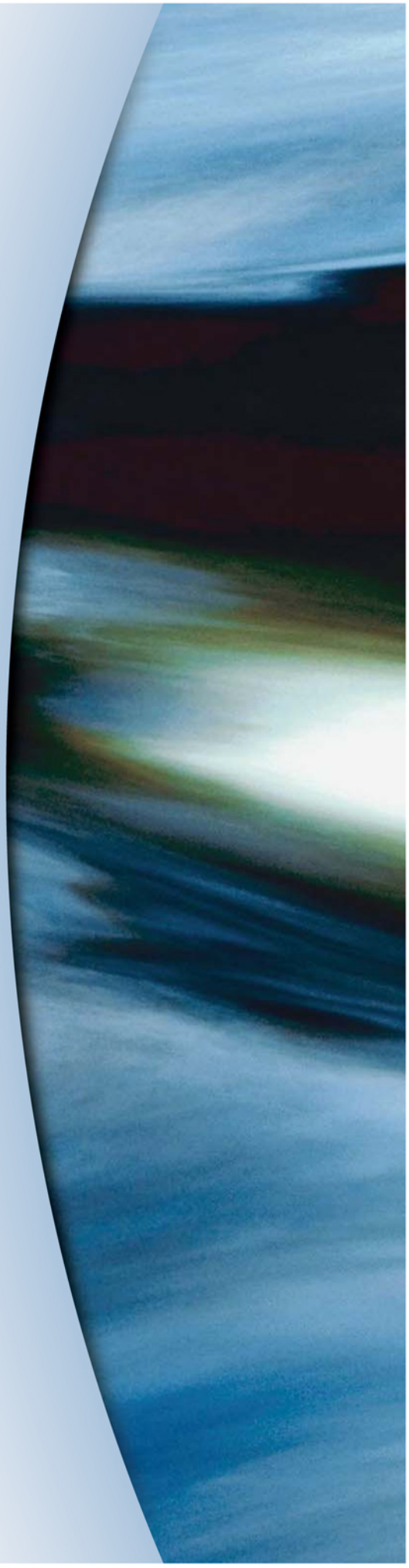

HYDROLOGY & HYDRAULICS REPORT (PRELIMINARY)

TOPGOLF ONTARIO

N. Archibald Ave. and Fourth Street
Ontario, California
APN 0210-181-45, 0210-181-34

Prepared For
Topgolf
8750 N. Central Expressway, Suite 1200
DALLAS, TEXAS 75231

Prepared By

Moyenuddin Sirajee, PE
Fuscoe Engineering, Inc.
2850 Inland Empire Blvd. Building B
Ontario, California, 91764
909.581.0676
www.fuscoe.com

Project Manager:
Steven L. Ellis

Date Prepared: October 2018
Date Revised: February 2019

Job Number: 1774.001.02

full circle thinking®

HYDROLOGY REPORT (PRELIMINARY)

TOP GOLF, ONTARIO

Located at the southeast corner of N. Archibald Avenue and 4th Street
in the City of Ontario
County of San Bernardino, California
APN 0210-181-45, 0210-181-34

Prepared for:

APPROVED
By Osvaldo Roque at 11:13 am, Mar 15, 2019

TOPGOLF
8750 N. CENTRAL EXPRESSWAY, SUITE 1200
DALLAS, TEXAS 75231
832.515.0150

Prepared by:
Moyenuddin Sirajee, PE, Senior Engineer
FUSCOE ENGINEERING, INC.
2850 Inland Empire Blvd. Building B
Ontario, CA 91764
909.581.0676

Date Prepared: October 2018
Revision Date: February 2019

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1.0 INTRODUCTION

1.1 GEOGRAPHIC SETTING

The proposed Top Golf project will be developed on land consisting of two vacant parcels totaling approximately 15.8-acres in the City of Ontario. The project is located on the southeast corner of N. Archibald Avenue and 4th Street and north of Deer Creek Channel. The Dear Creek Channel is flowing along the south boundary of the project.

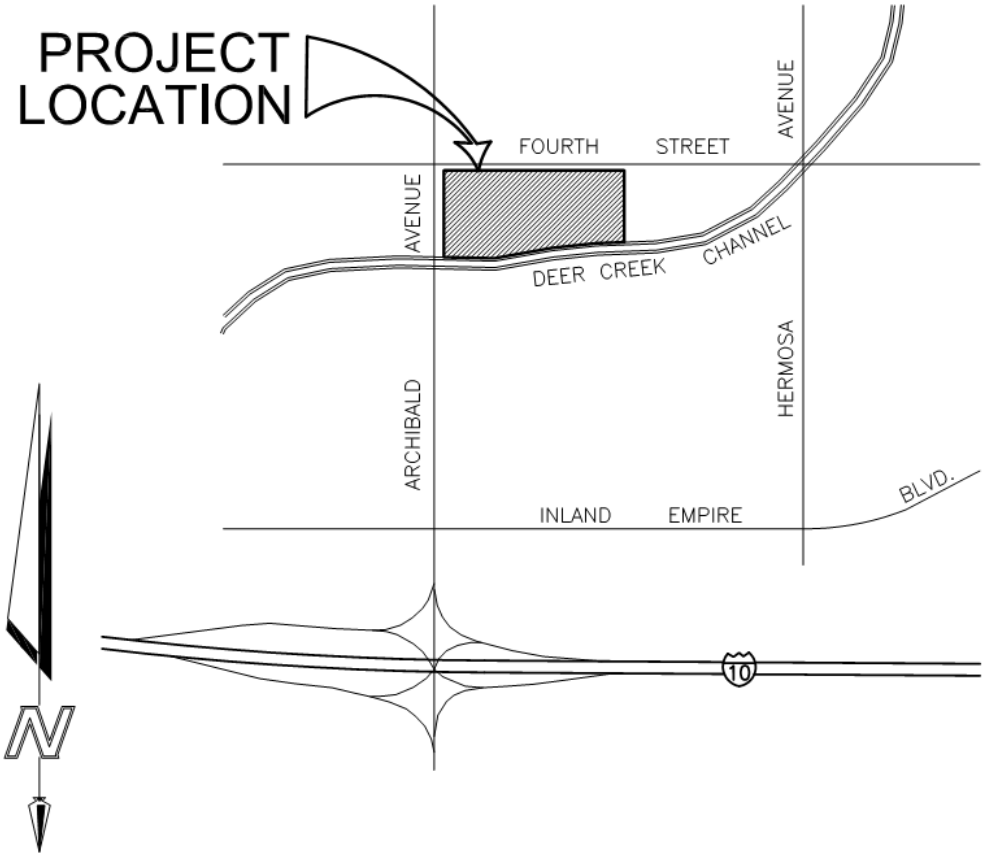
1.2 PURPOSE OF THIS REPORT

The purpose of this report is to determine the storm water runoff generated from a 100-year storm event due to the proposed development and to determine if there is any significant impact on existing storm drain system that received the runoff from the development. The 100-year storm runoff will also be used to size all the proposed on-site drainage pipes and structures.

1.3 REFERENCES

- San Bernardino County Hydrology Manual 1986
- The Urban Drainage Design Manual (Federal Highway Administration)

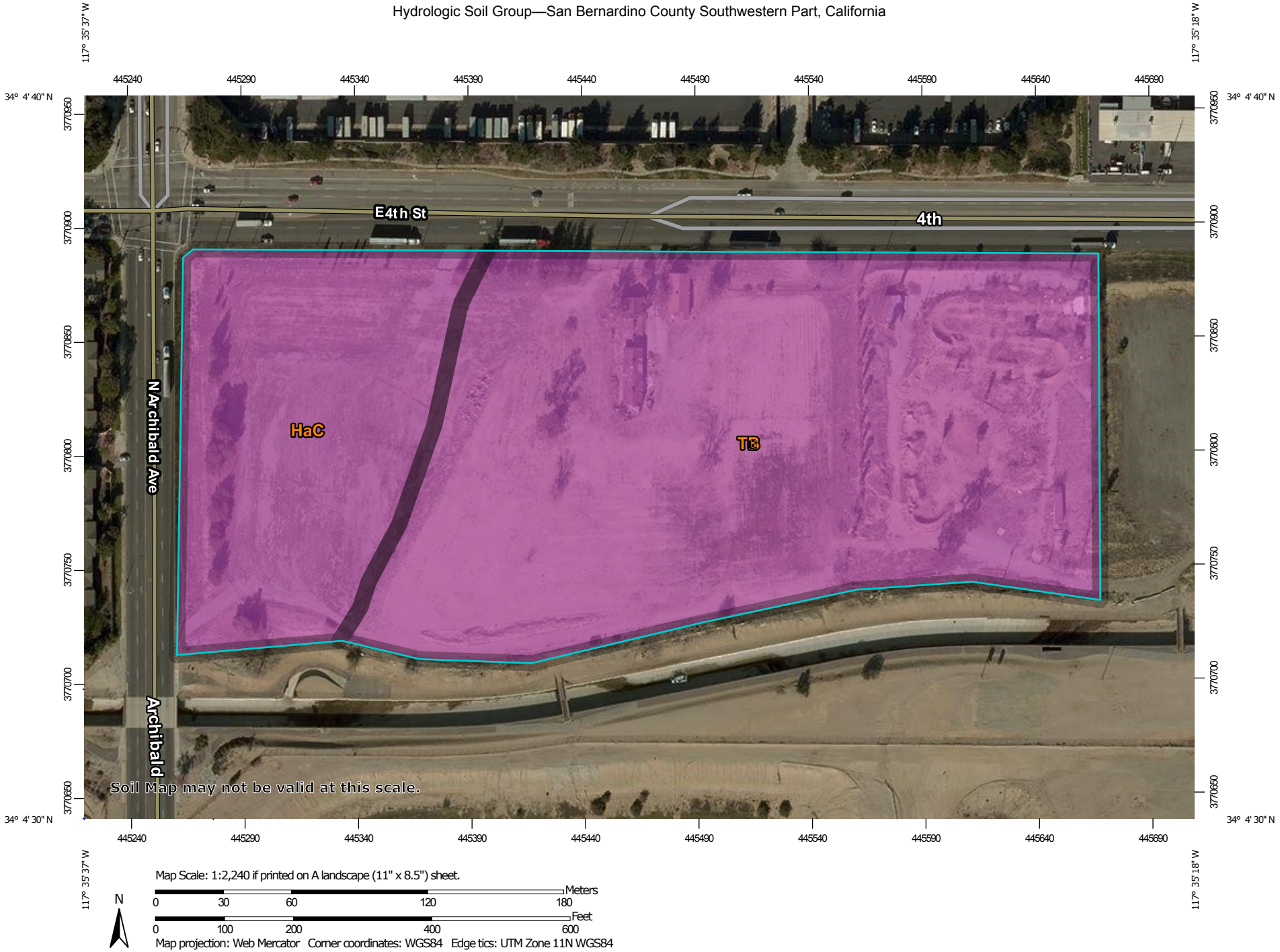
1.3 PROJECT SITE LOCATION MAP



VICINITY MAP

NOT TO SCALE

1.5 NRCS SOIL MAP & NOAA PRECIPITATION DATA



Map Scale: 1:2,240 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 30 60 120 180

Feet
0 100 200 400 600

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Lines

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Points

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: San Bernardino County Southwestern Part, California
Survey Area Data: Version 9, Sep 11, 2017

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jan 5, 2015—Jan 18, 2015

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
HaC	Hanford coarse sandy loam, 2 to 9 percent slopes	A	4.6	27.6%
TuB	Tujunga loamy sand, 0 to 5 percent slopes	A	12.0	72.4%
Totals for Area of Interest			**16.5**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

NOAA Atlas 14, Volume 6, Version 2
Location name: Ontario, California, USA*
Latitude: 34.0765°, Longitude: -117.5919°
Elevation: 1018.16 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**0.115** (0.096-0.139)	**0.157** (0.131-0.191)	**0.208** (0.173-0.253)	**0.247** (0.203-0.303)	**0.295** (0.235-0.375)	**0.330** (0.257-0.428)	**0.363** (0.275-0.483)	**0.394** (0.290-0.540)	**0.434** (0.306-0.621)	**0.462** (0.314-0.685)
10-min	**0.165** (0.137-0.200)	**0.225** (0.188-0.273)	**0.298** (0.248-0.363)	**0.354** (0.291-0.434)	**0.423** (0.337-0.538)	**0.473** (0.368-0.614)	**0.520** (0.394-0.692)	**0.565** (0.416-0.775)	**0.621** (0.439-0.889)	**0.662** (0.451-0.982)
15-min	**0.199** (0.166-0.241)	**0.272** (0.227-0.330)	**0.361** (0.300-0.439)	**0.428** (0.352-0.525)	**0.512** (0.407-0.650)	**0.572** (0.445-0.742)	**0.629** (0.477-0.837)	**0.683** (0.503-0.937)	**0.752** (0.530-1.08)	**0.800** (0.545-1.19)
30-min	**0.304** (0.253-0.368)	**0.415** (0.346-0.504)	**0.550** (0.457-0.669)	**0.653** (0.537-0.801)	**0.781** (0.621-0.992)	**0.872** (0.679-1.13)	**0.959** (0.727-1.28)	**1.04** (0.768-1.43)	**1.15** (0.809-1.64)	**1.22** (0.831-1.81)
60-min	**0.445** (0.371-0.539)	**0.609** (0.507-0.738)	**0.806** (0.670-0.981)	**0.956** (0.788-1.17)	**1.14** (0.910-1.45)	**1.28** (0.995-1.66)	**1.41** (1.07-1.87)	**1.53** (1.13-2.09)	**1.68** (1.19-2.40)	**1.79** (1.22-2.65)
2-hr	**0.670** (0.559-0.812)	**0.899** (0.749-1.09)	**1.17** (0.975-1.43)	**1.38** (1.14-1.70)	**1.64** (1.31-2.09)	**1.83** (1.42-2.37)	**2.00** (1.52-2.66)	**2.16** (1.59-2.97)	**2.37** (1.67-3.39)	**2.52** (1.71-3.73)
3-hr	**0.843** (0.703-1.02)	**1.12** (0.934-1.36)	**1.46** (1.21-1.77)	**1.71** (1.41-2.10)	**2.02** (1.61-2.57)	**2.25** (1.75-2.92)	**2.46** (1.86-3.27)	**2.66** (1.96-3.64)	**2.90** (2.05-4.16)	**3.08** (2.10-4.57)
6-hr	**1.20** (1.00-1.46)	**1.59** (1.32-1.93)	**2.06** (1.71-2.50)	**2.41** (1.98-2.95)	**2.84** (2.26-3.61)	**3.15** (2.45-4.09)	**3.44** (2.61-4.59)	**3.72** (2.74-5.10)	**4.07** (2.87-5.82)	**4.31** (2.94-6.40)
12-hr	**1.57** (1.31-1.90)	**2.08** (1.73-2.52)	**2.69** (2.24-3.28)	**3.16** (2.60-3.88)	**3.74** (2.98-4.76)	**4.16** (3.24-5.40)	**4.55** (3.45-6.06)	**4.92** (3.63-6.75)	**5.39** (3.80-7.72)	**5.72** (3.90-8.49)
24-hr	**2.09** (1.85-2.40)	**2.80** (2.48-3.23)	**3.67** (3.24-4.25)	**4.33** (3.79-5.05)	**5.17** (4.37-6.23)	**5.76** (4.78-7.09)	**6.33** (5.12-7.97)	**6.87** (5.42-8.90)	**7.56** (5.72-10.2)	**8.05** (5.89-11.2)
2-day	**2.50** (2.21-2.88)	**3.43** (3.03-3.95)	**4.56** (4.03-5.28)	**5.44** (4.76-6.35)	**6.56** (5.55-7.90)	**7.36** (6.11-9.05)	**8.13** (6.59-10.2)	**8.89** (7.00-11.5)	**9.84** (7.44-13.3)	**10.5** (7.70-14.7)
3-day	**2.68** (2.37-3.09)	**3.73** (3.30-4.31)	**5.04** (4.44-5.83)	**6.05** (5.29-7.05)	**7.34** (6.22-8.85)	**8.29** (6.87-10.2)	**9.20** (7.45-11.6)	**10.1** (7.95-13.1)	**11.2** (8.49-15.1)	**12.1** (8.82-16.8)
4-day	**2.89** (2.56-3.34)	**4.08** (3.61-4.71)	**5.56** (4.90-6.44)	**6.71** (5.87-7.83)	**8.20** (6.94-9.88)	**9.29** (7.71-11.4)	**10.3** (8.38-13.0)	**11.4** (8.98-14.8)	**12.7** (9.63-17.2)	**13.7** (10.0-19.1)
7-day	**3.33** (2.95-3.84)	**4.81** (4.25-5.55)	**6.67** (5.88-7.72)	**8.14** (7.12-9.50)	**10.1** (8.52-12.1)	**11.5** (9.54-14.1)	**12.9** (10.5-16.3)	**14.3** (11.3-18.5)	**16.2** (12.2-21.8)	**17.5** (12.8-24.5)
10-day	**3.57** (3.16-4.11)	**5.22** (4.62-6.02)	**7.33** (6.46-8.48)	**9.00** (7.87-10.5)	**11.2** (9.49-13.5)	**12.9** (10.7-15.8)	**14.5** (11.8-18.3)	**16.2** (12.8-21.0)	**18.4** (13.9-24.8)	**20.1** (14.7-28.0)
20-day	**4.26** (3.78-4.92)	**6.32** (5.59-7.29)	**9.00** (7.94-10.4)	**11.2** (9.78-13.0)	**14.1** (12.0-17.0)	**16.4** (13.6-20.2)	**18.7** (15.2-23.6)	**21.1** (16.6-27.3)	**24.3** (18.4-32.8)	**26.8** (19.6-37.5)
30-day	**5.03** (4.46-5.80)	**7.41** (6.55-8.55)	**10.6** (9.32-12.2)	**13.2** (11.5-15.4)	**16.8** (14.2-20.2)	**19.6** (16.2-24.1)	**22.5** (18.2-28.3)	**25.5** (20.1-33.0)	**29.7** (22.5-40.1)	**33.0** (24.1-46.1)
45-day	**6.15** (5.45-7.09)	**8.86** (7.83-10.2)	**12.5** (11.0-14.5)	**15.6** (13.7-18.2)	**20.0** (16.9-24.1)	**23.5** (19.5-28.9)	**27.1** (21.9-34.1)	**31.0** (24.4-40.1)	**36.5** (27.6-49.2)	**40.9** (29.9-57.0)
60-day	**7.27** (6.44-8.38)	**10.2** (9.02-11.8)	**14.2** (12.6-16.5)	**17.7** (15.5-20.7)	**22.7** (19.2-27.3)	**26.7** (22.2-32.9)	**31.0** (25.1-39.1)	**35.6** (28.1-46.1)	**42.3** (32.0-57.0)	**47.7** (34.9-66.6)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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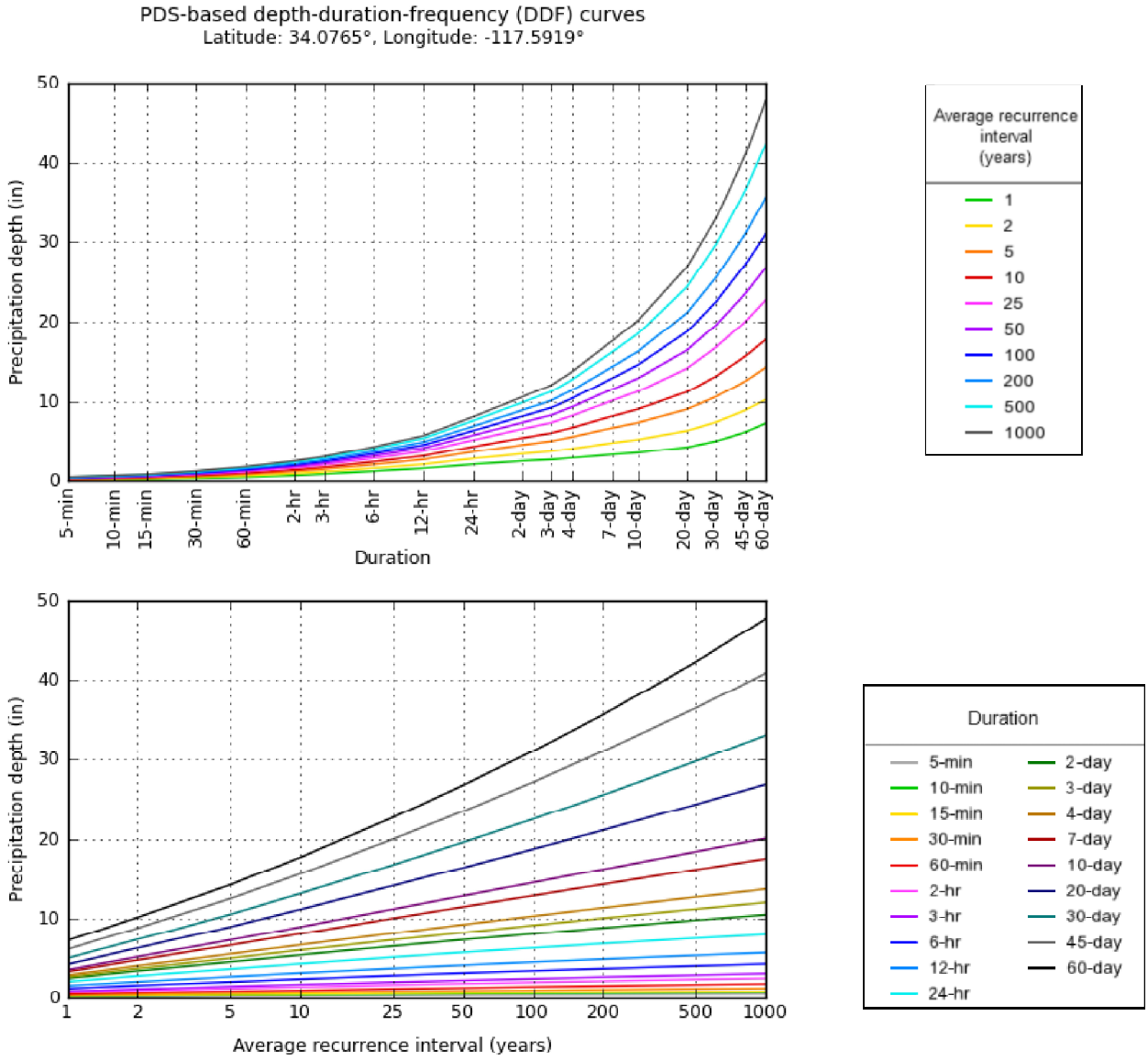
PF graphical



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Created (GMT): Tue Jan 29 20:03:37 2019

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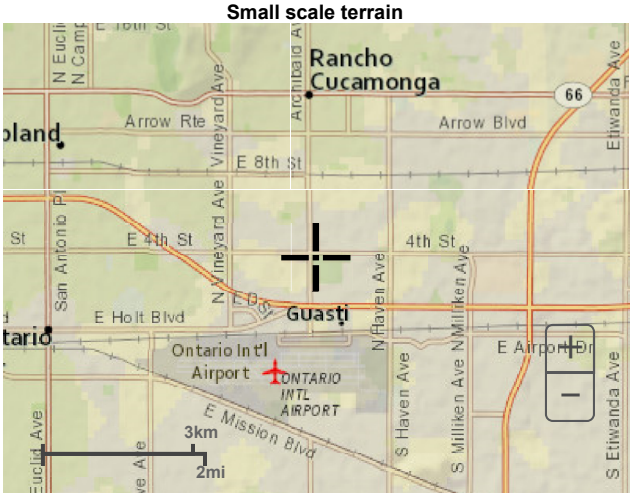
Maps & aerials

Small scale terrain



Large scale terrain

Large scale map

Large scale aerial

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US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

Disclaimer

2.0 PRE-DEVELOPMENT TOPOGRAPHIC & HYDROLOGIC CONDITIONS

2.1 PRE-DEVELOPMENT TOPOGRAPHY

Under existing conditions, the project site is a trapezoid parcel, currently vacant with relatively level topography descending gradually from north to south. Along all the four edges of the property the topography is relatively steeper than in the center. There is an earthen berm located at the easterly third of the land that covers almost its entire width. The site has poor growth of vegetation throughout. Bushes and trees grow around its boundary. There are some palm trees located on the easterly third of the land and at the top of the aformentioned berm.

2.2 PRE-DEVELOPMENT DRAINAGE SYSTEM

Under existing conditions, the project site mostly sheet flows from north to south towards Deer Creek Channel. There are no drainage facilities on site. However, Deer Creek Channel located on the south side of the project, receives most of the runoff generated on site. There is a 96-inch underground storm drain system located along N. Archibald Avenue. This system collects runoff from N. Archibald Avenue and its tributary area through curb inlet catch basin located at various locations along the street and ultimately drains into Deer Creek Channel across the southwest corner of the proposed project. The runoff from 4th street and portion of northerly edge of project site drains into an existing curb inlet near the intersection of N. Archibald Avenue and 4th Street which then drains in to the aforementioned 96-inch storm drain system on N. Archibald Avenue which ultimately drain in to Deer Creek Channel. Portion of westerly edge of the project site drain into N. Archibald Avenue, which then carried toward south along the N. Archibald Avenue. The detail of the current drainage condition can be found in Hydrology Map, Pre-Development condition in Appendix 3.

3.0 PROPOSED DEVELOPMENT AND DRAINAGE FACILITIES

3.1 PROPOSED DEVELOPMENT

The proposed Top Golf project site is a 15.8-acre site located in the City of Ontario, CA.

The project consists of construction of a commercial Golf Driving Range with entertainment facilities, buildings and paved parking for the user. Project site will be graded to accommodate the installation of pre-fabricated driving range targets in relation to the building and Hitting Bays final elevations. The proposed grading of the site will match the existing edge condition.

3.2 POST-DEVELOPMENT DRAINAGE FACILITY

Onsite storm water runoff will be collected by catch basins inlets, placed at various strategic locations of driving range and parking lot, and then into the proposed underground storm drain system. The runoff will then be conveyed through the Hydrodynamic separator to a properly sized underground Infiltration Chambers. These measures are adopted to mitigate Water Quality requirements of the proposed development. Additional details of project's water quality requirements and mitigation measures can be found in project's water quality report. Once these chambers reach its capacity, the high flow will bypass the Hydrodynamic Separator and discharge into the proposed onsite storm drain system which then ultimately drain into the existing 96-inch storm drain system on N. Archibald Avenue. South edge of the project and portion of easterly property will drain into Deer Creek Channel. North edge of the site within street setback line will drain into 4th Street and similarly westerly edge within street setback line will drain into Archibald Avenue. The proposed drainage condition can be found in the Hydrology Map Post-Development condition in Appendix 3.

4.0 HYDROLOGY AND HYDRAULIC STUDY

4.1 METHODOLOGY

The hydrology study was performed under the guidelines of the San Bernardino County (SBC) Hydrology Manual.

The Rational Method was used to calculate peak runoff rates.

Following Computer program was used:

- CIVILD: Rational Method, Hydrology Calculation;

Results of the analysis are included in this report on Appendix 1.

5.0 RESULTS AND CONCLUSIONS

5.1 PRE-DEVELOPED CONDITIONS 100 YEAR STORM EVENT

In pre-development condition this site and its effective drainage tributary area has two major discharge locations. Based on a Rational method calculation the 100-year flow for each of these discharge locations is given below.

Drainage Area	Remarks	Length (ft)	Area (acre)	Soil Type	Q100 (cfs)
E1.1	Initial Area (4th Street)	1000	1.8	A	5.3
E1.2	Flow thru street gutter	395	1.0	A	2.1
Discharging in to the existing Curb Inlet on Archibald Avenue Node 1.3 to 96-inch SD then to Deer Creek Channel			2.8	A	7.4
E2	Initial Area (Site Westerly Edge + Archibald Ave.)	747	4.0	A	10.2
Discharging on Archibald Avenue leaving site boundary at Node 2.2			4.0	A	10.2
E3.1	Initial Area (on-site)	1000	4.3	A	11.2
E3.2	Flow thru irregular channel	694	9.9	A	22.2
Discharging directly in to Deer Creek Channel leaving site boundary at Node 3.3			14.2	A	33.4

Thus, the site and its tributary area are discharging **40.8 cfs** (Node 1.3 and Node 3.3 combined) into Deer Creek Channel (Discharge location 1) and discharging **10.2 cfs** into N. Archibald Avenue at the south west corner of project boundary (Discharge location 2).

5.2 POST-DEVELOPMENT CONDITIONS 100 YEAR STORM EVENT

In post-development condition this site and its effective drainage tributary area has two major discharge locations as in the pre-development condition. Based on a Rational method calculation the summary of 100-year flow for each of these discharge locations is given below. For confluence values refer to the Hydrology Map Post Development condition on Appendix 3.

Drainage Area	Remarks	Length (ft)	Area (acre)	Soil Type	Q100 (cfs)
P1.1	Initial Area	1000	1.9	A	5.6
P1.2	Flow thru street gutter	395	0.8	A	1.5
Discharging in to the existing Curb Inlet on Archibald Avenue Node 1.3 to 96-inch SD then to Deer Creek Channel (Discharge Location-1)			2.7	A	7.1
P2.1	Initial Area	634	1.9	A	7.0
P2.2	Initial Area	234	0.3	A	1.4
P2.3	Initial Area	641	5.3	A	20.7
P2.4	Initial Area	563	1.8	A	6.7
P2.5	Initial Area	613	3.2	A	12.6
Discharging in to 96-inch SD on N. Archibald Avenue Node 2.12 then to Deer Creek Channel (Discharge Location-1)			12.5	A	46.6
P3.1	Initial Area	1000	3.2	A	5.8
P3.2	Flow thru irregular channel	590	1.4	A	2.1
Discharging directly in to Deer Creek Channel leaving site boundary at Node 3.3 (Discharge Location-1)			4.6	**A**	7.9
P4.1	Initial Area	661	1.0		3.9
Discharging in to Archibald Avenue leaving site boundary at Node 4.02 (Discharge Location-2)			1.0	A	3.9

According to this calculation, the post-development site and its tributary area, will be discharging 61.6 cfs (Node 1.03, Node 2.12 and Node 3.3) into Deer Creek Channel and 3.9cfs into N. Archibald Avenue at the south west corner of the project boundary. Therefore, due to the proposed development, without any onsite retention, the flow leaving at discharge location-1, into Deer Creek Channel would be increase by 20.8cfs (61.6cfs – 40.8cfs) and the flow at discharge location-2 into N. Archibald Avenue will be decreased by 6.3cfs (10.2cfs-3.9cfs).

5.3 POST-DEVELOPMENT WQMP, MITIGATION AND FLOW RATE

This development will mitigate Water Quality Objective by retaining full DCV onsite. Please refer to Site Specific WQMP for full information and proposed BMPs. Given below is the summery of proposed BMP and retention provided. Please see Appendix 3 for preliminary LID Map for BMP location.

TARGET CAPTURE VOLUME SUMMARY			
BMP Name	**DCV (cu-ft.) Required**	**DCV (cu-ft.) Captured**	**Model/ Dimensions**
Underground Infiltration Chambers IT-1	17,399 cu-ft.	17,527 cu-ft.	96" Perforated CMP 19' x 117'
Underground Infiltration Chambers IT-2	43,599 cu-ft.	43,622 cu-ft.	96" Perforated CMP 63' x 100'

As shown in the Table above that the total volume of runoff retained onsite to mitigate water quality measure is 61,149cft (17527+43622). This retention is provided for the runoff generated from the portion of the drainage tributary area of 19.8 acre (2.7+12.5+4.6) that is area discharging into Deer Creek channel and is labeled as discharge location-1.

A hydrograph analysis showed that after retention of 60,475cft of runoff the post-development discharge flow at Node 2.12 can be reduced to 12.1cfs. After combining this mitigated flow and the other two flows (7.1cfs at Node 1.3 and 7.9cfs at Node 3.3) that are at discharging at location-1, the flow will be equal to 27.1cfs which is less than the pre-development flow of 40.8cfs. As mentioned in paragraph 5.2, that the flow rate at discharge location-2 has been reduced to 3.9cfs which is also less than pre-development flow of 10.2cfs. Thus, it can be concluded that with on-site retention of 61,149cft this development will discharge at a rate that is less than the pre-development discharge rate.

PRE-CONSTRUCTION VS. POST-CONSTRUCTION FLOW SUMMARY BEFORE AND AFTER RETENTION					
Discharge Location	**Pre-construction Flow rate**	**Post-construction Flow rate (No Retention)**	**Retention Volume Provided**	**Post-construction Flow rate (After Retention)**	**Conclusion**
Location-1 (Deer Creek Channel)	40.8 cfs.	61.6 cfs.	61,149 cu-ft	27.1 cfs.	Flow reduced by 13.7 cfs.
Location-2 (N. Archibald Avenue)	10.2 cfs.	3.9 cfs.	N/A	3.9 cfs.	Flow reduced by 6.3 cfs.

Detail of Hydrograph analysis with discharge flow rate can be found in Appendix 4

6.0 APPENDICES

Appendix 1 Rational Method: Pre-Developed and Post-Developed Q_{100}

Appendix 2 Soils Report

Appendix 3 Pre-Development Hydrology Map, Post-Developement Hydrology Map, LID Map

Appendix 4 Hydrograph Calculation and results

APPENDIX 1

RATIONAL METHOD:
PRE-DEVELOPED Q_{100}

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2005 Version 7.1
Rational Hydrology Study Date: 02/07/19

TOP GOLF ONTARIO
PRE DEVELOPED AREA 1
DRAINING TO AN INLET
FUSCOE ENGINEERING

Program License Serial Number 6049

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

Rational hydrology study storm event year is 100.0
10 Year storm 1 hour rainfall = 0.956(In.)
100 Year storm 1 hour rainfall = 1.410(In.)
Computed rainfall intensity:
Storm year = 100.00 1 hour rainfall = 1.410 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 3

++

Process from Point/Station 1.100 to Point/Station 1.200
**** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.079(In/Hr)
Initial subarea data:
Initial area flow distance = 1000.000(Ft.)
Top (of initial area) elevation = 1026.800(Ft.)
Bottom (of initial area) elevation = 1022.300(Ft.)
Difference in elevation = 4.500(Ft.)
Slope = 0.00450 s(%)= 0.45
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 14.198 min.
Rainfall intensity = 3.348(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.879
Subarea runoff = 5.296(CFS)
Total initial stream area = 1.800(Ac.)
Pervious area fraction = 0.100
Initial area Fm value = 0.079(In/Hr)

++

Process from Point/Station 1.020 to Point/Station 1.030
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****

Estimated mean flow rate at midpoint of channel = 0.000(CFS)
Depth of flow = 0.460(Ft.), Average velocity = 2.303(Ft/s)
******* Irregular Channel Data **********

Information entered for subchannel number 1 :

Point number	'X' coordinate	'Y' coordinate
1	0.00	0.67
2	0.16	0.00
3	2.16	0.16
4	2.17	0.18
5	47.00	1.07

Manning's 'N' friction factor = 0.017

Sub-Channel flow = 6.357(CFS)
' ' flow top width = 16.215(Ft.)
' ' velocity= 2.303(Ft/s)
' ' area = 2.760(Sq.Ft)
' ' Froude number = 0.984

```
Upstream point elevation =  1022.300(Ft.)
Downstream point elevation =  1019.300(Ft.)
Flow length =   395.000(Ft.)
Travel time  =    2.86 min.
Time of concentration =   17.06 min.
Depth of flow =   0.460(Ft.)
Average velocity =   2.303(Ft/s)
Total irregular channel flow =     6.357(CFS)
Irregular channel normal depth above invert elev. =   0.460(Ft.)
Average velocity of channel(s) =   2.303(Ft/s)
 Adding area flow to channel
COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.1000     Max loss rate(Fm)=     0.079(In/Hr)
Rainfall intensity =      2.999(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.876
Subarea runoff =      2.063(CFS) for    1.000(Ac.)
Total runoff =      7.360(CFS)
Effective area this stream =        2.80(Ac.)
Total Study Area (Main Stream No. 1) =        2.80(Ac.)
Area averaged Fm value =    0.079(In/Hr)
Depth of flow =   0.479(Ft.), Average velocity =   2.386(Ft/s)
End of computations, Total Study Area =            2.80 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

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

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2005 Version 7.1
Rational Hydrology Study Date: 02/07/19

TOP GOLF ONTARIO
PRE DEVELOPED AREA 2
LEAVING SITE AT ARCHIBALD AVE.
FUSCOE ENGINEERING

Program License Serial Number 6049

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

Rational hydrology study storm event year is 100.0
10 Year storm 1 hour rainfall = 0.956(In.)
100 Year storm 1 hour rainfall = 1.410(In.)
Computed rainfall intensity:
Storm year = 100.00 1 hour rainfall = 1.410 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 3

++

Process from Point/Station 2.100 to Point/Station 2.200
**** INITIAL AREA EVALUATION ****

UNDEVELOPED (poor cover) subarea
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 67.00
Adjusted SCS curve number for AMC 3 = 84.60
Pervious ratio(Ap) = 1.0000 Max loss rate(Fm)= 0.290(In/Hr)
Initial subarea data:
Initial area flow distance = 747.000(Ft.)
Top (of initial area) elevation = 1025.500(Ft.)
Bottom (of initial area) elevation = 1009.300(Ft.)
Difference in elevation = 16.200(Ft.)
Slope = 0.02169 s(%)= 2.17
TC = k(0.525)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 15.931 min.
Rainfall intensity = 3.124(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.816
Subarea runoff = 10.204(CFS)
Total initial stream area = 4.000(Ac.)
Pervious area fraction = 1.000
Initial area Fm value = 0.290(In/Hr)
End of computations, Total Study Area = 4.00 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged SCS curve number = 67.0

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2005 Version 7.1
Rational Hydrology Study Date: 02/07/19

TOP GOLF ONTARIO
PRE DEVELOPED AREA 3
DRAINING TO DEER CREEK
FUSCOE ENGINEERING

Program License Serial Number 6049

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

Rational hydrology study storm event year is 100.0
10 Year storm 1 hour rainfall = 0.956(In.)
100 Year storm 1 hour rainfall = 1.410(In.)
Computed rainfall intensity:
Storm year = 100.00 1 hour rainfall = 1.410 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 3

++

Process from Point/Station 3.100 to Point/Station 3.200
**** INITIAL AREA EVALUATION ****

UNDEVELOPED (poor cover) subarea
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 67.00
Adjusted SCS curve number for AMC 3 = 84.60
Pervious ratio(Ap) = 1.0000 Max loss rate(Fm)= 0.290(In/Hr)
Initial subarea data:
Initial area flow distance = 864.000(Ft.)
Top (of initial area) elevation = 1039.000(Ft.)
Bottom (of initial area) elevation = 1010.000(Ft.)
Difference in elevation = 29.000(Ft.)
Slope = 0.03356 s(%)= 3.36
TC = k(0.525)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 15.473 min.
Rainfall intensity = 3.179(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.818
Subarea runoff = 11.182(CFS)
Total initial stream area = 4.300(Ac.)
Pervious area fraction = 1.000
Initial area Fm value = 0.290(In/Hr)

++

Process from Point/Station 3.200 to Point/Station 3.300
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****

Estimated mean flow rate at midpoint of channel = 0.000(CFS)
Depth of flow = 0.933(Ft.), Average velocity = 4.584(Ft/s)
******* Irregular Channel Data **********

Information entered for subchannel number 1 :

Point number	'X' coordinate	'Y' coordinate
1	0.00	12.00
2	27.80	1.00
3	38.70	0.00
4	39.00	1.00

Manning's 'N' friction factor = 0.030

Sub-Channel flow = 22.324(CFS)
' ' flow top width = 10.445(Ft.)
' ' velocity= 4.584(Ft/s)
' ' area = 4.870(Sq.Ft)
' ' Froude number = 1.183

```
Upstream point elevation =  1010.000(Ft.)
Downstream point elevation =   992.000(Ft.)
Flow length =   694.000(Ft.)
Travel time  =    2.52 min.
Time of concentration =   18.00 min.
Depth of flow =   0.933(Ft.)
Average velocity =   4.584(Ft/s)
Total irregular channel flow =    22.324(CFS)
Irregular channel normal depth above invert elev. =   0.933(Ft.)
Average velocity of channel(s) =   4.584(Ft/s)
 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 67.00
Adjusted SCS curve number for AMC 3 = 84.60
Pervious ratio(Ap) = 1.0000     Max loss rate(Fm)=     0.290(In/Hr)
Rainfall intensity =      2.904(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.810
Subarea runoff =     22.224(CFS) for    9.900(Ac.)
Total runoff =     33.407(CFS)
Effective area this stream =       14.20(Ac.)
Total Study Area (Main Stream No. 1) =       14.20(Ac.)
Area averaged Fm value =    0.290(In/Hr)
Depth of flow =   1.073(Ft.), Average velocity =   5.203(Ft/s)
End of computations, Total Study Area =           14.20 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged SCS curve number =  67.0
```

RATIONAL METHOD:
POST-DEVELOPED Q_{100}

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2005 Version 7.1
Rational Hydrology Study Date: 02/07/19

TOP GOLF ONTARIO
POST DEVELOPMENT AREA 1
DRAINING TO AN EXISTING INLET
FUSCOE ENGINEERING

Program License Serial Number 6049

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

Rational hydrology study storm event year is 100.0
10 Year storm 1 hour rainfall = 0.956(In.)
100 Year storm 1 hour rainfall = 1.410(In.)
Computed rainfall intensity:
Storm year = 100.00 1 hour rainfall = 1.410 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 3

++

Process from Point/Station 1.010 to Point/Station 1.020
**** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.079(In/Hr)
Initial subarea data:
Initial area flow distance = 1000.000(Ft.)
Top (of initial area) elevation = 1026.800(Ft.)
Bottom (of initial area) elevation = 1022.300(Ft.)
Difference in elevation = 4.500(Ft.)
Slope = 0.00450 s(%)= 0.45
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 14.198 min.
Rainfall intensity = 3.348(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.879
Subarea runoff = 5.591(CFS)
Total initial stream area = 1.900(Ac.)
Pervious area fraction = 0.100
Initial area Fm value = 0.079(In/Hr)

++

Process from Point/Station 1.020 to Point/Station 1.030
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****

Estimated mean flow rate at midpoint of channel = 0.000(CFS)
Depth of flow = 0.460(Ft.), Average velocity = 2.305(Ft/s)
******* Irregular Channel Data **********

Information entered for subchannel number 1 :

Point number	'X' coordinate	'Y' coordinate
1	0.00	0.67
2	0.16	0.00
3	2.16	0.16
4	2.17	0.18
5	47.00	1.07

Manning's 'N' friction factor = 0.017

Sub-Channel flow = 6.372(CFS)
' ' flow top width = 16.230(Ft.)
' ' velocity= 2.305(Ft/s)
' ' area = 2.765(Sq.Ft)
' ' Froude number = 0.984

```
Upstream point elevation =  1022.300(Ft.)
Downstream point elevation =  1019.300(Ft.)
Flow length =   395.000(Ft.)
Travel time  =    2.86 min.
Time of concentration =   17.05 min.
Depth of flow =   0.460(Ft.)
Average velocity =   2.305(Ft/s)
Total irregular channel flow =     6.372(CFS)
Irregular channel normal depth above invert elev. =   0.460(Ft.)
Average velocity of channel(s) =   2.305(Ft/s)
 Adding area flow to channel
COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.1000     Max loss rate(Fm)=     0.079(In/Hr)
Rainfall intensity =      2.999(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.876
Subarea runoff =      1.507(CFS) for    0.800(Ac.)
Total runoff =      7.097(CFS)
Effective area this stream =        2.70(Ac.)
Total Study Area (Main Stream No. 1) =        2.70(Ac.)
Area averaged Fm value =    0.079(In/Hr)
Depth of flow =   0.474(Ft.), Average velocity =   2.365(Ft/s)
End of computations, Total Study Area =            2.70 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

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

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2005 Version 7.1
Rational Hydrology Study Date: 02/07/19

TOP GOLF ONTARIO
POST DEVELOPMENT AREA 2
DRAINING TO EXISTING SD
FUSCOE ENGINEERING

Program License Serial Number 6049

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

Rational hydrology study storm event year is 100.0
10 Year storm 1 hour rainfall = 0.956(In.)
100 Year storm 1 hour rainfall = 1.410(In.)
Computed rainfall intensity:
Storm year = 100.00 1 hour rainfall = 1.410 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 3

++

Process from Point/Station 2.010 to Point/Station 2.020
**** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.079(In/Hr)
Initial subarea data:
Initial area flow distance = 634.000(Ft.)
Top (of initial area) elevation = 1026.000(Ft.)
Bottom (of initial area) elevation = 1018.700(Ft.)
Difference in elevation = 7.300(Ft.)
Slope = 0.01151 s(%)= 1.15
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 9.805 min.
Rainfall intensity = 4.181(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.883
Subarea runoff = 7.014(CFS)
Total initial stream area = 1.900(Ac.)
Pervious area fraction = 0.100
Initial area Fm value = 0.079(In/Hr)

++

Process from Point/Station 2.020 to Point/Station 2.040
**** PIPEFLOW TRAVEL TIME (User specified size) ****

Upstream point/station elevation = 1015.700(Ft.)
Downstream point/station elevation = 1013.500(Ft.)
Pipe length = 229.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 7.014(CFS)
Given pipe size = 18.00(In.)
Calculated individual pipe flow = 7.014(CFS)
Normal flow depth in pipe = 10.90(In.)
Flow top width inside pipe = 17.59(In.)
Critical Depth = 12.30(In.)
Pipe flow velocity = 6.27(Ft/s)
Travel time through pipe = 0.61 min.
Time of concentration (TC) = 10.41 min.

++

Process from Point/Station 2.020 to Point/Station 2.040
**** CONFLUENCE OF MAIN STREAMS ****

```
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      1.900(Ac.)
Runoff from this stream =      7.014(CFS)
Time of concentration =   10.41 min.
Rainfall intensity =     4.032(In/Hr)
Area averaged loss rate (Fm) =    0.0785(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1000
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        2.030 to Point/Station        2.040
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.1000     Max loss rate(Fm)=     0.079(In/Hr)
Initial subarea data:
Initial area flow distance =   234.000(Ft.)
Top (of initial area) elevation =  1026.000(Ft.)
Bottom (of initial area) elevation =  1023.800(Ft.)
Difference in elevation =     2.200(Ft.)
Slope =    0.00940  s(%)=       0.94
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    6.854 min.
Rainfall intensity =      5.183(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.886
Subarea runoff =      1.378(CFS)
Total initial stream area =        0.300(Ac.)
Pervious area fraction = 0.100
Initial area Fm value =    0.079(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        2.030 to Point/Station        2.040
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      0.300(Ac.)
Runoff from this stream =      1.378(CFS)
Time of concentration =    6.85 min.
Rainfall intensity =     5.183(In/Hr)
Area averaged loss rate (Fm) =    0.0785(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1000
Summary of stream data:

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


1      7.01     1.900     10.41    0.079      4.032
2      1.38     0.300      6.85    0.079      5.183
Qmax(1) =
           1.000 *    1.000 *     7.014) +
           0.775 *    1.000 *     1.378) + =       8.082
Qmax(2) =
           1.291 *    0.658 *     7.014) +
           1.000 *    1.000 *     1.378) + =       7.338

Total of 2 main streams to confluence:
Flow rates before confluence point:
       8.014       2.378
Maximum flow rates at confluence using above data:
        8.082        7.338
Area of streams before confluence:
        1.900        0.300
Effective area values after confluence:
        2.200        1.550


Results of confluence:
Total flow rate =      8.082(CFS)
Time of concentration =    10.414 min.
```

```
Effective stream area after confluence  =      2.200(Ac.)
Study area average Pervious fraction(Ap) =  0.100
Study area average soil loss rate(Fm) =    0.079(In/Hr)
Study area total =       2.20(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        2.040 to Point/Station        2.080
**** PIPEFLOW TRAVEL TIME (User specified size) ****
______________________________________________________________________________
Upstream point/station elevation =  1013.500(Ft.)
Downstream point/station elevation =  1001.000(Ft.)
Pipe length  =   486.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     8.082(CFS)
Given pipe size =     18.00(In.)
Calculated individual pipe flow  =     8.082(CFS)
Normal flow depth in pipe =    8.79(In.)
Flow top width inside pipe =   18.00(In.)
Critical Depth =   13.20(In.)
Pipe flow velocity =      9.44(Ft/s)
Travel time through pipe =    0.86 min.
Time of concentration (TC) =    11.27 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        2.040 to Point/Station        2.080
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      2.200(Ac.)
Runoff from this stream =      8.082(CFS)
Time of concentration =   11.27 min.
Rainfall intensity =     3.845(In/Hr)
Area averaged loss rate (Fm) =    0.0785(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1000
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        2.050 to Point/Station        2.060
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.1000     Max loss rate(Fm)=     0.079(In/Hr)
Initial subarea data:
Initial area flow distance =   641.000(Ft.)
Top (of initial area) elevation =  1031.000(Ft.)
Bottom (of initial area) elevation =  1019.000(Ft.)
Difference in elevation =    12.000(Ft.)
Slope =    0.01872  s(%)=       1.87
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.936 min.
Rainfall intensity =      4.420(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.884
Subarea runoff =     20.709(CFS)
Total initial stream area =        5.300(Ac.)
Pervious area fraction = 0.100
Initial area Fm value =    0.079(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        2.060 to Point/Station        2.080
**** PIPEFLOW TRAVEL TIME (User specified size) ****
______________________________________________________________________________
Upstream point/station elevation =  1004.600(Ft.)
Downstream point/station elevation =  1001.000(Ft.)
Pipe length  =   347.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    20.709(CFS)
Given pipe size =     24.00(In.)
Calculated individual pipe flow  =    20.709(CFS)
Normal flow depth in pipe =   17.77(In.)
Flow top width inside pipe =   21.05(In.)
Critical Depth =   19.58(In.)
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Pipe flow velocity =      8.30(Ft/s)
Travel time through pipe =    0.70 min.
Time of concentration (TC) =     9.63 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        2.060 to Point/Station        2.080
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      5.300(Ac.)
Runoff from this stream =     20.709(CFS)
Time of concentration =    9.63 min.
Rainfall intensity =     4.225(In/Hr)
Area averaged loss rate (Fm) =    0.0785(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1000
Program is now starting with Main Stream No. 3


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        2.070 to Point/Station        2.080
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.1000     Max loss rate(Fm)=     0.079(In/Hr)
Initial subarea data:
Initial area flow distance =   563.000(Ft.)
Top (of initial area) elevation =  1024.900(Ft.)
Bottom (of initial area) elevation =  1019.200(Ft.)
Difference in elevation =     5.700(Ft.)
Slope =    0.01012  s(%)=       1.01
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    9.594 min.
Rainfall intensity =      4.236(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.883
Subarea runoff =      6.734(CFS)
Total initial stream area =        1.800(Ac.)
Pervious area fraction = 0.100
Initial area Fm value =    0.079(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        2.070 to Point/Station        2.080
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 3
Stream flow area =      1.800(Ac.)
Runoff from this stream =      6.734(CFS)
Time of concentration =    9.59 min.
Rainfall intensity =     4.236(In/Hr)
Area averaged loss rate (Fm) =    0.0785(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1000
Summary of stream data:

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


1      8.08     2.200     11.27    0.079      3.845
2     20.71     5.300      9.63    0.079      4.225
3      6.73     1.800      9.59    0.079      4.236
Qmax(1) =
           1.000 *    1.000 *     8.082) +
           0.908 *    1.000 *    20.709) +
           0.906 *    1.000 *     6.734) + =      32.993
Qmax(2) =
           1.101 *    0.855 *     8.082) +
           1.000 *    1.000 *    20.709) +
           0.998 *    1.000 *     6.734) + =      35.030
Qmax(3) =
           1.104 *    0.851 *     8.082) +
           1.002 *    0.996 *    20.709) +
```

```
          1.000 *    1.000 *     6.734) + =      35.002

Total of 3 main streams to confluence:
Flow rates before confluence point:
       9.082      21.709       7.734
Maximum flow rates at confluence using above data:
       32.993       35.030       35.002
Area of streams before confluence:
        2.200        5.300        1.800
Effective area values after confluence:
        9.300        8.980        8.951


Results of confluence:
Total flow rate =     35.030(CFS)
Time of concentration =     9.633 min.
Effective stream area after confluence  =      8.980(Ac.)
Study area average Pervious fraction(Ap) =  0.100
Study area average soil loss rate(Fm) =    0.079(In/Hr)
Study area total =       9.30(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        2.080 to Point/Station        2.110
**** PIPEFLOW TRAVEL TIME (User specified size) ****
______________________________________________________________________________
Upstream point/station elevation =  1001.000(Ft.)
Downstream point/station elevation =   997.500(Ft.)
Pipe length  =   297.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    35.030(CFS)
Given pipe size =     30.00(In.)
Calculated individual pipe flow  =    35.030(CFS)
Normal flow depth in pipe =   20.06(In.)
Flow top width inside pipe =   28.24(In.)
Critical Depth =   24.12(In.)
Pipe flow velocity =     10.05(Ft/s)
Travel time through pipe =    0.49 min.
Time of concentration (TC) =    10.13 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        2.080 to Point/Station        2.110
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      8.980(Ac.)
Runoff from this stream =     35.030(CFS)
Time of concentration =   10.13 min.
Rainfall intensity =     4.101(In/Hr)
Area averaged loss rate (Fm) =    0.0785(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1000
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        2.090 to Point/Station        2.100
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.1000     Max loss rate(Fm)=     0.079(In/Hr)
Initial subarea data:
Initial area flow distance =   613.000(Ft.)
Top (of initial area) elevation =  1024.000(Ft.)
Bottom (of initial area) elevation =  1013.000(Ft.)
Difference in elevation =    11.000(Ft.)
Slope =    0.01794  s(%)=       1.79
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.853 min.
Rainfall intensity =      4.445(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.884
Subarea runoff =     12.575(CFS)
Total initial stream area =        3.200(Ac.)
Pervious area fraction = 0.100
```

```
Initial area Fm value =    0.079(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        2.090 to Point/Station        2.100
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      3.200(Ac.)
Runoff from this stream =     12.575(CFS)
Time of concentration =    8.85 min.
Rainfall intensity =     4.445(In/Hr)
Area averaged loss rate (Fm) =    0.0785(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1000
Summary of stream data:

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


1     35.03     8.980     10.13    0.079      4.101
2     12.58     3.200      8.85    0.079      4.445
Qmax(1) =
           1.000 *    1.000 *    35.030) +
           0.921 *    1.000 *    12.575) + =      46.614
Qmax(2) =
           1.086 *    0.874 *    35.030) +
           1.000 *    1.000 *    12.575) + =      45.823

Total of 2 main streams to confluence:
Flow rates before confluence point:
      36.030      13.575
Maximum flow rates at confluence using above data:
       46.614       45.823
Area of streams before confluence:
        8.980        3.200
Effective area values after confluence:
       12.180       11.051


Results of confluence:
Total flow rate =     46.614(CFS)
Time of concentration =    10.126 min.
Effective stream area after confluence  =     12.180(Ac.)
Study area average Pervious fraction(Ap) =  0.100
Study area average soil loss rate(Fm) =    0.079(In/Hr)
Study area total =      12.18(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        2.110 to Point/Station        2.120
**** PIPEFLOW TRAVEL TIME (User specified size) ****
______________________________________________________________________________
Upstream point/station elevation =   997.500(Ft.)
Downstream point/station elevation =   996.400(Ft.)
Pipe length  =    89.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    46.614(CFS)
Given pipe size =     30.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     2.149(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      1.149(Ft.)
 Minor friction loss =      2.100(Ft.)  K-factor =   1.50
Pipe flow velocity =      9.50(Ft/s)
Travel time through pipe =    0.16 min.
Time of concentration (TC) =    10.28 min.
End of computations, Total Study Area =           12.50 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

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

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2005 Version 7.1
Rational Hydrology Study Date: 02/07/19

TOP GOLF ONTARIO
POST DEVELOPMENT AREA 3
DRAINING TO DEER CREEK CHANNEL
FUSCOE ENGINEERING

Program License Serial Number 6049

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

Rational hydrology study storm event year is 100.0
10 Year storm 1 hour rainfall = 0.956(In.)
100 Year storm 1 hour rainfall = 1.410(In.)
Computed rainfall intensity:
Storm year = 100.00 1 hour rainfall = 1.410 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 3

++

Process from Point/Station 3.100 to Point/Station 3.200
**** INITIAL AREA EVALUATION ****

UNDEVELOPED (average cover) subarea
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 50.00
Adjusted SCS curve number for AMC 3 = 70.00
Pervious ratio(Ap) = 1.0000 Max loss rate(Fm)= 0.532(In/Hr)
Initial subarea data:
Initial area flow distance = 1000.000(Ft.)
Top (of initial area) elevation = 1039.000(Ft.)
Bottom (of initial area) elevation = 1009.300(Ft.)
Difference in elevation = 29.700(Ft.)
Slope = 0.02970 s(%)= 2.97
TC = k(0.706)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 22.608 min.
Rainfall intensity = 2.533(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.711
Subarea runoff = 5.760(CFS)
Total initial stream area = 3.200(Ac.)
Pervious area fraction = 1.000
Initial area Fm value = 0.532(In/Hr)

++

Process from Point/Station 3.200 to Point/Station 3.300
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****

Estimated mean flow rate at midpoint of channel = 0.000(CFS)
Depth of flow = 0.586(Ft.), Average velocity = 3.575(Ft/s)
******* Irregular Channel Data **********

Information entered for subchannel number 1 :

Point number	'X' coordinate	'Y' coordinate
1	0.00	12.00
2	27.80	1.00
3	38.70	0.00
4	39.00	1.00

Manning's 'N' friction factor = 0.030

Sub-Channel flow = 6.874(CFS)
' ' flow top width = 6.562(Ft.)
' ' velocity= 3.575(Ft/s)
' ' area = 1.923(Sq.Ft)
' ' Froude number = 1.164

```
Upstream point elevation =  1009.300(Ft.)
Downstream point elevation =   992.000(Ft.)
Flow length =   590.000(Ft.)
Travel time  =    2.75 min.
Time of concentration =   25.36 min.
Depth of flow =   0.586(Ft.)
Average velocity =   3.575(Ft/s)
Total irregular channel flow =     6.874(CFS)
Irregular channel normal depth above invert elev. =   0.586(Ft.)
Average velocity of channel(s) =   3.575(Ft/s)
 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 67.00
Adjusted SCS curve number for AMC 3 = 84.60
Pervious ratio(Ap) = 1.0000     Max loss rate(Fm)=     0.290(In/Hr)
Rainfall intensity =      2.364(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.725
Subarea runoff =      2.128(CFS) for    1.400(Ac.)
Total runoff =      7.888(CFS)
Effective area this stream =        4.60(Ac.)
Total Study Area (Main Stream No. 1) =        4.60(Ac.)
Area averaged Fm value =    0.459(In/Hr)
Depth of flow =   0.617(Ft.), Average velocity =   3.700(Ft/s)
End of computations, Total Study Area =            4.60 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged SCS curve number =  55.2
```

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2005 Version 7.1
Rational Hydrology Study Date: 02/07/19

TOP GOLF ONTARIO
POST DEVELOPEMENT AREA 4
DRAINING ON ARCHIBALD AVENUE TOWARD SOUTH
FUSCOE ENGINEERING

Program License Serial Number 6049

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

Rational hydrology study storm event year is 100.0
10 Year storm 1 hour rainfall = 0.956(In.)
100 Year storm 1 hour rainfall = 1.410(In.)
Computed rainfall intensity:
Storm year = 100.00 1 hour rainfall = 1.410 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 3

++
Process from Point/Station 4.010 to Point/Station 4.020
**** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.079(In/Hr)
Initial subarea data:
Initial area flow distance = 661.000(Ft.)
Top (of initial area) elevation = 1021.800(Ft.)
Bottom (of initial area) elevation = 1009.300(Ft.)
Difference in elevation = 12.500(Ft.)
Slope = 0.01891 s(%)= 1.89
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 9.028 min.
Rainfall intensity = 4.393(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.884
Subarea runoff = 3.883(CFS)
Total initial stream area = 1.000(Ac.)
Pervious area fraction = 0.100
Initial area Fm value = 0.079(In/Hr)
End of computations, Total Study Area = 1.00 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

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

APPENDIX 2

SOILS REPORT

GEOTECHNICAL
PROFESSIONALS INC

June 7, 2018

Topgolf
8750 North Central Expressway, Suite 1200
Dallas, California 75231

Attention: Ms. Jessica Sanberg

Subject: Results of Percolation/Infiltration Testing
Proposed Golf and Entertainment Facility
SEC 4th Street and North Archibald Avenue
Ontario, California
GPI Project No. 2872.1I

Dear Ms. Sanberg:

This report presents the results of percolation testing performed by Geotechnical Professionals Inc. (GPI) for the design of stormwater disposal systems for the subject site.

Based on the results of the percolation testing, the subsurface soils are suitable for stormwater infiltration based on the measured permeability. The results of our testing are presented below.

GENERAL

This report provides the results of percolation testing performed by GPI for the subject site. The testing was performed to provide an estimate of infiltration of water for disposal of storm water runoff. The location of the site is shown on the attached Site Location Map, Figure 1.

Based on information provided by you and Steve Ellis of Fuscoe Engineering, the project civil engineer, we understand that the proposed storm water disposal system will include infiltration at depths of approximately 3 and 13 feet below existing site grades. The locations of the infiltration structures are shown on the on the Site Plan, Figure 2. The types of disposal systems are shown as well and include a perforated underground infiltration trench (CMP) and shallow above ground infiltration basin.

5736 Corporate Avenue • Cypress, CA 90630 • (714) 220-2211 • FAX (714) 220-2122

SCOPE OF SERVICES

As part of our geotechnical investigation, dated, June 4, 2018, we advanced one CPT and drilled two exploratory borings in the vicinity of the proposed infiltration facilities to assess the subsurface conditions. The explorations were extended to depths of 18 to 31 feet below existing grades. Laboratory testing, including percent fines, was also performed. The results of the laboratory testing are presented below. The Logs of CPT and Borings are attached as Figures 3, 4 and 5. The locations of the explorations are shown on the Site Plan, Figure 2.

The scope of services for this phase of our services included installation of 2 test wells, field percolation testing, and the preparation of this report. In general, the testing was performed in accordance with the San Bernardino Method TGD-11 (see References, TGD). The percolation testing was performed using test wells founded at depths and locations corresponding to those provided by the project Civil Engineer.

Based on our experience in the area, groundwater is expected to occur at least 100 feet below existing grades.

PERCOLATION WELLS

The wells were constructed in accordance with the guidelines provided by the TGD. The wells extended approximately 4 feet and 13 feet below existing grades at the shallow basin and the buried infiltration trench, respectively, as indicated by the project Civil Engineer.

The test wells were installed in boreholes drilled using truck-mounted hollow-stem auger drill equipment. The wells consisted of 2-inch diameter perforated PVC casing installed in an 8-inch diameter borehole. Packing material around the slotted sections of the well casing consisted of #3 sand.

RESULTS OF LABORATORY TESTING

We performed laboratory tests to determine the percent fines (silts and clays) for the samples of the on-site soils. The results are shown in the table below.

Fines Content of Selected Samples

BORING NO.	DEPTH (ft)	SOIL DESCRIPTION	PERCENT PASSING No. 200 SIEVE
B-11	10	Sandy Silt (ML)	70
B-11	15	Silty Sand (SM)	39
B-11	20	Sandy Silt (ML)	57
B-11	22	Silty Sand (SM)	43

Moisture content was determined from a number of the soil samples collected below the proposed infiltration depth. The samples were weighed and then were dried in accordance with ASTM D 2216. After drying, the weight of each sample was measured,

and moisture content/dry density was calculated. Moisture content values are presented on the boring logs in the appendix.

RESULTS OF PERCOLATION TESTING

Prior to performing the percolation tests, water was first introduced into the wells using hoses attached to water tanks. We pre-soaked and tested the subsurface soils in accordance with the TGD. The wells were filled with 1 foot of water and emptied in less than 25 minutes. The results are presented in Table 1.

FINDINGS

The results of the infiltration tests performed in the near surface soils indicated adequate infiltration rates with respect to subsurface water infiltration as indicated by the TGD. GPI recommends using the most conservative value of 1.7 in/hr for the design of the disposal systems.

Subsequent to the prescribed presoaking, 6 percolation tests were performed in P-1 and P-2 over a period of 1 hour, measuring the drop in water levels for test periods of 10 minutes.

A pre-adjusted percolation rate was reduced by the reduction factor (R_f) to account for the discharge of water from both the sides and bottom of the boring in accordance with the TGD. A stabilized infiltration rate was assumed when the readings from three consecutive tests are within 10 percent of each other in accordance with the TGD.

The infiltration rates were calculated using the drop in water level over the test increment, corrected using the Porchet Method as provided in the Reference. The results of the calculated infiltration rate for each test are presented Tables 1.

Based on field testing, our evaluations indicate that the site soils are suitable for infiltration of stormwater. Soils are considered potentially feasible for infiltration if the measured infiltration rate obtained from field testing is greater than 0.3 inches per hour (TGD). These measured infiltration rates were greater than 0.3 inches per hour for both wells.

It should be noted that these infiltration rates are for clean, clear water and do not include any effects of sediment, fines, dissolved solids or any other debris as the materials will significantly reduce the percolation rates of the subsurface soils. Prior to infiltration, any water should be thoroughly cleaned of any sediment or other deleterious materials to help reduce the potential for clogging and reduced percolation rates.

From a geotechnical standpoint, we recommend that any open graded materials, such as gravel, used in construction of infiltration facilities be completely encapsulated in a non-woven filter fabric such as Mirafi 140N or equivalent.

LIMITATIONS

The report, exploration logs, and other materials resulting from GPI's efforts were prepared exclusively for use by Topgolf and their consultants in designing the proposed development. The report is not intended to be suitable for reuse on extensions or modifications of the project or for use on any project other than the currently proposed development as it may not contain sufficient or appropriate information for such uses. If this report or portions of this report are provided to contractors or included in specifications, it should be understood that they are provided for information only. This report cannot be utilized by another entity without the express written permission of GPI. This report is an instrument of our services and remains the property of GPI.

Soil deposits may vary in type, strength, and many other important properties between points of exploration due to non-uniformity of the geologic formations or to man-made cut and fill operations. While we cannot evaluate the consistency of the properties of materials in areas not explored, the conclusions drawn in this report are based on the assumption that the data obtained in the field and laboratory are reasonably representative of field conditions and are conducive to interpolation and extrapolation.

Furthermore, our recommendations were developed with the assumption that a proper level of field observation and construction review will be provided during grading, excavation, and foundation construction by GPI. If field conditions during construction appear to be different than is indicated in this report, we should be notified immediately so that we may assess the impact of such conditions on our recommendations. If construction phase services are performed by others they must accept full responsibility for all geotechnical aspects of the project including this report.

Our investigation and evaluations were performed using generally accepted engineering approaches and principles available at this time and the degree of care and skill ordinarily exercised under similar circumstances by reputable Geotechnical Engineers practicing in this area. No other representation, either expressed or implied, is included or intended in our report.

Respectfully submitted,
Geotechnical Professionals Inc.

James E. Harris, P.E., G.E.
Principal

JUN 0 7 2018

REGISTERED PROFESSIONAL ENGINEER
JAMES E. HARRIS, IV
No. GE 2100
GEOTECHNICAL
STATE OF CALIFORNIA

Table-1 is not included in the report

Enclosures: References
- Borehole Infiltration Test Results
Figure 1 - Site Location Map
Figure 2 - Site Plan
Figure 3 - Log of CPT
Figure 4 and 5 - Logs of Borings

Distribution: Addressee (Email only)

REFERENCES

County of San Bernardino TGD, "County of Orange, Infiltration Rate Evaluation Protocol and Factor of Safety Recommendations", Appendix VII, Technical Guidance Document, May 9, 2011.

BASE MAP REPRODUCED FROM GOOGLE MAPS © 2018

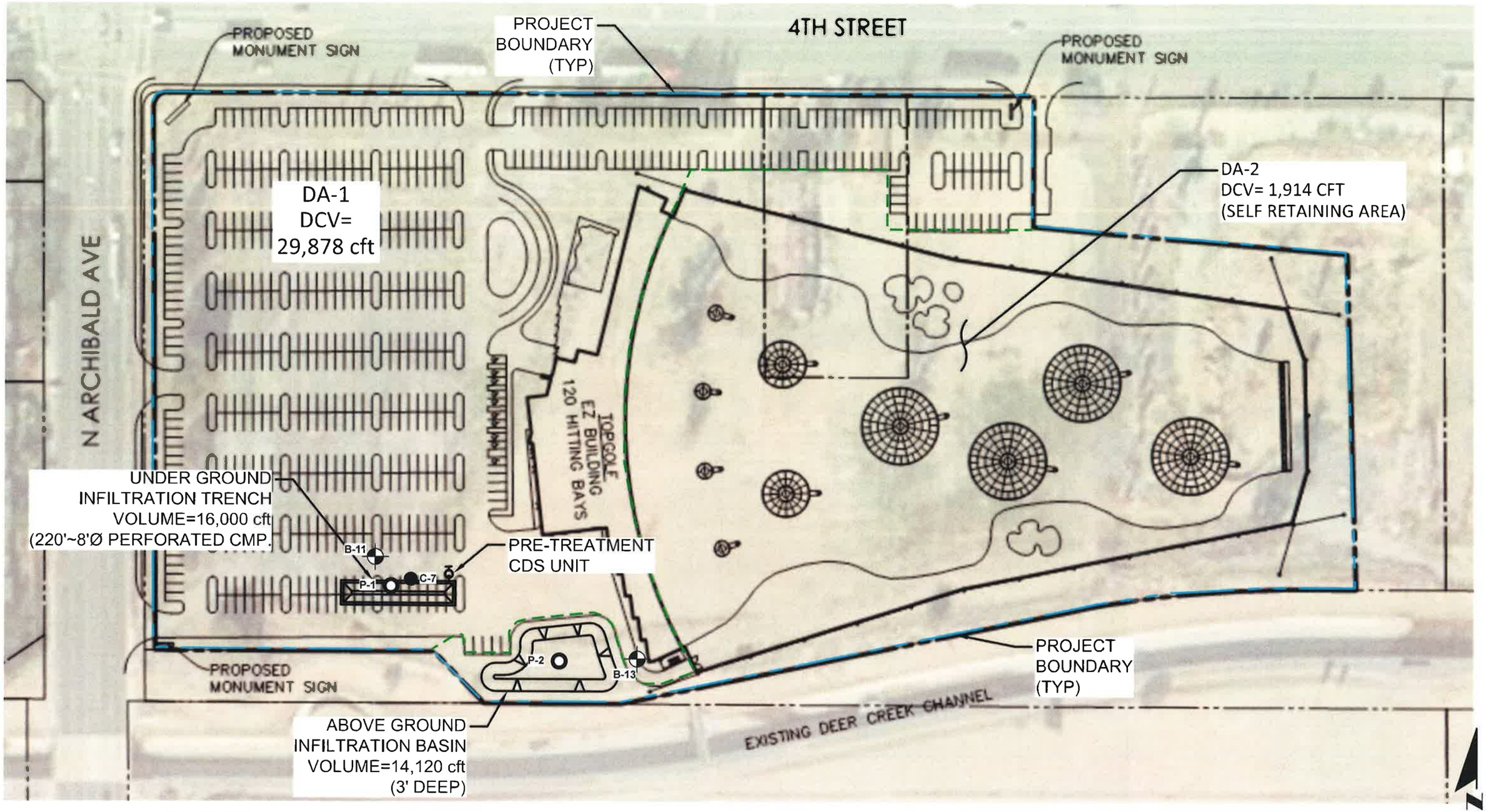
GPI GEOTECHNICAL PROFESSIONALS, INC.

TOP GOLF ONTARIO

GPI PROJECT NO. 2872.1I | SCALE: 1" = 2000'

SITE LOCATION

FIGURE 1



EXPLANATION

B-1 APPROXIMATE LOCATION AND NUMBER OF EXPLORATORY BORING

C-2 APPROXIMATE LOCATION AND NUMBER OF CONE PENETRATION TEST

P-2 APPROXIMATE LOCATION AND NUMBER PERCOLATION TEST

0 100 200 FEET

BASE MAP REPRODUCED FROM TOP GOLF CONCEPTUAL LID EXHIBIT, ONTARIO, CA BY FUSCOE ENGINEERING DATED 4-10-2018

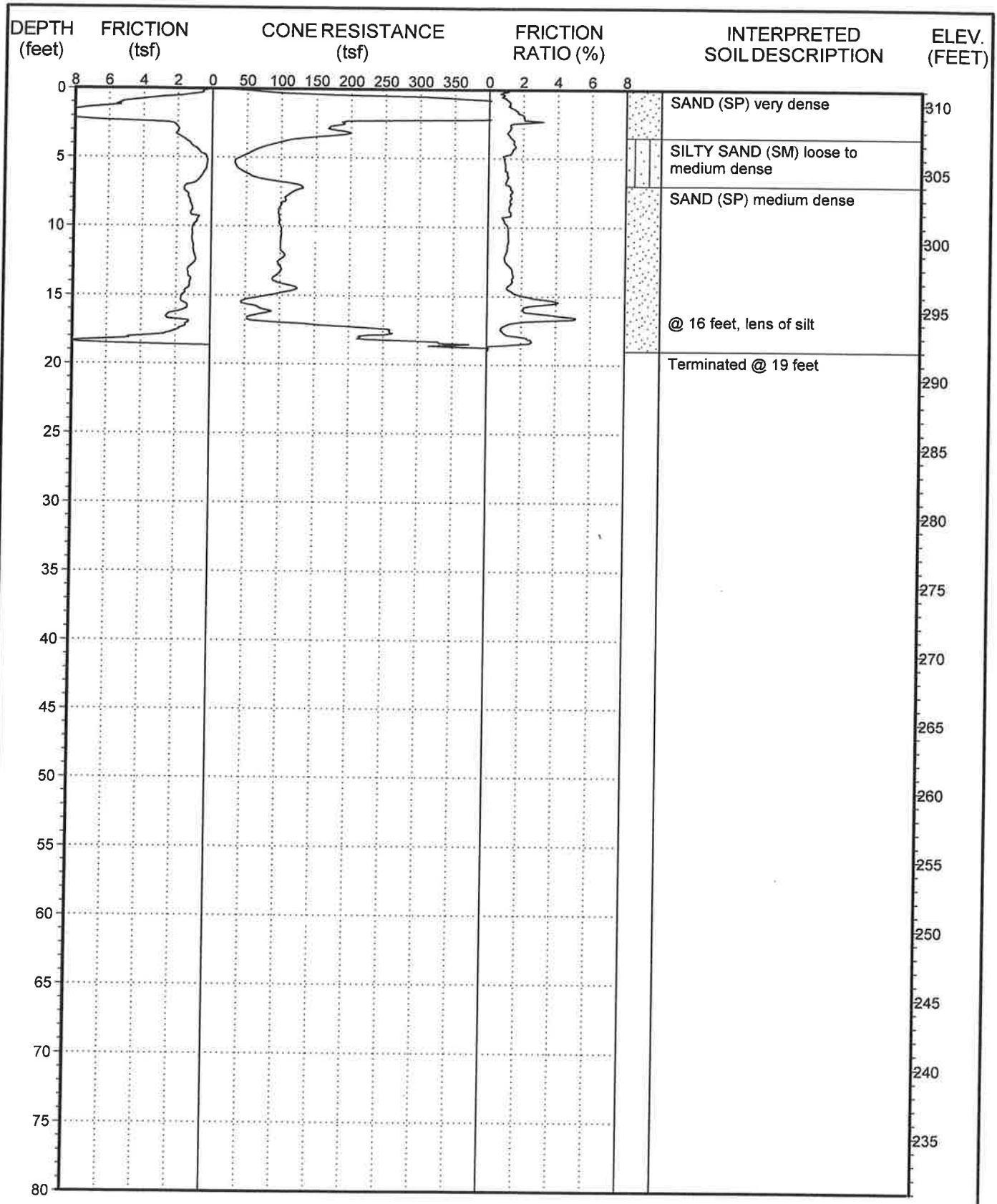
GPI GEOTECHNICAL PROFESSIONALS, INC.

TOPGOLF ONTARIO

GPI PROJECT NO.: 2872.1I | SCALE: 1" = 100'

SITE PLAN

FIGURE 2



Date performed:4-13-18

This summary applies only at the location of this cone penetration test and at the time of the exploration. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The interpreted soil description is derived from the friction ratio and cone resistance and is a simplification of actual conditions encountered.

GPI

PROJECT NO.: 2872.1I

TOPGOLF - ONTARIO

LOG OF CPT NO. C-7

FIGURE -3

MOISTURE (%)	DRY DENSITY (PCF)	PENETRATION RESISTANCE (BLOWS/FOOT)	SAMPLE TYPE	DEPTH (FEET)	DESCRIPTION OF SUBSURFACE MATERIALS This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	ELEVATION (FEET)
				0	Fill: **SILTY GRAVEL (GM)** brown, dry to slightly moist	310
3.6	117	41	D		**SANDY SILT (ML)** brown, dry, very stiff, with gravel up to 3 inches in diameter	
3.3	117	75	D		@ 3 feet, hard	
3.8	116	68	D			
6.4	109	33	D	5	Natural: **SILTY SAND (SM)** brown, dry, dense, trace gravel	305
8.2	113	39	D		**SANDY SILT (ML)** brown, slightly moist, very stiff, trace gravel	
					@ 7 feet, moist	
9.4	99	8	D	10	@ 10 feet, firm	300
4.3	99	22	D	15	**SILTY SAND (SM)** brown, dry, medium dense	295
9.4	92	17	D	20	**SANDY SILT (ML)** light brown, slightly moist, stiff	290
6.4	100	25	D		**SILTY SAND (SM)** light brown, slightly moist, medium dense, trace gravel	
					Total Depth 23 feet	
					Caved at 8'2"	

SAMPLE TYPES
- C Rock Core
- S Standard Split Spoon
- D Drive Sample
- B Bulk Sample
- T Tube Sample

DATE DRILLED: 4-23-18

EQUIPMENT USED: 8 " Hollow Stem Auger

GROUNDWATER LEVEL (ft): Not Encountered

GPI

PROJECT NO.: 2872.1I

TOPGOLF - ONTARIO

LOG OF BORING NO. B-11

FIGURE -4

MOISTURE (%)	DRY DENSITY (PCF)	PENETRATION RESISTANCE (BLOWS/FOOT)	SAMPLE TYPE	DEPTH (FEET)	DESCRIPTION OF SUBSURFACE MATERIALS This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	ELEVATION (FEET)
				0	Fill: **SANDY SILT (ML)** brown, dry, with gravel	
2.9	112	46	D		Natural: **SANDY SILT (ML)** brown, dry, hard, trace gravel	
8.5	103	37	D		@ 3 feet, slightly moist, very stiff	
3.5	106	26	D	5	**SILTY SAND (SM)** dark brown to brown, dry, medium dense	305
6.3	96	6	D		@ 7 feet, slightly moist, very loose to loose	
9.1	105	16	D	10	@ 10 feet, moist, medium dense	300
6.8	104	13	D	15	@ 15 feet, slightly moist, loose	295
14.2	102	23	D	20	**SILT (ML)** dark brown to brown, moist, very stiff, with sand	290
12.0	94	9	D	25	**SANDY SILT (ML)** dark brown to brown, moist, firm	285
15.5	94	16	D	30	**SILT (ML)** dark brown to brown, moist, stiff	280
					Total Depth 31 feet Caved at 8 1/2 feet	

SAMPLE TYPES
- C Rock Core
- S Standard Split Spoon
- D Drive Sample
- B Bulk Sample
- T Tube Sample

DATE DRILLED: 4-23-18

EQUIPMENT USED: 8 " Hollow Stem Auger

GROUNDWATER LEVEL (ft): Not Encountered

GPI

PROJECT NO.: 2872.1I

TOPGOLF - ONTARIO

LOG OF BORING NO. B-13

FIGURE -5

APPENDIX 3

PRE-DEVELOPMENT HYDROLOGY MAP

E1.2
1.0
Q_{100}= 2.1 cfs

1.2
1022.3
Q_{100}=5.3cfs

E1.1
1.8
Q_{100}= 5.3 cfs

4TH STREET

EXIST.
PROPERTY
BOUNDARY

1.1
1026.8

L=395

L=1000

1.3
1019.3
Q_{100}=7.4cfs

2.1
1025.5

3.1
1039.0

EXIST.
96" SD

E3.1
4.3
Q_{100}=11.2 cfs

N ARCHIBALD AVE

E2
4.0
Q_{100}=10.2 cfs

L=864

EXIST.
PROPERTY
BOUNDARY

E3.2
9.9
Q_{100}=22.3 cfs

L=747

DISCHARGE
LOCATION–1
Q_{100} (PRE)=
40.8cfs

2.2
1009.3
Q_{100}=10.2cfs

L=694

3.2
1010.0
Q_{100}=11.2cfs

EXIST. DEER
CREEK CHANNEL

3.3
992.0
Q_{100}=33.4cfs

EXIST.
PROPERTY
BOUNDARY

DISCHARGE
LOCATION–2
Q_{100} (PRE)=
10.2cfs

EXIST. DEER
CREEK CHANNEL

N

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

LEGEND:

- DRAINAGE STUDY AREA AND TRIBUTARY BOUNDARY
- DRAINAGE TRIBUTARY SUB-AREA
- E3.1 / ### — TRIBUTARY SUB-AREA NUMBER; AREA IN ACRES
- Q_{100}=10.8 cfs — FLOW GENERATING FROM 100 YEAR EVENT
- # / EL — NODE NUMBER; ELEVATION
- L=XXX' — CONVEYANCE LENGTH
- CONVEYANCE FLOW LINE (SURFACE FLOW)
- CONVEYANCE FLOW LINE (PIPE FLOW)

FUSCOE ENGINEERING
full circle thinking

N
Scale: 1"=50'
Exhibit Date:02.08.19

TOP GOLF - ONTARIO
HYDROLOGY MAP
PRE-DEVELOPEMENT
N. ARCHIBALD AVE. & 4TH STREET
ONTARIO, CA

F:\PROJECTS\1774\001_SUPPORT FILES\REPORTS\HYDROLOGY\EXHIBIT\1774-001-HYDROLOGY STUDY.DWG (02-08-19 12:10:52PM) Plotted by: Moyenuddin Sirajee

POST-DEVELOPMENT HYDROLOGY MAP

P1.2
0.8
Q_{100}= 1.5 cfs

1.02
1022.3
Q_{100}=5.6cfs

P2.2
0.3
Q_{100}= 1.4 cfs

P1.1
1.9
Q_{100}= 5.6 cfs

4TH STREET

EXIST.
PROPERTY
BOUNDARY

1.01
1026.8

L=395

2.07
1024.9

2.03
1026.0

L=1000

1.03
1019.3
Q_{100}=7.1cfs

4.01
1021.8

2.09
1024.0

2.02
1018.7

INV=1015.7
Q_{100}=7.0 cfs

3.1
1039.0

L=234

L=229

P2.1
1.9
Q_{100}= 7.0 cfs
L=634

2.01
1026.0

EXIST.
96" SD

L=613

TG=1023.6
INV=1020.6

P4.1
1.0
Q_{100}= 3.9 cfs

P2.4
1.8
Q_{100}= 6.7 cfs

2.04
1023.8
INV=1013.5
Q_{100}=8.1cfs

2.05
1031.0

N ARCHIBALD AVE

P2.5
3.2
Q_{100}=12.6 cfs

L=563

L=1000

L=486

EXIST.
PROPERTY
BOUNDARY

TG=1023.6
INV=1020.6

P2.3
5.3
Q_{100}=20.7 cfs

L=661

2.11
997.5
Q_{100}=46.6cfs

INFILTRATION
CHAMBERS IT-1

2.08
1019.2
INV=1001.0
Q_{100}=35.0cfs

2.06
1019.0
INV=1004.6
Q_{100}=20.7cfs

L=641

P3.1
3.2
Q_{100}= 5.8 cfs

2.12
996.4
Q_{100}=46.6cfs
POC.

Q_{100} AFTER
RETENTION=
12.1 cfs

L=89

PROPOSED
SD

L=297

2.10
1013.0
INV=1010.0
Q_{100}=12.6cfs

L=347

DISCHARGE
LOCATION-1
Q_{100} (POST)
=61.6cfs
Q_{100} AFTER
RETENTION
=27.1cfs

L=590

3.2
1009.3
Q_{100}=5.8cfs

EXIST. DEER
CREEK CHANNEL

INFILTRATION
CHAMBERS IT-2

EXIST.
PROPERTY
BOUNDARY

3.3
992.0
Q_{100}=7.9cfs

4.02
1009.3
Q_{100}=3.9cfs

P3.2
1.4
Q_{100}= 2.1 cfs

DISCHARGE
LOCATION-2
Q_{100} (POST)=
3.9cfs

EXIST. DEER
CREEK CHANNEL

LEGEND:

- DRAINAGE STUDY AREA AND TRIBUTARY BOUNDARY
- DRAINAGE TRIBUTARY SUB-AREA
- PX.X / ### — TRIBUTARY SUB-AREA NUMBER; AREA IN ACRES
- Q_{100}=XX.X cfs — FLOW GENERATING FROM 100 YEAR EVENT
- # / EL — NODE NUMBER; ELEVATION
- L=XXX' — CONVEYANCE LENGTH
- CONVEYANCE FLOW LINE (SURFACE FLOW)
- CONVEYANCE FLOW LINE (PIPE FLOW)

FUSCOE ENGINEERING
full circle thinking

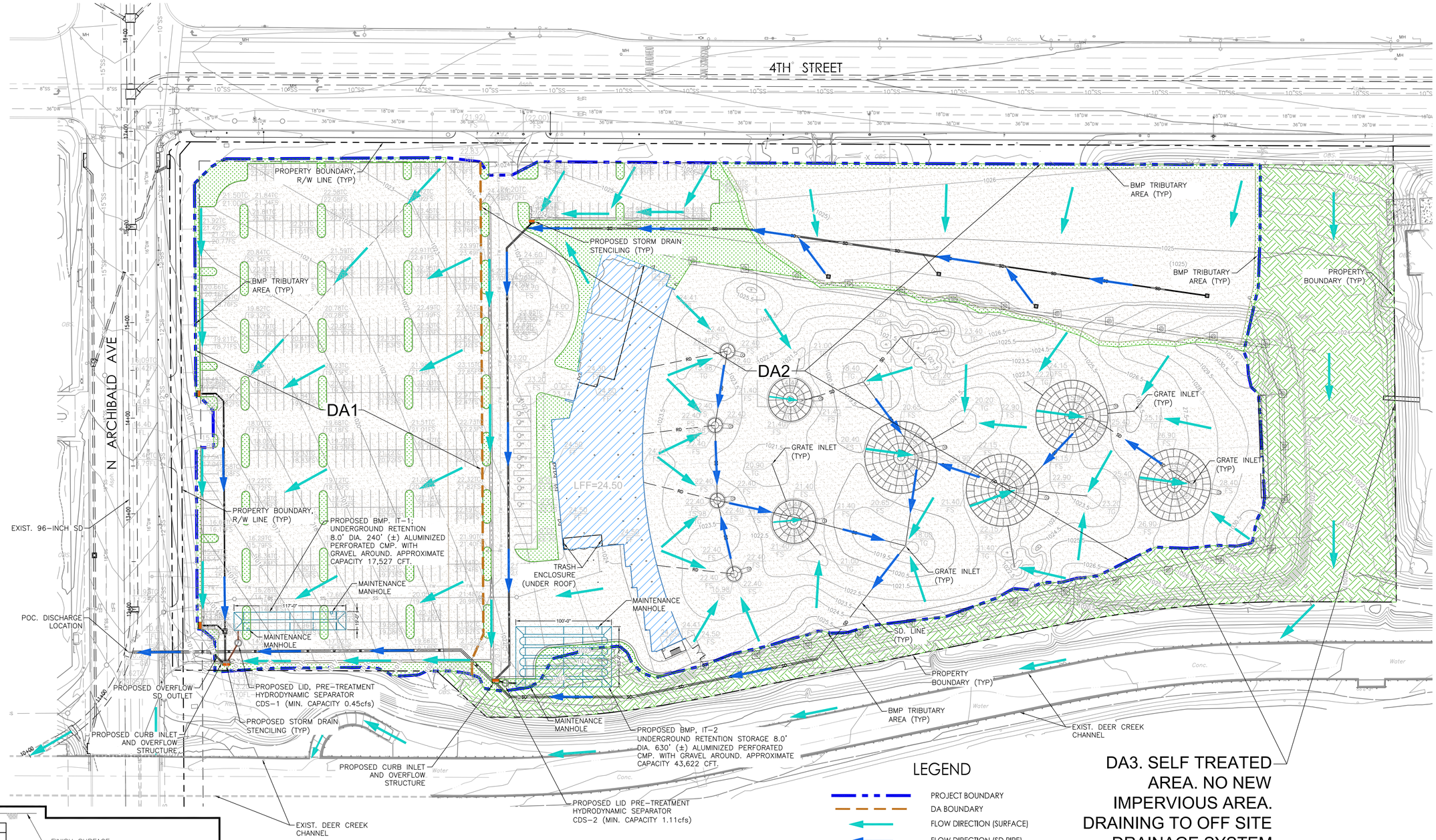
N

Scale: 1" =50'
Exhibit Date:02.08.19

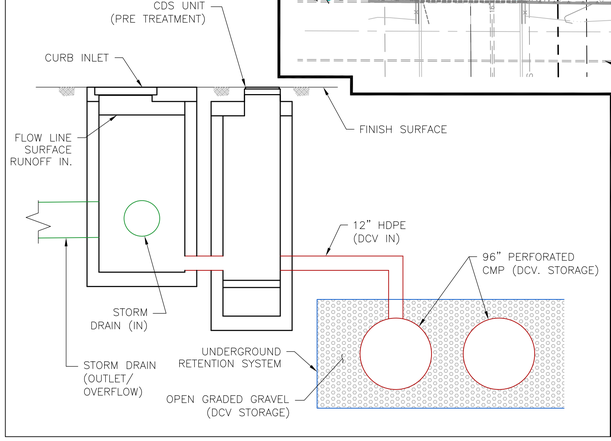
TOP GOLF - ONTARIO
HYDROLOGY MAP
PRE-DEVELOPEMENT
N. ARCHIBALD AVE. & 4TH STREET
ONTARIO, CA

F:\PROJECTS\1774\00_SUPPORT FILES\REPORTS\HYDROLOGY\EXHIBIT\1774-001-HYDROLOGY STUDY.DWG (02-08-19 12:12:11PM) Plotted by: Moyenuddin Sirajee

LID MAP



CONCEPTUAL CONNECTION DETAIL OF CURB INLET, CDS UNIT, UNDERGROUND RETENTION SYSTEM AND SD. OVERFLOW



DA AND LID SCHEDULE

DA ID	AREA (SF)	IMPERVIOUS AREA (SF)	PERVIOUS AREA (SF)	DCV (CFT)	TREATMENT FLOW (CFS)	LID ID	DESCRIPTION	PRO. VOLUME RETENTION . (CFT)
DA1	157,825	143,871	13,954	17,399	0.45	IT-1	INFILTRATION TRENCH	17,527
DA2	386,249	356,673	29,576	43,599	1.11	IT-2	INFILTRATION TRENCH	43,622
TOTAL AREA	544,074	500,544	43,530	60,998				61,149

LEGEND

- PROJECT BOUNDARY
- DA BOUNDARY
- FLOW DIRECTION (SURFACE)
- FLOW DIRECTION (SD PIPE)
- PROPOSED INLET
- SELF TREATED AREA, DRAINING TO OFF SITE DRAINAGE SYSTEM
- PERVIOUS AREAS/ LANDSCAPED AREA
- PROPOSED IMPERVIOUS AREA
- PROPOSED BUILDING/ROOFS
- PROPOSED INFILTRATION STORAGE
- STORM DRAIN SIGNAGE (ONLY RAIN DOWN THE STORM DRAIN)

DA3. SELF TREATED AREA. NO NEW IMPERVIOUS AREA. DRAINING TO OFF SITE DRAINAGE SYSTEM (DEER CREEK CHANNEL)

FUSCOE ENGINEERING
full circle thinking

N

Scale: 1"=50'
Exhibit Date:01.31.19

BMP AND SITE PLAN
TOPGOLF- ONTARIO

ARCHIBALD AVE. & 4TH STREET
ONTARIO, CA

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APPENDIX 4

HYDROGRAPH CALCULATION AND RESULTS

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2005 Version 7.1
Rational Hydrology Study Date: 02/07/19

TOP GOLF
TIME OF CONCENTRATION (TC) calculation for flow discharging in to
Deer Creek Channel at dicharge location-1

Program License Serial Number 6049

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

Rational hydrology study storm event year is 100.0
10 Year storm 1 hour rainfall = 0.956(In.)
100 Year storm 1 hour rainfall = 1.410(In.)
Computed rainfall intensity:
Storm year = 100.00 1 hour rainfall = 1.410 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 3

++
Process from Point/Station 1.030 to Point/Station 212.000
**** USER DEFINED FLOW INFORMATION AT A POINT ****

Soil classification AP and SCS values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2) = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.079(In/Hr)
Rainfall intensity = 3.000(In/Hr) for a 100.0 year storm
User specified values are as follows:
TC = 17.05 min. Rain intensity = 3.00(In/Hr)
Total area this stream = 2.70(Ac.)
Total Study Area (Main Stream No. 1) = 2.70(Ac.)
Total runoff = 7.10(CFS)

++
Process from Point/Station 1.030 to Point/Station 212.000
**** CONFLUENCE OF MAIN STREAMS ****

The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area = 2.700(Ac.)
Runoff from this stream = 7.097(CFS)
Time of concentration = 17.05 min.
Rainfall intensity = 3.000(In/Hr)
Area averaged loss rate (Fm) = 0.0785(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1000
Program is now starting with Main Stream No. 2

++
Process from Point/Station 2.110 to Point/Station 2.120
**** USER DEFINED FLOW INFORMATION AT A POINT ****

Soil classification AP and SCS values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2) = 32.00
Adjusted SCS curve number for AMC 3 = 52.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.079(In/Hr)
Rainfall intensity = 4.064(In/Hr) for a 100.0 year storm
User specified values are as follows:
TC = 10.28 min. Rain intensity = 4.06(In/Hr)
Total area this stream = 12.50(Ac.)
Total Study Area (Main Stream No. 2) = 15.20(Ac.)
Total runoff = 46.61(CFS)

++
Process from Point/Station 2.110 to Point/Station 2.120
**** CONFLUENCE OF MAIN STREAMS ****
_____
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area = 12.500(Ac.)
Runoff from this stream = 46.614(CFS)
Time of concentration = 10.28 min.
Rainfall intensity = 4.064(In/Hr)
Area averaged loss rate (Fm) = 0.0785(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1000
Program is now starting with Main Stream No. 3

++
Process from Point/Station 3.300 to Point/Station 2.120
**** USER DEFINED FLOW INFORMATION AT A POINT ****
_____
Soil classification AP and SCS values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2) = 55.20
Adjusted SCS curve number for AMC 3 = 75.16
Pervious ratio(Ap) = 1.0000 Max loss rate(Fm)= 0.450(In/Hr)
Rainfall intensity = 2.364(In/Hr) for a 100.0 year storm
User specified values are as follows:
TC = 25.36 min. Rain intensity = 2.36(In/Hr)
Total area this stream = 4.60(Ac.)
Total Study Area (Main Stream No. 3) = 19.80(Ac.)
Total runoff = 7.89(CFS)

++
Process from Point/Station 3.300 to Point/Station 2.120
**** CONFLUENCE OF MAIN STREAMS ****
_____
The following data inside Main Stream is listed:
In Main Stream number: 3
Stream flow area = 4.600(Ac.)
Runoff from this stream = 7.888(CFS)
Time of concentration = 25.36 min.
Rainfall intensity = 2.364(In/Hr)
Area averaged loss rate (Fm) = 0.4504(In/Hr)
Area averaged Pervious ratio (Ap) = 1.0000
Summary of stream data:

Stream No.	Flow rate (CFS)	Area (Ac.)	TC (min)	Fm (In/Hr)	Rainfall Intensity (In/Hr)
1	7.10	2.700	17.05	0.079	3.000
2	46.61	12.500	10.28	0.079	4.064
3	7.89	4.600	25.36	0.450	2.364

Qmax(1) =
1.000 * 1.000 * 7.097) +
0.733 * 1.000 * 46.614) +
1.332 * 0.672 * 7.888) + = 48.331
Qmax(2) =
1.364 * 0.603 * 7.097) +
1.000 * 1.000 * 46.614) +
1.888 * 0.405 * 7.888) + = 58.489
Qmax(3) =
0.782 * 1.000 * 7.097) +
0.573 * 1.000 * 46.614) +
1.000 * 1.000 * 7.888) + = 40.172

Total of 3 main streams to confluence:
Flow rates before confluence point:
8.097 47.614 8.888
Maximum flow rates at confluence using above data:
48.331 58.489 40.172
Area of streams before confluence:
2.700 12.500 4.600
Effective area values after confluence:
18.293 15.993 19.800

Results of confluence:
Total flow rate = 58.489(CFS)
Time of concentration = 10.280 min.

Effective stream area after confluence = 15.993(Ac.)
Study area average Pervious fraction(Ap) = 0.309
Study area average soil loss rate(Fm) = 0.165(In/Hr)
Study area total = 19.80(Ac.)
End of computations, Total Study Area = 19.80 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.309
Area averaged SCS curve number = 37.4

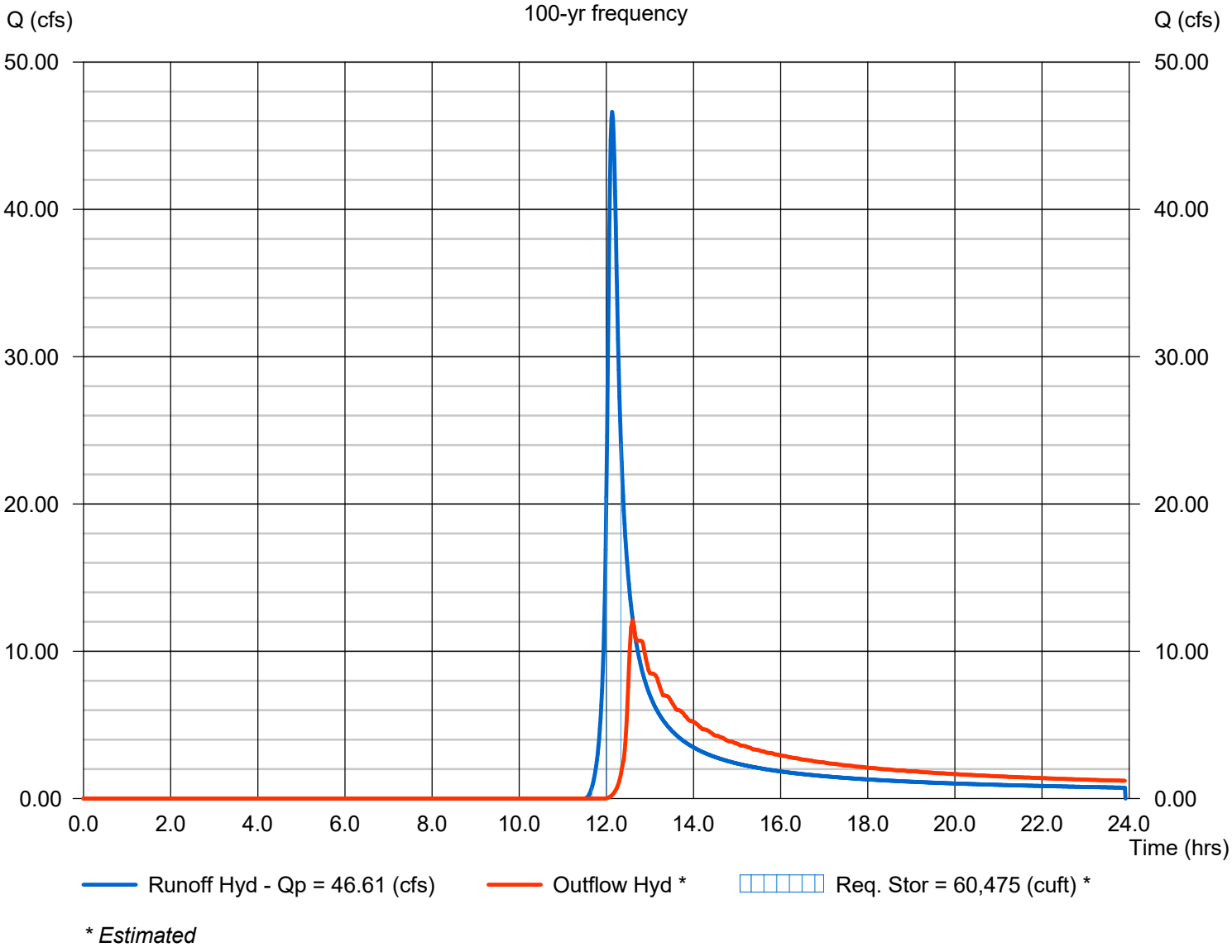
Hydrology Report

TOP Golf: Post-Development runoff Hydrograph

Hydrograph type	= SCS	Peak discharge (cfs)	= 46.61
Storm frequency (yrs)	= 100	Time interval (min)	= 1
Drainage area (ac)	= 19.800	Curve number (CN)	= 49
Basin Slope (%)	= n/a	Hydraulic length (ft)	= n/a
Tc method	= User	Time of conc. (min)	= 10
Total precip. (in)	= 7.83	Storm Distribution	= Synthetic
Storm duration (hrs)	= 24.00	Shape factor	= 484

Hydrograph Volume = 146,803 (cuft); 3.370 (acft)

Runoff Hydrograph



** Estimated*

Runoff Hydrograph			Outflow Hydrograph		Detention
Time	Q	Volume	Q	Volume	equired Storag
(hrs)	(cfs)	(cuft)	(cfs)	(cuft)	(cuft)
0.00	0.000	0.00	0.000	0.00	0.00
0.02	0.000	0.00	0.000	0.00	0.00
0.03	0.000	0.00	0.000	0.00	0.00
0.05	0.000	0.00	0.000	0.00	0.00
0.07	0.000	0.00	0.000	0.00	0.00
0.08	0.000	0.00	0.000	0.00	0.00
0.10	0.000	0.00	0.000	0.00	0.00
0.12	0.000	0.00	0.000	0.00	0.00
0.13	0.000	0.00	0.000	0.00	0.00
0.15	0.000	0.00	0.000	0.00	0.00
0.17	0.000	0.00	0.000	0.00	0.00
0.18	0.000	0.00	0.000	0.00	0.00
0.20	0.000	0.00	0.000	0.00	0.00
0.22	0.000	0.00	0.000	0.00	0.00
0.23	0.000	0.00	0.000	0.00	0.00
0.25	0.000	0.00	0.000	0.00	0.00
0.27	0.000	0.00	0.000	0.00	0.00
0.28	0.000	0.00	0.000	0.00	0.00
0.30	0.000	0.00	0.000	0.00	0.00
0.32	0.000	0.00	0.000	0.00	0.00
0.33	0.000	0.00	0.000	0.00	0.00

Runoff Hydrograph			Outflow Hydrograph		Detention
Time	Q	Volume	Q	Volume	equired Storag
(hrs)	(cfs)	(cuft)	(cfs)	(cuft)	(cuft)
0.35	0.000	0.00	0.000	0.00	0.00
0.37	0.000	0.00	0.000	0.00	0.00
0.38	0.000	0.00	0.000	0.00	0.00
0.40	0.000	0.00	0.000	0.00	0.00
0.42	0.000	0.00	0.000	0.00	0.00
0.43	0.000	0.00	0.000	0.00	0.00
0.45	0.000	0.00	0.000	0.00	0.00
0.47	0.000	0.00	0.000	0.00	0.00
0.48	0.000	0.00	0.000	0.00	0.00
0.50	0.000	0.00	0.000	0.00	0.00
0.52	0.000	0.00	0.000	0.00	0.00
0.53	0.000	0.00	0.000	0.00	0.00
0.55	0.000	0.00	0.000	0.00	0.00
0.57	0.000	0.00	0.000	0.00	0.00
0.58	0.000	0.00	0.000	0.00	0.00
0.60	0.000	0.00	0.000	0.00	0.00
0.62	0.000	0.00	0.000	0.00	0.00
0.63	0.000	0.00	0.000	0.00	0.00
0.65	0.000	0.00	0.000	0.00	0.00
0.67	0.000	0.00	0.000	0.00	0.00
0.68	0.000	0.00	0.000	0.00	0.00

Runoff Hydrograph			Outflow Hydrograph		Detention
Time	Q	Volume	Q	Volume	equired Storag
(hrs)	(cfs)	(cuft)	(cfs)	(cuft)	(cuft)
0.70	0.000	0.00	0.000	0.00	0.00
0.72	0.000	0.00	0.000	0.00	0.00
0.73	0.000	0.00	0.000	0.00	0.00
0.75	0.000	0.00	0.000	0.00	0.00
0.77	0.000	0.00	0.000	0.00	0.00
0.78	0.000	0.00	0.000	0.00	0.00
0.80	0.000	0.00	0.000	0.00	0.00
0.82	0.000	0.00	0.000	0.00	0.00
0.83	0.000	0.00	0.000	0.00	0.00
0.85	0.000	0.00	0.000	0.00	0.00
0.87	0.000	0.00	0.000	0.00	0.00
0.88	0.000	0.00	0.000	0.00	0.00
0.90	0.000	0.00	0.000	0.00	0.00
0.92	0.000	0.00	0.000	0.00	0.00
0.93	0.000	0.00	0.000	0.00	0.00
0.95	0.000	0.00	0.000	0.00	0.00
0.97	0.000	0.00	0.000	0.00	0.00
0.98	0.000	0.00	0.000	0.00	0.00
1.00	0.000	0.00	0.000	0.00	0.00
1.02	0.000	0.00	0.000	0.00	0.00
1.03	0.000	0.00	0.000	0.00	0.00

Runoff Hydrograph			Outflow Hydrograph		Detention
Time	Q	Volume	Q	Volume	equired Storag
(hrs)	(cfs)	(cuft)	(cfs)	(cuft)	(cuft)
1.05	0.000	0.00	0.000	0.00	0.00
1.07	0.000	0.00	0.000	0.00	0.00
1.08	0.000	0.00	0.000	0.00	0.00
1.10	0.000	0.00	0.000	0.00	0.00
1.12	0.000	0.00	0.000	0.00	0.00
1.13	0.000	0.00	0.000	0.00	0.00
1.15	0.000	0.00	0.000	0.00	0.00
1.17	0.000	0.00	0.000	0.00	0.00
1.18	0.000	0.00	0.000	0.00	0.00
1.20	0.000	0.00	0.000	0.00	0.00
1.22	0.000	0.00	0.000	0.00	0.00
1.23	0.000	0.00	0.000	0.00	0.00
1.25	0.000	0.00	0.000	0.00	0.00
1.27	0.000	0.00	0.000	0.00	0.00
1.28	0.000	0.00	0.000	0.00	0.00
1.30	0.000	0.00	0.000	0.00	0.00
1.32	0.000	0.00	0.000	0.00	0.00
1.33	0.000	0.00	0.000	0.00	0.00
1.35	0.000	0.00	0.000	0.00	0.00
1.37	0.000	0.00	0.000	0.00	0.00
1.38	0.000	0.00	0.000	0.00	0.00

Runoff Hydrograph			Outflow Hydrograph		Detention
Time	Q	Volume	Q	Volume	equired Storag
(hrs)	(cfs)	(cuft)	(cfs)	(cuft)	(cuft)
1.40	0.000	0.00	0.000	0.00	0.00
1.42	0.000	0.00	0.000	0.00	0.00
1.43	0.000	0.00	0.000	0.00	0.00
1.45	0.000	0.00	0.000	0.00	0.00
1.47	0.000	0.00	0.000	0.00	0.00
1.48	0.000	0.00	0.000	0.00	0.00
1.50	0.000	0.00	0.000	0.00	0.00
1.52	0.000	0.00	0.000	0.00	0.00
1.53	0.000	0.00	0.000	0.00	0.00
1.55	0.000	0.00	0.000	0.00	0.00
1.57	0.000	0.00	0.000	0.00	0.00
1.58	0.000	0.00	0.000	0.00	0.00
1.60	0.000	0.00	0.000	0.00	0.00
1.62	0.000	0.00	0.000	0.00	0.00
1.63	0.000	0.00	0.000	0.00	0.00
1.65	0.000	0.00	0.000	0.00	0.00
1.67	0.000	0.00	0.000	0.00	0.00
1.68	0.000	0.00	0.000	0.00	0.00
1.70	0.000	0.00	0.000	0.00	0.00
1.72	0.000	0.00	0.000	0.00	0.00
1.73	0.000	0.00	0.000	0.00	0.00

Runoff Hydrograph			Outflow Hydrograph		Detention
Time	Q	Volume	Q	Volume	equired Storag
(hrs)	(cfs)	(cuft)	(cfs)	(cuft)	(cuft)
1.75	0.000	0.00	0.000	0.00	0.00
1.77	0.000	0.00	0.000	0.00	0.00
1.78	0.000	0.00	0.000	0.00	0.00
1.80	0.000	0.00	0.000	0.00	0.00
1.82	0.000	0.00	0.000	0.00	0.00
1.83	0.000	0.00	0.000	0.00	0.00
1.85	0.000	0.00	0.000	0.00	0.00
1.87	0.000	0.00	0.000	0.00	0.00
1.88	0.000	0.00	0.000	0.00	0.00
1.90	0.000	0.00	0.000	0.00	0.00
1.92	0.000	0.00	0.000	0.00	0.00
1.93	0.000	0.00	0.000	0.00	0.00
1.95	0.000	0.00	0.000	0.00	0.00
1.97	0.000	0.00	0.000	0.00	0.00
1.98	0.000	0.00	0.000	0.00	0.00
2.00	0.000	0.00	0.000	0.00	0.00
2.02	0.000	0.00	0.000	0.00	0.00
2.03	0.000	0.00	0.000	0.00	0.00
2.05	0.000	0.00	0.000	0.00	0.00
2.07	0.000	0.00	0.000	0.00	0.00
2.08	0.000	0.00	0.000	0.00	0.00

Runoff Hydrograph			Outflow Hydrograph		Detention
Time	Q	Volume	Q	Volume	equired Storag
(hrs)	(cfs)	(cuft)	(cfs)	(cuft)	(cuft)
2.10	0.000	0.00	0.000	0.00	0.00
2.12	0.000	0.00	0.000	0.00	0.00
2.13	0.000	0.00	0.000	0.00	0.00
2.15	0.000	0.00	0.000	0.00	0.00
2.17	0.000	0.00	0.000	0.00	0.00
2.18	0.000	0.00	0.000	0.00	0.00
2.20	0.000	0.00	0.000	0.00	0.00
2.22	0.000	0.00	0.000	0.00	0.00
2.23	0.000	0.00	0.000	0.00	0.00
2.25	0.000	0.00	0.000	0.00	0.00
2.27	0.000	0.00	0.000	0.00	0.00
2.28	0.000	0.00	0.000	0.00	0.00
2.30	0.000	0.00	0.000	0.00	0.00
2.32	0.000	0.00	0.000	0.00	0.00
2.33	0.000	0.00	0.000	0.00	0.00
2.35	0.000	0.00	0.000	0.00	0.00
2.37	0.000	0.00	0.000	0.00	0.00
2.38	0.000	0.00	0.000	0.00	0.00
2.40	0.000	0.00	0.000	0.00	0.00
2.42	0.000	0.00	0.000	0.00	0.00
2.43	0.000	0.00	0.000	0.00	0.00

Runoff Hydrograph			Outflow Hydrograph		Detention
Time	Q	Volume	Q	Volume	equired Storag
(hrs)	(cfs)	(cuft)	(cfs)	(cuft)	(cuft)
2.45	0.000	0.00	0.000	0.00	0.00
2.47	0.000	0.00	0.000	0.00	0.00
2.48	0.000	0.00	0.000	0.00	0.00
2.50	0.000	0.00	0.000	0.00	0.00
2.52	0.000	0.00	0.000	0.00	0.00
2.53	0.000	0.00	0.000	0.00	0.00
2.55	0.000	0.00	0.000	0.00	0.00
2.57	0.000	0.00	0.000	0.00	0.00
2.58	0.000	0.00	0.000	0.00	0.00
2.60	0.000	0.00	0.000	0.00	0.00
2.62	0.000	0.00	0.000	0.00	0.00
2.63	0.000	0.00	0.000	0.00	0.00
2.65	0.000	0.00	0.000	0.00	0.00
2.67	0.000	0.00	0.000	0.00	0.00
2.68	0.000	0.00	0.000	0.00	0.00
2.70	0.000	0.00	0.000	0.00	0.00
2.72	0.000	0.00	0.000	0.00	0.00
2.73	0.000	0.00	0.000	0.00	0.00
2.75	0.000	0.00	0.000	0.00	0.00
2.77	0.000	0.00	0.000	0.00	0.00
2.78	0.000	0.00	0.000	0.00	0.00

Runoff Hydrograph			Outflow Hydrograph		Detention
Time	Q	Volume	Q	Volume	equired Storag
(hrs)	(cfs)	(cuft)	(cfs)	(cuft)	(cuft)
2.80	0.000	0.00	0.000	0.00	0.00
2.82	0.000	0.00	0.000	0.00	0.00
2.83	0.000	0.00	0.000	0.00	0.00
2.85	0.000	0.00	0.000	0.00	0.00
2.87	0.000	0.00	0.000	0.00	0.00
2.88	0.000	0.00	0.000	0.00	0.00
2.90	0.000	0.00	0.000	0.00	0.00
2.92	0.000	0.00	0.000	0.00	0.00
2.93	0.000	0.00	0.000	0.00	0.00
2.95	0.000	0.00	0.000	0.00	0.00
2.97	0.000	0.00	0.000	0.00	0.00
2.98	0.000	0.00	0.000	0.00	0.00
3.00	0.000	0.00	0.000	0.00	0.00
3.02	0.000	0.00	0.000	0.00	0.00
3.03	0.000	0.00	0.000	0.00	0.00
3.05	0.000	0.00	0.000	0.00	0.00
3.07	0.000	0.00	0.000	0.00	0.00
3.08	0.000	0.00	0.000	0.00	0.00
3.10	0.000	0.00	0.000	0.00	0.00
3.12	0.000	0.00	0.000	0.00	0.00
3.13	0.000	0.00	0.000	0.00	0.00

Runoff Hydrograph			Outflow Hydrograph		Detention
Time	Q	Volume	Q	Volume	equired Storag
(hrs)	(cfs)	(cuft)	(cfs)	(cuft)	(cuft)
3.15	0.000	0.00	0.000	0.00	0.00
3.17	0.000	0.00	0.000	0.00	0.00
3.18	0.000	0.00	0.000	0.00	0.00
3.20	0.000	0.00	0.000	0.00	0.00
3.22	0.000	0.00	0.000	0.00	0.00
3.23	0.000	0.00	0.000	0.00	0.00
3.25	0.000	0.00	0.000	0.00	0.00
3.27	0.000	0.00	0.000	0.00	0.00
3.28	0.000	0.00	0.000	0.00	0.00
3.30	0.000	0.00	0.000	0.00	0.00
3.32	0.000	0.00	0.000	0.00	0.00
3.33	0.000	0.00	0.000	0.00	0.00
3.35	0.000	0.00	0.000	0.00	0.00
3.37	0.000	0.00	0.000	0.00	0.00
3.38	0.000	0.00	0.000	0.00	0.00
3.40	0.000	0.00	0.000	0.00	0.00
3.42	0.000	0.00	0.000	0.00	0.00
3.43	0.000	0.00	0.000	0.00	0.00
3.45	0.000	0.00	0.000	0.00	0.00
3.47	0.000	0.00	0.000	0.00	0.00
3.48	0.000	0.00	0.000	0.00	0.00

Runoff Hydrograph			Outflow Hydrograph		Detention
Time	Q	Volume	Q	Volume	equired Storag
(hrs)	(cfs)	(cuft)	(cfs)	(cuft)	(cuft)
3.50	0.000	0.00	0.000	0.00	0.00
3.52	0.000	0.00	0.000	0.00	0.00
3.53	0.000	0.00	0.000	0.00	0.00
3.55	0.000	0.00	0.000	0.00	0.00
3.57	0.000	0.00	0.000	0.00	0.00
3.58	0.000	0.00	0.000	0.00	0.00
3.60	0.000	0.00	0.000	0.00	0.00
3.62	0.000	0.00	0.000	0.00	0.00
3.63	0.000	0.00	0.000	0.00	0.00
3.65	0.000	0.00	0.000	0.00	0.00
3.67	0.000	0.00	0.000	0.00	0.00
3.68	0.000	0.00	0.000	0.00	0.00
3.70	0.000	0.00	0.000	0.00	0.00
3.72	0.000	0.00	0.000	0.00	0.00
3.73	0.000	0.00	0.000	0.00	0.00
3.75	0.000	0.00	0.000	0.00	0.00
3.77	0.000	0.00	0.000	0.00	0.00
3.78	0.000	0.00	0.000	0.00	0.00
3.80	0.000	0.00	0.000	0.00	0.00
3.82	0.000	0.00	0.000	0.00	0.00
3.83	0.000	0.00	0.000	0.00	0.00

Runoff Hydrograph			Outflow Hydrograph		Detention
Time	Q	Volume	Q	Volume	equired Storag
(hrs)	(cfs)	(cuft)	(cfs)	(cuft)	(cuft)
3.85	0.000	0.00	0.000	0.00	0.00
3.87	0.000	0.00	0.000	0.00	0.00
3.88	0.000	0.00	0.000	0.00	0.00
3.90	0.000	0.00	0.000	0.00	0.00
3.92	0.000	0.00	0.000	0.00	0.00
3.93	0.000	0.00	0.000	0.00	0.00
3.95	0.000	0.00	0.000	0.00	0.00
3.97	0.000	0.00	0.000	0.00	0.00
3.98	0.000	0.00	0.000	0.00	0.00
4.00	0.000	0.00	0.000	0.00	0.00
4.02	0.000	0.00	0.000	0.00	0.00
4.03	0.000	0.00	0.000	0.00	0.00
4.05	0.000	0.00	0.000	0.00	0.00
4.07	0.000	0.00	0.000	0.00	0.00
4.08	0.000	0.00	0.000	0.00	0.00
4.10	0.000	0.00	0.000	0.00	0.00
4.12	0.000	0.00	0.000	0.00	0.00
4.13	0.000	0.00	0.000	0.00	0.00
4.15	0.000	0.00	0.000	0.00	0.00
4.17	0.000	0.00	0.000	0.00	0.00
4.18	0.000	0.00	0.000	0.00	0.00

Runoff Hydrograph			Outflow Hydrograph		Detention
Time	Q	Volume	Q	Volume	equired Storag
(hrs)	(cfs)	(cuft)	(cfs)	(cuft)	(cuft)
4.20	0.000	0.00	0.000	0.00	0.00
4.22	0.000	0.00	0.000	0.00	0.00
4.23	0.000	0.00	0.000	0.00	0.00
4.25	0.000	0.00	0.000	0.00	0.00
4.27	0.000	0.00	0.000	0.00	0.00
4.28	0.000	0.00	0.000	0.00	0.00
4.30	0.000	0.00	0.000	0.00	0.00
4.32	0.000	0.00	0.000	0.00	0.00
4.33	0.000	0.00	0.000	0.00	0.00
4.35	0.000	0.00	0.000	0.00	0.00
4.37	0.000	0.00	0.000	0.00	0.00
4.38	0.000	0.00	0.000	0.00	0.00
4.40	0.000	0.00	0.000	0.00	0.00
4.42	0.000	0.00	0.000	0.00	0.00
4.43	0.000	0.00	0.000	0.00	0.00
4.45	0.000	0.00	0.000	0.00	0.00
4.47	0.000	0.00	0.000	0.00	0.00
4.48	0.000	0.00	0.000	0.00	0.00
4.50	0.000	0.00	0.000	0.00	0.00
4.52	0.000	0.00	0.000	0.00	0.00
4.53	0.000	0.00	0.000	0.00	0.00

Runoff Hydrograph			Outflow Hydrograph		Detention
Time	Q	Volume	Q	Volume	equired Storag
(hrs)	(cfs)	(cuft)	(cfs)	(cuft)	(cuft)
4.55	0.000	0.00	0.000	0.00	0.00
4.57	0.000	0.00	0.000	0.00	0.00
4.58	0.000	0.00	0.000	0.00	0.00
4.60	0.000	0.00	0.000	0.00	0.00
4.62	0.000	0.00	0.000	0.00	0.00
4.63	0.000	0.00	0.000	0.00	0.00
4.65	0.000	0.00	0.000	0.00	0.00
4.67	0.000	0.00	0.000	0.00	0.00
4.68	0.000	0.00	0.000	0.00	0.00
4.70	0.000	0.00	0.000	0.00	0.00
4.72	0.000	0.00	0.000	0.00	0.00
4.73	0.000	0.00	0.000	0.00	0.00
4.75	0.000	0.00	0.000	0.00	0.00
4.77	0.000	0.00	0.000	0.00	0.00
4.78	0.000	0.00	0.000	0.00	0.00
4.80	0.000	0.00	0.000	0.00	0.00
4.82	0.000	0.00	0.000	0.00	0.00
4.83	0.000	0.00	0.000	0.00	0.00
4.85	0.000	0.00	0.000	0.00	0.00
4.87	0.000	0.00	0.000	0.00	0.00
4.88	0.000	0.00	0.000	0.00	0.00

Runoff Hydrograph			Outflow Hydrograph		Detention
Time	Q	Volume	Q	Volume	equired Storag
(hrs)	(cfs)	(cuft)	(cfs)	(cuft)	(cuft)
4.90	0.000	0.00	0.000	0.00	0.00
4.92	0.000	0.00	0.000	0.00	0.00
4.93	0.000	0.00	0.000	0.00	0.00
4.95	0.000	0.00	0.000	0.00	0.00
4.97	0.000	0.00	0.000	0.00	0.00
4.98	0.000	0.00	0.000	0.00	0.00
5.00	0.000	0.00	0.000	0.00	0.00
5.02	0.000	0.00	0.000	0.00	0.00
5.03	0.000	0.00	0.000	0.00	0.00
5.05	0.000	0.00	0.000	0.00	0.00
5.07	0.000	0.00	0.000	0.00	0.00
5.08	0.000	0.00	0.000	0.00	0.00
5.10	0.000	0.00	0.000	0.00	0.00
5.12	0.000	0.00	0.000	0.00	0.00
5.13	0.000	0.00	0.000	0.00	0.00
5.15	0.000	0.00	0.000	0.00	0.00
5.17	0.000	0.00	0.000	0.00	0.00
5.18	0.000	0.00	0.000	0.00	0.00
5.20	0.000	0.00	0.000	0.00	0.00
5.22	0.000	0.00	0.000	0.00	0.00
5.23	0.000	0.00	0.000	0.00	0.00

Runoff Hydrograph			Outflow Hydrograph		Detention
Time	Q	Volume	Q	Volume	equired Storag
(hrs)	(cfs)	(cuft)	(cfs)	(cuft)	(cuft)
5.25	0.000	0.00	0.000	0.00	0.00
5.27	0.000	0.00	0.000	0.00	0.00
5.28	0.000	0.00	0.000	0.00	0.00
5.30	0.000	0.00	0.000	0.00	0.00
5.32	0.000	0.00	0.000	0.00	0.00
5.33	0.000	0.00	0.000	0.00	0.00
5.35	0.000	0.00	0.000	0.00	0.00
5.37	0.000	0.00	0.000	0.00	0.00
5.38	0.000	0.00	0.000	0.00	0.00
5.40	0.000	0.00	0.000	0.00	0.00
5.42	0.000	0.00	0.000	0.00	0.00
5.43	0.000	0.00	0.000	0.00	0.00
5.45	0.000	0.00	0.000	0.00	0.00
5.47	0.000	0.00	0.000	0.00	0.00
5.48	0.000	0.00	0.000	0.00	0.00
5.50	0.000	0.00	0.000	0.00	0.00
5.52	0.000	0.00	0.000	0.00	0.00
5.53	0.000	0.00	0.000	0.00	0.00
5.55	0.000	0.00	0.000	0.00	0.00
5.57	0.000	0.00	0.000	0.00	0.00
5.58	0.000	0.00	0.000	0.00	0.00

Runoff Hydrograph			Outflow Hydrograph		Detention
Time	Q	Volume	Q	Volume	equired Storag
(hrs)	(cfs)	(cuft)	(cfs)	(cuft)	(cuft)
5.60	0.000	0.00	0.000	0.00	0.00
5.62	0.000	0.00	0.000	0.00	0.00
5.63	0.000	0.00	0.000	0.00	0.00
5.65	0.000	0.00	0.000	0.00	0.00
5.67	0.000	0.00	0.000	0.00	0.00
5.68	0.000	0.00	0.000	0.00	0.00
5.70	0.000	0.00	0.000	0.00	0.00
5.72	0.000	0.00	0.000	0.00	0.00
5.73	0.000	0.00	0.000	0.00	0.00
5.75	0.000	0.00	0.000	0.00	0.00
5.77	0.000	0.00	0.000	0.00	0.00
5.78	0.000	0.00	0.000	0.00	0.00
5.80	0.000	0.00	0.000	0.00	0.00
5.82	0.000	0.00	0.000	0.00	0.00
5.83	0.000	0.00	0.000	0.00	0.00
5.85	0.000	0.00	0.000	0.00	0.00
5.87	0.000	0.00	0.000	0.00	0.00
5.88	0.000	0.00	0.000	0.00	0.00
5.90	0.000	0.00	0.000	0.00	0.00
5.92	0.000	0.00	0.000	0.00	0.00
5.93	0.000	0.00	0.000	0.00	0.00

Runoff Hydrograph			Outflow Hydrograph		Detention
Time	Q	Volume	Q	Volume	equired Storag
(hrs)	(cfs)	(cuft)	(cfs)	(cuft)	(cuft)
5.95	0.000	0.00	0.000	0.00	0.00
5.97	0.000	0.00	0.000	0.00	0.00
5.98	0.000	0.00	0.000	0.00	0.00
6.00	0.000	0.00	0.000	0.00	0.00
6.02	0.000	0.00	0.000	0.00	0.00
6.03	0.000	0.00	0.000	0.00	0.00
6.05	0.000	0.00	0.000	0.00	0.00
6.07	0.000	0.00	0.000	0.00	0.00
6.08	0.000	0.00	0.000	0.00	0.00
6.10	0.000	0.00	0.000	0.00	0.00
6.12	0.000	0.00	0.000	0.00	0.00
6.13	0.000	0.00	0.000	0.00	0.00
6.15	0.000	0.00	0.000	0.00	0.00
6.17	0.000	0.00	0.000	0.00	0.00
6.18	0.000	0.00	0.000	0.00	0.00
6.20	0.000	0.00	0.000	0.00	0.00
6.22	0.000	0.00	0.000	0.00	0.00
6.23	0.000	0.00	0.000	0.00	0.00
6.25	0.000	0.00	0.000	0.00	0.00
6.27	0.000	0.00	0.000	0.00	0.00
6.28	0.000	0.00	0.000	0.00	0.00

Runoff Hydrograph			Outflow Hydrograph		Detention
Time	Q	Volume	Q	Volume	equired Storag
(hrs)	(cfs)	(cuft)	(cfs)	(cuft)	(cuft)
6.30	0.000	0.00	0.000	0.00	0.00
6.32	0.000	0.00	0.000	0.00	0.00
6.33	0.000	0.00	0.000	0.00	0.00
6.35	0.000	0.00	0.000	0.00	0.00
6.37	0.000	0.00	0.000	0.00	0.00
6.38	0.000	0.00	0.000	0.00	0.00
6.40	0.000	0.00	0.000	0.00	0.00
6.42	0.000	0.00	0.000	0.00	0.00
6.43	0.000	0.00	0.000	0.00	0.00
6.45	0.000	0.00	0.000	0.00	0.00
6.47	0.000	0.00	0.000	0.00	0.00
6.48	0.000	0.00	0.000	0.00	0.00
6.50	0.000	0.00	0.000	0.00	0.00
6.52	0.000	0.00	0.000	0.00	0.00
6.53	0.000	0.00	0.000	0.00	0.00
6.55	0.000	0.00	0.000	0.00	0.00
6.57	0.000	0.00	0.000	0.00	0.00
6.58	0.000	0.00	0.000	0.00	0.00
6.60	0.000	0.00	0.000	0.00	0.00
6.62	0.000	0.00	0.000	0.00	0.00
6.63	0.000	0.00	0.000	0.00	0.00

Runoff Hydrograph			Outflow Hydrograph		Detention
Time	Q	Volume	Q	Volume	equired Storag
(hrs)	(cfs)	(cuft)	(cfs)	(cuft)	(cuft)
6.65	0.000	0.00	0.000	0.00	0.00
6.67	0.000	0.00	0.000	0.00	0.00
6.68	0.000	0.00	0.000	0.00	0.00
6.70	0.000	0.00	0.000	0.00	0.00
6.72	0.000	0.00	0.000	0.00	0.00
6.73	0.000	0.00	0.000	0.00	0.00
6.75	0.000	0.00	0.000	0.00	0.00
6.77	0.000	0.00	0.000	0.00	0.00
6.78	0.000	0.00	0.000	0.00	0.00
6.80	0.000	0.00	0.000	0.00	0.00
6.82	0.000	0.00	0.000	0.00	0.00
6.83	0.000	0.00	0.000	0.00	0.00
6.85	0.000	0.00	0.000	0.00	0.00
6.87	0.000	0.00	0.000	0.00	0.00
6.88	0.000	0.00	0.000	0.00	0.00
6.90	0.000	0.00	0.000	0.00	0.00
6.92	0.000	0.00	0.000	0.00	0.00
6.93	0.000	0.00	0.000	0.00	0.00
6.95	0.000	0.00	0.000	0.00	0.00
6.97	0.000	0.00	0.000	0.00	0.00
6.98	0.000	0.00	0.000	0.00	0.00

Runoff Hydrograph			Outflow Hydrograph		Detention
Time	Q	Volume	Q	Volume	equired Storag
(hrs)	(cfs)	(cuft)	(cfs)	(cuft)	(cuft)
7.00	0.000	0.00	0.000	0.00	0.00
7.02	0.000	0.00	0.000	0.00	0.00
7.03	0.000	0.00	0.000	0.00	0.00
7.05	0.000	0.00	0.000	0.00	0.00
7.07	0.000	0.00	0.000	0.00	0.00
7.08	0.000	0.00	0.000	0.00	0.00
7.10	0.000	0.00	0.000	0.00	0.00
7.12	0.000	0.00	0.000	0.00	0.00
7.13	0.000	0.00	0.000	0.00	0.00
7.15	0.000	0.00	0.000	0.00	0.00
7.17	0.000	0.00	0.000	0.00	0.00
7.18	0.000	0.00	0.000	0.00	0.00
7.20	0.000	0.00	0.000	0.00	0.00
7.22	0.000	0.00	0.000	0.00	0.00
7.23	0.000	0.00	0.000	0.00	0.00
7.25	0.000	0.00	0.000	0.00	0.00
7.27	0.000	0.00	0.000	0.00	0.00
7.28	0.000	0.00	0.000	0.00	0.00
7.30	0.000	0.00	0.000	0.00	0.00
7.32	0.000	0.00	0.000	0.00	0.00
7.33	0.000	0.00	0.000	0.00	0.00

Runoff Hydrograph			Outflow Hydrograph		Detention
Time	Q	Volume	Q	Volume	equired Storag
(hrs)	(cfs)	(cuft)	(cfs)	(cuft)	(cuft)
7.35	0.000	0.00	0.000	0.00	0.00
7.37	0.000	0.00	0.000	0.00	0.00
7.38	0.000	0.00	0.000	0.00	0.00
7.40	0.000	0.00	0.000	0.00	0.00
7.42	0.000	0.00	0.000	0.00	0.00
7.43	0.000	0.00	0.000	0.00	0.00
7.45	0.000	0.00	0.000	0.00	0.00
7.47	0.000	0.00	0.000	0.00	0.00
7.48	0.000	0.00	0.000	0.00	0.00
7.50	0.000	0.00	0.000	0.00	0.00
7.52	0.000	0.00	0.000	0.00	0.00
7.53	0.000	0.00	0.000	0.00	0.00
7.55	0.000	0.00	0.000	0.00	0.00
7.57	0.000	0.00	0.000	0.00	0.00
7.58	0.000	0.00	0.000	0.00	0.00
7.60	0.000	0.00	0.000	0.00	0.00
7.62	0.000	0.00	0.000	0.00	0.00
7.63	0.000	0.00	0.000	0.00	0.00
7.65	0.000	0.00	0.000	0.00	0.00
7.67	0.000	0.00	0.000	0.00	0.00
7.68	0.000	0.00	0.000	0.00	0.00

Runoff Hydrograph			Outflow Hydrograph		Detention
Time	Q	Volume	Q	Volume	equired Storag
(hrs)	(cfs)	(cuft)	(cfs)	(cuft)	(cuft)
7.70	0.000	0.00	0.000	0.00	0.00
7.72	0.000	0.00	0.000	0.00	0.00
7.73	0.000	0.00	0.000	0.00	0.00
7.75	0.000	0.00	0.000	0.00	0.00
7.77	0.000	0.00	0.000	0.00	0.00
7.78	0.000	0.00	0.000	0.00	0.00
7.80	0.000	0.00	0.000	0.00	0.00
7.82	0.000	0.00	0.000	0.00	0.00
7.83	0.000	0.00	0.000	0.00	0.00
7.85	0.000	0.00	0.000	0.00	0.00
7.87	0.000	0.00	0.000	0.00	0.00
7.88	0.000	0.00	0.000	0.00	0.00
7.90	0.000	0.00	0.000	0.00	0.00
7.92	0.000	0.00	0.000	0.00	0.00
7.93	0.000	0.00	0.000	0.00	0.00
7.95	0.000	0.00	0.000	0.00	0.00
7.97	0.000	0.00	0.000	0.00	0.00
7.98	0.000	0.00	0.000	0.00	0.00
8.00	0.000	0.00	0.000	0.00	0.00
8.02	0.000	0.00	0.000	0.00	0.00
8.03	0.000	0.00	0.000	0.00	0.00

Runoff Hydrograph			Outflow Hydrograph		Detention
Time	Q	Volume	Q	Volume	equired Storag
(hrs)	(cfs)	(cuft)	(cfs)	(cuft)	(cuft)
8.05	0.000	0.00	0.000	0.00	0.00
8.07	0.000	0.00	0.000	0.00	0.00
8.08	0.000	0.00	0.000	0.00	0.00
8.10	0.000	0.00	0.000	0.00	0.00
8.12	0.000	0.00	0.000	0.00	0.00
8.13	0.000	0.00	0.000	0.00	0.00
8.15	0.000	0.00	0.000	0.00	0.00
8.17	0.000	0.00	0.000	0.00	0.00
8.18	0.000	0.00	0.000	0.00	0.00
8.20	0.000	0.00	0.000	0.00	0.00
8.22	0.000	0.00	0.000	0.00	0.00
8.23	0.000	0.00	0.000	0.00	0.00
8.25	0.000	0.00	0.000	0.00	0.00
8.27	0.000	0.00	0.000	0.00	0.00
8.28	0.000	0.00	0.000	0.00	0.00
8.30	0.000	0.00	0.000	0.00	0.00
8.32	0.000	0.00	0.000	0.00	0.00
8.33	0.000	0.00	0.000	0.00	0.00
8.35	0.000	0.00	0.000	0.00	0.00
8.37	0.000	0.00	0.000	0.00	0.00
8.38	0.000	0.00	0.000	0.00	0.00

Runoff Hydrograph			Outflow Hydrograph		Detention
Time	Q	Volume	Q	Volume	equired Storag
(hrs)	(cfs)	(cuft)	(cfs)	(cuft)	(cuft)
8.40	0.000	0.00	0.000	0.00	0.00
8.42	0.000	0.00	0.000	0.00	0.00
8.43	0.000	0.00	0.000	0.00	0.00
8.45	0.000	0.00	0.000	0.00	0.00
8.47	0.000	0.00	0.000	0.00	0.00
8.48	0.000	0.00	0.000	0.00	0.00
8.50	0.000	0.00	0.000	0.00	0.00
8.52	0.000	0.00	0.000	0.00	0.00
8.53	0.000	0.00	0.000	0.00	0.00
8.55	0.000	0.00	0.000	0.00	0.00
8.57	0.000	0.00	0.000	0.00	0.00
8.58	0.000	0.00	0.000	0.00	0.00
8.60	0.000	0.00	0.000	0.00	0.00
8.62	0.000	0.00	0.000	0.00	0.00
8.63	0.000	0.00	0.000	0.00	0.00
8.65	0.000	0.00	0.000	0.00	0.00
8.67	0.000	0.00	0.000	0.00	0.00
8.68	0.000	0.00	0.000	0.00	0.00
8.70	0.000	0.00	0.000	0.00	0.00
8.72	0.000	0.00	0.000	0.00	0.00
8.73	0.000	0.00	0.000	0.00	0.00

Runoff Hydrograph			Outflow Hydrograph		Detention
Time	Q	Volume	Q	Volume	equired Storag
(hrs)	(cfs)	(cuft)	(cfs)	(cuft)	(cuft)
8.75	0.000	0.00	0.000	0.00	0.00
8.77	0.000	0.00	0.000	0.00	0.00
8.78	0.000	0.00	0.000	0.00	0.00
8.80	0.000	0.00	0.000	0.00	0.00
8.82	0.000	0.00	0.000	0.00	0.00
8.83	0.000	0.00	0.000	0.00	0.00
8.85	0.000	0.00	0.000	0.00	0.00
8.87	0.000	0.00	0.000	0.00	0.00
8.88	0.000	0.00	0.000	0.00	0.00
8.90	0.000	0.00	0.000	0.00	0.00
8.92	0.000	0.00	0.000	0.00	0.00
8.93	0.000	0.00	0.000	0.00	0.00
8.95	0.000	0.00	0.000	0.00	0.00
8.97	0.000	0.00	0.000	0.00	0.00
8.98	0.000	0.00	0.000	0.00	0.00
9.00	0.000	0.00	0.000	0.00	0.00
9.02	0.000	0.00	0.000	0.00	0.00
9.03	0.000	0.00	0.000	0.00	0.00
9.05	0.000	0.00	0.000	0.00	0.00
9.07	0.000	0.00	0.000	0.00	0.00
9.08	0.000	0.00	0.000	0.00	0.00

Runoff Hydrograph			Outflow Hydrograph		Detention
Time	Q	Volume	Q	Volume	equired Storag
(hrs)	(cfs)	(cuft)	(cfs)	(cuft)	(cuft)
9.10	0.000	0.00	0.000	0.00	0.00
9.12	0.000	0.00	0.000	0.00	0.00
9.13	0.000	0.00	0.000	0.00	0.00
9.15	0.000	0.00	0.000	0.00	0.00
9.17	0.000	0.00	0.000	0.00	0.00
9.18	0.000	0.00	0.000	0.00	0.00
9.20	0.000	0.00	0.000	0.00	0.00
9.22	0.000	0.00	0.000	0.00	0.00
9.23	0.000	0.00	0.000	0.00	0.00
9.25	0.000	0.00	0.000	0.00	0.00
9.27	0.000	0.00	0.000	0.00	0.00
9.28	0.000	0.00	0.000	0.00	0.00
9.30	0.000	0.00	0.000	0.00	0.00
9.32	0.000	0.00	0.000	0.00	0.00
9.33	0.000	0.00	0.000	0.00	0.00
9.35	0.000	0.00	0.000	0.00	0.00
9.37	0.000	0.00	0.000	0.00	0.00
9.38	0.000	0.00	0.000	0.00	0.00
9.40	0.000	0.00	0.000	0.00	0.00
9.42	0.000	0.00	0.000	0.00	0.00
9.43	0.000	0.00	0.000	0.00	0.00

Runoff Hydrograph			Outflow Hydrograph		Detention
Time	Q	Volume	Q	Volume	equired Storag
(hrs)	(cfs)	(cuft)	(cfs)	(cuft)	(cuft)
9.45	0.000	0.00	0.000	0.00	0.00
9.47	0.000	0.00	0.000	0.00	0.00
9.48	0.000	0.00	0.000	0.00	0.00
9.50	0.000	0.00	0.000	0.00	0.00
9.52	0.000	0.00	0.000	0.00	0.00
9.53	0.000	0.00	0.000	0.00	0.00
9.55	0.000	0.00	0.000	0.00	0.00
9.57	0.000	0.00	0.000	0.00	0.00
9.58	0.000	0.00	0.000	0.00	0.00
9.60	0.000	0.00	0.000	0.00	0.00
9.62	0.000	0.00	0.000	0.00	0.00
9.63	0.000	0.00	0.000	0.00	0.00
9.65	0.000	0.00	0.000	0.00	0.00
9.67	0.000	0.00	0.000	0.00	0.00
9.68	0.000	0.00	0.000	0.00	0.00
9.70	0.000	0.00	0.000	0.00	0.00
9.72	0.000	0.00	0.000	0.00	0.00
9.73	0.000	0.00	0.000	0.00	0.00
9.75	0.000	0.00	0.000	0.00	0.00
9.77	0.000	0.00	0.000	0.00	0.00
9.78	0.000	0.00	0.000	0.00	0.00

Runoff Hydrograph			Outflow Hydrograph		Detention
Time	Q	Volume	Q	Volume	equired Storag
(hrs)	(cfs)	(cuft)	(cfs)	(cuft)	(cuft)
9.80	0.000	0.00	0.000	0.00	0.00
9.82	0.000	0.00	0.000	0.00	0.00
9.83	0.000	0.00	0.000	0.00	0.00
9.85	0.000	0.00	0.000	0.00	0.00
9.87	0.000	0.00	0.000	0.00	0.00
9.88	0.000	0.00	0.000	0.00	0.00
9.90	0.000	0.00	0.000	0.00	0.00
9.92	0.000	0.00	0.000	0.00	0.00
9.93	0.000	0.00	0.000	0.00	0.00
9.95	0.000	0.00	0.000	0.00	0.00
9.97	0.000	0.00	0.000	0.00	0.00
9.98	0.000	0.00	0.000	0.00	0.00
10.00	0.000	0.00	0.000	0.00	0.00
10.02	0.000	0.00	0.000	0.00	0.00
10.03	0.000	0.00	0.000	0.00	0.00
10.05	0.000	0.00	0.000	0.00	0.00
10.07	0.000	0.00	0.000	0.00	0.00
10.08	0.000	0.00	0.000	0.00	0.00
10.10	0.000	0.00	0.000	0.00	0.00
10.12	0.000	0.00	0.000	0.00	0.00
10.13	0.000	0.00	0.000	0.00	0.00

Runoff Hydrograph			Outflow Hydrograph		Detention
Time	Q	Volume	Q	Volume	equired Storag
(hrs)	(cfs)	(cuft)	(cfs)	(cuft)	(cuft)
10.15	0.000	0.00	0.000	0.00	0.00
10.17	0.000	0.00	0.000	0.00	0.00
10.18	0.000	0.00	0.000	0.00	0.00
10.20	0.000	0.00	0.000	0.00	0.00
10.22	0.000	0.00	0.000	0.00	0.00
10.23	0.000	0.00	0.000	0.00	0.00
10.25	0.000	0.00	0.000	0.00	0.00
10.27	0.000	0.00	0.000	0.00	0.00
10.28	0.000	0.00	0.000	0.00	0.00
10.30	0.000	0.00	0.000	0.00	0.00
10.32	0.000	0.00	0.000	0.00	0.00
10.33	0.000	0.00	0.000	0.00	0.00
10.35	0.000	0.00	0.000	0.00	0.00
10.37	0.000	0.00	0.000	0.00	0.00
10.38	0.000	0.00	0.000	0.00	0.00
10.40	0.000	0.00	0.000	0.00	0.00
10.42	0.000	0.00	0.000	0.00	0.00
10.43	0.000	0.00	0.000	0.00	0.00
10.45	0.000	0.00	0.000	0.00	0.00
10.47	0.000	0.00	0.000	0.00	0.00
10.48	0.000	0.00	0.000	0.00	0.00

Runoff Hydrograph			Outflow Hydrograph		Detention
Time	Q	Volume	Q	Volume	equired Storag
(hrs)	(cfs)	(cuft)	(cfs)	(cuft)	(cuft)
10.50	0.000	0.00	0.000	0.00	0.00
10.52	0.000	0.00	0.000	0.00	0.00
10.53	0.000	0.00	0.000	0.00	0.00
10.55	0.000	0.00	0.000	0.00	0.00
10.57	0.000	0.00	0.000	0.00	0.00
10.58	0.000	0.00	0.000	0.00	0.00
10.60	0.000	0.00	0.000	0.00	0.00
10.62	0.000	0.00	0.000	0.00	0.00
10.63	0.000	0.00	0.000	0.00	0.00
10.65	0.000	0.00	0.000	0.00	0.00
10.67	0.000	0.00	0.000	0.00	0.00
10.68	0.000	0.00	0.000	0.00	0.00
10.70	0.000	0.00	0.000	0.00	0.00
10.72	0.000	0.00	0.000	0.00	0.00
10.73	0.000	0.00	0.000	0.00	0.00
10.75	0.000	0.00	0.000	0.00	0.00
10.77	0.000	0.00	0.000	0.00	0.00
10.78	0.000	0.00	0.000	0.00	0.00
10.80	0.000	0.00	0.000	0.00	0.00
10.82	0.000	0.00	0.000	0.00	0.00
10.83	0.000	0.00	0.000	0.00	0.00

Runoff Hydrograph			Outflow Hydrograph		Detention
Time	Q	Volume	Q	Volume	equired Storag
(hrs)	(cfs)	(cuft)	(cfs)	(cuft)	(cuft)
10.85	0.000	0.00	0.000	0.00	0.00
10.87	0.000	0.00	0.000	0.00	0.00
10.88	0.000	0.00	0.000	0.00	0.00
10.90	0.000	0.00	0.000	0.00	0.00
10.92	0.000	0.00	0.000	0.00	0.00
10.93	0.000	0.00	0.000	0.00	0.00
10.95	0.000	0.00	0.000	0.00	0.00
10.97	0.000	0.00	0.000	0.00	0.00
10.98	0.000	0.00	0.000	0.00	0.00
11.00	0.000	0.00	0.000	0.00	0.00
11.02	0.000	0.00	0.000	0.00	0.00
11.03	0.000	0.00	0.000	0.00	0.00
11.05	0.000	0.00	0.000	0.00	0.00
11.07	0.000	0.00	0.000	0.00	0.00
11.08	0.000	0.00	0.000	0.00	0.00
11.10	0.000	0.00	0.000	0.00	0.00
11.12	0.000	0.00	0.000	0.00	0.00
11.13	0.000	0.00	0.000	0.00	0.00
11.15	0.000	0.00	0.000	0.00	0.00
11.17	0.000	0.00	0.000	0.00	0.00
11.18	0.000	0.00	0.000	0.00	0.00

Runoff Hydrograph			Outflow Hydrograph		Detention
Time	Q	Volume	Q	Volume	equired Storag
(hrs)	(cfs)	(cuft)	(cfs)	(cuft)	(cuft)
11.20	0.000	0.00	0.000	0.00	0.00
11.22	0.000	0.00	0.000	0.00	0.00
11.23	0.000	0.00	0.000	0.00	0.00
11.25	0.000	0.00	0.000	0.00	0.00
11.27	0.000	0.00	0.000	0.00	0.00
11.28	0.000	0.00	0.000	0.00	0.00
11.30	0.000	0.00	0.000	0.00	0.00
11.32	0.000	0.00	0.000	0.00	0.00
11.33	0.000	0.00	0.000	0.00	0.00
11.35	0.000	0.00	0.000	0.00	0.00
11.37	0.000	0.00	0.000	0.00	0.00
11.38	0.000	0.00	0.000	0.00	0.00
11.40	0.000	0.00	0.000	0.00	0.00
11.42	0.000	0.00	0.000	0.00	0.00
11.43	0.000	0.00	0.000	0.00	0.00
11.45	0.000	0.00	0.000	0.00	0.00
11.47	0.000	0.00	0.000	0.00	0.00
11.48	0.001	0.02	0.000	0.00	0.04
11.50	0.004	0.18	0.000	0.00	0.31
11.52	0.014	0.72	0.000	0.00	1.13
11.53	0.031	2.07	0.000	0.00	3.00

Runoff Hydrograph			Outflow Hydrograph		Detention
Time	Q	Volume	Q	Volume	equired Storag
(hrs)	(cfs)	(cuft)	(cfs)	(cuft)	(cuft)
11.55	0.060	4.80	0.000	0.00	6.60
11.57	0.103	9.70	0.000	0.00	12.81
11.58	0.164	17.73	0.000	0.00	22.66
11.60	0.243	29.94	0.000	0.00	37.22
11.62	0.339	47.40	0.000	0.00	57.58
11.63	0.455	71.24	0.000	0.00	84.90
11.65	0.591	102.64	0.000	0.00	120.37
11.67	0.748	142.81	0.000	0.00	165.25
11.68	0.927	193.07	0.000	0.00	220.89
11.70	1.131	254.81	0.000	0.00	288.73
11.72	1.360	329.53	0.000	0.00	370.34
11.73	1.618	418.88	0.000	0.00	467.43
11.75	1.908	524.68	0.000	0.00	581.93
11.77	2.236	649.01	0.000	0.00	716.09
11.78	2.607	794.30	0.000	0.00	872.52
11.80	3.030	963.41	0.000	0.00	1,054
11.82	3.513	1,160	0.000	0.00	1,265
11.83	4.068	1,387	0.000	0.00	1,509
11.85	4.711	1,651	0.000	0.00	1,792
11.87	5.458	1,956	0.000	0.00	2,119
11.88	6.334	2,309	0.000	0.00	2,499

Runoff Hydrograph			Outflow Hydrograph		Detention
Time	Q	Volume	Q	Volume	equired Storag
(hrs)	(cfs)	(cuft)	(cfs)	(cuft)	(cuft)
11.90	7.368	2,720	0.000	0.01	2,941
11.92	8.600	3,199	0.000	0.02	3,457
11.93	10.08	3,760	0.001	0.06	4,062
11.95	11.88	4,419	0.001	0.13	4,775
11.97	14.11	5,199	0.004	0.34	5,621
11.98	16.89	6,128	0.008	0.82	6,634
12.00	20.43	7,248	0.016	1.76	7,859
12.02	24.62	8,599	0.027	3.37	9,335
12.03	29.18	10,213	0.043	5.93	11,083
12.05	33.84	12,104	0.063	9.71	13,110
12.07	38.27	14,267	0.088	14.99	15,400
12.08	42.06	16,677	0.118	22.08	17,917
12.10	44.70	19,280	0.153	31.29	20,589
12.12	46.16	22,006	0.194	42.94	23,347
12.13	**46.61**	**24,789**	0.241	57.38	26,130
12.15	46.21	27,573	0.294	74.99	28,885
12.17	45.08	30,312	0.353	96.18	31,569
12.18	43.38	32,966	0.420	121.38	34,146
12.20	41.23	35,504	0.495	151.10	36,590
12.22	38.77	37,904	0.580	185.93	38,881
12.23	36.15	40,152	0.677	226.54	41,010

Runoff Hydrograph			Outflow Hydrograph		Detention
Time	Q	Volume	Q	Volume	equired Storag
(hrs)	(cfs)	(cuft)	(cfs)	(cuft)	(cuft)
12.25	33.56	42,243	0.786	273.72	42,976
12.27	31.20	44,186	0.912	328.44	44,794
12.28	29.12	45,996	1.056	391.80	46,478
12.30	27.27	47,688	1.223	465.17	48,040
12.32	25.62	49,274	1.417	550.18	49,493
12.33	24.15	50,767	1.644	648.83	50,843
12.35	22.82	52,176	1.913	763.58	52,097
12.37	21.62	53,510	2.232	897.52	53,261
12.38	20.54	54,774	2.425	1,043	54,347
12.40	19.55	55,977	2.617	1,200	55,363
12.42	18.65	57,123	3.085	1,385	56,297
12.43	17.82	58,217	3.662	1,605	57,146
12.45	17.06	59,263	4.384	1,868	57,907
12.47	16.36	60,265	5.304	2,186	58,570
12.48	15.71	61,228	6.390	2,569	59,129
12.50	15.11	62,152	7.575	3,024	59,582
12.52	14.56	63,042	8.785	3,551	59,928
12.53	14.04	63,900	9.934	4,147	60,174
12.55	13.55	64,728	10.92	4,802	60,332
12.57	13.10	65,528	11.60	5,498	60,422
12.58	12.68	66,301	11.98	6,217	60,464

Runoff Hydrograph			Outflow Hydrograph		Detention
Time	Q	Volume	Q	Volume	equired Storag
(hrs)	(cfs)	(cuft)	(cfs)	(cuft)	(cuft)
12.60	12.28	67,050	**12.10**	**6,943**	**60,475**
12.62	11.91	67,775	11.99	7,663	0.00
12.63	11.55	68,479	11.70	8,365	0.00
12.65	11.22	69,163	11.26	9,041	0.00
12.67	10.91	69,827	10.91	9,695	0.00
12.68	10.61	70,472	10.76	10,341	0.00
12.70	10.33	71,101	10.72	10,984	0.00
12.72	10.07	71,712	10.71	11,627	0.00
12.73	9.812	72,309	10.71	12,270	0.00
12.75	9.572	72,890	10.71	12,912	0.00
12.77	9.343	73,458	10.71	13,555	0.00
12.78	9.125	74,012	10.71	14,197	0.00
12.80	8.916	74,553	10.71	14,839	0.00
12.82	8.718	75,082	10.69	15,481	0.00
12.83	8.528	75,599	10.61	16,117	0.00
12.85	8.346	76,106	10.33	16,737	0.00
12.87	8.172	76,601	10.07	17,341	0.00
12.88	8.005	77,086	9.812	17,930	0.00
12.90	7.845	77,562	9.572	18,504	0.00
12.92	7.692	78,028	9.343	19,065	0.00
12.93	7.544	78,485	9.125	19,612	0.00

Runoff Hydrograph			Outflow Hydrograph		Detention
Time	Q	Volume	Q	Volume	equired Storag
(hrs)	(cfs)	(cuft)	(cfs)	(cuft)	(cuft)
12.95	7.403	78,934	8.916	20,147	0.00
12.97	7.266	79,374	8.718	20,670	0.00
12.98	7.135	79,806	8.528	21,182	0.00
13.00	7.008	80,230	8.505	21,692	0.00
13.02	6.886	80,647	8.494	22,202	0.00
13.03	6.769	81,056	8.488	22,711	0.00
13.05	6.655	81,459	8.485	23,220	0.00
13.07	6.546	81,855	8.482	23,729	0.00
13.08	6.440	82,245	8.460	24,237	0.00
13.10	6.337	82,628	8.437	24,743	0.00
13.12	6.238	83,005	8.391	25,247	0.00
13.13	6.142	83,377	8.346	25,747	0.00
13.15	6.049	83,742	8.259	26,243	0.00
13.17	5.959	84,103	8.172	26,733	0.00
13.18	5.872	84,458	8.005	27,214	0.00
13.20	5.788	84,807	7.845	27,684	0.00
13.22	5.706	85,152	7.692	28,146	0.00
13.23	5.626	85,492	7.544	28,598	0.00
13.25	5.549	85,827	7.403	29,043	0.00
13.27	5.474	86,158	7.266	29,479	0.00
13.28	5.401	86,484	7.135	29,907	0.00

Runoff Hydrograph			Outflow Hydrograph		Detention
Time	Q	Volume	Q	Volume	equired Storag
(hrs)	(cfs)	(cuft)	(cfs)	(cuft)	(cuft)
13.30	5.330	86,806	7.008	30,327	0.00
13.32	5.261	87,124	7.001	30,747	0.00
13.33	5.193	87,438	6.997	31,167	0.00
13.35	5.128	87,747	6.993	31,587	0.00
13.37	5.064	88,053	6.985	32,006	0.00
13.38	5.002	88,355	6.978	32,424	0.00
13.40	4.942	88,653	6.947	32,841	0.00
13.42	4.883	88,948	6.917	33,256	0.00
13.43	4.826	89,239	6.886	33,669	0.00
13.45	4.770	89,527	6.769	34,076	0.00
13.47	4.715	89,812	6.712	34,478	0.00
13.48	4.662	90,093	6.655	34,878	0.00
13.50	4.610	90,371	6.546	35,270	0.00
13.52	4.560	90,646	6.440	35,657	0.00
13.53	4.510	90,919	6.388	36,040	0.00
13.55	4.462	91,188	6.337	36,420	0.00
13.57	4.414	91,454	6.238	36,795	0.00
13.58	4.368	91,717	6.142	37,163	0.00
13.60	4.323	91,978	6.049	37,526	0.00
13.62	4.279	92,236	6.027	37,888	0.00
13.63	4.235	92,492	6.016	38,249	0.00

Runoff Hydrograph			Outflow Hydrograph		Detention
Time	Q	Volume	Q	Volume	equired Storag
(hrs)	(cfs)	(cuft)	(cfs)	(cuft)	(cuft)
13.65	4.193	92,744	6.010	38,609	0.00
13.67	4.152	92,995	6.004	38,969	0.00
13.68	4.111	93,243	5.982	39,328	0.00
13.70	4.071	93,488	5.959	39,686	0.00
13.72	4.033	93,731	5.916	40,041	0.00
13.73	3.994	93,972	5.872	40,393	0.00
13.75	3.957	94,211	5.830	40,743	0.00
13.77	3.921	94,447	5.788	41,090	0.00
13.78	3.885	94,681	5.706	41,433	0.00
13.80	3.850	94,913	5.626	41,770	0.00
13.82	3.815	95,143	5.587	42,105	0.00
13.83	3.781	95,371	5.549	42,438	0.00
13.85	3.748	95,597	5.474	42,767	0.00
13.87	3.716	95,821	5.401	43,091	0.00
13.88	3.684	96,043	5.330	43,410	0.00
13.90	3.653	96,263	5.312	43,729	0.00
13.92	3.622	96,481	5.295	44,047	0.00
13.93	3.592	96,698	5.278	44,364	0.00
13.95	3.562	96,912	5.261	44,679	0.00
13.97	3.533	97,125	5.244	44,994	0.00
13.98	3.504	97,336	5.227	45,307	0.00

Runoff Hydrograph			Outflow Hydrograph		Detention
Time	Q	Volume	Q	Volume	equired Storag
(hrs)	(cfs)	(cuft)	(cfs)	(cuft)	(cuft)
14.00	3.476	97,546	5.210	45,620	0.00
14.02	3.449	97,753	5.193	45,932	0.00
14.03	3.422	97,959	5.161	46,241	0.00
14.05	3.395	98,164	5.128	46,549	0.00
14.07	3.369	98,367	5.064	46,853	0.00
14.08	3.343	98,568	5.033	47,155	0.00
14.10	3.318	98,768	5.002	47,455	0.00
14.12	3.293	98,966	4.942	47,752	0.00
14.13	3.268	99,163	4.883	48,045	0.00
14.15	3.244	99,358	4.855	48,336	0.00
14.17	3.220	99,552	4.826	48,625	0.00
14.18	3.197	99,745	4.770	48,912	0.00
14.20	3.174	99,936	4.715	49,195	0.00
14.22	3.152	100,126	4.709	49,477	0.00
14.23	3.129	100,314	4.702	49,759	0.00
14.25	3.107	100,501	4.695	50,041	0.00
14.27	3.086	100,687	4.692	50,322	0.00
14.28	3.065	100,872	4.689	50,604	0.00
14.30	3.044	101,055	4.662	50,884	0.00
14.32	3.023	101,237	4.636	51,162	0.00
14.33	3.003	101,418	4.610	51,438	0.00

Runoff Hydrograph			Outflow Hydrograph		Detention
Time	Q	Volume	Q	Volume	equired Storag
(hrs)	(cfs)	(cuft)	(cfs)	(cuft)	(cuft)
14.35	2.983	101,597	4.585	51,713	0.00
14.37	2.963	101,776	4.560	51,987	0.00
14.38	2.944	101,953	4.510	52,258	0.00
14.40	2.924	102,129	4.462	52,525	0.00
14.42	2.906	102,304	4.438	52,792	0.00
14.43	2.887	102,478	4.414	53,056	0.00
14.45	2.869	102,650	4.368	53,318	0.00
14.47	2.851	102,822	4.323	53,578	0.00
14.48	2.833	102,992	4.279	53,835	0.00
14.50	2.815	103,162	4.273	54,091	0.00
14.52	2.798	103,330	4.268	54,347	0.00
14.53	2.781	103,498	4.262	54,603	0.00
14.55	2.764	103,664	4.257	54,858	0.00
14.57	2.747	103,829	4.246	55,113	0.00
14.58	2.731	103,994	4.235	55,367	0.00
14.60	2.714	104,157	4.193	55,619	0.00
14.62	2.698	104,319	4.152	55,868	0.00
14.63	2.683	104,481	4.147	56,117	0.00
14.65	2.667	104,641	4.141	56,365	0.00
14.67	2.652	104,801	4.131	56,613	0.00
14.68	2.636	104,959	4.111	56,860	0.00

Runoff Hydrograph			Outflow Hydrograph		Detention
Time	Q	Volume	Q	Volume	equired Storag
(hrs)	(cfs)	(cuft)	(cfs)	(cuft)	(cuft)
14.70	2.621	105,117	4.071	57,104	0.00
14.72	2.607	105,274	4.033	57,346	0.00
14.73	2.592	105,430	3.994	57,585	0.00
14.75	2.578	105,585	3.976	57,824	0.00
14.77	2.563	105,739	3.957	58,061	0.00
14.78	2.549	105,893	3.921	58,297	0.00
14.80	2.535	106,045	3.903	58,531	0.00
14.82	2.522	106,197	3.894	58,764	0.00
14.83	2.508	106,348	3.885	58,998	0.00
14.85	2.495	106,498	3.880	59,230	0.00
14.87	2.481	106,647	3.876	59,463	0.00
14.88	2.468	106,796	3.867	59,695	0.00
14.90	2.455	106,943	3.850	59,926	0.00
14.92	2.442	107,090	3.815	60,155	0.00
14.93	2.430	107,236	3.781	60,382	0.00
14.95	2.417	107,382	3.773	60,608	0.00
14.97	2.405	107,526	3.765	60,834	0.00
14.98	2.393	107,670	3.748	61,059	0.00
15.00	2.381	107,814	3.732	61,283	0.00
15.02	2.369	107,956	3.716	61,506	0.00
15.03	2.357	108,098	3.684	61,727	0.00

Runoff Hydrograph			Outflow Hydrograph		Detention
Time	Q	Volume	Q	Volume	equired Storag
(hrs)	(cfs)	(cuft)	(cfs)	(cuft)	(cuft)
15.05	2.345	108,239	3.653	61,946	0.00
15.07	2.334	108,379	3.622	62,163	0.00
15.08	2.322	108,519	3.607	62,380	0.00
15.10	2.311	108,658	3.592	62,595	0.00
15.12	2.300	108,796	3.588	62,811	0.00
15.13	2.289	108,934	3.584	63,026	0.00
15.15	2.278	109,071	3.577	63,240	0.00
15.17	2.267	109,207	3.569	63,454	0.00
15.18	2.256	109,343	3.562	63,668	0.00
15.20	2.246	109,478	3.548	63,881	0.00
15.22	2.235	109,612	3.533	64,093	0.00
15.23	2.225	109,746	3.504	64,303	0.00
15.25	2.214	109,879	3.476	64,512	0.00
15.27	2.204	110,012	3.469	64,720	0.00
15.28	2.194	110,144	3.463	64,928	0.00
15.30	2.184	110,275	3.449	65,135	0.00
15.32	2.174	110,406	3.422	65,340	0.00
15.33	2.165	110,536	3.395	65,544	0.00
15.35	2.155	110,666	3.369	65,746	0.00
15.37	2.146	110,795	3.343	65,946	0.00
15.38	2.136	110,923	3.337	66,147	0.00

Runoff Hydrograph			Outflow Hydrograph		Detention
Time	Q	Volume	Q	Volume	equired Storag
(hrs)	(cfs)	(cuft)	(cfs)	(cuft)	(cuft)
15.40	2.127	111,051	3.330	66,346	0.00
15.42	2.117	111,178	3.327	66,546	0.00
15.43	2.108	111,305	3.324	66,745	0.00
15.45	2.099	111,431	3.318	66,944	0.00
15.47	2.090	111,557	3.305	67,143	0.00
15.48	2.081	111,682	3.299	67,341	0.00
15.50	2.072	111,807	3.293	67,538	0.00
15.52	2.064	111,931	3.268	67,734	0.00
15.53	2.055	112,055	3.244	67,929	0.00
15.55	2.046	112,178	3.232	68,123	0.00
15.57	2.038	112,300	3.220	68,316	0.00
15.58	2.029	112,422	3.215	68,509	0.00
15.60	2.021	112,544	3.209	68,702	0.00
15.62	2.013	112,665	3.197	68,893	0.00
15.63	2.005	112,785	3.174	69,084	0.00
15.65	1.997	112,905	3.152	69,273	0.00
15.67	1.988	113,025	3.129	69,461	0.00
15.68	1.981	113,144	3.118	69,648	0.00
15.70	1.973	113,262	3.113	69,835	0.00
15.72	1.965	113,381	3.107	70,021	0.00
15.73	1.957	113,498	3.102	70,207	0.00

Runoff Hydrograph			Outflow Hydrograph		Detention
Time	Q	Volume	Q	Volume	equired Storag
(hrs)	(cfs)	(cuft)	(cfs)	(cuft)	(cuft)
15.75	1.949	113,615	3.099	70,393	0.00
15.77	1.942	113,732	3.097	70,579	0.00
15.78	1.934	113,848	3.091	70,764	0.00
15.80	1.927	113,964	3.086	70,950	0.00
15.82	1.919	114,080	3.065	71,133	0.00
15.83	1.912	114,195	3.044	71,316	0.00
15.85	1.905	114,309	3.023	71,497	0.00
15.87	1.897	114,423	3.003	71,678	0.00
15.88	1.890	114,537	2.998	71,857	0.00
15.90	1.883	114,650	2.995	72,037	0.00
15.92	1.876	114,763	2.993	72,217	0.00
15.93	1.869	114,875	2.983	72,396	0.00
15.95	1.862	114,987	2.963	72,573	0.00
15.97	1.855	115,099	2.944	72,750	0.00
15.98	1.848	115,210	2.924	72,926	0.00
16.00	1.842	115,320	2.920	73,101	0.00
16.02	1.835	115,431	2.915	73,276	0.00
16.03	1.828	115,541	2.906	73,450	0.00
16.05	1.822	115,650	2.896	73,624	0.00
16.07	1.815	115,759	2.894	73,797	0.00
16.08	1.809	115,868	2.892	73,971	0.00

Runoff Hydrograph			Outflow Hydrograph		Detention
Time	Q	Volume	Q	Volume	equired Storag
(hrs)	(cfs)	(cuft)	(cfs)	(cuft)	(cuft)
16.10	1.802	115,976	2.887	74,144	0.00
16.12	1.796	116,084	2.878	74,317	0.00
16.13	1.790	116,192	2.869	74,489	0.00
16.15	1.783	116,299	2.851	74,660	0.00
16.17	1.777	116,406	2.833	74,830	0.00
16.18	1.771	116,512	2.815	74,999	0.00
16.20	1.765	116,618	2.811	75,167	0.00
16.22	1.759	116,724	2.806	75,336	0.00
16.23	1.753	116,829	2.798	75,504	0.00
16.25	1.747	116,934	2.789	75,671	0.00
16.27	1.741	117,039	2.781	75,838	0.00
16.28	1.735	117,143	2.764	76,004	0.00
16.30	1.729	117,247	2.755	76,169	0.00
16.32	1.723	117,350	2.751	76,334	0.00
16.33	1.717	117,454	2.747	76,499	0.00
16.35	1.712	117,557	2.739	76,663	0.00
16.37	1.706	117,659	2.735	76,827	0.00
16.38	1.700	117,761	2.731	76,991	0.00
16.40	1.695	117,863	2.723	77,155	0.00
16.42	1.689	117,965	2.714	77,317	0.00
16.43	1.684	118,066	2.698	77,479	0.00

Runoff Hydrograph			Outflow Hydrograph		Detention
Time	Q	Volume	Q	Volume	equired Storag
(hrs)	(cfs)	(cuft)	(cfs)	(cuft)	(cuft)
16.45	1.678	118,167	2.683	77,640	0.00
16.47	1.673	118,267	2.667	77,800	0.00
16.48	1.667	118,367	2.659	77,960	0.00
16.50	1.662	118,467	2.652	78,119	0.00
16.52	1.657	118,567	2.648	78,278	0.00
16.53	1.651	118,666	2.644	78,436	0.00
16.55	1.646	118,765	2.636	78,595	0.00
16.57	1.641	118,864	2.621	78,752	0.00
16.58	1.636	118,962	2.618	78,909	0.00
16.60	1.631	119,060	2.614	79,066	0.00
16.62	1.626	119,158	2.610	79,222	0.00
16.63	1.621	119,255	2.607	79,379	0.00
16.65	1.616	119,352	2.592	79,534	0.00
16.67	1.611	119,449	2.585	79,690	0.00
16.68	1.606	119,545	2.581	79,844	0.00
16.70	1.601	119,642	2.578	79,999	0.00
16.72	1.596	119,738	2.563	80,153	0.00
16.73	1.591	119,833	2.556	80,306	0.00
16.75	1.586	119,928	2.549	80,459	0.00
16.77	1.581	120,023	2.535	80,611	0.00
16.78	1.577	120,118	2.522	80,763	0.00

Runoff Hydrograph			Outflow Hydrograph		Detention
Time	Q	Volume	Q	Volume	equired Storag
(hrs)	(cfs)	(cuft)	(cfs)	(cuft)	(cuft)
16.80	1.572	120,213	2.508	80,913	0.00
16.82	1.567	120,307	2.505	81,063	0.00
16.83	1.563	120,401	2.501	81,213	0.00
16.85	1.558	120,494	2.495	81,363	0.00
16.87	1.553	120,588	2.488	81,512	0.00
16.88	1.549	120,681	2.481	81,661	0.00
16.90	1.544	120,774	2.475	81,810	0.00
16.92	1.540	120,866	2.471	81,958	0.00
16.93	1.535	120,958	2.470	82,106	0.00
16.95	1.531	121,050	2.468	82,254	0.00
16.97	1.527	121,142	2.462	82,402	0.00
16.98	1.522	121,234	2.458	82,549	0.00
17.00	1.518	121,325	2.455	82,697	0.00
17.02	1.514	121,416	2.442	82,843	0.00
17.03	1.509	121,506	2.430	82,989	0.00
17.05	1.505	121,597	2.417	83,134	0.00
17.07	1.501	121,687	2.411	83,279	0.00
17.08	1.497	121,777	2.405	83,423	0.00
17.10	1.492	121,867	2.393	83,567	0.00
17.12	1.488	121,956	2.381	83,710	0.00
17.13	1.484	122,045	2.378	83,852	0.00

Runoff Hydrograph			Outflow Hydrograph		Detention
Time	Q	Volume	Q	Volume	equired Storag
(hrs)	(cfs)	(cuft)	(cfs)	(cuft)	(cuft)
17.15	1.480	122,134	2.375	83,995	0.00
17.17	1.476	122,223	2.369	84,137	0.00
17.18	1.472	122,311	2.363	84,279	0.00
17.20	1.468	122,399	2.360	84,420	0.00
17.22	1.464	122,487	2.357	84,562	0.00
17.23	1.460	122,575	2.354	84,703	0.00
17.25	1.456	122,663	2.351	84,844	0.00
17.27	1.452	122,750	2.345	84,985	0.00
17.28	1.448	122,837	2.342	85,125	0.00
17.30	1.444	122,924	2.339	85,265	0.00
17.32	1.440	123,010	2.334	85,406	0.00
17.33	1.437	123,096	2.322	85,545	0.00
17.35	1.433	123,183	2.311	85,684	0.00
17.37	1.429	123,268	2.300	85,821	0.00
17.38	1.425	123,354	2.289	85,959	0.00
17.40	1.421	123,439	2.283	86,096	0.00
17.42	1.418	123,525	2.278	86,232	0.00
17.43	1.414	123,610	2.267	86,368	0.00
17.45	1.410	123,694	2.264	86,504	0.00
17.47	1.407	123,779	2.262	86,640	0.00
17.48	1.403	123,863	2.259	86,776	0.00

Runoff Hydrograph			Outflow Hydrograph		Detention
Time	Q	Volume	Q	Volume	equired Storag
(hrs)	(cfs)	(cuft)	(cfs)	(cuft)	(cuft)
17.50	1.399	123,947	2.258	86,911	0.00
17.52	1.396	124,031	2.256	87,046	0.00
17.53	1.392	124,115	2.246	87,181	0.00
17.55	1.389	124,198	2.240	87,316	0.00
17.57	1.385	124,281	2.235	87,450	0.00
17.58	1.382	124,364	2.230	87,583	0.00
17.60	1.378	124,447	2.227	87,717	0.00
17.62	1.375	124,530	2.225	87,851	0.00
17.63	1.371	124,612	2.220	87,984	0.00
17.65	1.368	124,694	2.214	88,117	0.00
17.67	1.364	124,776	2.204	88,249	0.00
17.68	1.361	124,858	2.194	88,381	0.00
17.70	1.358	124,939	2.184	88,512	0.00
17.72	1.354	125,021	2.174	88,642	0.00
17.73	1.351	125,102	2.170	88,772	0.00
17.75	1.348	125,183	2.165	88,902	0.00
17.77	1.344	125,264	2.162	89,032	0.00
17.78	1.341	125,344	2.160	89,161	0.00
17.80	1.338	125,425	2.157	89,291	0.00
17.82	1.335	125,505	2.156	89,420	0.00
17.83	1.331	125,585	2.155	89,550	0.00

Runoff Hydrograph			Outflow Hydrograph		Detention
Time	Q	Volume	Q	Volume	equired Storag
(hrs)	(cfs)	(cuft)	(cfs)	(cuft)	(cuft)
17.85	1.328	125,665	2.150	89,679	0.00
17.87	1.325	125,744	2.146	89,807	0.00
17.88	1.322	125,824	2.141	89,936	0.00
17.90	1.319	125,903	2.136	90,064	0.00
17.92	1.316	125,982	2.127	90,192	0.00
17.93	1.313	126,061	2.117	90,319	0.00
17.95	1.309	126,139	2.108	90,445	0.00
17.97	1.306	126,218	2.106	90,571	0.00
17.98	1.303	126,296	2.104	90,698	0.00
18.00	1.300	126,374	2.099	90,824	0.00
18.02	1.297	126,452	2.090	90,949	0.00
18.03	1.294	126,530	2.081	91,074	0.00
18.05	1.291	126,607	2.072	91,198	0.00
18.07	1.288	126,685	2.071	91,323	0.00
18.08	1.285	126,762	2.070	91,447	0.00
18.10	1.282	126,839	2.070	91,571	0.00
18.12	1.279	126,916	2.069	91,695	0.00
18.13	1.276	126,993	2.068	91,819	0.00
18.15	1.274	127,069	2.064	91,943	0.00
18.17	1.271	127,145	2.059	92,066	0.00
18.18	1.268	127,222	2.055	92,190	0.00

Runoff Hydrograph			Outflow Hydrograph		Detention
Time	Q	Volume	Q	Volume	equired Storag
(hrs)	(cfs)	(cuft)	(cfs)	(cuft)	(cuft)
18.20	1.265	127,298	2.051	92,313	0.00
18.22	1.262	127,373	2.046	92,436	0.00
18.23	1.259	127,449	2.038	92,558	0.00
18.25	1.256	127,524	2.029	92,680	0.00
18.27	1.254	127,600	2.021	92,801	0.00
18.28	1.251	127,675	2.013	92,922	0.00
18.30	1.248	127,750	2.005	93,042	0.00
18.32	1.245	127,825	2.001	93,162	0.00
18.33	1.242	127,899	1.999	93,282	0.00
18.35	1.240	127,974	1.997	93,402	0.00
18.37	1.237	128,048	1.993	93,521	0.00
18.38	1.234	128,122	1.991	93,641	0.00
18.40	1.232	128,196	1.990	93,760	0.00
18.42	1.229	128,270	1.990	93,879	0.00
18.43	1.226	128,344	1.988	93,999	0.00
18.45	1.224	128,417	1.985	94,118	0.00
18.47	1.221	128,490	1.983	94,237	0.00
18.48	1.218	128,564	1.981	94,356	0.00
18.50	1.216	128,637	1.977	94,474	0.00
18.52	1.213	128,710	1.973	94,593	0.00
18.53	1.211	128,782	1.965	94,710	0.00

Runoff Hydrograph			Outflow Hydrograph		Detention
Time	Q	Volume	Q	Volume	equired Storag
(hrs)	(cfs)	(cuft)	(cfs)	(cuft)	(cuft)
18.55	1.208	128,855	1.957	94,828	0.00
18.57	1.205	128,927	1.949	94,945	0.00
18.58	1.203	128,999	1.942	95,061	0.00
18.60	1.200	129,072	1.934	95,177	0.00
18.62	1.198	129,143	1.927	95,293	0.00
18.63	1.195	129,215	1.923	95,408	0.00
18.65	1.193	129,287	1.919	95,524	0.00
18.67	1.190	129,358	1.917	95,639	0.00
18.68	1.188	129,430	1.916	95,754	0.00
18.70	1.185	129,501	1.914	95,868	0.00
18.72	1.183	129,572	1.913	95,983	0.00
18.73	1.181	129,643	1.913	96,098	0.00
18.75	1.178	129,714	1.912	96,213	0.00
18.77	1.176	129,784	1.908	96,327	0.00
18.78	1.173	129,855	1.906	96,442	0.00
18.80	1.171	129,925	1.905	96,556	0.00
18.82	1.168	129,995	1.901	96,670	0.00
18.83	1.166	130,065	1.897	96,784	0.00
18.85	1.164	130,135	1.890	96,897	0.00
18.87	1.161	130,205	1.883	97,010	0.00
18.88	1.159	130,275	1.876	97,123	0.00

Runoff Hydrograph			Outflow Hydrograph		Detention
Time	Q	Volume	Q	Volume	equired Storag
(hrs)	(cfs)	(cuft)	(cfs)	(cuft)	(cuft)
18.90	1.157	130,344	1.869	97,235	0.00
18.92	1.154	130,413	1.862	97,347	0.00
18.93	1.152	130,483	1.855	97,458	0.00
18.95	1.150	130,552	1.852	97,569	0.00
18.97	1.148	130,621	1.850	97,680	0.00
18.98	1.145	130,689	1.848	97,791	0.00
19.00	1.143	130,758	1.847	97,902	0.00
19.02	1.141	130,826	1.845	98,012	0.00
19.03	1.138	130,895	1.842	98,123	0.00
19.05	1.136	130,963	1.841	98,233	0.00
19.07	1.134	131,031	1.840	98,344	0.00
19.08	1.132	131,099	1.839	98,454	0.00
19.10	1.130	131,167	1.838	98,564	0.00
19.12	1.127	131,235	1.837	98,675	0.00
19.13	1.125	131,302	1.835	98,785	0.00
19.15	1.123	131,370	1.828	98,894	0.00
19.17	1.121	131,437	1.822	99,004	0.00
19.18	1.119	131,504	1.815	99,113	0.00
19.20	1.116	131,571	1.809	99,221	0.00
19.22	1.114	131,638	1.802	99,329	0.00
19.23	1.112	131,705	1.796	99,437	0.00

Runoff Hydrograph			Outflow Hydrograph		Detention
Time	Q	Volume	Q	Volume	equired Storag
(hrs)	(cfs)	(cuft)	(cfs)	(cuft)	(cuft)
19.25	1.110	131,772	1.793	99,545	0.00
19.27	1.108	131,838	1.791	99,652	0.00
19.28	1.106	131,905	1.790	99,759	0.00
19.30	1.104	131,971	1.783	99,866	0.00
19.32	1.102	132,037	1.780	99,973	0.00
19.33	1.100	132,103	1.777	100,080	0.00
19.35	1.098	132,169	1.777	100,186	0.00
19.37	1.096	132,235	1.776	100,293	0.00
19.38	1.094	132,300	1.775	100,400	0.00
19.40	1.091	132,366	1.774	100,506	0.00
19.42	1.089	132,431	1.772	100,612	0.00
19.43	1.087	132,497	1.771	100,719	0.00
19.45	1.085	132,562	1.768	100,825	0.00
19.47	1.083	132,627	1.765	100,930	0.00
19.48	1.081	132,692	1.759	101,036	0.00
19.50	1.079	132,757	1.753	101,141	0.00
19.52	1.077	132,822	1.747	101,246	0.00
19.53	1.076	132,886	1.741	101,350	0.00
19.55	1.074	132,951	1.738	101,455	0.00
19.57	1.072	133,015	1.735	101,559	0.00
19.58	1.070	133,079	1.732	101,663	0.00

Runoff Hydrograph			Outflow Hydrograph		Detention
Time	Q	Volume	Q	Volume	equired Storag
(hrs)	(cfs)	(cuft)	(cfs)	(cuft)	(cuft)
19.60	1.068	133,143	1.729	101,766	0.00
19.62	1.066	133,207	1.723	101,870	0.00
19.63	1.064	133,271	1.722	101,973	0.00
19.65	1.062	133,335	1.720	102,076	0.00
19.67	1.060	133,399	1.717	102,179	0.00
19.68	1.058	133,462	1.716	102,282	0.00
19.70	1.056	133,526	1.715	102,385	0.00
19.72	1.054	133,589	1.714	102,488	0.00
19.73	1.052	133,652	1.713	102,591	0.00
19.75	1.051	133,715	1.712	102,693	0.00
19.77	1.049	133,778	1.706	102,796	0.00
19.78	1.047	133,841	1.700	102,898	0.00
19.80	1.045	133,904	1.695	103,000	0.00
19.82	1.043	133,966	1.692	103,101	0.00
19.83	1.041	134,029	1.689	103,202	0.00
19.85	1.040	134,091	1.684	103,303	0.00
19.87	1.038	134,154	1.681	103,404	0.00
19.88	1.036	134,216	1.680	103,505	0.00
19.90	1.034	134,278	1.678	103,606	0.00
19.92	1.032	134,340	1.673	103,706	0.00
19.93	1.031	134,402	1.670	103,806	0.00

Runoff Hydrograph			Outflow Hydrograph		Detention
Time	Q	Volume	Q	Volume	equired Storag
(hrs)	(cfs)	(cuft)	(cfs)	(cuft)	(cuft)
19.95	1.029	134,464	1.669	103,906	0.00
19.97	1.027	134,525	1.667	104,006	0.00
19.98	1.025	134,587	1.662	104,106	0.00
20.00	1.023	134,648	1.661	104,206	0.00
20.02	1.022	134,710	1.660	104,305	0.00
20.03	1.020	134,771	1.659	104,405	0.00
20.05	1.018	134,832	1.658	104,504	0.00
20.07	1.017	134,893	1.657	104,604	0.00
20.08	1.015	134,954	1.651	104,703	0.00
20.10	1.013	135,015	1.646	104,802	0.00
20.12	1.011	135,076	1.641	104,900	0.00
20.13	1.010	135,136	1.636	104,998	0.00
20.15	1.008	135,197	1.633	105,096	0.00
20.17	1.006	135,257	1.632	105,194	0.00
20.18	1.005	135,318	1.631	105,292	0.00
20.20	1.003	135,378	1.631	105,390	0.00
20.22	1.001	135,438	1.626	105,488	0.00
20.23	1.000	135,498	1.621	105,585	0.00
20.25	0.998	135,558	1.618	105,682	0.00
20.27	0.996	135,618	1.617	105,779	0.00
20.28	0.995	135,677	1.616	105,876	0.00

Runoff Hydrograph			Outflow Hydrograph		Detention
Time	Q	Volume	Q	Volume	equired Storag
(hrs)	(cfs)	(cuft)	(cfs)	(cuft)	(cuft)
20.30	0.993	135,737	1.611	105,972	0.00
20.32	0.991	135,797	1.609	106,069	0.00
20.33	0.990	135,856	1.608	106,165	0.00
20.35	0.988	135,915	1.607	106,262	0.00
20.37	0.986	135,975	1.606	106,358	0.00
20.38	0.985	136,034	1.601	106,454	0.00
20.40	0.983	136,093	1.598	106,550	0.00
20.42	0.982	136,152	1.596	106,646	0.00
20.43	0.980	136,211	1.591	106,741	0.00
20.45	0.979	136,269	1.589	106,837	0.00
20.47	0.977	136,328	1.586	106,932	0.00
20.48	0.975	136,387	1.584	107,027	0.00
20.50	0.974	136,445	1.581	107,122	0.00
20.52	0.972	136,504	1.577	107,216	0.00
20.53	0.971	136,562	1.574	107,311	0.00
20.55	0.969	136,620	1.572	107,405	0.00
20.57	0.968	136,678	1.571	107,499	0.00
20.58	0.966	136,736	1.570	107,594	0.00
20.60	0.965	136,794	1.567	107,688	0.00
20.62	0.963	136,852	1.565	107,782	0.00
20.63	0.961	136,910	1.563	107,875	0.00

Runoff Hydrograph			Outflow Hydrograph		Detention
Time	Q	Volume	Q	Volume	equired Storag
(hrs)	(cfs)	(cuft)	(cfs)	(cuft)	(cuft)
20.65	0.960	136,967	1.560	107,969	0.00
20.67	0.958	137,025	1.558	108,062	0.00
20.68	0.957	137,082	1.556	108,156	0.00
20.70	0.955	137,140	1.553	108,249	0.00
20.72	0.954	137,197	1.549	108,342	0.00
20.73	0.952	137,254	1.544	108,435	0.00
20.75	0.951	137,311	1.543	108,527	0.00
20.77	0.949	137,368	1.542	108,620	0.00
20.78	0.948	137,425	1.541	108,712	0.00
20.80	0.947	137,482	1.540	108,805	0.00
20.82	0.945	137,539	1.535	108,897	0.00
20.83	0.944	137,595	1.531	108,989	0.00
20.85	0.942	137,652	1.529	109,080	0.00
20.87	0.941	137,708	1.527	109,172	0.00
20.88	0.939	137,765	1.524	109,263	0.00
20.90	0.938	137,821	1.522	109,355	0.00
20.92	0.936	137,877	1.520	109,446	0.00
20.93	0.935	137,934	1.519	109,537	0.00
20.95	0.934	137,990	1.518	109,628	0.00
20.97	0.932	138,046	1.516	109,719	0.00
20.98	0.931	138,101	1.514	109,810	0.00

Runoff Hydrograph			Outflow Hydrograph		Detention
Time	Q	Volume	Q	Volume	equired Storag
(hrs)	(cfs)	(cuft)	(cfs)	(cuft)	(cuft)
21.00	0.929	138,157	1.509	109,900	0.00
21.02	0.928	138,213	1.507	109,991	0.00
21.03	0.927	138,269	1.505	110,081	0.00
21.05	0.925	138,324	1.503	110,171	0.00
21.07	0.924	138,380	1.502	110,261	0.00
21.08	0.922	138,435	1.501	110,351	0.00
21.10	0.921	138,490	1.499	110,441	0.00
21.12	0.920	138,546	1.497	110,531	0.00
21.13	0.918	138,601	1.492	110,621	0.00
21.15	0.917	138,656	1.490	110,710	0.00
21.17	0.916	138,711	1.488	110,799	0.00
21.18	0.914	138,766	1.484	110,889	0.00
21.20	0.913	138,820	1.482	110,977	0.00
21.22	0.912	138,875	1.480	111,066	0.00
21.23	0.910	138,930	1.478	111,155	0.00
21.25	0.909	138,984	1.476	111,243	0.00
21.27	0.908	139,039	1.474	111,332	0.00
21.28	0.906	139,093	1.472	111,420	0.00
21.30	0.905	139,148	1.470	111,508	0.00
21.32	0.904	139,202	1.468	111,596	0.00
21.33	0.902	139,256	1.466	111,684	0.00

Runoff Hydrograph			Outflow Hydrograph		Detention
Time	Q	Volume	Q	Volume	equired Storag
(hrs)	(cfs)	(cuft)	(cfs)	(cuft)	(cuft)
21.35	0.901	139,310	1.465	111,772	0.00
21.37	0.900	139,364	1.464	111,860	0.00
21.38	0.898	139,418	1.462	111,948	0.00
21.40	0.897	139,472	1.460	112,035	0.00
21.42	0.896	139,526	1.456	112,123	0.00
21.43	0.894	139,579	1.454	112,210	0.00
21.45	0.893	139,633	1.452	112,297	0.00
21.47	0.892	139,687	1.450	112,384	0.00
21.48	0.891	139,740	1.448	112,471	0.00
21.50	0.889	139,793	1.444	112,558	0.00
21.52	0.888	139,847	1.442	112,644	0.00
21.53	0.887	139,900	1.441	112,731	0.00
21.55	0.885	139,953	1.440	112,817	0.00
21.57	0.884	140,006	1.437	112,903	0.00
21.58	0.883	140,059	1.435	112,989	0.00
21.60	0.882	140,112	1.433	113,075	0.00
21.62	0.880	140,165	1.429	113,161	0.00
21.63	0.879	140,218	1.427	113,247	0.00
21.65	0.878	140,271	1.426	113,332	0.00
21.67	0.877	140,323	1.426	113,418	0.00
21.68	0.876	140,376	1.426	113,503	0.00

Runoff Hydrograph			Outflow Hydrograph		Detention
Time	Q	Volume	Q	Volume	equired Storag
(hrs)	(cfs)	(cuft)	(cfs)	(cuft)	(cuft)
21.70	0.874	140,428	1.425	113,589	0.00
21.72	0.873	140,481	1.421	113,674	0.00
21.73	0.872	140,533	1.418	113,759	0.00
21.75	0.871	140,585	1.416	113,844	0.00
21.77	0.870	140,638	1.414	113,929	0.00
21.78	0.868	140,690	1.412	114,014	0.00
21.80	0.867	140,742	1.410	114,098	0.00
21.82	0.866	140,794	1.407	114,183	0.00
21.83	0.865	140,846	1.405	114,267	0.00
21.85	0.864	140,898	1.404	114,351	0.00
21.87	0.862	140,949	1.403	114,436	0.00
21.88	0.861	141,001	1.399	114,519	0.00
21.90	0.860	141,053	1.398	114,603	0.00
21.92	0.859	141,104	1.396	114,687	0.00
21.93	0.858	141,156	1.394	114,771	0.00
21.95	0.857	141,207	1.393	114,854	0.00
21.97	0.855	141,258	1.392	114,938	0.00
21.98	0.854	141,310	1.389	115,021	0.00
22.00	0.853	141,361	1.387	115,104	0.00
22.02	0.852	141,412	1.385	115,188	0.00
22.03	0.851	141,463	1.382	115,270	0.00

Runoff Hydrograph			Outflow Hydrograph		Detention
Time	Q	Volume	Q	Volume	equired Storag
(hrs)	(cfs)	(cuft)	(cfs)	(cuft)	(cuft)
22.05	0.849	141,514	1.381	115,353	0.00
22.07	0.848	141,565	1.380	115,436	0.00
22.08	0.847	141,616	1.378	115,519	0.00
22.10	0.846	141,667	1.375	115,601	0.00
22.12	0.845	141,718	1.373	115,684	0.00
22.13	0.844	141,768	1.372	115,766	0.00
22.15	0.842	141,819	1.371	115,848	0.00
22.17	0.841	141,869	1.370	115,930	0.00
22.18	0.840	141,920	1.368	116,012	0.00
22.20	0.839	141,970	1.364	116,094	0.00
22.22	0.838	142,020	1.363	116,176	0.00
22.23	0.837	142,071	1.362	116,258	0.00
22.25	0.836	142,121	1.361	116,339	0.00
22.27	0.834	142,171	1.359	116,421	0.00
22.28	0.833	142,221	1.358	116,502	0.00
22.30	0.832	142,271	1.354	116,584	0.00
22.32	0.831	142,321	1.351	116,665	0.00
22.33	0.830	142,371	1.350	116,746	0.00
22.35	0.829	142,420	1.349	116,827	0.00
22.37	0.828	142,470	1.348	116,908	0.00
22.38	0.827	142,520	1.344	116,988	0.00

Runoff Hydrograph			Outflow Hydrograph		Detention
Time	Q	Volume	Q	Volume	equired Storag
(hrs)	(cfs)	(cuft)	(cfs)	(cuft)	(cuft)
22.40	0.826	142,569	1.341	117,069	0.00
22.42	0.825	142,619	1.340	117,149	0.00
22.43	0.824	142,668	1.340	117,230	0.00
22.45	0.823	142,718	1.338	117,310	0.00
22.47	0.822	142,767	1.336	117,390	0.00
22.48	0.820	142,816	1.335	117,470	0.00
22.50	0.819	142,865	1.335	117,550	0.00
22.52	0.818	142,915	1.331	117,630	0.00
22.53	0.817	142,964	1.330	117,710	0.00
22.55	0.816	143,013	1.329	117,790	0.00
22.57	0.815	143,062	1.329	117,869	0.00
22.58	0.814	143,110	1.328	117,949	0.00
22.60	0.813	143,159	1.325	118,029	0.00
22.62	0.812	143,208	1.322	118,108	0.00
22.63	0.811	143,257	1.320	118,187	0.00
22.65	0.810	143,305	1.319	118,266	0.00
22.67	0.809	143,354	1.317	118,345	0.00
22.68	0.808	143,402	1.316	118,424	0.00
22.70	0.807	143,451	1.313	118,503	0.00
22.72	0.806	143,499	1.311	118,582	0.00
22.73	0.805	143,548	1.309	118,660	0.00

Runoff Hydrograph			Outflow Hydrograph		Detention
Time	Q	Volume	Q	Volume	equired Storag
(hrs)	(cfs)	(cuft)	(cfs)	(cuft)	(cuft)
22.75	0.804	143,596	1.306	118,739	0.00
22.77	0.803	143,644	1.305	118,817	0.00
22.78	0.802	143,692	1.304	118,895	0.00
22.80	0.800	143,740	1.303	118,973	0.00
22.82	0.799	143,788	1.300	119,051	0.00
22.83	0.798	143,836	1.300	119,129	0.00
22.85	0.797	143,884	1.299	119,207	0.00
22.87	0.796	143,932	1.299	119,285	0.00
22.88	0.795	143,980	1.299	119,363	0.00
22.90	0.794	144,027	1.297	119,441	0.00
22.92	0.793	144,075	1.294	119,519	0.00
22.93	0.792	144,122	1.291	119,596	0.00
22.95	0.791	144,170	1.290	119,673	0.00
22.97	0.790	144,217	1.288	119,751	0.00
22.98	0.789	144,265	1.285	119,828	0.00
23.00	0.788	144,312	1.284	119,905	0.00
23.02	0.787	144,359	1.282	119,982	0.00
23.03	0.786	144,407	1.281	120,059	0.00
23.05	0.785	144,454	1.279	120,135	0.00
23.07	0.784	144,501	1.276	120,212	0.00
23.08	0.783	144,548	1.275	120,289	0.00

Runoff Hydrograph			Outflow Hydrograph		Detention
Time	Q	Volume	Q	Volume	equired Storag
(hrs)	(cfs)	(cuft)	(cfs)	(cuft)	(cuft)
23.10	0.783	144,595	1.274	120,365	0.00
23.12	0.782	144,642	1.272	120,441	0.00
23.13	0.781	144,689	1.271	120,517	0.00
23.15	0.780	144,735	1.270	120,594	0.00
23.17	0.779	144,782	1.270	120,670	0.00
23.18	0.778	144,829	1.270	120,746	0.00
23.20	0.777	144,875	1.269	120,822	0.00
23.22	0.776	144,922	1.268	120,898	0.00
23.23	0.775	144,969	1.265	120,974	0.00
23.25	0.774	145,015	1.263	121,050	0.00
23.27	0.773	145,061	1.262	121,126	0.00
23.28	0.772	145,108	1.259	121,201	0.00
23.30	0.771	145,154	1.256	121,277	0.00
23.32	0.770	145,200	1.254	121,352	0.00
23.33	0.769	145,246	1.253	121,427	0.00
23.35	0.768	145,293	1.252	121,502	0.00
23.37	0.767	145,339	1.251	121,577	0.00
23.38	0.766	145,385	1.248	121,652	0.00
23.40	0.765	145,430	1.247	121,727	0.00
23.42	0.764	145,476	1.245	121,802	0.00
23.43	0.763	145,522	1.244	121,876	0.00

Runoff Hydrograph			Outflow Hydrograph		Detention
Time	Q	Volume	Q	Volume	equired Storag
(hrs)	(cfs)	(cuft)	(cfs)	(cuft)	(cuft)
23.45	0.762	145,568	1.243	121,951	0.00
23.47	0.761	145,614	1.242	122,025	0.00
23.48	0.760	145,659	1.241	122,100	0.00
23.50	0.759	145,705	1.240	122,174	0.00
23.52	0.758	145,750	1.239	122,248	0.00
23.53	0.757	145,796	1.238	122,323	0.00
23.55	0.756	145,841	1.237	122,397	0.00
23.57	0.755	145,886	1.236	122,471	0.00
23.58	0.754	145,932	1.234	122,545	0.00
23.60	0.753	145,977	1.232	122,619	0.00
23.62	0.752	146,022	1.229	122,693	0.00
23.63	0.751	146,067	1.228	122,766	0.00
23.65	0.750	146,112	1.226	122,840	0.00
23.67	0.749	146,157	1.225	122,914	0.00
23.68	0.748	146,202	1.224	122,987	0.00
23.70	0.747	146,247	1.221	123,060	0.00
23.72	0.747	146,292	1.220	123,133	0.00
23.73	0.746	146,336	1.220	123,207	0.00
23.75	0.745	146,381	1.219	123,280	0.00
23.77	0.744	146,426	1.218	123,353	0.00
23.78	0.743	146,470	1.216	123,426	0.00

Runoff Hydrograph			Outflow Hydrograph		Detention
Time	Q	Volume	Q	Volume	equired Storag
(hrs)	(cfs)	(cuft)	(cfs)	(cuft)	(cuft)
23.80	0.742	146,515	1.214	123,499	0.00
23.82	0.741	146,559	1.213	123,571	0.00
23.83	0.740	146,604	1.212	123,644	0.00
23.85	0.739	146,648	1.211	123,717	0.00
23.87	0.738	146,693	1.211	123,789	0.00
23.88	0.737	146,737	1.208	123,862	0.00
23.90	0.736	146,781	1.207	123,934	0.00
23.92	0.000	146,803	1.205	124,007	0.00