03	O				
48+35	0.0340	0.03	O				
48+40	0.0335	0.03	O				
48+45	0.0330	0.03	O				
48+50	0.0325	0.03	O				
48+55	0.0320	0.03	O				
49+ 0	0.0315	0.03	O				
49+ 5	0.0310	0.03	O				
49+10	0.0306	0.03	O				
49+15	0.0301	0.03	O				
49+20	0.0297	0.03	O				
49+25	0.0292	0.03	O				
49+30	0.0288	0.03	O				
49+35	0.0284	0.03	O				
49+40	0.0279	0.03	O				
49+45	0.0275	0.03	O				
49+50	0.0271	0.03	O				
49+55	0.0267	0.03	O				
50+ 0	0.0263	0.03	O				
50+ 5	0.0259	0.03	O				
50+10	0.0255	0.03	O				
50+15	0.0251	0.02	O				
50+20	0.0248	0.02	O				
50+25	0.0244	0.02	O				
50+30	0.0240	0.02	O				
50+35	0.0237	0.02	O				
50+40	0.0233	0.02	O				
50+45	0.0230	0.02	O				
50+50	0.0226	0.02	O				

50+55	0.0223	0.02	O				
51+ 0	0.0220	0.02	O				
51+ 5	0.0216	0.02	O				
51+10	0.0213	0.02	O				
51+15	0.0210	0.02	O				
51+20	0.0207	0.02	O				
51+25	0.0204	0.02	O				
51+30	0.0201	0.02	O				
51+35	0.0198	0.02	O				
51+40	0.0195	0.02	O				
51+45	0.0192	0.02	O				
51+50	0.0189	0.02	O				
51+55	0.0186	0.02	O				
52+ 0	0.0183	0.02	O				
52+ 5	0.0181	0.02	O				
52+10	0.0178	0.02	O				
52+15	0.0175	0.02	O				
52+20	0.0173	0.02	O				
52+25	0.0170	0.02	O				
52+30	0.0168	0.02	O				
52+35	0.0165	0.02	O				
52+40	0.0163	0.02	O				
52+45	0.0160	0.02	O				
52+50	0.0158	0.02	O				
52+55	0.0155	0.02	O				
53+ 0	0.0153	0.02	O				
53+ 5	0.0151	0.01	O				
53+10	0.0149	0.01	O				
53+15	0.0146	0.01	O				
53+20	0.0144	0.01	O				
53+25	0.0142	0.01	O				
53+30	0.0140	0.01	O				
53+35	0.0138	0.01	O				
53+40	0.0136	0.01	O				
53+45	0.0134	0.01	O				
53+50	0.0132	0.01	O				
53+55	0.0130	0.01	O				
54+ 0	0.0128	0.01	O				
54+ 5	0.0126	0.01	O				
54+10	0.0124	0.01	O				
54+15	0.0122	0.01	O				
54+20	0.0120	0.01	O				
54+25	0.0119	0.01	O				
54+30	0.0117	0.01	O				
54+35	0.0115	0.01	O				
54+40	0.0113	0.01	O				
54+45	0.0112	0.01	O				
54+50	0.0110	0.01	O				
54+55	0.0108	0.01	O				
55+ 0	0.0107	0.01	O				
55+ 5	0.0105	0.01	O				
55+10	0.0104	0.01	O				
55+15	0.0102	0.01	O				
55+20	0.0101	0.01	O				
55+25	0.0099	0.01	O				
55+30	0.0098	0.01	O				
55+35	0.0096	0.01	O				
55+40	0.0095	0.01	O				
55+45	0.0093	0.01	O				
55+50	0.0092	0.01	O				

55+55	0.0091	0.01	O				
56+ 0	0.0089	0.01	O				
56+ 5	0.0088	0.01	O				
56+10	0.0087	0.01	O				
56+15	0.0085	0.01	O				
56+20	0.0084	0.01	O				
56+25	0.0083	0.01	O				
56+30	0.0081	0.01	O				
56+35	0.0080	0.01	O				
56+40	0.0079	0.01	O				
56+45	0.0078	0.01	O				
56+50	0.0077	0.01	O				
56+55	0.0076	0.01	O				
57+ 0	0.0074	0.01	O				
57+ 5	0.0073	0.01	O				
57+10	0.0072	0.01	O				
57+15	0.0071	0.01	O				
57+20	0.0070	0.01	O				
57+25	0.0069	0.01	O				
57+30	0.0068	0.01	O				
57+35	0.0067	0.01	O				
57+40	0.0066	0.01	O				
57+45	0.0065	0.01	O				
57+50	0.0064	0.01	O				
57+55	0.0063	0.01	O				
58+ 0	0.0062	0.01	O				
58+ 5	0.0061	0.01	O				
58+10	0.0060	0.01	O				
58+15	0.0059	0.01	O				
58+20	0.0059	0.01	O				
58+25	0.0058	0.01	O				
58+30	0.0057	0.01	O				
58+35	0.0056	0.01	O				
58+40	0.0055	0.01	O				
58+45	0.0054	0.01	O				
58+50	0.0053	0.01	O				
58+55	0.0053	0.01	O				
59+ 0	0.0052	0.01	O				
59+ 5	0.0051	0.01	O				
59+10	0.0050	0.01	O				
59+15	0.0050	0.00	O				
59+20	0.0049	0.00	O				
59+25	0.0048	0.00	O				
59+30	0.0047	0.00	O				
59+35	0.0047	0.00	O				
59+40	0.0046	0.00	O				
59+45	0.0045	0.00	O				
59+50	0.0045	0.00	O				
59+55	0.0044	0.00	O				
60+ 0	0.0043	0.00	O				
60+ 5	0.0043	0.00	O				
60+10	0.0042	0.00	O				
60+15	0.0041	0.00	O				
60+20	0.0041	0.00	O				
60+25	0.0040	0.00	O				
60+30	0.0040	0.00	O				
60+35	0.0039	0.00	O				
60+40	0.0038	0.00	O				
60+45	0.0038	0.00	O				
60+50	0.0037	0.00	O				

60+55	0.0037	0.00	O				
61+ 0	0.0036	0.00	O				
61+ 5	0.0036	0.00	O				
61+10	0.0035	0.00	O				
61+15	0.0035	0.00	O				
61+20	0.0034	0.00	O				
61+25	0.0034	0.00	O				
61+30	0.0033	0.00	O				
61+35	0.0033	0.00	O				
61+40	0.0032	0.00	O				
61+45	0.0032	0.00	O				
61+50	0.0031	0.00	O				
61+55	0.0031	0.00	O				
62+ 0	0.0030	0.00	O				
62+ 5	0.0030	0.00	O				
62+10	0.0029	0.00	O				
62+15	0.0029	0.00	O				
62+20	0.0028	0.00	O				
62+25	0.0028	0.00	O				
62+30	0.0028	0.00	O				
62+35	0.0027	0.00	O				
62+40	0.0027	0.00	O				
62+45	0.0026	0.00	O				
62+50	0.0026	0.00	O				
62+55	0.0026	0.00	O				
63+ 0	0.0025	0.00	O				
63+ 5	0.0025	0.00	O				
63+10	0.0024	0.00	O				
63+15	0.0024	0.00	O				
63+20	0.0024	0.00	O				
63+25	0.0023	0.00	O				
63+30	0.0023	0.00	O				
63+35	0.0023	0.00	O				
63+40	0.0022	0.00	O				
63+45	0.0022	0.00	O				
63+50	0.0022	0.00	O				
63+55	0.0021	0.00	O				
64+ 0	0.0021	0.00	O				
64+ 5	0.0021	0.00	O				
64+10	0.0020	0.00	O				
64+15	0.0020	0.00	O				
64+20	0.0020	0.00	O				
64+25	0.0020	0.00	O				
64+30	0.0019	0.00	O				
64+35	0.0019	0.00	O				
64+40	0.0019	0.00	O				
64+45	0.0018	0.00	O				
64+50	0.0018	0.00	O				
64+55	0.0018	0.00	O				
65+ 0	0.0018	0.00	O				
65+ 5	0.0017	0.00	O				
65+10	0.0017	0.00	O				
65+15	0.0017	0.00	O				
65+20	0.0017	0.00	O				
65+25	0.0016	0.00	O				
65+30	0.0016	0.00	O				
65+35	0.0016	0.00	O				
65+40	0.0016	0.00	O				
65+45	0.0015	0.00	O				
65+50	0.0015	0.00	O				

65+55	0.0015	0.00	O				
66+ 0	0.0015	0.00	O				
66+ 5	0.0014	0.00	O				
66+10	0.0014	0.00	O				
66+15	0.0014	0.00	O				
66+20	0.0014	0.00	O				
66+25	0.0014	0.00	O				
66+30	0.0013	0.00	O				
66+35	0.0013	0.00	O				
66+40	0.0013	0.00	O				
66+45	0.0013	0.00	O				
66+50	0.0013	0.00	O				
66+55	0.0012	0.00	O				
67+ 0	0.0012	0.00	O				
67+ 5	0.0012	0.00	O				
67+10	0.0012	0.00	O				
67+15	0.0012	0.00	O				
67+20	0.0012	0.00	O				
67+25	0.0011	0.00	O				
67+30	0.0011	0.00	O				
67+35	0.0011	0.00	O				
67+40	0.0011	0.00	O				
67+45	0.0011	0.00	O				
67+50	0.0011	0.00	O				
67+55	0.0010	0.00	O				
68+ 0	0.0010	0.00	O				
68+ 5	0.0010	0.00	O				
68+10	0.0010	0.00	O				
68+15	0.0000	0.00	O				

**********HYDROGRAPH DATA**********

Number of intervals = 819
Time interval = 5.0 (Min.)
Maximum/Peak flow rate = 18.893 (CFS)
Total volume = 10.449 (Ac.Ft)

Status of hydrographs being held in storage

	Stream 1	Stream 2	Stream 3	Stream 4	Stream 5
Peak (CFS)	0.000	0.000	0.000	0.000	0.000
Vol (Ac.Ft)	0.000	0.000	0.000	0.000	0.000

****

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Process from Point/Station 18.000 to Point/Station 5.000

**** ADD/COMBINE/RECOVER HYDROGRAPHS ****

****

********** HYDROGRAPH INFORMATION **********

From study/file name: kimc2.rte

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P R I N T O F S T O R M
R u n o f f H y d r o g r a p h

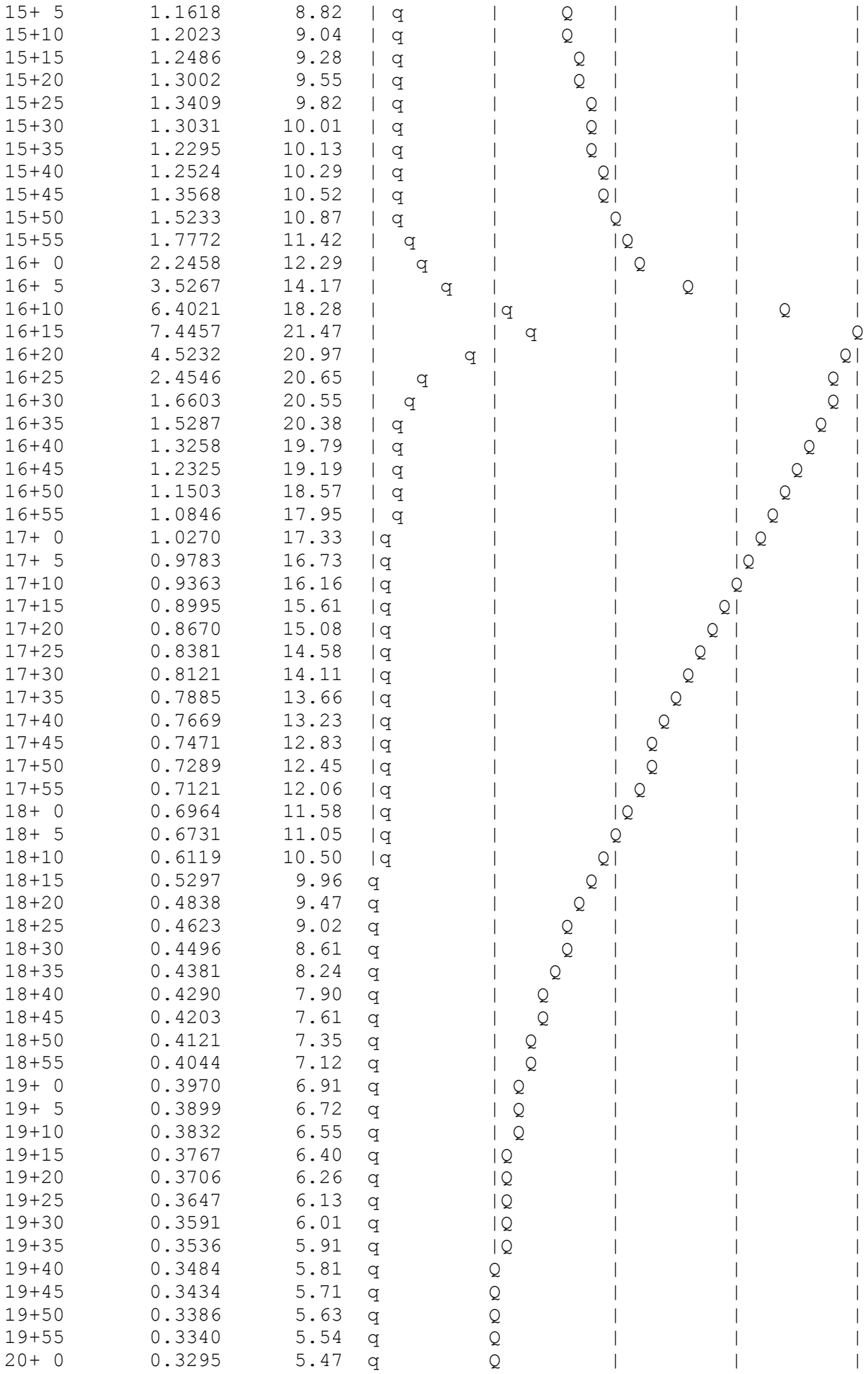
Hydrograph in 5 Minute intervals (CFS)

Time(h+m)	Add q(CFS)	Tot. Q	0	5.4	10.7	16.1	21.5

0+ 5	0.0104	0.01	Q	|	|	|	|
0+10	0.0674	0.09	Q	|	|	|	|
0+15	0.1509	0.22	Q	|	|	|	|
0+20	0.1922	0.37	Q	|	|	|	|
0+25	0.2055	0.52	Q	|	|	|	|
0+30	0.2091	0.67	qQ	|	|	|	|
0+35	0.2119	0.81	qQ	|	|	|	|
0+40	0.2126	0.93	qQ	|	|	|	|
0+45	0.2133	1.04	qQ	|	|	|	|
0+50	0.2140	1.14	q Q	|	|	|	|
0+55	0.2147	1.22	q Q	|	|	|	|
1+ 0	0.2154	1.29	q Q	|	|	|	|
1+ 5	0.2161	1.36	q Q	|	|	|	|
1+10	0.2168	1.41	q Q	|	|	|	|
1+15	0.2175	1.46	q Q	|	|	|	|
1+20	0.2183	1.51	q Q	|	|	|	|
1+25	0.2190	1.54	q Q	|	|	|	|
1+30	0.2197	1.58	q Q	|	|	|	|
1+35	0.2205	1.61	q Q	|	|	|	|
1+40	0.2213	1.64	q Q	|	|	|	|
1+45	0.2220	1.67	q Q	|	|	|	|
1+50	0.2228	1.69	q Q	|	|	|	|
1+55	0.2236	1.72	q Q	|	|	|	|
2+ 0	0.2244	1.74	q Q	|	|	|	|
2+ 5	0.2252	1.76	q Q	|	|	|	|
2+10	0.2260	1.78	q Q	|	|	|	|
2+15	0.2268	1.80	q Q	|	|	|	|
2+20	0.2276	1.82	q Q	|	|	|	|
2+25	0.2284	1.84	q Q	|	|	|	|
2+30	0.2292	1.85	q Q	|	|	|	|
2+35	0.2301	1.87	q Q	|	|	|	|
2+40	0.2309	1.88	q Q	|	|	|	|
2+45	0.2318	1.90	q Q	|	|	|	|
2+50	0.2327	1.92	q Q	|	|	|	|
2+55	0.2335	1.93	q Q	|	|	|	|
3+ 0	0.2344	1.95	q Q	|	|	|	|
3+ 5	0.2353	1.96	q Q	|	|	|	|
3+10	0.2362	1.98	q Q	|	|	|	|
3+15	0.2371	1.99	q Q	|	|	|	|
3+20	0.2380	2.01	q Q	|	|	|	|
3+25	0.2390	2.02	q Q	|	|	|	|
3+30	0.2399	2.03	q Q	|	|	|	|
3+35	0.2409	2.05	q Q	|	|	|	|
3+40	0.2418	2.06	q Q	|	|	|	|
3+45	0.2428	2.08	q Q	|	|	|	|
3+50	0.2438	2.09	q Q	|	|	|	|
3+55	0.2448	2.10	q Q	|	|	|	|
4+ 0	0.2458	2.12	q Q	|	|	|	|
4+ 5	0.2468	2.13	q Q	|	|	|	|
4+10	0.2478	2.15	q Q	|	|	|	|
4+15	0.2488	2.16	q Q	|	|	|	|
4+20	0.2499	2.18	q Q	|	|	|	|
4+25	0.2510	2.19	q Q	|	|	|	|
4+30	0.2520	2.20	q Q	|	|	|	|
4+35	0.2531	2.22	q Q	|	|	|	|
4+40	0.2542	2.23	q Q	|	|	|	|
4+45	0.2553	2.25	q Q	|	|	|	|
4+50	0.2564	2.26	q Q	|	|	|	|
4+55	0.2576	2.28	q Q	|	|	|	|
5+ 0	0.2587	2.29	q Q	|	|	|	|

5+ 5	0.2599	2.30	q	Q	|	|	|	|
5+10	0.2610	2.32	q	Q	|	|	|	|
5+15	0.2622	2.33	q	Q	|	|	|	|
5+20	0.2634	2.35	q	Q	|	|	|	|
5+25	0.2647	2.36	q	Q	|	|	|	|
5+30	0.2659	2.38	q	Q	|	|	|	|
5+35	0.2672	2.39	q	Q	|	|	|	|
5+40	0.2684	2.41	q	Q	|	|	|	|
5+45	0.2697	2.42	q	Q	|	|	|	|
5+50	0.2710	2.44	q	Q	|	|	|	|
5+55	0.2723	2.45	q	Q	|	|	|	|
6+ 0	0.2736	2.47	q	Q	|	|	|	|
6+ 5	0.2750	2.48	q	Q	|	|	|	|
6+10	0.2763	2.50	q	Q	|	|	|	|
6+15	0.2777	2.51	q	Q	|	|	|	|
6+20	0.2791	2.53	q	Q	|	|	|	|
6+25	0.2806	2.54	q	Q	|	|	|	|
6+30	0.2820	2.56	q	Q	|	|	|	|
6+35	0.2835	2.58	q	Q	|	|	|	|
6+40	0.2849	2.59	q	Q	|	|	|	|
6+45	0.2865	2.61	q	Q	|	|	|	|
6+50	0.2880	2.62	q	Q	|	|	|	|
6+55	0.2895	2.64	q	Q	|	|	|	|
7+ 0	0.2911	2.66	q	Q	|	|	|	|
7+ 5	0.2927	2.67	q	Q	|	|	|	|
7+10	0.2943	2.69	q	Q	|	|	|	|
7+15	0.2960	2.71	q	Q	|	|	|	|
7+20	0.2976	2.72	q	Q	|	|	|	|
7+25	0.2993	2.74	q	Q	|	|	|	|
7+30	0.3010	2.76	q	Q	|	|	|	|
7+35	0.3028	2.78	q	Q	|	|	|	|
7+40	0.3045	2.79	q	Q	|	|	|	|
7+45	0.3063	2.81	q	Q	|	|	|	|
7+50	0.3081	2.83	q	Q	|	|	|	|
7+55	0.3100	2.85	q	Q	|	|	|	|
8+ 0	0.3119	2.87	q	Q	|	|	|	|
8+ 5	0.3138	2.89	q	Q	|	|	|	|
8+10	0.3157	2.91	q	Q	|	|	|	|
8+15	0.3177	2.92	q	Q	|	|	|	|
8+20	0.3197	2.94	q	Q	|	|	|	|
8+25	0.3218	2.96	q	Q	|	|	|	|
8+30	0.3239	2.98	q	Q	|	|	|	|
8+35	0.3260	3.00	q	Q	|	|	|	|
8+40	0.3281	3.02	q	Q	|	|	|	|
8+45	0.3303	3.04	q	Q	|	|	|	|
8+50	0.3326	3.06	q	Q	|	|	|	|
8+55	0.3349	3.09	q	Q	|	|	|	|
9+ 0	0.3371	3.11	q	Q	|	|	|	|
9+ 5	0.3395	3.13	q	Q	|	|	|	|
9+10	0.3419	3.15	q	Q	|	|	|	|
9+15	0.3444	3.17	q	Q	|	|	|	|
9+20	0.3469	3.20	q	Q	|	|	|	|
9+25	0.3494	3.22	q	Q	|	|	|	|
9+30	0.3520	3.24	q	Q	|	|	|	|
9+35	0.3547	3.27	q	Q	|	|	|	|
9+40	0.3573	3.29	q	Q	|	|	|	|
9+45	0.3601	3.31	q	Q	|	|	|	|
9+50	0.3629	3.34	q	Q	|	|	|	|
9+55	0.3658	3.36	q	Q	|	|	|	|
10+ 0	0.3687	3.39	q	Q	|	|	|	|

```
10+ 5       0.3717      3.42  q     Q   |         |         |         |
10+10       0.3748      3.44  q     Q   |         |         |         |
10+15       0.3779      3.47  q     Q   |         |         |         |
10+20       0.3811      3.50  q     Q   |         |         |         |
10+25       0.3844      3.52  q     Q   |         |         |         |
10+30       0.3877      3.55  q     Q   |         |         |         |
10+35       0.3912      3.58  q     Q   |         |         |         |
10+40       0.3947      3.61  q     Q   |         |         |         |
10+45       0.3983      3.64  q     Q   |         |         |         |
10+50       0.4020      3.67  q     Q   |         |         |         |
10+55       0.4058      3.70  q     Q   |         |         |         |
11+ 0       0.4096      3.73  q     Q   |         |         |         |
11+ 5       0.4136      3.76  q      Q  |         |         |         |
11+10       0.4177      3.79  q      Q  |         |         |         |
11+15       0.4219      3.82  q      Q  |         |         |         |
11+20       0.4262      3.86  q      Q  |         |         |         |
11+25       0.4306      3.89  q      Q  |         |         |         |
11+30       0.4351      3.92  q      Q  |         |         |         |
11+35       0.4398      3.96  q      Q  |         |         |         |
11+40       0.4446      3.99  q      Q  |         |         |         |
11+45       0.4496      4.03  q      Q  |         |         |         |
11+50       0.4547      4.07  q      Q  |         |         |         |
11+55       0.4600      4.11  q      Q  |         |         |         |
12+ 0       0.4653      4.15  q      Q  |         |         |         |
12+ 5       0.4797      4.20  q      Q  |         |         |         |
12+10       0.5330      4.30  q       Q |         |         |         |
12+15       0.6086      4.46  |q      Q |         |         |         |
12+20       0.6490      4.62  |q      Q |         |         |         |
12+25       0.6662      4.78  |q      Q |         |         |         |
12+30       0.6754      4.95  |q       Q|         |         |         |
12+35       0.6843      5.11  |q       Q|         |         |         |
12+40       0.6915      5.25  |q       Q|         |         |         |
12+45       0.6991      5.39  |q        Q         |         |         |
12+50       0.7068      5.51  |q        Q         |         |         |
12+55       0.7149      5.63  |q        Q         |         |         |
13+ 0       0.7232      5.74  |q        Q         |         |         |
13+ 5       0.7320      5.85  |q        Q         |         |         |
13+10       0.7409      5.95  |q         |Q        |         |         |
13+15       0.7504      6.05  |q         |Q        |         |         |
13+20       0.7601      6.15  |q         |Q        |         |         |
13+25       0.7704      6.24  |q         |Q        |         |         |
13+30       0.7810      6.34  |q         |Q        |         |         |
13+35       0.7922      6.43  |q         |Q        |         |         |
13+40       0.8038      6.53  |q         | Q       |         |         |
13+45       0.8161      6.63  |q         | Q       |         |         |
13+50       0.8288      6.72  |q         | Q       |         |         |
13+55       0.8425      6.83  |q         | Q       |         |         |
14+ 0       0.8566      6.93  |q         | Q       |         |         |
14+ 5       0.8718      7.04  |q         |  Q      |         |         |
14+10       0.8876      7.15  |q         |  Q      |         |         |
14+15       0.9048      7.26  |q         |  Q      |         |         |
14+20       0.9226      7.38  |q         |  Q      |         |         |
14+25       0.9420      7.51  |q         |  Q      |         |         |
14+30       0.9623      7.64  |q         |   Q     |         |         |
14+35       0.9845      7.78  |q         |   Q     |         |         |
14+40       1.0079      7.93  |q         |   Q     |         |         |
14+45       1.0337      8.09  |q         |    Q    |         |         |
14+50       1.0612      8.25  |q         |    Q    |         |         |
14+55       1.0918      8.43  | q        |    Q    |         |         |
15+ 0       1.1247      8.62  | q        |     Q   |         |         |
```



20+ 5	0.3252	5.39	q	Q	|	|	|
20+10	0.3210	5.32	q	Q|	|	|	|
20+15	0.3170	5.26	q	Q|	|	|	|
20+20	0.3131	5.20	q	Q|	|	|	|
20+25	0.3093	5.13	q	Q|	|	|	|
20+30	0.3056	5.08	q	Q|	|	|	|
20+35	0.3021	5.02	q	Q|	|	|	|
20+40	0.2986	4.97	q	Q|	|	|	|
20+45	0.2953	4.92	q	Q|	|	|	|
20+50	0.2921	4.87	q	Q|	|	|	|
20+55	0.2889	4.82	q	Q |	|	|	|
21+ 0	0.2859	4.77	q	Q |	|	|	|
21+ 5	0.2829	4.72	q	Q |	|	|	|
21+10	0.2800	4.68	q	Q |	|	|	|
21+15	0.2772	4.63	q	Q |	|	|	|
21+20	0.2745	4.59	q	Q |	|	|	|
21+25	0.2718	4.55	q	Q |	|	|	|
21+30	0.2692	4.51	q	Q |	|	|	|
21+35	0.2667	4.47	q	Q |	|	|	|
21+40	0.2642	4.43	q	Q |	|	|	|
21+45	0.2618	4.39	q	Q |	|	|	|
21+50	0.2594	4.35	q	Q |	|	|	|
21+55	0.2571	4.32	q	Q |	|	|	|
22+ 0	0.2549	4.28	q	Q |	|	|	|
22+ 5	0.2527	4.24	q	Q |	|	|	|
22+10	0.2505	4.21	q	Q |	|	|	|
22+15	0.2484	4.18	q	Q |	|	|	|
22+20	0.2464	4.15	q	Q |	|	|	|
22+25	0.2444	4.11	q	Q |	|	|	|
22+30	0.2424	4.08	q	Q |	|	|	|
22+35	0.2405	4.05	q	Q |	|	|	|
22+40	0.2386	4.02	q	Q |	|	|	|
22+45	0.2368	3.99	q	Q |	|	|	|
22+50	0.2350	3.97	q	Q |	|	|	|
22+55	0.2332	3.94	q	Q |	|	|	|
23+ 0	0.2315	3.91	q	Q |	|	|	|
23+ 5	0.2298	3.88	q	Q |	|	|	|
23+10	0.2281	3.85	q	Q |	|	|	|
23+15	0.2264	3.83	q	Q |	|	|	|
23+20	0.2248	3.80	q	Q |	|	|	|
23+25	0.2233	3.77	q	Q |	|	|	|
23+30	0.2217	3.75	q	Q |	|	|	|
23+35	0.2202	3.72	q	Q |	|	|	|
23+40	0.2187	3.70	q	Q |	|	|	|
23+45	0.2172	3.67	q	Q |	|	|	|
23+50	0.2158	3.65	q	Q |	|	|	|
23+55	0.2144	3.62	q	Q |	|	|	|
24+ 0	0.2130	3.60	q	Q |	|	|	|
24+ 5	0.2013	3.56	q	Q |	|	|	|
24+10	0.1431	3.47	q	Q |	|	|	|
24+15	0.0590	3.31	q	Q |	|	|	|
24+20	0.0179	3.15	q	Q |	|	|	|
24+25	0.0051	2.98	q	Q |	|	|	|
24+30	0.0022	2.82	q	Q |	|	|	|
24+35	0.0000	2.66	q	Q |	|	|	|
24+40	0.0000	2.53	q	Q |	|	|	|
24+45	0.0000	2.41	q	Q |	|	|	|
24+50	0.0000	2.31	q	Q |	|	|	|
24+55	0.0000	2.21	q	Q |	|	|	|
25+ 0	0.0000	2.13	q	Q |	|	|	|

25+ 5	0.0000	2.06	q Q	|	|	|	|
25+10	0.0000	2.00	q Q	|	|	|	|
25+15	0.0000	1.95	q Q	|	|	|	|
25+20	0.0000	1.90	q Q	|	|	|	|
25+25	0.0000	1.85	q Q	|	|	|	|
25+30	0.0000	1.81	q Q	|	|	|	|
25+35	0.0000	1.78	q Q	|	|	|	|
25+40	0.0000	1.74	q Q	|	|	|	|
25+45	0.0000	1.71	q Q	|	|	|	|
25+50	0.0000	1.69	q Q	|	|	|	|
25+55	0.0000	1.66	q Q	|	|	|	|
26+ 0	0.0000	1.63	q Q	|	|	|	|
26+ 5	0.0000	1.61	q Q	|	|	|	|
26+10	0.0000	1.59	q Q	|	|	|	|
26+15	0.0000	1.57	q Q	|	|	|	|
26+20	0.0000	1.55	q Q	|	|	|	|
26+25	0.0000	1.53	q Q	|	|	|	|
26+30	0.0000	1.51	q Q	|	|	|	|
26+35	0.0000	1.49	q Q	|	|	|	|
26+40	0.0000	1.47	q Q	|	|	|	|
26+45	0.0000	1.46	q Q	|	|	|	|
26+50	0.0000	1.44	q Q	|	|	|	|
26+55	0.0000	1.42	q Q	|	|	|	|
27+ 0	0.0000	1.40	q Q	|	|	|	|
27+ 5	0.0000	1.39	q Q	|	|	|	|
27+10	0.0000	1.37	q Q	|	|	|	|
27+15	0.0000	1.36	q Q	|	|	|	|
27+20	0.0000	1.35	q Q	|	|	|	|
27+25	0.0000	1.33	q Q	|	|	|	|
27+30	0.0000	1.32	q Q	|	|	|	|
27+35	0.0000	1.30	q Q	|	|	|	|
27+40	0.0000	1.29	q Q	|	|	|	|
27+45	0.0000	1.28	q Q	|	|	|	|
27+50	0.0000	1.26	q Q	|	|	|	|
27+55	0.0000	1.25	q Q	|	|	|	|
28+ 0	0.0000	1.24	q Q	|	|	|	|
28+ 5	0.0000	1.23	q Q	|	|	|	|
28+10	0.0000	1.21	q Q	|	|	|	|
28+15	0.0000	1.20	q Q	|	|	|	|
28+20	0.0000	1.19	q Q	|	|	|	|
28+25	0.0000	1.18	q Q	|	|	|	|
28+30	0.0000	1.16	q Q	|	|	|	|
28+35	0.0000	1.15	q Q	|	|	|	|
28+40	0.0000	1.14	q Q	|	|	|	|
28+45	0.0000	1.13	q Q	|	|	|	|
28+50	0.0000	1.12	q Q	|	|	|	|
28+55	0.0000	1.11	q Q	|	|	|	|
29+ 0	0.0000	1.09	q Q	|	|	|	|
29+ 5	0.0000	1.08	q Q	|	|	|	|
29+10	0.0000	1.07	qQ	|	|	|	|
29+15	0.0000	1.06	qQ	|	|	|	|
29+20	0.0000	1.05	qQ	|	|	|	|
29+25	0.0000	1.04	qQ	|	|	|	|
29+30	0.0000	1.03	qQ	|	|	|	|
29+35	0.0000	1.02	qQ	|	|	|	|
29+40	0.0000	1.01	qQ	|	|	|	|
29+45	0.0000	1.00	qQ	|	|	|	|
29+50	0.0000	0.99	qQ	|	|	|	|
29+55	0.0000	0.98	qQ	|	|	|	|
30+ 0	0.0000	0.97	qQ	|	|	|	|

30+ 5	0.0000	0.95	qQ	|	|	|	|
30+10	0.0000	0.94	qQ	|	|	|	|
30+15	0.0000	0.93	qQ	|	|	|	|
30+20	0.0000	0.91	qQ	|	|	|	|
30+25	0.0000	0.90	qQ	|	|	|	|
30+30	0.0000	0.89	qQ	|	|	|	|
30+35	0.0000	0.87	qQ	|	|	|	|
30+40	0.0000	0.86	qQ	|	|	|	|
30+45	0.0000	0.85	qQ	|	|	|	|
30+50	0.0000	0.83	qQ	|	|	|	|
30+55	0.0000	0.82	qQ	|	|	|	|
31+ 0	0.0000	0.81	qQ	|	|	|	|
31+ 5	0.0000	0.80	qQ	|	|	|	|
31+10	0.0000	0.79	qQ	|	|	|	|
31+15	0.0000	0.77	qQ	|	|	|	|
31+20	0.0000	0.76	qQ	|	|	|	|
31+25	0.0000	0.75	qQ	|	|	|	|
31+30	0.0000	0.74	qQ	|	|	|	|
31+35	0.0000	0.73	qQ	|	|	|	|
31+40	0.0000	0.72	qQ	|	|	|	|
31+45	0.0000	0.71	qQ	|	|	|	|
31+50	0.0000	0.70	qQ	|	|	|	|
31+55	0.0000	0.69	qQ	|	|	|	|
32+ 0	0.0000	0.68	qQ	|	|	|	|
32+ 5	0.0000	0.67	qQ	|	|	|	|
32+10	0.0000	0.66	qQ	|	|	|	|
32+15	0.0000	0.65	qQ	|	|	|	|
32+20	0.0000	0.64	qQ	|	|	|	|
32+25	0.0000	0.63	qQ	|	|	|	|
32+30	0.0000	0.62	qQ	|	|	|	|
32+35	0.0000	0.61	qQ	|	|	|	|
32+40	0.0000	0.60	qQ	|	|	|	|
32+45	0.0000	0.59	qQ	|	|	|	|
32+50	0.0000	0.58	qQ	|	|	|	|
32+55	0.0000	0.57	qQ	|	|	|	|
33+ 0	0.0000	0.56	qQ	|	|	|	|
33+ 5	0.0000	0.56	qQ	|	|	|	|
33+10	0.0000	0.55	qQ	|	|	|	|
33+15	0.0000	0.54	qQ	|	|	|	|
33+20	0.0000	0.53	Q	|	|	|	|
33+25	0.0000	0.52	Q	|	|	|	|
33+30	0.0000	0.52	Q	|	|	|	|
33+35	0.0000	0.51	Q	|	|	|	|
33+40	0.0000	0.50	Q	|	|	|	|
33+45	0.0000	0.49	Q	|	|	|	|
33+50	0.0000	0.49	Q	|	|	|	|
33+55	0.0000	0.48	Q	|	|	|	|
34+ 0	0.0000	0.47	Q	|	|	|	|
34+ 5	0.0000	0.46	Q	|	|	|	|
34+10	0.0000	0.46	Q	|	|	|	|
34+15	0.0000	0.45	Q	|	|	|	|
34+20	0.0000	0.44	Q	|	|	|	|
34+25	0.0000	0.44	Q	|	|	|	|
34+30	0.0000	0.43	Q	|	|	|	|
34+35	0.0000	0.42	Q	|	|	|	|
34+40	0.0000	0.42	Q	|	|	|	|
34+45	0.0000	0.41	Q	|	|	|	|
34+50	0.0000	0.41	Q	|	|	|	|
34+55	0.0000	0.40	Q	|	|	|	|
35+ 0	0.0000	0.39	Q	|	|	|	|

35+ 5	0.0000	0.39	Q	|	|	|	|
35+10	0.0000	0.38	Q	|	|	|	|
35+15	0.0000	0.38	Q	|	|	|	|
35+20	0.0000	0.37	Q	|	|	|	|
35+25	0.0000	0.36	Q	|	|	|	|
35+30	0.0000	0.36	Q	|	|	|	|
35+35	0.0000	0.35	Q	|	|	|	|
35+40	0.0000	0.35	Q	|	|	|	|
35+45	0.0000	0.34	Q	|	|	|	|
35+50	0.0000	0.34	Q	|	|	|	|
35+55	0.0000	0.33	Q	|	|	|	|
36+ 0	0.0000	0.33	Q	|	|	|	|
36+ 5	0.0000	0.32	Q	|	|	|	|
36+10	0.0000	0.32	Q	|	|	|	|
36+15	0.0000	0.31	Q	|	|	|	|
36+20	0.0000	0.31	Q	|	|	|	|
36+25	0.0000	0.30	Q	|	|	|	|
36+30	0.0000	0.30	Q	|	|	|	|
36+35	0.0000	0.30	Q	|	|	|	|
36+40	0.0000	0.29	Q	|	|	|	|
36+45	0.0000	0.29	Q	|	|	|	|
36+50	0.0000	0.28	Q	|	|	|	|
36+55	0.0000	0.28	Q	|	|	|	|
37+ 0	0.0000	0.27	Q	|	|	|	|
37+ 5	0.0000	0.27	Q	|	|	|	|
37+10	0.0000	0.27	Q	|	|	|	|
37+15	0.0000	0.26	Q	|	|	|	|
37+20	0.0000	0.26	Q	|	|	|	|
37+25	0.0000	0.25	Q	|	|	|	|
37+30	0.0000	0.25	Q	|	|	|	|
37+35	0.0000	0.25	Q	|	|	|	|
37+40	0.0000	0.24	Q	|	|	|	|
37+45	0.0000	0.24	Q	|	|	|	|
37+50	0.0000	0.24	Q	|	|	|	|
37+55	0.0000	0.23	Q	|	|	|	|
38+ 0	0.0000	0.23	Q	|	|	|	|
38+ 5	0.0000	0.23	Q	|	|	|	|
38+10	0.0000	0.22	Q	|	|	|	|
38+15	0.0000	0.22	Q	|	|	|	|
38+20	0.0000	0.22	Q	|	|	|	|
38+25	0.0000	0.21	Q	|	|	|	|
38+30	0.0000	0.21	Q	|	|	|	|
38+35	0.0000	0.21	Q	|	|	|	|
38+40	0.0000	0.20	Q	|	|	|	|
38+45	0.0000	0.20	Q	|	|	|	|
38+50	0.0000	0.20	Q	|	|	|	|
38+55	0.0000	0.19	Q	|	|	|	|
39+ 0	0.0000	0.19	Q	|	|	|	|
39+ 5	0.0000	0.19	Q	|	|	|	|
39+10	0.0000	0.19	Q	|	|	|	|
39+15	0.0000	0.18	Q	|	|	|	|
39+20	0.0000	0.18	Q	|	|	|	|
39+25	0.0000	0.18	Q	|	|	|	|
39+30	0.0000	0.17	Q	|	|	|	|
39+35	0.0000	0.17	Q	|	|	|	|
39+40	0.0000	0.17	Q	|	|	|	|
39+45	0.0000	0.17	Q	|	|	|	|
39+50	0.0000	0.16	Q	|	|	|	|
39+55	0.0000	0.16	Q	|	|	|	|
40+ 0	0.0000	0.16	Q	|	|	|	|

40+ 5	0.0000	0.16	Q				
40+10	0.0000	0.15	Q				
40+15	0.0000	0.15	Q				
40+20	0.0000	0.15	Q				
40+25	0.0000	0.15	Q				
40+30	0.0000	0.15	Q				
40+35	0.0000	0.14	Q				
40+40	0.0000	0.14	Q				
40+45	0.0000	0.14	Q				
40+50	0.0000	0.14	Q				
40+55	0.0000	0.14	Q				
41+ 0	0.0000	0.13	Q				
41+ 5	0.0000	0.13	Q				
41+10	0.0000	0.13	Q				
41+15	0.0000	0.13	Q				
41+20	0.0000	0.13	Q				
41+25	0.0000	0.12	Q				
41+30	0.0000	0.12	Q				
41+35	0.0000	0.12	Q				
41+40	0.0000	0.12	Q				
41+45	0.0000	0.12	Q				
41+50	0.0000	0.11	Q				
41+55	0.0000	0.11	Q				
42+ 0	0.0000	0.11	Q				
42+ 5	0.0000	0.11	Q				
42+10	0.0000	0.11	Q				
42+15	0.0000	0.11	Q				
42+20	0.0000	0.10	Q				
42+25	0.0000	0.10	Q				
42+30	0.0000	0.10	Q				
42+35	0.0000	0.10	Q				
42+40	0.0000	0.10	Q				
42+45	0.0000	0.10	Q				
42+50	0.0000	0.10	Q				
42+55	0.0000	0.09	Q				
43+ 0	0.0000	0.09	Q				
43+ 5	0.0000	0.09	Q				
43+10	0.0000	0.09	Q				
43+15	0.0000	0.09	Q				
43+20	0.0000	0.09	Q				
43+25	0.0000	0.09	Q				
43+30	0.0000	0.08	Q				
43+35	0.0000	0.08	Q				
43+40	0.0000	0.08	Q				
43+45	0.0000	0.08	Q				
43+50	0.0000	0.08	Q				
43+55	0.0000	0.08	Q				
44+ 0	0.0000	0.08	Q				
44+ 5	0.0000	0.08	Q				
44+10	0.0000	0.08	Q				
44+15	0.0000	0.07	Q				
44+20	0.0000	0.07	Q				
44+25	0.0000	0.07	Q				
44+30	0.0000	0.07	Q				
44+35	0.0000	0.07	Q				
44+40	0.0000	0.07	Q				
44+45	0.0000	0.07	Q				
44+50	0.0000	0.07	Q				
44+55	0.0000	0.07	Q				
45+ 0	0.0000	0.06	Q				

45+ 5	0.0000	0.06	Q				
45+10	0.0000	0.06	Q				
45+15	0.0000	0.06	Q				
45+20	0.0000	0.06	Q				
45+25	0.0000	0.06	Q				
45+30	0.0000	0.06	Q				
45+35	0.0000	0.06	Q				
45+40	0.0000	0.06	Q				
45+45	0.0000	0.06	Q				
45+50	0.0000	0.06	Q				
45+55	0.0000	0.05	Q				
46+ 0	0.0000	0.05	Q				
46+ 5	0.0000	0.05	Q				
46+10	0.0000	0.05	Q				
46+15	0.0000	0.05	Q				
46+20	0.0000	0.05	Q				
46+25	0.0000	0.05	Q				
46+30	0.0000	0.05	Q				
46+35	0.0000	0.05	Q				
46+40	0.0000	0.05	Q				
46+45	0.0000	0.05	Q				
46+50	0.0000	0.05	Q				
46+55	0.0000	0.05	Q				
47+ 0	0.0000	0.05	Q				
47+ 5	0.0000	0.04	Q				
47+10	0.0000	0.04	Q				
47+15	0.0000	0.04	Q				
47+20	0.0000	0.04	Q				
47+25	0.0000	0.04	Q				
47+30	0.0000	0.04	Q				
47+35	0.0000	0.04	Q				
47+40	0.0000	0.04	Q				
47+45	0.0000	0.04	Q				
47+50	0.0000	0.04	Q				
47+55	0.0000	0.04	Q				
48+ 0	0.0000	0.04	Q				
48+ 5	0.0000	0.04	Q				
48+10	0.0000	0.04	Q				
48+15	0.0000	0.04	Q				
48+20	0.0000	0.04	Q				
48+25	0.0000	0.03	Q				
48+30	0.0000	0.03	Q				
48+35	0.0000	0.03	Q				
48+40	0.0000	0.03	Q				
48+45	0.0000	0.03	Q				
48+50	0.0000	0.03	Q				
48+55	0.0000	0.03	Q				
49+ 0	0.0000	0.03	Q				
49+ 5	0.0000	0.03	Q				
49+10	0.0000	0.03	Q				
49+15	0.0000	0.03	Q				
49+20	0.0000	0.03	Q				
49+25	0.0000	0.03	Q				
49+30	0.0000	0.03	Q				
49+35	0.0000	0.03	Q				
49+40	0.0000	0.03	Q				
49+45	0.0000	0.03	Q				
49+50	0.0000	0.03	Q				
49+55	0.0000	0.03	Q				
50+ 0	0.0000	0.03	Q				

50+ 5	0.0000	0.03	Q				
50+10	0.0000	0.03	Q				
50+15	0.0000	0.03	Q				
50+20	0.0000	0.02	Q				
50+25	0.0000	0.02	Q				
50+30	0.0000	0.02	Q				
50+35	0.0000	0.02	Q				
50+40	0.0000	0.02	Q				
50+45	0.0000	0.02	Q				
50+50	0.0000	0.02	Q				
50+55	0.0000	0.02	Q				
51+ 0	0.0000	0.02	Q				
51+ 5	0.0000	0.02	Q				
51+10	0.0000	0.02	Q				
51+15	0.0000	0.02	Q				
51+20	0.0000	0.02	Q				
51+25	0.0000	0.02	Q				
51+30	0.0000	0.02	Q				
51+35	0.0000	0.02	Q				
51+40	0.0000	0.02	Q				
51+45	0.0000	0.02	Q				
51+50	0.0000	0.02	Q				
51+55	0.0000	0.02	Q				
52+ 0	0.0000	0.02	Q				
52+ 5	0.0000	0.02	Q				
52+10	0.0000	0.02	Q				
52+15	0.0000	0.02	Q				
52+20	0.0000	0.02	Q				
52+25	0.0000	0.02	Q				
52+30	0.0000	0.02	Q				
52+35	0.0000	0.02	Q				
52+40	0.0000	0.02	Q				
52+45	0.0000	0.02	Q				
52+50	0.0000	0.02	Q				
52+55	0.0000	0.02	Q				
53+ 0	0.0000	0.02	Q				
53+ 5	0.0000	0.02	Q				
53+10	0.0000	0.01	Q				
53+15	0.0000	0.01	Q				
53+20	0.0000	0.01	Q				
53+25	0.0000	0.01	Q				
53+30	0.0000	0.01	Q				
53+35	0.0000	0.01	Q				
53+40	0.0000	0.01	Q				
53+45	0.0000	0.01	Q				
53+50	0.0000	0.01	Q				
53+55	0.0000	0.01	Q				
54+ 0	0.0000	0.01	Q				
54+ 5	0.0000	0.01	Q				
54+10	0.0000	0.01	Q				
54+15	0.0000	0.01	Q				
54+20	0.0000	0.01	Q				
54+25	0.0000	0.01	Q				
54+30	0.0000	0.01	Q				
54+35	0.0000	0.01	Q				
54+40	0.0000	0.01	Q				
54+45	0.0000	0.01	Q				
54+50	0.0000	0.01	Q				
54+55	0.0000	0.01	Q				
55+ 0	0.0000	0.01	Q				

55+ 5	0.0000	0.01	Q				
55+10	0.0000	0.01	Q				
55+15	0.0000	0.01	Q				
55+20	0.0000	0.01	Q				
55+25	0.0000	0.01	Q				
55+30	0.0000	0.01	Q				
55+35	0.0000	0.01	Q				
55+40	0.0000	0.01	Q				
55+45	0.0000	0.01	Q				
55+50	0.0000	0.01	Q				
55+55	0.0000	0.01	Q				
56+ 0	0.0000	0.01	Q				
56+ 5	0.0000	0.01	Q				
56+10	0.0000	0.01	Q				
56+15	0.0000	0.01	Q				
56+20	0.0000	0.01	Q				
56+25	0.0000	0.01	Q				
56+30	0.0000	0.01	Q				
56+35	0.0000	0.01	Q				
56+40	0.0000	0.01	Q				
56+45	0.0000	0.01	Q				
56+50	0.0000	0.01	Q				
56+55	0.0000	0.01	Q				
57+ 0	0.0000	0.01	Q				
57+ 5	0.0000	0.01	Q				
57+10	0.0000	0.01	Q				
57+15	0.0000	0.01	Q				
57+20	0.0000	0.01	Q				
57+25	0.0000	0.01	Q				
57+30	0.0000	0.01	Q				
57+35	0.0000	0.01	Q				
57+40	0.0000	0.01	Q				
57+45	0.0000	0.01	Q				
57+50	0.0000	0.01	Q				
57+55	0.0000	0.01	Q				
58+ 0	0.0000	0.01	Q				
58+ 5	0.0000	0.01	Q				
58+10	0.0000	0.01	Q				
58+15	0.0000	0.01	Q				
58+20	0.0000	0.01	Q				
58+25	0.0000	0.01	Q				
58+30	0.0000	0.01	Q				
58+35	0.0000	0.01	Q				
58+40	0.0000	0.01	Q				
58+45	0.0000	0.01	Q				
58+50	0.0000	0.01	Q				
58+55	0.0000	0.01	Q				
59+ 0	0.0000	0.01	Q				
59+ 5	0.0000	0.01	Q				
59+10	0.0000	0.01	Q				
59+15	0.0000	0.00	Q				
59+20	0.0000	0.00	Q				
59+25	0.0000	0.00	Q				
59+30	0.0000	0.00	Q				
59+35	0.0000	0.00	Q				
59+40	0.0000	0.00	Q				
59+45	0.0000	0.00	Q				
59+50	0.0000	0.00	Q				
59+55	0.0000	0.00	Q				
60+ 0	0.0000	0.00	Q				

60+ 5	0.0000	0.00	Q				
60+10	0.0000	0.00	Q				
60+15	0.0000	0.00	Q				
60+20	0.0000	0.00	Q				
60+25	0.0000	0.00	Q				
60+30	0.0000	0.00	Q				
60+35	0.0000	0.00	Q				
60+40	0.0000	0.00	Q				
60+45	0.0000	0.00	Q				
60+50	0.0000	0.00	Q				
60+55	0.0000	0.00	Q				
61+ 0	0.0000	0.00	Q				
61+ 5	0.0000	0.00	Q				
61+10	0.0000	0.00	Q				
61+15	0.0000	0.00	Q				
61+20	0.0000	0.00	Q				
61+25	0.0000	0.00	Q				
61+30	0.0000	0.00	Q				
61+35	0.0000	0.00	Q				
61+40	0.0000	0.00	Q				
61+45	0.0000	0.00	Q				
61+50	0.0000	0.00	Q				
61+55	0.0000	0.00	Q				
62+ 0	0.0000	0.00	Q				
62+ 5	0.0000	0.00	Q				
62+10	0.0000	0.00	Q				
62+15	0.0000	0.00	Q				
62+20	0.0000	0.00	Q				
62+25	0.0000	0.00	Q				
62+30	0.0000	0.00	Q				
62+35	0.0000	0.00	Q				
62+40	0.0000	0.00	Q				
62+45	0.0000	0.00	Q				
62+50	0.0000	0.00	Q				
62+55	0.0000	0.00	Q				
63+ 0	0.0000	0.00	Q				
63+ 5	0.0000	0.00	Q				
63+10	0.0000	0.00	Q				
63+15	0.0000	0.00	Q				
63+20	0.0000	0.00	Q				
63+25	0.0000	0.00	Q				
63+30	0.0000	0.00	Q				
63+35	0.0000	0.00	Q				
63+40	0.0000	0.00	Q				
63+45	0.0000	0.00	Q				
63+50	0.0000	0.00	Q				
63+55	0.0000	0.00	Q				
64+ 0	0.0000	0.00	Q				
64+ 5	0.0000	0.00	Q				
64+10	0.0000	0.00	Q				
64+15	0.0000	0.00	Q				
64+20	0.0000	0.00	Q				
64+25	0.0000	0.00	Q				
64+30	0.0000	0.00	Q				
64+35	0.0000	0.00	Q				
64+40	0.0000	0.00	Q				
64+45	0.0000	0.00	Q				
64+50	0.0000	0.00	Q				
64+55	0.0000	0.00	Q				
65+ 0	0.0000	0.00	Q				

65+ 5	0.0000	0.00	Q	|	|	|	|
65+10	0.0000	0.00	Q	|	|	|	|
65+15	0.0000	0.00	Q	|	|	|	|
65+20	0.0000	0.00	Q	|	|	|	|
65+25	0.0000	0.00	Q	|	|	|	|
65+30	0.0000	0.00	Q	|	|	|	|
65+35	0.0000	0.00	Q	|	|	|	|
65+40	0.0000	0.00	Q	|	|	|	|
65+45	0.0000	0.00	Q	|	|	|	|
65+50	0.0000	0.00	Q	|	|	|	|
65+55	0.0000	0.00	Q	|	|	|	|
66+ 0	0.0000	0.00	Q	|	|	|	|
66+ 5	0.0000	0.00	Q	|	|	|	|
66+10	0.0000	0.00	Q	|	|	|	|
66+15	0.0000	0.00	Q	|	|	|	|
66+20	0.0000	0.00	Q	|	|	|	|
66+25	0.0000	0.00	Q	|	|	|	|
66+30	0.0000	0.00	Q	|	|	|	|
66+35	0.0000	0.00	Q	|	|	|	|
66+40	0.0000	0.00	Q	|	|	|	|
66+45	0.0000	0.00	Q	|	|	|	|
66+50	0.0000	0.00	Q	|	|	|	|
66+55	0.0000	0.00	Q	|	|	|	|
67+ 0	0.0000	0.00	Q	|	|	|	|
67+ 5	0.0000	0.00	Q	|	|	|	|
67+10	0.0000	0.00	Q	|	|	|	|
67+15	0.0000	0.00	Q	|	|	|	|
67+20	0.0000	0.00	Q	|	|	|	|
67+25	0.0000	0.00	Q	|	|	|	|
67+30	0.0000	0.00	Q	|	|	|	|
67+35	0.0000	0.00	Q	|	|	|	|
67+40	0.0000	0.00	Q	|	|	|	|
67+45	0.0000	0.00	Q	|	|	|	|
67+50	0.0000	0.00	Q	|	|	|	|
67+55	0.0000	0.00	Q	|	|	|	|
68+ 0	0.0000	0.00	Q	|	|	|	|
68+ 5	0.0000	0.00	Q	|	|	|	|
68+10	0.0000	0.00	Q	|	|	|	|
68+15	0.0000	0.00	Q	|	|	|	|

**********HYDROGRAPH DATA**********

Number of intervals = 819
Time interval = 5.0 (Min.)
Maximum/Peak flow rate = 21.468 (CFS)
Total volume = 11.508 (Ac.Ft)

Status of hydrographs being held in storage

	Stream 1	Stream 2	Stream 3	Stream 4	Stream 5
Peak (CFS)	0.000	0.000	0.000	0.000	0.000
Vol (Ac.Ft)	0.000	0.000	0.000	0.000	0.000

****

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Process from Point/Station 5.000 to Point/Station 6.000

**** STREAM ROUTING SCS CONVEX METHOD ****

HYDROGRAPH STREAM ROUTING DATA:

Length of stream = 320.00 (Ft.)

Elevation difference = 3.20 (Ft.)
Slope of channel = 0.010000 (Vert/Horiz)
Channel type - Pipe

Pipe length = 320.00(Ft.) Elevation difference = 3.20(Ft.)
Manning's N = 0.013 No. of pipes = 1
Pipe evaluation using mean flow rate of hydrograph
Required pipe flow = 5.155(CFS)
Nearest computed pipe diameter = 15.00(In.)
Calculated individual pipe flow = 5.155(CFS)
Normal flow depth in pipe = 10.13(In.)
Flow top width inside pipe = 14.05(In.)
Critical Depth = 0.92(Ft.)
Pipe flow velocity = 5.84(Ft/s)
Travel time through pipe = 0.91 min.

Pipe length = 320.00(Ft.) Elevation difference = 3.20(Ft.)
Manning's N = 0.013 No. of pipes = 1
Pipe evaluation using maximum flow rate of hydrograph
Required pipe flow = 21.468(CFS)
Nearest computed pipe diameter = 24.00(In.)
Calculated individual pipe flow = 21.468(CFS)
Normal flow depth in pipe = 18.66(In.)
Flow top width inside pipe = 19.97(In.)
Critical Depth = 1.66(Ft.)
Pipe flow velocity = 8.19(Ft/s)
Travel time through pipe = 0.65 min.

********** SCS CONVEX CHANNEL ROUTING **********
Convex method of stream routing data items:
Using equation: Outflow =
O(t+dt) = (1-c*)O(t+dt-dt*) + Input(c*)
where c* = 1 - (1-c)^e and dt = c(length)/velocity
c(v/v+1.7) = 0.8282 Travel time = 0.65 (min.)
dt*(unit time interval) = 5.00(min.), e= 6.5170
dt(routing time-step) = 0.54 (min.), c* = 1.0000

Output hydrograph delayed by 0 unit time increments

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P R I N T O F S T O R M
R u n o f f H y d r o g r a p h

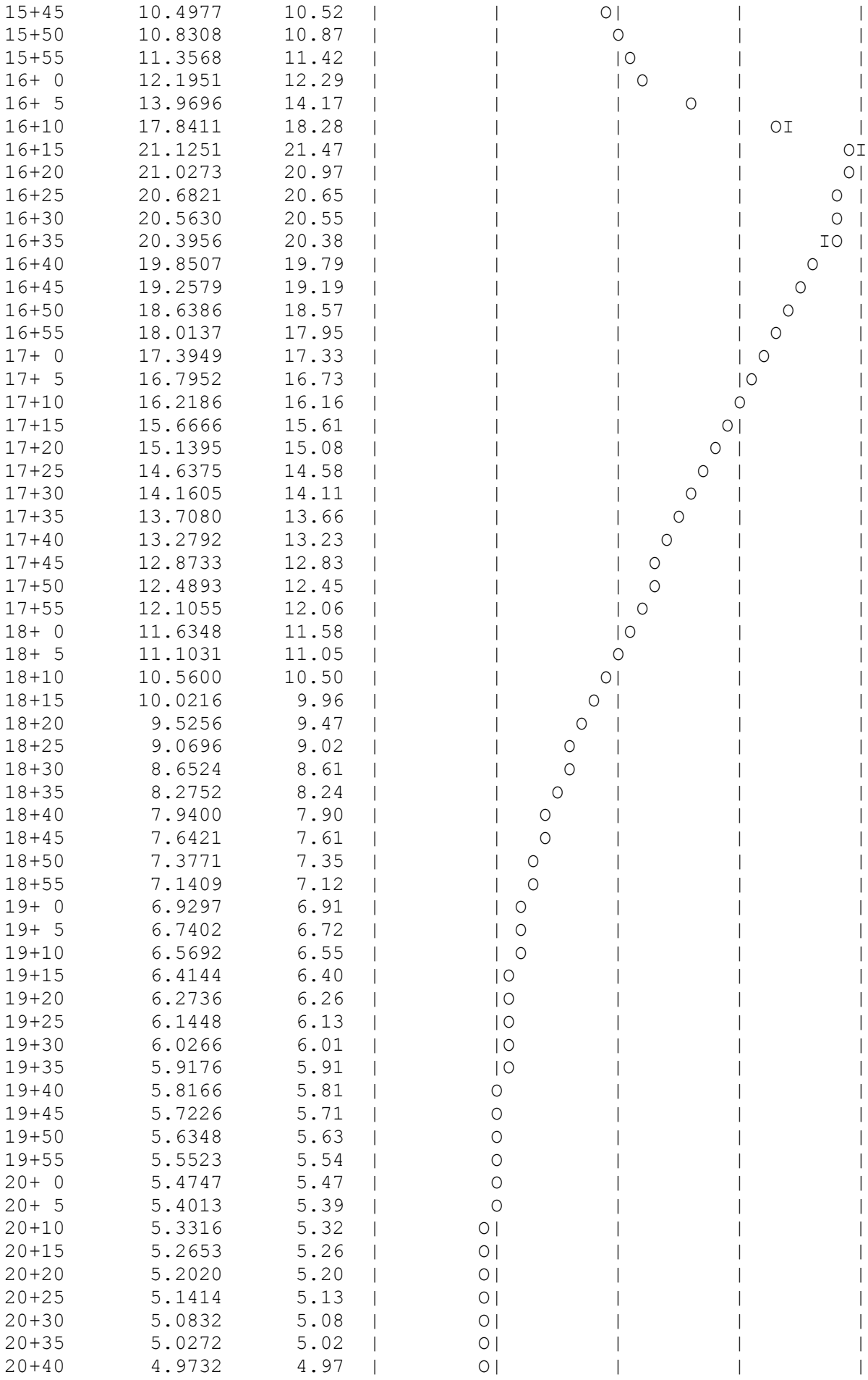
Hydrograph in 5 Minute intervals (CFS)

Time(h+m)	Out = O(CFS)	In = I	0	5.4	10.7	16.1	21.5
0+ 5	0.0111	0.01	O				
0+10	0.0780	0.09	O				
0+15	0.2085	0.22	O				
0+20	0.3519	0.37	O				
0+25	0.5017	0.52	O				
0+30	0.6516	0.67	|O				
0+35	0.7933	0.81	|O				
0+40	0.9190	0.93	|O				

0+45	1.0295	1.04	O				
0+50	1.1261	1.14	O				
0+55	1.2104	1.22	O				
1+ 0	1.2840	1.29	O				
1+ 5	1.3485	1.36	O				
1+10	1.4053	1.41	O				
1+15	1.4556	1.46	O				
1+20	1.5003	1.51	O				
1+25	1.5404	1.54	O				
1+30	1.5765	1.58	O				
1+35	1.6092	1.61	OI				
1+40	1.6391	1.64	O				
1+45	1.6665	1.67	O				
1+50	1.6920	1.69	O				
1+55	1.7156	1.72	O				
2+ 0	1.7378	1.74	O				
2+ 5	1.7588	1.76	O				
2+10	1.7787	1.78	O				
2+15	1.7977	1.80	O				
2+20	1.8159	1.82	O				
2+25	1.8334	1.84	O				
2+30	1.8504	1.85	O				
2+35	1.8670	1.87	O				
2+40	1.8831	1.88	O				
2+45	1.8989	1.90	O				
2+50	1.9144	1.92	O				
2+55	1.9297	1.93	O				
3+ 0	1.9447	1.95	O				
3+ 5	1.9596	1.96	O				
3+10	1.9743	1.98	O				
3+15	1.9890	1.99	O				
3+20	2.0034	2.01	O				
3+25	2.0179	2.02	O				
3+30	2.0322	2.03	O				
3+35	2.0465	2.05	O				
3+40	2.0607	2.06	O				
3+45	2.0749	2.08	O				
3+50	2.0891	2.09	O				
3+55	2.1033	2.10	O				
4+ 0	2.1174	2.12	O				
4+ 5	2.1315	2.13	O				
4+10	2.1457	2.15	OI				
4+15	2.1598	2.16	O				
4+20	2.1740	2.18	O				
4+25	2.1882	2.19	O				
4+30	2.2023	2.20	O				
4+35	2.2166	2.22	O				
4+40	2.2308	2.23	O				
4+45	2.2451	2.25	O				
4+50	2.2594	2.26	O				
4+55	2.2738	2.28	O				
5+ 0	2.2882	2.29	O				
5+ 5	2.3026	2.30	O				
5+10	2.3171	2.32	O				
5+15	2.3317	2.33	O				
5+20	2.3463	2.35	O				
5+25	2.3609	2.36	O				
5+30	2.3757	2.38	O				
5+35	2.3905	2.39	O				
5+40	2.4053	2.41	O				

5+45	2.4203	2.42	O				
5+50	2.4353	2.44	O				
5+55	2.4504	2.45	O				
6+ 0	2.4656	2.47	O				
6+ 5	2.4809	2.48	O				
6+10	2.4962	2.50	O				
6+15	2.5117	2.51	O				
6+20	2.5272	2.53	O				
6+25	2.5429	2.54	O				
6+30	2.5587	2.56	O				
6+35	2.5746	2.58	O				
6+40	2.5905	2.59	O				
6+45	2.6067	2.61	O				
6+50	2.6229	2.62	O				
6+55	2.6393	2.64	O				
7+ 0	2.6557	2.66	O				
7+ 5	2.6724	2.67	O				
7+10	2.6891	2.69	O				
7+15	2.7061	2.71	O				
7+20	2.7231	2.72	O				
7+25	2.7404	2.74	O				
7+30	2.7577	2.76	O				
7+35	2.7753	2.78	O				
7+40	2.7930	2.79	O				
7+45	2.8109	2.81	O				
7+50	2.8290	2.83	O				
7+55	2.8473	2.85	O				
8+ 0	2.8657	2.87	O				
8+ 5	2.8844	2.89	O				
8+10	2.9033	2.91	O				
8+15	2.9224	2.92	O				
8+20	2.9417	2.94	O				
8+25	2.9612	2.96	O				
8+30	2.9810	2.98	O				
8+35	3.0010	3.00	O				
8+40	3.0212	3.02	O				
8+45	3.0418	3.04	O				
8+50	3.0625	3.06	O				
8+55	3.0836	3.09	O				
9+ 0	3.1049	3.11	O				
9+ 5	3.1266	3.13	O				
9+10	3.1485	3.15	O				
9+15	3.1707	3.17	O				
9+20	3.1933	3.20	O				
9+25	3.2162	3.22	O				
9+30	3.2394	3.24	O				
9+35	3.2630	3.27	O				
9+40	3.2870	3.29	O				
9+45	3.3113	3.31	O				
9+50	3.3361	3.34	O				
9+55	3.3612	3.36	O				
10+ 0	3.3868	3.39	O				
10+ 5	3.4128	3.42	O				
10+10	3.4392	3.44	O				
10+15	3.4661	3.47	O				
10+20	3.4935	3.50	O				
10+25	3.5214	3.52	O				
10+30	3.5498	3.55	O				
10+35	3.5788	3.58	O				
10+40	3.6082	3.61	O				

10+45	3.6383	3.64	O				
10+50	3.6688	3.67	O				
10+55	3.6986	3.70	O				
11+ 0	3.7282	3.73	O				
11+ 5	3.7585	3.76	O				
11+10	3.7893	3.79	O				
11+15	3.8210	3.82	O				
11+20	3.8533	3.86	O				
11+25	3.8865	3.89	O				
11+30	3.9204	3.92	O				
11+35	3.9552	3.96	O				
11+40	3.9909	3.99	O				
11+45	4.0275	4.03	O				
11+50	4.0650	4.07	O				
11+55	4.1036	4.11	O				
12+ 0	4.1432	4.15	O				
12+ 5	4.1930	4.20	O				
12+10	4.2897	4.30	OI				
12+15	4.4389	4.46	O				
12+20	4.5979	4.62	O				
12+25	4.7624	4.78	O				
12+30	4.9278	4.95	O				
12+35	5.0879	5.11	O				
12+40	5.2361	5.25	O				
12+45	5.3734	5.39	O				
12+50	5.5009	5.51	O				
12+55	5.6202	5.63	O				
13+ 0	5.7324	5.74	O				
13+ 5	5.8392	5.85	O				
13+10	5.9416	5.95	O				
13+15	6.0409	6.05	O				
13+20	6.1379	6.15	O				
13+25	6.2336	6.24	O				
13+30	6.3284	6.34	O				
13+35	6.4234	6.43	O				
13+40	6.5189	6.53	O				
13+45	6.6157	6.63	O				
13+50	6.7139	6.72	O				
13+55	6.8147	6.83	O				
14+ 0	6.9179	6.93	O				
14+ 5	7.0245	7.04	O				
14+10	7.1348	7.15	O				
14+15	7.2500	7.26	O				
14+20	7.3702	7.38	O				
14+25	7.4963	7.51	O				
14+30	7.6283	7.64	O				
14+35	7.7674	7.78	O				
14+40	7.9137	7.93	O				
14+45	8.0688	8.09	O				
14+50	8.2331	8.25	O				
14+55	8.4087	8.43	O				
15+ 0	8.5964	8.62	O				
15+ 5	8.7990	8.82	O				
15+10	9.0177	9.04	O				
15+15	9.2566	9.28	O				
15+20	9.5180	9.55	O				
15+25	9.7873	9.82	O				
15+30	9.9867	10.01	O				
15+35	10.1133	10.13	O				
15+40	10.2729	10.29	O				



20+45	4.9210	4.92	| O|	|	|	|
20+50	4.8705	4.87	| O|	|	|	|
20+55	4.8215	4.82	| O |	|	|	|
21+ 0	4.7738	4.77	| O |	|	|	|
21+ 5	4.7275	4.72	| O |	|	|	|
21+10	4.6824	4.68	| O |	|	|	|
21+15	4.6385	4.63	| O |	|	|	|
21+20	4.5955	4.59	| O |	|	|	|
21+25	4.5536	4.55	| O |	|	|	|
21+30	4.5126	4.51	| O |	|	|	|
21+35	4.4724	4.47	| O |	|	|	|
21+40	4.4331	4.43	| O |	|	|	|
21+45	4.3946	4.39	| O |	|	|	|
21+50	4.3568	4.35	| O |	|	|	|
21+55	4.3197	4.32	| O |	|	|	|
22+ 0	4.2833	4.28	| O |	|	|	|
22+ 5	4.2475	4.24	| O |	|	|	|
22+10	4.2135	4.21	| O |	|	|	|
22+15	4.1809	4.18	| O |	|	|	|
22+20	4.1491	4.15	| O |	|	|	|
22+25	4.1178	4.11	| O |	|	|	|
22+30	4.0869	4.08	| O |	|	|	|
22+35	4.0566	4.05	| O |	|	|	|
22+40	4.0267	4.02	| O |	|	|	|
22+45	3.9973	3.99	| O |	|	|	|
22+50	3.9683	3.97	| O |	|	|	|
22+55	3.9397	3.94	| O |	|	|	|
23+ 0	3.9115	3.91	| O |	|	|	|
23+ 5	3.8837	3.88	| O |	|	|	|
23+10	3.8564	3.85	| O |	|	|	|
23+15	3.8293	3.83	| O |	|	|	|
23+20	3.8027	3.80	| O |	|	|	|
23+25	3.7763	3.77	| O |	|	|	|
23+30	3.7504	3.75	| O |	|	|	|
23+35	3.7247	3.72	| O |	|	|	|
23+40	3.6994	3.70	| O |	|	|	|
23+45	3.6744	3.67	| O |	|	|	|
23+50	3.6498	3.65	| O |	|	|	|
23+55	3.6254	3.62	| O |	|	|	|
24+ 0	3.6013	3.60	| O |	|	|	|
24+ 5	3.5666	3.56	| O |	|	|	|
24+10	3.4771	3.47	| O |	|	|	|
24+15	3.3264	3.31	| O |	|	|	|
24+20	3.1651	3.15	| O |	|	|	|
24+25	2.9994	2.98	| O |	|	|	|
24+30	2.8351	2.82	| O |	|	|	|
24+35	2.6805	2.66	| O |	|	|	|
24+40	2.5433	2.53	| O |	|	|	|
24+45	2.4225	2.41	| O |	|	|	|
24+50	2.3167	2.31	| O |	|	|	|
24+55	2.2242	2.21	| O |	|	|	|
25+ 0	2.1431	2.13	| O |	|	|	|
25+ 5	2.0719	2.06	| O |	|	|	|
25+10	2.0089	2.00	| O |	|	|	|
25+15	1.9530	1.95	| O |	|	|	|
25+20	1.9031	1.90	| O |	|	|	|
25+25	1.8584	1.85	| O |	|	|	|
25+30	1.8179	1.81	| O |	|	|	|
25+35	1.7812	1.78	| O |	|	|	|
25+40	1.7476	1.74	| O |	|	|	|

25+45	1.7167	1.71	| O	|	|	|	|
25+50	1.6881	1.69	| O	|	|	|	|
25+55	1.6615	1.66	| O	|	|	|	|
26+ 0	1.6366	1.63	| O	|	|	|	|
26+ 5	1.6131	1.61	| O	|	|	|	|
26+10	1.5909	1.59	| O	|	|	|	|
26+15	1.5698	1.57	| O	|	|	|	|
26+20	1.5496	1.55	| O	|	|	|	|
26+25	1.5303	1.53	| O	|	|	|	|
26+30	1.5116	1.51	| O	|	|	|	|
26+35	1.4936	1.49	| O	|	|	|	|
26+40	1.4762	1.47	| O	|	|	|	|
26+45	1.4592	1.46	| O	|	|	|	|
26+50	1.4427	1.44	| O	|	|	|	|
26+55	1.4239	1.42	| O	|	|	|	|
27+ 0	1.4058	1.40	| O	|	|	|	|
27+ 5	1.3903	1.39	| O	|	|	|	|
27+10	1.3759	1.37	| O	|	|	|	|
27+15	1.3617	1.36	| O	|	|	|	|
27+20	1.3477	1.35	| O	|	|	|	|
27+25	1.3338	1.33	| O	|	|	|	|
27+30	1.3200	1.32	| O	|	|	|	|
27+35	1.3064	1.30	| O	|	|	|	|
27+40	1.2929	1.29	| O	|	|	|	|
27+45	1.2796	1.28	| O	|	|	|	|
27+50	1.2664	1.26	| O	|	|	|	|
27+55	1.2533	1.25	| O	|	|	|	|
28+ 0	1.2404	1.24	| O	|	|	|	|
28+ 5	1.2276	1.23	| O	|	|	|	|
28+10	1.2149	1.21	| O	|	|	|	|
28+15	1.2024	1.20	| O	|	|	|	|
28+20	1.1900	1.19	| O	|	|	|	|
28+25	1.1777	1.18	| O	|	|	|	|
28+30	1.1656	1.16	| O	|	|	|	|
28+35	1.1536	1.15	| O	|	|	|	|
28+40	1.1417	1.14	| O	|	|	|	|
28+45	1.1299	1.13	| O	|	|	|	|
28+50	1.1182	1.12	| O	|	|	|	|
28+55	1.1067	1.11	| O	|	|	|	|
29+ 0	1.0953	1.09	| O	|	|	|	|
29+ 5	1.0840	1.08	| O	|	|	|	|
29+10	1.0728	1.07	|O	|	|	|	|
29+15	1.0617	1.06	|O	|	|	|	|
29+20	1.0508	1.05	|O	|	|	|	|
29+25	1.0399	1.04	|O	|	|	|	|
29+30	1.0292	1.03	|O	|	|	|	|
29+35	1.0186	1.02	|O	|	|	|	|
29+40	1.0081	1.01	|O	|	|	|	|
29+45	0.9977	1.00	|O	|	|	|	|
29+50	0.9874	0.99	|O	|	|	|	|
29+55	0.9772	0.98	|O	|	|	|	|
30+ 0	0.9671	0.97	|O	|	|	|	|
30+ 5	0.9553	0.95	|O	|	|	|	|
30+10	0.9416	0.94	|O	|	|	|	|
30+15	0.9276	0.93	|O	|	|	|	|
30+20	0.9138	0.91	|O	|	|	|	|
30+25	0.9001	0.90	|O	|	|	|	|
30+30	0.8867	0.89	|O	|	|	|	|
30+35	0.8735	0.87	|O	|	|	|	|
30+40	0.8605	0.86	|O	|	|	|	|

30+45	0.8476	0.85	|O	|	|	|	|
30+50	0.8350	0.83	|O	|	|	|	|
30+55	0.8225	0.82	|O	|	|	|	|
31+ 0	0.8103	0.81	|O	|	|	|	|
31+ 5	0.7982	0.80	|O	|	|	|	|
31+10	0.7863	0.79	|O	|	|	|	|
31+15	0.7746	0.77	|O	|	|	|	|
31+20	0.7630	0.76	|O	|	|	|	|
31+25	0.7516	0.75	|O	|	|	|	|
31+30	0.7404	0.74	|O	|	|	|	|
31+35	0.7294	0.73	|O	|	|	|	|
31+40	0.7185	0.72	|O	|	|	|	|
31+45	0.7078	0.71	|O	|	|	|	|
31+50	0.6972	0.70	|O	|	|	|	|
31+55	0.6868	0.69	|O	|	|	|	|
32+ 0	0.6766	0.68	|O	|	|	|	|
32+ 5	0.6665	0.67	|O	|	|	|	|
32+10	0.6565	0.66	|O	|	|	|	|
32+15	0.6468	0.65	|O	|	|	|	|
32+20	0.6371	0.64	|O	|	|	|	|
32+25	0.6276	0.63	|O	|	|	|	|
32+30	0.6182	0.62	|O	|	|	|	|
32+35	0.6090	0.61	|O	|	|	|	|
32+40	0.5999	0.60	|O	|	|	|	|
32+45	0.5910	0.59	|O	|	|	|	|
32+50	0.5822	0.58	|O	|	|	|	|
32+55	0.5735	0.57	|O	|	|	|	|
33+ 0	0.5649	0.56	|O	|	|	|	|
33+ 5	0.5565	0.56	|O	|	|	|	|
33+10	0.5482	0.55	|O	|	|	|	|
33+15	0.5400	0.54	|O	|	|	|	|
33+20	0.5320	0.53	O	|	|	|	|
33+25	0.5241	0.52	O	|	|	|	|
33+30	0.5162	0.52	O	|	|	|	|
33+35	0.5085	0.51	O	|	|	|	|
33+40	0.5010	0.50	O	|	|	|	|
33+45	0.4935	0.49	O	|	|	|	|
33+50	0.4861	0.49	O	|	|	|	|
33+55	0.4789	0.48	O	|	|	|	|
34+ 0	0.4717	0.47	O	|	|	|	|
34+ 5	0.4647	0.46	O	|	|	|	|
34+10	0.4578	0.46	O	|	|	|	|
34+15	0.4509	0.45	O	|	|	|	|
34+20	0.4442	0.44	O	|	|	|	|
34+25	0.4376	0.44	O	|	|	|	|
34+30	0.4311	0.43	O	|	|	|	|
34+35	0.4246	0.42	O	|	|	|	|
34+40	0.4183	0.42	O	|	|	|	|
34+45	0.4121	0.41	O	|	|	|	|
34+50	0.4059	0.41	O	|	|	|	|
34+55	0.3999	0.40	O	|	|	|	|
35+ 0	0.3939	0.39	O	|	|	|	|
35+ 5	0.3880	0.39	O	|	|	|	|
35+10	0.3822	0.38	O	|	|	|	|
35+15	0.3765	0.38	O	|	|	|	|
35+20	0.3709	0.37	O	|	|	|	|
35+25	0.3654	0.36	O	|	|	|	|
35+30	0.3599	0.36	O	|	|	|	|
35+35	0.3546	0.35	O	|	|	|	|
35+40	0.3493	0.35	O	|	|	|	|

35+45	0.3441	0.34	O				
35+50	0.3389	0.34	O				
35+55	0.3339	0.33	O				
36+ 0	0.3289	0.33	O				
36+ 5	0.3240	0.32	O				
36+10	0.3192	0.32	O				
36+15	0.3144	0.31	O				
36+20	0.3097	0.31	O				
36+25	0.3051	0.30	O				
36+30	0.3006	0.30	O				
36+35	0.2961	0.30	O				
36+40	0.2917	0.29	O				
36+45	0.2873	0.29	O				
36+50	0.2830	0.28	O				
36+55	0.2788	0.28	O				
37+ 0	0.2746	0.27	O				
37+ 5	0.2705	0.27	O				
37+10	0.2665	0.27	O				
37+15	0.2625	0.26	O				
37+20	0.2586	0.26	O				
37+25	0.2548	0.25	O				
37+30	0.2510	0.25	O				
37+35	0.2472	0.25	O				
37+40	0.2435	0.24	O				
37+45	0.2399	0.24	O				
37+50	0.2363	0.24	O				
37+55	0.2328	0.23	O				
38+ 0	0.2293	0.23	O				
38+ 5	0.2259	0.23	O				
38+10	0.2225	0.22	O				
38+15	0.2192	0.22	O				
38+20	0.2159	0.22	O				
38+25	0.2127	0.21	O				
38+30	0.2096	0.21	O				
38+35	0.2064	0.21	O				
38+40	0.2033	0.20	O				
38+45	0.2003	0.20	O				
38+50	0.1973	0.20	O				
38+55	0.1944	0.19	O				
39+ 0	0.1915	0.19	O				
39+ 5	0.1886	0.19	O				
39+10	0.1858	0.19	O				
39+15	0.1830	0.18	O				
39+20	0.1803	0.18	O				
39+25	0.1776	0.18	O				
39+30	0.1750	0.17	O				
39+35	0.1724	0.17	O				
39+40	0.1698	0.17	O				
39+45	0.1673	0.17	O				
39+50	0.1648	0.16	O				
39+55	0.1623	0.16	O				
40+ 0	0.1599	0.16	O				
40+ 5	0.1575	0.16	O				
40+10	0.1552	0.15	O				
40+15	0.1528	0.15	O				
40+20	0.1506	0.15	O				
40+25	0.1483	0.15	O				
40+30	0.1461	0.15	O				
40+35	0.1439	0.14	O				
40+40	0.1418	0.14	O				

40+45	0.1397	0.14	O				
40+50	0.1376	0.14	O				
40+55	0.1355	0.14	O				
41+ 0	0.1335	0.13	O				
41+ 5	0.1315	0.13	O				
41+10	0.1296	0.13	O				
41+15	0.1276	0.13	O				
41+20	0.1257	0.13	O				
41+25	0.1238	0.12	O				
41+30	0.1220	0.12	O				
41+35	0.1202	0.12	O				
41+40	0.1184	0.12	O				
41+45	0.1166	0.12	O				
41+50	0.1149	0.11	O				
41+55	0.1132	0.11	O				
42+ 0	0.1115	0.11	O				
42+ 5	0.1098	0.11	O				
42+10	0.1082	0.11	O				
42+15	0.1066	0.11	O				
42+20	0.1050	0.10	O				
42+25	0.1034	0.10	O				
42+30	0.1019	0.10	O				
42+35	0.1004	0.10	O				
42+40	0.0989	0.10	O				
42+45	0.0974	0.10	O				
42+50	0.0959	0.10	O				
42+55	0.0945	0.09	O				
43+ 0	0.0931	0.09	O				
43+ 5	0.0917	0.09	O				
43+10	0.0903	0.09	O				
43+15	0.0890	0.09	O				
43+20	0.0877	0.09	O				
43+25	0.0863	0.09	O				
43+30	0.0851	0.08	O				
43+35	0.0838	0.08	O				
43+40	0.0825	0.08	O				
43+45	0.0813	0.08	O				
43+50	0.0801	0.08	O				
43+55	0.0789	0.08	O				
44+ 0	0.0777	0.08	O				
44+ 5	0.0766	0.08	O				
44+10	0.0754	0.08	O				
44+15	0.0743	0.07	O				
44+20	0.0732	0.07	O				
44+25	0.0721	0.07	O				
44+30	0.0710	0.07	O				
44+35	0.0700	0.07	O				
44+40	0.0689	0.07	O				
44+45	0.0679	0.07	O				
44+50	0.0669	0.07	O				
44+55	0.0659	0.07	O				
45+ 0	0.0649	0.06	O				
45+ 5	0.0639	0.06	O				
45+10	0.0630	0.06	O				
45+15	0.0620	0.06	O				
45+20	0.0611	0.06	O				
45+25	0.0602	0.06	O				
45+30	0.0593	0.06	O				
45+35	0.0584	0.06	O				
45+40	0.0576	0.06	O				

45+45	0.0567	0.06	O				
45+50	0.0558	0.06	O				
45+55	0.0550	0.05	O				
46+ 0	0.0542	0.05	O				
46+ 5	0.0534	0.05	O				
46+10	0.0526	0.05	O				
46+15	0.0518	0.05	O				
46+20	0.0510	0.05	O				
46+25	0.0503	0.05	O				
46+30	0.0495	0.05	O				
46+35	0.0488	0.05	O				
46+40	0.0481	0.05	O				
46+45	0.0473	0.05	O				
46+50	0.0466	0.05	O				
46+55	0.0459	0.05	O				
47+ 0	0.0453	0.05	O				
47+ 5	0.0446	0.04	O				
47+10	0.0439	0.04	O				
47+15	0.0433	0.04	O				
47+20	0.0426	0.04	O				
47+25	0.0420	0.04	O				
47+30	0.0414	0.04	O				
47+35	0.0407	0.04	O				
47+40	0.0401	0.04	O				
47+45	0.0395	0.04	O				
47+50	0.0389	0.04	O				
47+55	0.0384	0.04	O				
48+ 0	0.0378	0.04	O				
48+ 5	0.0372	0.04	O				
48+10	0.0367	0.04	O				
48+15	0.0361	0.04	O				
48+20	0.0356	0.04	O				
48+25	0.0351	0.03	O				
48+30	0.0345	0.03	O				
48+35	0.0340	0.03	O				
48+40	0.0335	0.03	O				
48+45	0.0330	0.03	O				
48+50	0.0325	0.03	O				
48+55	0.0320	0.03	O				
49+ 0	0.0316	0.03	O				
49+ 5	0.0311	0.03	O				
49+10	0.0306	0.03	O				
49+15	0.0302	0.03	O				
49+20	0.0297	0.03	O				
49+25	0.0293	0.03	O				
49+30	0.0288	0.03	O				
49+35	0.0284	0.03	O				
49+40	0.0280	0.03	O				
49+45	0.0276	0.03	O				
49+50	0.0271	0.03	O				
49+55	0.0267	0.03	O				
50+ 0	0.0263	0.03	O				
50+ 5	0.0260	0.03	O				
50+10	0.0256	0.03	O				
50+15	0.0252	0.03	O				
50+20	0.0248	0.02	O				
50+25	0.0244	0.02	O				
50+30	0.0241	0.02	O				
50+35	0.0237	0.02	O				
50+40	0.0234	0.02	O				

50+45	0.0230	0.02	O				
50+50	0.0227	0.02	O				
50+55	0.0223	0.02	O				
51+ 0	0.0220	0.02	O				
51+ 5	0.0217	0.02	O				
51+10	0.0213	0.02	O				
51+15	0.0210	0.02	O				
51+20	0.0207	0.02	O				
51+25	0.0204	0.02	O				
51+30	0.0201	0.02	O				
51+35	0.0198	0.02	O				
51+40	0.0195	0.02	O				
51+45	0.0192	0.02	O				
51+50	0.0189	0.02	O				
51+55	0.0186	0.02	O				
52+ 0	0.0184	0.02	O				
52+ 5	0.0181	0.02	O				
52+10	0.0178	0.02	O				
52+15	0.0176	0.02	O				
52+20	0.0173	0.02	O				
52+25	0.0170	0.02	O				
52+30	0.0168	0.02	O				
52+35	0.0165	0.02	O				
52+40	0.0163	0.02	O				
52+45	0.0160	0.02	O				
52+50	0.0158	0.02	O				
52+55	0.0156	0.02	O				
53+ 0	0.0153	0.02	O				
53+ 5	0.0151	0.02	O				
53+10	0.0149	0.01	O				
53+15	0.0147	0.01	O				
53+20	0.0144	0.01	O				
53+25	0.0142	0.01	O				
53+30	0.0140	0.01	O				
53+35	0.0138	0.01	O				
53+40	0.0136	0.01	O				
53+45	0.0134	0.01	O				
53+50	0.0132	0.01	O				
53+55	0.0130	0.01	O				
54+ 0	0.0128	0.01	O				
54+ 5	0.0126	0.01	O				
54+10	0.0124	0.01	O				
54+15	0.0122	0.01	O				
54+20	0.0121	0.01	O				
54+25	0.0119	0.01	O				
54+30	0.0117	0.01	O				
54+35	0.0115	0.01	O				
54+40	0.0114	0.01	O				
54+45	0.0112	0.01	O				
54+50	0.0110	0.01	O				
54+55	0.0109	0.01	O				
55+ 0	0.0107	0.01	O				
55+ 5	0.0105	0.01	O				
55+10	0.0104	0.01	O				
55+15	0.0102	0.01	O				
55+20	0.0101	0.01	O				
55+25	0.0099	0.01	O				
55+30	0.0098	0.01	O				
55+35	0.0096	0.01	O				
55+40	0.0095	0.01	O				

55+45	0.0093	0.01	O				
55+50	0.0092	0.01	O				
55+55	0.0091	0.01	O				
56+ 0	0.0089	0.01	O				
56+ 5	0.0088	0.01	O				
56+10	0.0087	0.01	O				
56+15	0.0085	0.01	O				
56+20	0.0084	0.01	O				
56+25	0.0083	0.01	O				
56+30	0.0082	0.01	O				
56+35	0.0080	0.01	O				
56+40	0.0079	0.01	O				
56+45	0.0078	0.01	O				
56+50	0.0077	0.01	O				
56+55	0.0076	0.01	O				
57+ 0	0.0075	0.01	O				
57+ 5	0.0073	0.01	O				
57+10	0.0072	0.01	O				
57+15	0.0071	0.01	O				
57+20	0.0070	0.01	O				
57+25	0.0069	0.01	O				
57+30	0.0068	0.01	O				
57+35	0.0067	0.01	O				
57+40	0.0066	0.01	O				
57+45	0.0065	0.01	O				
57+50	0.0064	0.01	O				
57+55	0.0063	0.01	O				
58+ 0	0.0062	0.01	O				
58+ 5	0.0061	0.01	O				
58+10	0.0060	0.01	O				
58+15	0.0060	0.01	O				
58+20	0.0059	0.01	O				
58+25	0.0058	0.01	O				
58+30	0.0057	0.01	O				
58+35	0.0056	0.01	O				
58+40	0.0055	0.01	O				
58+45	0.0054	0.01	O				
58+50	0.0054	0.01	O				
58+55	0.0053	0.01	O				
59+ 0	0.0052	0.01	O				
59+ 5	0.0051	0.01	O				
59+10	0.0050	0.01	O				
59+15	0.0050	0.00	O				
59+20	0.0049	0.00	O				
59+25	0.0048	0.00	O				
59+30	0.0048	0.00	O				
59+35	0.0047	0.00	O				
59+40	0.0046	0.00	O				
59+45	0.0045	0.00	O				
59+50	0.0045	0.00	O				
59+55	0.0044	0.00	O				
60+ 0	0.0043	0.00	O				
60+ 5	0.0043	0.00	O				
60+10	0.0042	0.00	O				
60+15	0.0041	0.00	O				
60+20	0.0041	0.00	O				
60+25	0.0040	0.00	O				
60+30	0.0040	0.00	O				
60+35	0.0039	0.00	O				
60+40	0.0038	0.00	O				

60+45	0.0038	0.00	O				
60+50	0.0037	0.00	O				
60+55	0.0037	0.00	O				
61+ 0	0.0036	0.00	O				
61+ 5	0.0036	0.00	O				
61+10	0.0035	0.00	O				
61+15	0.0035	0.00	O				
61+20	0.0034	0.00	O				
61+25	0.0034	0.00	O				
61+30	0.0033	0.00	O				
61+35	0.0033	0.00	O				
61+40	0.0032	0.00	O				
61+45	0.0032	0.00	O				
61+50	0.0031	0.00	O				
61+55	0.0031	0.00	O				
62+ 0	0.0030	0.00	O				
62+ 5	0.0030	0.00	O				
62+10	0.0029	0.00	O				
62+15	0.0029	0.00	O				
62+20	0.0029	0.00	O				
62+25	0.0028	0.00	O				
62+30	0.0028	0.00	O				
62+35	0.0027	0.00	O				
62+40	0.0027	0.00	O				
62+45	0.0026	0.00	O				
62+50	0.0026	0.00	O				
62+55	0.0026	0.00	O				
63+ 0	0.0025	0.00	O				
63+ 5	0.0025	0.00	O				
63+10	0.0025	0.00	O				
63+15	0.0024	0.00	O				
63+20	0.0024	0.00	O				
63+25	0.0023	0.00	O				
63+30	0.0023	0.00	O				
63+35	0.0023	0.00	O				
63+40	0.0022	0.00	O				
63+45	0.0022	0.00	O				
63+50	0.0022	0.00	O				
63+55	0.0021	0.00	O				
64+ 0	0.0021	0.00	O				
64+ 5	0.0021	0.00	O				
64+10	0.0020	0.00	O				
64+15	0.0020	0.00	O				
64+20	0.0020	0.00	O				
64+25	0.0020	0.00	O				
64+30	0.0019	0.00	O				
64+35	0.0019	0.00	O				
64+40	0.0019	0.00	O				
64+45	0.0018	0.00	O				
64+50	0.0018	0.00	O				
64+55	0.0018	0.00	O				
65+ 0	0.0018	0.00	O				
65+ 5	0.0017	0.00	O				
65+10	0.0017	0.00	O				
65+15	0.0017	0.00	O				
65+20	0.0017	0.00	O				
65+25	0.0016	0.00	O				
65+30	0.0016	0.00	O				
65+35	0.0016	0.00	O				
65+40	0.0016	0.00	O				

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   65+45       0.0015      0.00  O         |         |         |         |
   65+50       0.0015      0.00  O         |         |         |         |
   65+55       0.0015      0.00  O         |         |         |         |
   66+ 0       0.0015      0.00  O         |         |         |         |
   66+ 5       0.0014      0.00  O         |         |         |         |
   66+10       0.0014      0.00  O         |         |         |         |
   66+15       0.0014      0.00  O         |         |         |         |
   66+20       0.0014      0.00  O         |         |         |         |
   66+25       0.0014      0.00  O         |         |         |         |
   66+30       0.0013      0.00  O         |         |         |         |
   66+35       0.0013      0.00  O         |         |         |         |
   66+40       0.0013      0.00  O         |         |         |         |
   66+45       0.0013      0.00  O         |         |         |         |
   66+50       0.0013      0.00  O         |         |         |         |
   66+55       0.0012      0.00  O         |         |         |         |
   67+ 0       0.0012      0.00  O         |         |         |         |
   67+ 5       0.0012      0.00  O         |         |         |         |
   67+10       0.0012      0.00  O         |         |         |         |
   67+15       0.0012      0.00  O         |         |         |         |
   67+20       0.0012      0.00  O         |         |         |         |
   67+25       0.0011      0.00  O         |         |         |         |
   67+30       0.0011      0.00  O         |         |         |         |
   67+35       0.0011      0.00  O         |         |         |         |
   67+40       0.0011      0.00  O         |         |         |         |
   67+45       0.0011      0.00  O         |         |         |         |
   67+50       0.0011      0.00  O         |         |         |         |
   67+55       0.0010      0.00  O         |         |         |         |
   68+ 0       0.0010      0.00  O         |         |         |         |
   68+ 5       0.0010      0.00  O         |         |         |         |
   68+10       0.0010      0.00  O         |         |         |         |
   68+15       0.0001      0.00  O         |         |         |         |
   68+20       0.0000      0.00  O         |         |         |         |
--------------------------------------------------------------------------
     ****************************HYDROGRAPH DATA****************************
               Number of intervals =   820
               Time interval =    5.0 (Min.)
               Maximum/Peak flow rate =       21.125 (CFS)
               Total volume =      11.508 (Ac.Ft)
          Status of hydrographs being held in storage
                     Stream 1  Stream 2  Stream 3  Stream 4  Stream 5
          Peak (CFS)      0.000     0.000     0.000     0.000     0.000
          Vol (Ac.Ft)      0.000     0.000     0.000     0.000     0.000
     ***********************************************************************

     ---------------------------------------------------------------------


     ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
     Process from Point/Station       19.000 to Point/Station        6.000
     **** ADD/COMBINE/RECOVER HYDROGRAPHS ****

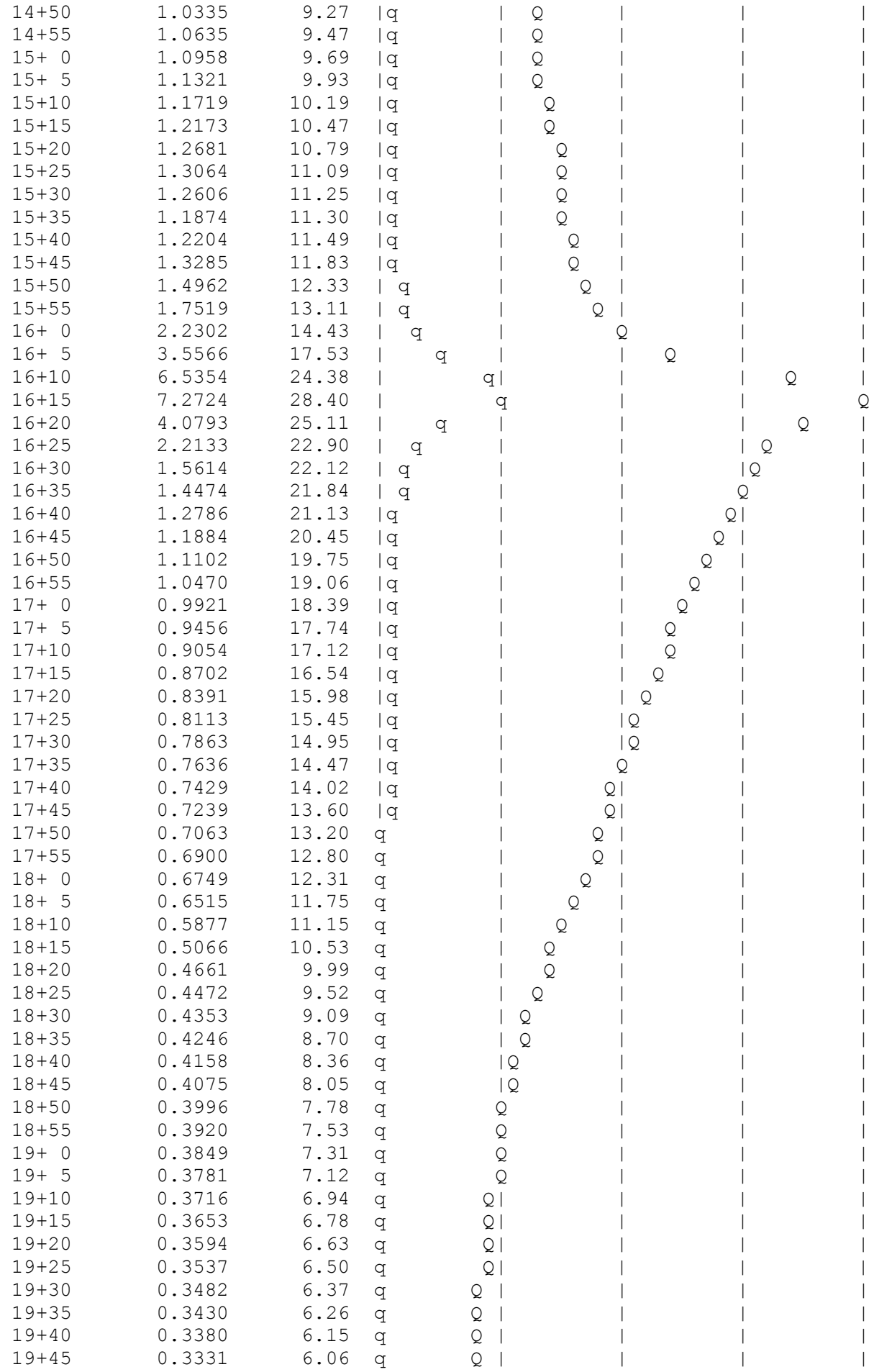
     ______________________________________________________________________
     ********************** HYDROGRAPH INFORMATION **********************

               From study/file name: kimcx2.rte
     ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                     P R I N T  O F  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)	Add q(CFS)	Tot. Q	0	7.1	14.2	21.3	28.4
0+ 5	0.0111	0.02	Q	|	|	|	|
0+10	0.0719	0.15	Q	|	|	|	|
0+15	0.1546	0.36	Q	|	|	|	|
0+20	0.1901	0.54	Q	|	|	|	|
0+25	0.2007	0.70	Q	|	|	|	|
0+30	0.2037	0.86	qQ	|	|	|	|
0+35	0.2059	1.00	qQ	|	|	|	|
0+40	0.2066	1.13	qQ	|	|	|	|
0+45	0.2073	1.24	qQ	|	|	|	|
0+50	0.2079	1.33	qQ	|	|	|	|
0+55	0.2086	1.42	qQ	|	|	|	|
1+ 0	0.2093	1.49	q Q	|	|	|	|
1+ 5	0.2100	1.56	q Q	|	|	|	|
1+10	0.2107	1.62	q Q	|	|	|	|
1+15	0.2114	1.67	q Q	|	|	|	|
1+20	0.2121	1.71	q Q	|	|	|	|
1+25	0.2128	1.75	q Q	|	|	|	|
1+30	0.2135	1.79	q Q	|	|	|	|
1+35	0.2143	1.82	q Q	|	|	|	|
1+40	0.2150	1.85	q Q	|	|	|	|
1+45	0.2158	1.88	q Q	|	|	|	|
1+50	0.2165	1.91	q Q	|	|	|	|
1+55	0.2173	1.93	q Q	|	|	|	|
2+ 0	0.2180	1.96	q Q	|	|	|	|
2+ 5	0.2188	1.98	q Q	|	|	|	|
2+10	0.2196	2.00	q Q	|	|	|	|
2+15	0.2204	2.02	q Q	|	|	|	|
2+20	0.2212	2.04	q Q	|	|	|	|
2+25	0.2220	2.06	q Q	|	|	|	|
2+30	0.2228	2.07	q Q	|	|	|	|
2+35	0.2236	2.09	q Q	|	|	|	|
2+40	0.2244	2.11	q Q	|	|	|	|
2+45	0.2252	2.12	q Q	|	|	|	|
2+50	0.2261	2.14	q Q	|	|	|	|
2+55	0.2269	2.16	q Q	|	|	|	|
3+ 0	0.2278	2.17	q Q	|	|	|	|
3+ 5	0.2287	2.19	q Q	|	|	|	|
3+10	0.2295	2.20	q Q	|	|	|	|
3+15	0.2304	2.22	q Q	|	|	|	|
3+20	0.2313	2.23	q Q	|	|	|	|
3+25	0.2322	2.25	q Q	|	|	|	|
3+30	0.2331	2.27	q Q	|	|	|	|
3+35	0.2341	2.28	q Q	|	|	|	|
3+40	0.2350	2.30	q Q	|	|	|	|
3+45	0.2359	2.31	q Q	|	|	|	|
3+50	0.2369	2.33	q Q	|	|	|	|
3+55	0.2379	2.34	q Q	|	|	|	|
4+ 0	0.2388	2.36	q Q	|	|	|	|
4+ 5	0.2398	2.37	q Q	|	|	|	|
4+10	0.2408	2.39	q Q	|	|	|	|
4+15	0.2418	2.40	q Q	|	|	|	|
4+20	0.2428	2.42	q Q	|	|	|	|
4+25	0.2439	2.43	q Q	|	|	|	|
4+30	0.2449	2.45	q Q	|	|	|	|
4+35	0.2460	2.46	q Q	|	|	|	|
4+40	0.2470	2.48	q Q	|	|	|	|
4+45	0.2481	2.49	q Q	|	|	|	|

4+50	0.2492	2.51	q	Q				
4+55	0.2503	2.52	q	Q				
5+ 0	0.2514	2.54	q	Q				
5+ 5	0.2526	2.56	q	Q				
5+10	0.2537	2.57	q	Q				
5+15	0.2549	2.59	q	Q				
5+20	0.2560	2.60	q	Q				
5+25	0.2572	2.62	q	Q				
5+30	0.2584	2.63	q	Q				
5+35	0.2596	2.65	q	Q				
5+40	0.2608	2.67	q	Q				
5+45	0.2621	2.68	q	Q				
5+50	0.2634	2.70	q	Q				
5+55	0.2646	2.72	q	Q				
6+ 0	0.2659	2.73	q	Q				
6+ 5	0.2673	2.75	q	Q				
6+10	0.2686	2.76	q	Q				
6+15	0.2699	2.78	q	Q				
6+20	0.2713	2.80	q	Q				
6+25	0.2727	2.82	q	Q				
6+30	0.2741	2.83	q	Q				
6+35	0.2755	2.85	q	Q				
6+40	0.2769	2.87	q	Q				
6+45	0.2784	2.89	q	Q				
6+50	0.2799	2.90	q	Q				
6+55	0.2814	2.92	q	Q				
7+ 0	0.2829	2.94	q	Q				
7+ 5	0.2845	2.96	q	Q				
7+10	0.2860	2.98	q	Q				
7+15	0.2876	2.99	q	Q				
7+20	0.2892	3.01	q	Q				
7+25	0.2909	3.03	q	Q				
7+30	0.2926	3.05	q	Q				
7+35	0.2943	3.07	q	Q				
7+40	0.2960	3.09	q	Q				
7+45	0.2977	3.11	q	Q				
7+50	0.2995	3.13	q	Q				
7+55	0.3013	3.15	q	Q				
8+ 0	0.3031	3.17	q	Q				
8+ 5	0.3050	3.19	q	Q				
8+10	0.3069	3.21	q	Q				
8+15	0.3088	3.23	q	Q				
8+20	0.3108	3.25	q	Q				
8+25	0.3128	3.27	q	Q				
8+30	0.3148	3.30	q	Q				
8+35	0.3169	3.32	q	Q				
8+40	0.3189	3.34	q	Q				
8+45	0.3211	3.36	q	Q				
8+50	0.3233	3.39	q	Q				
8+55	0.3255	3.41	q	Q				
9+ 0	0.3277	3.43	q	Q				
9+ 5	0.3300	3.46	q	Q				
9+10	0.3324	3.48	q	Q				
9+15	0.3348	3.51	q	Q				
9+20	0.3372	3.53	q	Q				
9+25	0.3397	3.56	q	Q				
9+30	0.3422	3.58	q	Q				
9+35	0.3448	3.61	q	Q				
9+40	0.3474	3.63	q	Q				
9+45	0.3501	3.66	q	Q				

9+50	0.3528	3.69	q	Q	|	|	|	|
9+55	0.3556	3.72	q	Q	|	|	|	|
10+ 0	0.3584	3.75	q	Q	|	|	|	|
10+ 5	0.3614	3.77	q	Q	|	|	|	|
10+10	0.3643	3.80	q	Q	|	|	|	|
10+15	0.3674	3.83	q	Q	|	|	|	|
10+20	0.3705	3.86	q	Q	|	|	|	|
10+25	0.3737	3.90	q	Q	|	|	|	|
10+30	0.3770	3.93	q	Q	|	|	|	|
10+35	0.3803	3.96	q	Q	|	|	|	|
10+40	0.3837	3.99	q	Q	|	|	|	|
10+45	0.3873	4.03	q	Q	|	|	|	|
10+50	0.3908	4.06	q	Q	|	|	|	|
10+55	0.3945	4.09	q	Q	|	|	|	|
11+ 0	0.3983	4.13	q	Q	|	|	|	|
11+ 5	0.4022	4.16	q	Q	|	|	|	|
11+10	0.4061	4.20	q	Q	|	|	|	|
11+15	0.4102	4.23	q	Q	|	|	|	|
11+20	0.4144	4.27	q	Q	|	|	|	|
11+25	0.4187	4.31	q	Q	|	|	|	|
11+30	0.4231	4.34	q	Q	|	|	|	|
11+35	0.4277	4.38	q	Q	|	|	|	|
11+40	0.4324	4.42	q	Q	|	|	|	|
11+45	0.4372	4.46	q	Q	|	|	|	|
11+50	0.4421	4.51	q	Q	|	|	|	|
11+55	0.4473	4.55	q	Q	|	|	|	|
12+ 0	0.4526	4.60	q	Q	|	|	|	|
12+ 5	0.4674	4.66	q	Q	|	|	|	|
12+10	0.5236	4.81	q	Q	|	|	|	|
12+15	0.5985	5.04	q	Q	|	|	|	|
12+20	0.6338	5.23	q	Q	|	|	|	|
12+25	0.6486	5.41	q	Q	|	|	|	|
12+30	0.6572	5.58	q	Q	|	|	|	|
12+35	0.6654	5.75	q	Q	|	|	|	|
12+40	0.6724	5.91	q	Q	|	|	|	|
12+45	0.6798	6.05	q	Q	|	|	|	|
12+50	0.6873	6.19	q	Q	|	|	|	|
12+55	0.6952	6.32	q	Q	|	|	|	|
13+ 0	0.7033	6.44	q	Q	|	|	|	|
13+ 5	0.7119	6.55	|q	Q	|	|	|	|
13+10	0.7206	6.66	|q	Q	|	|	|	|
13+15	0.7299	6.77	|q	Q	|	|	|	|
13+20	0.7393	6.88	|q	Q	|	|	|	|
13+25	0.7494	6.98	|q	Q	|	|	|	|
13+30	0.7597	7.09	|q	Q	|	|	|	|
13+35	0.7706	7.19	|q	Q	|	|	|	|
13+40	0.7819	7.30	|q	Q	|	|	|	|
13+45	0.7940	7.41	|q	Q	|	|	|	|
13+50	0.8064	7.52	|q	Q	|	|	|	|
13+55	0.8197	7.63	|q	Q	|	|	|	|
14+ 0	0.8335	7.75	|q	Q	|	|	|	|
14+ 5	0.8483	7.87	|q	|Q	|	|	|	|
14+10	0.8638	8.00	|q	|Q	|	|	|	|
14+15	0.8806	8.13	|q	|Q	|	|	|	|
14+20	0.8980	8.27	|q	|Q	|	|	|	|
14+25	0.9169	8.41	|q	|Q	|	|	|	|
14+30	0.9367	8.57	|q	| Q	|	|	|	|
14+35	0.9584	8.73	|q	| Q	|	|	|	|
14+40	0.9813	8.90	|q	| Q	|	|	|	|
14+45	1.0066	9.08	|q	| Q	|	|	|	|



19+50	0.3285	5.96	q	Q	|	|	|
19+55	0.3240	5.88	q	Q	|	|	|
20+ 0	0.3196	5.79	q	Q	|	|	|
20+ 5	0.3154	5.72	q	Q	|	|	|
20+10	0.3114	5.64	q	Q	|	|	|
20+15	0.3075	5.57	q	Q	|	|	|
20+20	0.3037	5.51	q	Q	|	|	|
20+25	0.3001	5.44	q	Q	|	|	|
20+30	0.2965	5.38	q	Q	|	|	|
20+35	0.2931	5.32	q	Q	|	|	|
20+40	0.2898	5.26	q	Q	|	|	|
20+45	0.2865	5.21	q	Q	|	|	|
20+50	0.2834	5.15	q	Q	|	|	|
20+55	0.2804	5.10	q	Q	|	|	|
21+ 0	0.2774	5.05	q	Q	|	|	|
21+ 5	0.2745	5.00	q	Q	|	|	|
21+10	0.2717	4.95	q	Q	|	|	|
21+15	0.2690	4.91	q	Q	|	|	|
21+20	0.2663	4.86	q	Q	|	|	|
21+25	0.2638	4.82	q	Q	|	|	|
21+30	0.2612	4.77	q	Q	|	|	|
21+35	0.2588	4.73	q	Q	|	|	|
21+40	0.2564	4.69	q	Q	|	|	|
21+45	0.2540	4.65	q	Q	|	|	|
21+50	0.2518	4.61	q	Q	|	|	|
21+55	0.2495	4.57	q	Q	|	|	|
22+ 0	0.2474	4.53	q	Q	|	|	|
22+ 5	0.2452	4.49	q	Q	|	|	|
22+10	0.2432	4.46	q	Q	|	|	|
22+15	0.2411	4.42	q	Q	|	|	|
22+20	0.2391	4.39	q	Q	|	|	|
22+25	0.2372	4.35	q	Q	|	|	|
22+30	0.2353	4.32	q	Q	|	|	|
22+35	0.2334	4.29	q	Q	|	|	|
22+40	0.2316	4.26	q	Q	|	|	|
22+45	0.2298	4.23	q	Q	|	|	|
22+50	0.2281	4.20	q	Q	|	|	|
22+55	0.2263	4.17	q	Q	|	|	|
23+ 0	0.2247	4.14	q	Q	|	|	|
23+ 5	0.2230	4.11	q	Q	|	|	|
23+10	0.2214	4.08	q	Q	|	|	|
23+15	0.2198	4.05	q	Q	|	|	|
23+20	0.2183	4.02	q	Q	|	|	|
23+25	0.2167	3.99	q	Q	|	|	|
23+30	0.2152	3.97	q	Q	|	|	|
23+35	0.2138	3.94	q	Q	|	|	|
23+40	0.2123	3.91	q	Q	|	|	|
23+45	0.2109	3.89	q	Q	|	|	|
23+50	0.2095	3.86	q	Q	|	|	|
23+55	0.2081	3.83	q	Q	|	|	|
24+ 0	0.2068	3.81	q	Q	|	|	|
24+ 5	0.1944	3.76	q	Q	|	|	|
24+10	0.1325	3.61	q	Q	|	|	|
24+15	0.0493	3.38	q	Q	|	|	|
24+20	0.0141	3.18	q	Q	|	|	|
24+25	0.0039	3.00	q	Q	|	|	|
24+30	0.0016	2.84	q	Q	|	|	|
24+35	0.0000	2.68	q	Q	|	|	|
24+40	0.0000	2.54	q	Q	|	|	|
24+45	0.0000	2.42	q	Q	|	|	|

24+50	0.0000	2.32	q Q				
24+55	0.0000	2.22	q Q				
25+ 0	0.0000	2.14	q Q				
25+ 5	0.0000	2.07	q Q				
25+10	0.0000	2.01	q Q				
25+15	0.0000	1.95	q Q				
25+20	0.0000	1.90	q Q				
25+25	0.0000	1.86	q Q				
25+30	0.0000	1.82	q Q				
25+35	0.0000	1.78	q Q				
25+40	0.0000	1.75	q Q				
25+45	0.0000	1.72	q Q				
25+50	0.0000	1.69	q Q				
25+55	0.0000	1.66	q Q				
26+ 0	0.0000	1.64	q Q				
26+ 5	0.0000	1.61	q Q				
26+10	0.0000	1.59	q Q				
26+15	0.0000	1.57	q Q				
26+20	0.0000	1.55	q Q				
26+25	0.0000	1.53	q Q				
26+30	0.0000	1.51	q Q				
26+35	0.0000	1.49	q Q				
26+40	0.0000	1.48	q Q				
26+45	0.0000	1.46	q Q				
26+50	0.0000	1.44	q Q				
26+55	0.0000	1.42	q Q				
27+ 0	0.0000	1.41	qQ				
27+ 5	0.0000	1.39	qQ				
27+10	0.0000	1.38	qQ				
27+15	0.0000	1.36	qQ				
27+20	0.0000	1.35	qQ				
27+25	0.0000	1.33	qQ				
27+30	0.0000	1.32	qQ				
27+35	0.0000	1.31	qQ				
27+40	0.0000	1.29	qQ				
27+45	0.0000	1.28	qQ				
27+50	0.0000	1.27	qQ				
27+55	0.0000	1.25	qQ				
28+ 0	0.0000	1.24	qQ				
28+ 5	0.0000	1.23	qQ				
28+10	0.0000	1.21	qQ				
28+15	0.0000	1.20	qQ				
28+20	0.0000	1.19	qQ				
28+25	0.0000	1.18	qQ				
28+30	0.0000	1.17	qQ				
28+35	0.0000	1.15	qQ				
28+40	0.0000	1.14	qQ				
28+45	0.0000	1.13	qQ				
28+50	0.0000	1.12	qQ				
28+55	0.0000	1.11	qQ				
29+ 0	0.0000	1.10	qQ				
29+ 5	0.0000	1.08	qQ				
29+10	0.0000	1.07	qQ				
29+15	0.0000	1.06	qQ				
29+20	0.0000	1.05	qQ				
29+25	0.0000	1.04	qQ				
29+30	0.0000	1.03	qQ				
29+35	0.0000	1.02	qQ				
29+40	0.0000	1.01	qQ				
29+45	0.0000	1.00	qQ				

29+50	0.0000	0.99	qQ				
29+55	0.0000	0.98	qQ				
30+ 0	0.0000	0.97	qQ				
30+ 5	0.0000	0.96	qQ				
30+10	0.0000	0.94	qQ				
30+15	0.0000	0.93	qQ				
30+20	0.0000	0.91	qQ				
30+25	0.0000	0.90	qQ				
30+30	0.0000	0.89	qQ				
30+35	0.0000	0.87	qQ				
30+40	0.0000	0.86	qQ				
30+45	0.0000	0.85	qQ				
30+50	0.0000	0.83	qQ				
30+55	0.0000	0.82	qQ				
31+ 0	0.0000	0.81	qQ				
31+ 5	0.0000	0.80	qQ				
31+10	0.0000	0.79	qQ				
31+15	0.0000	0.77	qQ				
31+20	0.0000	0.76	qQ				
31+25	0.0000	0.75	qQ				
31+30	0.0000	0.74	qQ				
31+35	0.0000	0.73	qQ				
31+40	0.0000	0.72	qQ				
31+45	0.0000	0.71	Q				
31+50	0.0000	0.70	Q				
31+55	0.0000	0.69	Q				
32+ 0	0.0000	0.68	Q				
32+ 5	0.0000	0.67	Q				
32+10	0.0000	0.66	Q				
32+15	0.0000	0.65	Q				
32+20	0.0000	0.64	Q				
32+25	0.0000	0.63	Q				
32+30	0.0000	0.62	Q				
32+35	0.0000	0.61	Q				
32+40	0.0000	0.60	Q				
32+45	0.0000	0.59	Q				
32+50	0.0000	0.58	Q				
32+55	0.0000	0.57	Q				
33+ 0	0.0000	0.56	Q				
33+ 5	0.0000	0.56	Q				
33+10	0.0000	0.55	Q				
33+15	0.0000	0.54	Q				
33+20	0.0000	0.53	Q				
33+25	0.0000	0.52	Q				
33+30	0.0000	0.52	Q				
33+35	0.0000	0.51	Q				
33+40	0.0000	0.50	Q				
33+45	0.0000	0.49	Q				
33+50	0.0000	0.49	Q				
33+55	0.0000	0.48	Q				
34+ 0	0.0000	0.47	Q				
34+ 5	0.0000	0.46	Q				
34+10	0.0000	0.46	Q				
34+15	0.0000	0.45	Q				
34+20	0.0000	0.44	Q				
34+25	0.0000	0.44	Q				
34+30	0.0000	0.43	Q				
34+35	0.0000	0.42	Q				
34+40	0.0000	0.42	Q				
34+45	0.0000	0.41	Q				

34+50	0.0000	0.41	Q				
34+55	0.0000	0.40	Q				
35+ 0	0.0000	0.39	Q				
35+ 5	0.0000	0.39	Q				
35+10	0.0000	0.38	Q				
35+15	0.0000	0.38	Q				
35+20	0.0000	0.37	Q				
35+25	0.0000	0.37	Q				
35+30	0.0000	0.36	Q				
35+35	0.0000	0.35	Q				
35+40	0.0000	0.35	Q				
35+45	0.0000	0.34	Q				
35+50	0.0000	0.34	Q				
35+55	0.0000	0.33	Q				
36+ 0	0.0000	0.33	Q				
36+ 5	0.0000	0.32	Q				
36+10	0.0000	0.32	Q				
36+15	0.0000	0.31	Q				
36+20	0.0000	0.31	Q				
36+25	0.0000	0.31	Q				
36+30	0.0000	0.30	Q				
36+35	0.0000	0.30	Q				
36+40	0.0000	0.29	Q				
36+45	0.0000	0.29	Q				
36+50	0.0000	0.28	Q				
36+55	0.0000	0.28	Q				
37+ 0	0.0000	0.27	Q				
37+ 5	0.0000	0.27	Q				
37+10	0.0000	0.27	Q				
37+15	0.0000	0.26	Q				
37+20	0.0000	0.26	Q				
37+25	0.0000	0.25	Q				
37+30	0.0000	0.25	Q				
37+35	0.0000	0.25	Q				
37+40	0.0000	0.24	Q				
37+45	0.0000	0.24	Q				
37+50	0.0000	0.24	Q				
37+55	0.0000	0.23	Q				
38+ 0	0.0000	0.23	Q				
38+ 5	0.0000	0.23	Q				
38+10	0.0000	0.22	Q				
38+15	0.0000	0.22	Q				
38+20	0.0000	0.22	Q				
38+25	0.0000	0.21	Q				
38+30	0.0000	0.21	Q				
38+35	0.0000	0.21	Q				
38+40	0.0000	0.20	Q				
38+45	0.0000	0.20	Q				
38+50	0.0000	0.20	Q				
38+55	0.0000	0.19	Q				
39+ 0	0.0000	0.19	Q				
39+ 5	0.0000	0.19	Q				
39+10	0.0000	0.19	Q				
39+15	0.0000	0.18	Q				
39+20	0.0000	0.18	Q				
39+25	0.0000	0.18	Q				
39+30	0.0000	0.17	Q				
39+35	0.0000	0.17	Q				
39+40	0.0000	0.17	Q				
39+45	0.0000	0.17	Q				

39+50	0.0000	0.16	Q				
39+55	0.0000	0.16	Q				
40+ 0	0.0000	0.16	Q				
40+ 5	0.0000	0.16	Q				
40+10	0.0000	0.16	Q				
40+15	0.0000	0.15	Q				
40+20	0.0000	0.15	Q				
40+25	0.0000	0.15	Q				
40+30	0.0000	0.15	Q				
40+35	0.0000	0.14	Q				
40+40	0.0000	0.14	Q				
40+45	0.0000	0.14	Q				
40+50	0.0000	0.14	Q				
40+55	0.0000	0.14	Q				
41+ 0	0.0000	0.13	Q				
41+ 5	0.0000	0.13	Q				
41+10	0.0000	0.13	Q				
41+15	0.0000	0.13	Q				
41+20	0.0000	0.13	Q				
41+25	0.0000	0.12	Q				
41+30	0.0000	0.12	Q				
41+35	0.0000	0.12	Q				
41+40	0.0000	0.12	Q				
41+45	0.0000	0.12	Q				
41+50	0.0000	0.11	Q				
41+55	0.0000	0.11	Q				
42+ 0	0.0000	0.11	Q				
42+ 5	0.0000	0.11	Q				
42+10	0.0000	0.11	Q				
42+15	0.0000	0.11	Q				
42+20	0.0000	0.10	Q				
42+25	0.0000	0.10	Q				
42+30	0.0000	0.10	Q				
42+35	0.0000	0.10	Q				
42+40	0.0000	0.10	Q				
42+45	0.0000	0.10	Q				
42+50	0.0000	0.10	Q				
42+55	0.0000	0.09	Q				
43+ 0	0.0000	0.09	Q				
43+ 5	0.0000	0.09	Q				
43+10	0.0000	0.09	Q				
43+15	0.0000	0.09	Q				
43+20	0.0000	0.09	Q				
43+25	0.0000	0.09	Q				
43+30	0.0000	0.09	Q				
43+35	0.0000	0.08	Q				
43+40	0.0000	0.08	Q				
43+45	0.0000	0.08	Q				
43+50	0.0000	0.08	Q				
43+55	0.0000	0.08	Q				
44+ 0	0.0000	0.08	Q				
44+ 5	0.0000	0.08	Q				
44+10	0.0000	0.08	Q				
44+15	0.0000	0.07	Q				
44+20	0.0000	0.07	Q				
44+25	0.0000	0.07	Q				
44+30	0.0000	0.07	Q				
44+35	0.0000	0.07	Q				
44+40	0.0000	0.07	Q				
44+45	0.0000	0.07	Q				

44+50	0.0000	0.07	Q				
44+55	0.0000	0.07	Q				
45+ 0	0.0000	0.06	Q				
45+ 5	0.0000	0.06	Q				
45+10	0.0000	0.06	Q				
45+15	0.0000	0.06	Q				
45+20	0.0000	0.06	Q				
45+25	0.0000	0.06	Q				
45+30	0.0000	0.06	Q				
45+35	0.0000	0.06	Q				
45+40	0.0000	0.06	Q				
45+45	0.0000	0.06	Q				
45+50	0.0000	0.06	Q				
45+55	0.0000	0.06	Q				
46+ 0	0.0000	0.05	Q				
46+ 5	0.0000	0.05	Q				
46+10	0.0000	0.05	Q				
46+15	0.0000	0.05	Q				
46+20	0.0000	0.05	Q				
46+25	0.0000	0.05	Q				
46+30	0.0000	0.05	Q				
46+35	0.0000	0.05	Q				
46+40	0.0000	0.05	Q				
46+45	0.0000	0.05	Q				
46+50	0.0000	0.05	Q				
46+55	0.0000	0.05	Q				
47+ 0	0.0000	0.05	Q				
47+ 5	0.0000	0.04	Q				
47+10	0.0000	0.04	Q				
47+15	0.0000	0.04	Q				
47+20	0.0000	0.04	Q				
47+25	0.0000	0.04	Q				
47+30	0.0000	0.04	Q				
47+35	0.0000	0.04	Q				
47+40	0.0000	0.04	Q				
47+45	0.0000	0.04	Q				
47+50	0.0000	0.04	Q				
47+55	0.0000	0.04	Q				
48+ 0	0.0000	0.04	Q				
48+ 5	0.0000	0.04	Q				
48+10	0.0000	0.04	Q				
48+15	0.0000	0.04	Q				
48+20	0.0000	0.04	Q				
48+25	0.0000	0.04	Q				
48+30	0.0000	0.03	Q				
48+35	0.0000	0.03	Q				
48+40	0.0000	0.03	Q				
48+45	0.0000	0.03	Q				
48+50	0.0000	0.03	Q				
48+55	0.0000	0.03	Q				
49+ 0	0.0000	0.03	Q				
49+ 5	0.0000	0.03	Q				
49+10	0.0000	0.03	Q				
49+15	0.0000	0.03	Q				
49+20	0.0000	0.03	Q				
49+25	0.0000	0.03	Q				
49+30	0.0000	0.03	Q				
49+35	0.0000	0.03	Q				
49+40	0.0000	0.03	Q				
49+45	0.0000	0.03	Q				

49+50	0.0000	0.03	Q				
49+55	0.0000	0.03	Q				
50+ 0	0.0000	0.03	Q				
50+ 5	0.0000	0.03	Q				
50+10	0.0000	0.03	Q				
50+15	0.0000	0.03	Q				
50+20	0.0000	0.02	Q				
50+25	0.0000	0.02	Q				
50+30	0.0000	0.02	Q				
50+35	0.0000	0.02	Q				
50+40	0.0000	0.02	Q				
50+45	0.0000	0.02	Q				
50+50	0.0000	0.02	Q				
50+55	0.0000	0.02	Q				
51+ 0	0.0000	0.02	Q				
51+ 5	0.0000	0.02	Q				
51+10	0.0000	0.02	Q				
51+15	0.0000	0.02	Q				
51+20	0.0000	0.02	Q				
51+25	0.0000	0.02	Q				
51+30	0.0000	0.02	Q				
51+35	0.0000	0.02	Q				
51+40	0.0000	0.02	Q				
51+45	0.0000	0.02	Q				
51+50	0.0000	0.02	Q				
51+55	0.0000	0.02	Q				
52+ 0	0.0000	0.02	Q				
52+ 5	0.0000	0.02	Q				
52+10	0.0000	0.02	Q				
52+15	0.0000	0.02	Q				
52+20	0.0000	0.02	Q				
52+25	0.0000	0.02	Q				
52+30	0.0000	0.02	Q				
52+35	0.0000	0.02	Q				
52+40	0.0000	0.02	Q				
52+45	0.0000	0.02	Q				
52+50	0.0000	0.02	Q				
52+55	0.0000	0.02	Q				
53+ 0	0.0000	0.02	Q				
53+ 5	0.0000	0.02	Q				
53+10	0.0000	0.01	Q				
53+15	0.0000	0.01	Q				
53+20	0.0000	0.01	Q				
53+25	0.0000	0.01	Q				
53+30	0.0000	0.01	Q				
53+35	0.0000	0.01	Q				
53+40	0.0000	0.01	Q				
53+45	0.0000	0.01	Q				
53+50	0.0000	0.01	Q				
53+55	0.0000	0.01	Q				
54+ 0	0.0000	0.01	Q				
54+ 5	0.0000	0.01	Q				
54+10	0.0000	0.01	Q				
54+15	0.0000	0.01	Q				
54+20	0.0000	0.01	Q				
54+25	0.0000	0.01	Q				
54+30	0.0000	0.01	Q				
54+35	0.0000	0.01	Q				
54+40	0.0000	0.01	Q				
54+45	0.0000	0.01	Q				

54+50	0.0000	0.01	Q				
54+55	0.0000	0.01	Q				
55+ 0	0.0000	0.01	Q				
55+ 5	0.0000	0.01	Q				
55+10	0.0000	0.01	Q				
55+15	0.0000	0.01	Q				
55+20	0.0000	0.01	Q				
55+25	0.0000	0.01	Q				
55+30	0.0000	0.01	Q				
55+35	0.0000	0.01	Q				
55+40	0.0000	0.01	Q				
55+45	0.0000	0.01	Q				
55+50	0.0000	0.01	Q				
55+55	0.0000	0.01	Q				
56+ 0	0.0000	0.01	Q				
56+ 5	0.0000	0.01	Q				
56+10	0.0000	0.01	Q				
56+15	0.0000	0.01	Q				
56+20	0.0000	0.01	Q				
56+25	0.0000	0.01	Q				
56+30	0.0000	0.01	Q				
56+35	0.0000	0.01	Q				
56+40	0.0000	0.01	Q				
56+45	0.0000	0.01	Q				
56+50	0.0000	0.01	Q				
56+55	0.0000	0.01	Q				
57+ 0	0.0000	0.01	Q				
57+ 5	0.0000	0.01	Q				
57+10	0.0000	0.01	Q				
57+15	0.0000	0.01	Q				
57+20	0.0000	0.01	Q				
57+25	0.0000	0.01	Q				
57+30	0.0000	0.01	Q				
57+35	0.0000	0.01	Q				
57+40	0.0000	0.01	Q				
57+45	0.0000	0.01	Q				
57+50	0.0000	0.01	Q				
57+55	0.0000	0.01	Q				
58+ 0	0.0000	0.01	Q				
58+ 5	0.0000	0.01	Q				
58+10	0.0000	0.01	Q				
58+15	0.0000	0.01	Q				
58+20	0.0000	0.01	Q				
58+25	0.0000	0.01	Q				
58+30	0.0000	0.01	Q				
58+35	0.0000	0.01	Q				
58+40	0.0000	0.01	Q				
58+45	0.0000	0.01	Q				
58+50	0.0000	0.01	Q				
58+55	0.0000	0.01	Q				
59+ 0	0.0000	0.01	Q				
59+ 5	0.0000	0.01	Q				
59+10	0.0000	0.01	Q				
59+15	0.0000	0.00	Q				
59+20	0.0000	0.00	Q				
59+25	0.0000	0.00	Q				
59+30	0.0000	0.00	Q				
59+35	0.0000	0.00	Q				
59+40	0.0000	0.00	Q				
59+45	0.0000	0.00	Q				

59+50	0.0000	0.00	Q				
59+55	0.0000	0.00	Q				
60+ 0	0.0000	0.00	Q				
60+ 5	0.0000	0.00	Q				
60+10	0.0000	0.00	Q				
60+15	0.0000	0.00	Q				
60+20	0.0000	0.00	Q				
60+25	0.0000	0.00	Q				
60+30	0.0000	0.00	Q				
60+35	0.0000	0.00	Q				
60+40	0.0000	0.00	Q				
60+45	0.0000	0.00	Q				
60+50	0.0000	0.00	Q				
60+55	0.0000	0.00	Q				
61+ 0	0.0000	0.00	Q				
61+ 5	0.0000	0.00	Q				
61+10	0.0000	0.00	Q				
61+15	0.0000	0.00	Q				
61+20	0.0000	0.00	Q				
61+25	0.0000	0.00	Q				
61+30	0.0000	0.00	Q				
61+35	0.0000	0.00	Q				
61+40	0.0000	0.00	Q				
61+45	0.0000	0.00	Q				
61+50	0.0000	0.00	Q				
61+55	0.0000	0.00	Q				
62+ 0	0.0000	0.00	Q				
62+ 5	0.0000	0.00	Q				
62+10	0.0000	0.00	Q				
62+15	0.0000	0.00	Q				
62+20	0.0000	0.00	Q				
62+25	0.0000	0.00	Q				
62+30	0.0000	0.00	Q				
62+35	0.0000	0.00	Q				
62+40	0.0000	0.00	Q				
62+45	0.0000	0.00	Q				
62+50	0.0000	0.00	Q				
62+55	0.0000	0.00	Q				
63+ 0	0.0000	0.00	Q				
63+ 5	0.0000	0.00	Q				
63+10	0.0000	0.00	Q				
63+15	0.0000	0.00	Q				
63+20	0.0000	0.00	Q				
63+25	0.0000	0.00	Q				
63+30	0.0000	0.00	Q				
63+35	0.0000	0.00	Q				
63+40	0.0000	0.00	Q				
63+45	0.0000	0.00	Q				
63+50	0.0000	0.00	Q				
63+55	0.0000	0.00	Q				
64+ 0	0.0000	0.00	Q				
64+ 5	0.0000	0.00	Q				
64+10	0.0000	0.00	Q				
64+15	0.0000	0.00	Q				
64+20	0.0000	0.00	Q				
64+25	0.0000	0.00	Q				
64+30	0.0000	0.00	Q				
64+35	0.0000	0.00	Q				
64+40	0.0000	0.00	Q				
64+45	0.0000	0.00	Q				

64+50	0.0000	0.00	Q	|	|	|	|
64+55	0.0000	0.00	Q	|	|	|	|
65+ 0	0.0000	0.00	Q	|	|	|	|
65+ 5	0.0000	0.00	Q	|	|	|	|
65+10	0.0000	0.00	Q	|	|	|	|
65+15	0.0000	0.00	Q	|	|	|	|
65+20	0.0000	0.00	Q	|	|	|	|
65+25	0.0000	0.00	Q	|	|	|	|
65+30	0.0000	0.00	Q	|	|	|	|
65+35	0.0000	0.00	Q	|	|	|	|
65+40	0.0000	0.00	Q	|	|	|	|
65+45	0.0000	0.00	Q	|	|	|	|
65+50	0.0000	0.00	Q	|	|	|	|
65+55	0.0000	0.00	Q	|	|	|	|
66+ 0	0.0000	0.00	Q	|	|	|	|
66+ 5	0.0000	0.00	Q	|	|	|	|
66+10	0.0000	0.00	Q	|	|	|	|
66+15	0.0000	0.00	Q	|	|	|	|
66+20	0.0000	0.00	Q	|	|	|	|
66+25	0.0000	0.00	Q	|	|	|	|
66+30	0.0000	0.00	Q	|	|	|	|
66+35	0.0000	0.00	Q	|	|	|	|
66+40	0.0000	0.00	Q	|	|	|	|
66+45	0.0000	0.00	Q	|	|	|	|
66+50	0.0000	0.00	Q	|	|	|	|
66+55	0.0000	0.00	Q	|	|	|	|
67+ 0	0.0000	0.00	Q	|	|	|	|
67+ 5	0.0000	0.00	Q	|	|	|	|
67+10	0.0000	0.00	Q	|	|	|	|
67+15	0.0000	0.00	Q	|	|	|	|
67+20	0.0000	0.00	Q	|	|	|	|
67+25	0.0000	0.00	Q	|	|	|	|
67+30	0.0000	0.00	Q	|	|	|	|
67+35	0.0000	0.00	Q	|	|	|	|
67+40	0.0000	0.00	Q	|	|	|	|
67+45	0.0000	0.00	Q	|	|	|	|
67+50	0.0000	0.00	Q	|	|	|	|
67+55	0.0000	0.00	Q	|	|	|	|
68+ 0	0.0000	0.00	Q	|	|	|	|
68+ 5	0.0000	0.00	Q	|	|	|	|
68+10	0.0000	0.00	Q	|	|	|	|
68+15	0.0000	0.00	Q	|	|	|	|
68+20	0.0000	0.00	Q	|	|	|	|

**********HYDROGRAPH DATA**********

Number of intervals = 820
Time interval = 5.0 (Min.)
Maximum/Peak flow rate = 28.397 (CFS)
Total volume = 12.537 (Ac.Ft)

Status of hydrographs being held in storage

	Stream 1	Stream 2	Stream 3	Stream 4	Stream 5
Peak (CFS)	0.000	0.000	0.000	0.000	0.000
Vol (Ac.Ft)	0.000	0.000	0.000	0.000	0.000

****

++++++++++

Process from Point/Station 19.000 to Point/Station 6.000

**** STORE OR DELETE CURRENT HYDROGRAPH ****

Current stream hydrograph of 5.0 minute
intervals has been stored as stream number 1 with
a starting time of 0.00 hours and ending time of 36.00 hours
With a total volume of 12.39(Ac.Ft)

**********HYDROGRAPH DATA**********

Number of intervals = 0
Time interval = 0.0 (Min.)
Maximum/Peak flow rate = 0.000 (CFS)
Total volume = 0.000 (Ac.Ft)

Status of hydrographs being held in storage

	Stream 1	Stream 2	Stream 3	Stream 4	Stream 5
Peak (CFS)	28.397	0.000	0.000	0.000	0.000
Vol (Ac.Ft)	12.388	0.000	0.000	0.000	0.000

Process from Point/Station 7.000 to Point/Station 6.000
**** ADD/COMBINE/RECOVER HYDROGRAPHS ****

********** HYDROGRAPH INFORMATION **********

From study/file name: kimcc2.rte

P R I N T O F 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)	Add q(CFS)	Tot. Q	0	4.3	8.6	12.9	17.2
0+ 5	0.0267	0.03	Q				
0+10	0.1700	0.17	Q				
0+15	0.3265	0.33	Q				
0+20	0.3790	0.38	Q				
0+25	0.3912	0.39	Q				
0+30	0.3973	0.40	Q				
0+35	0.3985	0.40	Q				
0+40	0.3998	0.40	Q				
0+45	0.4011	0.40	Q				
0+50	0.4024	0.40	Q				
0+55	0.4037	0.40	Q				
1+ 0	0.4051	0.41	Q				
1+ 5	0.4064	0.41	Q				
1+10	0.4078	0.41	Q				
1+15	0.4091	0.41	Q				
1+20	0.4105	0.41	Q				
1+25	0.4119	0.41	Q				
1+30	0.4133	0.41	Q				
1+35	0.4147	0.41	Q				
1+40	0.4162	0.42	Q				
1+45	0.4176	0.42	Q				
1+50	0.4191	0.42	Q				
1+55	0.4205	0.42	Q				
2+ 0	0.4220	0.42	Q				

2+ 5	0.4235	0.42	Q				
2+10	0.4250	0.43	Q				
2+15	0.4265	0.43	Q				
2+20	0.4281	0.43	Q				
2+25	0.4296	0.43	|Q				
2+30	0.4312	0.43	|Q				
2+35	0.4328	0.43	|Q				
2+40	0.4344	0.43	|Q				
2+45	0.4360	0.44	|Q				
2+50	0.4376	0.44	|Q				
2+55	0.4393	0.44	|Q				
3+ 0	0.4409	0.44	|Q				
3+ 5	0.4426	0.44	|Q				
3+10	0.4443	0.44	|Q				
3+15	0.4460	0.45	|Q				
3+20	0.4478	0.45	|Q				
3+25	0.4495	0.45	|Q				
3+30	0.4513	0.45	|Q				
3+35	0.4531	0.45	|Q				
3+40	0.4549	0.45	|Q				
3+45	0.4567	0.46	|Q				
3+50	0.4586	0.46	|Q				
3+55	0.4604	0.46	|Q				
4+ 0	0.4623	0.46	|Q				
4+ 5	0.4642	0.46	|Q				
4+10	0.4662	0.47	|Q				
4+15	0.4681	0.47	|Q				
4+20	0.4701	0.47	|Q				
4+25	0.4721	0.47	|Q				
4+30	0.4741	0.47	|Q				
4+35	0.4761	0.48	|Q				
4+40	0.4782	0.48	|Q				
4+45	0.4803	0.48	|Q				
4+50	0.4824	0.48	|Q				
4+55	0.4846	0.48	|Q				
5+ 0	0.4867	0.49	|Q				
5+ 5	0.4889	0.49	|Q				
5+10	0.4911	0.49	|Q				
5+15	0.4934	0.49	|Q				
5+20	0.4957	0.50	|Q				
5+25	0.4979	0.50	|Q				
5+30	0.5003	0.50	|Q				
5+35	0.5026	0.50	|Q				
5+40	0.5050	0.51	|Q				
5+45	0.5074	0.51	|Q				
5+50	0.5099	0.51	|Q				
5+55	0.5124	0.51	|Q				
6+ 0	0.5149	0.51	|Q				
6+ 5	0.5174	0.52	|Q				
6+10	0.5200	0.52	|Q				
6+15	0.5226	0.52	|Q				
6+20	0.5253	0.53	|Q				
6+25	0.5279	0.53	|Q				
6+30	0.5307	0.53	|Q				
6+35	0.5334	0.53	|Q				
6+40	0.5362	0.54	|Q				
6+45	0.5391	0.54	|Q				
6+50	0.5420	0.54	|Q				
6+55	0.5449	0.54	|Q				
7+ 0	0.5478	0.55	|Q				

7+ 5	0.5508	0.55	|Q	|	|	|	|
7+10	0.5539	0.55	|Q	|	|	|	|
7+15	0.5570	0.56	|Q	|	|	|	|
7+20	0.5601	0.56	|Q	|	|	|	|
7+25	0.5633	0.56	|Q	|	|	|	|
7+30	0.5666	0.57	|Q	|	|	|	|
7+35	0.5698	0.57	|Q	|	|	|	|
7+40	0.5732	0.57	|Q	|	|	|	|
7+45	0.5766	0.58	|Q	|	|	|	|
7+50	0.5800	0.58	|Q	|	|	|	|
7+55	0.5835	0.58	|Q	|	|	|	|
8+ 0	0.5871	0.59	|Q	|	|	|	|
8+ 5	0.5907	0.59	|Q	|	|	|	|
8+10	0.5944	0.59	|Q	|	|	|	|
8+15	0.5981	0.60	|Q	|	|	|	|
8+20	0.6019	0.60	|Q	|	|	|	|
8+25	0.6057	0.61	|Q	|	|	|	|
8+30	0.6097	0.61	|Q	|	|	|	|
8+35	0.6137	0.61	|Q	|	|	|	|
8+40	0.6178	0.62	|Q	|	|	|	|
8+45	0.6219	0.62	|Q	|	|	|	|
8+50	0.6261	0.63	|Q	|	|	|	|
8+55	0.6304	0.63	|Q	|	|	|	|
9+ 0	0.6348	0.63	|Q	|	|	|	|
9+ 5	0.6392	0.64	|Q	|	|	|	|
9+10	0.6438	0.64	|Q	|	|	|	|
9+15	0.6484	0.65	|Q	|	|	|	|
9+20	0.6531	0.65	|Q	|	|	|	|
9+25	0.6579	0.66	|Q	|	|	|	|
9+30	0.6629	0.66	|Q	|	|	|	|
9+35	0.6678	0.67	|Q	|	|	|	|
9+40	0.6730	0.67	|Q	|	|	|	|
9+45	0.6781	0.68	|Q	|	|	|	|
9+50	0.6835	0.68	|Q	|	|	|	|
9+55	0.6889	0.69	|Q	|	|	|	|
10+ 0	0.6945	0.69	|Q	|	|	|	|
10+ 5	0.7001	0.70	|Q	|	|	|	|
10+10	0.7059	0.71	|Q	|	|	|	|
10+15	0.7118	0.71	|Q	|	|	|	|
10+20	0.7179	0.72	|Q	|	|	|	|
10+25	0.7241	0.72	|Q	|	|	|	|
10+30	0.7305	0.73	|Q	|	|	|	|
10+35	0.7369	0.74	|Q	|	|	|	|
10+40	0.7436	0.74	|Q	|	|	|	|
10+45	0.7504	0.75	|Q	|	|	|	|
10+50	0.7574	0.76	|Q	|	|	|	|
10+55	0.7645	0.76	|Q	|	|	|	|
11+ 0	0.7719	0.77	|Q	|	|	|	|
11+ 5	0.7794	0.78	|Q	|	|	|	|
11+10	0.7871	0.79	|Q	|	|	|	|
11+15	0.7950	0.80	|Q	|	|	|	|
11+20	0.8032	0.80	|Q	|	|	|	|
11+25	0.8115	0.81	|Q	|	|	|	|
11+30	0.8202	0.82	|Q	|	|	|	|
11+35	0.8290	0.83	|Q	|	|	|	|
11+40	0.8382	0.84	|Q	|	|	|	|
11+45	0.8475	0.85	|Q	|	|	|	|
11+50	0.8572	0.86	|Q	|	|	|	|
11+55	0.8672	0.87	| Q	|	|	|	|
12+ 0	0.8775	0.88	| Q	|	|	|	|

12+ 5	0.9097	0.91	Q				
12+10	1.0371	1.04	Q				
12+15	1.1752	1.18	Q				
12+20	1.2292	1.23	Q				
12+25	1.2504	1.25	Q				
12+30	1.2674	1.27	Q				
12+35	1.2807	1.28	Q				
12+40	1.2946	1.29	Q				
12+45	1.3088	1.31	Q				
12+50	1.3237	1.32	Q				
12+55	1.3389	1.34	Q				
13+ 0	1.3550	1.35	Q				
13+ 5	1.3714	1.37	Q				
13+10	1.3887	1.39	Q				
13+15	1.4065	1.41	Q				
13+20	1.4253	1.43	Q				
13+25	1.4446	1.44	Q				
13+30	1.4651	1.47	Q				
13+35	1.4862	1.49	Q				
13+40	1.5087	1.51	Q				
13+45	1.5319	1.53	Q				
13+50	1.5566	1.56	Q				
13+55	1.5823	1.58	Q				
14+ 0	1.6098	1.61	Q				
14+ 5	1.6385	1.64	Q				
14+10	1.6699	1.67	Q				
14+15	1.7028	1.70	Q				
14+20	1.7377	1.74	Q				
14+25	1.7743	1.77	Q				
14+30	1.8141	1.81	Q				
14+35	1.8560	1.86	Q				
14+40	1.9020	1.90	Q				
14+45	1.9510	1.95	Q				
14+50	2.0052	2.01	Q				
14+55	2.0634	2.06	Q				
15+ 0	2.1286	2.13	Q				
15+ 5	2.1994	2.20	Q				
15+10	2.2799	2.28	Q				
15+15	2.3688	2.37	Q				
15+20	2.4719	2.47	Q				
15+25	2.5391	2.54	Q				
15+30	2.4145	2.41	Q				
15+35	2.2885	2.29	Q				
15+40	2.3967	2.40	Q				
15+45	2.6312	2.63	Q				
15+50	2.9825	2.98	Q				
15+55	3.5082	3.51	Q				
16+ 0	4.4843	4.48	Q				
16+ 5	7.8606	7.86	Q				
16+10	17.1113	17.11	Q				
16+15	17.1650	17.17	Q				
16+20	7.9496	7.95	Q				
16+25	3.9071	3.91	Q				
16+30	3.0767	3.08	Q				
16+35	2.6036	2.60	Q				
16+40	2.4320	2.43	Q				
16+45	2.2585	2.26	Q				
16+50	2.1166	2.12	Q				
16+55	1.9941	1.99	Q				
17+ 0	1.8919	1.89	Q				

17+ 5	1.8047	1.80	| Q	|	|	|
17+10	1.7286	1.73	| Q	|	|	|
17+15	1.6617	1.66	| Q	|	|	|
17+20	1.6028	1.60	| Q	|	|	|
17+25	1.5502	1.55	| Q	|	|	|
17+30	1.5027	1.50	| Q	|	|	|
17+35	1.4595	1.46	| Q	|	|	|
17+40	1.4201	1.42	| Q	|	|	|
17+45	1.3839	1.38	| Q	|	|	|
17+50	1.3504	1.35	| Q	|	|	|
17+55	1.3194	1.32	| Q	|	|	|
18+ 0	1.2906	1.29	| Q	|	|	|
18+ 5	1.2420	1.24	| Q	|	|	|
18+10	1.1006	1.10	| Q	|	|	|
18+15	0.9507	0.95	| Q	|	|	|
18+20	0.8874	0.89	| Q	|	|	|
18+25	0.8584	0.86	| Q	|	|	|
18+30	0.8355	0.84	|Q	|	|	|
18+35	0.8176	0.82	|Q	|	|	|
18+40	0.8008	0.80	|Q	|	|	|
18+45	0.7848	0.78	|Q	|	|	|
18+50	0.7697	0.77	|Q	|	|	|
18+55	0.7553	0.76	|Q	|	|	|
19+ 0	0.7416	0.74	|Q	|	|	|
19+ 5	0.7285	0.73	|Q	|	|	|
19+10	0.7161	0.72	|Q	|	|	|
19+15	0.7042	0.70	|Q	|	|	|
19+20	0.6928	0.69	|Q	|	|	|
19+25	0.6819	0.68	|Q	|	|	|
19+30	0.6714	0.67	|Q	|	|	|
19+35	0.6614	0.66	|Q	|	|	|
19+40	0.6517	0.65	|Q	|	|	|
19+45	0.6424	0.64	|Q	|	|	|
19+50	0.6334	0.63	|Q	|	|	|
19+55	0.6248	0.62	|Q	|	|	|
20+ 0	0.6165	0.62	|Q	|	|	|
20+ 5	0.6085	0.61	|Q	|	|	|
20+10	0.6007	0.60	|Q	|	|	|
20+15	0.5932	0.59	|Q	|	|	|
20+20	0.5860	0.59	|Q	|	|	|
20+25	0.5789	0.58	|Q	|	|	|
20+30	0.5721	0.57	|Q	|	|	|
20+35	0.5655	0.57	|Q	|	|	|
20+40	0.5591	0.56	|Q	|	|	|
20+45	0.5529	0.55	|Q	|	|	|
20+50	0.5469	0.55	|Q	|	|	|
20+55	0.5411	0.54	|Q	|	|	|
21+ 0	0.5354	0.54	|Q	|	|	|
21+ 5	0.5298	0.53	|Q	|	|	|
21+10	0.5244	0.52	|Q	|	|	|
21+15	0.5192	0.52	|Q	|	|	|
21+20	0.5141	0.51	|Q	|	|	|
21+25	0.5091	0.51	|Q	|	|	|
21+30	0.5043	0.50	|Q	|	|	|
21+35	0.4995	0.50	|Q	|	|	|
21+40	0.4949	0.49	|Q	|	|	|
21+45	0.4904	0.49	|Q	|	|	|
21+50	0.4860	0.49	|Q	|	|	|
21+55	0.4818	0.48	|Q	|	|	|
22+ 0	0.4776	0.48	|Q	|	|	|

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  22+ 5       0.4735      0.47  |Q        |         |         |         |
  22+10       0.4695      0.47  |Q        |         |         |         |
  22+15       0.4656      0.47  |Q        |         |         |         |
  22+20       0.4617      0.46  |Q        |         |         |         |
  22+25       0.4580      0.46  |Q        |         |         |         |
  22+30       0.4543      0.45  |Q        |         |         |         |
  22+35       0.4507      0.45  |Q        |         |         |         |
  22+40       0.4472      0.45  |Q        |         |         |         |
  22+45       0.4438      0.44  |Q        |         |         |         |
  22+50       0.4404      0.44  |Q        |         |         |         |
  22+55       0.4371      0.44  |Q        |         |         |         |
  23+ 0       0.4339      0.43  |Q        |         |         |         |
  23+ 5       0.4307      0.43  |Q        |         |         |         |
  23+10       0.4276      0.43  Q         |         |         |         |
  23+15       0.4245      0.42  Q         |         |         |         |
  23+20       0.4215      0.42  Q         |         |         |         |
  23+25       0.4186      0.42  Q         |         |         |         |
  23+30       0.4157      0.42  Q         |         |         |         |
  23+35       0.4129      0.41  Q         |         |         |         |
  23+40       0.4101      0.41  Q         |         |         |         |
  23+45       0.4073      0.41  Q         |         |         |         |
  23+50       0.4047      0.40  Q         |         |         |         |
  23+55       0.4020      0.40  Q         |         |         |         |
  24+ 0       0.3994      0.40  Q         |         |         |         |
  24+ 5       0.3702      0.37  Q         |         |         |         |
  24+10       0.2249      0.22  Q         |         |         |         |
  24+15       0.0677      0.07  Q         |         |         |         |
  24+20       0.0159      0.02  Q         |         |         |         |
  24+25       0.0049      0.00  Q         |         |         |         |
--------------------------------------------------------------------------
     ****************************HYDROGRAPH DATA****************************
               Number of intervals =   293
               Time interval =    5.0 (Min.)
               Maximum/Peak flow rate =       17.165 (CFS)
               Total volume =       2.046 (Ac.Ft)
          Status of hydrographs being held in storage
                     Stream 1  Stream 2  Stream 3  Stream 4  Stream 5
          Peak (CFS)     28.397     0.000     0.000     0.000     0.000
          Vol (Ac.Ft)     12.388     0.000     0.000     0.000     0.000
     ************************************************************************

     ------------------------------------------------------------------------


     ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
     Process from Point/Station        7.000 to Point/Station        6.000
     **** RETARDING BASIN ROUTING ****

     ________________________________________________________________________

     User entry of depth-outflow-storage data
     ------------------------------------------------------------------------
     Total number of inflow hydrograph intervals = 293
     Hydrograph time unit =  5.000 (Min.)
     Initial depth in storage basin =   0.00(Ft.)
     ------------------------------------------------------------------------
     ------------------------------------------------------------------------
     Initial basin depth =   0.00 (Ft.)
     Initial basin storage =      0.00 (Ac.Ft)
     Initial basin outflow =   0.00 (CFS)
     ------------------------------------------------------------------------
```

Depth vs. Storage and Depth vs. Discharge data:

Basin Depth (Ft.)	Storage (Ac.Ft)	Outflow (CFS)	(S-O*dt/2) (Ac.Ft)	(S+O*dt/2) (Ac.Ft)
0.000	0.000	0.000	0.000	0.000
1.000	0.560	2.000	0.553	0.567
2.000	1.710	5.170	1.692	1.728
3.000	2.900	11.170	2.862	2.938
4.140	4.140	19.020	4.075	4.205
5.000	5.420	24.300	5.336	5.504
6.000	6.750	56.750	6.555	6.945

Hydrograph Detention Basin Routing

Graph values: 'I'= unit inflow; 'O'=outflow at time shown

Time (Hours)	Inflow (CFS)	Outflow (CFS)	Storage (Ac.Ft)	.0	4.3	8.58	12.87	17.17	Depth (Ft.)
0.083	0.03	0.00	0.000	O	|	|	|	|	0.00
0.167	0.17	0.00	0.001	O	|	|	|	|	0.00
0.250	0.33	0.01	0.002	O	|	|	|	|	0.00
0.333	0.38	0.02	0.005	O	|	|	|	|	0.01
0.417	0.39	0.03	0.007	O	|	|	|	|	0.01
0.500	0.40	0.03	0.010	O	|	|	|	|	0.02
0.583	0.40	0.04	0.012	O	|	|	|	|	0.02
0.667	0.40	0.05	0.015	O	|	|	|	|	0.03
0.750	0.40	0.06	0.017	O	|	|	|	|	0.03
0.833	0.40	0.07	0.019	O	|	|	|	|	0.03
0.917	0.40	0.08	0.022	O	|	|	|	|	0.04
1.000	0.41	0.09	0.024	O	|	|	|	|	0.04
1.083	0.41	0.09	0.026	O	|	|	|	|	0.05
1.167	0.41	0.10	0.028	O	|	|	|	|	0.05
1.250	0.41	0.11	0.030	O	|	|	|	|	0.05
1.333	0.41	0.12	0.032	O	|	|	|	|	0.06
1.417	0.41	0.12	0.034	O	|	|	|	|	0.06
1.500	0.41	0.13	0.036	O	|	|	|	|	0.06
1.583	0.41	0.14	0.038	O	|	|	|	|	0.07
1.667	0.42	0.14	0.040	O	|	|	|	|	0.07
1.750	0.42	0.15	0.042	O	|	|	|	|	0.07
1.833	0.42	0.16	0.044	O	|	|	|	|	0.08
1.917	0.42	0.16	0.046	O	|	|	|	|	0.08
2.000	0.42	0.17	0.047	O	|	|	|	|	0.08
2.083	0.42	0.18	0.049	O	|	|	|	|	0.09
2.167	0.43	0.18	0.051	O	|	|	|	|	0.09
2.250	0.43	0.19	0.052	O	|	|	|	|	0.09
2.333	0.43	0.19	0.054	O	|	|	|	|	0.10
2.417	0.43	0.20	0.056	O	|	|	|	|	0.10
2.500	0.43	0.20	0.057	O	|	|	|	|	0.10
2.583	0.43	0.21	0.059	O	|	|	|	|	0.11
2.667	0.43	0.22	0.060	O	|	|	|	|	0.11
2.750	0.44	0.22	0.062	O	|	|	|	|	0.11
2.833	0.44	0.23	0.063	O	|	|	|	|	0.11
2.917	0.44	0.23	0.065	O	|	|	|	|	0.12
3.000	0.44	0.24	0.066	O	|	|	|	|	0.12
3.083	0.44	0.24	0.068	O	|	|	|	|	0.12
3.167	0.44	0.25	0.069	O	|	|	|	|	0.12
3.250	0.45	0.25	0.070	O	|	|	|	|	0.13
3.333	0.45	0.26	0.072	O	|	|	|	|	0.13

3.417	0.45	0.26	0.073	O					0.13
3.500	0.45	0.27	0.074	O					0.13
3.583	0.45	0.27	0.075	O					0.13
3.667	0.45	0.27	0.077	O					0.14
3.750	0.46	0.28	0.078	O					0.14
3.833	0.46	0.28	0.079	O					0.14
3.917	0.46	0.29	0.080	O					0.14
4.000	0.46	0.29	0.082	O					0.15
4.083	0.46	0.30	0.083	O					0.15
4.167	0.47	0.30	0.084	O					0.15
4.250	0.47	0.30	0.085	O					0.15
4.333	0.47	0.31	0.086	O					0.15
4.417	0.47	0.31	0.087	O					0.16
4.500	0.47	0.32	0.088	O					0.16
4.583	0.48	0.32	0.089	O					0.16
4.667	0.48	0.32	0.091	O					0.16
4.750	0.48	0.33	0.092	O					0.16
4.833	0.48	0.33	0.093	O					0.17
4.917	0.48	0.33	0.094	O					0.17
5.000	0.49	0.34	0.095	O					0.17
5.083	0.49	0.34	0.096	O					0.17
5.167	0.49	0.35	0.097	O					0.17
5.250	0.49	0.35	0.098	O					0.17
5.333	0.50	0.35	0.099	O					0.18
5.417	0.50	0.36	0.100	O					0.18
5.500	0.50	0.36	0.101	O					0.18
5.583	0.50	0.36	0.102	O					0.18
5.667	0.51	0.37	0.103	O					0.18
5.750	0.51	0.37	0.104	O					0.18
5.833	0.51	0.37	0.105	O					0.19
5.917	0.51	0.38	0.105	O					0.19
6.000	0.51	0.38	0.106	O					0.19
6.083	0.52	0.38	0.107	O					0.19
6.167	0.52	0.39	0.108	O					0.19
6.250	0.52	0.39	0.109	O					0.19
6.333	0.53	0.39	0.110	O					0.20
6.417	0.53	0.40	0.111	O					0.20
6.500	0.53	0.40	0.112	O					0.20
6.583	0.53	0.40	0.113	O					0.20
6.667	0.54	0.41	0.114	O					0.20
6.750	0.54	0.41	0.115	OI					0.20
6.833	0.54	0.41	0.115	OI					0.21
6.917	0.54	0.42	0.116	OI					0.21
7.000	0.55	0.42	0.117	OI					0.21
7.083	0.55	0.42	0.118	OI					0.21
7.167	0.55	0.43	0.119	OI					0.21
7.250	0.56	0.43	0.120	OI					0.21
7.333	0.56	0.43	0.121	OI					0.22
7.417	0.56	0.43	0.122	OI					0.22
7.500	0.57	0.44	0.123	OI					0.22
7.583	0.57	0.44	0.123	OI					0.22
7.667	0.57	0.44	0.124	OI					0.22
7.750	0.58	0.45	0.125	OI					0.22
7.833	0.58	0.45	0.126	OI					0.23
7.917	0.58	0.45	0.127	OI					0.23
8.000	0.59	0.46	0.128	OI					0.23
8.083	0.59	0.46	0.129	OI					0.23
8.167	0.59	0.46	0.130	OI					0.23
8.250	0.60	0.47	0.131	OI					0.23
8.333	0.60	0.47	0.132	OI					0.23

8.417	0.61	0.47	0.132	OI					0.24
8.500	0.61	0.48	0.133	OI					0.24
8.583	0.61	0.48	0.134	OI					0.24
8.667	0.62	0.48	0.135	OI					0.24
8.750	0.62	0.49	0.136	OI					0.24
8.833	0.63	0.49	0.137	OI					0.24
8.917	0.63	0.49	0.138	OI					0.25
9.000	0.63	0.50	0.139	OI					0.25
9.083	0.64	0.50	0.140	OI					0.25
9.167	0.64	0.50	0.141	OI					0.25
9.250	0.65	0.51	0.142	OI					0.25
9.333	0.65	0.51	0.143	OI					0.26
9.417	0.66	0.51	0.144	OI					0.26
9.500	0.66	0.52	0.145	OI					0.26
9.583	0.67	0.52	0.146	OI					0.26
9.667	0.67	0.52	0.147	OI					0.26
9.750	0.68	0.53	0.148	OI					0.26
9.833	0.68	0.53	0.149	OI					0.27
9.917	0.69	0.54	0.150	OI					0.27
10.000	0.69	0.54	0.151	|O					0.27
10.083	0.70	0.54	0.152	|O					0.27
10.167	0.71	0.55	0.153	|O					0.27
10.250	0.71	0.55	0.154	|O					0.28
10.333	0.72	0.56	0.155	|O					0.28
10.417	0.72	0.56	0.157	|O					0.28
10.500	0.73	0.56	0.158	|O					0.28
10.583	0.74	0.57	0.159	|O					0.28
10.667	0.74	0.57	0.160	|O					0.29
10.750	0.75	0.58	0.161	|O					0.29
10.833	0.76	0.58	0.162	|O					0.29
10.917	0.76	0.58	0.164	|O					0.29
11.000	0.77	0.59	0.165	|O					0.29
11.083	0.78	0.59	0.166	|O					0.30
11.167	0.79	0.60	0.167	|O					0.30
11.250	0.80	0.60	0.169	|O					0.30
11.333	0.80	0.61	0.170	|O					0.30
11.417	0.81	0.61	0.171	|O					0.31
11.500	0.82	0.62	0.173	|O					0.31
11.583	0.83	0.62	0.174	|O					0.31
11.667	0.84	0.63	0.176	|O					0.31
11.750	0.85	0.63	0.177	|O					0.32
11.833	0.86	0.64	0.179	|O					0.32
11.917	0.87	0.64	0.180	|O					0.32
12.000	0.88	0.65	0.182	|O					0.32
12.083	0.91	0.66	0.183	|O					0.33
12.167	1.04	0.66	0.186	|O					0.33
12.250	1.18	0.67	0.189	|OI					0.34
12.333	1.23	0.69	0.192	|OI					0.34
12.417	1.25	0.70	0.196	|OI					0.35
12.500	1.27	0.71	0.200	|OI					0.36
12.583	1.28	0.73	0.204	|OI					0.36
12.667	1.29	0.74	0.207	|OI					0.37
12.750	1.31	0.75	0.211	|OI					0.38
12.833	1.32	0.77	0.215	|OI					0.38
12.917	1.34	0.78	0.219	|OI					0.39
13.000	1.35	0.80	0.223	|OI					0.40
13.083	1.37	0.81	0.227	|OI					0.40
13.167	1.39	0.82	0.230	|OI					0.41
13.250	1.41	0.84	0.234	|OI					0.42
13.333	1.43	0.85	0.238	|OI					0.43

13.417	1.44	0.87	0.242	OI					0.43
13.500	1.47	0.88	0.246	OI					0.44
13.583	1.49	0.89	0.250	OI					0.45
13.667	1.51	0.91	0.254	OI					0.45
13.750	1.53	0.92	0.259	OI					0.46
13.833	1.56	0.94	0.263	OI					0.47
13.917	1.58	0.95	0.267	OI					0.48
14.000	1.61	0.97	0.271	O I					0.48
14.083	1.64	0.99	0.276	O I					0.49
14.167	1.67	1.00	0.280	O I					0.50
14.250	1.70	1.02	0.285	O I					0.51
14.333	1.74	1.04	0.290	O I					0.52
14.417	1.77	1.05	0.295	O I					0.53
14.500	1.81	1.07	0.300	O I					0.54
14.583	1.86	1.09	0.305	OI					0.54
14.667	1.90	1.11	0.310	OI					0.55
14.750	1.95	1.13	0.316	OI					0.56
14.833	2.01	1.15	0.322	OI					0.57
14.917	2.06	1.17	0.328	OI					0.59
15.000	2.13	1.19	0.334	OI					0.60
15.083	2.20	1.22	0.341	O I					0.61
15.167	2.28	1.24	0.348	O I					0.62
15.250	2.37	1.27	0.355	O I					0.63
15.333	2.47	1.30	0.363	O I					0.65
15.417	2.54	1.33	0.371	O I					0.66
15.500	2.41	1.35	0.379	O I					0.68
15.583	2.29	1.38	0.386	O I					0.69
15.667	2.40	1.40	0.392	O I					0.70
15.750	2.63	1.43	0.400	O I					0.71
15.833	2.98	1.46	0.409	O I					0.73
15.917	3.51	1.50	0.421	O I					0.75
16.000	4.48	1.57	0.438	O I					0.78
16.083	7.86	1.68	0.470	O	I				0.84
16.167	17.11	1.94	0.543	O				I	0.97
16.250	17.17	2.24	0.647	O				I	1.08
16.333	7.95	2.43	0.717	O	I				1.14
16.417	3.91	2.50	0.741	O I					1.16
16.500	3.08	2.52	0.748	OI					1.16
16.583	2.60	2.52	0.750	O					1.17
16.667	2.43	2.52	0.750	O					1.17
16.750	2.26	2.52	0.749	O					1.16
16.833	2.12	2.51	0.747	IO					1.16
16.917	1.99	2.51	0.743	IO					1.16
17.000	1.89	2.49	0.740	IO					1.16
17.083	1.80	2.48	0.735	IO					1.15
17.167	1.73	2.47	0.730	IO					1.15
17.250	1.66	2.45	0.725	IO					1.14
17.333	1.60	2.44	0.719	I O					1.14
17.417	1.55	2.42	0.713	I O					1.13
17.500	1.50	2.41	0.707	I O					1.13
17.583	1.46	2.39	0.701	I O					1.12
17.667	1.42	2.37	0.695	I O					1.12
17.750	1.38	2.35	0.688	I O					1.11
17.833	1.35	2.33	0.681	I O					1.11
17.917	1.32	2.32	0.674	I O					1.10
18.000	1.29	2.30	0.668	I O					1.09
18.083	1.24	2.28	0.660	I O					1.09
18.167	1.10	2.26	0.653	I O					1.08
18.250	0.95	2.23	0.645	I O					1.07
18.333	0.89	2.21	0.636	I O					1.07

18.417	0.86	2.18	0.626	|I O	|	|	|	1.06
18.500	0.84	2.16	0.617	|I O	|	|	|	1.05
18.583	0.82	2.13	0.608	|I O	|	|	|	1.04
18.667	0.80	2.11	0.599	|I O	|	|	|	1.03
18.750	0.78	2.08	0.590	|I O	|	|	|	1.03
18.833	0.77	2.06	0.581	|I O	|	|	|	1.02
18.917	0.76	2.03	0.573	|I O	|	|	|	1.01
19.000	0.74	2.01	0.564	|I O	|	|	|	1.00
19.083	0.73	1.98	0.555	|I O	|	|	|	0.99
19.167	0.72	1.95	0.546	|I O	|	|	|	0.98
19.250	0.70	1.92	0.538	|I O	|	|	|	0.96
19.333	0.69	1.89	0.530	|I O	|	|	|	0.95
19.417	0.68	1.86	0.522	|I O	|	|	|	0.93
19.500	0.67	1.83	0.513	|I O	|	|	|	0.92
19.583	0.66	1.81	0.506	|I O	|	|	|	0.90
19.667	0.65	1.78	0.498	|I O	|	|	|	0.89
19.750	0.64	1.75	0.490	|I O	|	|	|	0.88
19.833	0.63	1.72	0.482	|I O	|	|	|	0.86
19.917	0.62	1.70	0.475	|I O	|	|	|	0.85
20.000	0.62	1.67	0.468	|I O	|	|	|	0.84
20.083	0.61	1.64	0.460	|I O	|	|	|	0.82
20.167	0.60	1.62	0.453	|I O	|	|	|	0.81
20.250	0.59	1.59	0.446	|IO	|	|	|	0.80
20.333	0.59	1.57	0.440	|IO	|	|	|	0.79
20.417	0.58	1.55	0.433	|IO	|	|	|	0.77
20.500	0.57	1.52	0.426	|IO	|	|	|	0.76
20.583	0.57	1.50	0.420	|IO	|	|	|	0.75
20.667	0.56	1.48	0.413	|IO	|	|	|	0.74
20.750	0.55	1.45	0.407	|IO	|	|	|	0.73
20.833	0.55	1.43	0.401	|IO	|	|	|	0.72
20.917	0.54	1.41	0.395	|IO	|	|	|	0.71
21.000	0.54	1.39	0.389	I O	|	|	|	0.69
21.083	0.53	1.37	0.383	I O	|	|	|	0.68
21.167	0.52	1.35	0.377	I O	|	|	|	0.67
21.250	0.52	1.33	0.372	I O	|	|	|	0.66
21.333	0.51	1.31	0.366	I O	|	|	|	0.65
21.417	0.51	1.29	0.361	I O	|	|	|	0.64
21.500	0.50	1.27	0.356	I O	|	|	|	0.63
21.583	0.50	1.25	0.350	I O	|	|	|	0.63
21.667	0.49	1.23	0.345	I O	|	|	|	0.62
21.750	0.49	1.22	0.340	I O	|	|	|	0.61
21.833	0.49	1.20	0.335	I O	|	|	|	0.60
21.917	0.48	1.18	0.330	I O	|	|	|	0.59
22.000	0.48	1.16	0.326	I O	|	|	|	0.58
22.083	0.47	1.15	0.321	I O	|	|	|	0.57
22.167	0.47	1.13	0.316	I O	|	|	|	0.56
22.250	0.47	1.11	0.312	I O	|	|	|	0.56
22.333	0.46	1.10	0.307	I O	|	|	|	0.55
22.417	0.46	1.08	0.303	I O	|	|	|	0.54
22.500	0.45	1.07	0.299	IO	|	|	|	0.53
22.583	0.45	1.05	0.295	IO	|	|	|	0.53
22.667	0.45	1.04	0.291	IO	|	|	|	0.52
22.750	0.44	1.02	0.287	IO	|	|	|	0.51
22.833	0.44	1.01	0.283	IO	|	|	|	0.50
22.917	0.44	1.00	0.279	IO	|	|	|	0.50
23.000	0.43	0.98	0.275	IO	|	|	|	0.49
23.083	0.43	0.97	0.271	IO	|	|	|	0.48
23.167	0.43	0.96	0.267	IO	|	|	|	0.48
23.250	0.42	0.94	0.264	IO	|	|	|	0.47
23.333	0.42	0.93	0.260	IO	|	|	|	0.46

23.417	0.42	0.92	0.257	IO					0.46
23.500	0.42	0.91	0.253	IO					0.45
23.583	0.41	0.89	0.250	IO					0.45
23.667	0.41	0.88	0.247	IO					0.44
23.750	0.41	0.87	0.244	IO					0.44
23.833	0.40	0.86	0.240	IO					0.43
23.917	0.40	0.85	0.237	IO					0.42
24.000	0.40	0.84	0.234	IO					0.42
24.083	0.37	0.83	0.231	IO					0.41
24.167	0.22	0.81	0.228	IO					0.41
24.250	0.07	0.80	0.223	IO					0.40
24.333	0.02	0.78	0.218	IO					0.39
24.417	0.00	0.76	0.213	IO					0.38
24.500	0.00	0.74	0.208	IO					0.37
24.583	0.00	0.72	0.203	IO					0.36
24.667	0.00	0.71	0.198	IO					0.35
24.750	0.00	0.69	0.193	IO					0.34
24.833	0.00	0.67	0.188	IO					0.34
24.917	0.00	0.66	0.184	IO					0.33
25.000	0.00	0.64	0.179	IO					0.32
25.083	0.00	0.62	0.175	IO					0.31
25.167	0.00	0.61	0.171	IO					0.30
25.250	0.00	0.59	0.166	IO					0.30
25.333	0.00	0.58	0.162	IO					0.29
25.417	0.00	0.57	0.158	IO					0.28
25.500	0.00	0.55	0.155	IO					0.28
25.583	0.00	0.54	0.151	IO					0.27
25.667	0.00	0.53	0.147	O					0.26
25.750	0.00	0.51	0.144	O					0.26
25.833	0.00	0.50	0.140	O					0.25
25.917	0.00	0.49	0.137	O					0.24
26.000	0.00	0.48	0.133	O					0.24
26.083	0.00	0.46	0.130	O					0.23
26.167	0.00	0.45	0.127	O					0.23
26.250	0.00	0.44	0.124	O					0.22
26.333	0.00	0.43	0.121	O					0.22
26.417	0.00	0.42	0.118	O					0.21
26.500	0.00	0.41	0.115	O					0.21
26.583	0.00	0.40	0.112	O					0.20
26.667	0.00	0.39	0.110	O					0.20
26.750	0.00	0.38	0.107	O					0.19
26.833	0.00	0.37	0.104	O					0.19
26.917	0.00	0.36	0.102	O					0.18
27.000	0.00	0.35	0.099	O					0.18
27.083	0.00	0.35	0.097	O					0.17
27.167	0.00	0.34	0.094	O					0.17
27.250	0.00	0.33	0.092	O					0.16
27.333	0.00	0.32	0.090	O					0.16
27.417	0.00	0.31	0.088	O					0.16
27.500	0.00	0.31	0.086	O					0.15
27.583	0.00	0.30	0.084	O					0.15
27.667	0.00	0.29	0.082	O					0.15
27.750	0.00	0.28	0.080	O					0.14
27.833	0.00	0.28	0.078	O					0.14
27.917	0.00	0.27	0.076	O					0.14
28.000	0.00	0.26	0.074	O					0.13
28.083	0.00	0.26	0.072	O					0.13
28.167	0.00	0.25	0.070	O					0.13
28.250	0.00	0.25	0.069	O					0.12
28.333	0.00	0.24	0.067	O					0.12

28.417	0.00	0.23	0.065	O					0.12
28.500	0.00	0.23	0.064	O					0.11
28.583	0.00	0.22	0.062	O					0.11
28.667	0.00	0.22	0.061	O					0.11
28.750	0.00	0.21	0.059	O					0.11
28.833	0.00	0.21	0.058	O					0.10
28.917	0.00	0.20	0.056	O					0.10
29.000	0.00	0.20	0.055	O					0.10
29.083	0.00	0.19	0.054	O					0.10
29.167	0.00	0.19	0.052	O					0.09
29.250	0.00	0.18	0.051	O					0.09
29.333	0.00	0.18	0.050	O					0.09
29.417	0.00	0.17	0.049	O					0.09
29.500	0.00	0.17	0.047	O					0.08
29.583	0.00	0.17	0.046	O					0.08
29.667	0.00	0.16	0.045	O					0.08
29.750	0.00	0.16	0.044	O					0.08
29.833	0.00	0.15	0.043	O					0.08
29.917	0.00	0.15	0.042	O					0.07
30.000	0.00	0.15	0.041	O					0.07
30.083	0.00	0.14	0.040	O					0.07
30.167	0.00	0.14	0.039	O					0.07
30.250	0.00	0.14	0.038	O					0.07
30.333	0.00	0.13	0.037	O					0.07
30.417	0.00	0.13	0.036	O					0.06
30.500	0.00	0.13	0.035	O					0.06
30.583	0.00	0.12	0.034	O					0.06
30.667	0.00	0.12	0.034	O					0.06
30.750	0.00	0.12	0.033	O					0.06
30.833	0.00	0.11	0.032	O					0.06
30.917	0.00	0.11	0.031	O					0.06
31.000	0.00	0.11	0.030	O					0.05
31.083	0.00	0.11	0.030	O					0.05
31.167	0.00	0.10	0.029	O					0.05
31.250	0.00	0.10	0.028	O					0.05
31.333	0.00	0.10	0.028	O					0.05
31.417	0.00	0.10	0.027	O					0.05
31.500	0.00	0.09	0.026	O					0.05
31.583	0.00	0.09	0.026	O					0.05
31.667	0.00	0.09	0.025	O					0.04
31.750	0.00	0.09	0.024	O					0.04
31.833	0.00	0.09	0.024	O					0.04
31.917	0.00	0.08	0.023	O					0.04
32.000	0.00	0.08	0.023	O					0.04
32.083	0.00	0.08	0.022	O					0.04
32.167	0.00	0.08	0.022	O					0.04
32.250	0.00	0.08	0.021	O					0.04
32.333	0.00	0.07	0.021	O					0.04
32.417	0.00	0.07	0.020	O					0.04
32.500	0.00	0.07	0.020	O					0.03
32.583	0.00	0.07	0.019	O					0.03
32.667	0.00	0.07	0.019	O					0.03
32.750	0.00	0.06	0.018	O					0.03
32.833	0.00	0.06	0.018	O					0.03
32.917	0.00	0.06	0.017	O					0.03
33.000	0.00	0.06	0.017	O					0.03
33.083	0.00	0.06	0.016	O					0.03
33.167	0.00	0.06	0.016	O					0.03
33.250	0.00	0.06	0.016	O					0.03
33.333	0.00	0.05	0.015	O					0.03

33.417	0.00	0.05	0.015	O	|	|	|	|	0.03
33.500	0.00	0.05	0.015	O	|	|	|	|	0.03
33.583	0.00	0.05	0.014	O	|	|	|	|	0.03
33.667	0.00	0.05	0.014	O	|	|	|	|	0.02
33.750	0.00	0.05	0.014	O	|	|	|	|	0.02
33.833	0.00	0.05	0.013	O	|	|	|	|	0.02
33.917	0.00	0.05	0.013	O	|	|	|	|	0.02
34.000	0.00	0.04	0.013	O	|	|	|	|	0.02
34.083	0.00	0.04	0.012	O	|	|	|	|	0.02
34.167	0.00	0.04	0.012	O	|	|	|	|	0.02
34.250	0.00	0.04	0.012	O	|	|	|	|	0.02
34.333	0.00	0.04	0.011	O	|	|	|	|	0.02
34.417	0.00	0.04	0.011	O	|	|	|	|	0.02
34.500	0.00	0.04	0.011	O	|	|	|	|	0.02
34.583	0.00	0.04	0.011	O	|	|	|	|	0.02
34.667	0.00	0.04	0.010	O	|	|	|	|	0.02
34.750	0.00	0.04	0.010	O	|	|	|	|	0.02
34.833	0.00	0.04	0.010	O	|	|	|	|	0.02
34.917	0.00	0.03	0.010	O	|	|	|	|	0.02
35.000	0.00	0.03	0.009	O	|	|	|	|	0.02
35.083	0.00	0.03	0.009	O	|	|	|	|	0.02
35.167	0.00	0.03	0.009	O	|	|	|	|	0.02
35.250	0.00	0.03	0.009	O	|	|	|	|	0.02
35.333	0.00	0.03	0.008	O	|	|	|	|	0.02
35.417	0.00	0.03	0.008	O	|	|	|	|	0.01
35.500	0.00	0.03	0.008	O	|	|	|	|	0.01
35.583	0.00	0.03	0.008	O	|	|	|	|	0.01
35.667	0.00	0.03	0.008	O	|	|	|	|	0.01
35.750	0.00	0.03	0.008	O	|	|	|	|	0.01
35.833	0.00	0.03	0.007	O	|	|	|	|	0.01
35.917	0.00	0.03	0.007	O	|	|	|	|	0.01
36.000	0.00	0.02	0.007	O	|	|	|	|	0.01
36.083	0.00	0.02	0.007	O	|	|	|	|	0.01
36.167	0.00	0.02	0.007	O	|	|	|	|	0.01
36.250	0.00	0.02	0.006	O	|	|	|	|	0.01
36.333	0.00	0.02	0.006	O	|	|	|	|	0.01
36.417	0.00	0.02	0.006	O	|	|	|	|	0.01
36.500	0.00	0.02	0.006	O	|	|	|	|	0.01
36.583	0.00	0.02	0.006	O	|	|	|	|	0.01
36.667	0.00	0.02	0.006	O	|	|	|	|	0.01
36.750	0.00	0.02	0.006	O	|	|	|	|	0.01
36.833	0.00	0.02	0.005	O	|	|	|	|	0.01
36.917	0.00	0.02	0.005	O	|	|	|	|	0.01
37.000	0.00	0.02	0.005	O	|	|	|	|	0.01
37.083	0.00	0.02	0.005	O	|	|	|	|	0.01
37.167	0.00	0.02	0.005	O	|	|	|	|	0.01
37.250	0.00	0.02	0.005	O	|	|	|	|	0.01
37.333	0.00	0.02	0.005	O	|	|	|	|	0.01
37.417	0.00	0.02	0.005	O	|	|	|	|	0.01
37.500	0.00	0.02	0.004	O	|	|	|	|	0.01
37.583	0.00	0.02	0.004	O	|	|	|	|	0.01
37.667	0.00	0.02	0.004	O	|	|	|	|	0.01
37.750	0.00	0.01	0.004	O	|	|	|	|	0.01
37.833	0.00	0.01	0.004	O	|	|	|	|	0.01
37.917	0.00	0.01	0.004	O	|	|	|	|	0.01
38.000	0.00	0.01	0.004	O	|	|	|	|	0.01
38.083	0.00	0.01	0.004	O	|	|	|	|	0.01
38.167	0.00	0.01	0.004	O	|	|	|	|	0.01
38.250	0.00	0.01	0.004	O	|	|	|	|	0.01
38.333	0.00	0.01	0.003	O	|	|	|	|	0.01

38.417	0.00	0.01	0.003	O					0.01
38.500	0.00	0.01	0.003	O					0.01
38.583	0.00	0.01	0.003	O					0.01
38.667	0.00	0.01	0.003	O					0.01
38.750	0.00	0.01	0.003	O					0.01
38.833	0.00	0.01	0.003	O					0.01
38.917	0.00	0.01	0.003	O					0.01
39.000	0.00	0.01	0.003	O					0.01
39.083	0.00	0.01	0.003	O					0.01
39.167	0.00	0.01	0.003	O					0.00
39.250	0.00	0.01	0.003	O					0.00
39.333	0.00	0.01	0.003	O					0.00
39.417	0.00	0.01	0.003	O					0.00
39.500	0.00	0.01	0.002	O					0.00
39.583	0.00	0.01	0.002	O					0.00
39.667	0.00	0.01	0.002	O					0.00
39.750	0.00	0.01	0.002	O					0.00
39.833	0.00	0.01	0.002	O					0.00
39.917	0.00	0.01	0.002	O					0.00
40.000	0.00	0.01	0.002	O					0.00
40.083	0.00	0.01	0.002	O					0.00
40.167	0.00	0.01	0.002	O					0.00
40.250	0.00	0.01	0.002	O					0.00
40.333	0.00	0.01	0.002	O					0.00
40.417	0.00	0.01	0.002	O					0.00
40.500	0.00	0.01	0.002	O					0.00
40.583	0.00	0.01	0.002	O					0.00
40.667	0.00	0.01	0.002	O					0.00
40.750	0.00	0.01	0.002	O					0.00
40.833	0.00	0.01	0.002	O					0.00
40.917	0.00	0.01	0.002	O					0.00
41.000	0.00	0.01	0.002	O					0.00
41.083	0.00	0.01	0.002	O					0.00
41.167	0.00	0.01	0.002	O					0.00
41.250	0.00	0.01	0.001	O					0.00
41.333	0.00	0.01	0.001	O					0.00
41.417	0.00	0.01	0.001	O					0.00
41.500	0.00	0.00	0.001	O					0.00
41.583	0.00	0.00	0.001	O					0.00
41.667	0.00	0.00	0.001	O					0.00
41.750	0.00	0.00	0.001	O					0.00
41.833	0.00	0.00	0.001	O					0.00
41.917	0.00	0.00	0.001	O					0.00
42.000	0.00	0.00	0.001	O					0.00
42.083	0.00	0.00	0.001	O					0.00
42.167	0.00	0.00	0.001	O					0.00
42.250	0.00	0.00	0.001	O					0.00
42.333	0.00	0.00	0.001	O					0.00
42.417	0.00	0.00	0.001	O					0.00
42.500	0.00	0.00	0.001	O					0.00
42.583	0.00	0.00	0.001	O					0.00
42.667	0.00	0.00	0.001	O					0.00
42.750	0.00	0.00	0.001	O					0.00
42.833	0.00	0.00	0.001	O					0.00
42.917	0.00	0.00	0.001	O					0.00
43.000	0.00	0.00	0.001	O					0.00
43.083	0.00	0.00	0.001	O					0.00
43.167	0.00	0.00	0.001	O					0.00
43.250	0.00	0.00	0.001	O					0.00
43.333	0.00	0.00	0.001	O					0.00

43.417	0.00	0.00	0.001	O	|	|	|	|	0.00
43.500	0.00	0.00	0.001	O	|	|	|	|	0.00
43.583	0.00	0.00	0.001	O	|	|	|	|	0.00
43.667	0.00	0.00	0.001	O	|	|	|	|	0.00
43.750	0.00	0.00	0.001	O	|	|	|	|	0.00
43.833	0.00	0.00	0.001	O	|	|	|	|	0.00
43.917	0.00	0.00	0.001	O	|	|	|	|	0.00
44.000	0.00	0.00	0.001	O	|	|	|	|	0.00
44.083	0.00	0.00	0.001	O	|	|	|	|	0.00
44.167	0.00	0.00	0.001	O	|	|	|	|	0.00
44.250	0.00	0.00	0.001	O	|	|	|	|	0.00
44.333	0.00	0.00	0.001	O	|	|	|	|	0.00
44.417	0.00	0.00	0.001	O	|	|	|	|	0.00
44.500	0.00	0.00	0.001	O	|	|	|	|	0.00
44.583	0.00	0.00	0.001	O	|	|	|	|	0.00

**********HYDROGRAPH DATA**********

Number of intervals = 535
Time interval = 5.0 (Min.)
Maximum/Peak flow rate = 2.524 (CFS)
Total volume = 2.045 (Ac.Ft)

Status of hydrographs being held in storage

	Stream 1	Stream 2	Stream 3	Stream 4	Stream 5
Peak (CFS)	28.397	0.000	0.000	0.000	0.000
Vol (Ac.Ft)	12.388	0.000	0.000	0.000	0.000

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Process from Point/Station 7.000 to Point/Station 6.000

**** ADD/COMBINE/RECOVER HYDROGRAPHS ****

From stored stream number 1 the total
volume of 12.39 (Ac.Ft) is being added to the
current hydrograph at its original rate from user
with a delay time to start of addition of 0.00 hours.

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P R I N T O F S T O R M
R u n o f f H y d r o g r a p h

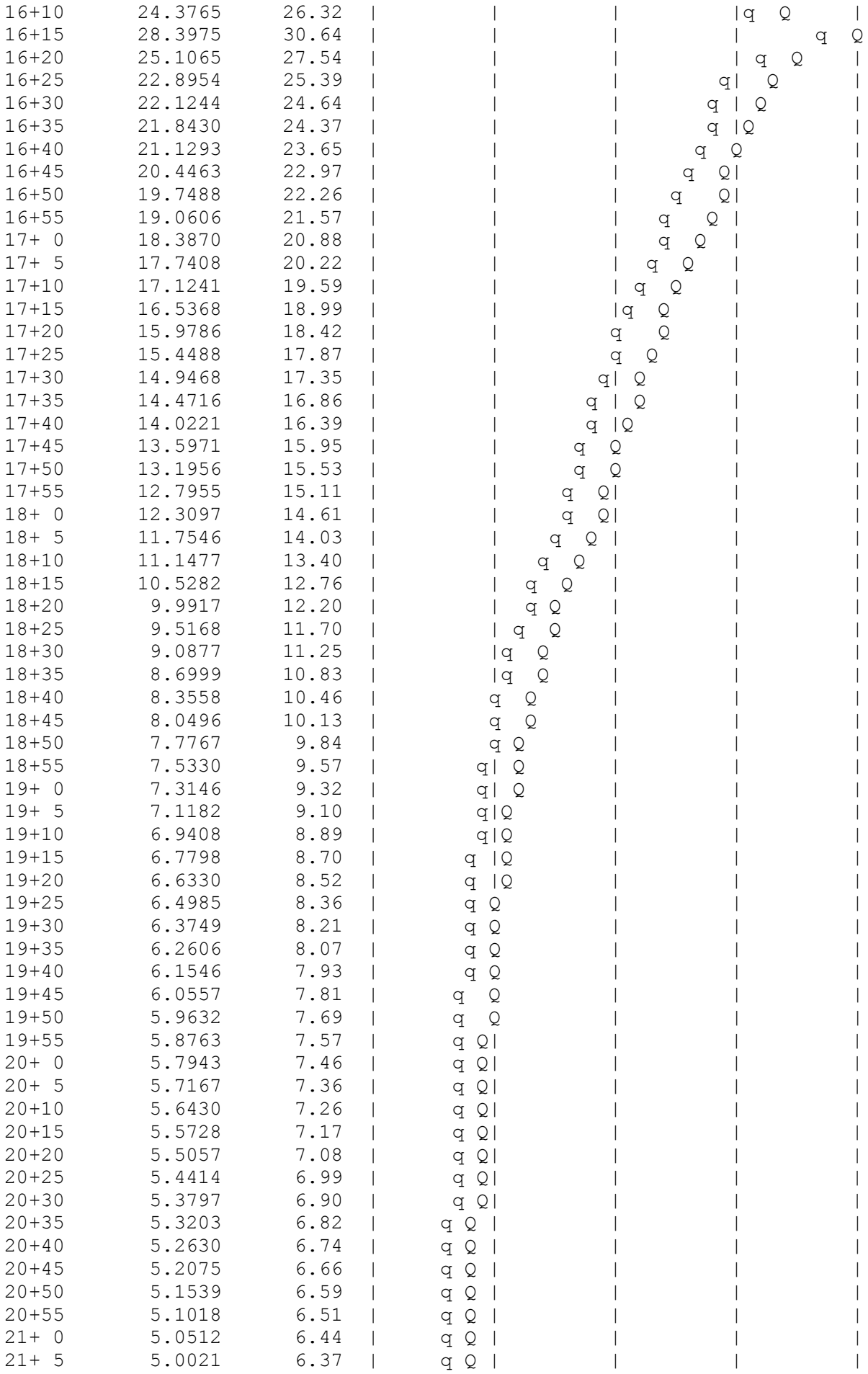
Hydrograph in 5 Minute intervals (CFS)

Time(h+m)	Add q(CFS)	Tot. Q	0	7.7	15.3	23.0	30.6
0+ 5	0.0222	0.02	Q	|	|	|	|
0+10	0.1499	0.15	Q	|	|	|	|
0+15	0.3631	0.37	Q	|	|	|	|
0+20	0.5419	0.56	Q	|	|	|	|
0+25	0.7024	0.73	Q	|	|	|	|
0+30	0.8553	0.89	|Q	|	|	|	|
0+35	0.9993	1.04	|Q	|	|	|	|
0+40	1.1256	1.18	|Q	|	|	|	|
0+45	1.2367	1.30	|Q	|	|	|	|
0+50	1.3340	1.40	|Q	|	|	|	|
0+55	1.4190	1.50	|Q	|	|	|	|
1+ 0	1.4933	1.58	|qQ	|	|	|	|
1+ 5	1.5585	1.65	| Q	|	|	|	|

1+10	1.6160	1.72	Q				
1+15	1.6670	1.78	Q				
1+20	1.7124	1.83	Q				
1+25	1.7532	1.88	Q				
1+30	1.7900	1.92	Q				
1+35	1.8235	1.96	Q				
1+40	1.8541	2.00	Q				
1+45	1.8823	2.03	Q				
1+50	1.9084	2.06	Q				
1+55	1.9329	2.10	Q				
2+ 0	1.9559	2.13	Q				
2+ 5	1.9776	2.15	Q				
2+10	1.9982	2.18	Q				
2+15	2.0180	2.21	Q				
2+20	2.0370	2.23	Q				
2+25	2.0554	2.25	Q				
2+30	2.0732	2.28	Q				
2+35	2.0906	2.30	qQ				
2+40	2.1075	2.32	qQ				
2+45	2.1242	2.34	qQ				
2+50	2.1405	2.37	qQ				
2+55	2.1566	2.39	qQ				
3+ 0	2.1725	2.41	qQ				
3+ 5	2.1883	2.43	qQ				
3+10	2.2039	2.45	qQ				
3+15	2.2194	2.47	qQ				
3+20	2.2348	2.49	qQ				
3+25	2.2501	2.51	qQ				
3+30	2.2653	2.53	qQ				
3+35	2.2806	2.55	qQ				
3+40	2.2957	2.57	qQ				
3+45	2.3109	2.59	Q				
3+50	2.3260	2.61	Q				
3+55	2.3411	2.63	Q				
4+ 0	2.3562	2.65	Q				
4+ 5	2.3714	2.67	Q				
4+10	2.3865	2.69	Q				
4+15	2.4017	2.71	Q				
4+20	2.4168	2.72	Q				
4+25	2.4320	2.74	Q				
4+30	2.4472	2.76	Q				
4+35	2.4625	2.78	Q				
4+40	2.4778	2.80	Q				
4+45	2.4932	2.82	Q				
4+50	2.5086	2.84	Q				
4+55	2.5241	2.86	Q				
5+ 0	2.5396	2.88	Q				
5+ 5	2.5552	2.90	Q				
5+10	2.5708	2.92	Q				
5+15	2.5865	2.94	Q				
5+20	2.6023	2.95	Q				
5+25	2.6181	2.97	Q				
5+30	2.6341	2.99	Q				
5+35	2.6501	3.01	Q				
5+40	2.6662	3.03	Q				
5+45	2.6824	3.05	Q				
5+50	2.6986	3.07	qQ				
5+55	2.7150	3.09	qQ				
6+ 0	2.7315	3.11	qQ				
6+ 5	2.7481	3.13	qQ				

6+10	2.7648	3.15	qQ				
6+15	2.7816	3.17	qQ				
6+20	2.7985	3.19	qQ				
6+25	2.8156	3.21	qQ				
6+30	2.8327	3.23	qQ				
6+35	2.8501	3.25	qQ				
6+40	2.8675	3.27	qQ				
6+45	2.8851	3.29	qQ				
6+50	2.9028	3.32	qQ				
6+55	2.9207	3.34	qQ				
7+ 0	2.9387	3.36	qQ				
7+ 5	2.9569	3.38	qQ				
7+10	2.9752	3.40	qQ				
7+15	2.9937	3.42	qQ				
7+20	3.0124	3.44	qQ				
7+25	3.0313	3.47	qQ				
7+30	3.0503	3.49	qQ				
7+35	3.0696	3.51	Q				
7+40	3.0890	3.53	Q				
7+45	3.1087	3.56	Q				
7+50	3.1285	3.58	Q				
7+55	3.1486	3.60	Q				
8+ 0	3.1689	3.63	Q				
8+ 5	3.1894	3.65	Q				
8+10	3.2102	3.67	Q				
8+15	3.2312	3.70	Q				
8+20	3.2524	3.72	Q				
8+25	3.2740	3.75	Q				
8+30	3.2957	3.77	Q				
8+35	3.3179	3.80	Q				
8+40	3.3402	3.82	Q				
8+45	3.3629	3.85	qQ				
8+50	3.3858	3.88	qQ				
8+55	3.4091	3.90	qQ				
9+ 0	3.4326	3.93	qQ				
9+ 5	3.4566	3.96	qQ				
9+10	3.4808	3.98	qQ				
9+15	3.5055	4.01	qQ				
9+20	3.5304	4.04	qQ				
9+25	3.5559	4.07	qQ				
9+30	3.5816	4.10	qQ				
9+35	3.6078	4.13	qQ				
9+40	3.6344	4.16	qQ				
9+45	3.6614	4.19	qQ				
9+50	3.6889	4.22	qQ				
9+55	3.7168	4.25	qQ				
10+ 0	3.7452	4.28	qQ				
10+ 5	3.7742	4.32	qQ				
10+10	3.8035	4.35	qQ				
10+15	3.8336	4.38	Q				
10+20	3.8640	4.42	Q				
10+25	3.8951	4.45	Q				
10+30	3.9267	4.49	Q				
10+35	3.9591	4.53	Q				
10+40	3.9919	4.56	Q				
10+45	4.0256	4.60	qQ				
10+50	4.0596	4.64	qQ				
10+55	4.0932	4.68	qQ				
11+ 0	4.1265	4.72	qQ				
11+ 5	4.1607	4.75	qQ				

11+10	4.1954	4.79	qQ				
11+15	4.2312	4.83	qQ				
11+20	4.2677	4.88	qQ				
11+25	4.3052	4.92	qQ				
11+30	4.3435	4.96	qQ				
11+35	4.3829	5.01	qQ				
11+40	4.4232	5.05	qQ				
11+45	4.4647	5.10	qQ				
11+50	4.5072	5.15	qQ				
11+55	4.5509	5.19	qQ				
12+ 0	4.5957	5.24	Q				
12+ 5	4.6604	5.32	Q				
12+10	4.8134	5.48	qQ				
12+15	5.0374	5.71	qQ				
12+20	5.2317	5.92	qQ				
12+25	5.4111	6.11	Q				
12+30	5.5849	6.30	qQ				
12+35	5.7532	6.48	qQ				
12+40	5.9084	6.65	qQ				
12+45	6.0532	6.81	qQ				
12+50	6.1882	6.96	qQ				
12+55	6.3155	7.10	qQ				
13+ 0	6.4357	7.23	qQ				
13+ 5	6.5511	7.36	qQ				
13+10	6.6622	7.49	qQ				
13+15	6.7708	7.61	qQ				
13+20	6.8772	7.73	q Q				
13+25	6.9829	7.85	qQ				
13+30	7.0880	7.97	qQ				
13+35	7.1941	8.09	qQ				
13+40	7.3008	8.21	qQ				
13+45	7.4096	8.33	qQ				
13+50	7.5203	8.46	q|Q				
13+55	7.6344	8.59	q|Q				
14+ 0	7.7513	8.72	qQ				
14+ 5	7.8728	8.86	qQ				
14+10	7.9986	9.00	qQ				
14+15	8.1306	9.15	qQ				
14+20	8.2682	9.30	q Q				
14+25	8.4132	9.47	q Q				
14+30	8.5651	9.64	|qQ				
14+35	8.7258	9.82	|qQ				
14+40	8.8950	10.00	|q Q				
14+45	9.0754	10.20	|q Q				
14+50	9.2666	10.42	| qQ				
14+55	9.4722	10.64	| qQ				
15+ 0	9.6922	10.89	| q Q				
15+ 5	9.9311	11.15	| q Q				
15+10	10.1897	11.43	| qQ				
15+15	10.4739	11.74	| q Q				
15+20	10.7861	12.08	| qQ				
15+25	11.0937	12.42	| q Q				
15+30	11.2473	12.60	| q Q				
15+35	11.3007	12.68	| q Q				
15+40	11.4933	12.89	| qQ				
15+45	11.8262	13.25	| q Q				
15+50	12.3269	13.79	| q Q				
15+55	13.1086	14.61	| q Q|				
16+ 0	14.4253	15.99	| q Q				
16+ 5	17.5262	19.20	| | q Q				



21+10	4.9542	6.30	q Q				
21+15	4.9075	6.24	q Q				
21+20	4.8619	6.17	q Q				
21+25	4.8173	6.11	qQ				
21+30	4.7738	6.04	qQ				
21+35	4.7312	5.98	qQ				
21+40	4.6895	5.92	qQ				
21+45	4.6486	5.86	qQ				
21+50	4.6086	5.81	qQ				
21+55	4.5692	5.75	q Q				
22+ 0	4.5307	5.69	q Q				
22+ 5	4.4928	5.64	q Q				
22+10	4.4566	5.59	q Q				
22+15	4.4220	5.54	q Q				
22+20	4.3882	5.49	q Q				
22+25	4.3549	5.44	q Q				
22+30	4.3222	5.39	q Q				
22+35	4.2900	5.34	qQ				
22+40	4.2583	5.30	qQ				
22+45	4.2271	5.25	qQ				
22+50	4.1963	5.21	qQ				
22+55	4.1660	5.16	qQ				
23+ 0	4.1362	5.12	qQ				
23+ 5	4.1068	5.08	qQ				
23+10	4.0777	5.03	qQ				
23+15	4.0491	4.99	qQ				
23+20	4.0209	4.95	qQ				
23+25	3.9931	4.91	qQ				
23+30	3.9656	4.87	qQ				
23+35	3.9385	4.83	qQ				
23+40	3.9117	4.79	qQ				
23+45	3.8853	4.76	qQ				
23+50	3.8593	4.72	qQ				
23+55	3.8335	4.68	qQ				
24+ 0	3.8081	4.64	q Q				
24+ 5	3.7609	4.59	qQ				
24+10	3.6096	4.42	qQ				
24+15	3.3757	4.17	qQ				
24+20	3.1792	3.96	qQ				
24+25	3.0033	3.76	qQ				
24+30	2.8366	3.58	qQ				
24+35	2.6805	3.40	qQ				
24+40	2.5433	3.25	qQ				
24+45	2.4225	3.11	qQ				
24+50	2.3167	2.99	Q				
24+55	2.2242	2.88	qQ				
25+ 0	2.1431	2.78	qQ				
25+ 5	2.0719	2.70	qQ				
25+10	2.0089	2.62	qQ				
25+15	1.9530	2.55	qQ				
25+20	1.9031	2.48	qQ				
25+25	1.8584	2.42	qQ				
25+30	1.8179	2.37	qQ				
25+35	1.7812	2.32	qQ				
25+40	1.7476	2.27	Q				
25+45	1.7167	2.23	Q				
25+50	1.6881	2.19	Q				
25+55	1.6615	2.15	Q				
26+ 0	1.6366	2.11	Q				
26+ 5	1.6131	2.08	Q				

26+10	1.5909	2.04	| Q	|	|	|	|
26+15	1.5698	2.01	| Q	|	|	|	|
26+20	1.5496	1.98	| Q	|	|	|	|
26+25	1.5303	1.95	|qQ	|	|	|	|
26+30	1.5116	1.92	|qQ	|	|	|	|
26+35	1.4936	1.89	|qQ	|	|	|	|
26+40	1.4762	1.87	|qQ	|	|	|	|
26+45	1.4592	1.84	|qQ	|	|	|	|
26+50	1.4427	1.82	|qQ	|	|	|	|
26+55	1.4239	1.79	|qQ	|	|	|	|
27+ 0	1.4058	1.76	|qQ	|	|	|	|
27+ 5	1.3903	1.74	|qQ	|	|	|	|
27+10	1.3759	1.71	|qQ	|	|	|	|
27+15	1.3617	1.69	|qQ	|	|	|	|
27+20	1.3477	1.67	|qQ	|	|	|	|
27+25	1.3338	1.65	|qQ	|	|	|	|
27+30	1.3200	1.63	|qQ	|	|	|	|
27+35	1.3064	1.60	|qQ	|	|	|	|
27+40	1.2929	1.58	|qQ	|	|	|	|
27+45	1.2796	1.56	|qQ	|	|	|	|
27+50	1.2664	1.54	|qQ	|	|	|	|
27+55	1.2533	1.52	|Q	|	|	|	|
28+ 0	1.2404	1.50	|Q	|	|	|	|
28+ 5	1.2276	1.49	|Q	|	|	|	|
28+10	1.2149	1.47	|Q	|	|	|	|
28+15	1.2024	1.45	|Q	|	|	|	|
28+20	1.1900	1.43	|Q	|	|	|	|
28+25	1.1777	1.41	|Q	|	|	|	|
28+30	1.1656	1.39	|Q	|	|	|	|
28+35	1.1536	1.38	|Q	|	|	|	|
28+40	1.1417	1.36	|Q	|	|	|	|
28+45	1.1299	1.34	|Q	|	|	|	|
28+50	1.1182	1.32	|Q	|	|	|	|
28+55	1.1067	1.31	|Q	|	|	|	|
29+ 0	1.0953	1.29	|Q	|	|	|	|
29+ 5	1.0840	1.28	|Q	|	|	|	|
29+10	1.0728	1.26	|Q	|	|	|	|
29+15	1.0617	1.24	|Q	|	|	|	|
29+20	1.0508	1.23	|Q	|	|	|	|
29+25	1.0399	1.21	|Q	|	|	|	|
29+30	1.0292	1.20	|Q	|	|	|	|
29+35	1.0186	1.18	|Q	|	|	|	|
29+40	1.0081	1.17	|Q	|	|	|	|
29+45	0.9977	1.16	|Q	|	|	|	|
29+50	0.9874	1.14	|Q	|	|	|	|
29+55	0.9772	1.13	|Q	|	|	|	|
30+ 0	0.9671	1.11	|Q	|	|	|	|
30+ 5	0.9553	1.10	|Q	|	|	|	|
30+10	0.9416	1.08	|Q	|	|	|	|
30+15	0.9276	1.06	|Q	|	|	|	|
30+20	0.9138	1.05	|Q	|	|	|	|
30+25	0.9001	1.03	|Q	|	|	|	|
30+30	0.8867	1.01	|Q	|	|	|	|
30+35	0.8735	1.00	|Q	|	|	|	|
30+40	0.8605	0.98	|Q	|	|	|	|
30+45	0.8476	0.96	|Q	|	|	|	|
30+50	0.8350	0.95	|Q	|	|	|	|
30+55	0.8225	0.93	|Q	|	|	|	|
31+ 0	0.8103	0.92	|Q	|	|	|	|
31+ 5	0.7982	0.90	|Q	|	|	|	|

31+10	0.7863	0.89	|Q	|	|	|	|
31+15	0.7746	0.88	|Q	|	|	|	|
31+20	0.7630	0.86	qQ	|	|	|	|
31+25	0.7516	0.85	qQ	|	|	|	|
31+30	0.7404	0.83	qQ	|	|	|	|
31+35	0.7294	0.82	qQ	|	|	|	|
31+40	0.7185	0.81	qQ	|	|	|	|
31+45	0.7078	0.80	qQ	|	|	|	|
31+50	0.6972	0.78	qQ	|	|	|	|
31+55	0.6868	0.77	qQ	|	|	|	|
32+ 0	0.6766	0.76	Q	|	|	|	|
32+ 5	0.6665	0.75	Q	|	|	|	|
32+10	0.6565	0.73	Q	|	|	|	|
32+15	0.6468	0.72	Q	|	|	|	|
32+20	0.6371	0.71	Q	|	|	|	|
32+25	0.6276	0.70	Q	|	|	|	|
32+30	0.6182	0.69	Q	|	|	|	|
32+35	0.6090	0.68	Q	|	|	|	|
32+40	0.5999	0.67	Q	|	|	|	|
32+45	0.5910	0.66	Q	|	|	|	|
32+50	0.5822	0.65	Q	|	|	|	|
32+55	0.5735	0.64	Q	|	|	|	|
33+ 0	0.5649	0.63	Q	|	|	|	|
33+ 5	0.5565	0.62	Q	|	|	|	|
33+10	0.5482	0.61	Q	|	|	|	|
33+15	0.5400	0.60	Q	|	|	|	|
33+20	0.5320	0.59	Q	|	|	|	|
33+25	0.5241	0.58	Q	|	|	|	|
33+30	0.5162	0.57	Q	|	|	|	|
33+35	0.5085	0.56	Q	|	|	|	|
33+40	0.5010	0.55	Q	|	|	|	|
33+45	0.4935	0.54	Q	|	|	|	|
33+50	0.4861	0.53	Q	|	|	|	|
33+55	0.4789	0.52	Q	|	|	|	|
34+ 0	0.4717	0.52	Q	|	|	|	|
34+ 5	0.4647	0.51	Q	|	|	|	|
34+10	0.4578	0.50	Q	|	|	|	|
34+15	0.4509	0.49	Q	|	|	|	|
34+20	0.4442	0.48	Q	|	|	|	|
34+25	0.4376	0.48	Q	|	|	|	|
34+30	0.4311	0.47	Q	|	|	|	|
34+35	0.4246	0.46	Q	|	|	|	|
34+40	0.4183	0.46	Q	|	|	|	|
34+45	0.4121	0.45	Q	|	|	|	|
34+50	0.4059	0.44	Q	|	|	|	|
34+55	0.3999	0.43	Q	|	|	|	|
35+ 0	0.3939	0.43	Q	|	|	|	|
35+ 5	0.3880	0.42	Q	|	|	|	|
35+10	0.3822	0.41	Q	|	|	|	|
35+15	0.3765	0.41	Q	|	|	|	|
35+20	0.3709	0.40	Q	|	|	|	|
35+25	0.3654	0.39	Q	|	|	|	|
35+30	0.3599	0.39	Q	|	|	|	|
35+35	0.3546	0.38	Q	|	|	|	|
35+40	0.3493	0.38	Q	|	|	|	|
35+45	0.3441	0.37	Q	|	|	|	|
35+50	0.3389	0.37	Q	|	|	|	|
35+55	0.3339	0.36	Q	|	|	|	|
36+ 0	0.3289	0.35	Q	|	|	|	|
36+ 5	0.0000	0.02	Q	|	|	|	|

36+10	0.0000	0.02	Q				
36+15	0.0000	0.02	Q				
36+20	0.0000	0.02	Q				
36+25	0.0000	0.02	Q				
36+30	0.0000	0.02	Q				
36+35	0.0000	0.02	Q				
36+40	0.0000	0.02	Q				
36+45	0.0000	0.02	Q				
36+50	0.0000	0.02	Q				
36+55	0.0000	0.02	Q				
37+ 0	0.0000	0.02	Q				
37+ 5	0.0000	0.02	Q				
37+10	0.0000	0.02	Q				
37+15	0.0000	0.02	Q				
37+20	0.0000	0.02	Q				
37+25	0.0000	0.02	Q				
37+30	0.0000	0.02	Q				
37+35	0.0000	0.02	Q				
37+40	0.0000	0.02	Q				
37+45	0.0000	0.01	Q				
37+50	0.0000	0.01	Q				
37+55	0.0000	0.01	Q				
38+ 0	0.0000	0.01	Q				
38+ 5	0.0000	0.01	Q				
38+10	0.0000	0.01	Q				
38+15	0.0000	0.01	Q				
38+20	0.0000	0.01	Q				
38+25	0.0000	0.01	Q				
38+30	0.0000	0.01	Q				
38+35	0.0000	0.01	Q				
38+40	0.0000	0.01	Q				
38+45	0.0000	0.01	Q				
38+50	0.0000	0.01	Q				
38+55	0.0000	0.01	Q				
39+ 0	0.0000	0.01	Q				
39+ 5	0.0000	0.01	Q				
39+10	0.0000	0.01	Q				
39+15	0.0000	0.01	Q				
39+20	0.0000	0.01	Q				
39+25	0.0000	0.01	Q				
39+30	0.0000	0.01	Q				
39+35	0.0000	0.01	Q				
39+40	0.0000	0.01	Q				
39+45	0.0000	0.01	Q				
39+50	0.0000	0.01	Q				
39+55	0.0000	0.01	Q				
40+ 0	0.0000	0.01	Q				
40+ 5	0.0000	0.01	Q				
40+10	0.0000	0.01	Q				
40+15	0.0000	0.01	Q				
40+20	0.0000	0.01	Q				
40+25	0.0000	0.01	Q				
40+30	0.0000	0.01	Q				
40+35	0.0000	0.01	Q				
40+40	0.0000	0.01	Q				
40+45	0.0000	0.01	Q				
40+50	0.0000	0.01	Q				
40+55	0.0000	0.01	Q				
41+ 0	0.0000	0.01	Q				
41+ 5	0.0000	0.01	Q				

41+10	0.0000	0.01	Q				
41+15	0.0000	0.01	Q				
41+20	0.0000	0.01	Q				
41+25	0.0000	0.01	Q				
41+30	0.0000	0.00	Q				
41+35	0.0000	0.00	Q				
41+40	0.0000	0.00	Q				
41+45	0.0000	0.00	Q				
41+50	0.0000	0.00	Q				
41+55	0.0000	0.00	Q				
42+ 0	0.0000	0.00	Q				
42+ 5	0.0000	0.00	Q				
42+10	0.0000	0.00	Q				
42+15	0.0000	0.00	Q				
42+20	0.0000	0.00	Q				
42+25	0.0000	0.00	Q				
42+30	0.0000	0.00	Q				
42+35	0.0000	0.00	Q				
42+40	0.0000	0.00	Q				
42+45	0.0000	0.00	Q				
42+50	0.0000	0.00	Q				
42+55	0.0000	0.00	Q				
43+ 0	0.0000	0.00	Q				
43+ 5	0.0000	0.00	Q				
43+10	0.0000	0.00	Q				
43+15	0.0000	0.00	Q				
43+20	0.0000	0.00	Q				
43+25	0.0000	0.00	Q				
43+30	0.0000	0.00	Q				
43+35	0.0000	0.00	Q				
43+40	0.0000	0.00	Q				
43+45	0.0000	0.00	Q				
43+50	0.0000	0.00	Q				
43+55	0.0000	0.00	Q				
44+ 0	0.0000	0.00	Q				
44+ 5	0.0000	0.00	Q				
44+10	0.0000	0.00	Q				
44+15	0.0000	0.00	Q				
44+20	0.0000	0.00	Q				
44+25	0.0000	0.00	Q				
44+30	0.0000	0.00	Q				
44+35	0.0000	0.00	Q				
44+40	0.0000	0.00	Q				
44+45	0.0000	0.00	Q				
44+50	0.0000	0.00	Q				
44+55	0.0000	0.00	Q				
45+ 0	0.0000	0.00	Q				
45+ 5	0.0000	0.00	Q				
45+10	0.0000	0.00	Q				
45+15	0.0000	0.00	Q				
45+20	0.0000	0.00	Q				
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45+45	0.0000	0.00	Q				
45+50	0.0000	0.00	Q				
45+55	0.0000	0.00	Q				
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46+ 5	0.0000	0.00	Q				

46+10	0.0000	0.00	Q				
46+15	0.0000	0.00	Q				
46+20	0.0000	0.00	Q				
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46+30	0.0000	0.00	Q				
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46+40	0.0000	0.00	Q				
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46+50	0.0000	0.00	Q				
46+55	0.0000	0.00	Q				
47+ 0	0.0000	0.00	Q				
47+ 5	0.0000	0.00	Q				
47+10	0.0000	0.00	Q				
47+15	0.0000	0.00	Q				
47+20	0.0000	0.00	Q				
47+25	0.0000	0.00	Q				
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47+35	0.0000	0.00	Q				
47+40	0.0000	0.00	Q				
47+45	0.0000	0.00	Q				
47+50	0.0000	0.00	Q				
47+55	0.0000	0.00	Q				
48+ 0	0.0000	0.00	Q				
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48+10	0.0000	0.00	Q				
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48+20	0.0000	0.00	Q				
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48+40	0.0000	0.00	Q				
48+45	0.0000	0.00	Q				
48+50	0.0000	0.00	Q				
48+55	0.0000	0.00	Q				
49+ 0	0.0000	0.00	Q				
49+ 5	0.0000	0.00	Q				
49+10	0.0000	0.00	Q				
49+15	0.0000	0.00	Q				
49+20	0.0000	0.00	Q				
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49+50	0.0000	0.00	Q				
49+55	0.0000	0.00	Q				
50+ 0	0.0000	0.00	Q				
50+ 5	0.0000	0.00	Q				
50+10	0.0000	0.00	Q				
50+15	0.0000	0.00	Q				
50+20	0.0000	0.00	Q				
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50+30	0.0000	0.00	Q				
50+35	0.0000	0.00	Q				
50+40	0.0000	0.00	Q				
50+45	0.0000	0.00	Q				
50+50	0.0000	0.00	Q				
50+55	0.0000	0.00	Q				
51+ 0	0.0000	0.00	Q				
51+ 5	0.0000	0.00	Q				

51+10	0.0000	0.00	Q				
51+15	0.0000	0.00	Q				
51+20	0.0000	0.00	Q				
51+25	0.0000	0.00	Q				
51+30	0.0000	0.00	Q				
51+35	0.0000	0.00	Q				
51+40	0.0000	0.00	Q				
51+45	0.0000	0.00	Q				
51+50	0.0000	0.00	Q				
51+55	0.0000	0.00	Q				
52+ 0	0.0000	0.00	Q				
52+ 5	0.0000	0.00	Q				
52+10	0.0000	0.00	Q				
52+15	0.0000	0.00	Q				
52+20	0.0000	0.00	Q				
52+25	0.0000	0.00	Q				
52+30	0.0000	0.00	Q				
52+35	0.0000	0.00	Q				
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52+45	0.0000	0.00	Q				
52+50	0.0000	0.00	Q				
52+55	0.0000	0.00	Q				
53+ 0	0.0000	0.00	Q				
53+ 5	0.0000	0.00	Q				
53+10	0.0000	0.00	Q				
53+15	0.0000	0.00	Q				
53+20	0.0000	0.00	Q				
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53+40	0.0000	0.00	Q				
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53+50	0.0000	0.00	Q				
53+55	0.0000	0.00	Q				
54+ 0	0.0000	0.00	Q				
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54+55	0.0000	0.00	Q				
55+ 0	0.0000	0.00	Q				
55+ 5	0.0000	0.00	Q				
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55+40	0.0000	0.00	Q				
55+45	0.0000	0.00	Q				
55+50	0.0000	0.00	Q				
55+55	0.0000	0.00	Q				
56+ 0	0.0000	0.00	Q				
56+ 5	0.0000	0.00	Q				

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68+20	0.0000	0.00	Q	|	|	|	|
68+25	0.0000	0.00	Q	|	|	|	|

**********HYDROGRAPH DATA**********

Number of intervals = 821
Time interval = 5.0 (Min.)
Maximum/Peak flow rate = 30.637 (CFS)
Total volume = 14.433 (Ac.Ft)

Status of hydrographs being held in storage

	Stream 1	Stream 2	Stream 3	Stream 4	Stream 5
Peak (CFS)	0.000	0.000	0.000	0.000	0.000
Vol (Ac.Ft)	0.000	0.000	0.000	0.000	0.000

****

APPENDIX B

BMP SIZING CALCULATIONS

DRAINAGE AREA 1 BASIN

UNDERGROUND INFILTRATION BASIN - CMP PERFORATED PIPE

VOLUME CALCULATIONS

UNDERGROUND INFILTRATION BASIN DIMENSIONS		VOLUME PROVIDED BY 54" CMP PERFORATED PIPE (CU-FT) *	VOLUME PROVIDED BY GRAVEL MEDIA (CU-FT) **	TOTAL VOLUME PROVIDED (CU-FT)	REQUIRED V(BMP) (CU-FT)
BASIN AREA (SQ-FT)	TRENCH DEPTH (FT)				
28,534	9.0	28,804	91,201	120,005	119,669

NOTES:

* REFER TO ATTACHED CONTECH DESIGN SPREADSHEET

** VOLUME GRAVEL MEDIA =((BASIN AREA X BASIN DEPTH) - VOLUME PERFORATED PIPES) X 0.40 GRAVEL VOID RATIO

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Project Summary

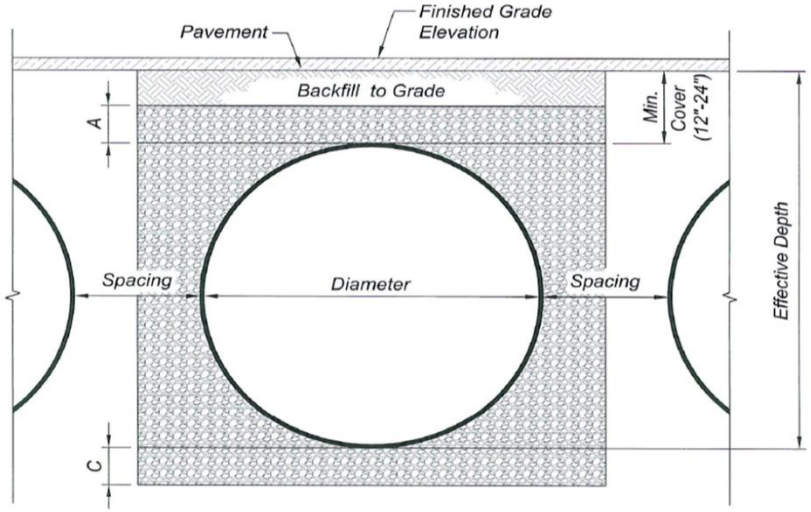
Date:	2/13/2017
Project Name:	DA 1
City / County:	Chino, Los Angeles County
State:	California
Designed By:	Proactive Engineering
Company:	Proactive Engineering
Telephone:	951-280-3300

Enter Information in Blue Cells

Corrugated Metal Pipe Calculator

Storage Volume Required (cf):	53,250
Limiting Width (ft):	67.00
Invert Depth Below Asphalt (ft):	7.00
Solid or Perforated Pipe:	Perforated
Shape Or Diameter (in):	60
Number Of Headers:	2
Spacing between Barrels (ft):	2.25
Stone Width Around Perimeter of System (ft):	0
Depth A: Porous Stone Above Pipe (in):	24
Depth C: Porous Stone Below Pipe (in):	24
Stone Porosity (0 to 40%):	40

19.63 ft^2 Pipe Area



System Sizing

Pipe Storage:	28,804	cf	
Porous Stone Storage:	24,539	cf	
Total Storage Provided:	53,344	cf	100.2% Of Required Storage
Number of Barrels:	9	barrels	
Length per Barrel:	149.0	ft	
Length Per Header:	63.0	ft	
Rectangular Footprint (W x L):	63. ft x 159. ft		

CONTECH Materials

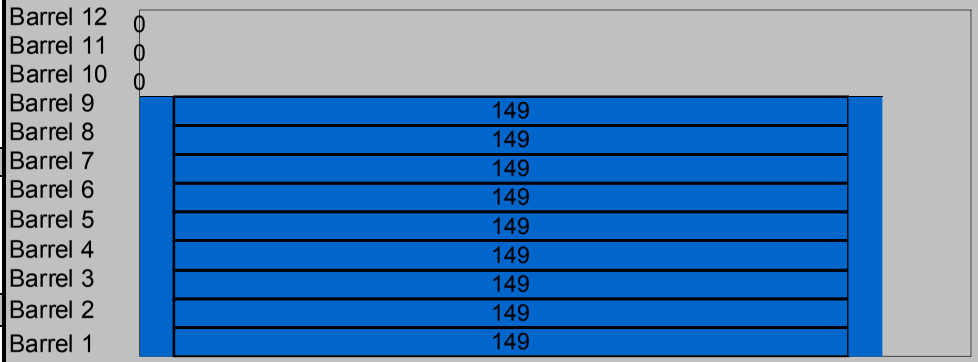
Total CMP Footage:	1,467	ft
Approximate Total Pieces:	69	pcs
Approximate Coupling Bands:	76	bands
Approximate Truckloads:	18	trucks

Construction Quantities**

Total Excavation:	2597	cy
Porous Stone Backfill For Storage:	2272	cy stone
Backfill to Grade Excluding Stone:	-742	cy fill

***Construction quantities are approximate and should be verified upon final design*

System Layout



Barrel Footage (w/o headers)

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Project Summary

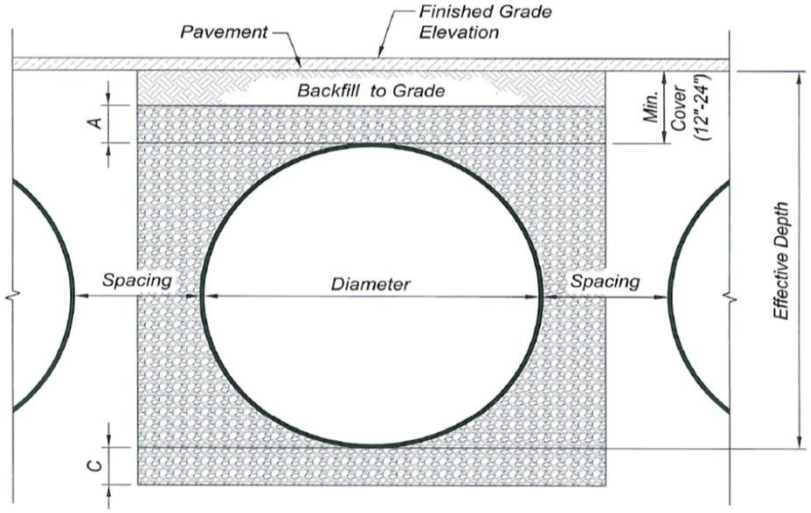
Date:	7/25/2017
Project Name:	DA 1B
City / County:	Chino, Los Angeles County
State:	California
Designed By:	Proactive Engineering
Company:	Proactive Engineering
Telephone:	951-280-3300

Enter Information in Blue Cells

Corrugated Metal Pipe Calculator

Storage Volume Required (cf):	19,850
Limiting Width (ft):	15.50
Invert Depth Below Asphalt (ft):	7.00
Solid or Perforated Pipe:	Perforated
Shape Or Diameter (in):	54
Number Of Headers:	2
Spacing between Barrels (ft):	2.50
Stone Width Around Perimeter of System (ft):	2
Depth A: Porous Stone Above Pipe (in):	12
Depth C: Porous Stone Below Pipe (in):	36
Stone Porosity (0 to 40%):	40

15.90 ft^2 Pipe Area



System Sizing

Pipe Storage:	8,859	cf	
Porous Stone Storage:	11,213	cf	
Total Storage Provided:	20,071	cf	101.1% Of Required Storage
Number of Barrels:	2	barrels	
Length per Barrel:	267.0	ft	
Length Per Header:	11.5	ft	
Rectangular Footprint (W x L):	15.5 ft x 280. ft		

CONTECH Materials

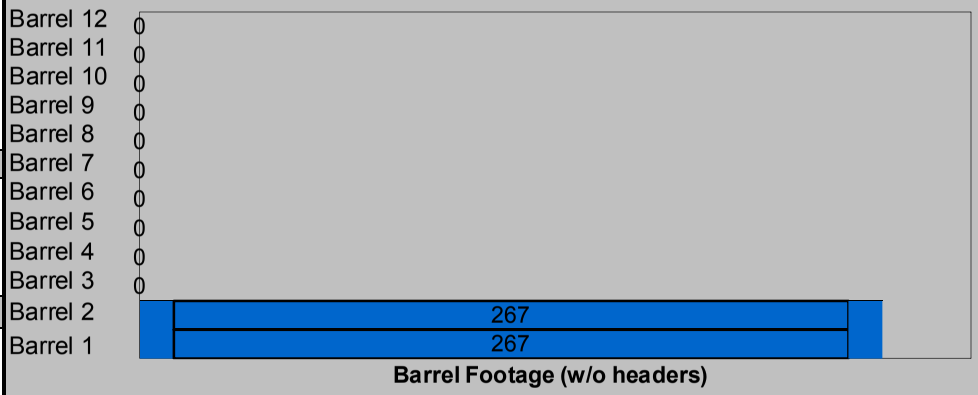
Total CMP Footage:	557	ft
Approximate Total Pieces:	26	pcs
Approximate Coupling Bands:	26	bands
Approximate Truckloads:	7	trucks

Construction Quantities**

Total Excavation:	1126	cy
Porous Stone Backfill For Storage:	1038	cy stone
Backfill to Grade Excluding Stone:	-240	cy fill

***Construction quantities are approximate and should be verified upon final design*

System Layout



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Project Summary

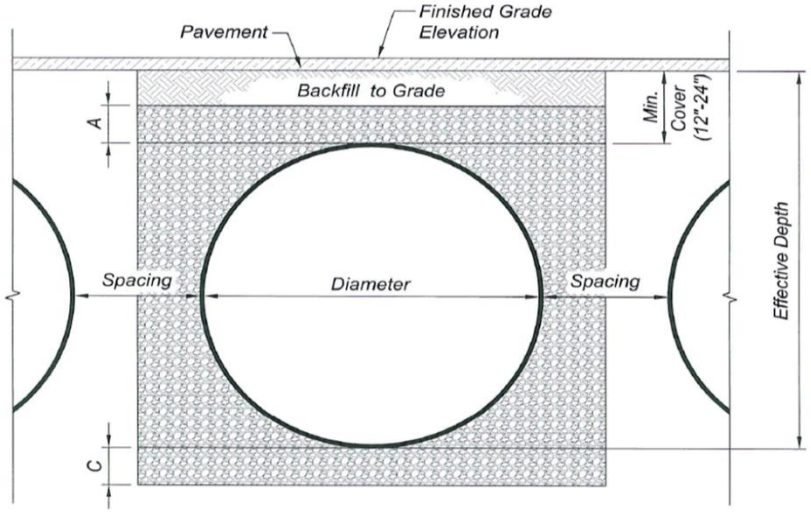
Date:	7/25/2017
Project Name:	DA 1C
City / County:	Chino, Los Angeles County
State:	California
Designed By:	Proactive Engineering
Company:	Proactive Engineering
Telephone:	951-280-3300

Enter Information in Blue Cells

Corrugated Metal Pipe Calculator

Storage Volume Required (cf):	10,500
Limiting Width (ft):	8.50
Invert Depth Below Asphalt (ft):	7.00
Solid or Perforated Pipe:	Perforated
Shape Or Diameter (in):	54
Number Of Headers:	2
Spacing between Barrels (ft):	2.50
Stone Width Around Perimeter of System (ft):	2
Depth A: Porous Stone Above Pipe (in):	12
Depth C: Porous Stone Below Pipe (in):	36
Stone Porosity (0 to 40%):	40

15.90 ft^2 Pipe Area



System Sizing

Pipe Storage:	4,358	cf	
Porous Stone Storage:	6,291	cf	
Total Storage Provided:	10,649	cf	101.4% Of Required Storage
Number of Barrels:	1	barrels	
Length per Barrel:	265.0	ft	
Length Per Header:	4.5	ft	
Rectangular Footprint (W x L):	8.5 ft x 278. ft		

CONTECH Materials

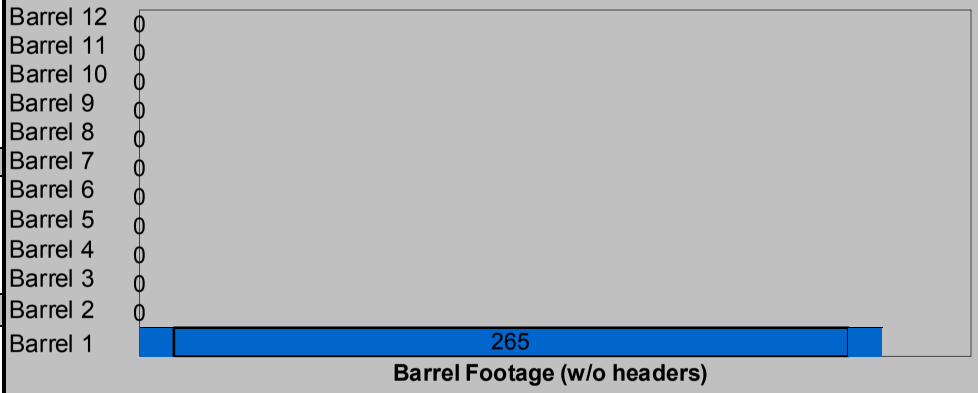
Total CMP Footage:	274	ft
Approximate Total Pieces:	14	pcs
Approximate Coupling Bands:	13	bands
Approximate Truckloads:	4	trucks

Construction Quantities**

Total Excavation:	613	cy
Porous Stone Backfill For Storage:	583	cy stone
Backfill to Grade Excluding Stone:	-131	cy fill

***Construction quantities are approximate and should be verified upon final design*

System Layout



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Infiltration Trench - Design Procedure	BMP ID DA 2	Legend:	Required Entries / Calculated Cells
Company Name:	PROACTIVE ENGINEERING	Date:	2/13/2017
Designed by:	Samuel Aguilar	County/City Case No.:	

Design Volume

Enter the area tributary to this feature, Max = 10 acres	A_t =	4	acres
Enter V_{BMP} determined from Section 2.1 of this Handbook	V_{BMP} =	13,553	ft^3

Calculate Maximum Depth of the Reservoir Layer

Enter Infiltration rate	I =	1.1	in/hr
Enter Factor of Safety, FS (unitless)	FS =	3	
Obtain from Table 1, Appendix A: "Infiltration Testing" of this BMP Handbook			
	n =	40	%
Calculate D_1. $D_1 = \frac{I\ (in/hr) \times 72\ hrs}{12\ (in/ft) \times (n/100) \times FS}$	D_1 =	5.50	ft
Enter depth to historic high groundwater mark (measured from finished grade)		25	ft
Enter depth to top of bedrock or impermeable layer (measured from finished grade)		35	ft
D_2 is the smaller of: Depth to groundwater - 11 ft; & Depth to impermeable layer - 6 ft	D_2 =	14.0	ft
D_{MAX} is the smaller value of D_1 and D_2, must be less than or equal to 8 feet.	D_{MAX} =	5.5	ft

Trench Sizing

Enter proposed reservoir layer depth D_R, must be ≤ D_{MAX}	D_R =	5.50	ft
Calculate the design depth of water, d_W			
Design d_W = $(D_R) \times (n/100)$	Design d_W =	2.20	ft
Minimum Surface Area, A_S $A_S = \frac{V_{BMP}}{d_W}$	A_S =	6,160	ft^2
Proposed Design Surface Area	A_D =	8,036	ft^2
Minimum Width = D_R + 1 foot pea gravel		6.50	ft
Sediment Control Provided? (Use pulldown)		Yes	
Geotechnical report attached? (Use pulldown)		Yes	

If the trench has been designed correctly, there should be no error messages on the spreadsheet.

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Project Summary

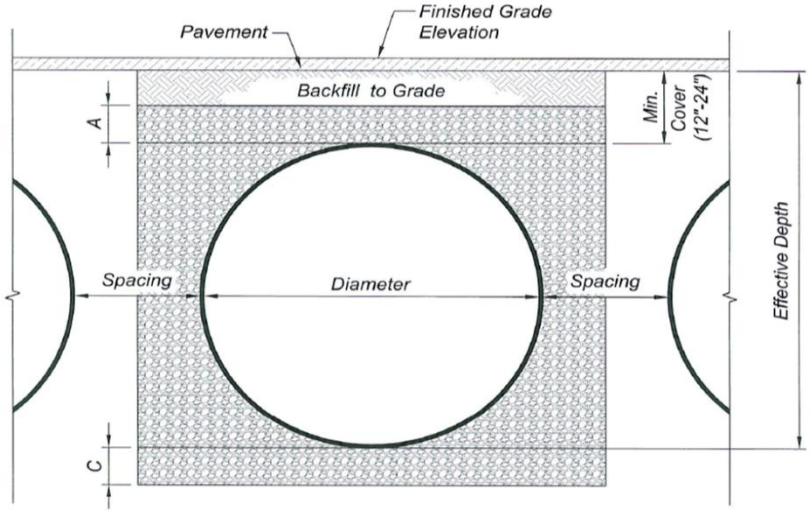
Date:	4/24/2015
Project Name:	DA 3
City / County:	Chino, Los Angeles County
State:	California
Designed By:	Proactive Engineering
Company:	Proactive Engineering
Telephone:	951-280-3300

Enter Information in Blue Cells

Corrugated Metal Pipe Calculator

Storage Volume Required (cf):	13,250
Limiting Width (ft):	12.00
Invert Depth Below Asphalt (ft):	7.00
Solid or Perforated Pipe:	Perforated
Shape Or Diameter (in):	48
Number Of Headers:	2
Spacing between Barrels (ft):	2.00
Stone Width Around Perimeter of System (ft):	1
Depth A: Porous Stone Above Pipe (in):	36
Depth C: Porous Stone Below Pipe (in):	36
Stone Porosity (0 to 40%):	40

12.57 ft^2 Pipe Area



System Sizing

Pipe Storage:	5,328	cf	
Porous Stone Storage:	8,045	cf	
Total Storage Provided:	13,373	cf	100.9% Of Required Storage
Number of Barrels:	2	barrels	
Length per Barrel:	202.0	ft	
Length Per Header:	10.0	ft	
Rectangular Footprint (W x L):	12. ft x 212. ft		

CONTECH Materials

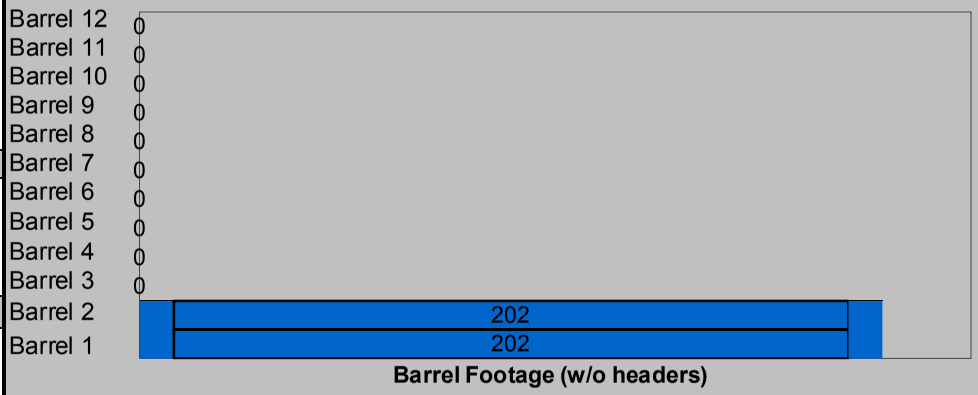
Total CMP Footage:	424	ft
Approximate Total Pieces:	20	pcs
Approximate Coupling Bands:	20	bands
Approximate Truckloads:	3	trucks

Construction Quantities**

Total Excavation:	660	cy
Porous Stone Backfill For Storage:	745	cy stone
Backfill to Grade Excluding Stone:	-282	cy fill

***Construction quantities are approximate and should be verified upon final design*

System Layout



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Infiltration Trench - Design Procedure	BMP ID DA 4	Legend:	Required Entries / Calculated Cells
Company Name:	PROACTIVE ENGINEERING	Date:	2/13/2017
Designed by:	Samuel Aguilar	County/City Case No.:	

Design Volume

Enter the area tributary to this feature, Max = 10 acres	A_t=	10	acres
Enter V_{BMP} determined from Section 2.1 of this Handbook	V_{BMP}=	32,580	ft^3

Calculate Maximum Depth of the Reservoir Layer

Enter Infiltration rate	I =	1.1	in/hr
Enter Factor of Safety, FS (unitless)	FS =	3	
Obtain from Table 1, Appendix A: "Infiltration Testing" of this BMP Handbook			
	n =	40	%
Calculate D_1. $D_1 = \frac{I\ (in/hr) \times 72\ hrs}{12\ (in/ft) \times (n/100) \times FS}$	D_1 =	5.50	ft
Enter depth to historic high groundwater mark (measured from finished grade)		25	ft
Enter depth to top of bedrock or impermeable layer (measured from finished grade)		35	ft
D_2 is the smaller of: Depth to groundwater - 11 ft; & Depth to impermeable layer - 6 ft	D_2 =	14.0	ft
D_{MAX} is the smaller value of D_1 and D_2, must be less than or equal to 8 feet.	D_{MAX} =	5.5	ft

Trench Sizing

Enter proposed reservoir layer depth D_R, must be ≤ D_{MAX}	D_R =	2.50	ft
Calculate the design depth of water, d_W			
Design d_W = (D_R) x (n/100)	Design d_W=	1.00	ft
Minimum Surface Area, A_S $A_S = \frac{V_{BMP}}{d_W}$	A_S =	32,580	ft^2
Proposed Design Surface Area	A_D =	38,142	ft^2
Minimum Width = D_R + 1 foot pea gravel		3.50	ft
Sediment Control Provided? (Use pulldown)		Yes	
Geotechnical report attached? (Use pulldown)		Yes	

If the trench has been designed correctly, there should be no error messages on the spreadsheet.

Infiltration Trench - Design Procedure	BMP ID DA 5	Legend:	Required Entries / Calculated Cells
Company Name:	PROACTIVE ENGINEERING	Date:	2/13/2017
Designed by:	Samuel Aguilar	County/City Case No.:	

Design Volume

Enter the area tributary to this feature, Max = 10 acres	A_t =	2	acres
Enter V_{BMP} determined from Section 2.1 of this Handbook	V_{BMP} =	7,944	ft^3

Calculate Maximum Depth of the Reservoir Layer

Enter Infiltration rate	I =	1.1	in/hr
Enter Factor of Safety, FS (unitless)	FS =	3	
Obtain from Table 1, Appendix A: "Infiltration Testing" of this BMP Handbook			
	n =	40	%
Calculate D_1. $D_1 = \frac{I\ (in/hr) \times 72\ hrs}{12\ (in/ft) \times (n/100) \times FS}$	D_1 =	5.50	ft
Enter depth to historic high groundwater mark (measured from finished grade)		25	ft
Enter depth to top of bedrock or impermeable layer (measured from finished grade)		35	ft
D_2 is the smaller of: Depth to groundwater - 11 ft; & Depth to impermeable layer - 6 ft	D_2 =	14.0	ft
D_{MAX} is the smaller value of D_1 and D_2, must be less than or equal to 8 feet.	D_{MAX} =	5.5	ft

Trench Sizing

Enter proposed reservoir layer depth D_R, must be ≤ D_{MAX}	D_R =	5.50	ft
Calculate the design depth of water, d_W			
Design $d_W = (D_R) \times (n/100)$	Design d_W =	2.20	ft
Minimum Surface Area, A_S $A_S = \frac{V_{BMP}}{d_W}$	A_S =	3,611	ft^2
Proposed Design Surface Area	A_D =	4,251	ft^2
Minimum Width = D_R + 1 foot pea gravel		6.50	ft

Sediment Control Provided? (Use pulldown) Yes

Geotechnical report attached? (Use pulldown) Yes

If the trench has been designed correctly, there should be no error messages on the spreadsheet.

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CONTECH CMP DETENTION SYSTEMS

CONTECH STORMWATER SOLUTIONS INC.

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and pricing send completed worksheet to:
dyods@contech-cpi.com



Project Summary

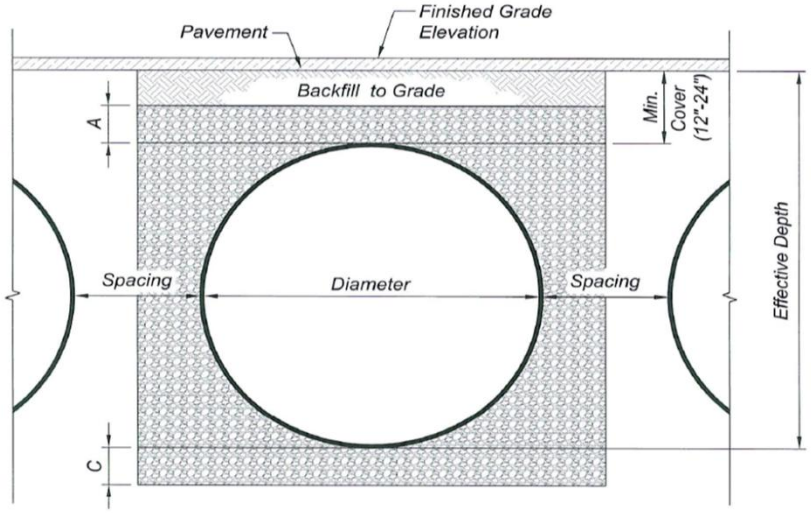
Date:	2/13/2017
Project Name:	DA 6
City / County:	Chino, Los Angeles County
State:	California
Designed By:	Proactive Engineering
Company:	Proactive Engineering
Telephone:	951-280-3300

Enter Information in Blue Cells

Corrugated Metal Pipe Calculator

Storage Volume Required (cf):	11,650
Limiting Width (ft):	12.00
Invert Depth Below Asphalt (ft):	7.00
Solid or Perforated Pipe:	Perforated
Shape Or Diameter (in):	48
Number Of Headers:	2
Spacing between Barrels (ft):	2.00
Stone Width Around Perimeter of System (ft):	1
Depth A: Porous Stone Above Pipe (in):	36
Depth C: Porous Stone Below Pipe (in):	36
Stone Porosity (0 to 40%):	40

12.57 ft^2 Pipe Area



System Sizing

Pipe Storage:	4,675	cf	
Porous Stone Storage:	7,058	cf	
Total Storage Provided:	11,733	cf	100.7% Of Required Storage
Number of Barrels:	2	barrels	
Length per Barrel:	176.0	ft	
Length Per Header:	10.0	ft	
Rectangular Footprint (W x L):	12. ft x 186. ft		

CONTECH Materials

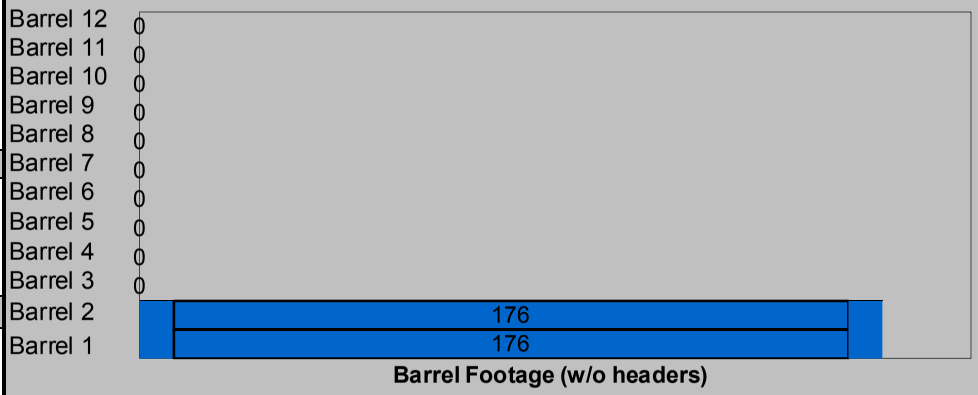
Total CMP Footage:	372	ft
Approximate Total Pieces:	18	pcs
Approximate Coupling Bands:	18	bands
Approximate Truckloads:	3	trucks

Construction Quantities**

Total Excavation:	579	cy
Porous Stone Backfill For Storage:	654	cy stone
Backfill to Grade Excluding Stone:	-248	cy fill

***Construction quantities are approximate and should be verified upon final design*

System Layout



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Infiltration Trench - Design Procedure	BMP ID DA 7	Legend:	Required Entries / Calculated Cells

Company Name:	PROACTIVE ENGINEERING	Date:	2/13/2017
Designed by:	Samuel Aguilar	County/City Case No.:	

Design Volume

Enter the area tributary to this feature, Max = 10 acres	A_t=	2	acres
Enter V_{BMP} determined from Section 2.1 of this Handbook	V_{BMP}=	9,819	ft^3

Calculate Maximum Depth of the Reservoir Layer

Enter Infiltration rate	I =	1.0	in/hr
Enter Factor of Safety, FS (unitless)	FS =	3	
Obtain from Table 1, Appendix A: "Infiltration Testing" of this BMP Handbook			
	n =	40	%
Calculate D_1. $D_1 = \frac{I\ (in/hr) \times 72\ hrs}{12\ (in/ft) \times (n/100) \times FS}$	D_1 =	5.00	ft
Enter depth to historic high groundwater mark (measured from finished grade)		25	ft
Enter depth to top of bedrock or impermeable layer (measured from finished grade)		35	ft
D_2 is the smaller of: Depth to groundwater - 11 ft; & Depth to impermeable layer - 6 ft	D_2 =	14.0	ft
D_{MAX} is the smaller value of D_1 and D_2, must be less than or equal to 8 feet.	D_{MAX} =	5.0	ft

Trench Sizing

Enter proposed reservoir layer depth D_R, must be ≤ D_{MAX}	D_R =	5.00	ft
Calculate the design depth of water, d_W			
Design d_W = $(D_R) \times (n/100)$	Design d_W=	2.00	ft
Minimum Surface Area, A_S $A_S = \frac{V_{BMP}}{d_W}$	A_S =	4,910	ft^2
Proposed Design Surface Area	A_D =	5,614	ft^2
Minimum Width = D_R + 1 foot pea gravel		6.00	ft
Sediment Control Provided? (Use pulldown)		Yes	
Geotechnical report attached? (Use pulldown)		Yes	

If the trench has been designed correctly, there should be no error messages on the spreadsheet.

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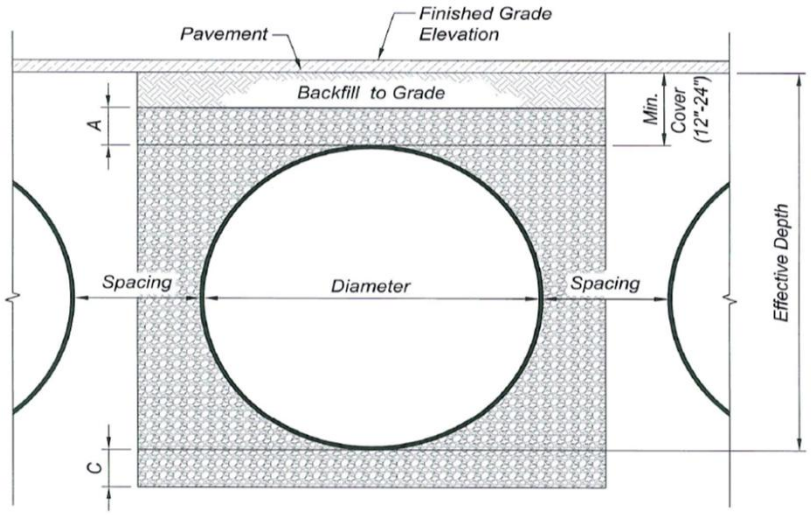


Project Summary

Date:	2/13/2017
Project Name:	DA 8
City / County:	Chino, Los Angeles County
State:	California
Designed By:	Proactive Engineering
Company:	Proactive Engineering
Telephone:	951-280-3300

Enter Information in Blue Cells

Corrugated Metal Pipe Calculator

Storage Volume Required (cf):	14,900
Limiting Width (ft):	14.00
Invert Depth Below Asphalt (ft):	7.00
Solid or Perforated Pipe:	Perforated
Shape Or Diameter (in):	48
Number Of Headers:	2
Spacing between Barrels (ft):	2.00
Stone Width Around Perimeter of System (ft):	1
Depth A: Porous Stone Above Pipe (in):	36
Depth C: Porous Stone Below Pipe (in):	36
Stone Porosity (0 to 40%):	40

12.57 ft^2 Pipe Area

System Sizing

Pipe Storage:	5,982	cf	
Porous Stone Storage:	9,031	cf	
Total Storage Provided:	15,013	cf	100.8% Of Required Storage
Number of Barrels:	2	barrels	
Length per Barrel:	228.0	ft	
Length Per Header:	10.0	ft	
Rectangular Footprint (W x L):	12. ft x 238. ft		

CONTECH Materials

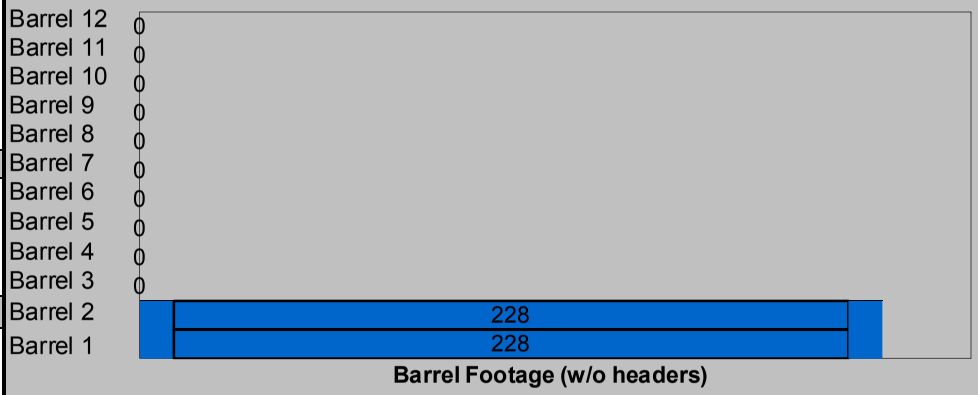
Total CMP Footage:	476	ft
Approximate Total Pieces:	22	pcs
Approximate Coupling Bands:	22	bands
Approximate Truckloads:	3	trucks

Construction Quantities**

Total Excavation:	741	cy
Porous Stone Backfill For Storage:	836	cy stone
Backfill to Grade Excluding Stone:	-317	cy fill

***Construction quantities are approximate and should be verified upon final design*

System Layout



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Project Summary

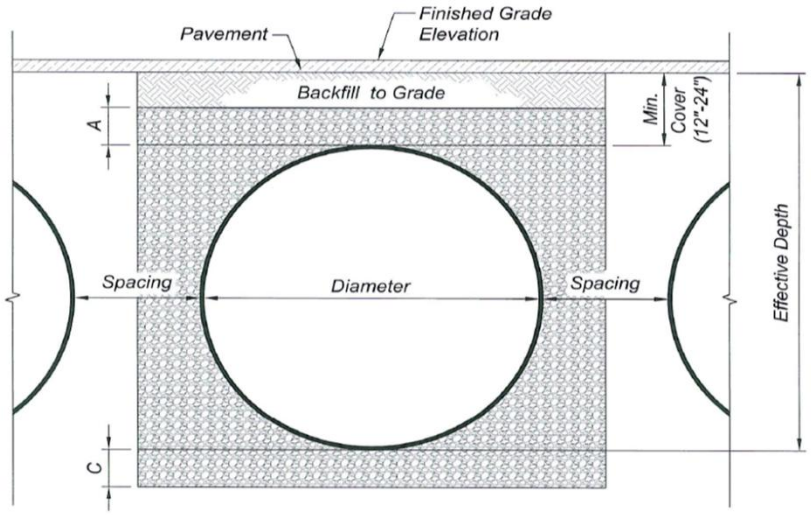
Date:	2/13/2017
Project Name:	DA 9
City / County:	Chino, Los Angeles County
State:	California
Designed By:	Proactive Engineering
Company:	Proactive Engineering
Telephone:	951-280-3300

Enter Information in Blue Cells

Corrugated Metal Pipe Calculator

Storage Volume Required (cf):	5,300
Limiting Width (ft):	12.00
Invert Depth Below Asphalt (ft):	7.00
Solid or Perforated Pipe:	Perforated
Shape Or Diameter (in):	48
Number Of Headers:	2
Spacing between Barrels (ft):	2.00
Stone Width Around Perimeter of System (ft):	1
Depth A: Porous Stone Above Pipe (in):	36
Depth C: Porous Stone Below Pipe (in):	36
Stone Porosity (0 to 40%):	40

12.57 ft^2 Pipe Area



System Sizing

Pipe Storage:	2,161	cf	
Porous Stone Storage:	3,263	cf	
Total Storage Provided:	5,425	cf	102.4% Of Required Storage
Number of Barrels:	2	barrels	
Length per Barrel:	76.0	ft	
Length Per Header:	10.0	ft	
Rectangular Footprint (W x L):	12. ft x 86. ft		

CONTECH Materials

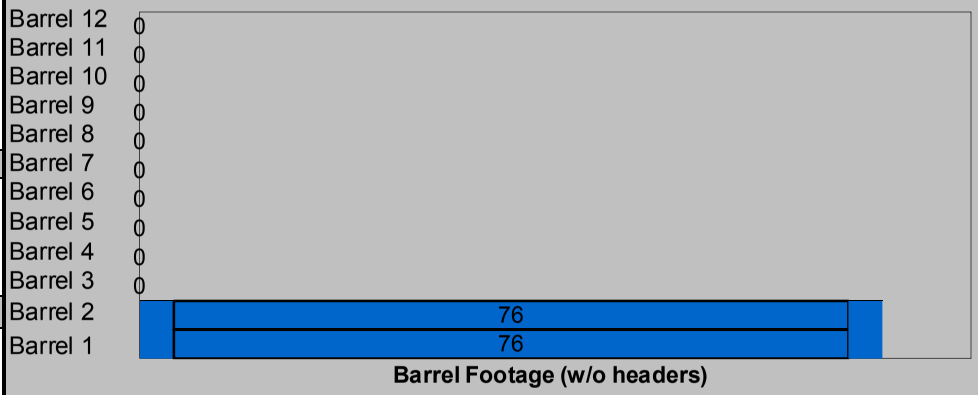
Total CMP Footage:	172	ft
Approximate Total Pieces:	10	pcs
Approximate Coupling Bands:	10	bands
Approximate Truckloads:	2	trucks

Construction Quantities**

Total Excavation:	268	cy
Porous Stone Backfill For Storage:	302	cy stone
Backfill to Grade Excluding Stone:	-114	cy fill

***Construction quantities are approximate and should be verified upon final design*

System Layout



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Project Summary

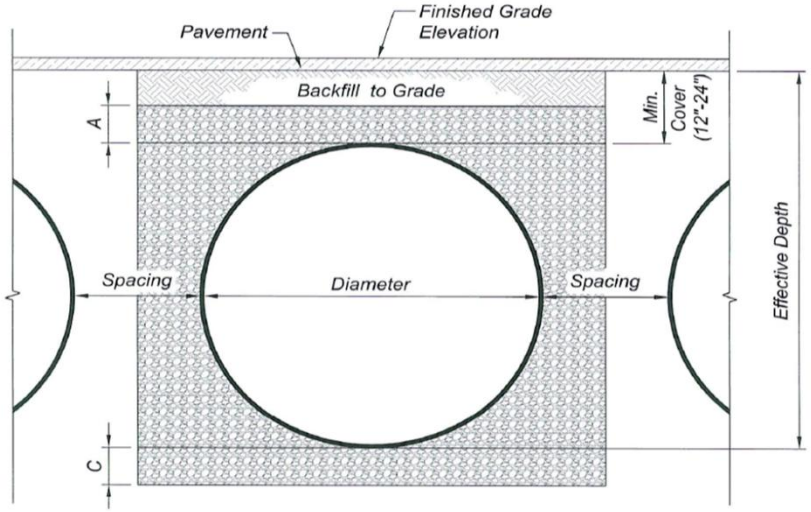
Date:	2/13/2017
Project Name:	DA 10
City / County:	Chino, Los Angeles County
State:	California
Designed By:	Proactive Engineering
Company:	Proactive Engineering
Telephone:	951-280-3300

Enter Information in Blue Cells

Corrugated Metal Pipe Calculator

Storage Volume Required (cf):	17,000
Limiting Width (ft):	14.00
Invert Depth Below Asphalt (ft):	7.00
Solid or Perforated Pipe:	Perforated
Shape Or Diameter (in):	54
Number Of Headers:	2
Spacing between Barrels (ft):	3.00
Stone Width Around Perimeter of System (ft):	1
Depth A: Porous Stone Above Pipe (in):	30
Depth C: Porous Stone Below Pipe (in):	36
Stone Porosity (0 to 40%):	40

15.90 ft^2 Pipe Area



System Sizing

Pipe Storage:	7,284	cf	
Porous Stone Storage:	9,854	cf	
Total Storage Provided:	17,139	cf	100.8% Of Required Storage
Number of Barrels:	2	barrels	
Length per Barrel:	217.0	ft	
Length Per Header:	12.0	ft	
Rectangular Footprint (W x L):	14. ft x 228. ft		

CONTECH Materials

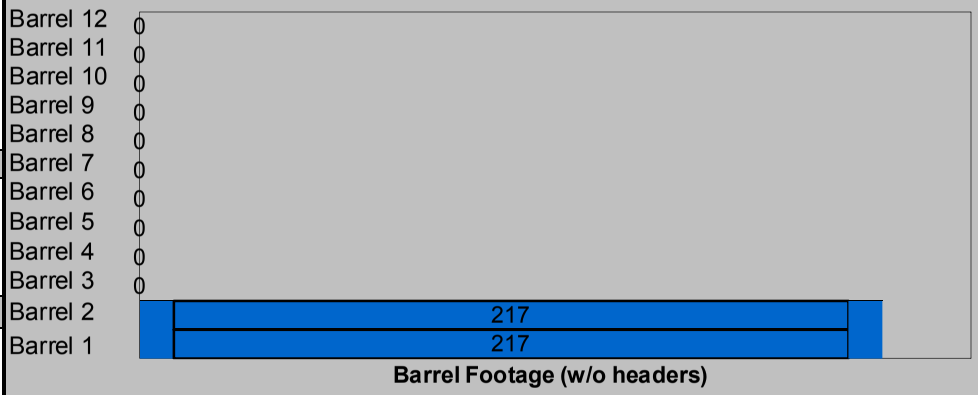
Total CMP Footage:	458	ft
Approximate Total Pieces:	22	pcs
Approximate Coupling Bands:	22	bands
Approximate Truckloads:	6	trucks

Construction Quantities**

Total Excavation:	828	cy
Porous Stone Backfill For Storage:	912	cy stone
Backfill to Grade Excluding Stone:	-354	cy fill

***Construction quantities are approximate and should be verified upon final design*

System Layout



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APPENDIX C

BMP DETAILS

INFILTRATION TRENCH

INF-2: Infiltration Trench Fact Sheet

An infiltration trench is a long, narrow, rock-filled trench with no outlet other than an overflow outlet. Runoff is stored in the void space between stones and infiltrates through the bottom and sides of the trench. Infiltration trenches provide the majority of their pollutant removal benefits through volume reduction. Pretreatment is important for limiting amounts of coarse sediment entering the trench which can clog and render the trench ineffective. *Note: if an infiltration trench is "deeper than its widest surface dimension," or includes an assemblage of perforated pipes, drain tiles, or other similar mechanisms intended to distribute runoff below the surface of the ground, it would probably be considered a "Class V Injection Well" under the federal Underground Injection Control (UIC) Program, which is regulated in California by U.S. EPA Region 9. A UIC permit may be required for such a facility (for details see* **http://www.epa.gov/region9/water/groundwater/uic-classv.html**).

Also known as:

- *French Drains*
- *Rock Trenches*
- *Exfiltration Trenches*
- *Soak-aways*
- *Soakage Trenches*



Infiltration Trench

Source: www.dot.ca.gov

Feasibility Screening Considerations

- Infiltration trenches shall pass infeasibility screening criteria to be considered for use
- Infiltration trenches, particularly deeper designs, may not provide significant attenuation of stormwater pollutants if underlying soils have high permeability; potential risk of groundwater contamination.
- The potential for groundwater mounding should be evaluated if depth to seasonally high groundwater (unmounded) is less than 15 feet.

Opportunity Criteria

- Soils are adequate for infiltration or can be amended to provide an adequate infiltration rate.
- Drainage area area is ≤ 5 acres and has low to moderate sediment production.
- 2-3 percent of drainage area available for infiltration (generally requires less surface area than infiltration basins and bioretention areas without underdrain).
- Space available for pretreatment (biotreatment or treatment control BMP as described below).
- Potential for groundwater contamination can be mitigated through isolation of pollutant sources, pretreatment of inflow, and/or demonstration of adequate treatment capacity of underlying soils.
- Infiltration is into native soil, or depth of engineered fill is ≤ 5 feet from the bottom of the facility to native material and infiltration into shallow fill is approved by a geotechnical professional.
- Tributary area land uses include open areas adjacent to parking lots, driveways, and buildings, and roadway medians and shoulders.

OC-Specific Design Criteria and Considerations

☐ Must comply with local, state, and federal UIC regulations if applicable; a permit may be required.

- ☐ Placement of BMPs should observe geotechnical recommendations with respect to geological hazards (e.g. landslides, liquefaction zones, erosion, etc.) and set-backs (e.g., foundations, utilities, roadways, etc.)
- ☐ For facilities with tributary area less than 1 acre and less than 3 foot depth, minimum separation to mounded seasonally high groundwater of 5 feet shall be observed.
- ☐ For facilities with tributary area greater than 1 acre or deeper than 3 feet, minimum separation to mounded seasonally high groundwater of 10 feet shall be observed.
- ☐ Minimum pretreatment should be provided upstream of the infiltration trench, and water bypassing pretreatment should not be directed to the infiltration trench.
- ☐ Infiltration trenches should not be used for drainage areas with high sediment production potential unless preceded by full treatment control with a BMP effective for sediment removal.
- ☐ Ponded water should not persist within 1 foot of the surface of the facility for longer than 72 hours following the end of a storm event (observation well is needed to allow observation of drain time).
- ☐ Energy dissipators should be provided at inlet and outlet to prevent erosion.
- ☐ An overflow device must be provided if basin is on-line.
- ☐ A minimum freeboard of one foot should be provided above the overflow device (for an on-line basin) or the outlet (for an off-line basin).
- ☐ Longitudinal trench slope should not exceed 3%.
- ☐ Side slopes above trench fill should not be steeper than 3:1.

Simple Sizing Method for Infiltration Trenches

If the Simple Design Capture Volume Sizing Method is used to size an infiltration trench, the user calculates the DCV and then designs the geometry required to draw down the DCV in 48 hours. The sizing steps are as follows:

Step 1: Determine Infiltration Basin DCV

Calculate the DCV using the Simple Design Capture Volume Sizing Method described in **Appendix III.3.1**.

Step 2: Determine the 48-hour Effective Depth

The depth of water that can be drawn down in 48 hours can be calculated using the following equation:

$d_{48} = K_{DESIGN} \times SACF \times 48 \text{ hours}$

Where:

d_{48} = trench effective 48-hour depth, ft

K_{DESIGN} = basin design infiltration rate, in/hr (See **Appendix VII**)

SACF = Surface Area Correction Factor = ranges from 1.0 (sides insignificant or not accounted) to 2.0 (sides plus bottom are 2 times the surface area of the bottom at mid depth) to account for the ratio of infiltration through the sides of the trench to the bottom footprint of the trench; should be based on anticipated trench geometry and wetted surface area at mid-depth.

This is the maximum effective depth of the trench below the overflow device to achieve drawdown in 48 hours.

Step 3: Determine the Trench Ponding Depth and Trench Depth

The depth of water stored in the ponding depth (i.e. above the trench fill) and within the trench itself should be equal or less than d_{48}. Determine the ponding depth and the trench fill depth such that:

$$d_{48} \geq (n_T \times d_T + d_P)$$

Where:

d_{48} = trench effective 48-hour depth, ft (from Step 2)

n_T = porosity of trench fill; 0.35 may be assumed where other information is not available

d_T = depth of trench fill, ft

d_P = ponding depth, ft (should not exceed 1 ft)

Step 4: Calculate the Required Infiltrating Area

The required footprint area can be calculated using the following equation:

$$A = DCV/ ((n_T \times d_T) + d_P)$$

Where:

A = required trench footprint area, sq-ft

DCV = design capture volume, cu-ft (see Step 1)

n_T = porosity of trench fill; 0.35 may be assumed where other information is not available

d_T = depth of trench fill, ft

d_P = ponding depth, ft

Capture Efficiency Method for Infiltration Trenches

If BMP geometry has already been defined and deviates from the 48 hour drawdown time, the designer can use the Capture Efficiency Method for Volume-Based, Constant Drawdown BMPs (**Appendix III.3.2**) to determine the fraction of the DCV that must be provided to manage 80 percent of average annual runoff volume. This method accounts for drawdown time different than 48 hours.

Step 1: Determine the drawdown time associated with the selected trench geometry

$$DD = ((n_T \times d_T) + d_P) / (K_{DESIGN} \times SACF) \times 12$$

Where:

DD = time to completely drain infiltration basin ponding depth, hours

n_T = porosity of trench fill; 0.35 may be assumed where other information is not available

d_T = depth of trench fill, ft

d_P = ponding depth, ft

SACF = Surface Area Correction Factor = ranges from 1.0 (sides insignificant or not accounted) to 2.0 (sides plus bottom are 2 times the surface area of the bottom at mid depth) to account for the ratio of infiltration through the sides of the trench to the bottom footprint of the trench; should be based on anticipated trench geometry and wetted surface area at mid-depth.

K_{DESIGN} = basin design infiltration rate, in/hr (See **Appendix VII**)

Step 2: Determine the Required Adjusted DCV for this Drawdown Time

Use the Capture Efficiency Method for Volume-Based, Constant Drawdown BMPs (**Appendix III.3.2**) to calculate the required fraction of the DCV the basin must hold to achieve 80 percent capture of average annual stormwater runoff volume based on the trench drawdown time calculated above.

Step 3: Determine the Trench Infiltrating Area Needed

The required footprint area can be calculated using the following equation:

$A = DCV / ((n_T \times d_T) + d_P)$

Where:

A = required trench footprint area, sq-ft

DCV = design capture volume, cu-ft (see Step 1)

n_T = porosity of trench fill; 0.35 may be assumed where other information is not available

d_T = depth of trench fill, ft

d_P = ponding depth, ft

If the area required is greater than the selected trench area, adjust surface area or adjust ponding and/or trench depth and recalculate required area until the required area is achieved.

Configuration for Use in a Treatment Train

- Infiltration trenches may be preceeded in a treatment train by HSCs in the drainage area, which would reduce the required volume of the trench.
- Infiltration trenches must be preceeded by some form of pretreatment which may be biotreatment or a treatment control BMP; if an approved biotreatment BMP is used as pretreatment, the overflow from the infiltration trench may be considered “biotreated” for the purposes of meeting the LID requirments
- The overflow or bypass from an infiltration trench can be routed to a downstream biotreatment BMP and/or a treatment control BMP if additional control is required to achieve LID or treatment control requirements

Additional References for Design Guidance

- CASQA BMP Handbook for New and Redevelopment: **http://www.cabmphandbooks.com/Documents/Development/TC-10.pdf**
- SMC LID Manual (pp 141): **http://www.lowimpactdevelopment.org/guest75/pub/All_Projects/SoCal_LID_Manual/SoCalLID_Manual_FINAL_040910.pdf**
- Los Angeles County Stormwater BMP Design and Maintenance Manual, Chapter 6: **http://dpw.lacounty.gov/DES/design_manuals/StormwaterBMPDesignandrainageareaintenance.pdf**
- City of Portland Stormwater Management Manual (Soakage Trenches, page 2-82) **http://www.portlandonline.com/bes/index.cfm?c=47954&a=202883**
- San Diego County LID Handbook Appendix 4 (Factsheet 1): **http://www.sdcounty.ca.gov/dplu/docs/LID-Appendices.pdf**

UNDERGROUND CMP INFILTRATION BASINS

INF-7: Underground Infiltration

Underground infiltration is a vault or chamber with an open bottom that used to store runoff and percolate into the subsurface. A number of vendors offer proprietary infiltration products that allow for similar or enhanced rates of infiltration and subsurface storage while offering durable prefrabricated structures. There are many varieties of proprietary infiltration BMPs that can be used for roads and parking lots, parks and open spaces, single and multi-family residential, or mixed-use and commercial uses.

Also known as:

- *Infiltration vault*
- *Recharge vault*



Underground Infiltration

Source: http://www.contech-cpi.com

Feasibility Screening Considerations

- Infiltration bains shall pass infeasible screening criteria to be considered for use.
- Underground infiltration galleries pose a potential risk of groundwater contamination; pretreatment should be used.

Opportunity Criteria

- Soils are adequate for infiltration or can be amended to provide an adequate infiltration rate.
- Appropriate for sites with limited surface space.
- Can be placed beneath roads, parking lots, parks, and athletic fields.
- Potential for groundwater contamination can be mitigated through isolation of pollutant sources, pretreatment of inflow, and/or demonstration of adequate treatment capacity of underlying soils.
- Infiltration is into native soil, or depth of engineered fill is ≤ 5 feet from the bottom of the facility to native material and infiltration into fill is approved by a geotechnical professional.
- Tributary area land uses include mixed-use and commercial, sngle-family and multi-family, roads and parking lots, and parks and open spaces. High pollutant land uses should not be tributary to infiltration BMPs.

OC-Specific Design Criteria and Considerations

- ☐ Placement of BMPs should observe geotechnical recommendations with respect to geological hazards (e.g. landslides, liquefaction zones, erosion, etc.) and set-backs (e.g., foundations, utilities, roadways, etc.)
- ☐ Minimum separation to mounded seasonally high groundwater of 10 feet shall be observed.
- ☐ Minimum pretreatment should be provided upstream of the infiltration facility, and water bypassing pretreatment should not be directed to the facility.
- ☐ Underground infiltration should not be used for drainage areas with high sediment production potential unless preceded by full treatment control with a BMP effective for sediment removal.
- ☐ Design infiltration rate should be determined as described in **Appendix VII**.
- ☐ Inspection ports or similar design features shall be provided to verify continued system performance and identify need for major maintenance.

☐ For infiltration facilities beneath roads and parking areas, structural requirements should meet H-20 load requirements.

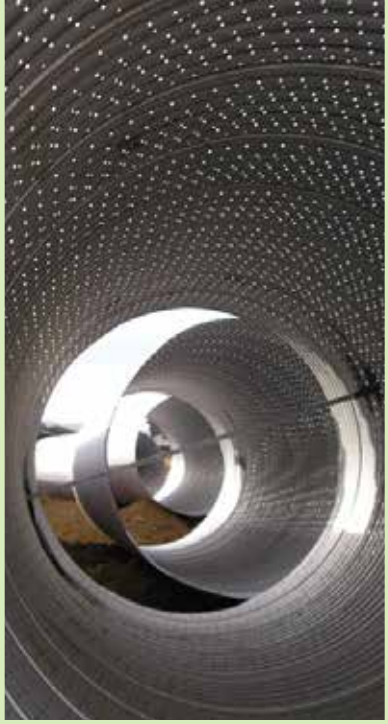
Computing Underground Infiltration Device Size

Underground infiltration devices vary by design and by proprietary designs. The sizing method selected for use must be based on the BMP type it most strongly resembles.

- For underground infiltration devices with open pore volume (e.g., vaults, crates, pipe sections, etc), sizing will be most similar to infiltration basins.
- For underground infiltration devices with pore space (e.g., aggregate reservoirs), sizing will be most similar to permeable pavement.

Additional References for Design Guidance

- Los Angeles Unified School District (LAUSD) Stormwater Technical Manual, Chapter 5: **http://www.laschools.org/employee/design/fs-studies-and-reports/download/white_paper_report_material/Storm_Water_Technical_Manual_2009-opt-red.pdf?version_id=76975850**



CONTECH®
ENGINEERED SOLUTIONS

Corrugated Metal Pipe Infiltration System

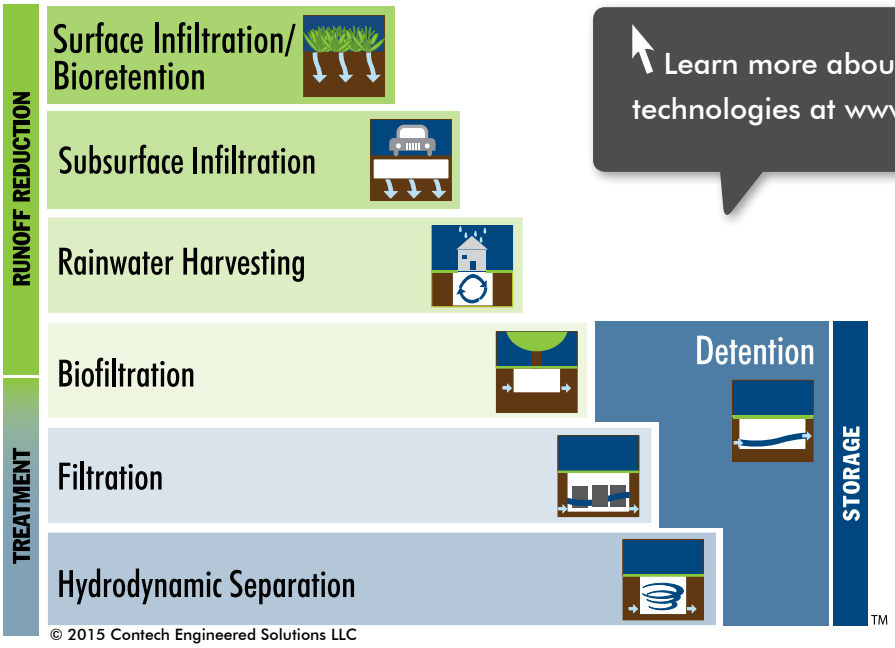
Solutions Guide



Stormwater Solutions from Contech

Selecting the Right Stormwater Solution Just Got Easier...

It's simple to choose the right stormwater solution to achieve your goals with the Contech Stormwater Solutions Staircase. First, select the runoff reduction practices that are most appropriate for your site, paying particular attention to pretreatment needs. If the entire design storm cannot be retained, select a treatment best management practice (BMP) for the balance. Finally, select a detention system to address any outstanding downstream erosion.



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Learn more about all of our stormwater technologies at www.ContechES.com/stormwater

DYODS

Design Your Own Detention or Infiltration System

The Contech Design Your Own Detention System (DYODS®) tool fully automates the layout process for stormwater detention and infiltration systems and produces CAD and PDF files that can be used for creating plans and specs, and for estimating total installed costs.



To use the *Design Your Own Detention or Infiltration System* tool, visit: www.ContechES.com/dyods

Subsurface Infiltration as a Stormwater Management Strategy

The only sure way to eliminate stormwater pollution is to eliminate stormwater runoff. In recognition of this fact, Green Infrastructure and Low Impact Development based stormwater management regulations prioritizing runoff reduction have proliferated throughout the United States.

Where site conditions allow, infiltration is typically the most cost effective and reliable runoff reduction approach. In urban environments where there are competing demands for land, subsurface infiltration can provide many of the benefits of landscape based systems but without requiring dedicated land area. Infiltration systems are commonly comprised of a pretreatment component designed to remove sediment, trash, and oil, followed by plastic, metal or concrete storage units surrounded by permeable stone creating a high voids storage gallery. Infiltration systems are typically designed to support vehicular loading and to withstand lateral pressures from surrounding soil that allows the overlying land to be used for virtually any non-building application.

Subsurface infiltration meets the objectives of LID by reducing runoff with the added benefit of saving land space in urban environments.



LID benefits include runoff volume reduction, peak flow control, ground water recharge, and water quality improvement.



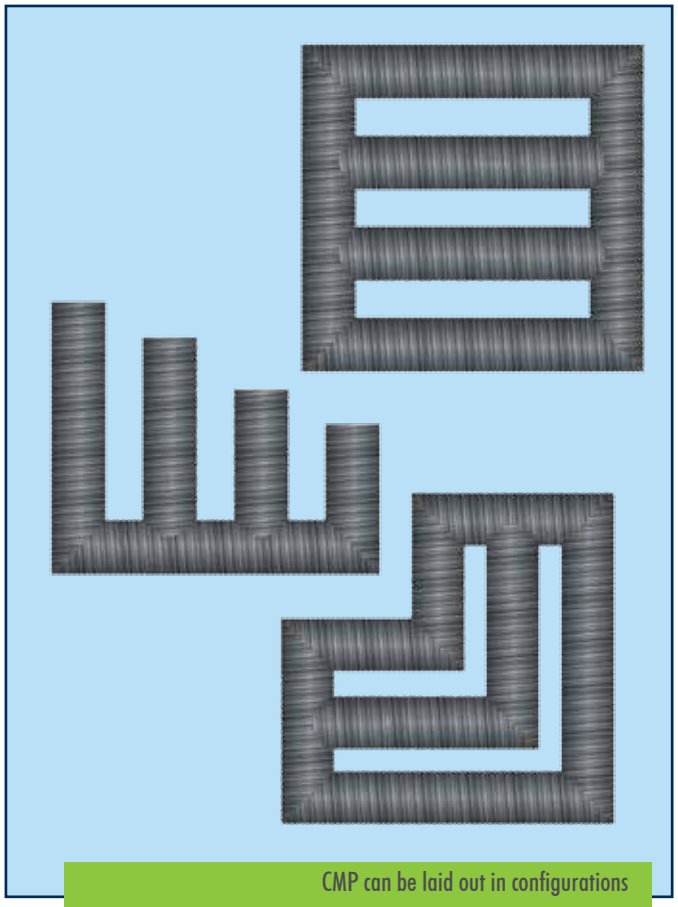
CMP infiltration is used at Pitzer College in Claremont, California.

CMP – the "Go To" Material for Subsurface Infiltration

The purpose of the storage vessel is to hold stormwater runoff underground while allowing it to infiltrate the surrounding soil. For the majority of applications, corrugated metal pipe (CMP) is the "go to" material for subsurface infiltration.

- 75+ year service life guidance for certain materials/coatings in recommended environments.* Please refer to the Corrugated Metal Pipe Detention Design Guide for additional information.
- Various pipe coatings and materials are available to accommodate site-specific needs: Aluminized Steel Type 2 (ALT2), Galvanized, CORLIX® Aluminum, and Polymer Coated.
- Wide range of gages, corrugations, and shapes, in diameters 12" – 144".
- Pipe can be fully or partially perforated for infiltration, retention, or groundwater recharge applications.
- Custom access risers and manifolds provide direct access for maintenance.
- Outlet control devices can be incorporated within the system, eliminating the need for a separate structure.
- Customizable - a variety of fittings allow CMP to match most layout configurations.
- May be designed for heavy loading and high maximum cover.
- Contributes to LEED points.
- Available locally; quick turnaround time.
- The most economical installed solution.

With its low cost, a wide variety of diameters, layout configurations, and materials, no other material can match CMP's flexibility and versatility.



CMP can be laid out in configurations not achievable with other materials.



A wide range of CMP diameters and coatings are available to meet site specific needs.

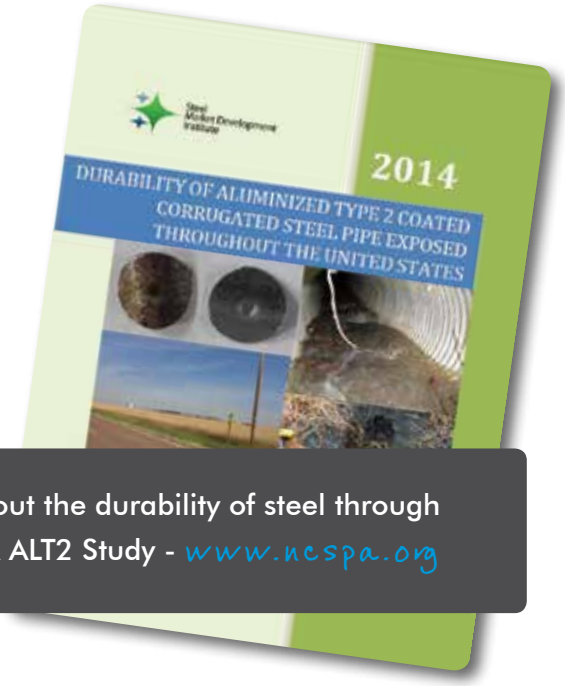
* Service life guidance provided by National Corrugated Steel Pipe Association (NCSPA) and/or AK Steel Corporation. See NCSPA.org website or consult your engineer of record for additional information on service life, recommended environments and field studies on various materials and coatings. Corrosive environments, such as seawater and road/de-icing salt infiltration, and other environments with pH and resistivity outside of the recommended range may cause premature corrosion and reduce actual service life. Because site conditions vary, Contech does not guaranty or warrant service life guidance for materials and coatings

Addressing the Question of Longevity

Some engineers are hesitant to use corrugated metal pipe (CMP) for infiltration because they have heard about CMP drainage culverts that have corroded due to abrasion. Factors affecting longevity differ between culvert and infiltration applications. Culverts experience high velocity flows carrying abrasive sediment, which can wear off galvanized coatings used in older CMP culverts. Infiltration systems are designed for storage rather than conveyance, so velocity and abrasive forces are minimized. In addition, improved CMP coatings, such as Aluminized Type 2 (ALT2), are more abrasion resistant and have demonstrated superior in-ground performance against abrasion in long-term durability studies. Field studies also have indicated that ALT2 coating may extend service life in wider pH and resistivity ranges than galvanized coatings. Confirming and maintaining recommended environmental conditions helps ensure system longevity projected by the long term studies. Finally, properly designed infiltration systems include pretreatment, flow control and a stone backfill envelope that can reduce exposure to abrasion.



CMP has a proven service life



Learn more about the durability of steel through the recent NCSPA ALT2 Study - www.ncspa.org

- National Corrugated Steel Pipe Association (NCSPA) service life guidance of 75+ years for certain materials/coatings in recommended environments.
- CMP infiltration systems can be designed to meet HS-20 or greater load requirements with proper depths of cover.
- With low flows, CMP infiltration systems have little susceptibility to abrasion inside the pipe that holds stormwater runoff.
- Various pipe coatings and materials are available to accommodate site-specific needs: Aluminized Steel Type 2 (ALT2), Galvanized, CORLIX® Aluminum, and Polymer Coated.
- CMP infiltration systems are to be surrounded by clean crushed rock to provide increased storage capacity and reduce contact with native soils. The entire system may be wrapped with fabric or liner on the sides and top to help further reduce contact with native soils.
- CMP infiltration systems may be used in wide range of recommended environments. AK Steel Corporation's field studies and technical guidance indicate 75 year service life guidance for 16 gage Alt2 for pH of 5-9 and resistivity greater than 1,500 ohm-cm and 100 year service life guidance for 16 gage Alt2 for pH of 6-8 and resistivity greater than 5,000 ohm-cm.
- Corrosive environments, such as seawater and road/de-icing salt infiltration, acidic minewater, and sanitary sewage, and other environments with pH and resistivity outside of the recommended range may cause premature corrosion and reduce actual service life.
- Infiltration systems are to be inspected and maintained in accordance with Contech's guidelines. See Corrugated Metal Pipe Detention Design Guide for additional information on CMP infiltration systems.

Learn more at www.ContechES.com/cmp-detention

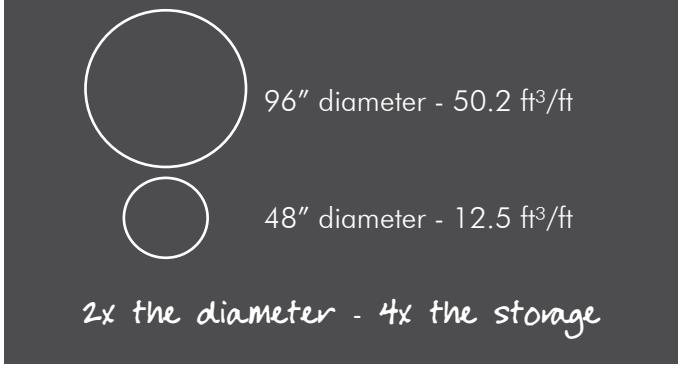
Maximizing Vertical Space: Every Inch Counts

One of the most overlooked advantages of CMP is its ability to maximize vertical storage space.

Increasing the depth of a CMP infiltration system allows for more water storage in the same footprint. For example, doubling the diameter of pipe yields four times as much storage volume in the pipe. This provides a significant cost savings per cubic foot of storage. In addition, more vertical storage space means a smaller footprint, less excavation, and lower project costs.

Contech's Corrugated Metal Pipe Detention systems maximize vertical storage space.





Sizing

Round Pipe – CMP → 6-in to 144-in

Diameter (inches)	Volume (ft³/ft)	Min. Cover Height	Diameter (inches)	Volume (ft³/ft)	Min. Cover Height
12	.78	12″	78	33.2	12″
15	1.22	12″	84	38.5	12″
18	1.76	12″	90	44.2	12″
21	2.40	12″	96	50.3	12″
24	3.14	12″	102	56.8	18″
30	4.9	12″	108	63.6	18″
36	7.1	12″	114	70.9	18″
42	9.6	12″	120	78.5	18″
48	12.6	12″	126	86.6	18″
54	15.9	12″	132	95.0	18″
60	19.6	12″	138	103.9	18″
66	23.8	12″	144	113.1	18″
72	28.3	12″			

The Need for Effective Pretreatment

Infiltration systems have multiple components, and one of the most important is pretreatment. The purpose of a pretreatment device is to prolong the life of the infiltration system by removing debris and sediment that can collect on the invert and within the stone backfill voids. Pretreatment will maintain the efficiency of an infiltration system as well as extend the life cycle, therefore preventing a premature replacement. Pretreatment also offers these additional benefits:

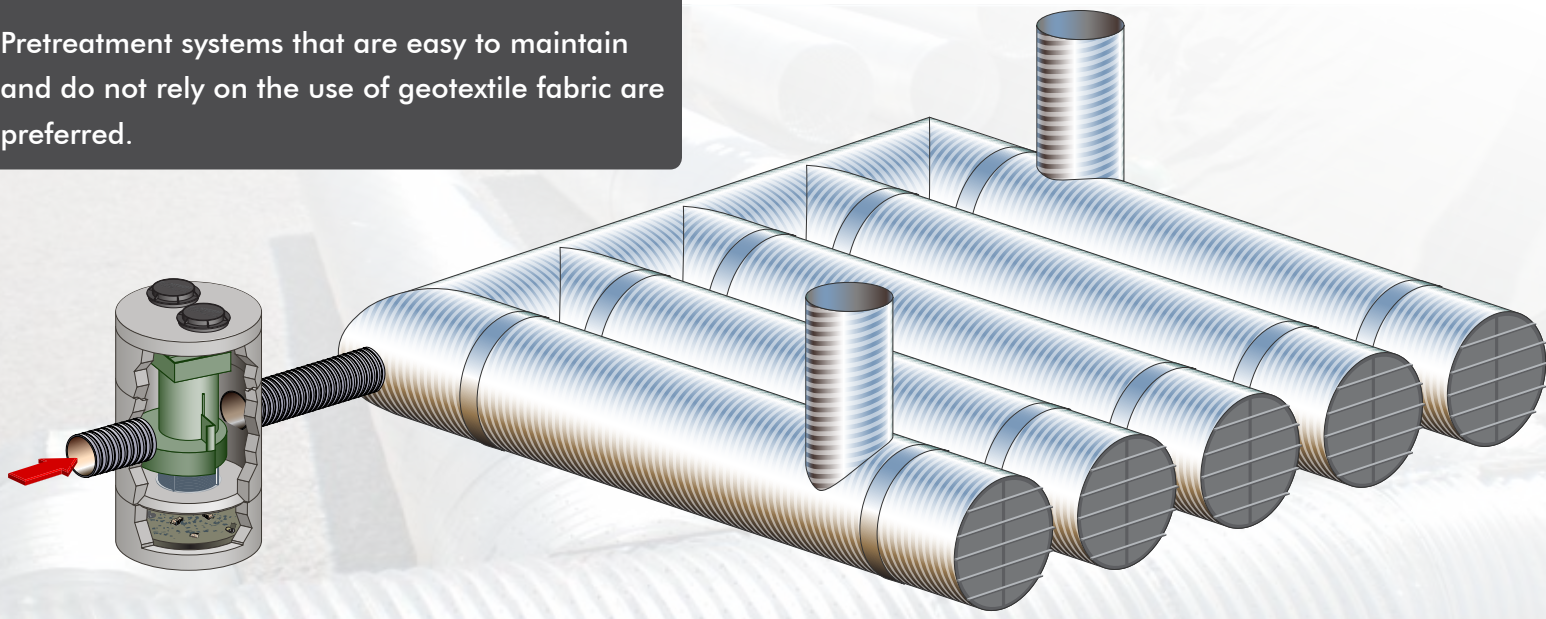
- Easier to clean and maintain compared to the infiltration system itself.
- Cost savings due to the extended service life of the system.
- Removing trash and debris protects downstream outlet control structures from clogging.

Pretreatment Design Considerations

When choosing a pretreatment system, it is important to consider the following:

- Downstream outlet control structures may require protection from a pretreatment device that screens trash and debris.
- Pretreatment system selection depends on pollutant targets. Trash, debris, and larger particles can be removed with hydrodynamic separators. Removing high percentages of fine particles and associated heavy metals and nutrients requires filtration.
- Reduced long term maintenance or replacement cost of the infiltration system can help justify pretreatment construction costs.
- Inlet and pipe layout will influence the number and type of pretreatment systems used. A combination of different systems may be appropriate for the various inlet locations and flows.

Pretreatment systems that are easy to maintain and do not rely on the use of geotextile fabric are preferred.



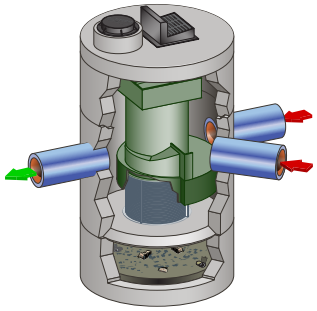
Learn more at www.ContechES.com/cmp-detention

7

Pretreatment Options

Contech offers a number of pretreatment options, all of which will extend the life of subsurface infiltration systems and improve water quality. The type of system chosen will depend on a number of factors including footprint, soil conditions, local regulations, and the desired level of pretreatment.

CDS provides direct access to cleaning, and the built-in high flow bypass weir eliminates the need for a separate bypass structure.



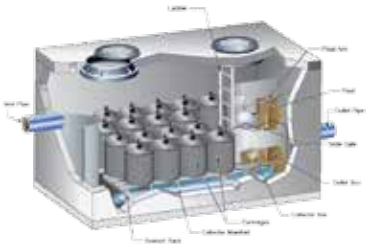
Hydrodynamic Separation

Hydrodynamic Separation (HDS) provides a basic level of pretreatment by capturing and retaining trash and debris, sediment, and oil from stormwater runoff.

CDS®

The CDS uses a combination of swirl concentration and indirect screening and is the only non-blocking screening technology available in an HDS system.







Filtration

Filtration provides a higher level of pretreatment and improved water quality by removing trash and debris, oil, fine solids, and dissolved pollutants such as metals, hydrocarbons, and nutrients.

Filterra® Bioretention System

Filterra is an engineered bioretention system that has been optimized for high volume/flow treatment and high pollutant removal.

The Stormwater Management StormFilter®

The StormFilter system is comprised of a structure that houses rechargeable, media-filled cartridges. The media can be customized to target site-specific pollutants.

Jellyfish® Filter

The Jellyfish filter uses membrane filtration in a compact footprint to remove a high level and a wide variety of stormwater pollutants such as fine particulates, oil, trash and debris, metals, and nutrients.

Alternative Materials for Subsurface Infiltration

There may be instances where alternative materials are needed for subsurface infiltration due to site specific needs.

Plastic Chambers

Plastic chambers are best suited to shallow depth applications; minimum cover is 18 inches, and maximum cover is 96 inches. Some benefits of chambers are:

- Chambers may be beneficial for sites with limited vertical storage.
- Lightweight and installed by hand.
- Heavy equipment is not required to set units into place.
- Centralized stocking locations for short lead times.

Concrete Structures/Vaults

Some concrete structures and vaults are best suited for high loading applications such as railroads or airports. Concrete units are also ideal in corrosive environments or areas with high salinity. Some benefits of concrete structures are:

- Wide range of spans and heights.
- Greater underground infiltration storage in a smaller footprint.
- Ample and easy maintenance access.
- Fast installation.



Project Profiles: CMP Infiltration Systems in Action

Edie and Lew Wasserman Building, UCLA

Westwood, California

- The new six-story, 100,000 square foot Edie and Lew Wasserman Building was built on a very dense site that needed to meet sustainability requirements.
- The design needed to maximize infiltration volume, match existing inverts, and work around existing utilities.
- The stormwater management systems included a CDS pretreatment system and a CMP infiltration system using 57′ of 72″ perforated CMP.
- Perforated CMP was selected to avoid utilities, minimize excavation, meet the City of LA LID requirements, contribute to the building's LEED certification, and to provide space for the buildings "outdoor room" and gardens.





Creative Office Space

El Segundo, California

- A stormwater infiltration solution was needed for a new group of office buildings.
- The owner wanted to maximize the use of the parking area in the urban setting.
- The site had a tight footprint and multiple utility constraints, requiring the design of five separate systems.
- A total of 860 LF of perforated CMP was installed providing of 25,265 CF of storage.
- Perforated CMP was selected for its design flexibility, cost effectiveness, and ease of installation.

City Center Regional Stormwater Facility

Mountlake Terrace, Washington

- The city of Mountlake Terrace, Washington needed a new stormwater retention facility to provide stormwater treatment and downstream flood control.
- There was limited footprint for 80,000 CF of runoff, and the system was required to be very deep, with about 15′ of cover.
- Engineers designed a system consisting of a CDS pretreatment system in front of 800 linear feet of 120″ diameter, perforated, aluminized type 2 CMP that allows the runoff to slowly infiltrate the surrounding soil.
- Perforated CMP was selected for its ability to accommodate the deep bury, the relatively small footprint, and cost effectiveness.



The Right Partner Can Make All the Difference

Regardless of your project's objectives and constraints, our team of stormwater design engineers, regulatory managers, and local stormwater consultants are here to provide you with expert advice and assistance. If your goal is to eliminate or detain runoff, you can rely on Contech for a wide range of subsurface infiltration, detention, and rainwater harvesting solutions. If treatment is needed, our landscape-based biofiltration or subsurface filtration designs can fit into virtually any site and can be tailored to address specific pollutants.

At every stage of your project, count on Contech to provide engineering services including:

- Regulatory guidance and permitting assistance
- Preliminary standard details and/or site specific final CAD drawings and specifications
- Low Impact Development design assistance
- Engineering calculations for hydraulics/hydrology, rainwater harvesting, and detention/retention
- Online "Design Your Own" tools
- Review of preliminary site design, feasibility screening, and layout assistance
- Value engineering – cost estimates and options analysis
- Pre-construction support, project scheduling, and contractor coordination
- Installation and construction support
- Maintenance support:
  - » Guidance manuals
  - » Demonstrations
  - » Qualified contractor identification

The result: an efficient design process, the right product, greater land space savings, and faster permitting. The entire Contech stormwater team welcomes the opportunity to work with you on your stormwater projects.

To get started, please visit www.conteches.com/localresources or call us at 800-338-1122.





Dig Deeper

Find all the information you need at www.ContechES.com, including field and laboratory test results, approvals, brochures, design guides, standard details, and specifications within the product section of our site.

Connect with Us

We're here to make your job easier – and that includes being able to get in touch with us when you need to. Go to www.ContechES.com/ConnectwithContech.

While you're there, be sure to check out our upcoming seminar schedule or request an in-house technical presentation.

Start a Project

If you are ready to begin a project, contact your local representative to get started. Or you can check out our design toolbox for all our online resources at www.ContechES.com/designtoolbox.

Links to Stormwater Tools:

To use the Land Value Calculator, visit:
www.ContechES.com/lvc
(Look under the Stormwater Management section to download the Land Value Calculator)

To use the Design Your Own Detention System tool, visit:
www.ContechES.com/dyods

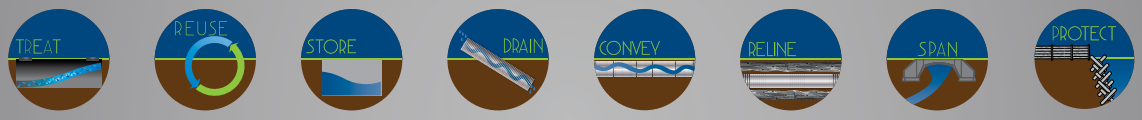
To use the Design Your Own Hydrodynamic Separator tool, visit: www.ContechES.com/dyohds

To use the Rainwater Harvesting Runoff Reduction Calculator tool, visit: www.ContechES.com/rwh-calculator

To use the LID Site Planner , visit:
www.ContechES.com/LIDsiteplanner

CONTECH® ENGINEERED SOLUTIONS

COMPLETE SITE SOLUTIONS



Stormwater Solutions
Helping to satisfy stormwater management requirements on land development projects
- Stormwater Treatment
- Detention/Infiltration
- Rainwater Harvesting
- Biofiltration/Bioretention

Pipe Solutions
Meeting project needs for durability, hydraulics, corrosion resistance, and stiffness
- Corrugated Metal Pipe (CMP)
- Steel Reinforced Polyethylene (SRPE)
- High Density Polyethylene (HDPE)
- Polyvinyl Chloride (PVC)

Structures Solutions
Providing innovative options and support for crossings, culverts, and bridges
- Plate, Precast & Truss bridges
- Hard Armor
- Retaining Walls
- Tunnel Liner Plate

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CMP Infiltration Bro (5M as of 1/15) PDF 1/17

Contech® CMP Detention Inspection and Maintenance Guide

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, quarterly 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.

Systems are to be rinsed, including above the spring line, annually soon after the spring thaw, and after any additional use of salting agents, as part of the maintenance program for all systems where salting agents may accumulate inside the pipe.

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®
ENGINEERED SOLUTIONS

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CATCH BASIN FILTER INSERTS

FloGard +Plus® Catch Basin Insert Filter

Inlet Filtration

Removes pollutants from runoff at the source

FloGard +Plus is a catch basin insert filter designed to remove sediment, gross solids, trash, and petroleum hydrocarbons from stormwater runoff. FloGard +Plus is ideally suited for removal of primary pollutants from paved surfaces in commercial and residential areas. Rated filter flow capacities are designed to exceed the required "first flush" treatment flow rate, and the unique dual-bypass design typically exceeds catch basin inlet capacity.

Economical Treatment
Quick, easy, and cost-effective to install, inspect, and maintain.

Efficient Performance
Removes pollutants at the inlet where they are easiest to catch.

Versatile Applications
Appropriate and easy to use on new construction or retrofit projects.

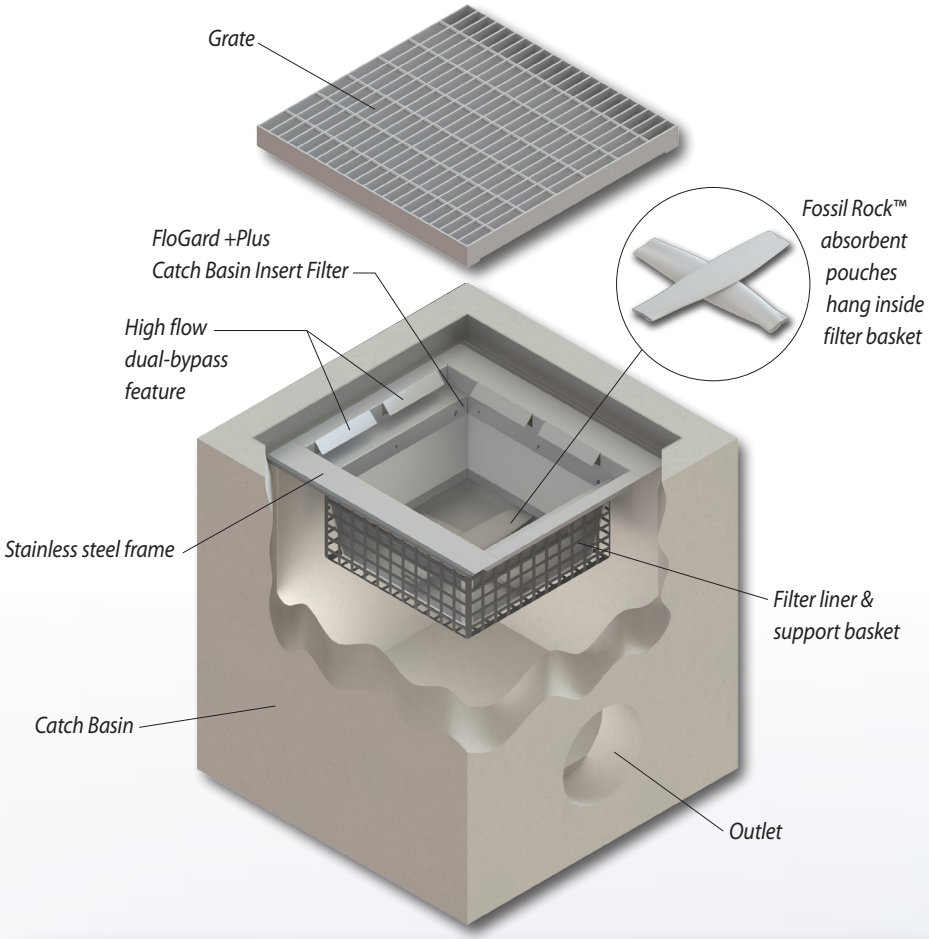
Flexible Design
Available in a wide variety of sizes and configurations, including custom options.

Durable Construction
Built to last and withstand the loads from captured pollutants.

Environmentally Friendly
No standing water minimizes vector, bacteria, and odor problems.

Proven Performance
Field and laboratory tested with up to 86%[1] removal of TSS and 80%[2] removal of oils and grease.

1. *University of Auckland laboratory testing of local street sweep material.*
2. *UCLA laboratory study.*



How It Works:

Flows entering the unit pass through the filter liner basket for removal of sediment, trash, and debris. Optional Fossil Rock™ sorbent pouches installed in the basket effect hydrocarbon capture. As the storm flow exceeds the treatment flow rate, treatment will continue and excess flows will pass through the dual-bypass openings near the top of the unit.

FloGard +Plus Catch Basin Insert Filter

Catch basin insert designed to capture sediment, gross solids, trash, and petroleum hydrocarbons from low (first flush) flows, even during the most extreme weather conditions.

Example Types, Sizes, and Capacities

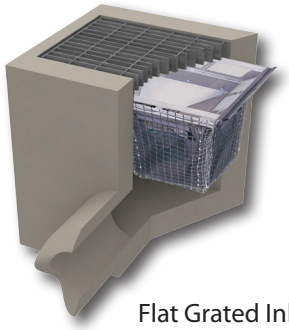
Additional sizes, including regional and custom options are available.

FloGard Combination Inlet SPECIFIER CHART								
MODEL NO. STANDARD DEPTH	STANDARD & SHALLOW DEPTH (Data in these columes is the same for both STANDARD & SHALLOW versions)			STANDARD DEPTH -20 Inches-		MODEL NO. SHALLOW DEPTH	SHALLOW DEPTH -12 Inches-	
	INLET ID Inside Dimension (inch x inch)	GRATE OD Outside Dimension (inch x inch)	TOTAL BYPASS CAPACITY (cu. ft. / sec.)	SOLIDS STORAGE CAPACITY (cu. ft.)	FILTERED FLOW (cu. ft. / sec.)		SOLIDS STORAGE CAPACITY (cu. ft.)	FILTERED FLOW (cu. ft. / sec.)
FGP-1633FGO	16 X 33	18 X 36	7.0	2.5	1.7	FGP-1633FGO8	1.4	1.1
FGP-1836FGO	18 X 36	18 X 40	6.9	2.3	1.6	FGP-1836FGO8	1.3	.9
FGP-2234FGO	22 X 34	24 X 36	8.1	3.6	2.1	FGP-2234FGO8	2.1	1.4
FGP-2436FGO	24 X 36	24 X 40	8.0	3.4	2.0	FGP-2436FGO8	1.95	1.15



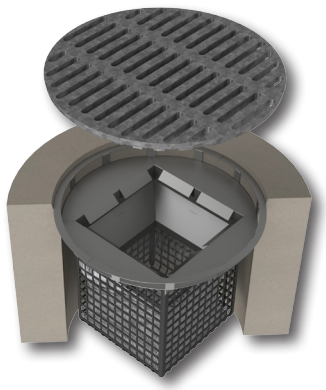
Combination Inlet

FloGard Flat Grated Inlet SPECIFIER CHART								
MODEL NO. STANDARD DEPTH	STANDARD & SHALLOW DEPTH (Data In these columes Is the same for both STANDARD & SHALLOW versions)			STANDARD DEPTH -20 Inches-		MODEL NO. SHALLOW DEPTH	SHALLOW DEPTH -12 Inches-	
	INLET ID Inside Dimension (inch x inch)	GRATE OD Outside Dimension (inch x inch)	TOTAL BYPASS CAPACITY (cu. ft. / sec.)	SOLIDS STORAGE CAPACITY (cu. ft.)	FILTERED FLOW (cu. ft. / sec.)		SOLIDS STORAGE CAPACITY (cu. ft.)	FILTERED FLOW (cu. ft. / sec.)
FGP-12F	12 X 12	12 X 14	2.8	0.3	0.4	FGP-12F8	.15	.25
FGP-16F	16 X 16	16 X 19	4.7	0.8	0.7	FGP-16F8	.45	.4
FGP-18F	18 X 18	18 X 20	4.7	0.8	0.7	FGP-18F8	.45	.4
FGP-1836F	18 X 36	18 X 40	6.9	2.3	1.6	FGP-1836F8	1.3	.9
FGP-21F	22 X 22	22 X 24	6.1	2.2	1.5	FGP-21F8	1.25	.85
FGP-24F	24 X 24	24 X 27	6.1	2.2	1.5	FGP-24F8	1.25	.85
FGP-2436F	24 X 36	24 X 40	8.0	3.4	2.0	FGP-2436F8	1.95	1.15
FGP-2448F	24 X 48	24 X 48	9.3	4.4	2.4	FGP-2448F8	2.5	1.35
FGP-32F-TN	28 X 28	32 X 32	6.3	2.2	1.5	FGP-32F8-TN	1.25	.85
FGP-30F	30 X 30	30 X 34	8.1	3.6	2.0	FGP-30F8	2.05	1.15
FGP-36F	36 X 36	36 X 40	9.1	4.6	2.4	FGP-36F8	2.65	1.35
FGP-3648F	36 X 48	40 X 48	11.5	6.8	3.2	FGP-3648F8	3.9	1.85
FGP-48F	48 X 48	48 X 54	13.2	9.5	3.9	FGP-48F8	5.45	2.25
FGP-1633F	16 X 34	18 X 36	6.9	2.3	1.6	FGP-1633F8	1.3	.9
FGP-2234F	22 X 34	24 X 36	8.0	3.4	2.0	FGP-2234F8	1.95	1.15



Flat Grated Inlet

FloGard Circular Grated Inlet SPECIFIER CHART					
MODEL NUMBER	INLET ID (Ø INCHES)	GRATE OD (Ø INCHES)	SOLIDS STORAGE CAPACITY (CU FT)	FILTERED FLOW (CFS)	TOTAL BYPASS CAPACITY (CFS)
FGP-RF15F	15	18	0.3	0.4	2.8
FGP-RF18F	18	20	0.8	0.7	4.7
FGP-RF20F	20	23	0.8	0.7	4.7
FGP-RF21F	21	23.5	0.8	0.7	4.7
FGP-RF22F	22	24	0.8	0.7	4.7
FGP-RF24F	24	26	0.8	0.7	4.7
FGP-RF30F	30	32	2.2	1.5	6.1
FGP-RF36F	36	39	3.6	2.0	8.1



Circular Frame Catch Basin

Visit our website: oldcastlestormwater.com or call (800) 579-8819 for additional sizes and options.

12/22/2015_V3
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BMP EDUCATIONAL MATERIAL

SAN BERNARDINO COUNTY
STORMWATER POLLUTION PREVENTION

Commercial landscape maintenance:

Yard waste, sediments and toxic lawn and garden chemicals used in commercial landscape maintenance often make their way into the San Bernardino County storm drain system and do not get treated before reaching the Santa Ana River. This pollutes our drinking water and contaminates local waterways, making them unsafe for people and wildlife. Follow these best management practices to prevent pollution, protect public health and avoid fines or legal action.

- **Recycle Yard Waste:** Recycle leaves, grass clippings and other yard waste. Do not blow, sweep, rake or hose yard waste into the street. Let your customers know about grass cycling --the natural recycling of grass by leaving clippings on the lawn when mowing instead of using a grass catcher. Grass clippings will quickly decompose, returning valuable nutrients to the soil. You can get more information at www.ciwmb.ca.gov/Organics.
- **Use Fertilizers, Herbicides & Pesticides Safely:** Fertilizers, herbicides and pesticides are often carried into the storm drain system by sprinkler runoff. Use natural, non-toxic alternatives to traditional garden chemicals. If you must use chemical fertilizers, herbicides, or pesticides spot apply rather than blanketing entire areas, avoid applying near curbs and driveways and never apply before a rain.
- **Recycle Hazardous Waste:** Pesticides, fertilizers, herbicides and motor oil contaminate landfills and should be disposed of through a Hazardous Waste Facility. For information on proper disposal, call (909) 386-8401.
- **Use Water Wisely:** Conserve water and prevent runoff by controlling the amount of water and direction of sprinklers. Sprinklers should be on long enough to allow water to soak into the ground but not so long as to cause runoff. Periodically inspect, fix leaks and realign sprinkler heads.



- **Planting:** Plant native vegetation to reduce the need of water, fertilizers, herbicides and pesticides.
- **Prevent Erosion:** Erosion washes sediments, debris and toxic runoff into the storm drain system, polluting waterways. Prevent erosion and sediment runoff by using ground cover, berms and vegetation down-slope to capture runoff. Avoid excavation or grading during wet weather.



- **Store Materials Safely:** Keep landscaping materials and debris away from the street, gutter and storm drains. On-site stockpiles of materials should be covered with plastic sheeting to protect from rain, wind and runoff.

For more information about how you can prevent stormwater pollution:

www.sbcountystormwater.org

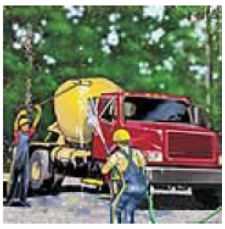
SAN BERNARDINO COUNTY
STORMWATER POLLUTION PREVENTION

Construction & development:

Soil, cement wash, asphalt, oil and other hazardous debris from construction sites often make their way into the San Bernardino County storm drain system, and flow untreated into local waterways. Follow these best management practices to prevent pollution, protect public health and avoid fines or legal action.



- **Store Materials Safely:** Keep construction materials and debris away from the street, gutter and storm drains. Cover exposed stockpiles of soil, sand or gravel and excavated material with plastic sheeting, protected from rain, wind and runoff.
- **Preventing Erosion:** Avoid excavation or grading during wet weather. Plant temporary vegetation or add hydro mulch on slopes where construction is not immediately planned, and permanent vegetation once excavation and grading are complete. Construct diversion dikes to channel runoff to a detention basin and around the construction site. Use gravel approaches where truck traffic is frequent to reduce soil compaction and limit the tracking of sediment into the streets. For more information on erosion control, call (909) 799-7407.



- **Cleaning & Preventing Spills:** Use a drip pan and funnel when draining or pouring fluids. Sweep up dry spills, instead of hosing. Be ready for spills by preparing and using spill containment and cleanup kits that include safety equipment and dry cleanup materials such as kitty litter or sawdust. To report serious spills, call 911.
- **Maintaining Vehicles & Equipment:** Maintain and refuel vehicles and equipment at a single location on-site, away from the street, gutter and storm drains. Perform major equipment repairs and washings off-site. Inspect vehicles and equipment frequently for leaks, and prevent leaks from stored vehicles by draining gas, hydraulic oil, transmission, and brake and radiator fluids.
- **Ordering Materials & Recycling Waste:** Reduce waste by ordering only the amounts of materials needed for the job. Use recycled or recyclable materials whenever possible. You can recycle broken asphalt, concrete, wood, and cleared vegetation. Dispose of hazardous materials through a hazardous waste hauler or other means in accordance with the construction permit. Non-recyclable materials should be taken to a landfill or disposed of as hazardous waste. For recycling and disposal information, call (909) 386-8401.
- **Concrete and mortar application:** Never dispose of cement washout into driveways, streets, gutters or drainage ditches. Wash concrete mixers and equipment only in specified washout areas, where the water flows into lined containment ponds. Cement wash water can be recycled by pumping it back into cement mixers for reuse.

For more information about how you can prevent stormwater pollution:

www.sbcountystormwater.org

STORMWATER Pollution Prevention

CONSTRUCTION

Cement wash, sediment, vehicle fluids, dust and hazardous debris from construction sites often make their way into the San Bernardino County storm drain system and do not get treated before reaching the Santa Ana River. This pollutes our drinking water and contaminates waterways, making them unsafe for people and wildlife. Follow these best management practices to prevent pollution and protect public health.



Store Materials Safely
Keep construction materials and debris away from the street, gutter and storm drains. Cover exposed stockpiles of soil, sand or gravel and excavated material with plastic sheeting, protected from rain, wind and runoff.



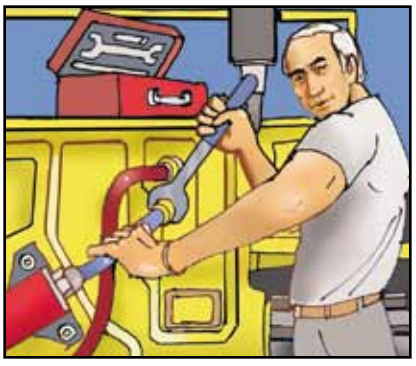
Ordering Materials & Recycling Waste
Reduce waste by ordering only the amounts of materials needed for the job. Use recycled or recyclable materials whenever possible. You can recycle broken asphalt, concrete, wood, and cleared vegetation. Non-recyclable materials should be taken to a landfill or disposed of as hazardous waste. For recycling and disposal information, call (909) 386-8401.



Cleaning & Preventing Spills
Use a drip pan and funnel when draining or pouring fluids. Sweep up dry spills, instead of hosing. Be ready for spills by preparing and using spill containment and cleanup kits that include safety equipment and dry cleanup materials such as kitty litter or sawdust. To report serious spills, call 911.



Preventing Erosion
Avoid excavation or grading during wet weather. Plant temporary vegetation or add hydromulch on slopes where construction is not immediately planned, and permanent vegetation once excavation and grading are complete. Construct diversion dikes to channel runoff to a detention basin and around the construction site. Channels can be lined with grass or roughened pavement to reduce runoff velocity.



Maintaining Vehicles & Equipment
Maintain and refuel vehicles and equipment at a single location on-site, away from the street, gutter and storm drains. Perform major equipment repairs and washings off-site. Inspect vehicles and equipment frequently for leaks, and prevent leaks from stored vehicles by draining gas, hydraulic oil, transmission, brake and radiator fluids.



To report illegal dumping call
(877) WASTE18
sbcountystormwater.org

San Bernardino County STORMWATER PROGRAM

Prevención de Contaminación del Desagüe

CONSTRUCCIÓN

Cemento, sedimentos, liquidos de auto, polvos y residuos peligrosos acaban por llegar a los drenajes del Condado de San Bernardino y terminando en el Rio de Santa Ana. Esto contamina el agua que tomamos, haciendola peligorsa para la gente y la vida salvaje. Sigue estas practicas para prevenir la contaminación y protejer la salud publica.



Almacenando Materiales Cuidadosamente

Manten materiales de construcción y residuos lejos de las calles, coladeras y desagües. Manten tapados los bultos de arena, grava y herramientas para excavar cuviertos con algun plastico para protejerlos de la lluvia, el aire y el desagüe.



Ordenando Materiales & Reciclando Desechos

Reduce la cantidad al ordenar el material, solo ordena lo necesario. Usa materiales que se puedan reciclar cuando sea posible. Se puede reciclar el aspfalto, concreto, madera y la vegetacion. Materiales no reciclados se deven llevar a lugares de desechos peligrosos. Para mas información llama al (909) 386-8401.



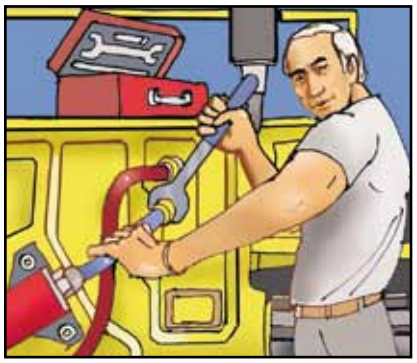
Limpiando & Previniendo Derrames

Usa siempre un enbudo al vaciar liquidos. Barre los derrames en ves de lavarlos con la manguera. Mantente siempre preparado para cualquier derrame, usa siempre las herramientas de seguridad al igual que materiales como, tierra para desechos de gato o aserrin. Para reportar derrames llama al 911.



Previniendo Erosiones

Evita las excavaciones durante lluvia. Planta vegetacion temporal en colinas donde aun no hay planes de construccion y planta vegetacion permanente al terminar las excavaciones. Construye algunos canales para el desagüe. Estos pueden ser creados con pasto y cemento para reducir la velocidad del desagüe.



Mantenimiento de Vehiculos & Herramientas

Has el mantenimiento y carga de vehiculos en el mismo lugar, lejos de la calle, las alcantarillas y los drenajes. Inspecciona los vehiculos y el equipo de cualquier goteadura y preveen goteaduras de autos que no se usan vasiandoles la gasolina, aceite de transmision, frenos y liquidos del radiador.



Para reportar actividades ilegales llamar al:

(877) WASTE18

sbcountystormwater.org

San Bernardino County STORMWATER PROGRAM

STORMWATER Pollution Prevention

ROADWORK AND PAVING

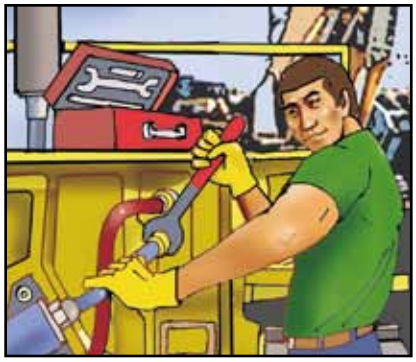
Asphalt, saw-cut slurry and excavated materials from road paving, surfacing and pavement removal often make their way into the San Bernardino County storm drain system and do not get treated before reaching the Santa Ana River. This pollutes our drinking water and contaminates waterways, making them unsafe for people and wildlife. Follow these best management practices to prevent pollution and protect public health.



Preventing Erosion
Schedule excavation and grading work during dry weather. Develop and implement erosion and sediment control plans for excavated embankments. Cover exposed stockpiles of soil, sand or gravel and excavated material with plastic sheeting, protected from rain, wind and runoff.



During Construction
Cover catch basins and maintenance holes when applying seal coat, slurry seal or fog seal. Use check dams, ditches or berms around excavations, and avoid over applying water for dust control. Never wash excess materials from exposed aggregate or concrete into the street, gutter or a storm drain.



Maintaining Vehicles & Equipment
Maintain and refuel vehicles and equipment at a single location on-site, away from the street, gutter and storm drains. Perform major equipment repairs and washings off-site. Inspect vehicles and equipment frequently for leaks, and prevent leaks from stored vehicles by draining gas, hydraulic oil, transmission, brake and radiator fluids.

Asphalt & Concrete Removal
Barricade storm drain openings during saw-cutting, and recycle broken up pavement at a crushing company. For recycling information, call (909) 386-8401.



Cleaning & Preventing Spills
Be ready for spills by preparing and using spill containment and cleanup kits that include safety equipment and dry cleanup materials such as kitty litter or sawdust. Sweep up dry spills, instead of hosing. Prevent spills from paver machines by using drip pans, or by placing absorbent materials like cloths or rags under the machines when not in use. To report serious spills, call 911.



To report illegal dumping call

(877) WASTE18

sbcountystormwater.org

San Bernardino County STORMWATER PROGRAM

Prevención de Contaminación del Desagüe

TRABAJO DE CARRETERAS & PAVIMENTO

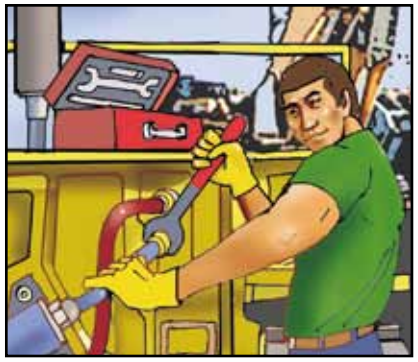
Asfalto, mezcla y materiales de excavaciones del pavimento acaban por llegar a los drenajes del Condado de San Bernardino y terminando en el Rio de Santa Ana. Esto contamina el agua que tomamos, haciendola peligorsa para la gente y la vida salvaje. Sigue estas practicas para prevenir la contaminación y protejer la salud publica.



Previniendo Erosiones
Planea las excavaciones trabajo de jardineria durante el clima seco. Desarrolla e implementa planes de embancamientos de control de sedimento y excavaciones. Cubre montones de tierra, grava y otros materiales con un plastico para protejerlos de la llvia, aire y desagüe.



Durante Construcción
Cubre los lavados y da mantenimiento a los hoyos al aplicar selladura o mezcla. Revisa las areas de excavaciones, y evita pasarte de agua para preveenir polvadura. Nunca laves los materiales llenos de concreto en la calle, drenajes o en el desagüe.



Mantenimiento de Vehiculos & Herramientas
Has el mantenimiento y carga de vehiculos en el mismo lugar, lejos de la calle, las alcantarillas y los drenajes. Inspecciona los vehiculos y el equipo de cualquier goteadura y evita goteaduras de autos que no se usan vasiandoles la gasolina, aceite de transmision, frenos y liquidos del radiador.

Removiendo Asfalto & Concreto
Bloquea alrededor de los drenajes cuando estes usando las maquinas de sierra, tambien recicla todo el pavimento roto en la compañia demolidora. Para más información llama al (909) 386-8401.



Limpiando & Previniendo Derrames
Mantente siempre preparado para cualquier derrame, usa siempre las herramientas de seguridad al igual que materiales como, tierra para desechos de gato o aserrin Barre los derrames en ves de lavarlos con la manguera. Previene los derrames de las maquinas usando enbudos o colocanto garras para absorver cualquier liquido. Para reportar derrames llama al 911.



Para reportar actividades ilegales llamar al:

(877) WASTE18

sbcountystormwater.org

San Bernardino County STORMWATER PROGRAM

San Bernardino County Stormwater Program
825 East Third Street · Room 127
San Bernardino, CA 94215-0835

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STORMWATER Pollution Prevention

Stormwater Management Practices for Commercial Landscape Maintenance

Yard waste, sediments, and toxic lawn/garden chemicals used in commercial landscape maintenance often make their way into the San Bernardino County storm drain system and do not get treated before reaching the Santa Ana River. This pollutes our drinking water and contaminates local waterways, making them unsafe for people and wildlife. Following these best management practices will prevent pollution, comply with regulations and protect public health.

Recycle Yard Waste

Recycle leaves, grass clippings and other yard waste. Do not blow, sweep, rake or hose yard waste into the street. Try grasscycling - the natural recycling of grass by leaving clippings on the lawn when mowing. Grass clippings will quickly decompose, returning valuable nutrients to the soil. Further information can be obtained at www.ciwmb.ca.gov/Organics.

Use Fertilizers, Herbicides and Pesticides Safely

Fertilizers, herbicides and pesticides are often carried into the storm drain system by sprinkler runoff. Use of natural, non-toxic alternatives to the traditional fertilizers, herbicides and pesticides is highly recommended. If you must use chemical fertilizers, herbicides, or pesticides:



- Spot apply pesticides and herbicides, rather than blanketing entire areas.
- Avoid applying near curbs and driveways, and never apply before a rain.
- Apply fertilizers as needed, when plants can best use it, and when the potential for it being carried away by runoff is low.

Recycle Hazardous Waste

Pesticides, fertilizers, herbicides and motor oil contaminate landfills and should be disposed of through a Hazardous Waste Facility, which accepts these types of materials. For information on proper disposal call, (909) 386-8401.

Use Water Wisely

Conserve water and prevent runoff by controlling the amount of water and direction of sprinklers. Sprinklers should be on long enough to allow water to soak into the ground but not so long as to cause runoff. Periodically inspect, fix leaks and realign sprinkler heads. Plant native vegetation to reduce the need of water, fertilizers, herbicides, and pesticides.

Prevent Erosion

Erosion washes sediments, debris and toxic runoff into the storm drain system, polluting waterways.

- Prevent erosion and sediment runoff by using ground cover, berms and vegetation down-slope to capture runoff.
- Avoid excavation or grading during wet weather.

Store Materials Safely

Keep landscaping materials and debris away from the street, gutter and storm drains. On-site stockpiles of materials must be covered with plastic sheeting to protect from rain, wind and runoff.

San Bernardino County STORMWATER PROGRAM

To report illegal dumping call

(877) WASTE18

or visit our website:

sbcountystormwater.org

Stormwater Pollution Prevention

Best Management Practices for Homeowner's Associations, Property Managers and Property Owners

Your Guide To Maintaining Water Friendly Standards In Your Community

sbcountystormwater.org

Big Bear · Chino · Chino Hills · Colton · Fontana · Grand Terrace · Highland · Loma Linda · Montclair · Ontario · Rancho Cucamonga
Redlands · Rialto · San Bernardino · San Bernardino County · San Bernardino County Flood Control District · Upland · Yucaipa

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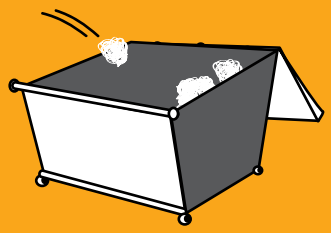
COMMERCIAL TRASH ENCLOSURES

FOLLOW THESE **REQUIREMENTS** TO **KEEP OUR WATERWAYS CLEAN**

Trash enclosures, such as those found in commercial and apartment complexes, typically contain materials that are intended to find their way to a landfill or a recycling facility. **These materials are NOT meant to go into our local lakes and rivers.**

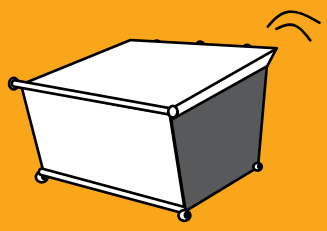
PROTECT WATER QUALITY BY FOLLOWING THESE SIMPLE STEPS

PUT TRASH INSIDE



Place trash inside the bin (preferably in sealed bags)

CLOSE THE LID



Prevent rain from entering the bin in order to avoid leakage of polluted water runoff

KEEP TOXICS OUT



- Paint
- Grease, fats and used oils
- Batteries, electronics and fluorescent lights

SOME ADDITIONAL GUIDELINES, INCLUDE

✓ SWEEP FREQUENTLY
Sweep trash enclosure areas frequently, instead of hosing them down, to prevent polluted water from flowing into the streets and storm drains.

✓ FIX LEAKS
Address trash bin leaks immediately by using dry clean up methods and report to your waste hauler to receive a replacement.

✓ CONSTRUCT ROOF
Construct a solid cover roof over the existing trash enclosure structure to prevent rainwater from coming into contact with trash and garbage. Check with your local City/County for Building Codes.

In San Bernardino County, stormwater pollution is caused by food waste, landscape waste, chemicals and other debris that are washed into storm drains and end up in our waterways - untreated! You can be part of the solution by maintaining a water-friendly trash enclosure.

THANK YOU FOR HELPING TO KEEP SAN BERNARDINO COUNTY CLEAN AND HEALTHY!

San Bernardino County STORMWATER PROGRAM

In the event of a spill or discharge to a storm drain or waterway, contact San Bernadino County Stormwater immediately: (877) WASTE18 | sbcountystormwater.org/report

sbcountystormwater.org

Big Bear • Chino • Chino Hills • Colton • Fontana • Grand Terrace • Highland • Loma Linda • Montclair • Ontario • Rancho Cucamongo
Redlands • Rialto • San Bernadino • San Bernadino County • San Bernadino County Flood Control District • Upland • Yucaipa

CESQG PROGRAM

Conditionally Exempt Small Quantity Generator

WHAT IS A CESQG?

Businesses that generate 27 gallons or 220 lbs. of hazardous waste, or 2.2 lbs. of extremely hazardous waste per month are called "Conditionally Exempt Small Quantity Generators," or CESQGs. San Bernardino County Household Hazardous Program provides waste management services to CESQG businesses. The most common CESQGs in San Bernardino County are painters, print shops, auto shops, builders, agricultural operators and property managers, but there are many others. When you call, be ready to describe the types and amounts of waste your business generates in a typical month. If you generate hazardous waste on a regular basis, you must:

- Register with San Bernardino County Fire Department (909) 386-8401 as a hazardous waste generator.
- To obtain an EPA ID# and application form from the State visit www.dtsc.ca.gov.
- Manage hazardous waste in accordance with all applicable local, state and federal laws and regulations.

HOW DO I GET SERVICE?

To arrange an appointment for the CESQG Program, call 1-800-OILY CAT or 909-382-5401. Be ready to describe the type and amount of hazardous waste your business is ready to dispose of, and the types and size(s) of containers that the waste is in.

Waste Type and Cost

There is a small handling fee involved in the collection of hazardous waste from your business. Disposal costs depend on the type of waste.

Aerosols	$1.29/lb.
Automobile motor oil	$.73/gal.
Anti-freeze	$1.57/gal.
Contaminated oil	$4.48/gal.
Car batteries	$.62/ea.
Corrosive liquids, solids	$2.80/lb.
Flammable solids, liquids	$1.57/lb.
Latex Paint	$.73/lb.
Mercury	$10.08/lb.
NiCad/Alkaline Batteries	$2.13/lb.
Oil Base Paints	$1.00/lb.
Oil Filters	$.56/ea.
Oxidizers	$9.63/lb.
PCB Ballasts	$5.94/lb.
Pesticides (most)	$2.91/lb.
Photofixer, developer	$4.31/gal.
Television & Monitors	$11.20/ea.
Additional Handling	$138.00/hr.

Rates subject to change without notice

WE CANNOT ACCEPT

- Radioactives
- Water reactives
- Explosives
- Compressed gas cylinders
- Medical or biohazardous waste
- Asbestos
- Remediation wastes

HAZARDOUS WASTE

WHY IS THE FIRE DEPARTMENT COLLECTING HAZARDOUS WASTE?

Small Quantity Generators often have difficulty disposing of small quantities of hazardous waste. Hazardous waste companies usually have a minimum amount of waste that they will pick up, or charge a minimum fee for service. Typically, the minimum fee exceeds the cost of disposal for the hazardous waste. This leaves the small quantity generator in a difficult situation. Some respond by storing hazardous waste until it becomes economical for the hazardous waste transporter to pick it up, putting the business out of compliance by exceeding regulatory accumulation time limits. Other businesses simply store their hazardous wastes indefinitely, creating an unsafe work environment and exceeding accumulation time limits. Yet other businesses attempt to illegally dispose of their waste at household hazardous waste collection facilities. These facilities are not legally permitted to accept commercial wastes, nor are prepared to provide legal documentation for commercial hazardous waste disposal. In answer to the problems identified above, the San Bernardino County Fire Department Household Hazardous Program instituted the Conditionally Exempt Small Quantity Generator Program.

PAYMENT FOR SERVICES

The CESQG Program will prepare an invoice for your business at the time of service. You can pay at the time of service with cash or a check, or you can mail your payment to the Fire Department within 30 days. Please note that we do not accept credit card payments. The preferred method of payment is to handle payment at time of service. Additional charges may apply for accounts not paid within 30 days.

ARE THERE ANY OTHER WAYS THAT I CAN SAVE MONEY ON HAZARDOUS WASTE DISPOSAL?

Yes! First, start by reducing the amount of waste that you produce by changing processes or process chemicals, at your business. Next, examine if there is a way that you can recycle your waste back into your processes. Network with similar businesses or trade associations for waste minimization and pollution prevention solutions.

WHAT IF YOUR BUSINESS DOES NOT QUALIFY?

Call the San Bernardino County Fire Department Field Services Division for assistance with hazardous waste management at 909-386-8401. If you reduce the amount of waste you generate each month to 27 gallons or less, you may qualify in the future.

WHAT HAPPENS TO YOUR HAZARDOUS WASTE?

Hazardous waste collected by the CESQG Program is transported to a state permitted processing facility in San Bernardino. The waste is further processed at this point and packaged for off-site recycling (oil filters, oil, latex paint, antifreeze, and batteries) or destructive incineration (pesticides, corrosives, flammables, oil based paint).

San Bernardino County Fire Department
CESQG Program
2824 East "W" Street
San Bernardino, CA 92415-0799
Phone: 909-382-5401
Fax: 909-382-5413
www.sbcfire.org/hazmat/hhw.asp
Email: jschwab@sbcfire.org

WHEN WORKING OUTDOORS USE THE 3Cs

CUANDO TRABAJE AL AIRE LIBRE UTILICE LAS 3Cs

CONTROL | CONTROL



Locate the nearest storm drain and ensure nothing can enter or be discharged into it.

Ubique el desagüe de aguas pluviales más cercano y asegúrese de que nada pueda ingresar a éste ni descargarse en él.

CONTAIN | CONTENER



Isolate your area to prevent material from potentially flowing or being blown away.

Aísle su área para evitar que el material pueda discurrirse o ser llevado por el viento.

CAPTURE | CAPTURAR



Sweep up debris and place it in the trash. Clean up spills with an absorbent material (e.g. kitty litter) or vacuum with a Wet-Vac and dispose of properly.

Recoja los restos y colóquelos en la basura. Limpie los derrames con un material absorbente (como la arena para gatos) o aspírelos con una Wet-Vac (aspiradora de humedad) y deséchelos correctamente.

COMMERCIAL LANDSCAPE

Yard waste, sediments, and toxic lawn/garden chemicals used in commercial landscape maintenance often make their way into the San Bernardino County storm drain system and do not get treated before reaching the Santa Ana River. This pollutes our drinking water and contaminates local waterways, making them unsafe for people and wildlife. Following these best management practices will prevent pollution, comply with regulations and protect public health.

Recycle Yard Waste
Recycle leaves, grass clippings and other yard waste. Do not blow, sweep, rake or hose yard waste into the street. Try grasscycling - the natural recycling of grass by leaving clippings on the lawn when mowing. Grass clippings willquickly decompose, returning valuable nutrients to the soil. Further information can be obtained at www.calrecycle.ca.gov/organics.

Use Fertilizers, Herbicides and Pesticides Safely
Fertilizers, herbicides and pesticides are often carried into the storm drain system by sprinkler runoff. Use of natural, non-toxic alternatives to the traditional fertilizers, herbicides and pesticides is highly recommended. If you must use chemical fertilizers, herbicides, or pesticides:

- Spot apply pesticides and herbicides, rather than blanketing entire areas.
- Avoid applying near curbs and driveways, and never apply before a rain.
- Apply fertilizers as needed, when plants can best use it, and when the potential for it being carried away by runoff is low.

Recycle Hazardous Waste
Pesticides, fertilizers, herbicides and motor oil contaminate landfills and should be disposed of through a Hazardous Waste Facility, which accepts these types of materials. For information on proper disposal call, (909) 386-8401.

Use Water Wisely
Conserve water and prevent runoff by controlling the amount of water and direction of sprinklers. Sprinklers should be on long enough to allow water to soak into the ground but not so long as to cause runoff. Periodically inspect, fix leaks and realign sprinkler heads. Plant native vegetation to reduce the need of water, fertilizers, herbicides, and pesticides.

Prevent Erosion
Erosion washes sediments, debris and toxic runoff into the storm drain system, polluting waterways.

- Prevent erosion and sediment runoff by using ground cover, berms and vegetation down-slope to capture runoff.
- Avoid excavation or grading during wet weather.

Store Materials Safely
Keep landscaping materials and debris away from the street, gutter and storm drains. On-site stockpiles of materials must be covered with plastic sheeting and surrounded with sand bags to protect from rain, wind and runoff.

SIDEWALK, PLAZA, ENTRY MONUMENT & FOUNTAIN MAINTENANCE

Pollutants on sidewalks and other pedestrian traffic areas and plazas are typically due to littering and vehicle use. Fountain water containing chlorine and copperbased algaecides is toxic to aquatic life. Proper inspection, cleaning, and repair of pedestrian areas and HOA owned surfaces and structures can reduce pollutant runoff from these areas. Maintaining these areas may involve one or more of the following activities:

1. **Surface Cleaning**
2. **Graffiti Cleaning**
3. **Sidewalk Repair**
4. **Controlling Litter**
5. **Fountain Maintenance**

POLLUTION PREVENTION:

Pollution prevention measures have been considered and incorporated in the model procedures. Implementation of these measures may be more effective and reduce or eliminate the need to implement other more complicated or costly procedures. Possible pollution prevention measures for sidewalk, plaza, and fountain maintenance and cleaning include:

- Use dry cleaning methods whenever practical for surface cleaning activities.
- Use the least toxic materials available (e.g. water based paints, gels or sprays for graffiti removal).
- Once per year, educate HOA staff and tenants on pollution prevention measures.

MODEL PROCEDURES:

1. Surface Cleaning

Discharges of wash water to the storm water drainage system from cleaning or hosing of impervious surfaces is prohibited.

Sidewalks, Plazas

✓ Use dry methods (e.g. sweeping, backpack blowers, vacuuming) whenever practical to clean sidewalks and plazas rather than hosing, pressure washing, or steam cleaning. DO NOT sweep or blow material into curb; use devices that contain the materials.

✓ If water must be used, block storm drain inlets and contain runoff. Discharge wash water to landscaping or contain and dispose of properly.

SIDEWALK, PLAZA, ENTRY MONUMENT & FOUNTAIN MAINTENANCE

Parking Areas, Driveways, Drive-thru

✓ Parking facilities should be swept/vacuumed on a regular basis. Establish frequency of public parking lot sweeping based on usage and field observations of waste accumulation.

✓ If water must be used, block storm drain inlets and contain runoff. Discharge wash water to landscaping or contain and dispose of properly.

✓ Sweep all parking lots at least once before the onset of the wet season.

✓ Use absorbents to pick up oil; then dry sweep.

✓ Appropriately dispose of spilled materials and absorbents.

OPTIONAL:

- Consider increasing sweeping frequency based on factors such as traffic volume, land use, field observations of sediment and trash accumulation, proximity to water courses, etc.

Building Surfaces, Decks, etc., without loose paint

✓ Use high-pressure water, no soap.

✓ If water must be used, block storm drain inlets and contain runoff. Discharge wash water to landscaping or contain and dispose of properly.

Unpainted Building Surfaces, Wood Decks, etc.

✓ If water must be used, block storm drain inlets and contain runoff. Discharge wash water to landscaping or contain and dispose of properly.

✓ Use biodegradable cleaning agents to remove deposits.

✓ Make sure pH is between 6.5 and 8.5 THEN discharge to landscaping (if cold water without a cleaning agent) otherwise dispose of properly.

2. Graffiti Cleaning

Graffiti Removal

✓ Avoid graffiti abatement activities during rain events.

✓ When graffiti is removed by painting over, implement the procedures under Painting and Paint Removal in the Roads, Streets, and Highway Operation and Maintenance procedure sheet.

✓ Protect nearby storm drain inlets prior to removing graffiti from walls, signs, sidewalks, or other structures needing graffiti abatement. Clean up afterwards by sweeping or vacuuming thoroughly, and/or by using absorbent and properly disposing of the absorbent.

SIDEWALK, PLAZA, ENTRY MONUMENT & FOUNTAIN MAINTENANCE

✓ Note that care should be taken when disposing of waste since it may need to be disposed of as hazardous waste.

OPTIONAL:

• Consider using a waterless and non-toxic chemical cleaning method for graffiti removal (e.g. gels or spray compounds).

3. Sidewalk Repair

Surface Removal and Repair

✓ Schedule surface removal activities for dry weather if possible.

✓ Avoid creating excess dust when breaking asphalt or concrete.

✓ Take measures to protect nearby storm drain inlets prior to breaking up asphalt or concrete (e.g. place hay bales or sand bags around inlets). Clean afterwards by sweeping up material.

✓ Designate an area for clean up and proper disposal of excess materials.

✓ Remove and recycle as much of the broken pavement as possible.

✓ When making saw cuts in pavement, use as little water as possible. Cover each storm drain inlet with filter fabric during the sawing operation and contain the slurry by placing straw bales, sandbags, or gravel dams around the inlets. After the liquid drains shovel or vacuum the slurry, remove from site and dispose of properly.

✓ Always dry sweep first to clean up tracked dirt. Use a street sweeper or vacuum truck. Do not dump vacuumed liquid in storm drains. Once dry sweeping is complete, the area may be hosed down if needed. Discharge wash water to landscaping, pump to the sanitary sewer if permitted to do so or contain and dispose of properly.

Concrete Installation and Repair

✓ Avoid mixing excess amounts of fresh concrete or cement mortar on-site. Only mix what is needed for the job.

✓ Wash concrete trucks off-site or in designated areas on-site, such that there is no discharge of concrete wash water into storm drain inlets, open ditches, streets, or other storm water conveyance structures. (See Concrete Waste Management BMP WM – 8)

SIDEWALK, PLAZA, ENTRY MONUMENT & FOUNTAIN MAINTENANCE

- ✓ Store dry and wet concrete materials under cover, protected from rainfall and runoff and away from drainage areas. After job is complete remove temporary stockpiles (asphalt materials, sand, etc.) and other materials as soon as possible.
- ✓ Return leftover materials to the transit mixer. Dispose of small amounts of excess concrete, grout, and mortar in the trash.
- ✓ When washing concrete to remove fine particles and expose the aggregate, contain the wash water for proper disposal.
- ✓ Do not wash sweepings from exposed aggregate concrete into the street or storm drain. Collect and return sweepings to aggregate base stock pile, or dispose in the trash.
- ✓ Protect applications of fresh concrete from rainfall and runoff until the material has hardened.

4. Litter Control

- ✓ Enforce anti-litter laws.
- ✓ Provide litter receptacles in busy, high pedestrian traffic areas of the community, at recreational facilities, and at community events.
- ✓ Cover litter receptacles and clean out frequently to prevent leaking/spillage or overflow.

OPTIONAL:

- Post "No Littering" signs.

5. Fountain Maintenance

- ✓ Do not use copper-based algaecides. Control algae with chlorine or other alternatives, such as sodium bromide.
- ✓ Allow chlorine to dissipate for a few days and then recycle/reuse water by draining it gradually onto a landscaped area. Water must be tested prior to discharge to ensure that chlorine is not present (concentration must be less than 0.1 ppm).
- ✓ Contact local agency for approval to drain into sewer or storm drain.
- ✓ Avoid mixing excess amounts of fresh concrete or cement mortar on-site. Only mix what is needed for the job.

EQUIPMENT MAINTENANCE & REPAIR

Vehicle or equipment maintenance has the potential to be a significant source of stormwater pollution. Engine repair and service (parts cleaning, spilled fuel, oil, etc.), replacement of fluids, and outdoor equipment storage and parking (dripping engines) can all contaminate stormwater. Conducting the following activities in a controlled manner will reduce the potential for stormwater contamination:

1. **General Maintenance and Repair**
2. **Vehicle and Machine Repair**
3. **Waste Handling/Disposal**

Related vehicle maintenance activities are covered under the following program headings in this manual: "Vehicle and Equipment Cleaning", "Vehicle and Equipment Storage", and "Vehicle Fueling".

POLLUTION PREVENTION:

Pollution prevention measures have been considered and incorporated in the model procedures. Implementation of these measures may be more effective and reduce or eliminate the need to implement other more complicated or costly procedures. Possible pollution prevention measures for equipment maintenance and repair include:

- Review maintenance activities to verify that they minimize the amount of pollutants discharged to receiving waters. Keep accurate maintenance logs to evaluate materials removed and improvements made.
- Switch to non-toxic chemicals for maintenance when possible.
- Choose cleaning agents that can be recycled.
- Minimize use of solvents. Clean parts without using solvents whenever possible. Recycle used motor oil, diesel oil, and other vehicle fluids and parts whenever possible.
- Once per year, educate HOA staff and tenants on pollution prevention measures.

EQUIPMENT MAINTENANCE & REPAIR

MODEL PROCEDURES:

1. General Maintenance and Repair

General Guidelines

➔ *Note: Permission must be obtained for any discharge of wash water to the sanitary sewer from the local sewering agency.*

- ✓ Review maintenance activities to verify that they minimize the amount of pollutants discharged to receiving waters. Keep accurate maintenance logs to evaluate materials removed and improvements made.
- ✓ Regularly inspect vehicles and equipment for leaks.
- ✓ Move activity indoors or cover repair area with a permanent roof if feasible.
- ✓ Minimize contact of stormwater with outside operations through berming the local sewering and drainage routing.
- ✓ Place curbs around the immediate boundaries of the process equipment.
- ✓ Clean yard storm drain inlets regularly and stencil them.

Good Housekeeping

- ✓ Avoid hosing down work areas. If work areas are washed and if discharge to the sanitary sewer is allowed, treat water with an appropriate treatment device (e.g. clarifier) before discharging. If discharge to the sanitary sewer is not permitted, pump water to a tank and dispose of properly.
- ✓ Collect leaking or dripping fluids in drip pans or container. Fluids are easier to recycle or dispose of properly if kept separate.
- ✓ Keep a drip pan under the vehicle while you unclip hoses, unscrew filters, any discharge of or remove other parts. Place a drip pan under any vehicle that might leak while you work on it to keep splatters or drips off the shop floor.
- ✓ Educate employees on proper handling and disposal of engine fluids.
- ✓ Promptly transfer used fluids to the proper waste or recycling drums. Don't leave full drip pans or other open containers lying around.
- ✓ Do not pour liquid waste to floor drains, sinks, outdoor storm drain inlets, or other storm drains or sewer connections.
- ✓ Post signs at sinks and stencil outdoor storm drain inlets.

2. Vehicle Repair

General Guidelines

- ✓ Perform vehicle fluid removal or changing inside of a building or in a contained covered area, where feasible, to prevent the run-on of stormwater and the runoff of spills.
- ✓ Regularly inspect vehicles and equipment for leaks, and repair as needed.

- ✓ Use secondary containment, such as a drain pan or drop cloth, to catch spills or leaks when removing or changing fluids.
- ✓ Immediately drain all fluids from wrecked vehicles. Ensure that the drain pan or drip pan is large enough to contain drained fluids (e.g. larger pans are needed to contain antifreeze, which may gush from some vehicles).
- ✓ Promptly transfer used fluids to the proper waste or recycling drums. Don't leave full drip pans or other open containers lying around.
- ✓ Recycle used motor oil, diesel oil, and other vehicle fluids and parts whenever possible.
- ✓ Oil filters disposed of in trash cans or dumpsters can leak oil. Place the oil filter in a funnel over a waste oil recycling drum to drain excess oil before disposal. Oil filters can also be recycled. Ask your oil supplier or recycler about recycling oil filters.
- ✓ Store cracked batteries in a non-leaking secondary container and dispose of properly at recycling facilities or at County hazardous waste disposal site.

Vehicle Leak and Spill Control

- ✓ Use absorbent materials on small spills. Remove the absorbent materials promptly and dispose of properly.
- ✓ Place a stockpile of spill cleanup materials where it will be readily accessible.
- ✓ Sweep floor using dry absorbent material.

3. Machine Repair

- ✓ Keep equipment clean; don't allow excessive build-up of oil or grease.
- ✓ Minimize use of solvents.
- ✓ Use secondary containment, such as a drain pan or drop cloth, to catch spills or leaks when removing or changing fluids.
- ✓ Perform major equipment repairs at the corporation yard, when practical.
- ✓ Following good housekeeping measures in Vehicle Repair section.

4. Waste Handling/Disposal

Waste Reduction

- ✓ Prevent spills and drips of solvents and cleansers to the shop floor.
- ✓ Do liquid cleaning at a centralized station so the solvents and residues stay in one area. Recycle liquid cleaners when feasible.

✓ Locate drip pans, drain boards, and drying racks to direct drips back into a solvent sink or fluid holding tank for reuse.

OPTIONAL:

- If possible, eliminate or reduce the amount of hazardous materials and waste by substituting non-hazardous or less hazardous material:

  -Use non-caustic detergents instead of caustic cleaning for parts cleaning.

  -Use a water-based cleaning service and have tank cleaned. Use detergent-based or water-based cleaning systems in place of organic solvent degreasers.

  -Replace chlorinated organic solvents with non-chlorinated solvents. Non-chlorinated solvents like kerosene or mineral spirits are less toxic and less expensive to dispose of properly. Check list of active ingredients to see whether it contains chlorinated solvents.

  -Choose cleaning agents that can be recycled.

Recycling

OPTIONAL:

- Separate wastes for easier recycling. Keep hazardous and non-hazardous wastes separate, do not mix used oil and solvents, and keep chlorinated solvents separate from non-chlorinated solvents.

- Label and track the recycling of waste material (e.g. used oil, spent solvents, batteries).

- Purchase recycled products to support the market for recycled materials.

LIMITATIONS:

Space and time limitations may preclude all work being conducted indoors. It may not be possible to contain and clean up spills from vehicles/equipment brought on-site after working hours. Dry floor cleaning methods may not be sufficient for some spills – see spill prevention and control procedures sheet. Identification of engine leaks may require some use of solvents.

POOL MAINTENANCE

Pool chemicals and filter solids, when discharged to the City streets, gutters or storm drans, DO NOT GET TREATED before reaching the Santa Ana River. Chlorine, acid cleaning chemicals and metal-based algaecides used in pools can kill beneficial organisms in the food chain and pollute our drinking water.

When emptying your swimming pool, spa or fountain, please use one of the following best management practices to prevent water pollution:

- Reuse the water as landscape irrigation
- Empty the water into the sewer between midnight and 6:00 am
- Remove solids and floating debris and dispose of in the trash, de-chlorinate the water to a chlorine residual = 0, wait 24 hours, then discharge the water to the street or storm drain
- Try not to use metal-based algaecides (i.e. copper sulfate) in your pool or spa. If you have, empty your pool or spa into the sewer. *Prior to discharging pool water into the sanitary sewer system, contact your local agency.*
- If the pool contains algae and mosquito larvae, discharge the water to the sewer

When acid cleaning or other chemical cleaning:

- Neutralize the pool water to pH of 6.5 to 8.5, then discharge to the sewer

For swimming pool and spa filter backwash:

- Dispose of solids into trash bag, then wash filter into a landscape area
- Settle, dispose of solids in trash and discharge water to the sewer, never to the storm drain



WE DID IT OURSELVES AND WE DID IT RIGHT

When painting your home, protect your family and community.

- **PAINTS** that are water-based are less toxic and should be used whenever possible.
- **BRUSHES** with water-based paint should be washed in the sink. Those with oil-based paint should be cleaned with paint thinner.
- **SAFELY** dispose of unwanted paint and paint thinner. The County of San Bernardino offers 9 HHW Centers that accept paint and other household hazardous waste from residents FREE of charge. For a list of acceptable materials, location information, and hours of operation call 1-800-OILY CAT.

VEHICLE MAINTENANCE

Oil, grease, anti-freeze and other toxic automotive fluids often make their way into the San Bernardino County storm drain system, and do not get treated before reaching the Santa Ana River. This pollutes our drinking water and contaminates waterways, making them unsafe for people and wildlife. Follow these best management practices to prevent pollution and protect public health.

Cleaning Auto Parts
Scrape parts with a wire brush or use a bake oven rather than liquid cleaners. Arrange drip pans, drying racks and drain boards so that fluids are directed back into the parts washer or the fluid holding tank. Do not wash parts or equipment in a sink, parking lot, driveway or street.

Storing Hazardous Waste
Keep your liquid waste segregated. Many fluids can be recycled via hazardous waste disposal companies if they are not mixed. Store all materials under cover with spill containment or inside to prevent contamination of rainwater runoff.

Preventing Leaks and Spills
Conduct all vehicle maintenance inside of a garage. Place drip pans underneath vehicle to capture fluids. Use absorbent materials instead of water to clean work areas.

Cleaning Spills
Use dry methods for spill cleanup (sweeping, absorbent materials). To report accidental spills into the street or storm drain call (877) WASTE18 or 911.

Proper Disposal of Hazardous Waste
Dispose of household hazardous waste by taking it to your nearest household hazardous waste center. For more information, call 1-800-OILY CAT or check out sbcountystormwater.org/Disposal.html

PET WASTE DISPOSAL

FREE

DOGGIE WASTE BAGS

Remember to pick up after your pet every time to keep San Bernardino County clean and healthy!



In the event of a spill or discharge to a storm drain or waterway, contact San Bernadino County Stormwater immediately: (877) WASTE18 | sbcountystormwater.org/report

sbcountystormwater.org

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» Get In Touch With Us Online!

» Website
sbcountystormwater.org

» eUpdates
sbcountystormwater.org/newsletter

» Facebook
facebook.com/sbcountystormwater

» YouTube
youtube.com/sbcountystormwater



» Report Pollution Violations
sbcountystormwater.org/report

» Email
info@sbcountystormwater.org

Regulatory information

The Federal Water Pollution Control Act prohibits the discharge of any pollutant to navigable waters from a point source unless the discharge is authorized by a National Pollutant Discharge Elimination System (NPDES) permit. The 1987 passage of the Water Quality Act established NPDES permit requirements for discharges of storm water. The NPDES permit program controls water pollution by regulating point sources that discharge pollutants into waters of the United States.

Industrial facilities and construction sites are regulated by the Regional Water Quality Control Board and State Water Resources Control Board, through general storm water permits. Most industrial, manufacturing or transportation businesses that store materials, products or equipment outdoors, or conduct vehicle washing or process operations outdoors are required to obtain coverage under the State Water Resources Control Board's General Industrial Activities Stormwater Permit. For more information about this permit, visit www.swrcb.ca.gov/stormwtr/industrial.html or contact your local storm water coordinator.

If your business conducts construction activities, including clearing, grading, stockpiling or excavation that results in soil disturbances of at least one acre, you are subject to the State Water Resources Control Board's General Construction Activities Stormwater Permit. To find out more about this storm water permit for construction, visit: www.swrcb.ca.gov/stormwtr/construction.html.

Cities and counties are regulated through permits issued by the Regional Boards. Since 1990, operators of large storm drain systems such as San Bernardino County's have been required to:

- Develop a storm water management program designed to prevent harmful pollutants from being dumped or washed by storm water runoff, into the storm water system, then discharged into local water bodies; and
- Obtain a National Pollutant Discharge Elimination System (NPDES) permit.

The NPDES permit programs in California are administered by the State Water Resources Control Board and by nine regional boards that issue NPDES permits and enforce regulations within their respective region.

San Bernardino County lies within the jurisdiction of the Santa Ana Region. This regional board issues a permit to the San Bernardino County Permittees, which includes the County of San Bernardino, San Bernardino County Flood Control District and incorporated cities of San Bernardino County. Since the program's inception, the County of San Bernardino has served as the principal permittee.

SAN BERNARDINO COUNTY
STORMWATER POLLUTION PREVENTION



Documents & reports:

The following documents describe the regulations and programs for water quality in San Bernardino County. You can review the latest Basin Plan, National Pollutant Discharge Elimination System (NPDES) Permit and Drainage Area Management Plan (DAMP).

- **Basin Plans:** The document for each region of the State Water Quality Board's jurisdiction, including Santa Ana, is the Water Quality Control Plan, commonly referred to as the Basin Plan. It is the foundation for the regulatory programs of each regional board. The Basin Plan documents the beneficial uses of the region's ground and surface waters, existing water quality conditions, problems, and goals, and actions by the regional board and others that are necessary to achieve and maintain water quality standards.

▶Water Control Plan for the Santa Ana River Basin

- **Municipal National Pollutant Discharge Elimination System (NPDES) Permits:** The permits of each region outline additional steps for a storm water management program and specify requirements to help protect the beneficial uses of the receiving waters. They require permittees to develop and implement Best Management Practices (BMPs) to control/reduce the discharge of pollutants to waters of the United States to the maximum extent practicable (MEP).

  ▶Santa Ana Regional Water Quality Control Board Municipal NPDES Permit Order No. R8-2002-0012

- **Report of Waste Discharge:** The Report of Waste Discharge (ROWD) describes the San Bernardino Stormwater Program, implemented by the County and cities to comply with their jointly held stormwater permit. It is the principle policy and guidance document for the NPDES Stormwater Program.

  ▶Report of Waste Discharge 2000

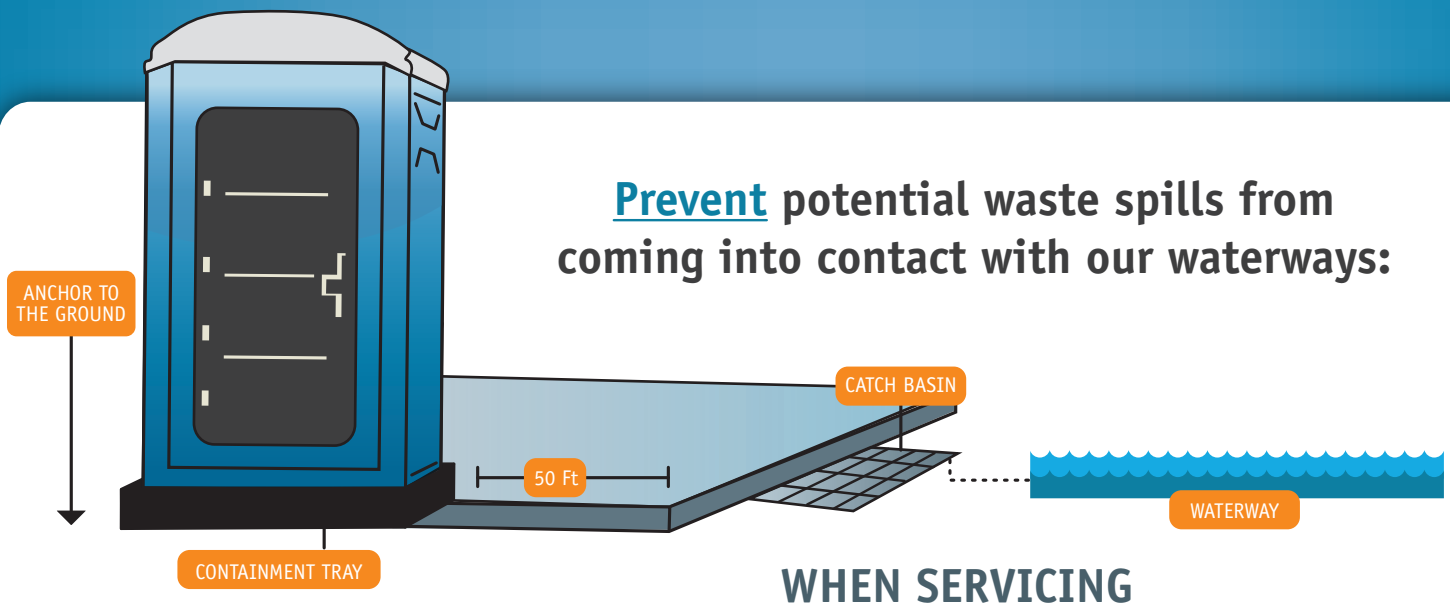
- **San Bernardino County Storm Water Program Annual Status Report:** The Annual Status Report is a requirement of the NPDES permit for submittal to the Regional Boards and United States Environmental Protection Agency. The report presents an analysis and assessment of permit compliance activities.

▶Annual report - will be posted soon

For more information about how you can prevent stormwater pollution:

www.sbcountystormwater.org

PORTABLE TOILET BUSINESSES



Prevent potential waste spills from coming into contact with our waterways:

WHEN DELIVERING

- ✓ Site Portable Toilets at least 50 feet away from a catch basin or waterway.
- ✓ In high wind areas, secure the Portable Toilets by anchoring the unit securely to the ground.
- ✓ Equip Portable Toilets with a containment tray to prevent accidental overflow.

When there is potential for greater than normal usage, **remind** your clients to **request additional units** or **adjust the service schedule** to ensure sanitary conditions and **prevent overflow**.

WHEN SERVICING

- ✓ On the service vehicle:
  - Maintain the condition of all hoses, couplings, tanks, and equipment to prevent leaks or spills.
  - Properly store and handle potential contaminants (Portable Toilet waste, disinfectants, oils,detergents etc.) to prevent any spills or discharges from entering the street, gutter or catch basin.
- ✓ When rinsing or washing Portable Toilets, ensure that all waste water is captured in the containment tray to prevent waste water from entering the street, gutter or catch basin.
- ✓ Upon completion of the cleaning process, pump the captured water into the service vehicle.

WHAT IS STORMWATER POLLUTION?

Stormwater pollution is created when bacteria, organic matter, disinfectants, and suspended solids are transported by water or wind into the catch basins and storm drain system. The untreated urban runoff then flows directly into our lakes and rivers contaminating our communities with high levels of bacteria, posing a threat to public health and wildlife.

THANK YOU FOR BEING A RESPONSIBLE BUSINESS AND HELPING TO KEEP SAN BERNARDINO COUNTY CLEAN AND HEALTHY!

In the event of a spill or discharge to a storm drain or waterway, contact San Bernardino County Stormwater immediately: **(877) WASTE18** | **sbcountystormwater.org/report**
To dispose of hazardous waste call the San Bernardino County Fire Dept. - CUPA Program **(909) 386-8401**

sbcountystormwater.org

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NEGOCIOS DE BAÑOS PORTÁTILES



Impida que los derrames potenciales de desechos entren en contacto con nuestras vías fluviales:

AL MOMENTO DE LA ENTREGA

- ✓ Coloque los Baños Portátiles a una distancia mínima de 50 pies de un sumidero o vía fluvial.
- ✓ En áreas de vientos fuertes, proteja los Baños Portátiles anclando la unidad en forma segura al suelo.
- ✓ Coloque la bandeja de contencion abajo del Baño Portatil.

Cuando exista la posibilidad de un uso mayor de lo normal, **recuerde** a sus clientes **que soliciten unidades adicionales o que adapten el programa de mantenimiento** para garantizar las condiciones sanitarias y **prevenir desbordes.**

CUANDO SE REALIZE EL MANTENIMIENTO

- ✓ En el vehículo de servicio:
  - Mantenga en condiciones óptimas todas las mangueras acoples, tanques y equipo a fin de prevenir derrames.
  - Almacene y maneje en forma apropiada los contaminantes potenciales (desechos del Baño Portátil, desinfectantes, aceites, detergentes, etc) para impedir cualquier derrame o que se produzcan descargas hacia la calle, la alcantarilla o el sumidero.
- ✓ Al enjuagar o lavar los Baños Portátiles, asegúrese de que la bandeja de contención capture toda el agua residual, para impedir que ésta llegue a la calle, alcantarilla o sumidero.
- ✓ Al completar el proceso de limpieza, bombee el agua capturada en el vehículo de servicio.

¿QUÉ ES LA CONTAMINACIÓN DE AGUAS PLUVIALES?

La contaminación de aguas pluviales se crea cuando el agua o el viento transportan bacterias, materia orgánica, desinfectantes y sólidos suspendidos hacia los sumideros y el sistema de drenaje pluvial. Los residuos líquidos urbanos sin tratar luego fluyen directamente hacia los lagos y ríos contaminando nuestras comunidades con altos niveles de bacterias y plantean una amenaza para la salud pública y la vida silvestre.

GRACIAS POR SER UN NEGOCIO RESPONSABLE Y AYUDAR A MANTENER LIMPIO Y SALUDABLE EL CONDADO DE SAN BERNARDINO.

En caso de un derrame o descarga en un drenaje pluvial o vía fluvial, comuníquese de inmediato con San Bernardino County Stormwater: **(877) WASTE18 | sbcountystormwater.org/report**
Para deshacerse de los residuos peligrosos llame al Condado de San Bernardino Departamento de Bomberos - programa CUPA **(909) 386-8401**

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SAN BERNARDINO COUNTY
STORMWATER POLLUTION PREVENTION

General industrial & manufacturing businesses:

If you own, manage or help operate a business, especially an industrial or manufacturing company, you can help reduce storm water pollution. From environmentally friendly cleaning and maintenance activities, to recycling hazardous waste materials, businesses can do a lot to prevent storm water pollution.

- Review your cleaning and maintenance activities to look for ways to reduce runoff into the storm drain system, especially in outdoor areas like parking lots, loading docks and maintenance yards. Keep trash enclosure swept and trash bin lids closed.
- Train employees to wash vehicles and equipment indoors in a wash rack that is connected to the sanitary sewer or off-site at a commercial wash facility. Train janitorial staff to dispose of floor cleaning water in the sewer and not into the parking lot. Make sure that cooling towers, boilers, compressors, water softeners and other process equipment are connected to the sanitary sewer and do not discharge wastewater into the parking lot.
- If you use hazardous materials in your everyday business, like ink and solvents for commercial printing, or polishes and chemicals for car detailing or manufacturing after-market accessories, do not put these hazardous materials in the trash or pour them into the gutter. Take them to be recycled safely. Store chemicals, wastes, raw materials and contaminated equipment indoors or in a covered, spill contained area, to prevent exposure of these materials to storm water. For information on proper hazardous waste disposal, call (909)386-8401.
- Take advantage of less-toxic alternatives to dangerous chemicals. From detergents to drain openers, there are a lot of ways to get the same or better result without having to rely toxic substances.
- Looking for raw materials? San Bernardino County Materials Exchange Program, or SBCoMax is a partnership between the County and the California Integrated Waste Management Board, for businesses to provide used but usable materials to those interested in obtaining them. The program helps divert used materials from landfills, saves resources and can save you money.

For more information about how you can prevent stormwater pollution:

www.sbcountystormwater.org

STORMWATER Pollution Prevention

Important Phone Numbers

San Bernardino County Flood Control
(909) 387-8112

County of San Bernardino
(909) 387-8109

City of Big Bear Lake
(909) 866-5831

City of Chino (909) 591-9850

City of Chino Hills (909) 364-2722

City of Colton (909) 370-6128

City of Fontana (909) 350-6772

City of Grand Terrace
(909) 824-6671 x 226

City of Highland (909) 864-8732 x 230

City of Loma Linda (909) 799-4405

City of Montclair (909) 625-9470

City of Ontario (909) 395-2025

City of Rancho Cucamonga
(909) 477-2740 x 4063

City of Redlands (909) 798-7655

City of Rialto (909) 421-4921

City of San Bernardino (909) 384-5154

City of Upland (909) 931-4370

City of Yucaipa (909) 797-2489 x 243

San Bernardino County
Stormwater Program
825 East Third Street • Room 201
San Bernardino, CA 94215-0835

STORMWATER Pollution Prevention

INDUSTRIAL AND COMMERCIAL FACILITIES



STORMWATER Pollution Prevention

To reduce the amount of pollutants reaching our storm drain system, which leads to the Santa Ana River and Pacific Ocean, the San Bernardino County Stormwater Program has developed Best Management Practices (BMPs) for Industrial and Commercial Facilities. City and County ordinances require that businesses comply with these BMPs, where applicable, to protect local water quality. Local cities and the County are required to verify implementation of these BMPs by performing regular facility inspections.



Prohibited Discharges

- Discontinue all non-stormwater discharges to the storm drain system. It is prohibited to discharge any chemicals, wastes or wastewater into the gutter, street or storm drain.

Outdoor Storage

- Install covers and secondary containment areas for all hazardous materials and wastes stored outdoors in accordance with County and/or City standards.
- Keep all temporary waste containers covered, except when in direct use.
- Sweep outdoor areas instead of using a hose or pressure washer.

Outdoor Processes

- Move all process operations including vehicle and equipment maintenance inside of the building or into a covered and contained area.
- Wash equipment and vehicles in a contained and covered wash bay which is closed-loop or connected to a clarifier sized to city standards, then discharged to a sanitary sewer or take them to a commercial car wash.

Spills and Clean Ups

- Clean up spills immediately when they occur, using dry clean up methods such as absorbent materials and followed by proper disposal of materials.
- Always have a spill kit available near chemical loading dock doors, vehicle maintenance and fueling areas.
- Follow your Business Emergency Plan, as filed with the County Fire Department at (909) 386-8401.

Industrial and Commercial Facilities

- Report all prohibited discharges and non-implementation of BMPs to your local Stormwater Coordinator either at (800) CLEANUP or as listed at www.sbcounty.gov/stormwater.
- Report hazardous materials spills to (800) 33 TOXIC and your local Fire Department Hazmat Team at 911.

Training

Train employees in spill response procedures and prohibited discharges to the storm drain system, as prescribed in your local Stormwater Ordinance and in applicable Best Management Practices available at www.cabmphandbooks.com and www. sbcounty.gov/stormwater.

Permitting

Stormwater discharges associated with specific categories of commercial and industrial facilities are regulated by the State Water Resources Control Board (SWRCB) through an Industrial Storm Water General Permit. A copy of the General Permit and application forms are available at: www.waterboards.ca.gov/stormwtr/industrial.html

To report illegal dumping or for more information on stormwater pollution prevention, call:

1 (800) CLEANUP

or visit our websites at:

www.sbcounty.gov/stormwater

www.1800cleanup.org

San Bernardino County STORMWATER PROGRAM

Prevención de Contaminación
AL SISTEMA DE DRENAJE

Números de Teléfono Importantes

San Bernardino County Flood Control
(909) 387-8112

County of San Bernardino
(909) 387-8109

City of Big Bear Lake
(909) 866-5831

City of Chino (909) 591-9850

City of Chino Hills (909) 364-2722

City of Colton (909) 370-6128

City of Fontana (909) 350-6772

City of Grand Terrace
(909) 824-6671 x 226

City of Highland (909) 864-8732 x 230

City of Loma Linda (909) 799-4405

City of Montclair (909) 625-9470

City of Ontario (909) 395-2025

City of Rancho Cucamonga
(909) 477-2740 x 4063

City of Redlands (909) 798-7655

City of Rialto (909) 421-4921

City of San Bernardino (909) 384-5154

City of Upland (909) 931-4370

City of Yucaipa (909) 797-2489 x 243

San Bernardino County
Stormwater Program
825 East Third Street • Room 201
San Bernardino, CA 94215-0835

Prevención de Contaminación
AL SISTEMA DE DRENAJE

INSTALACIONES INDUSTRIALES Y COMERCIALES



Prevención de Contaminación
AL SISTEMA DE DRENAJE

Para reducir la cantidad de contaminantes que alcanzan nuestro sistema de aguas pluviales, las cuales desembocan en el Río Santa Ana y el Océano Pacífico, el Programa del Condado de San Bernandino ha desarrollado las pautas de Mejores Prácticas de Manejo (BMPs, por sus siglas en inglés) para instalaciones industriales y comerciales. Los decretos de la ciudad y del condado establecen que todas las empresas deben de cumplir con estas BMPs, cuando corresponda, para proteger la calidad del agua local. Las ciudades locales y el condado tienen la obligación de verificar la implementación de estas BMPs al llevar a cabo inspecciones regulares en sus instalaciones.



Desagües Prohibidos

- Descontinúe todo desagüe de aguas no pluviales al sistema de drenaje de aguas pluviales. Está prohibido descargar cualquier sustancia química, residuo o agua residual a los drenajes de la cuneta, de la calle o de aguas pluviales.

Almacenamiento al Aire Libre

- Instale cubiertas y áreas de retención secundarias para todos los materiales peligrosos y residuos almacenados al aire libre, estas instalaciones deberán de cumplir con los estándares establecidos por el condado y/o la ciudad.
- Mantenga todos los recipientes temporales de residuos cubiertos, con la excepción de cuando se estén utilizando directamente.
- Barra todas las áreas al aire libre en lugar de usar una manguera o un equipo de limpieza con agua a alta presión.

Procesos al Aire Libre

- Reubique todos los procesos u operaciones, incluyendo el mantenimiento de vehículos y equipo, dentro de un edificio en una área cubierta e independiente.
- Lave el equipo y los vehículos en una fosa de lavado independiente que tenga un anillo cerrado o bien, esté conectada a un clarificador del tamaño de los estándares municipales, luego elimine los residuos en un drenaje sanitario o llévelos a un lavador de carros comercial.

Derrames y Limpieza

- Limpie los derrames inmediatamente, utilice métodos de limpieza en seco como son el uso de materiales absorbentes y elimine estos materiales de la manera adecuada.
- Siempre tenga a la mano un estuche para derrames cerca de las puertas de los muelles de carga de sustancias químicas, en las áreas de mantenimiento de vehículos y en las áreas de combustible.
- Siga su Plan de Emergencia Comercial, como lo registró con el Departamento de Bomberos del Condado marcando al (909) 386-8401.
- Reporte todos los desagües prohibidos y cualquier punto no implementado de las BMPs a su coordinador local de Aguas Pluviales llamando al (800) CLEANUP o como se indica en el enlace www.sbcounty.gov/stormwater.
- Reporte cualquier derrame peligroso al (800) 33 TOXIC y al equipo Hazmat de su departamento local de bomberos marcando al 911.

Instalaciones Industriales y Comerciales

Capacitación

Capacite a los empleados sobre los procedimientos de respuesta ante un derrame y los desagües prohibidos al sistema de aguas pluviales, como lo indica el decreto local de aguas pluviales de Mejores Prácticas de Manejo (BMPs) disponibles en el sitio www.cabmphandbooks.com y www.sbcounty.gov/stormwater.

Autoridad Competente

Los desagües de aguas pluviales relacionados con categorías específicas de instalaciones comerciales e industriales están regulados por la Junta Estatal de Control de Recursos Acuáticos (State Water Resources Control Board, SWRCB) a través de un permiso industrial general de aguas pluviales. Para obtener una copia de este permiso general y una solicitud, visite el sitio: www.waterboards.ca.gov/stormwtr/industrial.html

Para reportar el desagüe de residuos ilegales o para obtener información adicional sobre la prevención de contaminación a las aguas pluviales, llame a:

1 (800) CLEANUP

o visite nuestro sitio:

www.sbcounty.gov/stormwater

www.1800cleanup.org

San Bernardino County STORMWATER PROGRAM

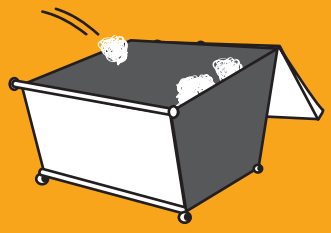
COMMERCIAL TRASH ENCLOSURES

FOLLOW THESE **REQUIREMENTS** TO **KEEP OUR WATERWAYS CLEAN**

Trash enclosures, such as those found in commercial and apartment complexes, typically contain materials that are intended to find their way to a landfill or a recycling facility. **These materials are NOT meant to go into our local lakes and rivers.**

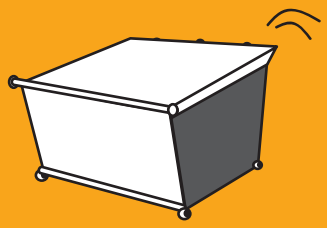
PROTECT WATER QUALITY BY FOLLOWING THESE SIMPLE STEPS

PUT TRASH INSIDE



Place trash inside the bin (preferably in sealed bags)

CLOSE THE LID



Prevent rain from entering the bin in order to avoid leakage of polluted water runoff

KEEP TOXICS OUT



- Paint
- Grease, fats and used oils
- Batteries, electronics and fluorescent lights

SOME ADDITIONAL GUIDELINES, INCLUDE

✓ SWEEP FREQUENTLY

Sweep trash enclosure areas frequently, instead of hosing them down, to prevent polluted water from flowing into the streets and storm drains.

✓ FIX LEAKS

Address trash bin leaks immediately by using dry clean up methods and report to your waste hauler to receive a replacement.

✓ CONSTRUCT ROOF

Construct a solid cover roof over the existing trash enclosure structure to prevent rainwater from coming into contact with trash and garbage. Check with your local City/County for Building Codes.

In San Bernardino County, stormwater pollution is caused by food waste, landscape waste, chemicals and other debris that are washed into storm drains and end up in our waterways - untreated! You can be part of the solution by maintaining a water-friendly trash enclosure.

THANK YOU FOR HELPING TO KEEP SAN BERNARDINO COUNTY CLEAN AND HEALTHY!

San Bernardino County STORMWATER PROGRAM

To report illegal dumping **(877-WASTE18)** or
to find a household hazardous waste facility (800-OILY CAT): **sbcountystormwater.org**
To dispose of hazardous waste call the San Bernardino County Fire Dept. - CUPA Program **(909) 386-8401**

Big Bear • Chino • Chino Hills • Colton • Fontana • Grand Terrace • Highland • Loma Linda • Montclair • Ontario • Rancho Cucamonga
Redlands • Rialto • San Bernardino • San Bernardino County • San Bernardino County Flood Control District • Upland • Yucaipa

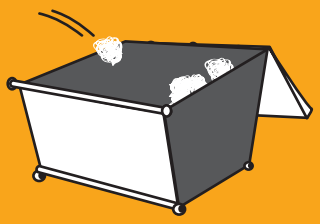
CONTENEDORES COMERCIALES PARA LA BASURA

SIGA ESTOS **PASOS** PARA MANTENER **LIMPIAS NUESTRAS VÍAS FLUVIALES**

Los contenedores de basura, tales como aquellos que se encuentran en las unidades comerciales y departamentos, generalmente contienen materiales que están destinados a los rellenos sanitarios o en algún establecimiento de reciclaje.
Estos materiales NO deben ser vertidos en nuestros lagos y ríos locales.

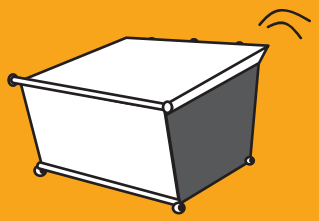
SIGA ESTOS PASOS PARA PROTEGER LA CALIDAD DEL AGUA

COLOQUE LA BASURA ADENTRO



Coloque la basura adentro del contenedor (preferentemente en bolsas selladas)

CIERRE LA TAPA



Evite que la lluvia ingrese al contenedor para evitar un escape de escorrentía contaminada

MANTENGA LOS PRODUCTOS TÓXICOS AFUERA



- Pintura
- Lubricante, grasas y aceites usados
- Baterías, componentes electrónicos y luces fluorescentes

ALGUNAS GUÍAS ADICIONALES, LAS CUALES INCLUYEN

✓ BARRER CON FRECUENCIA

Barra con frecuencia las áreas de los recintos para la basura, en lugar de lavarlas con una manguera, para evitar que el agua contaminada se vierta en las calles y los desagües de lluvia.

✓ REPARE LAS GOTERAS

Ocúpese inmediatamente de las goteras en los contenedores de basura. Use los métodos de limpieza en seco e infórmele a su recolector de basura para que reciba un reemplazo.

✓ CONSTRUYA UN TECHO

Construya un techo de cubierta sólida sobre la estructura actual del recinto para la basura a fin de evitar que el agua de lluvia entre en contacto con los desechos y la basura. Consulte con su Ciudad/Condado para conocer los Códigos de Construcción.

En el Condado de San Bernardino, los desechos de alimentos y jardines, los productos químicos y otros restos que se vierten en los desagües de aguas pluviales y que terminan en nuestras vías fluviales sin tratamiento alguno provocan la contaminación de estas aguas. Usted puede ser parte de la solución si mantiene un recinto para la basura que no contamine el agua.

¡MUCHAS GRACIAS POR AYUDAR A MANTENER EL CONDADO DE SB LIMPIO Y SIN CONTAMINACIÓN!

San Bernardino County STORMWATER PROGRAM

Para informar acerca del vertedero ilegal, llame a **(877-WASTE18)**, o para encontrar un establecimiento donde arrojar los residuos peligrosos del hogar, llame a **(800-OILY CAT)**: **sbcountystormwater.org**
Para deshacerse de los residuos peligrosos llame al Condado de San Bernardino Departamento de Bomberos - programa CUPA **(909) 386-8401**

Big Bear • Chino • Chino Hills • Colton • Fontana • Grand Terrace • Highland • Loma Linda • Montclair • Ontario • Rancho Cucamonga
Redlands • Rialto • San Bernardino • San Bernardino County • San Bernardino County Flood Control District • Upland • Yucaipa

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Mosquitoes and Disease



Mosquitoes can carry a variety of diseases that can affect humans. Some of the most common diseases include:

- West Nile Virus
- Zika
- St. Louis Encephalitis
- Dengue Fever

Read more to find out how you can stop mosquitoes at home.

Protecting Public Health
West Valley Mosquito and Vector Control District

@wvmosquito @WestValleyMVCD

What You Can Do at Home:

- Dump and empty any containers with standing water every 2-3 days.
- Maintain pools by keeping them clean and operable or COMPLETELY drained and DRY.
- Fountains and watergardens should be free of algae, have working filters, and a device that agitates the water's surface.
- Place mosquitofish in ponds and water gardens to prevent future breeding (available free at the District, or we can deliver to you).
- Windows need tight fitting screens with no holes or tears.
- Mosquito repellent and netting can be used to protect against mosquitoes.
- Check for Stormwater devices on your property and be sure the are drained.
- Minimize time outside during dusk and dawn.
- Report standing water to vector control
- Give Vector Control Technicians access to property when they visit to inspect.

For Information and Assistance:

Contact the West Valley Mosquito and Vector Control District if you are experiencing problems with mosquitoes and need assistance.

909-635-0307

1295 East Locust St

Ontario, CA 91761

www.wvmvcd.org

Mosquito Life Cycle:

There are four stages to the mosquito life cycle. It only takes 7-10 days to complete an entire life cycle.



Eggs, larvae, and pupae are completely dependent on water; without standing water they will die.

Possible Mosquito Breeding Sites:

1. Unkept pools
2. Ponds
3. Pet dishes
4. Stormwater Retention devices/BMPs
5. Gutters
6. Storm drains
7. Open trash cans
8. Unkept fountains
9. Rain barrels
10. Flower pots
11. Tires

Containers, no matter what size, that can hold standing water are potential breeding sites.



APPENDIX D

MAINTENANCE COVENANT

AND WHEN RECORDED MAIL TO

City Clerk
City of Chino
P.O. Box 667
Chino, CA 91708

SPACE ABOVE THIS LINE FOR RECORDER'S USE

WATER QUALITY MANAGEMENT PLAN AND STORMWATER BMP TRANSFER, ACCESS AND MAINTENANCE AGREEMENT

CITY OF CHINO, COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA

This Agreement is made and entered into this 1 day of February, 2019, by and between the CITY OF CHINO, a municipal corporation, hereinafter referred to as CITY, and SLV Bickmore Holdings, LLC & HCW Bickmore Holdings, LLC hereinafter referred to as OWNER.

WHEREAS, the Owner is the legal property owner of the real property situated in the State of California, County of San Bernardino, located at Bickmore Avenue in the City of Chino, more commonly referred to as San Bernardino County Tax Assessor Parcel No. 1055-541-01 described in Exhibit A and depicted in Exhibit B attached hereto and incorporated herein by this reference; and

WHEREAS, at the time of initial approval of the development project known as TPM 19756 within the Property described herein, the City required the project to employ Best Management Practices, hereinafter referred to as "BMPs, " to minimize pollutants in urban runoff; and

WHEREAS, the Owner has chosen to install and/or implement BMPs as described in the Water Quality Management Plan, on file with the City, hereinafter referred to as "WQMP," to minimize pollutants in urban runoff and to minimize other adverse impacts of urban runoff; and

WHEREAS, said WQMP has been certified by the Owner and reviewed and approved by the City; and

WHEREAS, said BMPs, with installation and/or implementation on private property and draining only private property, are part of a private facility with all maintenance or replacement therefore, the sole responsibility of the Owner in accordance with the terms of this Agreement;

WHEREAS, the Owner is aware that periodic and continuous maintenance, including, but not necessarily limited to, filter material replacement and sediment removal, is required to assure peak performance of all BMPs in the WQMP and that, furthermore, such maintenance activity will require compliance with all Local, State, or Federal laws and regulations, including those pertaining to confined space and waste disposal methods, in effect at the time such maintenance occurs;

NOW THEREFORE, it is mutually stipulated and agreed as follows:

1. The Owner hereby provides the City or the City's designee complete access, of any duration, to the BMPs and their immediate vicinity at any time, upon reasonable notice, or in the event of emergency, as determined by City's Director of Public Works with no advance notice, for the purpose of inspection, sampling, testing of the BMPs, and in case of emergency, to undertake all necessary repairs or other preventative measures at the owner's expense as provided in paragraph 3 below. The City shall make every effort at all times to minimize or avoid interference with the Owner's use of the Property.

2. The Owner shall use its best efforts diligently to maintain all BMPs in a manner assuring peak performance at all times. All reasonable precautions shall be exercised by the Owner and the Owner's representative or contractor in the removal and extraction of any material(s) from the BMPs and the ultimate disposal of the material(s) in a manner consistent with all relevant laws and regulations in effect at the time. As may be requested from time to time by the City, the Owner shall provide the City with documentation identifying the material(s) removed, the quantity, and disposal destination.

3. In the event the Owner, or its successors or assigns, fails to accomplish the necessary maintenance contemplated by this Agreement, within five (5) days of being given written notice by the City, the City is hereby authorized to cause any maintenance necessary to be done and charge the entire cost and expense to the Owner or the Owner's successors or assigns, including administrative costs, attorneys fees and interest thereon at the maximum rate authorized by the Civil Code from the date of the notice of expense until paid in full.

4. The City may require the Owner to post security in form and for a time period satisfactory to the City to guarantee the performance of the obligations stated herein. Should the Owner fail to perform the obligations under this Agreement, the City may, in the case of a cash bond, act for the Owner using the proceeds from it, or in the case of a surety bond, require the sureties to perform the obligations of this Agreement. As an additional remedy, the Director may withdraw any previous stormwater-related approval with respect to the property on which BMPs have been installed and/or implemented until such time as the Owner repays to the City its reasonable costs incurred in accordance with paragraph 3 above.

5. This Agreement shall be recorded in the Office of the Recorder of San Bernardino County, California, at the expense of the Owner and shall constitute notice to all successors and assigns of the title to said Property of the obligation herein set forth, and also a lien in such amount as will fully reimburse the City, including interest as herein above set forth, subject to foreclosure in event of default in payment.

6. In event of legal action occasioned by any default or action of the Owner, or its successors or assigns, then the Owner and its successors or assigns agree(s) to pay all costs incurred by the City in enforcing the terms of this Agreement, including reasonable attorney's fees and costs, and that the same shall become a part of the lien against said Property.

7. It is the intent of the parties hereto that burdens and benefits herein undertaken shall constitute covenants that run with said Property and constitute a lien against the Property.

8. The obligations herein undertaken shall be binding upon the heirs, successors, executors, administrators and assigns of the parties hereto. The term "Owner" shall include not only the present Owner, but also its heirs, successors, executors, administrators, and assigns. The Owner shall notify any successor to title of all or part of the Property about the existence of this Agreement. The Owner shall provide such notice prior to such successor obtaining an interest in all or part of the Property. The Owner shall provide a copy of such notice to the City at the same time such notice is provided to the successor.

9. Time is of the essence in the performance of this Agreement.

10. Any notice to a party required or called for in this Agreement shall be served in person, or by deposit in the U.S. Mail, first class postage prepaid, to the address set forth below. Notice(s) shall be deemed effective upon receipt, or seventy-two (72) hours after deposit in the U.S. Mail, whichever is earlier. A party may change a notice address only by providing written notice thereof to the other party.

IF TO CITY:	IF TO OWNER:
Jose Alire	John H. Schafer
Assistant City Manager	Senior Vice President
13220 Central Avenue	3161 Michelson Drive, Suite 425
Chino, CA 91710	Irvine, CA 92612

IN WITNESS THEREOF, the parties hereto have affixed their signatures as of the date first written above.

APPROVED AS TO FORM:

By: (Signature Not Required)
City Attorney

City of Chino

By: _____
Matthew C. Ballantyne
City Manager

ATTEST:

_____
Angela Robles, City Clerk

APPROVED AS TO CONTENT:

By: _____
Jose Alire
Assistant City Manager
City of Chino

Owner: SLV Bickmore Holdings, LLC (75%)
HCW Bickmore Holdings, LLC (25%)
(Company)

By: _____
(Signature and Date)

Name: John H. Schafer
(Please Print or Type Name)

Title: Senior Vice President
(Please Print or Type Title)

NOTE: OWNER'S SIGNATURE MUST BE NOTARIZED FOR RECORDATION

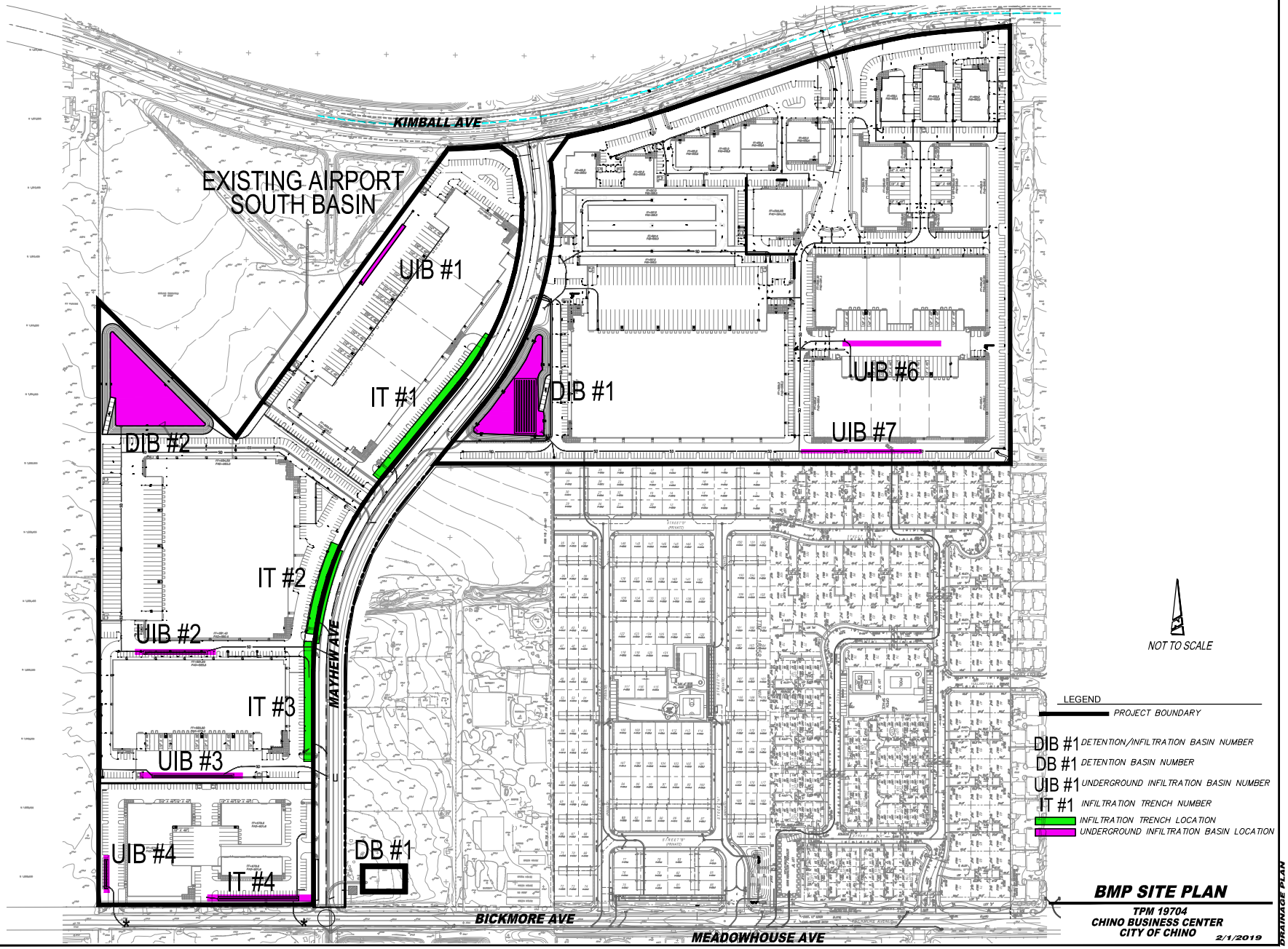

KIMBALL AVE
EXISTING AIRPORT
SOUTH BASIN
UIB #1
IT #1
DIB #1
UIB #6
UIB #7
DIB #2
IT #2
UIB #2
MAYHEW AVE
IT #3
UIB #3
UIB #4
IT #4
DB #1
BICKMORE AVE
MEADOWHOUSE AVE
NOT TO SCALE
LEGEND
PROJECT BOUNDARY
DIB #1 DETENTION/INFILTRATION BASIN NUMBER
DB #1 DETENTION BASIN NUMBER
UIB #1 UNDERGROUND INFILTRATION BASIN NUMBER
IT #1 INFILTRATION TRENCH NUMBER
INFILTRATION TRENCH LOCATION
UNDERGROUND INFILTRATION BASIN LOCATION
BMP SITE PLAN
TPM 19704
CHINO BUSINESS CENTER
CITY OF CHINO
2/1/2019
DRAINAGE PLAN

Exhibit A

LEGAL DESCRIPTION

Real property in the City of Chino, County of San Bernardino, State of California, described as follows:

PARCEL A: (APN: 1055-541-01-0-000 AND 1056-101-02-0-000)
LOTS 57 OF SECTION 29 AND LOT 54, SECTION 30, TOWNSHIP 2 SOUTH, RANGE 7 WEST, ACCORDING TO MAP OF SUBDIVISION OF A PART OF THE RANCHO SANTA ANA DEL CHINO, IN THE COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA, AS PER MAP RECORDED IN BOOK 6 PAGE 15 OF MAPS, IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY.

EXCEPT THEREFROM THAT PORTION CONVEYED TO THE COUNTY OF SAN BERNARDINO, BY DEED RECORDED SEPTEMBER 26, 1972 IN BOOK 8028, PAGE 259 OF OFFICIAL RECORDS.

PARCEL B: (APN: 1056-111-04-0-000 AND A PORTION OF 1055-541-02-0-000)

PARCEL 1 OF LOT LINE ADJUSTMENT NO. 2017-01, RECORDED DECEMBER 21, 2017 AS INSTRUMENT NO. 2017-0543255 OF OFFICIAL RECORDS AND MORE PARTICULARLY DESCRIBED AS FOLLOWS:

PARCEL 'B' OF LOT LINE ADJUSTMENT 2014-04, RECORDED FEBRUARY 18, 2016 AS INSTRUMENT NO. 2016-0062918, OFFICIAL RECORDS OF THE COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA, TOGETHER WITH A PORTION OF LOT 56, WITHIN SECTION 29, TOWNSHIP 2 SOUTH, RANGE 7 WEST, ACCORDING TO MAP OF SUBDIVISION OF A PART OF THE RANCHO SANTA ANA DEL CHINO, AS PER MAP RECORDED IN BOOK 6, PAGE 15 OF MAPS, IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY, BEING DESCRIBED AS FOLLOWS:

BEGINNING AT THE SOUTHWESTERLY CORNER OF SAID PARCEL 'B';

THENCE, ALONG THE WESTERLY LINE OF SAID PARCEL 'B', NORTH 00°37'00" WEST, A DISTANCE OF 926.66 FEET TO THE NORTHWESTERLY CORNER OF SAID PARCEL 'B';

THENCE, ALONG THE NORTHERLY LINE OF SAID PARCEL 'B' AND ITS' EASTERLY PROLONGATION, NORTH 89°17'08" EAST, A DISTANCE OF 660.00 FEET TO THE CENTERLINE OF SULTANA AVENUE, 66 FEET WIDE, SAID POINT ALSO BEING THE INTERSECTION OF THE WESTERLY PROLONGATION OF THE NORTHERLY LINE OF SAID LOT 56 AND THE CENTERLINE OF SULTANA AVENUE;

THENCE, ALONG THE WESTERLY PROLONGATION OF THE NORTHERLY LINE OF SAID LOT 56 AND THE NORTHERLY LINE OF SAID LOT 56, NORTH 89°22'47" EAST, A DISTANCE OF 244.10 FEET TO THE INTERSECTION OF A LINE THAT IS PARALLEL WITH AND 9.00 FEET SOUTHEASTERLY, AS MEASURED AT RIGHT ANGLES, FROM THE CENTERLINE OF AN EASEMENT FOR SEWER PURPOSES DESCRIBED IN A DEED RECORDED DECEMBER 3, 2015 AS INSTRUMENT NO. 2015-0524851, OFFICIAL RECORDS OF SAID COUNTY;

THENCE, ALONG SAID PARALLEL LINE, SOUTH 38°34'57" WEST, A DISTANCE OF 83.48 FEET TO THE BEGINNING OF A TANGENT CURVE, CONCAVE SOUTHEASTERLY, AND HAVING A RADIUS OF 850.00 FEET;

THENCE, SOUTHERLY ALONG SAID CURVE AND SAID PARALLEL LINE, THROUGH A CENTRAL ANGLE OF 39°12'14", AN ARC DISTANCE OF 581.60 FEET TO THE CENTERLINE OF SULTANA AVENUE;
THENCE, ALONG THE CENTERLINE OF SULTANA AVENUE, SOUTH 00°37'17" EAST, A DISTANCE OF 57.84 FEET TO THE INTERSECTION OF THE WESTERLY PROLONGATION OF THE SOUTHERLY LINE OF SAID LOT 56 AND THE CENTERLINE OF SULTANA AVENUE;

THENCE, AT A RIGHT ANGLE TO THE CENTERLINE OF SULTANA AVENUE, SOUTH 89°22'43" WEST, A DISTANCE OF 33.00 FEET TO THE EASTERLY LINE OF SAID PARCEL 'B';

THENCE, ALONG THE EASTERLY LINE OF SAID PARCEL 'B', SOUTH 00°37'17" EAST, A DISTANCE OF 266.86 FEET TO THE SOUTHEASTERLY CORNER OF SAID PARCEL 'B';

THENCE, ALONG THE SOUTHERLY LINE OF SAID PARCEL 'B', SOUTH 89°16'50" WEST, A DISTANCE OF 627.08 FEET TO THE POINT OF BEGINNING.

PARCEL C: (APN: A PORTION OF 1055-541-02-0-000)

PARCEL 2 OF LOT LINE ADJUSTMENT NO. 2017-01, RECORDED DECEMBER 21, 2017 AS INSTRUMENT NO. 2017-0543255 OF OFFICIAL RECORDS AND MORE PARTICULARLY DESCRIBED AS FOLLOWS:

A PORTION OF LOT 56, WITHIN SECTION 29, TOWNSHIP 2 SOUTH, RANGE 7 WEST, ACCORDING TO MAP OF SUBDIVISION OF A PART OF THE RANCHO SANTA ANA DEL CHINO, AS PER MAP RECORDED IN BOOK 6, PAGE 15 OF MAPS, IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY, BEING DESCRIBED AS FOLLOWS:

BEGINNING AT THE SOUTHEASTERLY CORNER OF SAID LOT 56;

THENCE, ALONG THE EASTERLY LINE OF SAID LOT 56, NORTH 00°38'37" WEST, A DISTANCE OF 660.00 FEET TO THE NORTHEASTERLY CORNER OF SAID LOT 56;

THENCE, ALONG THE NORTHERLY LINE OF SAID LOT 56, SOUTH 89°22'47" WEST, A DISTANCE OF 417.46 FEET TO THE INTERSECTION OF A LINE THAT IS PARALLEL WITH AND 9.00 FEET SOUTHEASTERLY, AS MEASURED AT RIGHT ANGLES, FROM THE CENTERLINE OF AN EASEMENT FOR SEWER PURPOSES DESCRIBED IN A DEED RECORDED DECEMBER 3, 2015 AS INSTRUMENT NO. 2015-0524851, OFFICIAL RECORDS OF SAID COUNTY;

THENCE, ALONG SAID PARALLEL LINE, SOUTH 38°34'57" WEST, A DISTANCE OF 83.48 FEET TO THE BEGINNING OF A TANGENT CURVE, CONCAVE SOUTHEASTERLY, AND HAVING A RADIUS OF 850.00 FEET;

THENCE, SOUTHERLY ALONG SAID CURVE AND SAID PARALLEL LINE, THROUGH A CENTRAL ANGLE OF 39°12'14", AN ARC DISTANCE OF 581.60 FEET TO THE CENTERLINE OF SULTANA AVENUE;

THENCE, ALONG THE CENTERLINE OF SULTANA AVENUE, SOUTH 00°37'17" EAST, A DISTANCE OF 57.84 FEET TO THE INTERSECTION OF THE WESTERLY PROLONGATION OF THE SOUTHERLY LINE OF SAID LOT 56 AND THE CENTERLINE OF SULTANA AVENUE;

THENCE, ALONG THE WESTERLY PROLONGATION OF SAID LOT 56 AND THE SOUTHERLY LINE OF SAID LOT 56, NORTH 89°23'49" EAST, A DISTANCE OF 661.81 FEET TO THE POINT OF BEGINNING.

PARCEL D: (APN: A PORTION OF 1055-231-01-0-000 AND A PORTION OF 1055-231-02-0-000)

PARCEL 3 OF LOT LINE ADJUSTMENT NO. 2017-01, RECORDED DECEMBER 21, 2017 AS INSTRUMENT NO. 2017-0543255 OF OFFICIAL RECORDS AND MORE PARTICULARLY DESCRIBED AS FOLLOWS:

PORTIONS OF LOT 40 AND LOT 41, WITHIN SECTION 29, TOWNSHIP 2 SOUTH, RANGE 7 WEST, ACCORDING TO MAP OF SUBDIVISION OF A PART OF THE RANCHO SANTA ANA DEL CHINO, AS PER MAP RECORDED IN BOOK 6, PAGE 15 OF MAPS, IN THE OFFICE OF THE COUNTY RECORDER OF SAID

COUNTY, BEING DESCRIBED AS FOLLOWS:

BEGINNING AT THE SOUTHEAST CORNER OF SAID LOT 41;

THENCE, ALONG THE SOUTHERLY LINE OF SAID LOT 41, SOUTH 89°22'47" WEST, A DISTANCE OF 417.46 FEET, TO A LINE THAT IS PARALLEL WITH AND 9.00 FEET SOUTHEASTERLY, AS MEASURED AT RIGHT ANGLES, FROM THE CENTERLINE OF AN EASEMENT FOR SEWER PURPOSES DESCRIBED IN A DEED RECORDED DECEMBER 3, 2015 AS INSTRUMENT NO. 2015-0524851, OFFICIAL RECORDS OF SAID COUNTY;

THENCE, LEAVING SAID SOUTHERLY LINE OF SAID LOT 41 AND ALONG SAID PARALLEL LINE, NORTH 38°34'57" EAST, A DISTANCE OF 268.69 FEET, TO THE BEGINNING OF A CURVE, CONCAVE NORTHWESTERLY, AND HAVING A RADIUS OF 850.00 FEET;

THENCE, NORTHERLY ALONG SAID CURVE AND CONTINUING ALONG SAID PARALLEL LINE, THROUGH A CENTRAL ANGLE OF 47°04'17", AN ARC DISTANCE OF 698.32 FEET;

THENCE, CONTINUING ALONG SAID PARALLEL LINE NORTH 08°29'20" WEST, A DISTANCE OF 75.00 FEET TO THE GENERAL SOUTHERLY LINE OF THAT CERTAIN PROPERTY DESCRIBED IN SAID GRANT DEED, RECORDED SEPTEMBER 26, 1972 IN BOOK 8028, PAGE 259 OF OFFICIAL RECORDS OF SAID COUNTY, SAID POINT ALSO BEING THE BEGINNING OF A CURVE, CONCAVE NORTHERLY, AND HAVING A RADIUS OF 2050.00 FEET, A RADIAL LINE TO SAID POINT BEARS SOUTH 08°29'20" EAST;

THENCE, ALONG SAID GENERAL SOUTHERLY LINE, AND EASTERLY ALONG SAID CURVE, THROUGH A CENTRAL ANGLE OF 2°05'57", AN ARC DISTANCE OF 75.10 FEET, TO THE EASTERLY LINE OF SAID LOT 40, ALSO BEING THE SOUTHEAST CORNER OF SAID GRANT DEED, RECORDED SEPTEMBER 26, 1972 IN BOOK 8028, PAGE 259 OF OFFICIAL RECORDS OF SAID COUNTY;

THENCE, ALONG THE EASTERLY LINES OF SAID LOTS 40 AND 41, SOUTH 00°38'37" EAST, A DISTANCE OF 947.77 FEET, TO THE POINT OF BEGINNING;

PARCEL E: (APN: A PORTION OF 1055-231-01-0-000 AND A PORTION OF 1055-231-02-0-000)

PARCEL 4 OF LOT LINE ADJUSTMENT NO. 2017-01, RECORDED DECEMBER 21, 2017 AS INSTRUMENT NO. 2017-0543255 OF OFFICIAL RECORDS AND MORE PARTICULARLY DESCRIBED AS FOLLOWS:

PORTIONS OF LOT 40 AND LOT 41, WITHIN SECTION 29, TOWNSHIP 2 SOUTH, RANGE 7 WEST, ACCORDING TO MAP OF SUBDIVISION OF A PART OF THE RANCHO SANTA ANA DEL CHINO, AS PER MAP RECORDED IN BOOK 6, PAGE 15 OF MAPS, IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY, BEING DESCRIBED AS FOLLOWS:

BEGINNING AT THE SOUTHEAST CORNER OF SAID LOT 41;

THENCE, ALONG THE SOUTHERLY LINE OF SAID LOT 41, SOUTH 89°22'47" WEST, A DISTANCE OF 417.46 FEET, TO A LINE THAT IS PARALLEL WITH AND 9.00 FEET SOUTHEASTERLY, AS MEASURED AT RIGHT ANGLES, FROM THE CENTERLINE OF AN EASEMENT FOR SEWER PURPOSES DESCRIBED IN A DEED RECORDED DECEMBER 3, 2015 AS INSTRUMENT NO. 2015-0524851, OFFICIAL RECORDS OF SAID COUNTY, SAID POINT BEING THE TRUE POINT OF BEGINNING;

THENCE, LEAVING SAID SOUTHERLY LINE OF SAID LOT 41 AND ALONG SAID PARALLEL LINE, NORTH 38°34'57" EAST, A DISTANCE OF 268.69 FEET, TO THE BEGINNING OF A CURVE, CONCAVE NORTHWESTERLY, AND HAVING A RADIUS OF 850.00 FEET;

THENCE, NORTHERLY ALONG SAID CURVE AND CONTINUING ALONG SAID PARALLEL LINE, THROUGH A CENTRAL ANGLE OF 47°04'17", AN ARC DISTANCE OF 698.32 FEET;

THENCE, CONTINUING ALONG SAID PARALLEL LINE NORTH 08°29'20" WEST, A DISTANCE OF 75.00 FEET TO THE GENERAL SOUTHERLY LINE OF THAT CERTAIN PROPERTY DESCRIBED IN SAID GRANT DEED, RECORDED SEPTEMBER 26, 1972 IN BOOK 8028, PAGE 259 OF OFFICIAL RECORDS OF SAID COUNTY, SAID POINT ALSO BEING THE BEGINNING OF A CURVE, CONCAVE NORTHERLY, AND HAVING A RADIUS OF 2050.00 FEET, A RADIAL LINE TO SAID POINT BEARS SOUTH 08°29'20" EAST;

THENCE, ALONG SAID GENERAL SOUTHERLY LINE, AND WESTERLY ALONG SAID CURVE, THROUGH A CENTRAL ANGLE OF 06°27'40", AN ARC DISTANCE OF 231.18 FEET;

THENCE, CONTINUING ALONG SAID GENERAL SOUTHERLY LINE SOUTH 35°40'15" WEST, A DISTANCE OF 602.63 FEET TO THE CENTERLINE OF SULTANA AVENUE, 66 FEET WIDE;

THENCE, ALONG SAID CENTERLINE OF SULTANA AVENUE, SOUTH 00°37'17" EAST, A DISTANCE OF 431.72 FEET TO THE INTERSECTION OF THE WESTERLY PROLONGATION OF THE SOUTHERLY LINE OF SAID LOT 41 AND SAID CENTERLINE OF SULTANA AVENUE;

THENCE, ALONG SAID WESTERLY PROLONGATION AND THE SOUTHERLY LINE OF SAID LOT 41, NORTH 89°22'47" EAST, A DISTANCE OF 244.10 FEET TO THE TRUE POINT OF BEGINNING.

APPENDIX E

SOILS REPORT

May 28, 2015

Project No. G14-1194-20

Mr. Craig Cristina, Director of Entitlement
RICHLAND REAL ESTATE FUND, LLC
3161 Michelson Drive, Suite 425
Irvine, California 92612

Subject: ***Preliminary Infiltration Testing Investigation for the Proposed Onsite Storm Water Infiltration Basin Areas BMP, 121 Acre Richland Assemblage, Chino Project, City of Chino, San Bernardino County, California.***

Reference: *MacDavid Aubort and Associates, Inc., Conceptual Master Plan # 2, Scale: 1"=100', dated March 31, 2015.*

Philip Bias Consulting, Plan for Medium Density Residential, West Preserve – Bouma Property, Scale: 1"=100', dated February 23, 2015.

ProActive Engineering Consultants, Richland Chino Bickmore Properties Net Acreage Exhibit, Scale: 1"=300', dated October 3, 2014.

1.0 INTRODUCTION

LGC Geo-Environmental, Inc. (LGC) is pleased to present this preliminary infiltration testing investigation report for the proposed onsite storm water infiltration device areas Best Management Practices (BMP), relative to the proposed 121 acre Richland Assemblage, Chino Project, in the City of Chino, San Bernardino County, California. The purpose of our study was to determine the physical characteristics of the subsurface soils and vertical infiltration rates for the four (4) proposed onsite storm water infiltration device areas, within specific portions of the subject property, as indicated by the project Architect/Planner, on a copy of the referenced Conceptual Master Plan # 2.

2.0 PROPERTY LOCATIONS AND DESCRIPTION

The subject site is roughly rectangular in shape and is about 121 acres in size and is located approximately 920 feet east of Euclid Avenue and about 210 feet west of Rincon Meadows Avenue, in the City of Chino, County of San Bernardino, California. The site is bounded on the north by Kimball Avenue, agricultural fields and a retention basin, on the east by multi-family residential development and a dairy, on the west by a storage facility and agricultural fields, and on the south by Bickmore Avenue.

The topography of the site is relatively level, with a change in elevation roughly 30 feet from the northeast corner to the southwest corner. Drainage appears to flow south to southwest, with elevations ranging from approximately 607

feet msl in the northeast portion of the site to approximately 567 feet above mean sea level (msl) in the southwest portion of the site.

The majority of the site appears to be mainly agricultural crop lands, with several nurseries in the southwestern portion of the site and an abandoned dairy in the northeast corner of the site. Portions of the perimeters of the site have a light to moderate growth of annual weeds and grasses. Some scattered piles of concrete, debris/trash and vegetation also exist on the site.

3.0 PROPOSED CONSTRUCTION

Based on the proposed onsite storm water infiltration device areas, as indicated on a copy of the referenced Conceptual Master Plan # 2, infiltration appears to be proposed within onsite storm water infiltration areas, located in four (4) separate proposed locations of the subject site to handle the onsite sheet flow and storm drain flow from water within the surrounding areas. The approximate locations can be found on either the Infiltration Test Trench Location Map (Plate 1) or on the Aerial Infiltration Test Trench Location Map (Plate 2).

4.0 SUBSURFACE EXPLORATION AND INFILTRATION TESTING

4.1 Subsurface Exploration

Subsurface exploration of the subject site consisted of excavating eight (8) infiltration test trench locations, IT-1 through IT-8, utilizing a backhoe, on April 28 and 29, 2015, within proposed onsite storm water infiltration device areas locations, at depths of approximately 5.0 feet to 10.0 feet below existing grade or pre-existing surrounding grade for near surface infiltration testing. Infiltration test trenches IT-3 and IT-4 where located within an existing approximately 4.0 foot to 6.0 f feet to foot deep retention basin from the former dairy operations. Therefore the overall depths of these trenches were about 5.5 feet to 9.0 feet deep. Earth materials encountered within the locations were classified in general accordance with the visual manual procedures of the Unified Soil Classification System (USCS). Logs of the infiltration test trenches are presented in Appendix A, and their approximate locations are depicted on the Infiltration Test Trench Location Map (Plate 1) and on the Aerial Infiltration Test Trench Location Map (Plate 2).

Prior to the subsurface exploration work, an underground utilities clearance was obtained from Underground Service Alert of Southern California. At the conclusion of the subsurface exploration, all the test trenches were backfilled with existing materials with some compactive effort. Minor settlement of the backfill soils may occur over time.

4.2 Infiltration Testing

From April 28 through 30, 2015, eight (8) shallow percolation method infiltration tests, labeled IT-1 through IT-8, were performed in the bottom of the infiltration test trenches. An 8-inch diameter, 12-inch long, plastic liner was placed within a 12-inch deep excavated test hole and approximately 2 inches of ¾-inch gravel was placed below the bottom of the liner. At least 9 inches of clean water was filled within each of the test holes. From a fixed test point, the drop in water level, in inches, and the amount of water used was measured and recorded at intervals over a period of at least 6 readings or until the rate for two consecutive readings was within a five percent variation. The field percolation rates were reduced in the field utilizing a reduction factor of the actual field test rates per the Porchet Method in order to get an infiltration rate. This testing methodology, utilizing a reduction factor of 2.97 to 3.39 of the actual field test rates, was utilized due to the

nature of the soil types within the proposed infiltration device areas. The results are presented in Table 1 found in following section 5.3. The infiltration test data sheets are presented in Appendix A.

5.0 FINDINGS

5.1 Earth Materials

The earth materials underlying the proposed onsite storm water infiltration basin area, to the depths explored include undocumented artificial fill, topsoil, alluvium and older alluvium within the upper 3.0 feet to 37.5 feet. A description of the earth material soils encountered is described below:

Artificial Fill, Undocumented (Afu): Undocumented non-engineered artificial fills are present, scattered over the majority of the of the subject site, associated with the previous dairy structures and operations as well as the existing agricultural operations. Based on exploration and mapping the approximate depths of these fill soils is estimated to range from about 0.0 feet to 5.0 feet. Where observed these non-engineered fill soils are generally comprised of silty sand, clayey sand and sandy silt, which are various shades of yellow, brown and olive, very fine to coarse-grained, dry to damp, medium dense to dense, desiccated, with some local gravel.

Topsoil (No map symbol): Topsoil was encountered within the majority of the exploratory trenches at the surface up to depths of about 0.6 feet to 2.5 feet. These materials were generally consisted of silty sand, clayey sand and sandy silt, with a trace of clay, which were very fine to medium grained, various shades of olive, brown, gray and black, dry to damp, loose to medium dense and soft to firm, desiccated, porous and slightly mottled, with some roots and rootlets.

Alluvium (Qal): Alluvium was present below the undocumented artificial fill and topsoil, down to depth of about 8.0 feet. Within some previously graded areas the alluvium was exposed at the surface, These materials were generally comprised of silty sand, clayey sand, sandy silt, silty clay and sandy clay, which were very fine to coarse grained, various shades of brown, olive, gray and orange, dry to very moist, medium dense to dense and stiff to very stiff, with a trace of gravel, local areas of abundant calcium nodules and caliche, some pinhole pores, with a trace of mottling and locally desiccated. These materials were typically weathered, higher in porosity, more desiccated and lower in density within about the upper 0.5 foot to 3.0 feet.

Older Alluvium (Qoal): Older alluvium, where observed in exploratory trenches, was present below the alluvium at depths of about 0.8 foot 5.5 feet and likely deeper. These materials were generally comprised of sand, silty sand, clayey sand and sandy silt, which were very fine to medium grained, various shades of yellow, brown, orange and gray, dry to moist, dense and stiff, locally friable, with some pinhole pores, trace caliche, slightly micaceous, some oxidation, with some root casts and rootlets.

5.2 Groundwater

Groundwater was encountered during recent subsurface exploration for the in progress geotechnical investigation of the site, at a depth of approximately 28 feet to 30 feet below the existing surface. A review of the Chino Basin Watermaster "Depth to Groundwater Contour Map, Fall 2006"and "Groundwater Elevation Contours Map, in Spring of 2012" as well as near-by water well information indicates groundwater in the general site area is at a depth of about 25 feet to 75 feet.

5.3 *Infiltration Testing Results*

The shallow infiltration testing rates for design considerations for each of proposed storm water infiltration device BMP are presented below:

Table 1: Infiltration Design Rates

TEST NO.	*PROPOSED INILTRATION AREA*	*TEST DEPTH (Feet)*	*INFILTRATION RATES*		*SOIL DESCRIPTION (USCS)*
			FIELD PERCOLATION RATE INCHES/HOUR	*DESIGN INFILTRATION RATE INCHES/HOUR*	
IT-1	1	5.0	3.4	1.1	Silty SAND (SM) / Clayey SAND (SC)
IT-2	1	7.0	1.8	0.5	Clayey SAND (SC)
IT-3	2	3.0 (9.0 below surrounding pre-existing grade)	0.9	0.3	Silty SAND (SM)
IT-4	2	1.5 (5.5 below surrounding pre-existing grade)	2.5	0.8	Silty SAND (SM)
IT-5	3	5.0	3.8	1.2	Silty SAND (SM)
IT-6	3	10.0	0.9	0.3	Silty SAND (SM)
IT-7	4	8.0	3.0	1.0	Silty SAND (SM) / Clayey SAND (SC)
IT-8	4	5.0	4.3	1.4	Clayey SAND (SC)

6.0 *CONCLUSIONS AND RECOMMENDATIONS*

Shallow infiltration testing for the proposed drainage system indicated design rates of approximately 0.3 inches/hour to 1.4 inches/hour at depths of approximately 1.5 feet to 10.0 feet (5.0 feet to 10.0 feet overall), as presented in the above Infiltration Design Rate Table, Section 5.3. Groundwater should be approximately 25 feet to 30 feet below the existing ground surface and should not be present within the current allowable limit of within 10 feet of the bottom of testing and/or proposed infiltration drainage device systems, set forth by the City of Chino, County of San Bernardino and California State requirements. Therefore proposed infiltration drainage device systems should not be deeper than 15 feet below the existing ground surface.

7.0 INVESTIGATION LIMITATIONS

This report is based upon information provided by the client and the project civil engineer, a limited number of subsurface excavations, field observations, and infiltration tests to which various methods of analysis and interpretation were applied. The materials encountered and tested in the field on the project site are believed to be representative of the project area, and the conclusions and recommendations contained herein are presented on that basis. However, soil materials can vary in characteristics between points of exploration, both laterally and vertically, and those variations could affect the conclusions, recommendations, and performance of the proposed storm water infiltration Best Management Practice, or BMP. Fluctuations in the level of groundwater may occur due to variations in rainfall, irrigation, and the other factors not in evidence at the time measurements were made. If this occurs, the changed conditions must be evaluated by the project geotechnical engineer and engineering geologist and design(s) adjusted as required or alternate design(s) recommended.

This report is issued with the understanding that it is the responsibility of the owner, or of his/her representative, to ensure that the information and recommendations contained herein are brought to the attention of the project engineer and incorporated into the plans, and the necessary steps are taken to see that the contractor and/or subcontractor properly implements the recommendations in the field.

The conclusions and opinions contained in this report are based on the results of the described geotechnical evaluations and represent our professional judgment. The findings, conclusions and recommendations contained in this report are to be considered tentative only and subject to confirmation by the undersigned during the construction process. Without this confirmation, this report is to be considered incomplete and LGC or the undersigned professionals assume no responsibility for its use.

The conclusions and opinions contained in this report are valid up to a period of 2 years from the date of this report. Changes in the conditions of a property can and do occur with the passage of time, whether they be because of natural processes or the works of man on this or adjacent properties. In addition, changes in applicable or appropriate codes or standards may occur, whether they result from legislation or the broadening of knowledge. Accordingly, the findings of this report may be invalidated wholly or partially by changes outside our control. Therefore if any of the above mentioned situations occur, an update of this report should be completed.

This report has not been prepared for use by parties or projects other than those named or designed above. It may not contain sufficient information for other parties or other purposes.

The opportunity to be of service is appreciated. Should you have any questions regarding the content of this report, or should you require additional information, please do not hesitate to contact this office at your earliest convenience.

Our services were performed using the degree of care and skill ordinarily exercised, under similar circumstances, by engineers and geologists practicing in this or other localities. The contents of this report are professional opinions and as such, are not to be considered a guarantee or warranty.

The opportunity to be of service is appreciated. Should you have any questions regarding the content of this report, or should you require additional information, please do not hesitate to contact this office at your earliest convenience.

Respectfully submitted,

LGC Geo-Environmental, Inc.

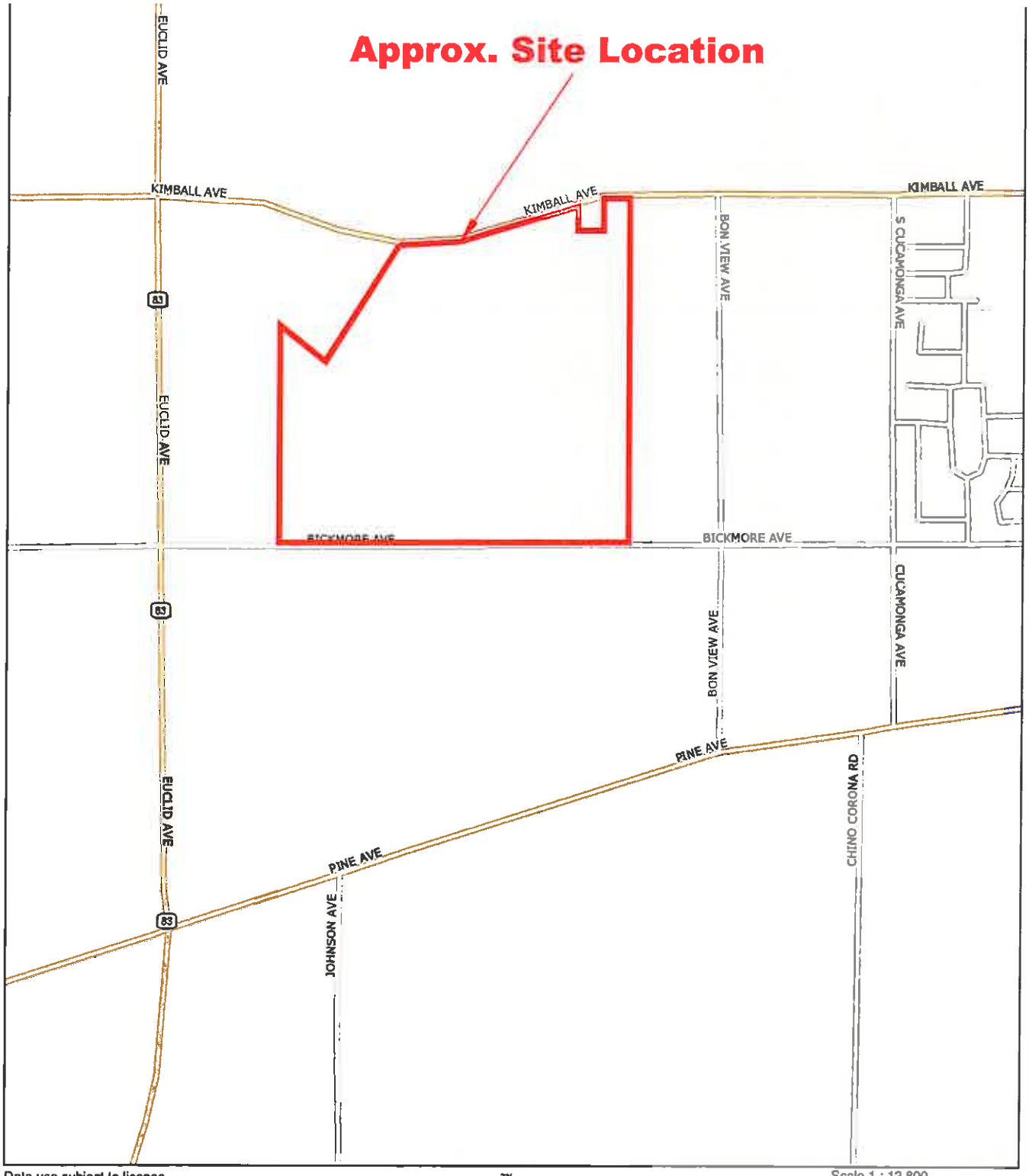
Robert L. Gregorek II, CEG 1257
Geologic Operations Manager

Larry D. Cooley, RCE 54037
Project Engineer

ARP/RLG/LDC

Distribution: (3) Addressee

Attachments: Figure 1 – Site Location Map *(Rear of Text)*
Appendix A – Infiltration Test Trench Logs *(Rear of Text)*
Appendix B – Infiltration Test Results *(Rear of Text)*
Plate 1 – Infiltration Test Trench Location Map *(In Pocket)*
Plate 2 – Aerial Infiltration Test Trench Location Map *(In Pocket)*



LGC

FIGURE 1
SITE LOCATION MAP

Project Name	RICHLAND ASSEMBLAGE, CHINO
Project No.	G14-1194-20
Geol./ Eng.	RLG/LDC
Scale	AS SHOWN
Date	MAY 2015

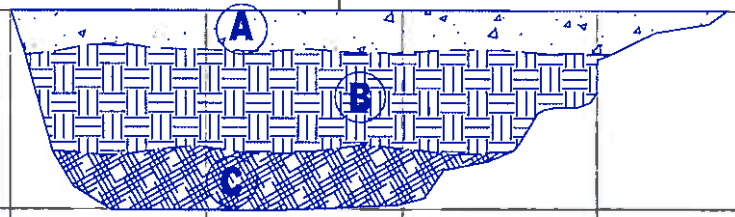
APPENDIX A

INFILTRATION TEST TRENCH LOGS

Project Name: RICHLAND ASSEMBLAGE, CHINO	**Logged by:** KRM	**LOG OF TEST TRENCH IT-1**
Project Number: G141194-20	**Elevation:**	**Engineering Properties**
Equipment: BACKHOE	**Location/Grid:** SEE PLATE 1 AND PLATE 2	

Depth (ft)	Date: 4/28/15 — Description:	Geologic Unit	USCS	Sample No.	Moisture (%)	Dry Density (pcf)
0-1.0	A TOPSOIL: Sandy SILT; medium to light olive brown, dry to damp, soft to firm, very fine to medium grained, desiccated in upper 1.0' and porous.		ML			
1.0-3.5	B WEATHERED ALLUVIUM: Silty SAND/Sandy SILT; dark to medium olive brown, dry to damp, medium dense/stiff. very fine to medium grained, highly porous (pinhole pores and pores) and rootcasts up to 0.25". @ 2.5', porosity decreases.		SM/ML			
3.5-5.0	C ALLUVIUM: Silty SAND/Clayey SAND; dark to medium brown and olive brown, damp to moist, dense/stiff, very fine to medium grained, lens of abundant calcium nodules and caliche, some pinhole pores, trace of mottling. @ 5.0', Infiltration test.	Qal	SM/SC			

GRAPHICAL REPRESENTATION: EAST WALL | **SCALE: 1" = 5'** | **SURFACE SLOPE: LEVEL** | **TREND: N8E**



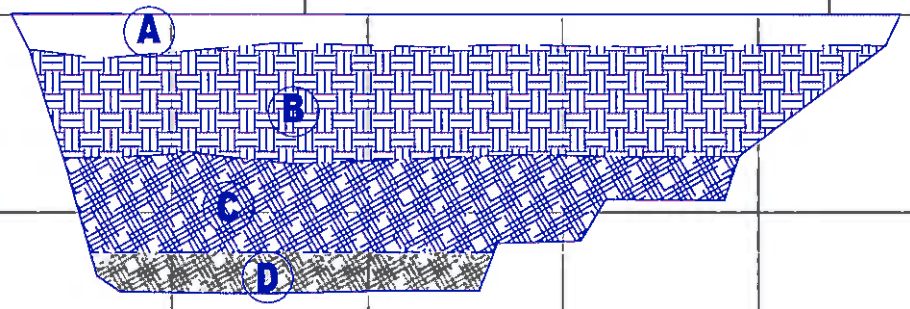
TOTAL DEPTH= 5.0' FEET
NO GROUNDWATER ENCOUNTERED

LGC

Project Name: RICHLAND ASSEMBLAGE, CHINO	**Logged by:** KRM	**LOG OF TEST TRENCH IT-2**	
Project Number: G141194-20	**Elevation:**	**Engineering Properties**	
Equipment: BACKHOE	**Location/Grid:** SEE PLATE 1 AND PLATE 2		

Depth (ft)	Date: 4/28/15 — Description:	Geologic Unit	USCS	Sample No.	Moisture (%)	Dry Density (pcf)
0-0.6	A TOPSOIL: Sandy SILT; medium to light olive brown, dry to damp, stiff, very fine to medium grained, desiccated, porous, roots and rootlets.		ML			
0.6-3.5	B WEATHERED ALLUVIUM: Silty SAND/Sandy SILT; olive brown, dry to damp, medium dense/stiff. very fine to medium grained, highly porous (pinhole pores and pores up to 0.5"), trace rootlets.		SM/ML			
3.5-6.0	C ALLUVIUM: Silty SAND/Clayey SAND; brown olive, damp to moist, medium dense/stiff, fine to coarse grained, trace of caliche nodules, slightly mottled, pores and pinhole pores.	Qal	SM/SC			
6.0-7.0	D ALLUVIUM: Clayey SAND; brown gray, damp to moist, stiff, very fine to medium grained, abundant calcium nodules, slightly mottled, some pinhole pores and rootcasts. @ 7.0', Infiltration test.	Qal	SC			

GRAPHICAL REPRESENTATION: EAST WALL | **SCALE: 1" = 5'** | **SURFACE SLOPE: LEVEL** | **TREND: N5E**



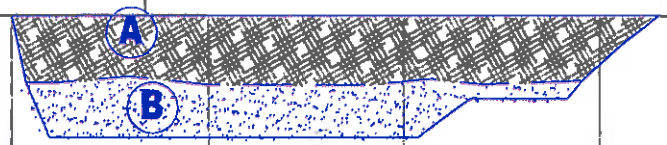
TOTAL DEPTH= 7.0 FEET
NO GROUNDWATER ENCOUNTERED

LGC

Project Name: RICHLAND ASSEMBLAGE, CHINO	Logged by: KRM	LOG OF TEST TRENCH IT-3
Project Number: G141194-20	Elevation: 9.0' BELOW PRE-EXISTING	Engineering Properties
Equipment: BACKHOE	Location/Grid: SEE PLATE 1 AND PLATE 2	

Depth (ft)	Date: 4/28/15 — Description:	Geologic Unit	USCS	Sample No.	Moisture (%)	Dry Density (pcf)
0-1.5	A ALLUVIUM: Silty SAND/Clayey SAND; brown gray and buff gray, dry, dense/stiff, very fine to medium grained, abundant caliche nodules, blocky in upper 0.8', pores up to 0.25" and voids up to 0.5", roots and rootlets. @ 1.0', Getting damp.	Qal	SM/SC			
1.5-3.0	B OLDER ALLUVIUM: Silty SAND; yellowish brown and orange brown, damp to moist, dense, fine to medium grained, pinhole pores, trace of caliche, oxidation and rootlets. @ 3.0', Infiltration test.	Qoal	SM			

GRAPHICAL REPRESENTATION: EAST WALL	SCALE: 1" = 5'	SURFACE SLOPE: LEVEL	TREND: N80E



TOTAL DEPTH= 3.0 FEET
NO GROUNDWATER ENCOUNTERED

LGC

Project Name: RICHLAND ASSEMBLAGE, CHINO	Logged by: KRM	LOG OF TEST TRENCH IT-4
Project Number: G141194-20	Elevation:	Engineering Properties
Equipment: BACKHOE	Location/Grid: SEE PLATE 1 AND PLATE 2	

Depth	Date: 4/28/15 Description:	Geologic Unit	USCS	Sample No.	Moisture (%)	Dry Density (pcf)
0-0.8	A ALLUVIUM: Silty SAND/Clayey SAND; brown, dry, loose to medium dense, fine to coarse grained, highly desiccated, some fine gravel, abundant calcium nodules.	Qal	SM/SC			
0.8-1.5	B OLDER ALLUVIUM: Silty SAND; yellowish brown, damp to moist, dense, fine to medium grained, slightly mottled, trace of calcite nodules. @ 1.5', Infiltration test.	Qoal	SM			

GRAPHICAL REPRESENTATION: EAST WALL	SCALE: 1" = 5'	SURFACE SLOPE: LEVEL	TREND: N85E



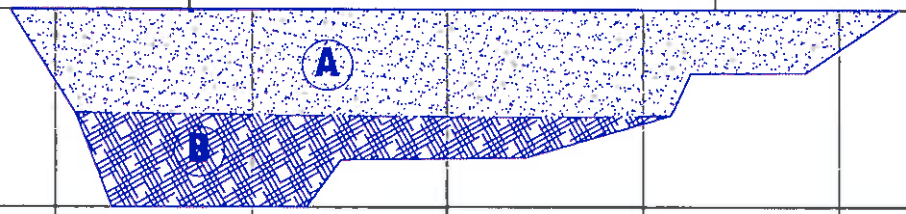
TOTAL DEPTH= 1.5 FEET
NO GROUNDWATER ENCOUNTERED

LGC

Project Name: RICHLAND ASSEMBLAGE, CHINO	Logged by: KRM	LOG OF TEST TRENCH IT-5
Project Number: G141194-20	Elevation:	Engineering Properties
Equipment: BACKHOE	Location/Grid: SEE PLATE 1 AND PLATE 2	

Depth (ft)	Date: 4/28/15	Description:	Geologic Unit	USCS	Sample No.	Moisture (%)	Dry Density (pcf)
0-2.5	A	TOPSOIL: Clayey SAND; dark brown to black, dry to damp at 1.0', fine to medium grained, abundant pinhole pores and pores up to 0.25", crushed stone placed in upper 0.3', slightly desiccated in upper 0.3', slightly mottled and micaceous. @ 2.5', Reduced porosity.		ML			
2.5-5.0	B	ALLUVIUM: Silty SAND; dark to light orange brown and gray brown, dry to damp, dense, pinhole pores, slightly mottled, some clay, trace fine gravel and roothairs. @ 4.0', Abundant calcium nodules, up to 3". @ 5.0', Infiltration test.	Qal	SM			

GRAPHICAL REPRESENTATION: EAST WALL	SCALE: 1" = 5'	SURFACE SLOPE: LEVEL	TREND: N85E



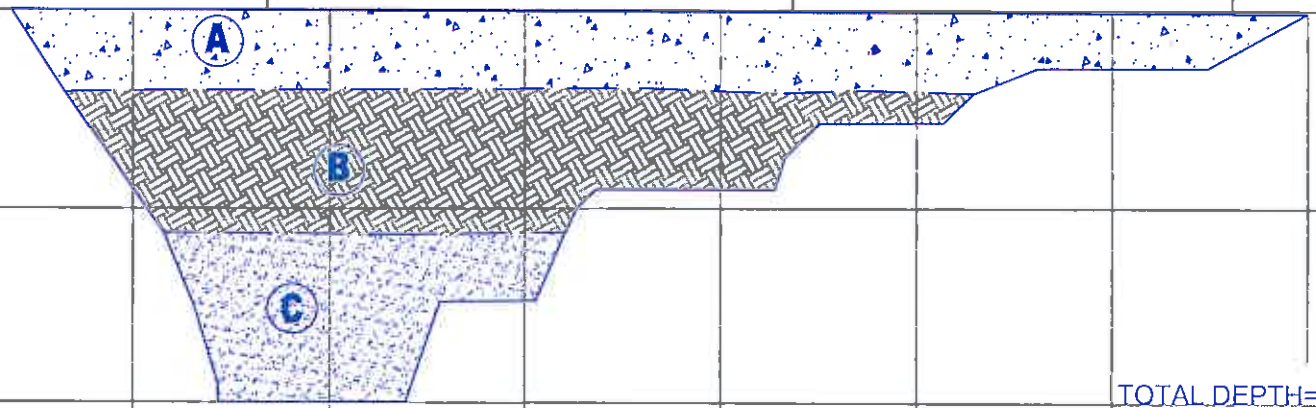
TOTAL DEPTH= 5.0' FEET
NO GROUNDWATER ENCOUNTERED

LGC

Project Name: RICHLAND ASSEMBLAGE, CHINO	Logged by: KRM	LOG OF TEST TRENCH IT-6
Project Number: G141194-20	Elevation:	Engineering Properties
Equipment: BACKHOE	Location/Grid: SEE PLATE 1 AND PLATE 2	

Depth	Date: 4/28/15 Description:	Geologic Unit	USCS	Sample No.	Moisture (%)	Dry Density (pcf)
0-2.0	A TOPSOIL: Sandy SILT; medium to light brown and gray brown, dry, soft to firm, very fine to medium grained, highly desiccated with abundant voids up to 0.5", roots and rootlets.		ML			
2.0-5.5	B ALLUVIUM: Silty CLAY; light gray and olive gray, dry, stiff to very stiff, abundant pinhole pores and pores, desiccated, trace of calcium and rootlets along desiccation fractures.	Qal	CL			
5.5-10.0	C OLDER ALLUVIUM: Well-Sorted SAND / Silty SAND; yellowish gray, gray brown, dry to damp below 9.0', dense to very dense, fine grained, interbedded, friable, rootcasts, trace of oxidation, slightly micaceous. @ 10.0', Infiltration test.	Qoal	SW/SM			

GRAPHICAL REPRESENTATION: EAST WALL	SCALE: 1" = 5'	SURFACE SLOPE: LEVEL	TREND: N4E



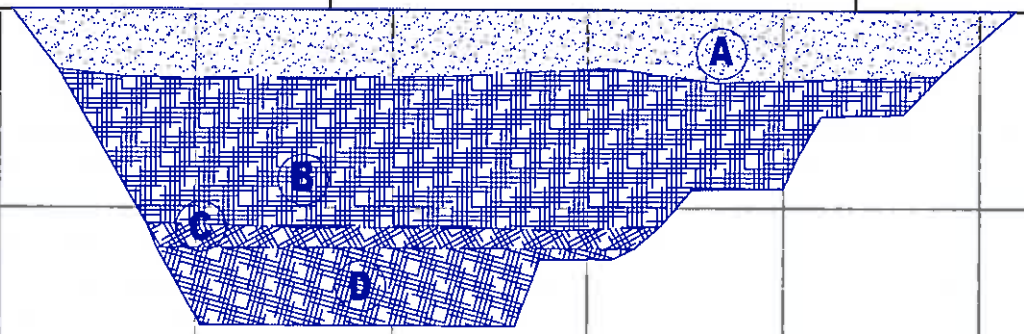
TOTAL DEPTH=10.0' FEET
NO GROUNDWATER ENCOUNTERED

LGC

Project Name: RICHLAND ASSEMBLAGE, CHINO	Logged by: KRM	LOG OF TEST TRENCH IT-7
Project Number: G141194-20	Elevation:	Engineering Properties
Equipment: BACKHOE	Location/Grid: SEE PLATE 1 AND PLATE 2	

Depth (ft)	Date: 4/28/15 — Description:	Geologic Unit	USCS	Sample No.	Moisture (%)	Dry Density (pcf)
0-1.3	A ARTIFICIAL FILL, UNDOCUMENTED: Silty SAND; yellowish brown and olive brown, dry to damp, medium dense to dense, very fine to coarse grained, desiccated, abundant gravel locally, layers visible	Afu	SM			
1.3-5.5	B ALLUVIUM: Silty SAND/Sandy SILT; dark to medium brown and olive brown, damp to moist, dense/stiff, very fine to medium grained, some pinhole pores, massive @ 4.8', Increase in moisture	Qal	SM/ML			
5.5-6.0	C Clayey SAND; medium to light brown gray, damp, dense to very dense, very fine to medium grained, pores and pinhole pores, slightly desiccated, trace rootcasts.	Qal	SC			
6.0-8.0	D Silty SAND/Clayey SAND/Sandy CLAY; dark to medium gray brown, damp to moist, dense, stiff to very stiff, fine to medium grained, generally massive. @ 7.0', Increase in moisture. @ 8.0', Infiltration test.	Qal	SM/SC/CL			

GRAPHICAL REPRESENTATION: EAST WALL	SCALE: 1" = 5'	SURFACE SLOPE: LEVEL	TREND: N4E



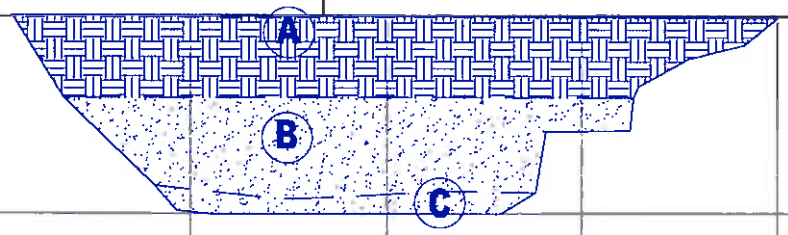
TOTAL DEPTH= 8.0' FEET
NO GROUNDWATER ENCOUNTERED

LGC

Project Name: RICHLAND ASSEMBLAGE, CHINO	Logged by: KRM	LOG OF TEST TRENCH IT-8
Project Number: G141194-20	Elevation:	Engineering Properties
Equipment: BACKHOE	Location/Grid: SEE PLATE 1 AND PLATE 2	

Depth (ft)	Date: 4/28/15 — Description:	Geologic Unit	USCS	Sample No.	Moisture (%)	Dry Density (pcf)
0-2.0	A TOPSOIL/WEATHERED OLDER ALLUVIUM: Silty SAND; dark brown, dry to damp, loose to medium dense, very fine to medium grained, micaceous, trace clay and gravel.		SM			
2.0-4.5	B OLDER ALLUVIUM: Silty SAND/Sandy SILT; yellowish brown, damp to moist, dense/stiff, very fine to medium grained, slightly porous and micaceous.	Qoal	SM/ML			
4.5-5.0	C Clayey SAND; yellowish brown and brown yellow, damp to moist, stiff, very fine to medium grained, pinhole pores and pores, trace of oxidation. @ 5.0', Infiltration test.	Qoal	SC			

GRAPHICAL REPRESENTATION: EAST WALL	SCALE: 1" = 5'	SURFACE SLOPE: LEVEL	TREND: N10E



TOTAL DEPTH= 5.0 FEET
NO GROUNDWATER ENCOUNTERED

LGC

APPENDIX B

INFILTRATION TEST RESULTS

Project:	Richland Communities	Job No.:	G14-1194-21	
Test Hole No.:	IT-1	Date Excavated:	4/28/2015	
Depth of Test Hole:	5.0'	Soil Classification:	SM/SC	
Check for Sandy Soil Criteria By:		Date of Perc Test:	4/29/2015	Diameter: 8"

SANDY SOIL CRITERIA TEST

TIME	Time Interval (Minutes)	Time Interval (Minutes)	Initial Water Level (Inches)	Final Water Level (Inches)	Change In Water Level (Inches)

PRESOAK PERIOD

	Date	Time	Interval	Amount of Water Used
Start	4/28/15	9:50	21h 00m	All 5 Gallons
Stop	4/29/15	6:50		

TEST PERIOD

Time	Time Interval (min.)	Total Elasped Time (min.)	Initial Water Level (inches)	Final Water Level (inches)	Change In Water Level (Inches)	Percolation Rate (min./inch)
6:54	60	60	10	4 1/2	5 1/2	10.9
7:54						
7:55	60	121	10	5 3/4	4 1/4	14.1
8:55						
8:56	60	182	10	5 1/4	4 3/4	12.6
9:56						
9:57	60	243	10	5 5/8	4 3/8	13.7
10:57						
10:58	60	304	10	6 5/8	3 3/8	17.8
11:58						
11:59	60	365	10	6 5/8	3 3/8	17.8
12:59						
					Reduction Factor:	3.08

LGC

LGC GEO-ENVIRONMENTAL, INC.

Project:	Richland Communities	Job No.:	G14-1194-21	
Test Hole No.:	IT-2	Date Excavated:	4/28/2015	
Depth of Test Hole:	7.0'	Soil Classification:	SM/SC	
Check for Sandy Soil Criteria By:		Date of Perc Test:	4/29/2015	Diameter: 8"

SANDY SOIL CRITERIA TEST

TIME	Time Interval (Minutes)	Time Interval (Minutes)	Initial Water Level (Inches)	Final Water Level (Inches)	Change In Water Level (Inches)

PRESOAK PERIOD

	Date	Time	Interval	Amount of Water Used
Start	4/28/15	10:25	20h 30m	All 5 Gallons
Stop	4/29/15	6:55		

TEST PERIOD

Time	Time Interval (min.)	Total Elasped Time (min.)	Initial Water Level (inches)	Final Water Level (inches)	Change In Water Level (Inches)	Percolation Rate (min./inch)
6:57	60	60	10	5 3/4	4 1/4	14.1
7:57						
7:58	60	121	10	7 3/8	2 5/8	22.9
8:58						
8:59	60	182	10	8	2	30.0
9:59						
10:00	60	243	10	8 1/8	1 7/8	32.0
11:00						
11:01	60	304	10	8 1/4	1 3/4	34.3
12:01						
12:02	60	365	10	8 1/4	1 3/4	34.3
13:02						
					Reduction Factor:	3.28

LGC

LGC GEO-ENVIRONMENTAL, INC.

Project:	Richland Communities	Job No.:	G14-1194-21	
Test Hole No.:	IT-3	Date Excavated:	4/28/2015	
Depth of Test Hole:	3.0' (9.0' Overall)	Soil Classification:	SC/SM	
Check for Sandy Soil Criteria By:		Date of Perc Test:	4/29/2015	Diameter: 8"

SANDY SOIL CRITERIA TEST

TIME	Time Interval (Minutes)	Time Interval (Minutes)	Initial Water Level (Inches)	Final Water Level (Inches)	Change In Water Level (Inches)

PRESOAK PERIOD

	Date	Time	Interval	Amount of Water Used
Start	4/28/15	11:10	19h 55m	All 5 Gallons
Stop	4/29/15	7:05		

TEST PERIOD

Time	Time Interval (min.)	Total Elasped Time (min.)	Initial Water Level (inches)	Final Water Level (inches)	Change In Water Level (Inches)	Percolation Rate (min./inch)
7:06	60	60	10	8 5/8	1 3/8	43.6
8:06						
8:07	60	121	10	9	1	60.0
9:07						
9:08	60	182	10	9 1/8	7/8	68.6
10:08						
10:08	60	242	9 1/8	8 1/8	1	60.0
11:08						
11:09	60	303	10	9	1	60.0
12:09						
12:10	60	364	10	9	1	60.0
13:10						
				Reduction Factor:	3.39	

LGC

LGC GEO-ENVIRONMENTAL, INC.

Project:	Richland Communities	Job No.:	G14-1194-21	
Test Hole No.:	IT-4	Date Excavated:	4/28/2015	
Depth of Test Hole:	1.5' (5.5' Overall)	Soil Classification:	SM/SC	
Check for Sandy Soil Criteria By:		Date of Perc Test:	4/29/2015	Diameter: 8"

SANDY SOIL CRITERIA TEST

TIME	Time Interval (Minutes)	Time Interval (Minutes)	Initial Water Level (Inches)	Final Water Level (Inches)	Change In Water Level (Inches)

PRESOAK PERIOD

	Date	Time	Interval	Amount of Water Used
Start	4/28/15	10:50	20h 29m	All 5 Gallons
Stop	4/29/15	7:09		

TEST PERIOD

Time	Time Interval (min.)	Total Elasped Time (min.)	Initial Water Level (inches)	Final Water Level (inches)	Change In Water Level (Inches)	Percolation Rate (min./inch)
7:10	60	60	10	3 3/4	6 1/4	9.6
8:10						
8:11	60	121	10	4 1/8	5 7/8	10.2
9:11						
9:12	60	182	10	6 1/8	3 7/8	15.5
10:12						
10:13	60	243	10	6 7/8	3 1/8	19.2
11:13						
11:14	60	304	10	7 1/2	2 1/2	24.0
12:14						
12:15	60	365	10	7 3/8	2 5/8	22.9
13:15						
					Reduction Factor:	3.19

LGC GEO-ENVIRONMENTAL, INC.

Project:	Richland Communities	Job No.:	G14-1194-21	
Test Hole No.:	IT-5	Date Excavated:	4/28/2015	
Depth of Test Hole:	5.0'	Soil Classification:	SM/SC	
Check for Sandy Soil Criteria By:		Date of Perc Test:	4/29/2015	Diameter: 8"

SANDY SOIL CRITERIA TEST

TIME	Time Interval (Minutes)	Time Interval (Minutes)	Initial Water Level (Inches)	Final Water Level (Inches)	Change In Water Level (Inches)

PRESOAK PERIOD

	Date	Time	Interval	Amount of Water Used
Start	4/28/15	12:43	19h 00m	All 5 Gallons
Stop	4/29/15	7:43		

TEST PERIOD

Time	Time Interval (min.)	Total Elasped Time (min.)	Initial Water Level (inches)	Final Water Level (inches)	Change In Water Level (Inches)	Percolation Rate (min./inch)
8:12	60	60	10	5 1/2	4 1/2	13.3
9:12						
9:13	60	121	10	6	4	15.0
10:13						
10:14	60	182	10	6 1/8	3 7/8	15.5
11:14						
11:15	60	243	10	6 3/8	3 5/8	16.6
12:15						
12:16	60	304	10	6 1/4	3 3/4	16.0
13:16						
13:17	60	365	10	6 1/4	3 3/4	16.0
14:17						
					Reduction Factor:	3.05

LGC GEO-ENVIRONMENTAL, INC.

Project:	Richland Communities	Job No.:	G14-1194-21	
Test Hole No.:	IT-6	Date Excavated:	4/28/2015	
Depth of Test Hole:	10.0'	Soil Classification:	SM/SC	
Check for Sandy Soil Criteria By:		Date of Perc Test:	4/29/2015	Diameter: 8"

SANDY SOIL CRITERIA TEST

TIME	Time Interval (Minutes)	Time Interval (Minutes)	Initial Water Level (Inches)	Final Water Level (Inches)	Change In Water Level (Inches)

PRESOAK PERIOD

	Date	Time	Interval	Amount of Water Used
Start	4/28/15	14:36	17h 00m	±4.75 of 5 Gallons
Stop	4/29/15	7:36		

TEST PERIOD

Time	Time Interval (min.)	Total Elasped Time (min.)	Initial Water Level (inches)	Final Water Level (inches)	Change In Water Level (Inches)	Percolation Rate (min./inch)
8:18	60	60	10	9	1	60.0
9:18						
9:19	60	121	10	9 1/8	7/8	68.6
10:19						
10:19	60	181	9 1/8	8 1/8	1	60.0
11:19						
11:20	60	242	10	9 1/8	7/8	68.6
12:20						
12:20	60	303	9 1/8	8 1/8	1	60.0
13:20						
13:21	60	364	10	9	1	60.0
14:21						
					Reduction Factor:	3.39

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LGC GEO-ENVIRONMENTAL, INC.

Project:	Richland Communities	Job No.:	G14-1194-21	
Test Hole No.:	IT-7	Date Excavated:	4/29/2015	
Depth of Test Hole:	8.0'	Soil Classification:	SC/SM	
Check for Sandy Soil Criteria By:		Date of Perc Test:	4/30/2015	Diameter: 8"

SANDY SOIL CRITERIA TEST

TIME	Time Interval (Minutes)	Time Interval (Minutes)	Initial Water Level (Inches)	Final Water Level (Inches)	Change In Water Level (Inches)

PRESOAK PERIOD

	Date	Time	Interval	Amount of Water Used
Start	4/29/15	13:50	17h 30m	All 5 Gallons
Stop	4/30/15	7:20		

TEST PERIOD

Time	Time Interval (min.)	Total Elasped Time (min.)	Initial Water Level (inches)	Final Water Level (inches)	Change In Water Level (Inches)	Percolation Rate (min./inch)
8:23	60	60	10	6 7/8	3 1/8	19.2
9:23						
9:24	60	121	10	6 7/8	3 1/8	19.2
10:24						
10:25	60	182	10	7	3	20.0
11:25						
11:26	60	243	10	7	3	20.0
12:26						
				Reduction Factor:	3.13	

LGC

LGC GEO-ENVIRONMENTAL, INC.

Project:	Richland Communities	Job No.:	G14-1194-21	
Test Hole No.:	IT-8	Date Excavated:	4/29/2015	
Depth of Test Hole:	5.0'	Soil Classification:	SM/SC	
Check for Sandy Soil Criteria By:		Date of Perc Test:	4/30/2015	Diameter: 8"

SANDY SOIL CRITERIA TEST

TIME	Time Interval (Minutes)	Time Interval (Minutes)	Initial Water Level (Inches)	Final Water Level (Inches)	Change In Water Level (Inches)

PRESOAK PERIOD

	Date	Time	Interval	Amount of Water Used
Start	4/29/15	15:15	16h 00m	All 5 Gallons
Stop	4/30/15	7:15		

TEST PERIOD

Time	Time Interval (min.)	Total Elasped Time (min.)	Initial Water Level (inches)	Final Water Level (inches)	Change In Water Level (Inches)	Percolation Rate (min./inch)
8:28	60	60	10	4 1/4	5 3/4	10.4
9:28						
9:29	60	121	10	4 1/2	5 1/2	10.9
10:29						
10:30	60	182	10	5 1/4	4 3/4	12.6
11:30						
11:31	60	243	10	5 3/8	4 5/8	13.0
12:31						
12:32	60	304	10	5 5/8	4 3/8	13.7
13:32						
13:33	60	365	10	5 3/4	4 1/4	14.1
14:33						
					Reduction Factor:	2.97

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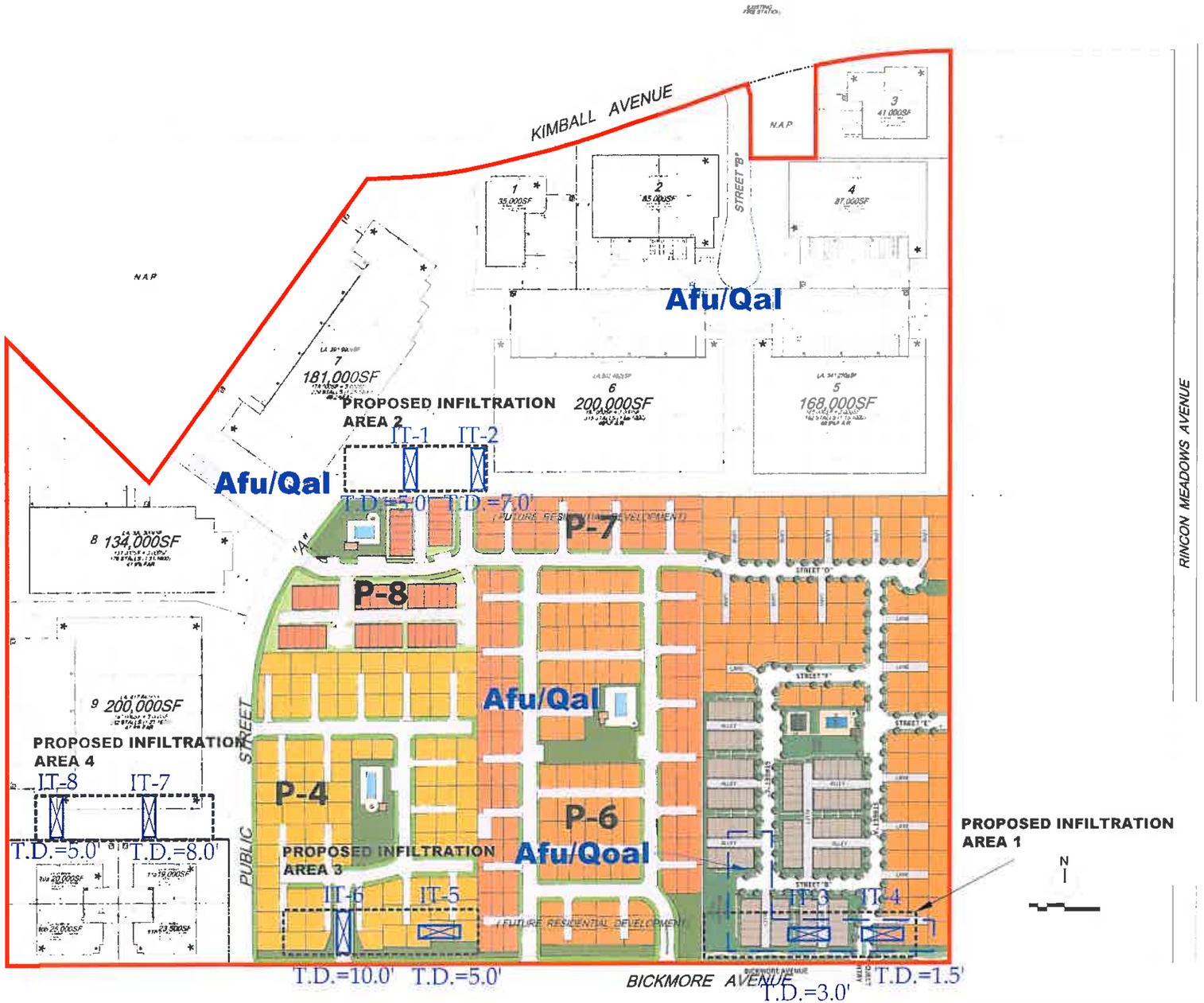

LEGEND

(Locations are Approximate)

Earth Units

Afu - Artificial Fill (Undocumented)

Qal - Quarternary Alluvium

Qoal - Quarternary Old Alluvium

Symbols

IT-8
T.D.=5.0'
- Infiltration Test Trench Location

- Limits of Report

- Geologic Contact

- Proposed Storm Water Infiltration Area

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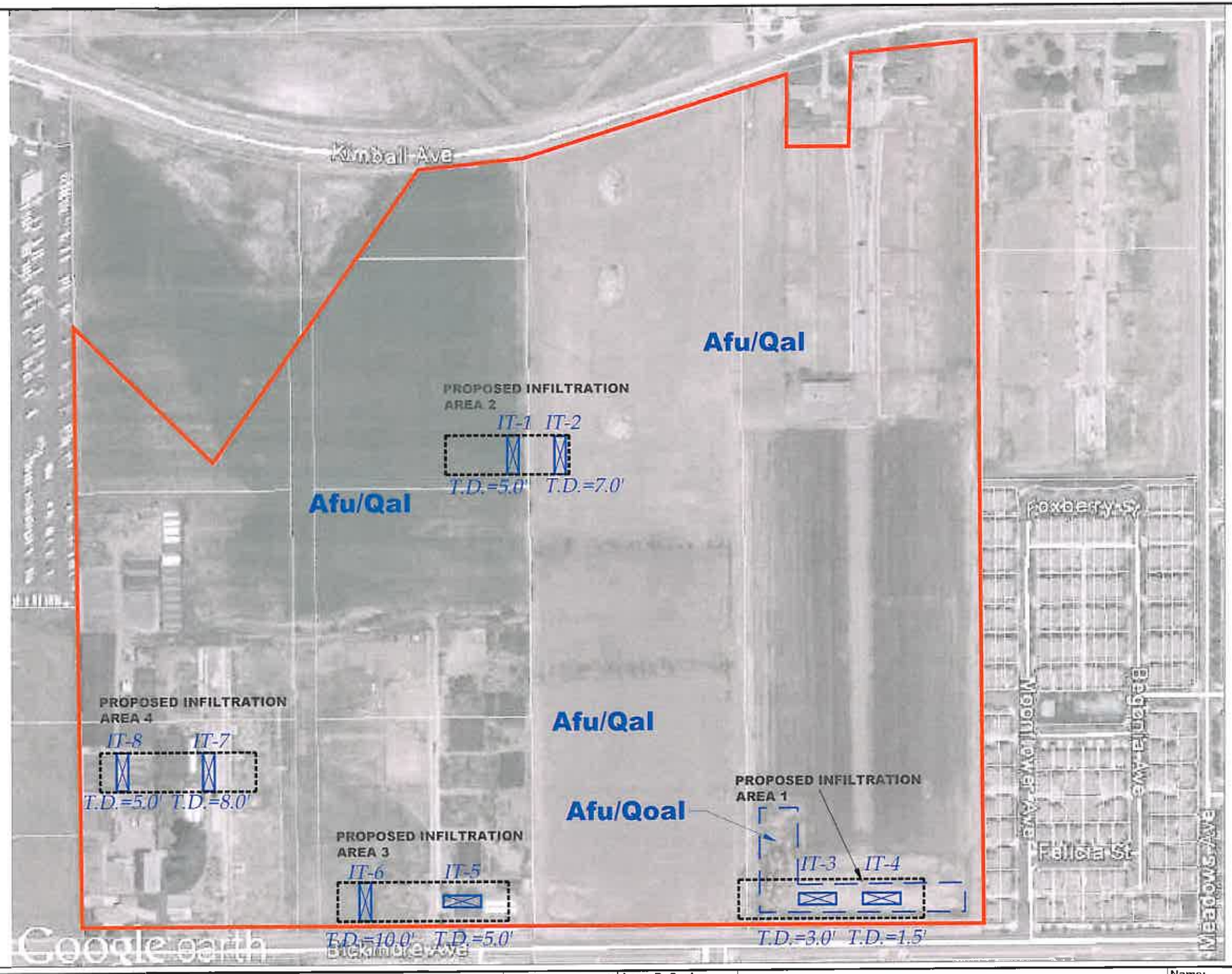
GEO-ENVIRONMENTAL, INC.
27570 COMMERCE CENTER DRIVE, SUITE 128
TEMECULA, CA 92590
Office: (951) 287-2450
Fax: (951) 719-2998

Robert L. Gregorek, II — Engineering Geologist
Larry D. Cooley — Project Engineer

INFILTRATION TEST TRENCH LOCATION MAP

RICHLAND ASSEMBLAGE, CHINO
CITY OF CHINO, SAN BERNARDINO COUNTY, CALIFORNIA

Name:	RICHLAND ASSEMBLAGE, CHINO
Project No.	G141194-20
Client:	RICHLAND REAL ESTATE FUND, LLC
Scale:	1" = 150'
Date:	MAY 2015
Reference:	SEE INFILTRATION REPORT
Plate No.	PLATE NO. 1



LEGEND

(Locations are Approximate)

Earth Units

- Afu - Artificial Fill (Undocumented)
- Qal - Quarternary Alluvium
- Qol - Quarternary Old Alluvium

Symbols

IT-8
T.D.=5.0'
- Infiltration Test Trench Location

- Limits of Report

- Geologic Contact

- Proposed Storm Water Infiltration Area

0 150' 300'

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27570 COMMERCE CENTER DRIVE, SUITE 128
TEMECULA, CA 92590
Office: (951) 297-2450
Fax: (951) 719-2998

Robert L. Gregorek, II	Larry D. Cooley
Engineering Geologist	Project Engineer

AERIAL INFILTRATION TEST TRENCH LOCATION MAP
RICHLAND ASSEMBLAGE, CHINO
CITY OF CHINO, SAN BERNARDINO COUNTY, CA

Name:	RICHLAND ASSEMBLAGE, CHINO
Project No.	G141194
Client:	RICHLAND REAL ESTATE FUND, LLC
Scale:	1" = 150'
Date:	MAY 2015
Reference:	SEE INFILTRATION REPORT
Plate No.	PLATE NO. 2