Preliminary

Drainage Report

For

Desert Meadows

Lancaster, CA

Prepared
August 2023

United Engineering Group - California
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Tel: (909) 466-9240

Provided for:

Guardian Capital
5780 Fleet Street, Suite 255
Carlsbad, CA 92008

Project # 30230

This report has been prepared by or under the direction of the following registered civil engineer who attests to the technical information contained herein. The registered civil engineer has also judged the qualifications of any employees that have provided data and calculations upon which the recommendations, conclusions, and decisions are based.



Christopher F. Lenz, PE 63001

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I. INTRODUCTION

The Desert Meadows project is a high-density residential cluster of apartments and townhomes on approximately 22.6 acres, located at the northwest corner of Lancaster Drive and 30th Street in the City of Lancaster, California. The property is rectangular in shape and is bordered by paved roads to the south and west. By a regional drainage channel to the east. And undeveloped land to the north.

The purpose of this study is to determine the 2, 5, 10, and 50-year storm runoff emanating from on-site areas for the project and to show how the project will handle the storm water. The study will determine the peak flow rate for the existing condition, the peak flow rate for the proposed condition, proposed condition flow rate routed through two combination water quality and detention basins. Additional analysis will confirm hydraulic capacity of proposed street sections compared to rational expected runoff.

The scope of the study includes the following:

- Determination of points of flow concentration and watershed areas.
- Determination of the 50-year 24 hours storm runoff based upon the onsite drainage conditions utilizing the Modified Rational Method from the LA County Hydrology Manual, using the HydroCalc program.
- Determination of the 50-year 24 hour storm routing through a basin, using the CivilD programs Modified Puls Basin Routing.

II. SITE DISCUSSION

The current property is vacant, undeveloped land with varying slopes. The topography indicates that the runoff drains in a northeasterly direction primarily in the form of sheet flow. There is slight ridge in the middle of the site. There are stockpiles of soil that have been added to site. The sites flows concentrate along the east side of the project where they eventually spill north to the adjacent property, and south into Lancaster Boulevard's storm drain that connects to the regional channel.



III. RAINFALL DATA

The Los Angeles County DPW Hydrology Manual, (Reference 1) was used to develop the hydrological parameters for the 2,5,10, & 50-year storm events. The Modified Rational Method was used to determine the peak flow rates associated with the existing project conditions as well as the time of concentration used in the Unit Hydrograph method. Computations were performed using the HydroCalc and CivilCADD drainage software.

50-year rainfall data of 2.8" was taken from the LA County isohyetal maps from the SBCFCD hydrology Manual.

Hydrologic Soil Group "120" is used for the study area.

The project runoff is designed to be contained in two basins that will act as both water quality, and flood storage for peak runoff mitigation. The 50-year 24 runoff event is the limiting factor for design.

IV. ONSITE RUNOFF

Existing Condition/Pre Development

Runoff from the site drains easterly to the eastern property line. It is shown as Area A and Nodes 101 to 102 on the Existing Conditions Drainage Exhibit in Appendix A. The peak flow rate is 4.2 cfs with a 30 min time of concentration.

Proposed Condition/Post Development

The site is to be developed in two phases, west and east. It has been analyzed based on that phasing and the ultimate outlets for developed flows for each phase. The western portion, phase 1, Area A, is proposed to connect to existing storm drain roughly 600' north of the site in 30th street. The eastern portion, phase 2, Area B, is proposed to connect to existing storm drain channel directly east of the site. The proposed condition is to utilize two main basins along the north side of the project for water quality and flood routing for the developed site. The Modified Rational method was prepared for determination of the post development runoff. The post development 50 year 24 hour runoff for area A is 7.89 cfs with a 30 minute time of concentration. The post development 50 year 24 hour runoff for area B is 5.76 cfs with a 30 minute time of concentration.

The post development runoff is routed through the proposed basin to confirm post development runoff could be mitigated to 85% of the pre-development runoff. The basins are designed to be dual purpose water quality and detention basins. The basins will be designed with outflow structures at final design to control the outlet. The following is the summary of runoff rates.

Desert Meadows: Onsite Runoff Summary Area A

Storm Event	Pre Development Runoff	Post Development Runoff	Post Basin Routing Runoff
2-year	0.9	3.0	
5-year	1.3	4.6	
10-year	1.6	5.6	
50-year	2.56	7.9	2.20

Desert Meadows: Onsite Runoff Summary Area B

Storm Event	Pre Development Runoff	Post Development Runoff	Post Basin Routing Runoff
2-year	0.5	1.9	
5-year	0.8	2.9	
10-year	1.0	3.6	
50-year	1.63	5.8	1.32

After routing through the proposed basins the post development 50 year 24 hour runoff for the onsite Area A is 2.20 cfs with 0.78 ac-ft stored, and for Area B is 1.32 cfs with 0.67 ac-ft stored. The total post development runoff is 3.52 cfs, or 84.0% of predevelopment peak runoff of 4.19 cfs. Refer to Appendices B, C, and D for detailed output files and the Tract Rough Grading Plans.

Appendices B, C, and D for detailed output files and the Tract Rough Grading Plans.

The primary hydraulic design elements are the drive aisles, curb openings, storm drain, and the outlets from the basins. Drive aisles and a system of onsite storm drain within the project will be used to carry runoff to the basins. Refer to the Proposed Conditions Drainage Exhibit and Appendix E for additional detail.

V. OFFSITE RUNOFF

The offsite contributing areas to the subject site are from the west and south. Therefore, the property is protected by the perimeter roads of Lancaster Boulevard, which has an existing storm drain system connecting to the regional channel, and 30th street which drains northerly.

VI. STORMWATER TREATMENT

The entire region drains to the Rosamond Dry lakebed. The City of Lancaster has been designated a regulated Small Municipal Storm Sewer System (MS4) under general permit number CAS000004. The project will be evaluated per the Cities Stormwater Management Plan (SWMP), and will implement design features to comply to the "Maximum Extent Practicable" determination. Measurable goals will include Public education and outreach, post construction BMP's, source control, and monitoring and maintenance. The project proposes to treat the "first flush" runoff via filtration systems due to site constraints. Two possible examples are included in Appendix F, with final determination made at final design. Area A will require treatment of 1.02 cfs, and Area B will require treatment of 0.73 cfs.

VII. CONCLUSION

The proposed development of Desert Meadows, a 22.6 acre, high density residential project, can be mitigated as designed and analyzed in this report to be compatible with the City of Lancaster Master Plan of Drainage. The development of the subject site will not change area drainage patterns, impact any of the surrounding properties, or change any of the regional master plan facilities. The Site will construct basins of sufficient size to handle flood mitigation through detention. The drive aisles, storm drain, and basin outlet structures have been designed and analyzed in conjunction with preliminary grading design to confirm capacity to adequately handle the design storm runoff.

REFERENCES

1. Los Angeles County Department of Public Works Hydrology Manual, January 2006.

APPENDIX A:
PROJECT PRE AND POST CONDITION EXHIBITS



VICINITY MAP
N.T.S.

LEGAL DESCRIPTION:

LOT 1 OF TRACT NO. 51824, IN THE CITY OF LANCASTER, COUNTY OF LOS ANGELES, STATE OF CALIFORNIA, AS PER MAP RECORDED IN BOOK 1209, PAGES 66 TO 71, INCLUSIVE, OF MAPS, IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY.

EXCEPT ALL OIL, GAS, MINERALS AND OTHER HYDROCARBON SUBSTANCES IN AND UNDER SAID LAND, AS RESERVED IN DEED REGISTERED ON JUNE 17, 1947 AS DOCUMENT NO. 1947-14010-P OF TORRENS, IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY.

ALSO EXCEPT ALL OIL, GAS, MINERALS AND OTHER HYDROCARBON SUBSTANCES IN AND UNDER SAID LAND AS RESERVED IN DEED REGISTERED AUGUST 28, 1947 AS DOCUMENT NO. 1947-20023-P OF TORRENS, IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY.

ASSESSOR'S PARCEL NUMBERS: 3153-034-087

SCHEDULE "B" ITEMS:

SCHEDULE "B" ITEMS SHOWN HEREON WERE DERIVED FROM THE PRELIMINARY TITLE REPORT, ORDER NO. 140-2354665-20, DATED FEBRUARY 2, 2023, AS PREPARED BY ORANGE COAST TITLE COMPANY.

NO RESPONSIBILITY FOR CONTENT, COMPLETENESS OR ACCURACY OF SAID PRELIMINARY REPORT IS ASSUMED BY THIS MAP, THE SURVEYOR OR UNITED ENGINEERING GROUP-CA, INC.

1 NOT A SURVEY MATTER.

2 NOT A SURVEY MATTER.

3 NOT A SURVEY MATTER

4. NOT A SURVEY MATTER

5 A 10 FOOT EASEMENT FOR SEWER INCIDENTAL PURPOSES THERETO AS DEDICATED AND DELINEATED ON THE MAP RECORDED IN BOOK 1209, PAGE 66 OF MAPS.

6 THE FACT THAT THE OWNERS OF SAID LAND HAVE NO RIGHT OF VEHICULAR ACCESS TO LANCASTER BOULEVARD EXCEPT THE PUBLIC RIGHT TO TRAVEL SAME, SAID RIGHTS HAVING BEEN RELINQUISHED BY THE DEDICATION PROVISIONS ON THE MAP OF SAID TRACT.

SAID LAND, HOWEVER, ABUTS ON A PUBLIC THOROUGHFARE OTHER THAN THE ONE REFERRED TO ABOVE, OVER WHICH RIGHTS OF VEHICULAR ACCESS HAVE NOT BEEN RELINQUISHED.

7 THE FACT THAT THE OWNERS OF SAID LAND HAVE NO RIGHT OF VEHICULAR ACCESS TO 30TH STREET WEST EXCEPT THE PUBLIC RIGHT TO TRAVEL SAME, SAID RIGHTS HAVING BEEN RELINQUISHED BY THE DEDICATION PROVISIONS ON THE MAP OF SAID TRACT.

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8 AN INSTRUMENT, UPON THE TERMS AND CONDITIONS CONTAINED THEREIN
ENTITLED: ATTORNEY-IN-FACT FOR LANCASTER LANDMARK PROPERTIES
RECORDED: 2/4/1987, AS INSTRUMENT NO. 1987-166472, OFFICIAL RECORDS
SAID DOCUMENT IS BLANKET IN NATURE.

9 NOT A SURVEY MATTER.

10 THE RIGHT TO EMPLACE ON, UNDER AND ACROSS SAID LAND, TRANSMISSION LINES AND OTHER FACILITIES FOR A COMMUNITY ANTENNA TELEVISION SYSTEM, AND THE RIGHT TO ENTER UPON SAID LAND TO MAINTAIN, REPAIR, RECONSTRUCT AND REPLACE SAID LINES AND FACILITIES, PROVIDED THE EXERCISE THAT OF SAID RIGHTS DOES NOT UNREASONABLY INTERFERE WITH THE USE AND ENJOYMENT OF SAID LAND, AS PROVIDED IN AN INSTRUMENT RECORDED 12/31/1997, AS INSTRUMENT NO. 1997-2043865, OF OFFICIAL RECORDS.
SAID DOCUMENT IS INDETERMINATE IN NATURE.

11 AN EASEMENT FOR CONSTRUCTION, INSTALLATION AND MAINTENANCE OF ELECTRIC, GAS, TELEPHONE, WATER, SEWER AND DRAINAGE FACILITIES AND INCIDENTAL PURPOSES AS RESERVED BY PRESLEY HOMES, A CALIFORNIA CORPORATION IN THE DEED RECORDED 12/31/1997, AS INSTRUMENT NO. 1997-2043865 OFFICIAL RECORDS, ALONG SAID LAND.
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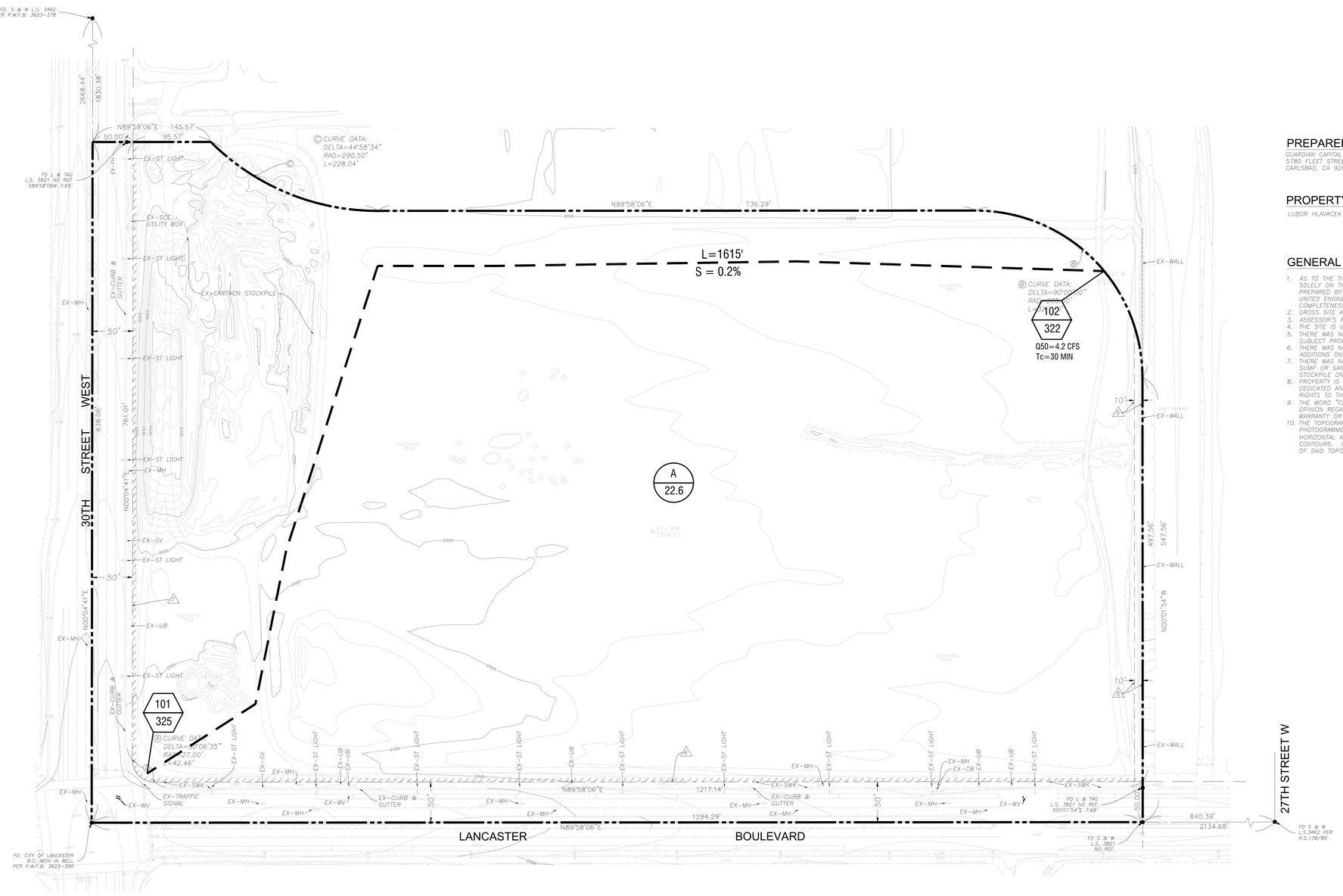
FD. S & W L.S. 3462 PER P.W.F.B. 3623-378
2668.44'
1830.38'
N89°58'06"E 145.57'
50.00'
95.57'
FD L & TAG L.S. 3821 NO REF S89°58'06"W 7.65'
EX-ST LIGHT
EX-FH
EX-SCE UTILITY BOX
EX-CURB & GUTTER
EX-MH
EX-EARTHEN STOCKPILE
50'
EX-ST LIGHT
761.01'
838.06'
30TH STREET WEST
N00°04'41"E
EX-ST LIGHT
EX-MH
EX-GV
EX-ST LIGHT
50'
EX-UB
EX-MH
EX-ST LIGHT
EX-CURB & GUTTER
EX-TRAFFIC SIGNAL
EX-SWK
EX-WV
EX-MH
EX-MH
EX-MH
EX-WV
EX-CURB & GUTTER
50'
EX-MH
EX-MH
EX-MH
EX-SWK
EX-CURB & GUTTER
EX-MH
EX-MH
EX-WV
EX-SWK
FD L & TAG L.S. 3821 NO REF S00°01'54"E 7.68'
50'
840.39'
2134.68'
27TH STREET W
FD S & W L.S.3462 PER R.S.138/86
FD S & W L.S. 3821 NO REF.
FD. CITY OF LANCASTER B.C.MON IN WELL PER P.W.F.B. 3623-390
LANCASTER
BOULEVARD
N89°58'06"E
1294.29'
N89°58'06"E
1217.14
N89°58'06"E
736.29'
L=1615'
S = 0.2%
A
22.6
101
325
CURVE DATA:
DELTA=0°06'35"
RAD=22,027.00'
L=42.46'
CURVE DATA:
DELTA=44°58'34"
RAD=290.50'
L=228.04'
CURVE DATA:
DELTA=90°00'00"
RAD=100.00'
L=157.08'
102
322
Q50=4.2 CFS
Tc=30 MIN
EX-WALL
EX-WALL
EX-WALL
EX-WALL
10'
10'
497.56'
547.56'
N00°01'54"W
EX-MH
EX-CB
EX-UB
EX-UB
EX-ST LIGHT
EX-ST LIGHT
EX-ST LIGHT
EX-ST LIGHT
EX-ST LIGHT
EX-ST LIGHT
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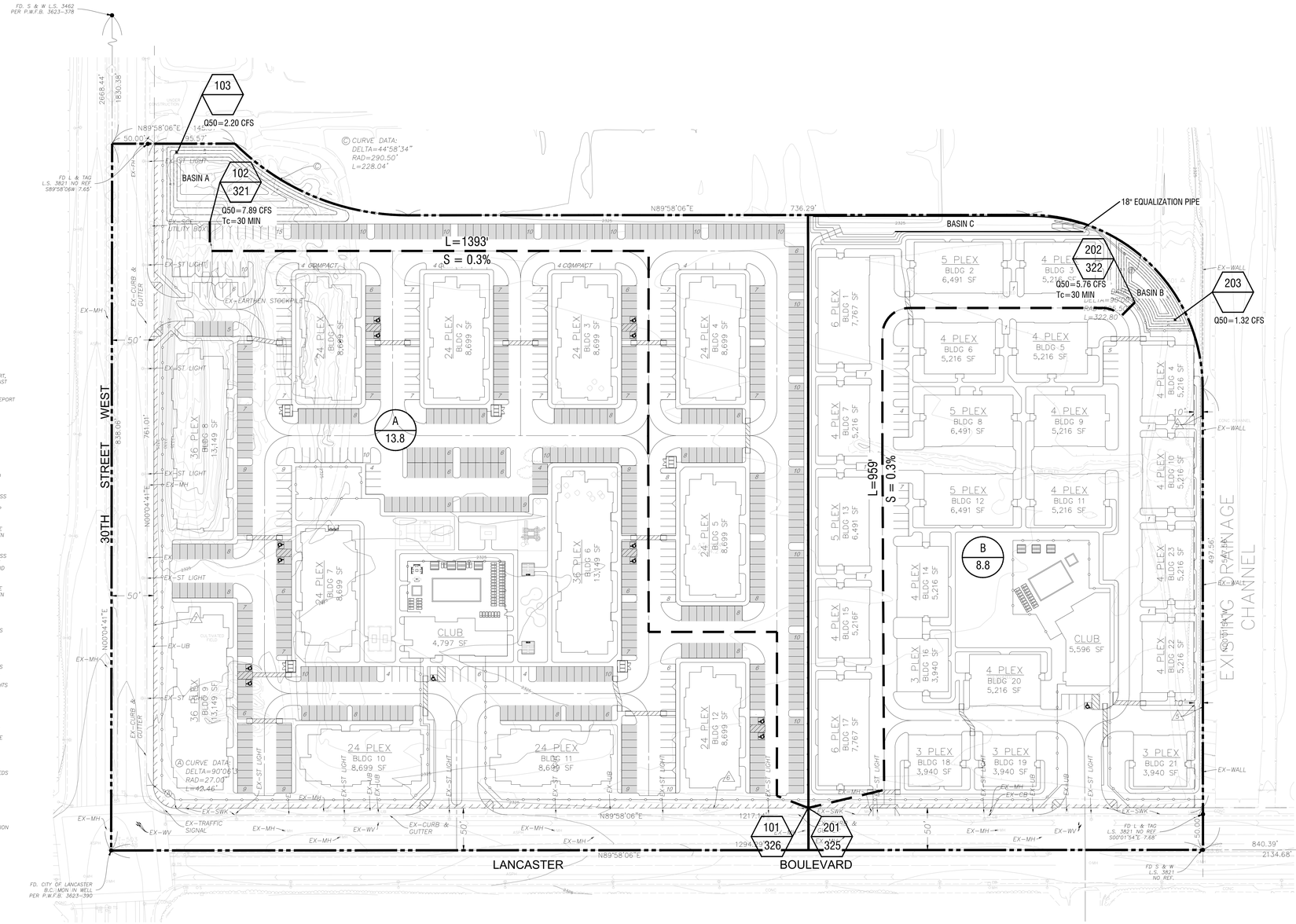




VICINITY MAP
N.T.S.

PREPARED FOR:

GUARDIAN CAPITAL
5780 FLEET STREET, SUITE 225
CARLSBAD, CA 92008

PROPERTY OWNERS:

LUBOR HLAVACEK AND JILL HLAVACEK, HUSBAND AND WIFE AS JOINTS TENANTS.

GENERAL NOTES:

1. AS TO THE TITLE MATTERS SHOWN HEREON, UNITED ENGINEERING GROUP HAS RELIED SOLELY ON THE PRELIMINARY TITLE REPORT DATED AS OF FEBRUARY 2, 2023, AS PREPARED BY ORANGE COAST TITLE COMPANY, ORDER NUMBER 140-2354665-20. UNITED ENGINEERING GROUP MAKES NO STATEMENT AS TO THE ACCURACY OR COMPLETENESS OF THE SUBJECT TITLE REPORT.
2. GROSS SITE AREA: APN 3153-034-087 = 20.17 ACRES..
3. ASSESSOR'S PARCEL NUMBER: 3153-034-087, LOS ANGELES COUNTY.
4. THE SITE IS VACANT AND THERE ARE NO BUILDINGS ON THE SITE.
5. THERE WAS NO OBSERVED EVIDENCE OF CEMETERIES/BURIAL GROUNDS ON THE SUBJECT PROPERTY.
6. THERE WAS NO OBSERVED EVIDENCE OF BUILDING CONSTRUCTION, OR BUILDING ADDITIONS ON THE SUBJECT PROPERTY.
7. THERE WAS NO OBSERVED EVIDENCE OF SITES USED AS A SOLID WASTE DUMP, SUMP OR SANITARY LANDFILL, HOWEVER, THERE WAS EVIDENCE OF AN EARTHEN STOCKPILE ON THE SITE.
8. PROPERTY IS ADJACENT TO 30TH STREET WEST AND LANCASTER BOULEVARD, DULY DEDICATED AND ACCEPTED PUBLIC STREETS, HOWEVER, VEHICULAR ACCESS RIGHTS TO THOSE STREET HAVE BEEN DEDICATED TO THE CITY OF LANCASTER.
9. THE WORD "CERTIFY" OR "CERTIFICATION" IS AN EXPRESSION OF PROFESSIONAL OPINION REGARDING THE FACTS OF THE SURVEY AND DOES NOT CONSTITUTE A WARRANTY OR GUARANTEE, EXPRESSED OR IMPLIED.
10. THE TOPOGRAPHY SHOWN HEREON PROVIDED BY ARROWHEAD MAPPING USING AERIAL PHOTOGRAMMETRIC MAPPING IN JANUARY 2023 AND WAS COMPILED PER STANDARD HORIZONTAL ACCURACY FOR 1" = 100' AND VERTICAL ACCURACY FOR 1 FOOT CONTOURS. UEG MAKES NO STATEMENT AS TO THE ACCURACY OR COMPLETENESS OF SAID TOPOGRAPHY.

NOTE:
EXISTING RUNOFF = 4.19 CFS
COMBINED PEAK OUTLET = 3.52 CFS
3.52 CFS / 4.19 CFS = 84.0%

LEGEND:

PL	=	PROPERTY LINE
BC	=	BRASS CAP
IP	=	IRON PIPE
DN	=	DOWN FROM GROUND SURFACE
EX-UB	=	EXISTING UTILITY BOX
EX-SWK	=	EXISTING SIDEWALK
EX-MH	=	EXISTING MANHOLE
A	=	EASEMENT PER SCHEDULE "B"
WV	=	WATER VALVE
EX-CB	=	EXISTING CATCH BASIN
EX-GV	=	EXISTING GAS VALVE
EX-FH	=	EXISITNG FIRE HYDRANT
S & W	=	SPIKE & WASHER
L & TAG	=	LEAD & TAG
P.W.F.B.	=	PUBLIC WORKS FIELD BOOK
●	=	FOUND MONUMENT AS NOTED
NO REF	=	NO REFERENCE
- - - -	=	PROJECT BOUNARY
//////	=	VEHICULAR ACCESS RIGHTS DEDICATED TO THE CITY OF LANCASTER

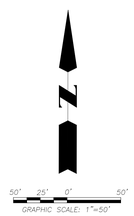
CONTRIBUTARY AREA
PROJECT BOUNDARY
FLOWPATH
1.2% RUNOFF FLOW DIRECTION AND SLOPE
102 / XX NODE/CONCENTRATION POINT / FLOWLINE ELEVATION
A2 / 24.4 SUBAREA / ACRES

BENCHMARK:

LOS ANGELES COUNTY PUBLIC WORKS SURVEY SECTION
LANCASTER QUAD (2012)
BENCHMARK NUMBER--L 5760
LS TAG IN N CB 1 FT W/O BCR @ NW COR AVE I & 30TH ST W 52.5 FT N/O & 100 FT W/O CL INT.
ELEV = 2320.174

BASIS OF BEARINGS:

THE BASIS OF BEARINGS FOR THIS SURVEY IS N 00°04'41" E, SHOWN AS THE CENTERLINE OF 30TH STREET WEST AS SHOWN ON TRACT MAP MAP NO. 51824, AS PER MAP FILED IN BOOK 1209, PAGES 66 THROUGH 71, INCLUSIVE, OF MAPS, IN THE OFFICE OF THE COUNTY RECORDER OF LOS ANGELES COUNTY.



SUBMITTALS:	REVISIONS NO.	DESCRIPTION	DATE
DESIGNED BY:			
DRAWN BY:			
CHECKED BY:			

LICENSED LAND SURVEYOR DEAN C. PHILLIPS EXP. 9/30/23 NO. 6974 STATE OF CALIFORNIA

PREPARED UNDER MY SUPERVISION:

DEAN C. PHILLIPS DATE
L.S. No. 6974
dphillips@unitedeng.com

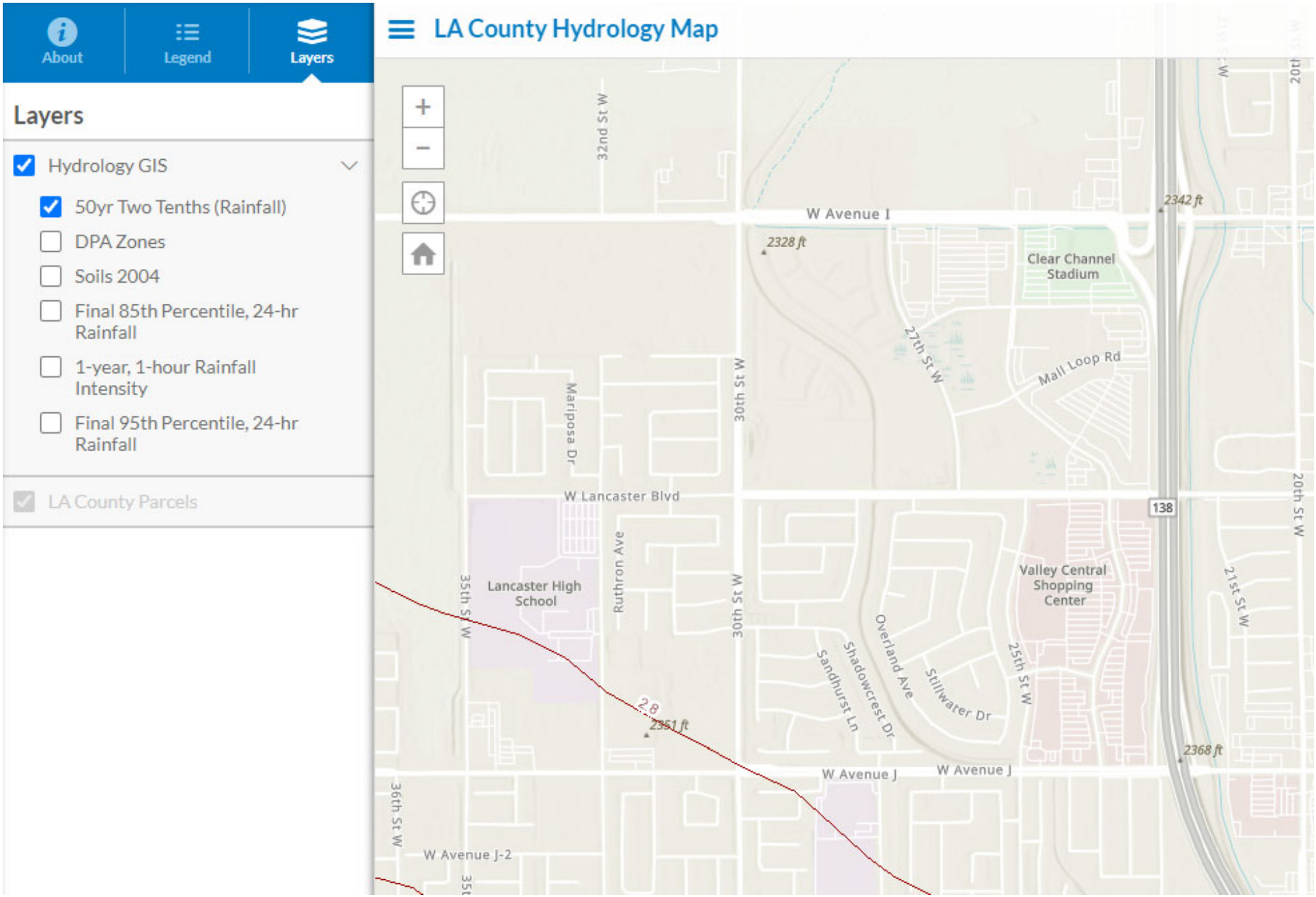
united engineering group
8885 Haven Avenue
Suite 195
Rancho Cucamonga,
CA 91730
Phone: 909.466.9240
www.unitedeng.com

DRAINAGE EXHIBIT - PROPOSED CONDITIONS

LANCASTER BLVD & 30TH STREET WEST
LANCASTER, CA
ASSESSOR'S PARCEL NUMBERS:
3153-034-087

DATE: AUGUST 2023
SHEET 1 OF 1
PROJECT NUMBER
CA-30230

APPENDIX B:
PRE-DEVELOPMENT HYDROCALC OUTPUT
2,5,10, & 50 YR


About
Legend
Layers
LA County Hydrology Map
Layers
Hydrology GIS
50yr Two Tenths (Rainfall)
DPA Zones
Soils 2004
Final 85th Percentile, 24-hr Rainfall
1-year, 1-hour Rainfall Intensity
Final 95th Percentile, 24-hr Rainfall
LA County Parcels
32nd St W
W Avenue I
2328 ft
2342 ft
Clear Channel Stadium
27th St W
Mall Loop Rd
30th St W
Mariposa Dr
W Lancaster Blvd
138
20th St W
Ruthron Ave
Lancaster High School
35th St W
Valley Central Shopping Center
21st St W
Overland Ave
Sandhurst Ln
Shadowcrest Dr
Stillwater Dr
25th St W
2351 ft
2368 ft
W Avenue J
W Avenue J
36th St W
W Avenue J-2

Peak Flow Hydrologic Analysis

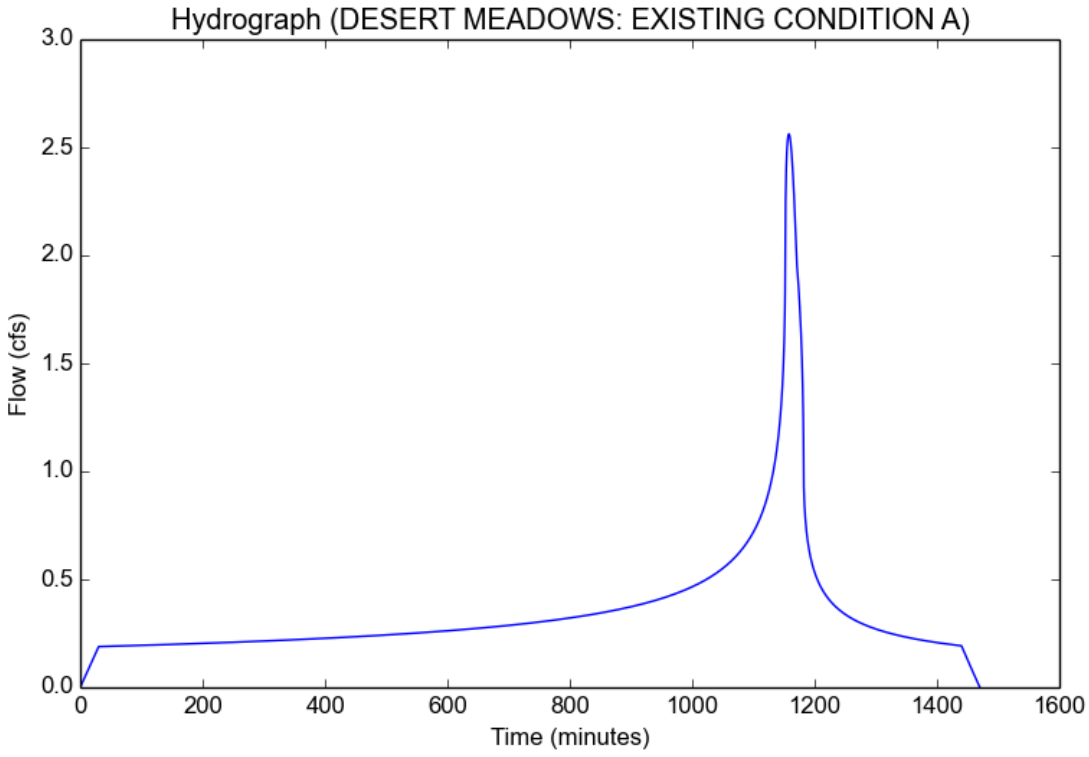
File location: U:/CA-30230 Desert Medows (Lancaster 30th)/Drainage/DESERT MEADOWS - EXISTING CONDITION A.pdf
Version: HydroCalc 0.3.1

Input Parameters

Project Name	DESERT MEADOWS
Subarea ID	EXISTING CONDITION A
Area (ac)	13.8
Flow Path Length (ft)	1393.0
Flow Path Slope (vft/hft)	0.003
50-yr Rainfall Depth (in)	2.8
Percent Impervious	0.15
Soil Type	120
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	2.8
Peak Intensity (in/hr)	0.7197
Undeveloped Runoff Coefficient (Cu)	0.1447
Developed Runoff Coefficient (Cd)	0.258
Time of Concentration (min)	30.0
Clear Peak Flow Rate (cfs)	2.5618
Burned Peak Flow Rate (cfs)	2.5618
24-Hr Clear Runoff Volume (ac-ft)	0.7092
24-Hr Clear Runoff Volume (cu-ft)	30893.8751



Peak Flow Hydrologic Analysis

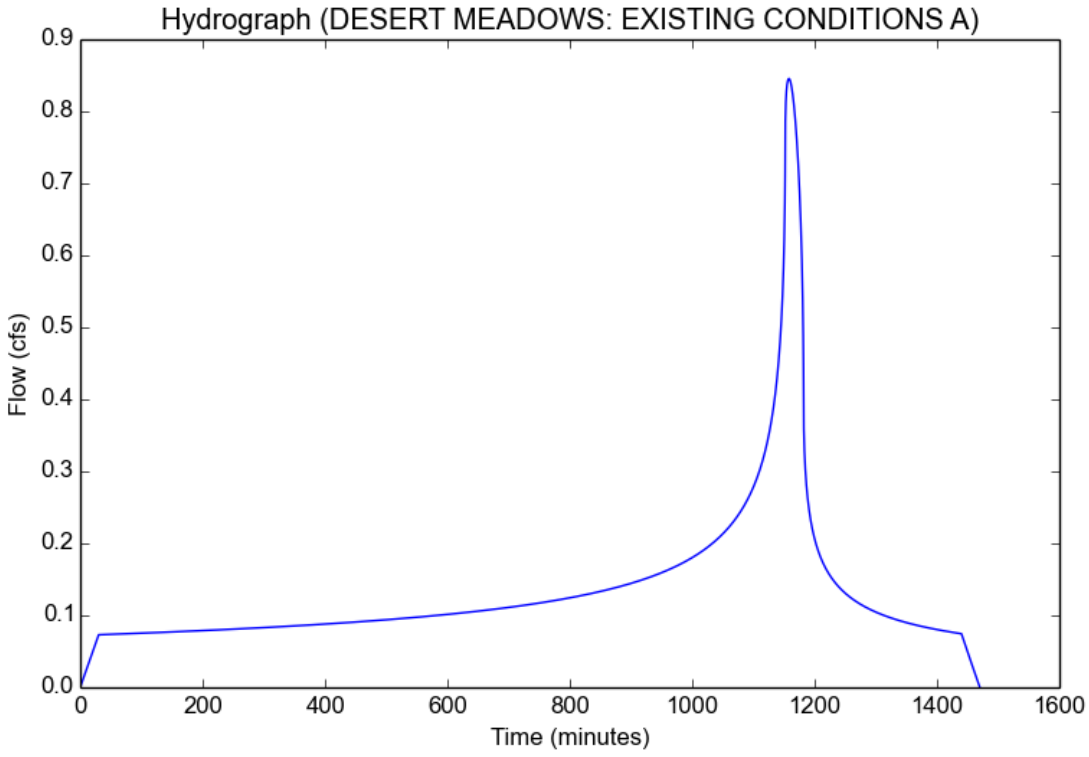
File location: R:/Job Folders/Others/CA-30230 Lancaster & 30th St W-Guardian/Documents/Drainage/LA County Method/DESERT MEADOWS - EXISTI
Version: HydroCalc 0.3.1

Input Parameters

Project Name	DESERT MEADOWS
Subarea ID	EXISTING CONDITIONS A
Area (ac)	13.8
Flow Path Length (ft)	1393.0
Flow Path Slope (vft/hft)	0.003
50-yr Rainfall Depth (in)	2.8
Percent Impervious	0.15
Soil Type	120
Design Storm Frequency	2-yr
Fire Factor	0
LID	False

Output Results

Modeled (2-yr) Rainfall Depth (in)	1.0836
Peak Intensity (in/hr)	0.2785
Undeveloped Runoff Coefficient (Cu)	0.1
Developed Runoff Coefficient (Cd)	0.22
Time of Concentration (min)	30.0
Clear Peak Flow Rate (cfs)	0.8456
Burned Peak Flow Rate (cfs)	0.8456
24-Hr Clear Runoff Volume (ac-ft)	0.2719
24-Hr Clear Runoff Volume (cu-ft)	11843.4505



Peak Flow Hydrologic Analysis

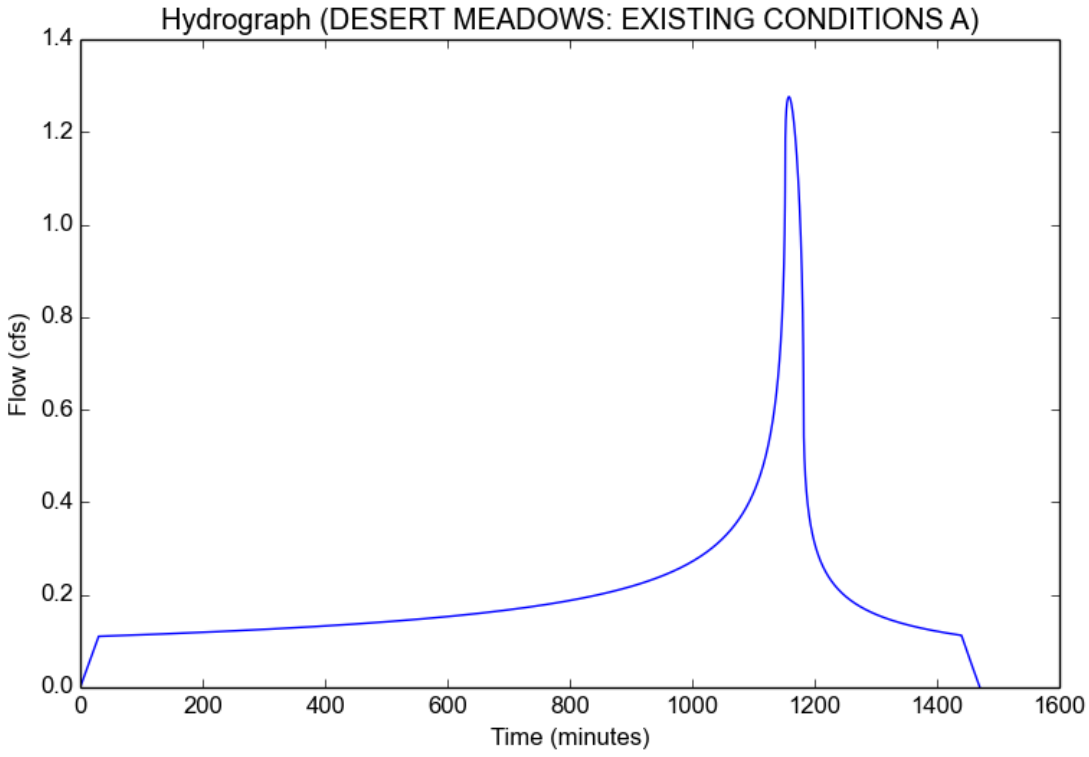
File location: R:/Job Folders/Others/CA-30230 Lancaster & 30th St W-Guardian/Documents/Drainage/LA County Method/DESERT MEADOWS - EXISTI
Version: HydroCalc 0.3.1

Input Parameters

Project Name	DESERT MEADOWS
Subarea ID	EXISTING CONDITIONS A
Area (ac)	13.8
Flow Path Length (ft)	1393.0
Flow Path Slope (vft/hft)	0.003
50-yr Rainfall Depth (in)	2.8
Percent Impervious	0.15
Soil Type	120
Design Storm Frequency	5-yr
Fire Factor	0
LID	False

Output Results

Modeled (5-yr) Rainfall Depth (in)	1.6352
Peak Intensity (in/hr)	0.4203
Undeveloped Runoff Coefficient (Cu)	0.1
Developed Runoff Coefficient (Cd)	0.22
Time of Concentration (min)	30.0
Clear Peak Flow Rate (cfs)	1.276
Burned Peak Flow Rate (cfs)	1.276
24-Hr Clear Runoff Volume (ac-ft)	0.4103
24-Hr Clear Runoff Volume (cu-ft)	17872.2871



Peak Flow Hydrologic Analysis

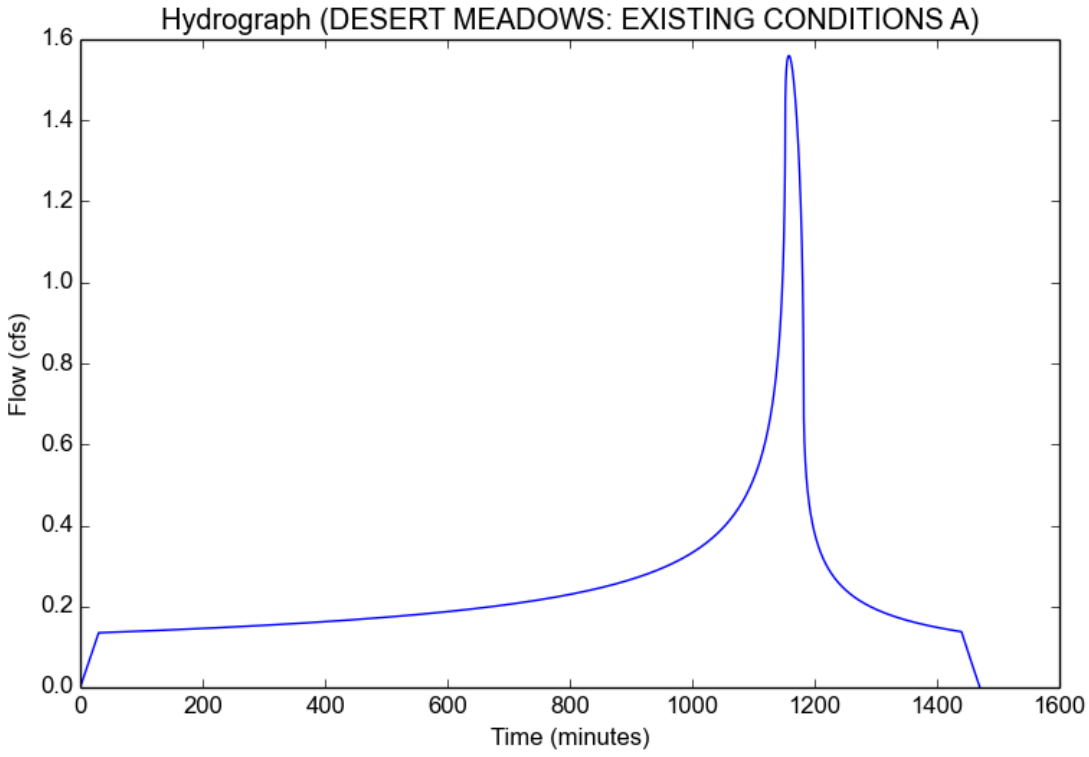
File location: R:/Job Folders/Others/CA-30230 Lancaster & 30th St W-Guardian/Documents/Drainage/LA County Method/DESERT MEADOWS - EXISTI
Version: HydroCalc 0.3.1

Input Parameters

Project Name	DESERT MEADOWS
Subarea ID	EXISTING CONDITIONS A
Area (ac)	13.8
Flow Path Length (ft)	1393.0
Flow Path Slope (vft/hft)	0.003
50-yr Rainfall Depth (in)	2.8
Percent Impervious	0.15
Soil Type	120
Design Storm Frequency	10-yr
Fire Factor	0
LID	False

Output Results

Modeled (10-yr) Rainfall Depth (in)	1.9992
Peak Intensity (in/hr)	0.5138
Undeveloped Runoff Coefficient (Cu)	0.1
Developed Runoff Coefficient (Cd)	0.22
Time of Concentration (min)	30.0
Clear Peak Flow Rate (cfs)	1.56
Burned Peak Flow Rate (cfs)	1.56
24-Hr Clear Runoff Volume (ac-ft)	0.5016
24-Hr Clear Runoff Volume (cu-ft)	21850.7072



Peak Flow Hydrologic Analysis

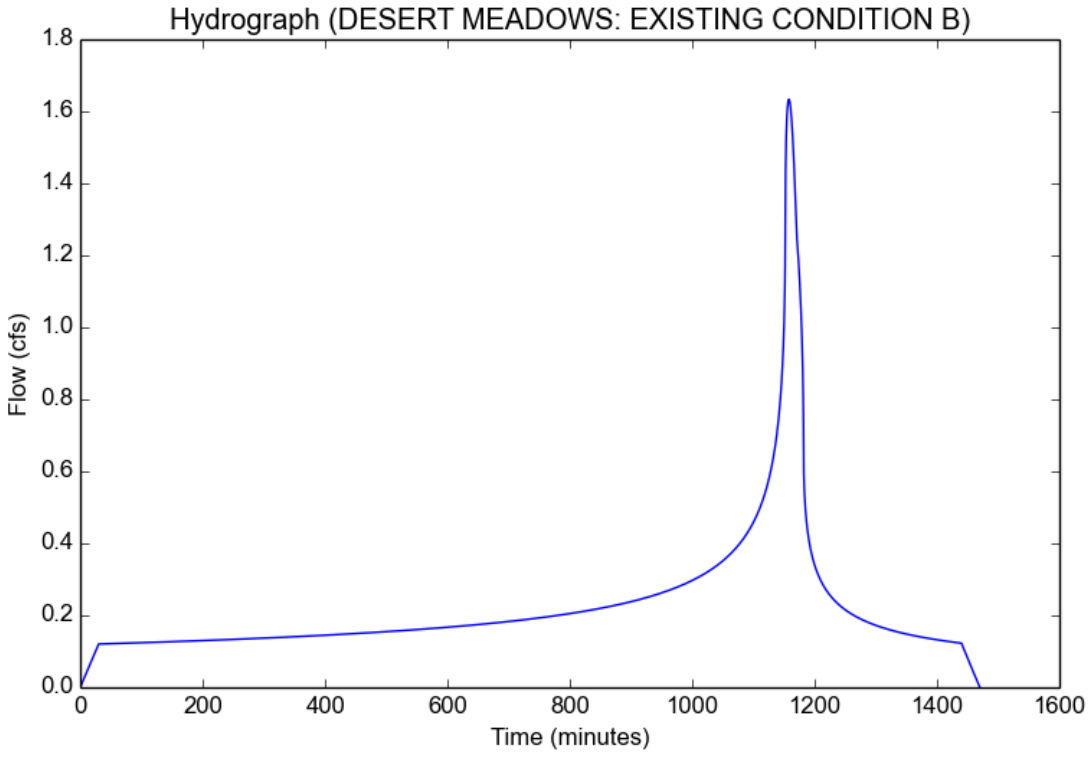
File location: U:/CA-30230 Desert Medows (Lancaster 30th)/Drainage/DESERT MEADOWS - EXISTING CONDITION B.pdf
Version: HydroCalc 0.3.1

Input Parameters

Project Name	DESERT MEADOWS
Subarea ID	EXISTING CONDITION B
Area (ac)	8.8
Flow Path Length (ft)	959.0
Flow Path Slope (vft/hft)	0.003
50-yr Rainfall Depth (in)	2.8
Percent Impervious	0.15
Soil Type	120
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	2.8
Peak Intensity (in/hr)	0.7197
Undeveloped Runoff Coefficient (Cu)	0.1447
Developed Runoff Coefficient (Cd)	0.258
Time of Concentration (min)	30.0
Clear Peak Flow Rate (cfs)	1.6336
Burned Peak Flow Rate (cfs)	1.6336
24-Hr Clear Runoff Volume (ac-ft)	0.4523
24-Hr Clear Runoff Volume (cu-ft)	19700.4421



Peak Flow Hydrologic Analysis

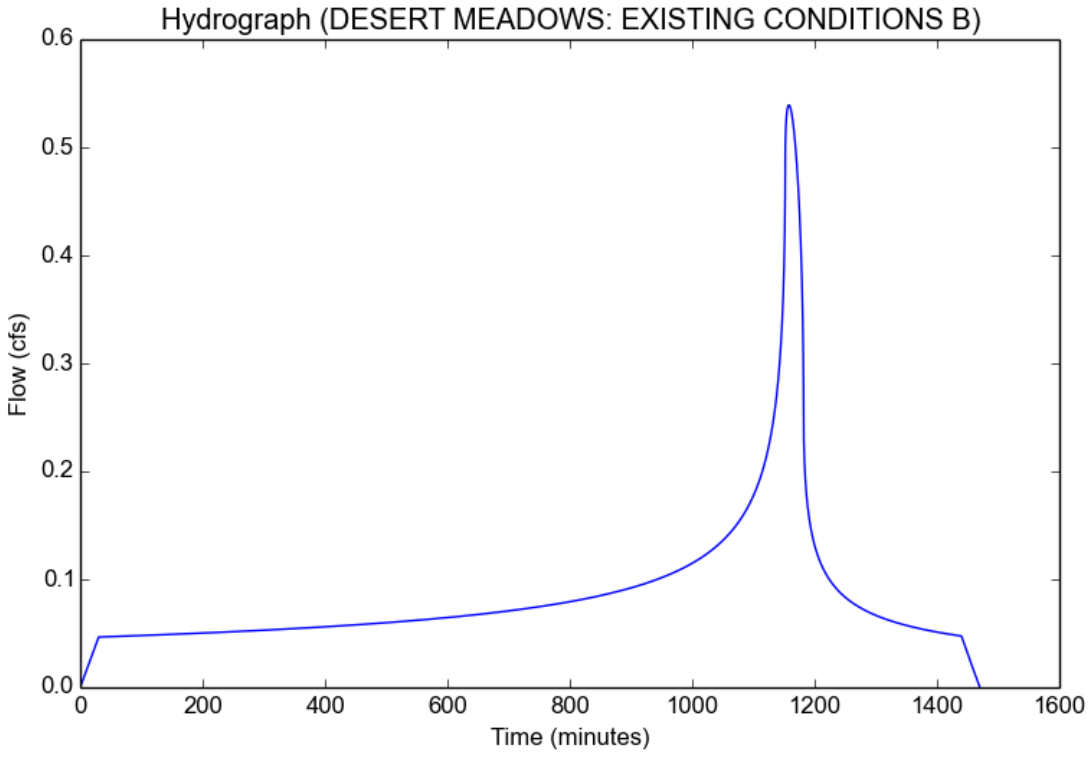
File location: R:/Job Folders/Others/CA-30230 Lancaster & 30th St W-Guardian/Documents/Drainage/LA County Method/DESERT MEADOWS - EXISTI
Version: HydroCalc 0.3.1

Input Parameters

Project Name	DESERT MEADOWS
Subarea ID	EXISTING CONDITIONS B
Area (ac)	8.8
Flow Path Length (ft)	959.0
Flow Path Slope (vft/hft)	0.003
50-yr Rainfall Depth (in)	2.8
Percent Impervious	0.15
Soil Type	120
Design Storm Frequency	2-yr
Fire Factor	0
LID	False

Output Results

Modeled (2-yr) Rainfall Depth (in)	1.0836
Peak Intensity (in/hr)	0.2785
Undeveloped Runoff Coefficient (Cu)	0.1
Developed Runoff Coefficient (Cd)	0.22
Time of Concentration (min)	30.0
Clear Peak Flow Rate (cfs)	0.5392
Burned Peak Flow Rate (cfs)	0.5392
24-Hr Clear Runoff Volume (ac-ft)	0.1734
24-Hr Clear Runoff Volume (cu-ft)	7552.3453



Peak Flow Hydrologic Analysis

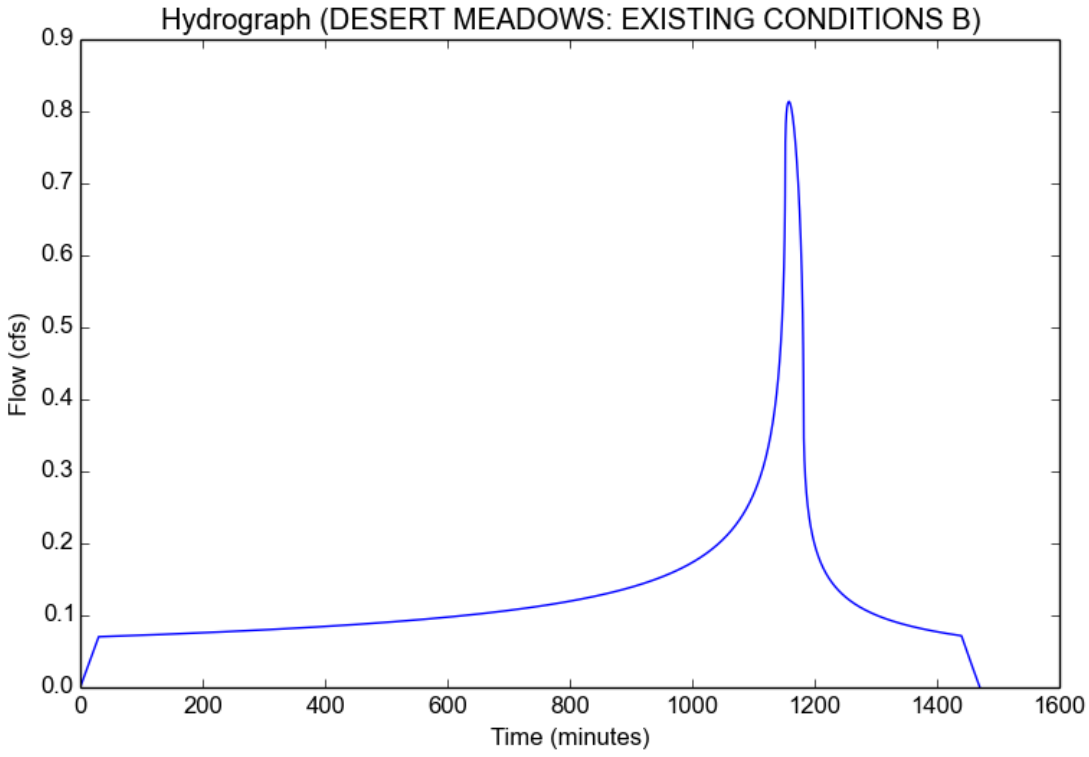
File location: R:/Job Folders/Others/CA-30230 Lancaster & 30th St W-Guardian/Documents/Drainage/LA County Method/DESERT MEADOWS - EXISTI
Version: HydroCalc 0.3.1

Input Parameters

Project Name	DESERT MEADOWS
Subarea ID	EXISTING CONDITIONS B
Area (ac)	8.8
Flow Path Length (ft)	959.0
Flow Path Slope (vft/hft)	0.003
50-yr Rainfall Depth (in)	2.8
Percent Impervious	0.15
Soil Type	120
Design Storm Frequency	5-yr
Fire Factor	0
LID	False

Output Results

Modeled (5-yr) Rainfall Depth (in)	1.6352
Peak Intensity (in/hr)	0.4203
Undeveloped Runoff Coefficient (Cu)	0.1
Developed Runoff Coefficient (Cd)	0.22
Time of Concentration (min)	30.0
Clear Peak Flow Rate (cfs)	0.8137
Burned Peak Flow Rate (cfs)	0.8137
24-Hr Clear Runoff Volume (ac-ft)	0.2616
24-Hr Clear Runoff Volume (cu-ft)	11396.8208



Peak Flow Hydrologic Analysis

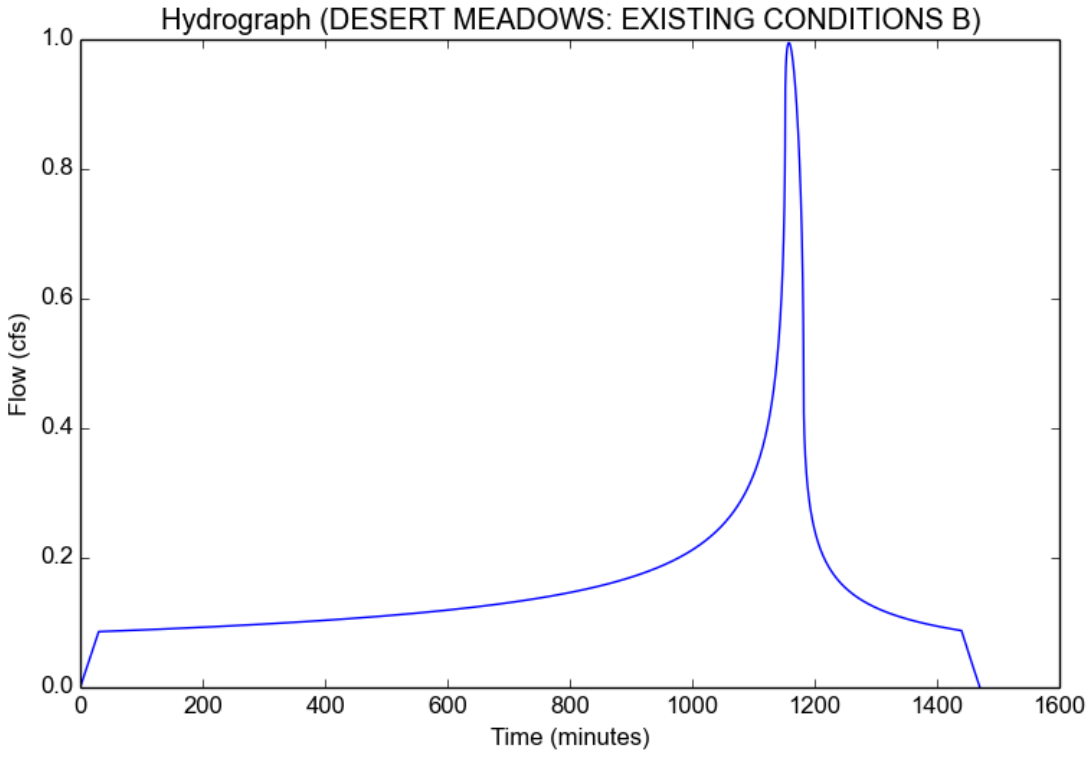
File location: R:/Job Folders/Others/CA-30230 Lancaster & 30th St W-Guardian/Documents/Drainage/LA County Method/DESERT MEADOWS - EXISTI
Version: HydroCalc 0.3.1

Input Parameters

Project Name	DESERT MEADOWS
Subarea ID	EXISTING CONDITIONS B
Area (ac)	8.8
Flow Path Length (ft)	959.0
Flow Path Slope (vft/hft)	0.003
50-yr Rainfall Depth (in)	2.8
Percent Impervious	0.15
Soil Type	120
Design Storm Frequency	10-yr
Fire Factor	0
LID	False

Output Results

Modeled (10-yr) Rainfall Depth (in)	1.9992
Peak Intensity (in/hr)	0.5138
Undeveloped Runoff Coefficient (Cu)	0.1
Developed Runoff Coefficient (Cd)	0.22
Time of Concentration (min)	30.0
Clear Peak Flow Rate (cfs)	0.9948
Burned Peak Flow Rate (cfs)	0.9948
24-Hr Clear Runoff Volume (ac-ft)	0.3199
24-Hr Clear Runoff Volume (cu-ft)	13933.7843



APPENDIX C:
POST-DEVELOPMENT HYDROCALC OUTPUT
2,5,10, & 50 YR

Peak Flow Hydrologic Analysis

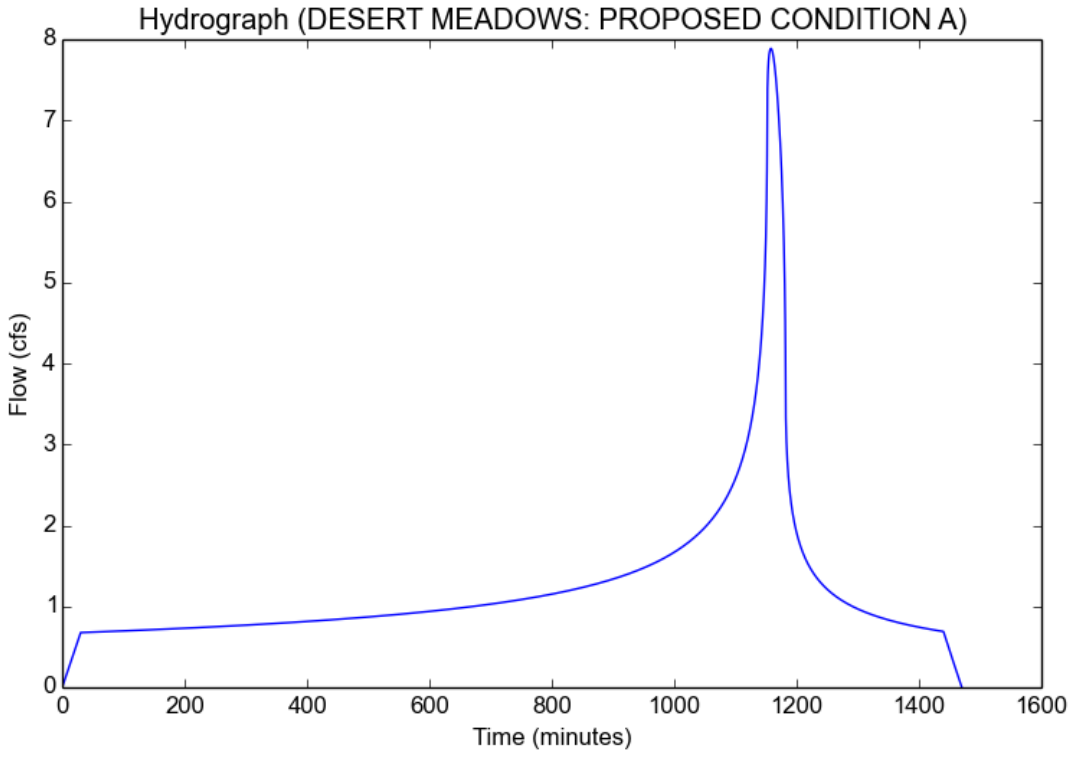
File location: U:/CA-30230 Desert Medows (Lancaster 30th)/Drainage/DESERT MEADOWS - PROPOSED CONDITION A.pdf
Version: HydroCalc 0.3.1

Input Parameters

Project Name	DESERT MEADOWS
Subarea ID	PROPOSED CONDITION A
Area (ac)	13.8
Flow Path Length (ft)	1393.0
Flow Path Slope (vft/hft)	0.003
50-yr Rainfall Depth (in)	2.8
Percent Impervious	0.86
Soil Type	120
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	2.8
Peak Intensity (in/hr)	0.7197
Undeveloped Runoff Coefficient (Cu)	0.1447
Developed Runoff Coefficient (Cd)	0.7943
Time of Concentration (min)	30.0
Clear Peak Flow Rate (cfs)	7.888
Burned Peak Flow Rate (cfs)	7.888
24-Hr Clear Runoff Volume (ac-ft)	2.5175
24-Hr Clear Runoff Volume (cu-ft)	109663.0813



Peak Flow Hydrologic Analysis

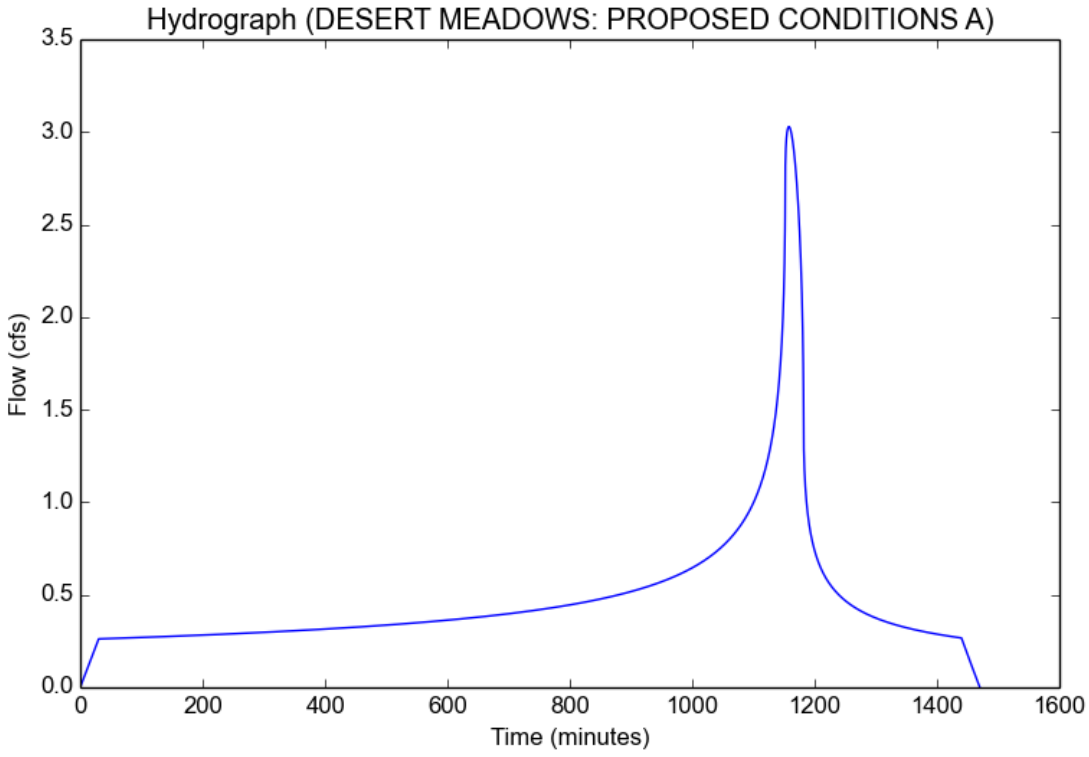
File location: R:/Job Folders/Others/CA-30230 Lancaster & 30th St W-Guardian/Documents/Drainage/LA County Method/DESERT MEADOWS - PROPO
Version: HydroCalc 0.3.1

Input Parameters

Project Name	DESERT MEADOWS
Subarea ID	PROPOSED CONDITIONS A
Area (ac)	13.8
Flow Path Length (ft)	1393.0
Flow Path Slope (vft/hft)	0.003
50-yr Rainfall Depth (in)	2.8
Percent Impervious	0.86
Soil Type	120
Design Storm Frequency	2-yr
Fire Factor	0
LID	False

Output Results

Modeled (2-yr) Rainfall Depth (in)	1.0836
Peak Intensity (in/hr)	0.2785
Undeveloped Runoff Coefficient (Cu)	0.1
Developed Runoff Coefficient (Cd)	0.788
Time of Concentration (min)	30.0
Clear Peak Flow Rate (cfs)	3.0286
Burned Peak Flow Rate (cfs)	3.0286
24-Hr Clear Runoff Volume (ac-ft)	0.9739
24-Hr Clear Runoff Volume (cu-ft)	42421.0865



Peak Flow Hydrologic Analysis

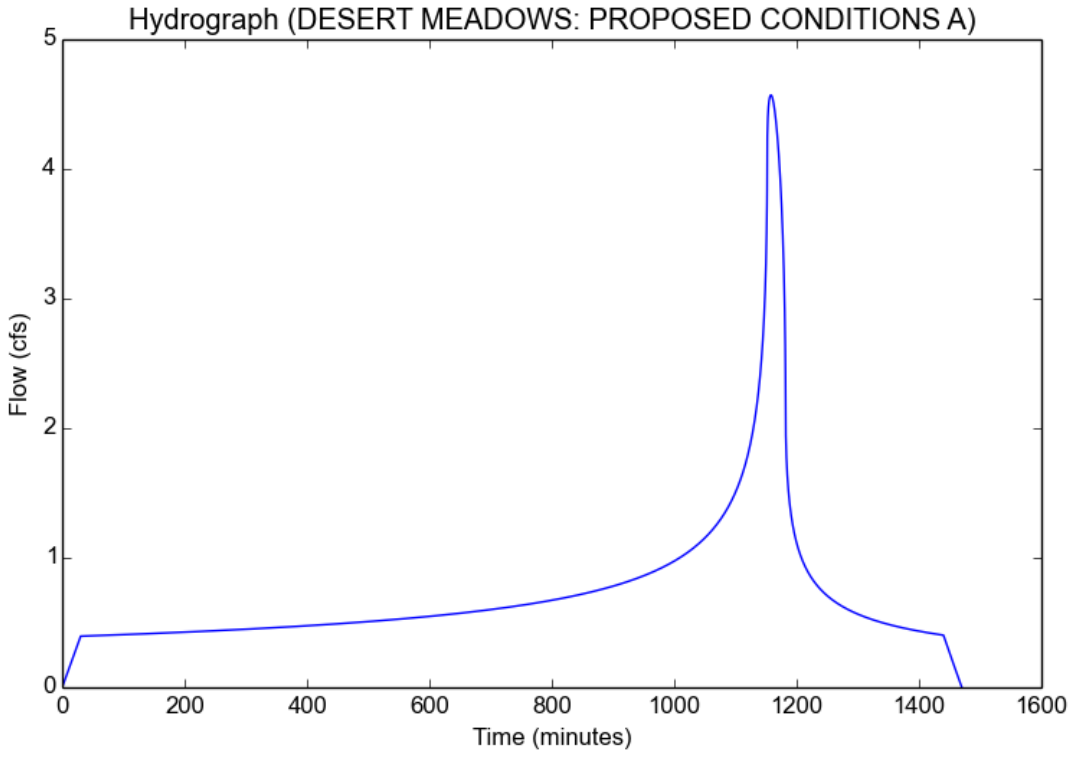
File location: R:/Job Folders/Others/CA-30230 Lancaster & 30th St W-Guardian/Documents/Drainage/LA County Method/DESERT MEADOWS - PROPO
Version: HydroCalc 0.3.1

Input Parameters

Project Name	DESERT MEADOWS
Subarea ID	PROPOSED CONDITIONS A
Area (ac)	13.8
Flow Path Length (ft)	1393.0
Flow Path Slope (vft/hft)	0.003
50-yr Rainfall Depth (in)	2.8
Percent Impervious	0.86
Soil Type	120
Design Storm Frequency	5-yr
Fire Factor	0
LID	False

Output Results

Modeled (5-yr) Rainfall Depth (in)	1.6352
Peak Intensity (in/hr)	0.4203
Undeveloped Runoff Coefficient (Cu)	0.1
Developed Runoff Coefficient (Cd)	0.788
Time of Concentration (min)	30.0
Clear Peak Flow Rate (cfs)	4.5703
Burned Peak Flow Rate (cfs)	4.5703
24-Hr Clear Runoff Volume (ac-ft)	1.4696
24-Hr Clear Runoff Volume (cu-ft)	64015.2829



Peak Flow Hydrologic Analysis

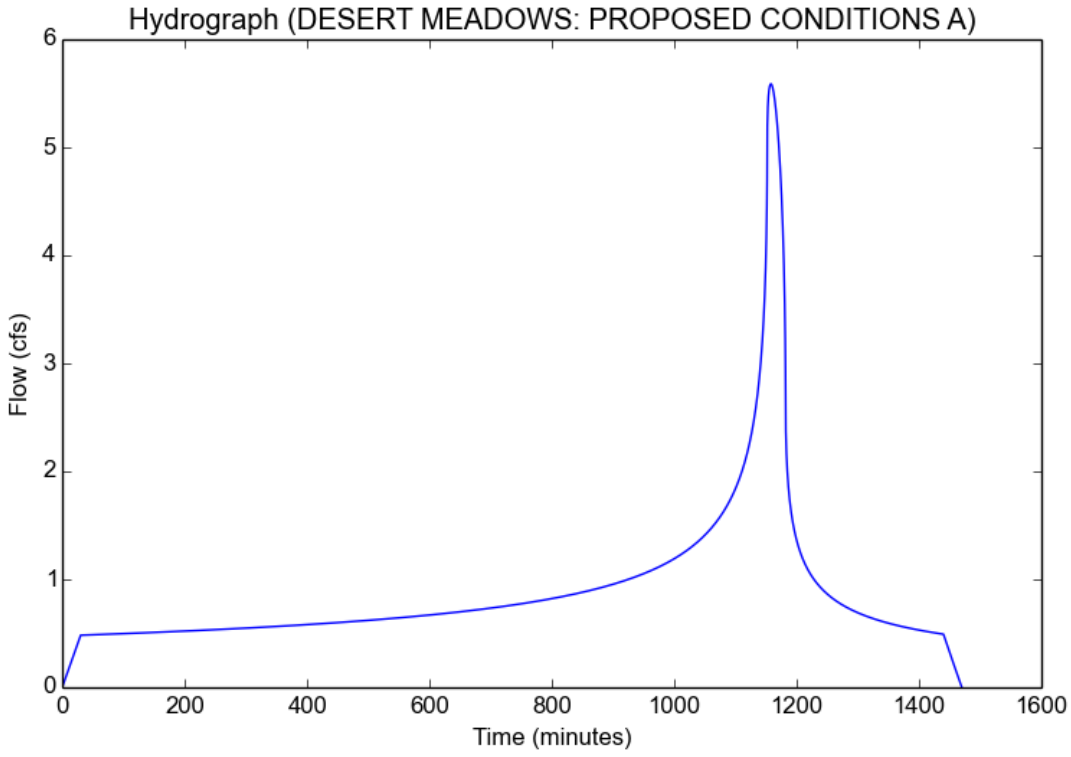
File location: R:/Job Folders/Others/CA-30230 Lancaster & 30th St W-Guardian/Documents/Drainage/LA County Method/DESERT MEADOWS - PROPO
Version: HydroCalc 0.3.1

Input Parameters

Project Name	DESERT MEADOWS
Subarea ID	PROPOSED CONDITIONS A
Area (ac)	13.8
Flow Path Length (ft)	1393.0
Flow Path Slope (vft/hft)	0.003
50-yr Rainfall Depth (in)	2.8
Percent Impervious	0.86
Soil Type	120
Design Storm Frequency	10-yr
Fire Factor	0
LID	False

Output Results

Modeled (10-yr) Rainfall Depth (in)	1.9992
Peak Intensity (in/hr)	0.5138
Undeveloped Runoff Coefficient (Cu)	0.1
Developed Runoff Coefficient (Cd)	0.788
Time of Concentration (min)	30.0
Clear Peak Flow Rate (cfs)	5.5877
Burned Peak Flow Rate (cfs)	5.5877
24-Hr Clear Runoff Volume (ac-ft)	1.7967
24-Hr Clear Runoff Volume (cu-ft)	78265.2603



Peak Flow Hydrologic Analysis

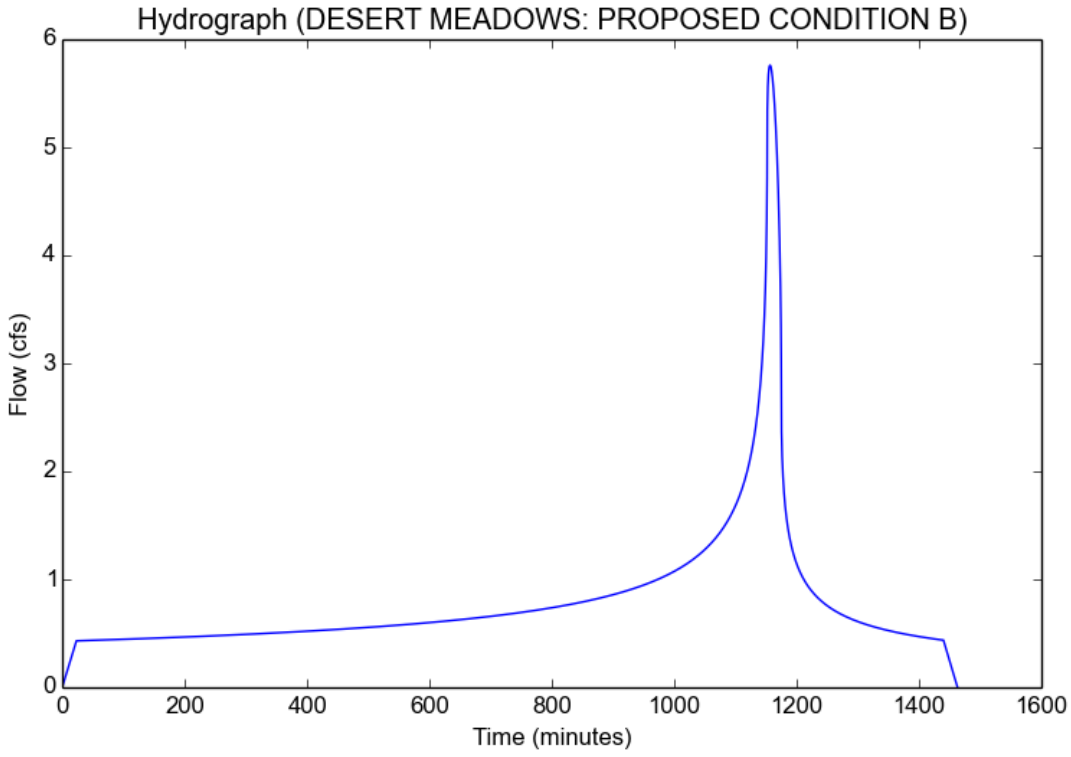
File location: U:/CA-30230 Desert Medows (Lancaster 30th)/Drainage/DESERT MEADOWS - PROPOSED CONDITION B.pdf
Version: HydroCalc 0.3.1

Input Parameters

Project Name	DESERT MEADOWS
Subarea ID	PROPOSED CONDITION B
Area (ac)	8.8
Flow Path Length (ft)	959.0
Flow Path Slope (vft/hft)	0.003
50-yr Rainfall Depth (in)	2.8
Percent Impervious	0.86
Soil Type	120
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	2.8
Peak Intensity (in/hr)	0.8154
Undeveloped Runoff Coefficient (Cu)	0.206
Developed Runoff Coefficient (Cd)	0.8028
Time of Concentration (min)	23.0
Clear Peak Flow Rate (cfs)	5.7607
Burned Peak Flow Rate (cfs)	5.7607
24-Hr Clear Runoff Volume (ac-ft)	1.6066
24-Hr Clear Runoff Volume (cu-ft)	69982.7567



Peak Flow Hydrologic Analysis

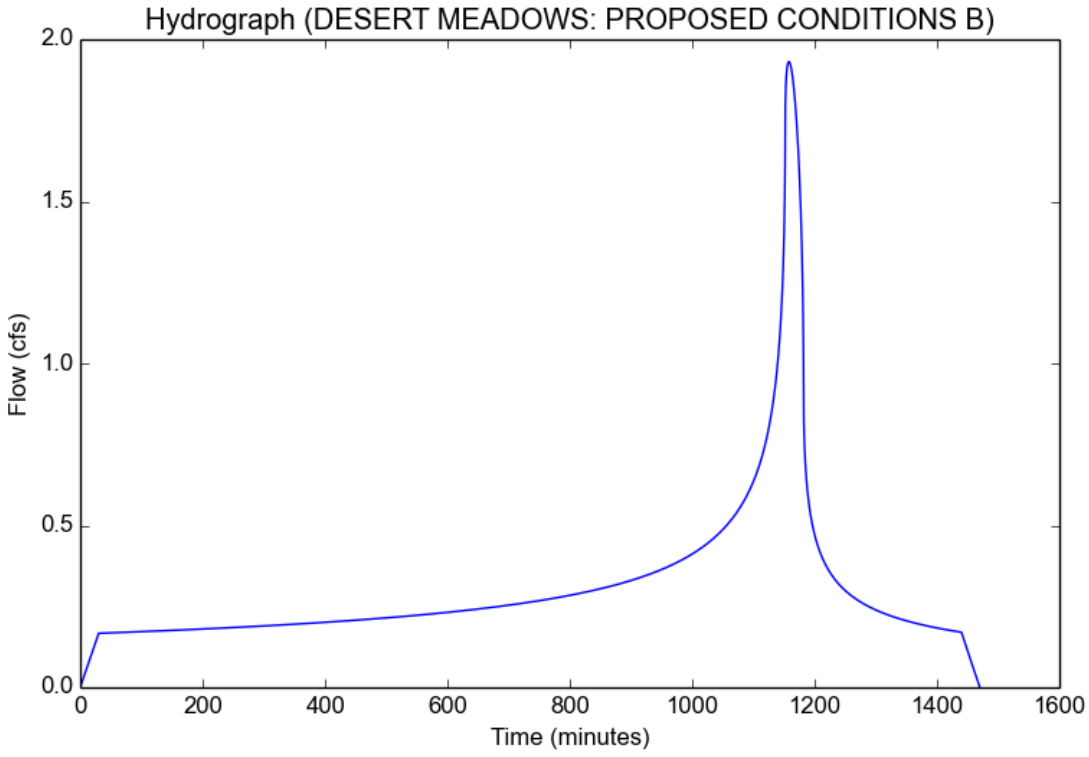
File location: R:/Job Folders/Others/CA-30230 Lancaster & 30th St W-Guardian/Documents/Drainage/LA County Method/DESERT MEADOWS - PROPO
Version: HydroCalc 0.3.1

Input Parameters

Project Name	DESERT MEADOWS
Subarea ID	PROPOSED CONDITIONS B
Area (ac)	8.8
Flow Path Length (ft)	959.0
Flow Path Slope (vft/hft)	0.003
50-yr Rainfall Depth (in)	2.8
Percent Impervious	0.86
Soil Type	120
Design Storm Frequency	2-yr
Fire Factor	0
LID	False

Output Results

Modeled (2-yr) Rainfall Depth (in)	1.0836
Peak Intensity (in/hr)	0.2785
Undeveloped Runoff Coefficient (Cu)	0.1
Developed Runoff Coefficient (Cd)	0.788
Time of Concentration (min)	30.0
Clear Peak Flow Rate (cfs)	1.9313
Burned Peak Flow Rate (cfs)	1.9313
24-Hr Clear Runoff Volume (ac-ft)	0.621
24-Hr Clear Runoff Volume (cu-ft)	27051.1276



Peak Flow Hydrologic Analysis

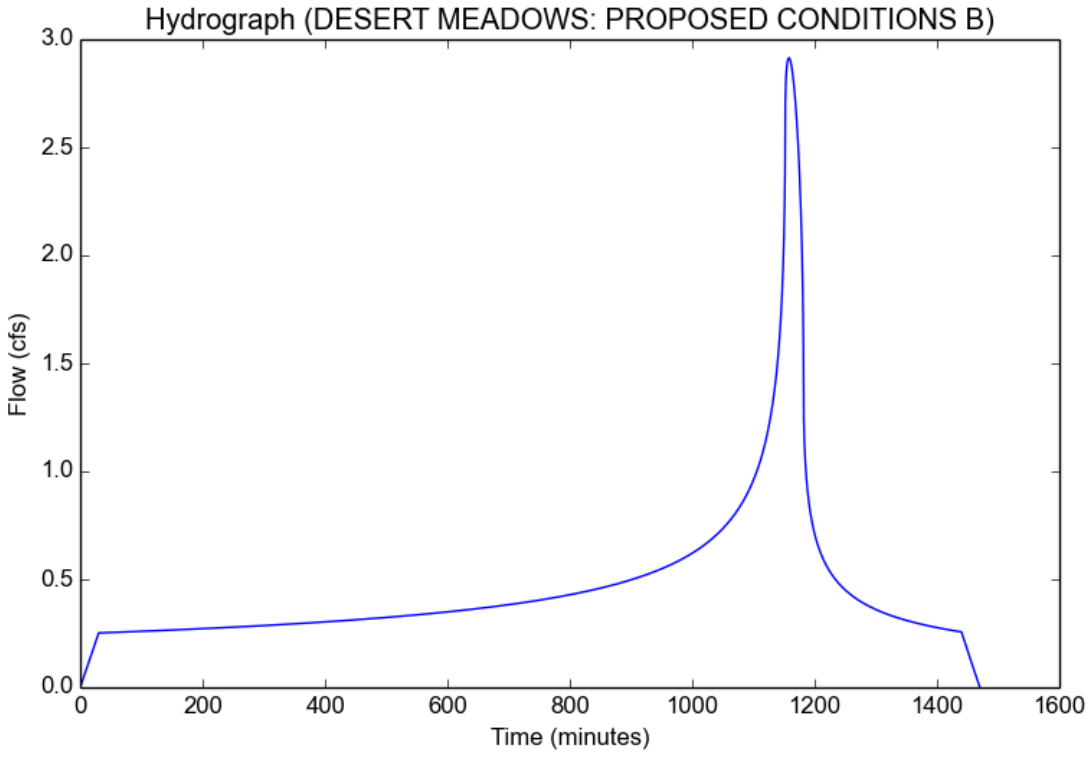
File location: R:/Job Folders/Others/CA-30230 Lancaster & 30th St W-Guardian/Documents/Drainage/LA County Method/DESERT MEADOWS - PROPO
Version: HydroCalc 0.3.1

Input Parameters

Project Name	DESERT MEADOWS
Subarea ID	PROPOSED CONDITIONS B
Area (ac)	8.8
Flow Path Length (ft)	959.0
Flow Path Slope (vft/hft)	0.003
50-yr Rainfall Depth (in)	2.8
Percent Impervious	0.86
Soil Type	120
Design Storm Frequency	5-yr
Fire Factor	0
LID	False

Output Results

Modeled (5-yr) Rainfall Depth (in)	1.6352
Peak Intensity (in/hr)	0.4203
Undeveloped Runoff Coefficient (Cu)	0.1
Developed Runoff Coefficient (Cd)	0.788
Time of Concentration (min)	30.0
Clear Peak Flow Rate (cfs)	2.9144
Burned Peak Flow Rate (cfs)	2.9144
24-Hr Clear Runoff Volume (ac-ft)	0.9371
24-Hr Clear Runoff Volume (cu-ft)	40821.3398



Peak Flow Hydrologic Analysis

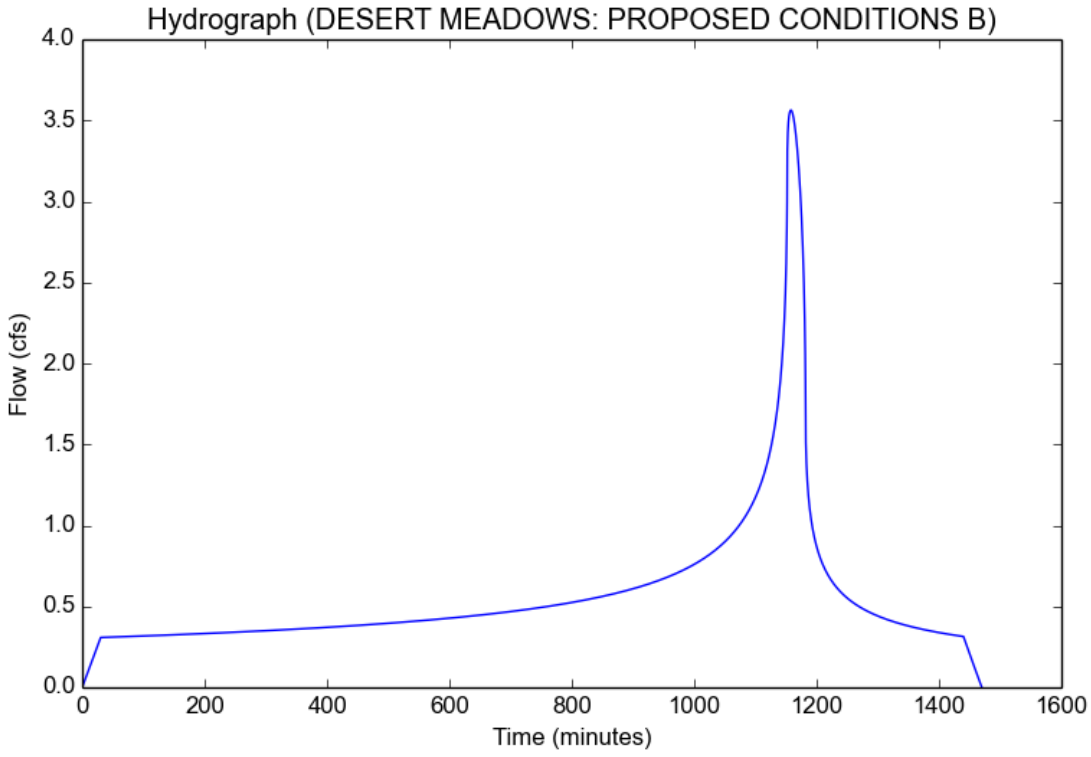
File location: R:/Job Folders/Others/CA-30230 Lancaster & 30th St W-Guardian/Documents/Drainage/LA County Method/DESERT MEADOWS - PROPO
Version: HydroCalc 0.3.1

Input Parameters

Project Name	DESERT MEADOWS
Subarea ID	PROPOSED CONDITIONS B
Area (ac)	8.8
Flow Path Length (ft)	959.0
Flow Path Slope (vft/hft)	0.003
50-yr Rainfall Depth (in)	2.8
Percent Impervious	0.86
Soil Type	120
Design Storm Frequency	10-yr
Fire Factor	0
LID	False

Output Results

Modeled (10-yr) Rainfall Depth (in)	1.9992
Peak Intensity (in/hr)	0.5138
Undeveloped Runoff Coefficient (Cu)	0.1
Developed Runoff Coefficient (Cd)	0.788
Time of Concentration (min)	30.0
Clear Peak Flow Rate (cfs)	3.5632
Burned Peak Flow Rate (cfs)	3.5632
24-Hr Clear Runoff Volume (ac-ft)	1.1457
24-Hr Clear Runoff Volume (cu-ft)	49908.2819



APPENDIX D:
BASIN ROUTING

Desert Meadows

Table IV.A

Basin Stage-Storage-Outfall Chart								
	Depth [ft]	Elevation	Area [sf]	Vol [acft]	Vol Total [acft]	Q in Peak [cfs]	Qout Inf. [cfs]	Q out Pipe [cfs]
Basin A	0	318.0	4970			7.89		
Rev3	1	319.0	6914	0.136	0.136		0.009	0.00
	2	320.0	9071	0.183	0.320		0.009	1.50
	3	321.0	11471	0.236	0.556		0.009	2.00
	4	322.0	12935	0.280	0.836		0.009	2.25

Qout = 2.20 cfs

Vol = 0.778 ac ft

Depth = 3.79'

Table IV.B

Basin Stage-Storage-Outfall Chart								
	Depth [ft]	Elevation	Area [sf]	Vol [acft]	Vol Total [acft]	Q in Peak [cfs]	Qout Inf. [cfs]	Q out Pipe [cfs]
Basin B&C	0	317.0	568			5.76		
Rev3	1	318.0	1064	0.019	0.019		0.001	0.00
	2	319.0	1647	0.031	0.050		0.001	0.50
	3	320.0	7399	0.104	0.154		0.001	0.75
	4	321.0	8725	0.185	0.339		0.001	1.00
	5	322.0	10145	0.217	0.555		0.001	1.25
	6	323.0	12502	0.228	0.784		0.001	1.40

Qout = 1.32 cfs

Vol = 0.668 ac ft

Depth = 5.49'

FLOOD HYDROGRAPH ROUTING PROGRAM
Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2005
Study date: 08/21/23

DESERT MEADOWS
PROPOSED CONDITION
BASIN A ROUTING

Program License Serial Number 6232

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

From study/file name: dma.rte
********** Hydrograph Information **********
From manual input hydrograph

**********HYDROGRAPH DATA**********
Number of intervals = 25
Time interval = 60.0 (Min.)
Maximum/Peak flow rate = 7.900 (CFS)
Total volume = 2.488 (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 103.000 to Point/Station 104.000
**** RETARDING BASIN ROUTING ****

User entry of depth-outflow-storage data

Total number of inflow hydrograph intervals = 25
Hydrograph time unit = 60.000 (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      0.136      0.009      0.136        0.136
          2.000      0.320      1.500      0.258        0.382
          3.000      0.556      2.000      0.473        0.639
          4.000      0.836      2.250      0.743        0.929
      ------------------------------------------------------------------
--
                  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       2.0    3.95    5.93    7.90
(Ft.)
  1.000    0.60    0.00      0.025  O I     |       |       |       |
0.18
  2.000    0.60    0.00      0.074  O I     |       |       |       |
0.54
  3.000    0.70    0.01      0.127  O I     |       |       |       |
0.94
  4.000    0.70    0.30      0.172  |OI     |       |       |       |
1.20
  5.000    0.70    0.50      0.197  | O     |       |       |       |
1.33
  6.000    0.80    0.63      0.212  | OI    |       |       |       |
1.41
  7.000    0.80    0.71      0.223  | OI    |       |       |       |
1.47
  8.000    0.80    0.76      0.228  |  O    |       |       |       |
1.50
  9.000    0.80    0.78      0.231  |  O    |       |       |       |
1.52
 10.000    0.90    0.81      0.235  |  O    |       |       |       |
1.54
 11.000    0.90    0.86      0.241  |  O    |       |       |       |
1.57
 12.000    0.90    0.88      0.243  |  O    |       |       |       |
1.58
 13.000    0.90    0.89      0.245  |  O    |       |       |       |
```

1.59								
14.000	1.00	0.92	0.248	| OI	|	|	|	|
1.61								
15.000	1.00	0.96	0.253	| OI	|	|	|	|
1.64								
16.000	1.00	0.98	0.256	| OI	|	|	|	|
1.65								
17.000	1.20	1.04	0.263	| O	|	|	|	|
1.69								
18.000	1.30	1.15	0.276	| OI	|	|	|	|
1.76								
19.000	1.50	1.27	0.292	| OI	|	|	|	|
1.85								
20.000	2.00	1.50	0.322	| O I	|	|	|	|
2.01								
21.000	7.90	2.03	0.585	| O	|	|	|	I|
3.10								
22.000	1.00	2.20	0.778	| I O	|	|	|	|
3.79								
23.000	0.80	2.11	0.675	| I O	|	|	|	|
3.42								
24.000	0.70	2.01	0.567	| I O	|	|	|	|
3.04								
25.000	0.60	1.80	0.463	| I O|	|	|	|	|
2.61								
26.000	0.00	1.56	0.349	| I O	|	|	|	|
2.12								
27.000	0.00	0.91	0.247	| I O	|	|	|	|
1.60								
28.000	0.00	0.45	0.191	| IO	|	|	|	|
1.30								
29.000	0.00	0.23	0.163	| O	|	|	|	|
1.14								
30.000	0.00	0.11	0.149	| O	|	|	|	|
1.07								
31.000	0.00	0.06	0.142	| O	|	|	|	|
1.03								
32.000	0.00	0.03	0.138	| O	|	|	|	|
1.01								
33.000	0.00	0.01	0.137	| O	|	|	|	|
1.00								
34.000	0.00	0.01	0.136	| O	|	|	|	|
1.00								
35.000	0.00	0.01	0.135	| O	|	|	|	|
0.99								
36.000	0.00	0.01	0.134	| O	|	|	|	|
0.99								
37.000	0.00	0.01	0.133	| O	|	|	|	|
0.98								
38.000	0.00	0.01	0.133	| O	|	|	|	|
0.98								
39.000	0.00	0.01	0.132	| O	|	|	|	|
0.97								
40.000	0.00	0.01	0.131	| O	|	|	|	|
0.97								
41.000	0.00	0.01	0.131	| O	|	|	|	|
0.96								
42.000	0.00	0.01	0.130	| O	|	|	|	|
0.95								
43.000	0.00	0.01	0.129	| O	|	|	|	|

0.95								
44.000	0.00	0.01	0.128	O	|	|	|	|
0.94								
45.000	0.00	0.01	0.128	O	|	|	|	|
0.94								
46.000	0.00	0.01	0.127	O	|	|	|	|
0.93								
47.000	0.00	0.01	0.126	O	|	|	|	|
0.93								
48.000	0.00	0.01	0.126	O	|	|	|	|
0.92								
49.000	0.00	0.01	0.125	O	|	|	|	|
0.92								
50.000	0.00	0.01	0.124	O	|	|	|	|
0.91								
51.000	0.00	0.01	0.124	O	|	|	|	|
0.91								
52.000	0.00	0.01	0.123	O	|	|	|	|
0.90								
53.000	0.00	0.01	0.122	O	|	|	|	|
0.90								
54.000	0.00	0.01	0.122	O	|	|	|	|
0.89								
55.000	0.00	0.01	0.121	O	|	|	|	|
0.89								
56.000	0.00	0.01	0.120	O	|	|	|	|
0.88								
57.000	0.00	0.01	0.120	O	|	|	|	|
0.88								
58.000	0.00	0.01	0.119	O	|	|	|	|
0.87								
59.000	0.00	0.01	0.118	O	|	|	|	|
0.87								
60.000	0.00	0.01	0.118	O	|	|	|	|
0.87								
61.000	0.00	0.01	0.117	O	|	|	|	|
0.86								
62.000	0.00	0.01	0.116	O	|	|	|	|
0.86								
63.000	0.00	0.01	0.116	O	|	|	|	|
0.85								
64.000	0.00	0.01	0.115	O	|	|	|	|
0.85								
65.000	0.00	0.01	0.115	O	|	|	|	|
0.84								
66.000	0.00	0.01	0.114	O	|	|	|	|
0.84								
67.000	0.00	0.01	0.113	O	|	|	|	|
0.83								
68.000	0.00	0.01	0.113	O	|	|	|	|
0.83								
69.000	0.00	0.01	0.112	O	|	|	|	|
0.82								
70.000	0.00	0.01	0.111	O	|	|	|	|
0.82								
71.000	0.00	0.01	0.111	O	|	|	|	|
0.81								
72.000	0.00	0.01	0.110	O	|	|	|	|
0.81								
73.000	0.00	0.01	0.110	O	|	|	|	|

0.81
 74.000 0.00 0.01 0.109 O | | | |
0.80
 75.000 0.00 0.01 0.108 O | | | |
0.80
 76.000 0.00 0.01 0.108 O | | | |
0.79
 77.000 0.00 0.01 0.107 O | | | |
0.79
 78.000 0.00 0.01 0.107 O | | | |
0.78
 79.000 0.00 0.01 0.106 O | | | |
0.78
 80.000 0.00 0.01 0.105 O | | | |
0.78
 81.000 0.00 0.01 0.105 O | | | |
0.77
 82.000 0.00 0.01 0.104 O | | | |
0.77
 83.000 0.00 0.01 0.104 O | | | |
0.76
 84.000 0.00 0.01 0.103 O | | | |
0.76
 85.000 0.00 0.01 0.103 O | | | |
0.75
 86.000 0.00 0.01 0.102 O | | | |
0.75
 87.000 0.00 0.01 0.102 O | | | |
0.75
 88.000 0.00 0.01 0.101 O | | | |
0.74
 89.000 0.00 0.01 0.100 O | | | |
0.74
 90.000 0.00 0.01 0.100 O | | | |
0.73
 91.000 0.00 0.01 0.099 O | | | |
0.73
 92.000 0.00 0.01 0.099 O | | | |
0.73
 93.000 0.00 0.01 0.098 O | | | |
0.72
 94.000 0.00 0.01 0.098 O | | | |
0.72
 95.000 0.00 0.01 0.097 O | | | |
0.71
 96.000 0.00 0.01 0.097 O | | | |
0.71
 97.000 0.00 0.01 0.096 O | | | |
0.71
 98.000 0.00 0.01 0.096 O | | | |
0.70
 99.000 0.00 0.01 0.095 O | | | |
0.70
100.000 0.00 0.01 0.095 O | | | |
0.70
101.000 0.00 0.01 0.094 O | | | |
0.69
102.000 0.00 0.01 0.094 O | | | |
0.69
103.000 0.00 0.01 0.093 O | | | |

0.68
104.000 0.00 0.01 0.093 O | | | |
0.68
105.000 0.00 0.01 0.092 O | | | |
0.68
106.000 0.00 0.01 0.092 O | | | |
0.67
107.000 0.00 0.01 0.091 O | | | |
0.67
108.000 0.00 0.01 0.091 O | | | |
0.67
109.000 0.00 0.01 0.090 O | | | |
0.66
110.000 0.00 0.01 0.090 O | | | |
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111.000 0.00 0.01 0.089 O | | | |
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112.000 0.00 0.01 0.089 O | | | |
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113.000 0.00 0.01 0.088 O | | | |
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114.000 0.00 0.01 0.088 O | | | |
0.64
115.000 0.00 0.01 0.087 O | | | |
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116.000 0.00 0.01 0.087 O | | | |
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117.000 0.00 0.01 0.086 O | | | |
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118.000 0.00 0.01 0.086 O | | | |
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119.000 0.00 0.01 0.085 O | | | |
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120.000 0.00 0.01 0.085 O | | | |
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121.000 0.00 0.01 0.084 O | | | |
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122.000 0.00 0.01 0.084 O | | | |
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123.000 0.00 0.01 0.083 O | | | |
0.61
124.000 0.00 0.01 0.083 O | | | |
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125.000 0.00 0.01 0.082 O | | | |
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126.000 0.00 0.01 0.082 O | | | |
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127.000 0.00 0.01 0.082 O | | | |
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128.000 0.00 0.01 0.081 O | | | |
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129.000 0.00 0.01 0.081 O | | | |
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130.000 0.00 0.01 0.080 O | | | |
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131.000 0.00 0.01 0.080 O | | | |
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132.000 0.00 0.01 0.079 O | | | |
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133.000 0.00 0.01 0.079 O | | | |

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134.000 0.00 0.01 0.079 O | | | |
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135.000 0.00 0.01 0.078 O | | | |
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136.000 0.00 0.01 0.078 O | | | |
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137.000 0.00 0.01 0.077 O | | | |
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138.000 0.00 0.01 0.077 O | | | |
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139.000 0.00 0.01 0.076 O | | | |
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140.000 0.00 0.01 0.076 O | | | |
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141.000 0.00 0.01 0.076 O | | | |
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142.000 0.00 0.00 0.075 O | | | |
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143.000 0.00 0.00 0.075 O | | | |
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144.000 0.00 0.00 0.074 O | | | |
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145.000 0.00 0.00 0.074 O | | | |
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146.000 0.00 0.00 0.074 O | | | |
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147.000 0.00 0.00 0.073 O | | | |
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148.000 0.00 0.00 0.073 O | | | |
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149.000 0.00 0.00 0.072 O | | | |
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150.000 0.00 0.00 0.072 O | | | |
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151.000 0.00 0.00 0.072 O | | | |
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152.000 0.00 0.00 0.071 O | | | |
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153.000 0.00 0.00 0.071 O | | | |
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154.000 0.00 0.00 0.070 O | | | |
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155.000 0.00 0.00 0.070 O | | | |
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156.000 0.00 0.00 0.070 O | | | |
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157.000 0.00 0.00 0.069 O | | | |
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158.000 0.00 0.00 0.069 O | | | |
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159.000 0.00 0.00 0.068 O | | | |
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160.000 0.00 0.00 0.068 O | | | |
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161.000 0.00 0.00 0.068 O | | | |
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162.000 0.00 0.00 0.067 O | | | |
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163.000 0.00 0.00 0.067 O | | | |

0.49
164.000 0.00 0.00 0.067 O | | | |
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165.000 0.00 0.00 0.066 O | | | |
0.49
166.000 0.00 0.00 0.066 O | | | |
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167.000 0.00 0.00 0.066 O | | | |
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168.000 0.00 0.00 0.065 O | | | |
0.48
169.000 0.00 0.00 0.065 O | | | |
0.48
170.000 0.00 0.00 0.064 O | | | |
0.47
171.000 0.00 0.00 0.064 O | | | |
0.47
172.000 0.00 0.00 0.064 O | | | |
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173.000 0.00 0.00 0.063 O | | | |
0.47
174.000 0.00 0.00 0.063 O | | | |
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175.000 0.00 0.00 0.063 O | | | |
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176.000 0.00 0.00 0.062 O | | | |
0.46
177.000 0.00 0.00 0.062 O | | | |
0.46
178.000 0.00 0.00 0.062 O | | | |
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179.000 0.00 0.00 0.061 O | | | |
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180.000 0.00 0.00 0.061 O | | | |
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181.000 0.00 0.00 0.061 O | | | |
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182.000 0.00 0.00 0.060 O | | | |
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183.000 0.00 0.00 0.060 O | | | |
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184.000 0.00 0.00 0.060 O | | | |
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185.000 0.00 0.00 0.059 O | | | |
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186.000 0.00 0.00 0.059 O | | | |
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187.000 0.00 0.00 0.059 O | | | |
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188.000 0.00 0.00 0.058 O | | | |
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189.000 0.00 0.00 0.058 O | | | |
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190.000 0.00 0.00 0.058 O | | | |
0.42
191.000 0.00 0.00 0.057 O | | | |
0.42
192.000 0.00 0.00 0.057 O | | | |
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193.000 0.00 0.00 0.057 O | | | |

0.42
194.000 0.00 0.00 0.057 O | | | |
0.42
195.000 0.00 0.00 0.056 O | | | |
0.41
196.000 0.00 0.00 0.056 O | | | |
0.41
197.000 0.00 0.00 0.056 O | | | |
0.41
198.000 0.00 0.00 0.055 O | | | |
0.41
199.000 0.00 0.00 0.055 O | | | |
0.40
200.000 0.00 0.00 0.055 O | | | |
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201.000 0.00 0.00 0.054 O | | | |
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202.000 0.00 0.00 0.054 O | | | |
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203.000 0.00 0.00 0.054 O | | | |
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204.000 0.00 0.00 0.054 O | | | |
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205.000 0.00 0.00 0.053 O | | | |
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206.000 0.00 0.00 0.053 O | | | |
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207.000 0.00 0.00 0.053 O | | | |
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208.000 0.00 0.00 0.052 O | | | |
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209.000 0.00 0.00 0.052 O | | | |
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210.000 0.00 0.00 0.052 O | | | |
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211.000 0.00 0.00 0.052 O | | | |
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212.000 0.00 0.00 0.051 O | | | |
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213.000 0.00 0.00 0.051 O | | | |
0.37
214.000 0.00 0.00 0.051 O | | | |
0.37
215.000 0.00 0.00 0.050 O | | | |
0.37
216.000 0.00 0.00 0.050 O | | | |
0.37
217.000 0.00 0.00 0.050 O | | | |
0.37
218.000 0.00 0.00 0.050 O | | | |
0.36
219.000 0.00 0.00 0.049 O | | | |
0.36
220.000 0.00 0.00 0.049 O | | | |
0.36
221.000 0.00 0.00 0.049 O | | | |
0.36
222.000 0.00 0.00 0.049 O | | | |
0.36
223.000 0.00 0.00 0.048 O | | | |

0.35								
224.000	0.00	0.00	0.048	O	|	|	|	|
0.35								
225.000	0.00	0.00	0.048	O	|	|	|	|
0.35								
226.000	0.00	0.00	0.047	O	|	|	|	|
0.35								
227.000	0.00	0.00	0.047	O	|	|	|	|
0.35								
228.000	0.00	0.00	0.047	O	|	|	|	|
0.35								
229.000	0.00	0.00	0.047	O	|	|	|	|
0.34								
230.000	0.00	0.00	0.046	O	|	|	|	|
0.34								
231.000	0.00	0.00	0.046	O	|	|	|	|
0.34								
232.000	0.00	0.00	0.046	O	|	|	|	|
0.34								
233.000	0.00	0.00	0.046	O	|	|	|	|
0.34								
234.000	0.00	0.00	0.045	O	|	|	|	|
0.33								
235.000	0.00	0.00	0.045	O	|	|	|	|
0.33								
236.000	0.00	0.00	0.045	O	|	|	|	|
0.33								
237.000	0.00	0.00	0.045	O	|	|	|	|
0.33								
238.000	0.00	0.00	0.044	O	|	|	|	|
0.33								
239.000	0.00	0.00	0.044	O	|	|	|	|
0.33								
240.000	0.00	0.00	0.044	O	|	|	|	|
0.32								
241.000	0.00	0.00	0.044	O	|	|	|	|
0.32								
242.000	0.00	0.00	0.043	O	|	|	|	|
0.32								
243.000	0.00	0.00	0.043	O	|	|	|	|
0.32								
244.000	0.00	0.00	0.043	O	|	|	|	|
0.32								
245.000	0.00	0.00	0.043	O	|	|	|	|
0.31								
246.000	0.00	0.00	0.043	O	|	|	|	|
0.31								
247.000	0.00	0.00	0.042	O	|	|	|	|
0.31								
248.000	0.00	0.00	0.042	O	|	|	|	|
0.31								
249.000	0.00	0.00	0.042	O	|	|	|	|
0.31								
250.000	0.00	0.00	0.042	O	|	|	|	|
0.31								
251.000	0.00	0.00	0.041	O	|	|	|	|
0.30								
252.000	0.00	0.00	0.041	O	|	|	|	|
0.30								
253.000	0.00	0.00	0.041	O	|	|	|	|

0.30								
254.000	0.00	0.00	0.041	O	|	|	|	|
0.30								
255.000	0.00	0.00	0.041	O	|	|	|	|
0.30								
256.000	0.00	0.00	0.040	O	|	|	|	|
0.30								
257.000	0.00	0.00	0.040	O	|	|	|	|
0.29								
258.000	0.00	0.00	0.040	O	|	|	|	|
0.29								
259.000	0.00	0.00	0.040	O	|	|	|	|
0.29								
260.000	0.00	0.00	0.039	O	|	|	|	|
0.29								
261.000	0.00	0.00	0.039	O	|	|	|	|
0.29								
262.000	0.00	0.00	0.039	O	|	|	|	|
0.29								
263.000	0.00	0.00	0.039	O	|	|	|	|
0.29								
264.000	0.00	0.00	0.039	O	|	|	|	|
0.28								
265.000	0.00	0.00	0.038	O	|	|	|	|
0.28								
266.000	0.00	0.00	0.038	O	|	|	|	|
0.28								
267.000	0.00	0.00	0.038	O	|	|	|	|
0.28								
268.000	0.00	0.00	0.038	O	|	|	|	|
0.28								
269.000	0.00	0.00	0.038	O	|	|	|	|
0.28								
270.000	0.00	0.00	0.037	O	|	|	|	|
0.27								
271.000	0.00	0.00	0.037	O	|	|	|	|
0.27								
272.000	0.00	0.00	0.037	O	|	|	|	|
0.27								
273.000	0.00	0.00	0.037	O	|	|	|	|
0.27								
274.000	0.00	0.00	0.037	O	|	|	|	|
0.27								
275.000	0.00	0.00	0.036	O	|	|	|	|
0.27								
276.000	0.00	0.00	0.036	O	|	|	|	|
0.27								
277.000	0.00	0.00	0.036	O	|	|	|	|
0.26								
278.000	0.00	0.00	0.036	O	|	|	|	|
0.26								
279.000	0.00	0.00	0.036	O	|	|	|	|
0.26								
280.000	0.00	0.00	0.035	O	|	|	|	|
0.26								
281.000	0.00	0.00	0.035	O	|	|	|	|
0.26								
282.000	0.00	0.00	0.035	O	|	|	|	|
0.26								
283.000	0.00	0.00	0.035	O	|	|	|	|

0.26
284.000 0.00 0.00 0.035 O | | | |
0.25
285.000 0.00 0.00 0.034 O | | | |
0.25
286.000 0.00 0.00 0.034 O | | | |
0.25
287.000 0.00 0.00 0.034 O | | | |
0.25
288.000 0.00 0.00 0.034 O | | | |
0.25
289.000 0.00 0.00 0.034 O | | | |
0.25
290.000 0.00 0.00 0.033 O | | | |
0.25
291.000 0.00 0.00 0.033 O | | | |
0.24
292.000 0.00 0.00 0.033 O | | | |
0.24
293.000 0.00 0.00 0.033 O | | | |
0.24
294.000 0.00 0.00 0.033 O | | | |
0.24
295.000 0.00 0.00 0.033 O | | | |
0.24
296.000 0.00 0.00 0.032 O | | | |
0.24
297.000 0.00 0.00 0.032 O | | | |
0.24
298.000 0.00 0.00 0.032 O | | | |
0.24
299.000 0.00 0.00 0.032 O | | | |
0.23
300.000 0.00 0.00 0.032 O | | | |
0.23
301.000 0.00 0.00 0.031 O | | | |
0.23
302.000 0.00 0.00 0.031 O | | | |
0.23
303.000 0.00 0.00 0.031 O | | | |
0.23
304.000 0.00 0.00 0.031 O | | | |
0.23
305.000 0.00 0.00 0.031 O | | | |
0.23
306.000 0.00 0.00 0.031 O | | | |
0.23
307.000 0.00 0.00 0.030 O | | | |
0.22
308.000 0.00 0.00 0.030 O | | | |
0.22
309.000 0.00 0.00 0.030 O | | | |
0.22
310.000 0.00 0.00 0.030 O | | | |
0.22
311.000 0.00 0.00 0.030 O | | | |
0.22
312.000 0.00 0.00 0.030 O | | | |
0.22
313.000 0.00 0.00 0.029 O | | | |

0.22
314.000 0.00 0.00 0.029 O | | | |
0.22
315.000 0.00 0.00 0.029 O | | | |
0.21
316.000 0.00 0.00 0.029 O | | | |
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317.000 0.00 0.00 0.029 O | | | |
0.21
318.000 0.00 0.00 0.029 O | | | |
0.21
319.000 0.00 0.00 0.029 O | | | |
0.21
320.000 0.00 0.00 0.028 O | | | |
0.21
321.000 0.00 0.00 0.028 O | | | |
0.21
322.000 0.00 0.00 0.028 O | | | |
0.21
323.000 0.00 0.00 0.028 O | | | |
0.21
324.000 0.00 0.00 0.028 O | | | |
0.20
325.000 0.00 0.00 0.028 O | | | |
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326.000 0.00 0.00 0.027 O | | | |
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327.000 0.00 0.00 0.027 O | | | |
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328.000 0.00 0.00 0.027 O | | | |
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329.000 0.00 0.00 0.027 O | | | |
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330.000 0.00 0.00 0.027 O | | | |
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331.000 0.00 0.00 0.027 O | | | |
0.20
332.000 0.00 0.00 0.027 O | | | |
0.20
333.000 0.00 0.00 0.026 O | | | |
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334.000 0.00 0.00 0.026 O | | | |
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335.000 0.00 0.00 0.026 O | | | |
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336.000 0.00 0.00 0.026 O | | | |
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337.000 0.00 0.00 0.026 O | | | |
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338.000 0.00 0.00 0.026 O | | | |
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340.000 0.00 0.00 0.025 O | | | |
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341.000 0.00 0.00 0.025 O | | | |
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342.000 0.00 0.00 0.025 O | | | |
0.19
343.000 0.00 0.00 0.025 O | | | |

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344.000 0.00 0.00 0.025 O | | | |
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345.000 0.00 0.00 0.025 O | | | |
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346.000 0.00 0.00 0.025 O | | | |
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347.000 0.00 0.00 0.024 O | | | |
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348.000 0.00 0.00 0.024 O | | | |
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349.000 0.00 0.00 0.024 O | | | |
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350.000 0.00 0.00 0.024 O | | | |
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351.000 0.00 0.00 0.024 O | | | |
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352.000 0.00 0.00 0.024 O | | | |
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353.000 0.00 0.00 0.024 O | | | |
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354.000 0.00 0.00 0.024 O | | | |
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355.000 0.00 0.00 0.023 O | | | |
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356.000 0.00 0.00 0.023 O | | | |
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357.000 0.00 0.00 0.023 O | | | |
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358.000 0.00 0.00 0.023 O | | | |
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359.000 0.00 0.00 0.023 O | | | |
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360.000 0.00 0.00 0.023 O | | | |
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361.000 0.00 0.00 0.023 O | | | |
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362.000 0.00 0.00 0.023 O | | | |
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363.000 0.00 0.00 0.022 O | | | |
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364.000 0.00 0.00 0.022 O | | | |
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365.000 0.00 0.00 0.022 O | | | |
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366.000 0.00 0.00 0.022 O | | | |
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367.000 0.00 0.00 0.022 O | | | |
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368.000 0.00 0.00 0.022 O | | | |
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369.000 0.00 0.00 0.022 O | | | |
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370.000 0.00 0.00 0.022 O | | | |
0.16
371.000 0.00 0.00 0.021 O | | | |
0.16
372.000 0.00 0.00 0.021 O | | | |
0.16
373.000 0.00 0.00 0.021 O | | | |

0.16
374.000 0.00 0.00 0.021 O | | | |
0.16
375.000 0.00 0.00 0.021 O | | | |
0.15
376.000 0.00 0.00 0.021 O | | | |
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377.000 0.00 0.00 0.021 O | | | |
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378.000 0.00 0.00 0.021 O | | | |
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379.000 0.00 0.00 0.021 O | | | |
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380.000 0.00 0.00 0.020 O | | | |
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381.000 0.00 0.00 0.020 O | | | |
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382.000 0.00 0.00 0.020 O | | | |
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383.000 0.00 0.00 0.020 O | | | |
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386.000 0.00 0.00 0.020 O | | | |
0.15
387.000 0.00 0.00 0.020 O | | | |
0.14
388.000 0.00 0.00 0.020 O | | | |
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389.000 0.00 0.00 0.019 O | | | |
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390.000 0.00 0.00 0.019 O | | | |
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391.000 0.00 0.00 0.019 O | | | |
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392.000 0.00 0.00 0.019 O | | | |
0.14
393.000 0.00 0.00 0.019 O | | | |
0.14
394.000 0.00 0.00 0.019 O | | | |
0.14
395.000 0.00 0.00 0.019 O | | | |
0.14
396.000 0.00 0.00 0.019 O | | | |
0.14
397.000 0.00 0.00 0.019 O | | | |
0.14
398.000 0.00 0.00 0.019 O | | | |
0.14
399.000 0.00 0.00 0.018 O | | | |
0.14
400.000 0.00 0.00 0.018 O | | | |
0.13
401.000 0.00 0.00 0.018 O | | | |
0.13
402.000 0.00 0.00 0.018 O | | | |
0.13
403.000 0.00 0.00 0.018 O | | | |

0.13								
404.000	0.00	0.00	0.018	O	|	|	|	|
0.13								
405.000	0.00	0.00	0.018	O	|	|	|	|
0.13								
406.000	0.00	0.00	0.018	O	|	|	|	|
0.13								
407.000	0.00	0.00	0.018	O	|	|	|	|
0.13								
408.000	0.00	0.00	0.018	O	|	|	|	|
0.13								
409.000	0.00	0.00	0.017	O	|	|	|	|
0.13								
410.000	0.00	0.00	0.017	O	|	|	|	|
0.13								
411.000	0.00	0.00	0.017	O	|	|	|	|
0.13								
412.000	0.00	0.00	0.017	O	|	|	|	|
0.13								
413.000	0.00	0.00	0.017	O	|	|	|	|
0.13								
414.000	0.00	0.00	0.017	O	|	|	|	|
0.12								
415.000	0.00	0.00	0.017	O	|	|	|	|
0.12								
416.000	0.00	0.00	0.017	O	|	|	|	|
0.12								
417.000	0.00	0.00	0.017	O	|	|	|	|
0.12								
418.000	0.00	0.00	0.017	O	|	|	|	|
0.12								
419.000	0.00	0.00	0.017	O	|	|	|	|
0.12								
420.000	0.00	0.00	0.016	O	|	|	|	|
0.12								
421.000	0.00	0.00	0.016	O	|	|	|	|
0.12								
422.000	0.00	0.00	0.016	O	|	|	|	|
0.12								
423.000	0.00	0.00	0.016	O	|	|	|	|
0.12								
424.000	0.00	0.00	0.016	O	|	|	|	|
0.12								
425.000	0.00	0.00	0.016	O	|	|	|	|
0.12								
426.000	0.00	0.00	0.016	O	|	|	|	|
0.12								
427.000	0.00	0.00	0.016	O	|	|	|	|
0.12								
428.000	0.00	0.00	0.016	O	|	|	|	|
0.12								
429.000	0.00	0.00	0.016	O	|	|	|	|
0.11								
430.000	0.00	0.00	0.016	O	|	|	|	|
0.11								
431.000	0.00	0.00	0.015	O	|	|	|	|
0.11								
432.000	0.00	0.00	0.015	O	|	|	|	|
0.11								
433.000	0.00	0.00	0.015	O	|	|	|	|

```
0.11
434.000    0.00    0.00      0.015  O       |       |       |       |
0.11
435.000    0.00    0.00      0.015  O       |       |       |       |
0.11
436.000    0.00    0.00      0.015  O       |       |       |       |
0.11


      Remaining water in basin =    0.02 (Ac.Ft)


      ****************************HYDROGRAPH
DATA****************************
                  Number of intervals =   436
                  Time interval =   60.0 (Min.)
                  Maximum/Peak flow rate =        2.198 (CFS)
                  Total volume =       2.473 (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
      ****************************************************************
*****

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

FLOOD HYDROGRAPH ROUTING PROGRAM
Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2005
Study date: 08/21/23

DESERT MEADOWS
BASIN ROUTING
AREA B

Program License Serial Number 6232

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

From study/file name: DMB.rte
********** Hydrograph Information **********
From manual input hydrograph

**********HYDROGRAPH DATA**********
Number of intervals = 24
Time interval = 60.0 (Min.)
Maximum/Peak flow rate = 5.760 (CFS)
Total volume = 1.774 (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

****

++++++

```
      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      0.019      0.001      0.019        0.019
          2.000      0.050      0.500      0.029        0.071
          3.000      0.154      0.750      0.123        0.185
          4.000      0.339      1.000      0.298        0.380
          5.000      0.555      1.250      0.503        0.607
          6.000      0.784      1.400      0.726        0.842
      ------------------------------------------------------------------
--
                  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       1.4    2.88    4.32    5.76
(Ft.)
  1.000    0.40    0.00      0.016  O I     |       |       |       |
0.87
  2.000    0.40    0.30      0.037  |OI     |       |       |       |
1.59
  3.000    0.40    0.38      0.042  | O     |       |       |       |
1.76
  4.000    0.50    0.44      0.046  | O     |       |       |       |
1.87
  5.000    0.50    0.49      0.049  | O     |       |       |       |
1.97
  6.000    0.50    0.50      0.050  | O     |       |       |       |
1.99
  7.000    0.50    0.50      0.050  | O     |       |       |       |
2.00
  8.000    0.60    0.51      0.054  | OI    |       |       |       |
2.04
  9.000    0.60    0.53      0.061  | OI    |       |       |       |
2.10
 10.000    0.60    0.54      0.066  | OI    |       |       |       |
2.16
 11.000    0.70    0.56      0.075  |  O    |       |       |       |
2.24
 12.000    0.70    0.58      0.085  |  O    |       |       |       |
```

```
2.34
 13.000    0.80    0.61      0.098  |  OI   |       |       |       |
2.46
 14.000    0.80    0.65      0.112  |  OI   |       |       |       |
2.59
 15.000    0.80    0.68      0.123  |  OI   |       |       |       |
2.70
 16.000    1.00    0.72      0.140  |  O I  |       |       |       |
2.86
 17.000    1.50    0.79      0.181  |   O   I       |       |       |
3.15
 18.000    2.00    0.89      0.256  |   O   |  I    |       |       |
3.55
 19.000    5.76    1.18      0.492  |     O |       |       |      I|
4.71
 20.000    1.00    1.32      0.668  |    I O|       |       |       |
5.49
 21.000    0.50    1.29      0.622  | I    O|       |       |       |
5.29
 22.000    0.30    1.24      0.550  |I    O |       |       |       |
4.98
 23.000    0.30    1.16      0.475  |I    O |       |       |       |
4.63
 24.000    0.30    1.08      0.408  |I   O  |       |       |       |
4.32
 25.000    0.00    0.99      0.334  I    O  |       |       |       |
3.98
 26.000    0.00    0.89      0.257  I   O   |       |       |       |
3.55
 27.000    0.00    0.79      0.187  I   O   |       |       |       |
3.18
 28.000    0.00    0.68      0.126  I  O    |       |       |       |
2.73
 29.000    0.00    0.56      0.075  I  O    |       |       |       |
2.24
 30.000    0.00    0.32      0.039  IO      |       |       |       |
1.63
 31.000    0.00    0.06      0.023  O       |       |       |       |
1.13
 32.000    0.00    0.01      0.020  O       |       |       |       |
1.02
 33.000    0.00    0.00      0.019  O       |       |       |       |
1.00
 34.000    0.00    0.00      0.019  O       |       |       |       |
1.00


      Remaining water in basin =    0.02 (Ac.Ft)


      ****************************HYDROGRAPH
DATA***************************
                 Number of intervals =    34
                 Time interval =   60.0 (Min.)
                 Maximum/Peak flow rate =        1.324 (CFS)
                 Total volume =       1.755 (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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APPENDIX E:
PROJECT HYDRAULIC CALCULATIONS

Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Monday, Aug 21 2023

Desert Meadows - Preliminary Storm Drain Sizing

Circular

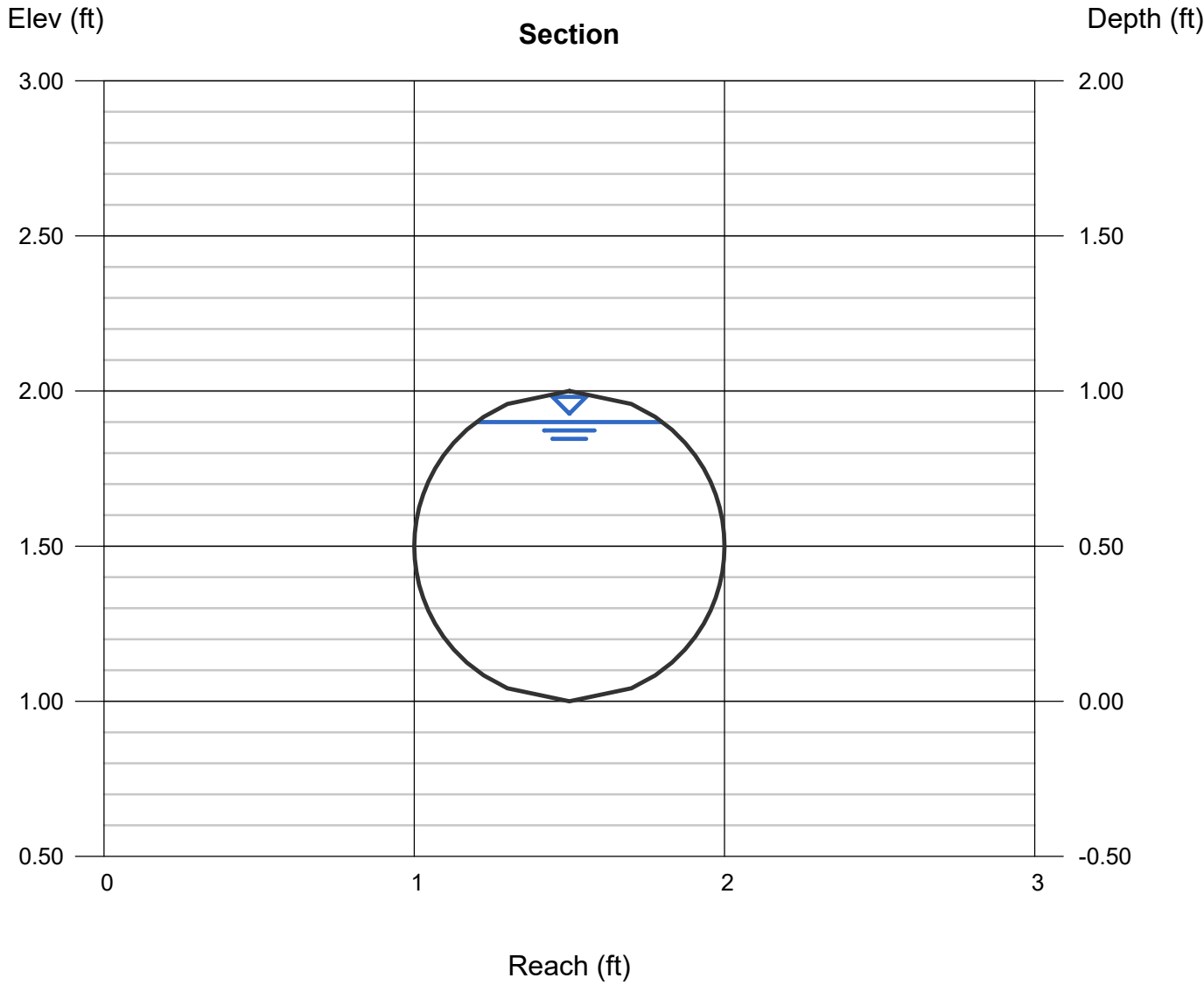
Diameter (ft)	= 1.00
Invert Elev (ft)	= 1.00
Slope (%)	= 0.30
N-Value	= 0.012

Calculations

Compute by:	Q vs Depth
No. Increments	= 10

Highlighted

Depth (ft)	= 0.90
Q (cfs)	= 2.253
Area (sqft)	= 0.74
Velocity (ft/s)	= 3.02
Wetted Perim (ft)	= 2.50
Crit Depth, Yc (ft)	= 0.65
Top Width (ft)	= 0.60
EGL (ft)	= 1.04



Channel Report

Desert Meadows - Preliminary Storm Drain Sizing

Circular

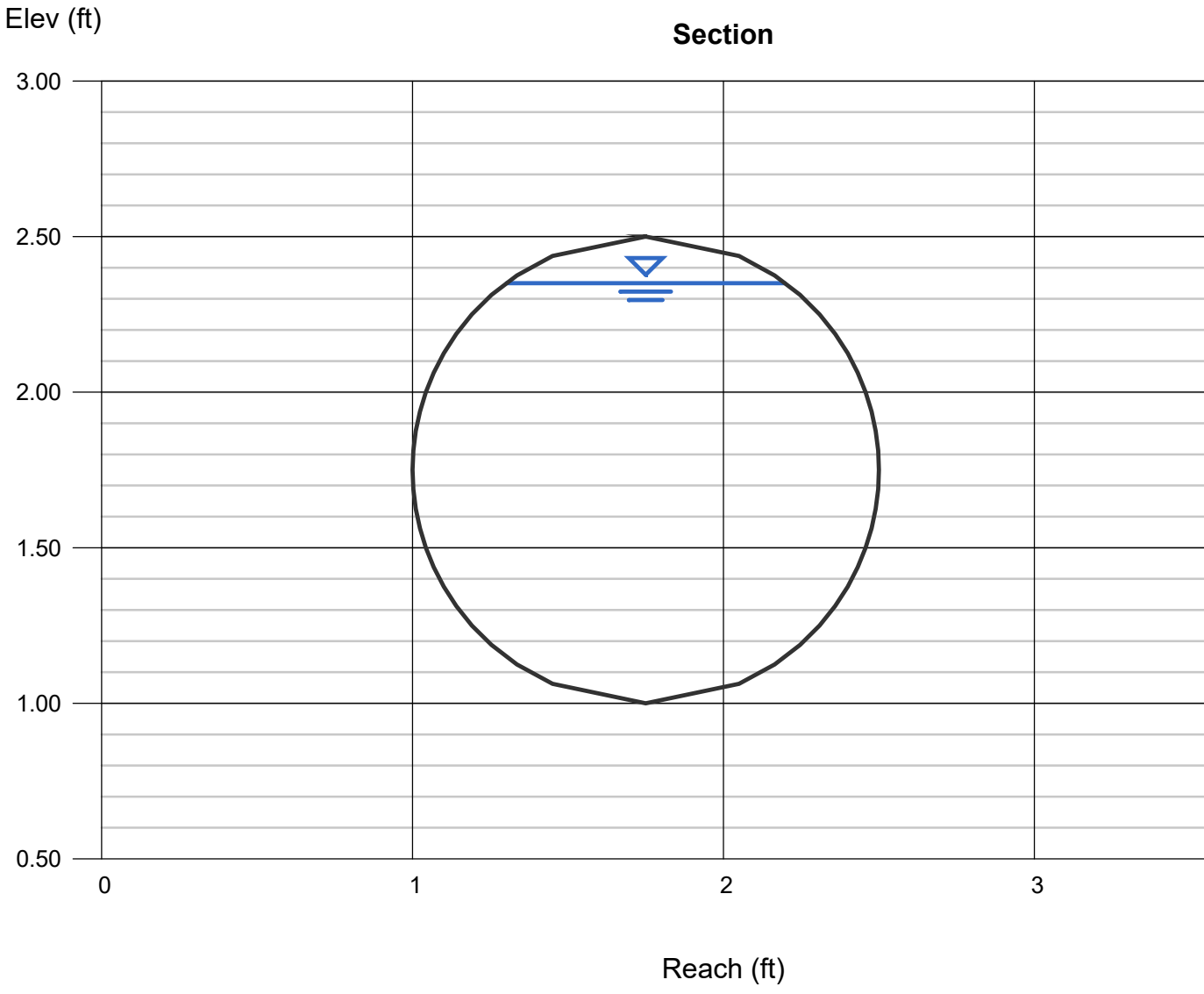
Diameter (ft)	= 1.50
Invert Elev (ft)	= 1.00
Slope (%)	= 0.30
N-Value	= 0.012

Calculations

Compute by:	Q vs Depth
No. Increments	= 10

Highlighted

Depth (ft)	= 1.35
Q (cfs)	= 6.643
Area (sqft)	= 1.68
Velocity (ft/s)	= 3.96
Wetted Perim (ft)	= 3.75
Crit Depth, Yc (ft)	= 1.00
Top Width (ft)	= 0.90
EGL (ft)	= 1.59



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Monday, Aug 21 2023

Desert Meadows - Preliminary Storm Drain Sizing

Circular

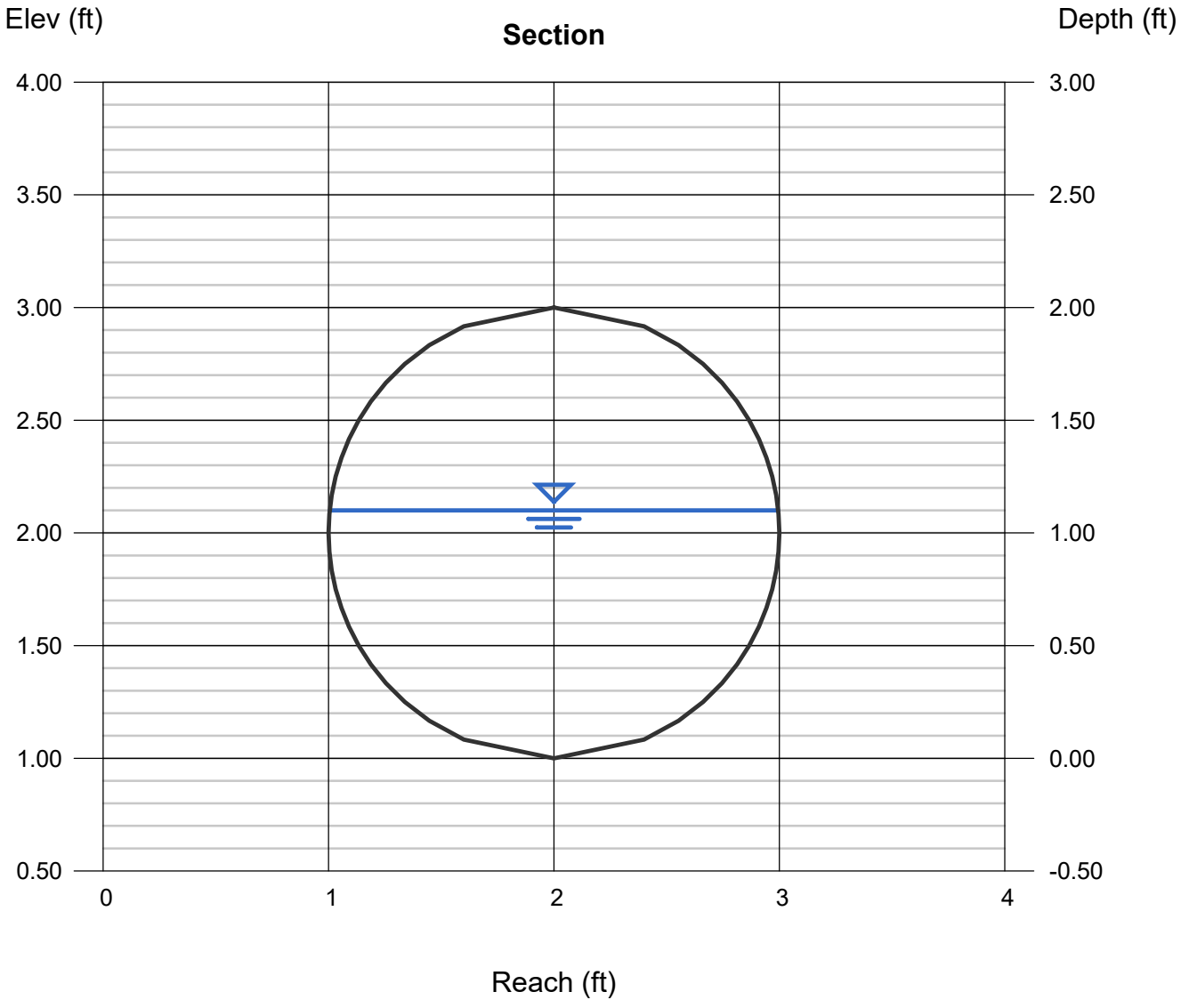
Diameter (ft)	= 2.00
Invert Elev (ft)	= 1.00
Slope (%)	= 0.30
N-Value	= 0.012

Calculations

Compute by:	Known Q
Known Q (cfs)	= 7.89

Highlighted

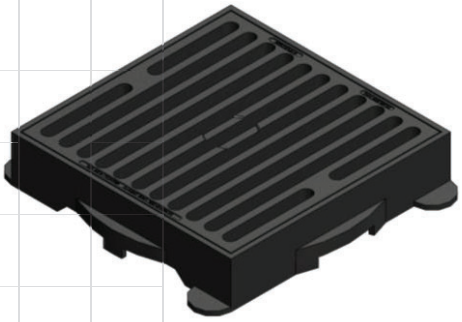
Depth (ft)	= 1.10
Q (cfs)	= 7.890
Area (sqft)	= 1.78
Velocity (ft/s)	= 4.44
Wetted Perim (ft)	= 3.35
Crit Depth, Yc (ft)	= 1.00
Top Width (ft)	= 1.99
EGL (ft)	= 1.41



Nyloplast Grate Inlet Capacity Charts

These charts are based on equations from the USDOT/FAA Advisory Circular pertaining to Surface Drainage Design, AC No: AC150/5320-5C and the USDOT/FHWA Urban Drainage Design Manual, Hydraulic Engineering Circular No. 22, Third Edition, Publication No. FHWA-NHI-10-009. Certain assumptions have been made, and no two installations will necessarily perform the same way. Safety factors should change with site conditions and is left to the discretion of the design engineer.







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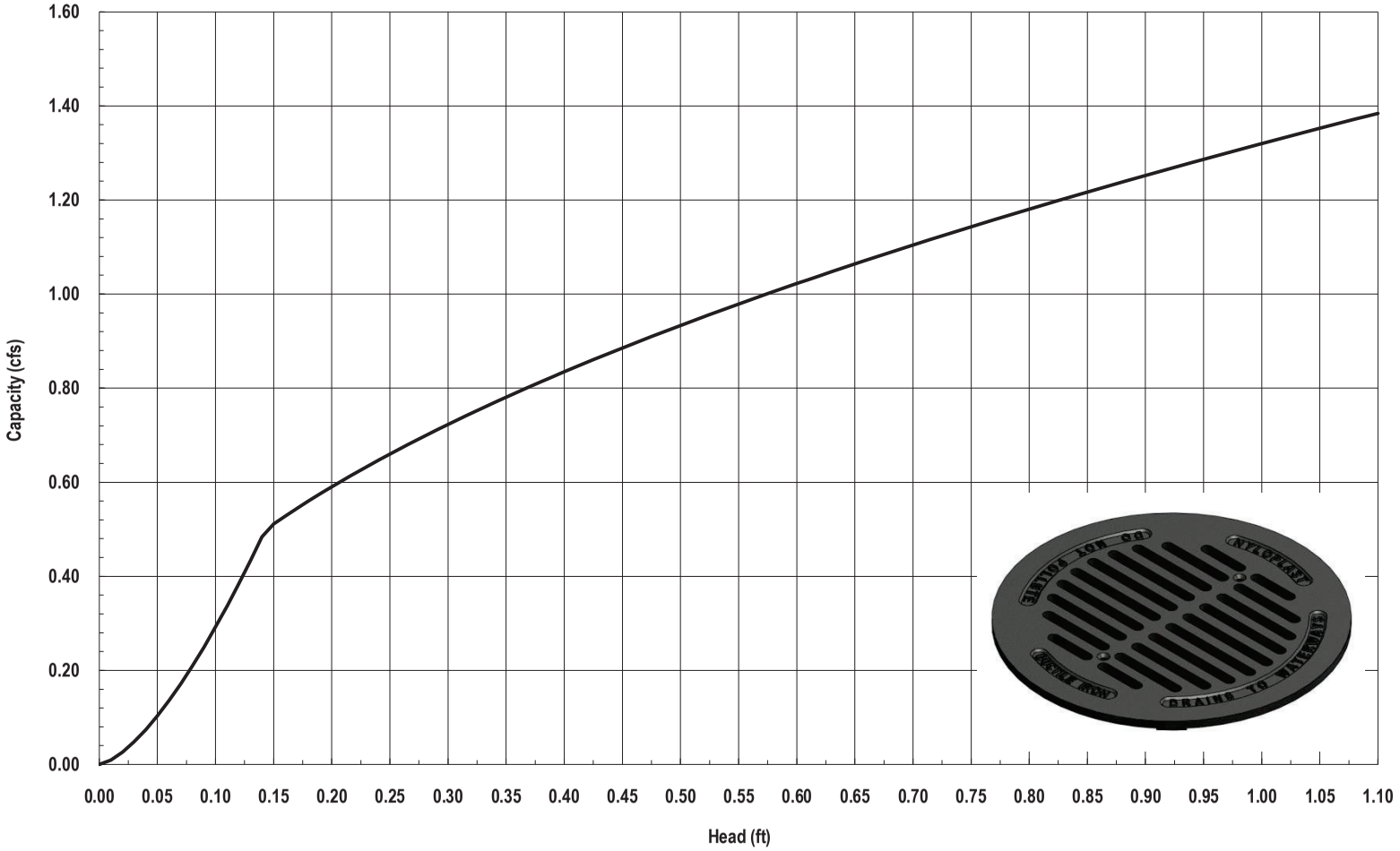
Nyloplast 12" Drop In Grate Inlet Capacity Chart



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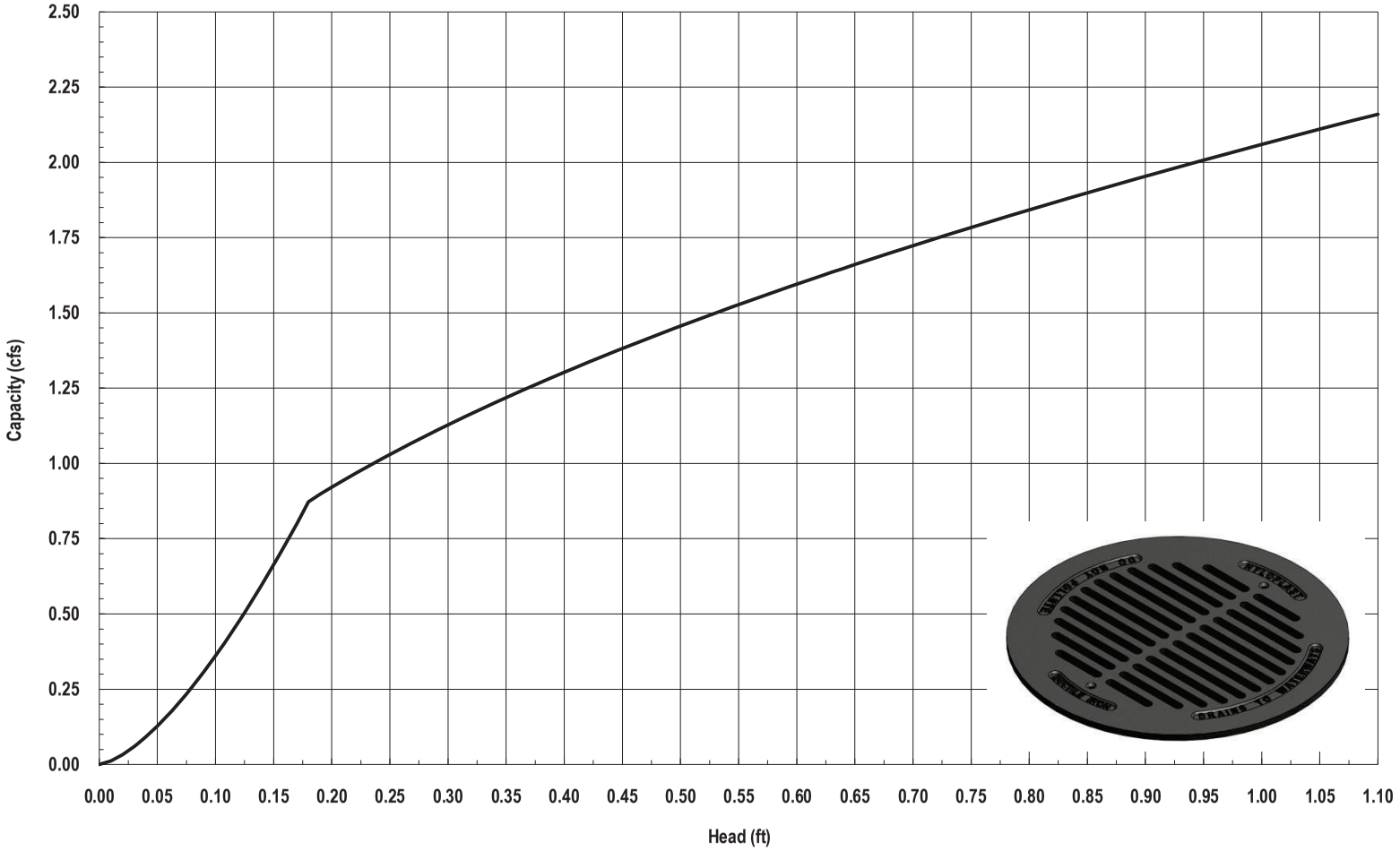
Nyloplast 15" Drop In Grate Inlet Capacity Chart



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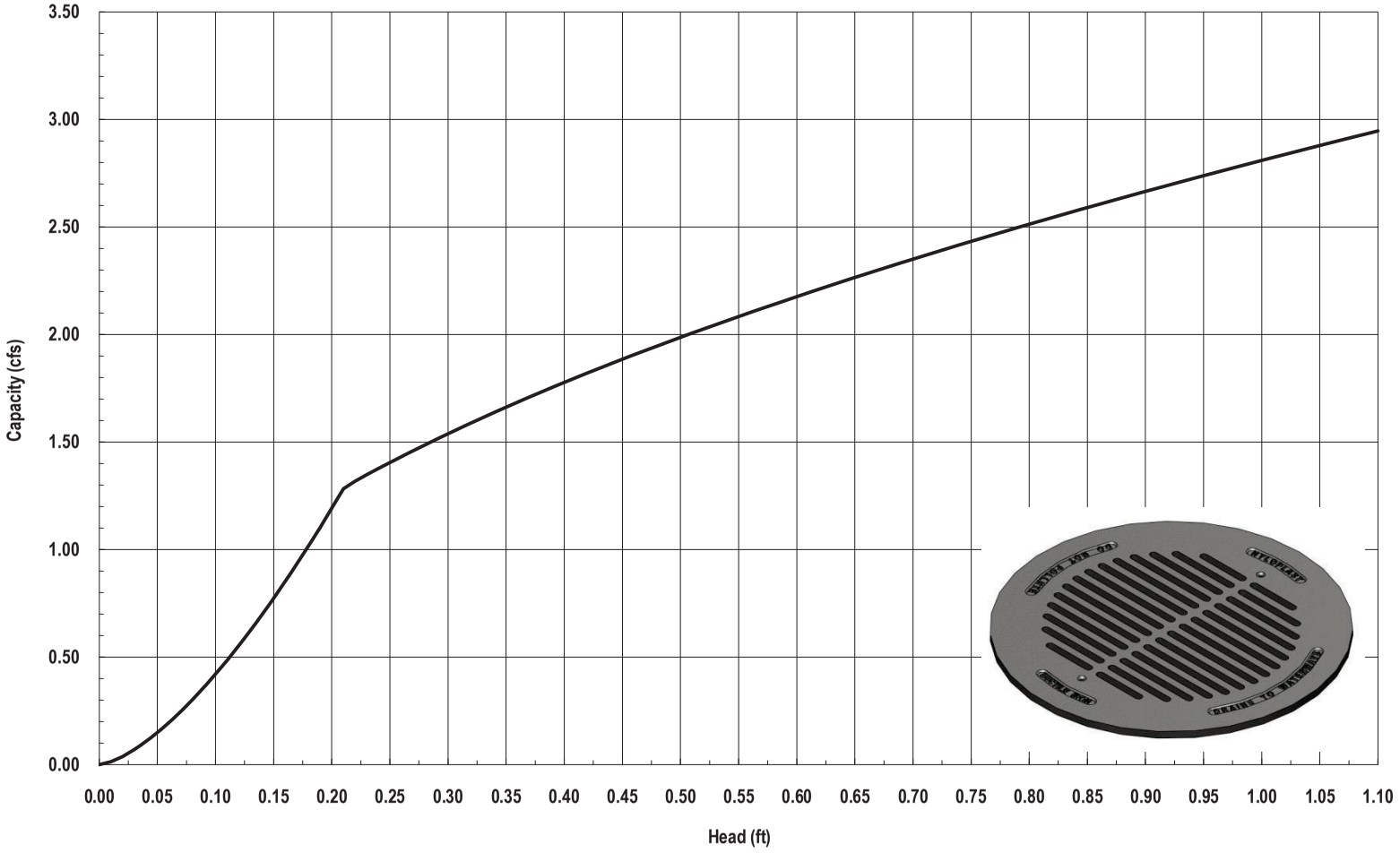
Nyloplast 18" Drop In Grate Inlet Capacity Chart



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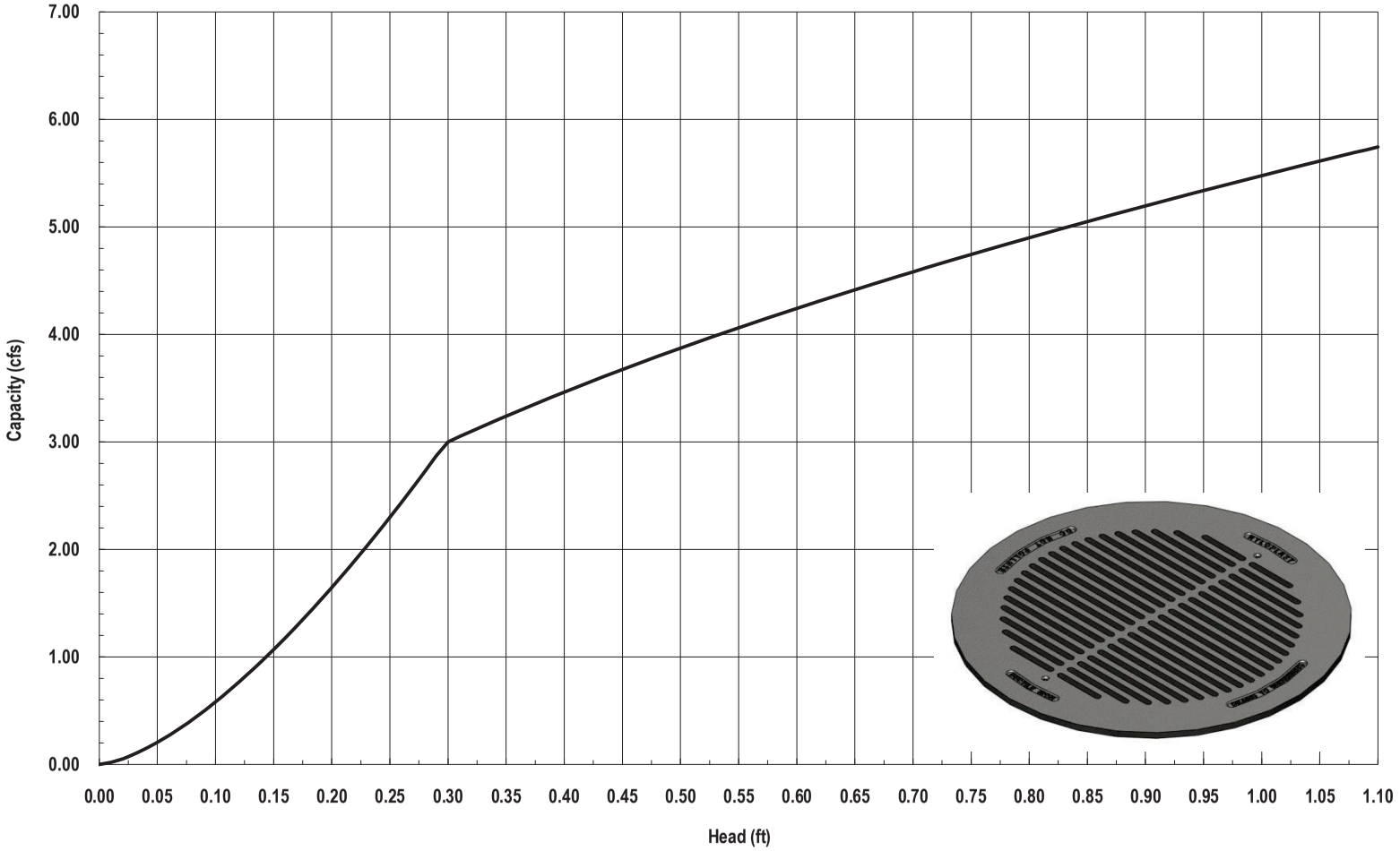
Nyloplast 24" Drop In Grate Inlet Capacity Chart



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Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Monday, Aug 21 2023

Desert Meadows - Preliminary Drive Aisle Sizing 64ft width

Triangular

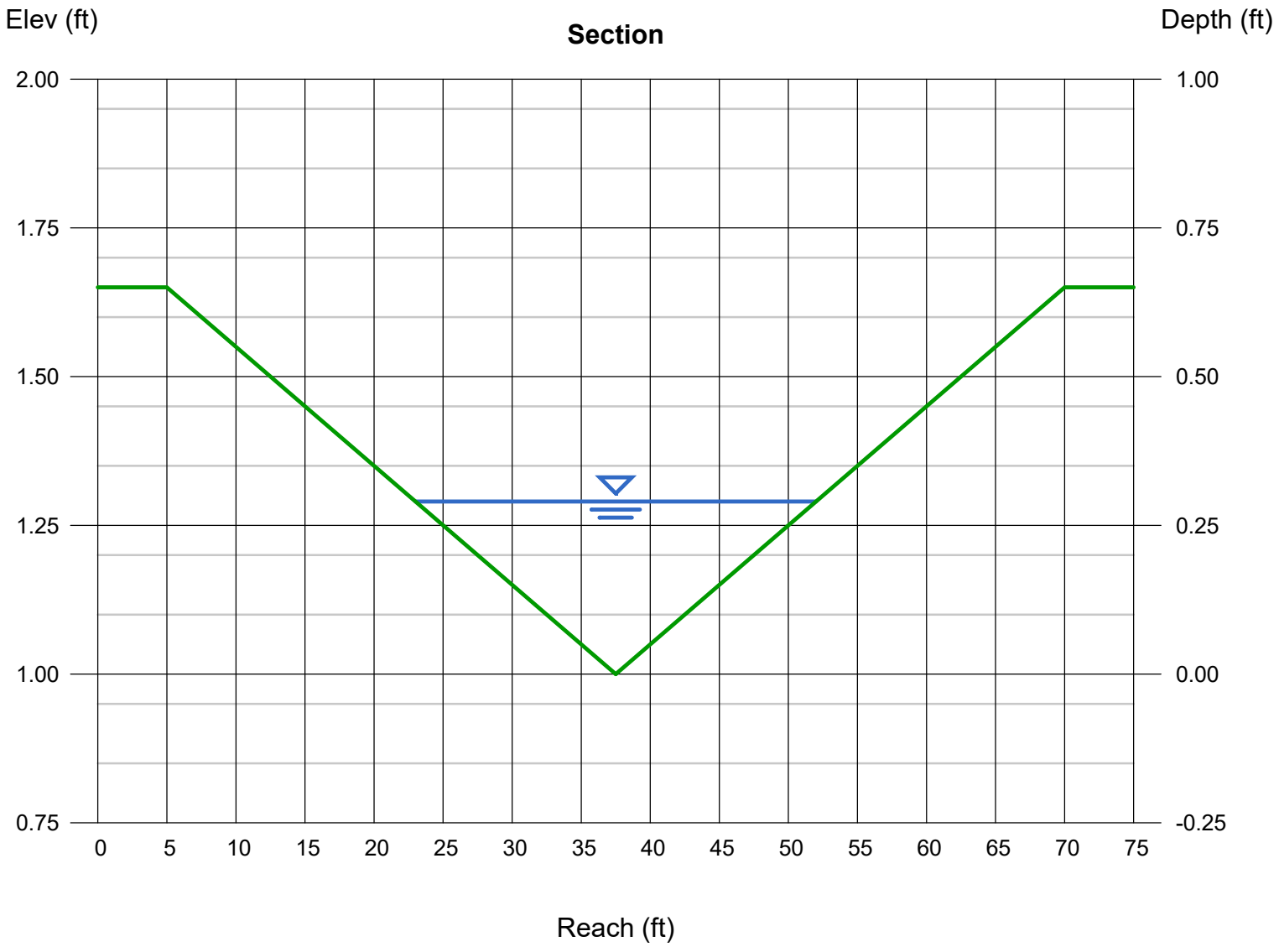
Side Slopes (z:1)	= 50.00, 50.00
Total Depth (ft)	= 0.65
Invert Elev (ft)	= 1.00
Slope (%)	= 0.50
N-Value	= 0.015

Calculations

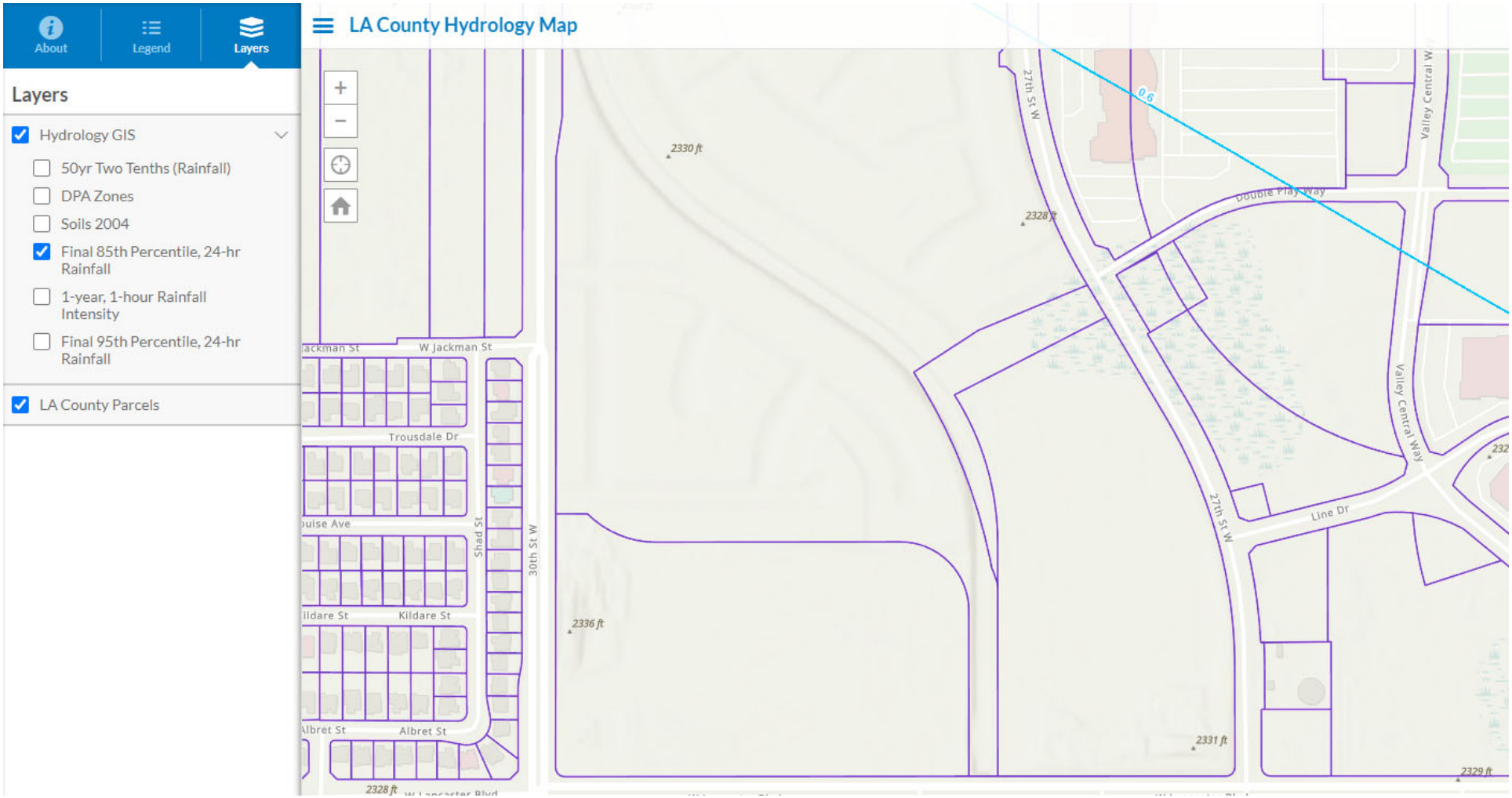
Compute by:	Known Q
Known Q (cfs)	= 7.89

Highlighted

Depth (ft)	= 0.29
Q (cfs)	= 7.890
Area (sqft)	= 4.21
Velocity (ft/s)	= 1.88
Wetted Perim (ft)	= 29.01
Crit Depth, Yc (ft)	= 0.28
Top Width (ft)	= 29.00
EGL (ft)	= 0.34



APPENDIX F:
SWMP DETAILS


About
Legend
Layers
LA County Hydrology Map
Layers
Hydrology GIS
50yr Two Tenths (Rainfall)
DPA Zones
Soils 2004
Final 85th Percentile, 24-hr Rainfall
1-year, 1-hour Rainfall Intensity
Final 95th Percentile, 24-hr Rainfall
LA County Parcels
W Jackman St
Trousdale Dr
Kildare St
Albret St
Shad St
30th St W
27th St W
Valley Central Way
Double Play Way
Line Dr
2330 ft
2328 ft
2336 ft
2331 ft
2329 ft
0.6

Peak Flow Hydrologic Analysis

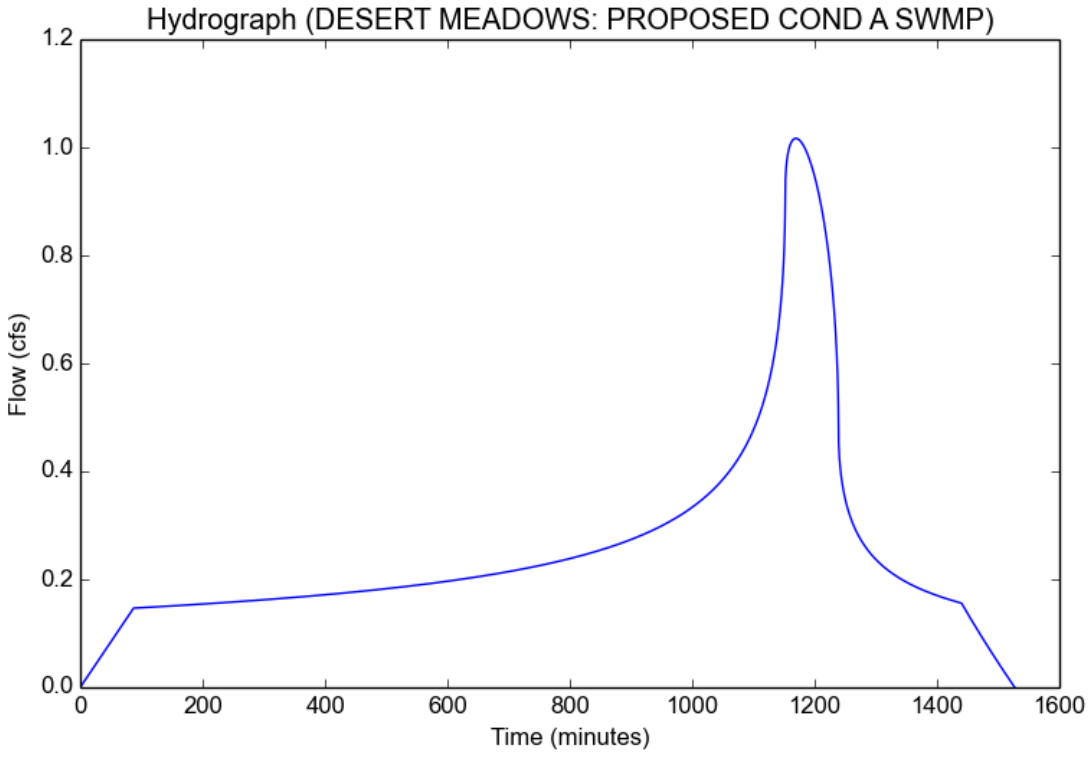
File location: U:/CA-30230 Desert Meadows (Lancaster 30th)/Drainage/DESERT MEADOWS - PROPOSED COND A SWMP.pdf
Version: HydroCalc 0.3.1

Input Parameters

Project Name	DESERT MEADOWS
Subarea ID	PROPOSED COND A SWMP
Area (ac)	13.8
Flow Path Length (ft)	1393.0
Flow Path Slope (vft/hft)	0.003
85th Percentile Rainfall Depth (in)	0.6
Percent Impervious	0.86
Soil Type	120
Design Storm Frequency	85th percentile storm
Fire Factor	0
LID	True

Output Results

Modeled (85th percentile storm) Rainfall Depth (in)	0.6
Peak Intensity (in/hr)	0.0935
Undeveloped Runoff Coefficient (Cu)	0.1
Developed Runoff Coefficient (Cd)	0.788
Time of Concentration (min)	87.0
Clear Peak Flow Rate (cfs)	1.0167
Burned Peak Flow Rate (cfs)	1.0167
24-Hr Clear Runoff Volume (ac-ft)	0.5393
24-Hr Clear Runoff Volume (cu-ft)	23491.0595



Peak Flow Hydrologic Analysis

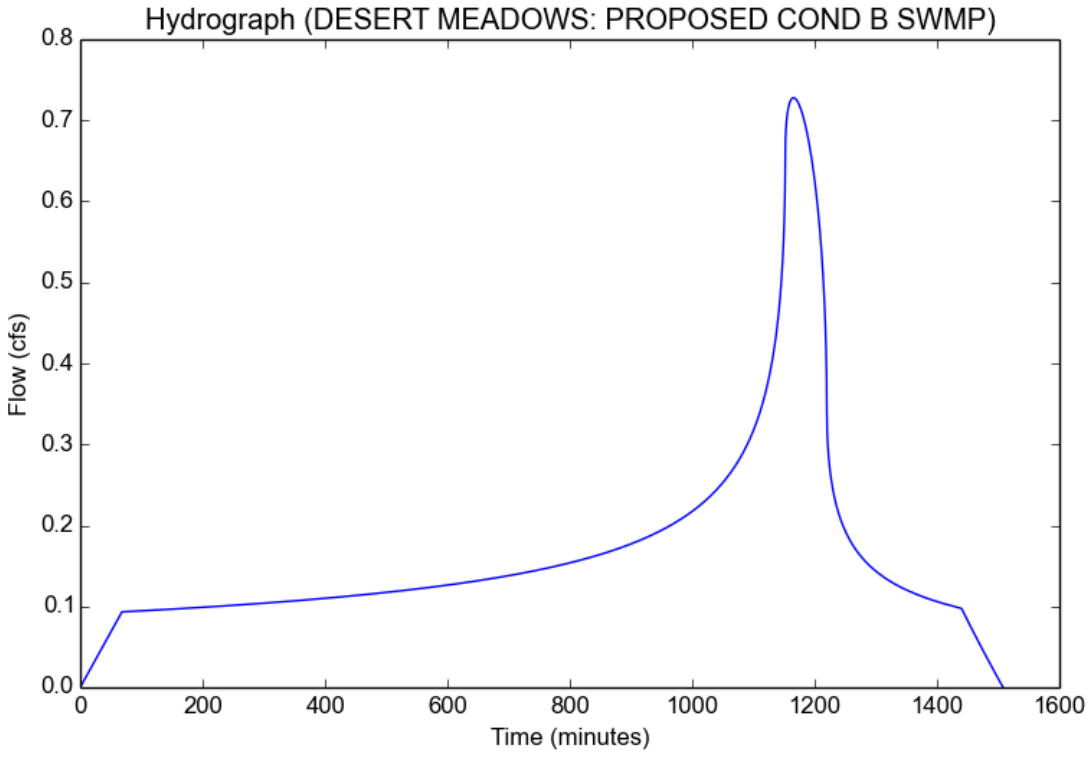
File location: U:/CA-30230 Desert Meadows (Lancaster 30th)/Drainage/DESERT MEADOWS - PROPOSED COND B SWMP.pdf
Version: HydroCalc 0.3.1

Input Parameters

Project Name	DESERT MEADOWS
Subarea ID	PROPOSED COND B SWMP
Area (ac)	8.8
Flow Path Length (ft)	959.0
Flow Path Slope (vft/hft)	0.003
85th Percentile Rainfall Depth (in)	0.6
Percent Impervious	0.86
Soil Type	120
Design Storm Frequency	85th percentile storm
Fire Factor	0
LID	True

Output Results

Modeled (85th percentile storm) Rainfall Depth (in)	0.6
Peak Intensity (in/hr)	0.105
Undeveloped Runoff Coefficient (Cu)	0.1
Developed Runoff Coefficient (Cd)	0.788
Time of Concentration (min)	68.0
Clear Peak Flow Rate (cfs)	0.7279
Burned Peak Flow Rate (cfs)	0.7279
24-Hr Clear Runoff Volume (ac-ft)	0.3439
24-Hr Clear Runoff Volume (cu-ft)	14979.21



Oldcastle Infrastructure™
A CRH COMPANY

FLOGARD®
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.

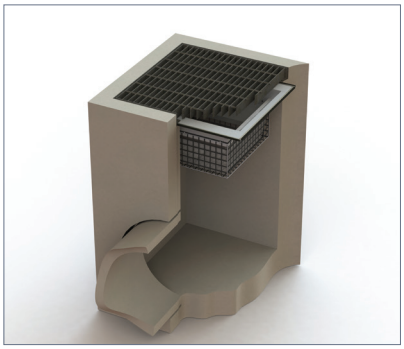
FloGard Combination Inlet
SPECIFIER CHART

MODEL NO. STANDARD DEPTH	STANDARD & SHALLOW DEPTH (Data in these columns 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)	GRADE 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

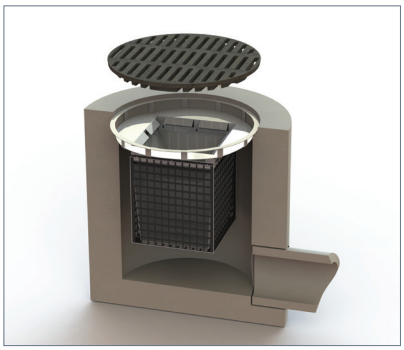
FloGard Flat Grated Inlet
SPECIFIER CHART

MODEL NO. STANDARD DEPTH	STANDARD & SHALLOW DEPTH (Data in these columns 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)	GRADE 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

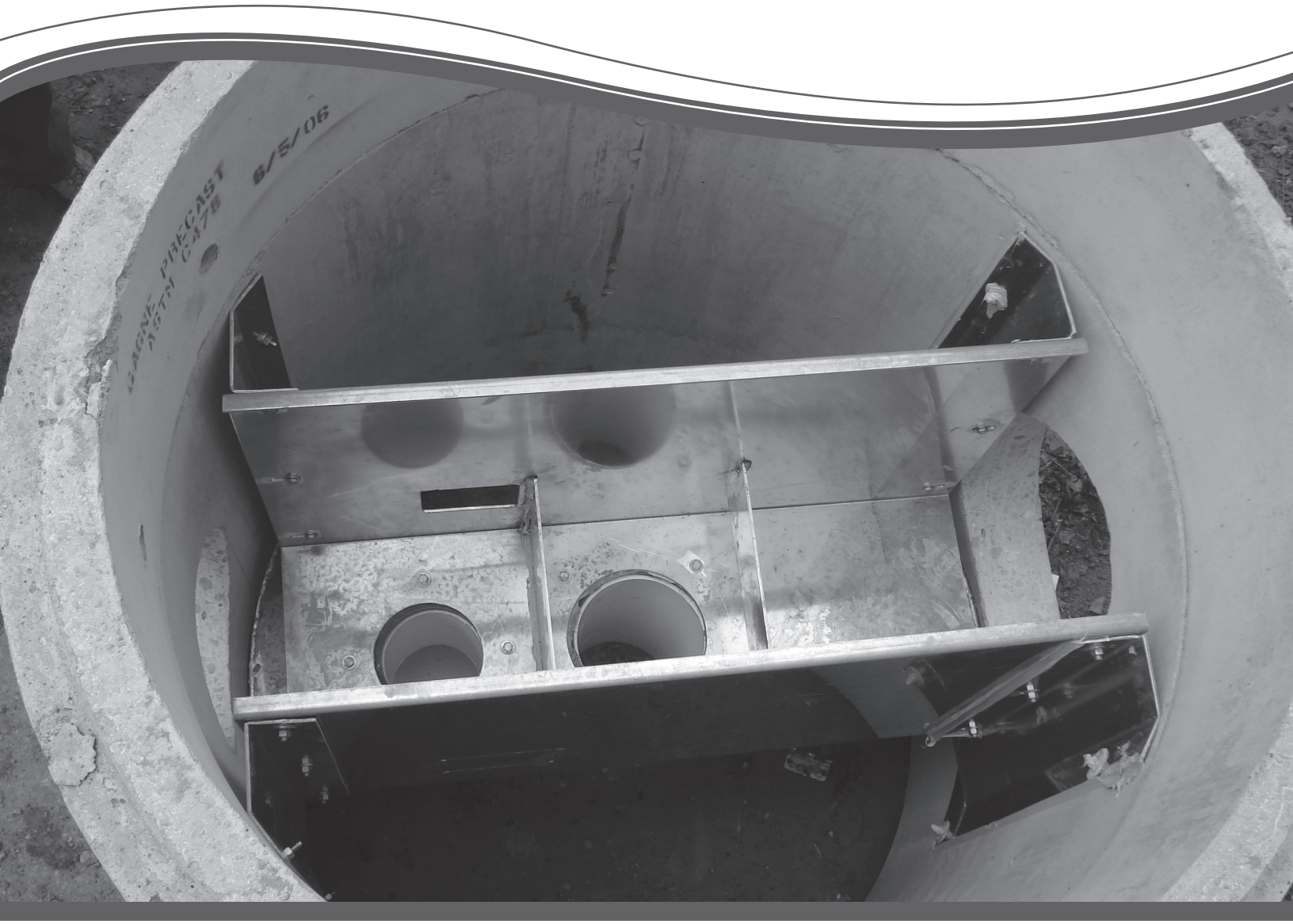
FloGard Circular Grated Inlet
SPECIFIER CHART

MODEL NUMBER	INLET ID (inches)	GRADE OD (inches)	SOLIDS STORAGE CAPACITY (CU FT)	FILTERED FLOW (CSF)	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 Inlet

CONTECH®
ENGINEERED SOLUTIONS

VortSentry® HS Guide
Operation, Design, Performance and Maintenance



VortSentry® HS

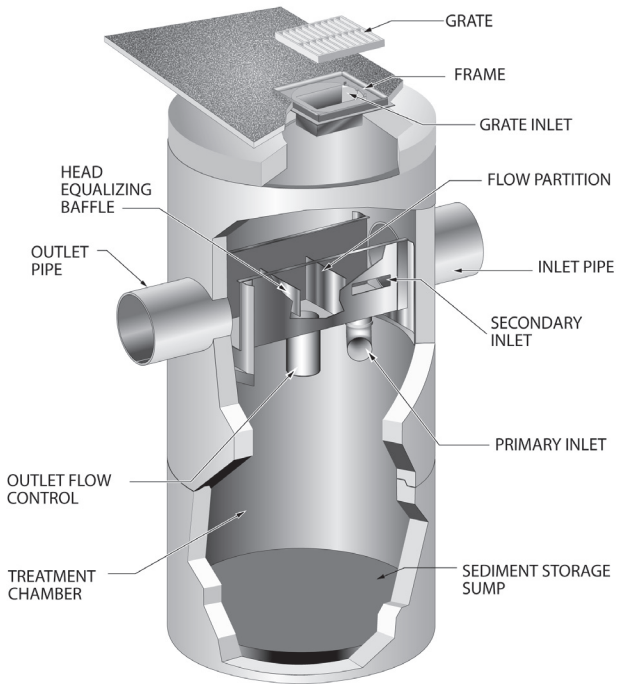
The VortSentry HS is a compact, below grade stormwater treatment system that employs helical flow technology to enhance gravitational separation of floating and settling pollutants from stormwater flows. With the ability to accept a wide range of pipe sizes, the VortSentry HS can treat and convey flows from small to large sites. A unique internal bypass design means higher flows can be diverted without the use of external bypass structures. The VortSentry HS is also available in a grate inlet configuration, which is ideal for retrofit installations.

Operation Overview

Low, frequently occurring storm flows are directed into the treatment chamber through the primary inlet. The tangentially oriented downward pipe induces a swirling motion in the treatment chamber that increases capture and containment abilities. Moderate storm flows are directed into the treatment chamber through the secondary inlet, which allows for capture of floating trash and debris. The secondary inlet also provides for treatment of higher flows without significantly increasing the velocity or turbulence in the treatment chamber. This allows for a more quiescent separation environment. Settleable solids and floating pollutants are captured and contained in the treatment chamber.

Flow exits the treatment chamber through the outlet flow control, which manages the amount of flow that is treated and helps maintain the helical flow patterns developed within the treatment chamber.

Flows exceeding the system's rated treatment flow are diverted away from the treatment chamber by the flow partition. Internal diversion of high flows eliminates the need for external bypass structures. During bypass, the head equalizing baffle applies head on the outlet flow control to limit the flow through the treatment chamber. This helps prevent re-suspension of previously captured pollutants.



Design Basics

There are two primary methods of sizing a VortSentry HS system. The Water Quality Flow Rate Method determines which model size provides the desired removal efficiency at a given flow for a defined particle size. The summation process of the Rational Rainfall Method is used when a specific removal efficiency of the net annual sediment load is required.

Typically, VortSentry HS systems are designed to achieve an 80% annual solids load reduction based on lab generated performance curves for a particle gradation with an average particle size (d_{50}) of 240-microns (μm).

Water Quality Flow Rate Method

In many cases, regulations require that a specific flow rate, often referred to as the water quality design flow (WQQ), be treated. This WQQ represents the peak flow rate from either an event with a specific recurrence interval (i.e. the six-month storm) or a water quality depth (i.e. 1/2-inch of rainfall).

The VortSentry HS is designed to treat all flows up to the WQQ. Due to its internal bypass weir configuration, flow rates in the treatment chamber only increase minimally once the WQQ is surpassed. At influent rates higher than the WQQ, the flow partition will allow most flow exceeding the treatment flow rate to bypass the treatment chamber. This allows removal efficiency to remain relatively constant in the treatment chamber and reduces the risk of washout during bypass flows regardless of influent flow rates.

Treatment flow rates are defined as the rate at which the VortSentry HS will remove a specific gradation of sediment at a specific removal efficiency. Therefore they are variable based on the gradation and removal efficiency specified by the design engineer and the unit size is scaled according to the project goal.

Rational Rainfall Method™

Differences in local climate, topography and scale make every site hydraulically unique. The Rational Rainfall Method is a sizing program Contech uses to estimate a net annual sediment load reduction for a particular VortSentry HS model based on site size, site runoff coefficient, regional rainfall intensity distribution, and anticipated pollutant characteristics. For more information on the Rational Rainfall Method, see *Vortechs Technical Bulletin 4: Modeling Long Term Load Reduction: The Rational Rainfall Method*, available at **www.ContechES.com/stormwater**

Treatment Flow Rate

The outlet flow control is sized to allow the WQQ to pass entirely through the treatment chamber at a water surface elevation equal to the crest of the flow partition. The head equalizing baffle applies head on the outlet flow control to limit the flow through the treatment chamber when bypass occurs, thus helping to prevent re-suspension or re-entrainment of previously captured particles.

Hydraulic Capacity

The VortSentry HS is available in three standard configurations: inline (with inlet and outlet pipes at 180° to each other), grated inlet, and a combination of grate and pipe inlets. All three configurations are available in 36-inch (900-mm) through 96-inch (2400-mm) diameter manholes.

The configuration of the system is determined by the suffix of the model name:

- A model name without a suffix denotes a standard pipe inlet (Example HS48).
- A "G" at the end of the model designation denotes a grate inlet (Example HS48G).
- A "GP" at the end of the model designation denotes a combination of grate and pipe inlets (Example HS48GP).

Performance

Full-Scale Laboratory Test Results

Laboratory testing of the VortSentry HS was conducted using F-55 Silica, a commercially available sand product with an average particle size of 240-μm (Table 1). This material was metered into a model HS48 VortSentry HS at an average concentration of between 250-mg/L and 300-mg/L at flow rates ranging from 0.50-cfs to 1.5-cfs (14-L/s to 56-L/s).

US Standard Sieve Size	Particle Size Micron (μm)	Cumulative Passing %
30	600	99.7%
40	425	95.7%
50	300	74.7%
70	212	33.7%
100	150	6.7%
140	106	0.7%

Table 1 : US Silica F-55 Particle Size Distribution

Removal efficiencies at each flow rate were calculated based on net sediment loads passing the influent and effluent sampling points. Results are illustrated in Figure 1.

Assuming that sediment in the inlet chamber is ideally mixed, removal rates through the system will decay according to the percentage of flow bypassed. This effect has been observed in the laboratory where the test system is designed to produce a

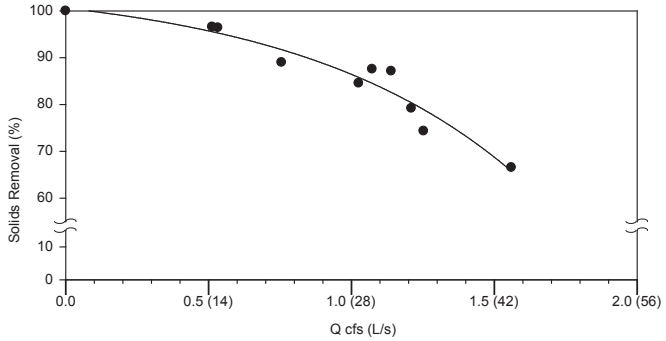


Figure 1: VortSentry HS Removal Efficiencies for 240-μm Particle Gradation

thoroughly mixed inlet stream. All VortSentry HS models have the same aspect ratio regardless of system diameter (i.e. an increase in diameter results in a corresponding increase in depth). Operating rates are expressed volumetrically.

Removal efficiency at each operating rate is calculated according to the average of volumetric and Froude scaling methods and is described by Equation 1.

Equation 1: $$\left(\frac{\text{Diameter Prototype}}{\text{Diameter Model}}\right)^{2.75} = \left(\frac{\text{Flow Rate Prototype}}{\text{Flow Rate Model}}\right)$$

Equation 1 and actual laboratory test results were used to determine the flow rate which would be required for the various VortSentry HS models to remove 80% of solids.

View report at **www.ContechES.com/stormwater**

Maintenance

The VortSentry HS system should be inspected at regular intervals and maintained when necessary to ensure optimum performance. The rate at which the system collects pollutants will depend more heavily on site activities than the size of the unit, i.e., unstable soils or heavy winter sanding will cause the treatment chamber to fill more quickly, but regular sweeping will slow accumulation.

Inspection

Inspection is the key to effective maintenance and is easily performed. Pollutant deposition and transport may vary from year to year and regular inspections will help ensure that the system is cleaned out at the appropriate time. At a minimum, inspections should be performed twice per year (i.e. spring and fall) however more frequent inspections may be necessary in equipment washdown areas and in climates where winter sanding operations may lead to rapid accumulations of a large volume of sediment. It is useful and often required as part of a permit to keep a record of each inspection. A simple inspection and maintenance log form for doing so is available for download at **www.ContechES.com/stormwater**

The VortSentry HS should be cleaned when the sediment has accumulated to a depth of two feet in the treatment chamber. This determination can be made by taking two measurements with a stadia rod or similar measuring device; one measurement from the manhole opening to the top of the sediment pile and the other from the manhole opening to the water surface. If the difference between these measurements is less than the distance given in Table 2, the VortSentry HS should be maintained to ensure effective treatment.

Cleaning

Cleaning of the VortSentry HS should be done during dry weather conditions when no flow is entering the system. Cleanout of the VortSentry HS with a vacuum truck is generally the most effective and convenient method of excavating pollutants from the system. Simply remove the manhole cover and insert the vacuum hose into the sump. All pollutants can be removed from this one access point from the surface with no requirements for Confined Space Entry.

In installations where the risk of petroleum spills is small, liquid contaminants may not accumulate as quickly as sediment. However, an oil or gasoline spill should be cleaned out immediately. Motor oil and other hydrocarbons that accumulate on a more routine basis should be removed when an appreciable layer has been captured. To remove these pollutants, it may be preferable to use adsorbent pads, which solidify the oils. These are usually much easier to remove from the unit individually, and less expensive to dispose than the oil/water emulsion that may be

created by vacuuming the oily layer. Floating trash can be netted out if you wish to separate it from the other pollutants.

Manhole covers should be securely seated following cleaning activities to prevent leakage of runoff into the system from above and also to ensure proper safety precautions. If anyone physically enters the unit, Confined Space Entry procedures need to be followed.

Disposal of all material removed from the VortSentry HS should be done is accordance with local regulations. In many locations, disposal of evacuated sediments may be handled in the same manner as disposal of sediments removed from catch basins or deep sump manholes. Check your local regulations for specific requirements on disposal.

VortSentry HS Model	Diameter		Distance Between Water Surface and Top of Storage Sump		Sediment Storage		Oil Spill Storage	
	in.	m	ft.	m	yd^3	m^3	gal.	liter
HS36	36	0.9	3.6	1.1	0.5	0.4	83	314
HS48	48	1.2	4.7	1.4	0.9	0.7	158	598
HS60	60	1.5	6.0	1.8	1.5	1.1	258	978
HS72	72	1.8	7.1	2.2	2.1	1.6	372	1409
HS84	84	2.1	8.4	2.6	2.9	2.2	649	2458
HS96	96	2.4	9.5	2.9	3.7	2.8	845	3199

Table 2: VortSentry HS Maintenance Indicators and Sediment Storage Capacities.

Note: To avoid underestimating the volume of sediment in the chamber, the measuring device must be carefully lowered to the top of the sediment pile. Finer, silty particles at the top of the pile may be more difficult to feel with the measuring stick. These finer particles typically offer less resistance to the end of the rod than larger particles toward the bottom of the pile.

Logon to **www.ContechES.com/stormwater** to download the VortSentry HS Inspection and Maintenance Log.

For assistance with maintaining your VortSentry HS, contact us regarding the Contech Maintenance compliance certification program.



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Support

- Drawings and specifications are available at contechstormwater.com.
- Site-specific design support is available from our engineers.