LAKEVIEW TRAILS

Residential Subdivision
Cedar Hills, Utah

FINAL STORMWATER MANAGEMENT PLAN REPORT

Prepared for:

MJG Holdings, LLC
9644 Winchester Drive
Pleasant Grove, Utah 84062
(801) 636-2074

Prepared by:

Civil Science, Inc.
3160 W. Clubhouse Drive
Lehi, Utah 84043
(801) 768-7200

REGISTERED PROFESSIONAL ENGINEER
JUSTIN GLEN JONES
NO. 353820-2202
4/08/15
STATE OF UTAH

April 2015

TABLE OF CONTENTS

1.0 BACKGROUND AND INTRODUCTION 1
1.1 Project Introduction 1
1.2 Jurisdictional Requirements 1
1.3 Drainage Design Criteria 1
1.4 Drainage Analysis Methodology 5

2.0 PRE-DEVELOPED CONDITIONS
2.1 Site Description 6
2.2 Drainage Description and Analysis 6

3.0 POST-DEVELOPED CONDITIONS
3.1 Site Description 7
3.2 Drainage Description and Analysis 7

4.0 CONCLUSIONS 8

FIGURES:

FIGURE 1: Off-Site Pre-Developed Condition
FIGURE 2: On-Site Pre-Developed Condition
FIGURE 3: Post-Developed Condition
FIGURE 4: NRCS Hydrologic Soils Map
FIGURE 5: Hydraflow Express Sections
FIGURE 6: Off-Site Topography
FIGURE 7: 5-FT Diameter Sump Storage Curve
FIGURE 8: Percolation Test Results
FIGURE 9: Infiltration Sump Output

APPENDICES:

APPENDIX A: 100-Year 24-Hour Storm Analysis Output

1.0 BACKGROUND AND INTRODUCTION

1.1 Project Introduction

MJG Holdings, LLC is proposing the Lakeview Trails development consisting of single family residential lots along the east bench of Cedar Hills, Utah. The project is located in the northwest quarter of Section 5, Township 5 South, Range 2 East, Salt Lake Meridian, Cedar Hills, Utah County, Utah. The following parcels are included in the subdivision:
Parcel numbers 14:001:0072 and 14:001:0050

The purpose of this report is to document the design approach, calculations, recommendations and other pertinent information specific to the development with respect to stormwater design. The design report is being submitted to the City of Cedar Hills to assist the city with the decision making process for approval of the final plan.

1.2 Jurisdictional Requirements

The *2010 City of Cedar Hills Storm Water Management Plan, Part 3—Storm Water Technical Manual* requires the following:

a. Incorporate best management practices (BMPs) into development design to limit quantity of runoff and preserve quality of runoff
b. Prepare Construction Site Storm Water Management Plan
c. Provide financial guarantee that improvements contained in the Construction Site Storm Water Management Plan will be installed and maintained
d. Prepare Post Construction Storm Water Management Plan
e. Obtain UPDES Permit (all sites having land disturbance area equal to or greater than 1 acre)

1.3 Drainage Design Criteria

The *2010 City of Cedar Hills Storm Water Management Plan, Part 3F—Storm Water Performance Criteria and Design Guidelines* requires the following:

a. Contents of drainage system plan
    i. The drainage plan shall include an analysis of potential drainage problems, along with a proposal indicating how the surface water will be disposed of. Detention basins may be required to alleviate the impact on existing drainage facilities. Said plan shall also include the projected quantity of waters anticipated for a ten-year and fifty-year storm (piping), 100-year storm (detention facilities), and 100-year storm (retention facilities). All

drainage facilities shall be installed in conformance with approved City drainage plans.

ii. The development shall include all necessary storm drainage appurtenances including collection boxes/basins, culverts, drain pipes, detention/retention basins, erosion control, energy dissipation structures, and drainage channels. In order to insure the safety of the occupants of a subdivision, the City may require the developer to cover or fence culverts, basins, and canals, at the discretion of the City Planning Commission and Council.

b. Design storm frequency

i. Drainage facilities other than detention and retention facilities shall be adequate for a design ten-year storm

ii. Flood control facilities shall be designed for a 10-year and 50-year storm

iii. Drainage basins (detention or retention) shall be designed for a 100-year storm (of all durations)

c. Drainage basin design

i. Drainage basins shall be designed to have a minimum of one foot of freeboard, 3:1 slope (max.), and grass covering with a sprinkling system unless otherwise approved.

ii. Detention basins shall be designed with a maximum discharge rate of 0.2 cfs/acre, or as otherwise dictated by the City Engineer.

iii. All drainage basins shall include a spillway adequate to assure that minimum damage occurs as a result of basin overflow.

iv. All drainage basin calculations shall be compiled in the form of a report, and shall be stamped by a professional engineer, licensed in the State of Utah.

d. Drainage system design

i. Maximum design capacity is 3.0 cfs for a standard bicycle safe 18” x 36” inlet grate.

ii. All surface drainage piping shall have a minimum diameter of 15-inches.

iii. All subsurface drainage piping shall have a minimum diameter of 8-inches.

iv. Manholes shall be installed at spacing no greater than 400 feet and at angle points in drainage and subsurface drainage piping.

v. Minimum pipe slopes shall be the same as required by the Utah State Division of Health for sanitary sewers.

vi. Piping, testing, etc., shall comply with specific requirements as defined in the section of the specifications covering storm drainage requirements unless otherwise approved by the City Engineer.

e. Pretreatment facilities

i. In areas where the highest water level in the ground is no closer than eight (8) feet to the ground surface and percolation rates are high, pre-treatment sumps may be used to dispose of surface waters.
ii. All pre-treatment manhole and storm water sumps shall be constructed to comply with applicable City Standards, and as indicated within Standard Drawing No. 507a & 507b.
iii. All design data including percolation tests, etc., must be submitted with the drainage plan.
iv. For single lots or small areas, the above may be waived so that sumps can be installed or drainage directed on to private property with a drainage easement.

f. Storm water encroachment onto streets

Allowable use of streets for the initial storm water runoff in terms of pavement encroachment is as follows:

Street Classification	Maximum Encroachment
Rural	No curb over-topping. Flow may spread to crown of street.
Local	No curb over-topping. Flow may spread to crown of street.
Minor Collector	No curb over-topping. Flow spread must leave at least one lane in each direction free of water.
Major Collector	No curb over-topping. Flow spread must leave at least one lane in each direction free of water.

g. Intensity-Duration-Frequency (IDF) Curve

The Intensity Duration Frequency (IDF) data shown below shall be used for storm drainage calculations in Cedar Hills City.

Design Rainfall Intensities (inches per hour) for the Given Duration

Duration	**10 Year**	**25 Year**	**50 Year**	**100 Year**
10 min	2.57	3.39	4.13	5.02
15 min	2.12	2.80	3.42	4.14
30 min	1.43	1.89	2.30	2.79
60 min	0.88	1.17	1.42	1.73
2 hours	0.51	0.66	0.80	0.95
3 hours	0.37	0.47	0.55	0.65
6 hours	0.23	0.28	0.32	0.36
12 hours	0.14	0.17	0.19	0.22
24 hours	0.09	0.10	0.11	0.12

Design Rainfall Depths (Inches) for the Given Duration

Duration	10 Year	25 Year	50 Year	100 Year
10 min	0.44	0.57	0.70	0.84
15 min	0.54	0.71	0.86	1.05
30 min	0.73	0.95	1.16	1.41
60 min	0.90	1.18	1.44	1.74
2 hours	1.04	1.34	1.61	1.93
3 hours	1.13	1.42	1.68	1.99
6 hours	1.39	1.68	1.91	2.18
12 hours	1.75	2.08	2.34	2.63
24 hours	1.95	2.26	2.51	2.76

h. Storm water quality criteria

i. Storm Water Treatment

Prior to discharging storm water; collected water must be treated in an attempt to prevent illicit discharges of sediment, oils, floatables and other pollutants.

ii. Use of Best Management Practices

Cedar Hills City encourages the use of the BMP fact sheets included in PART 4, CONSTRUCTION AND POST CONSTRUCTION BEST MANAGEMENT PRACTICES. The following BMPs are required to be a part of all Construction Site Storm Water Management Plans:

BMP Inspection & Maintenance	BMPIM
Concrete Waste Management	CWM
Dust Controls	DC
Grading Practices	GP
Portable Toilets	PT

There is no list of BMPs that is required on all Post Construction Storm Water Management Plans.

In addition to the required BMPs listed above, other BMPs from PART 4 that apply to a given development should be used. Cedar Hills City also encourages the use of practices in addition to those contained in the Cedar Hills Storm Water Management Program that may be suitable for a given development. Engineering judgment must be used in selecting BMPs for a given development.

i. Prohibited Practices

The following practices are specifically prohibited:

i. Soil or construction materials may not be piled in streets

ii. Soil bridges over curb and gutter may not be constructed

j. Meeting with City Staff
   i. Civil Science met with the city engineer and planner to discuss the project and the following direction was provided:
      i) All storm water generated within the project limits must be retained on-site. Assume that all individual lots will retain their own storm water; therefore, only public rights-of-way need to be included in the storm water calculations.
      ii) All off-site storm water that impacts the project is allowed to pass through without detention/retention.

1.4 Drainage Analysis Methodology

The NRCS TR-55 method of analysis was used for all on-site and off-site subbasins. The primary analysis for subbasins, infiltration sumps, and pipe sizing was performed using Autodesk® Storm and Sanitary Analysis (SSA) software with additional cross-section analysis performed using Autodesk® Hydraflow Express Extension software. Results from the SSA analysis can be found in Appendix A and Hydraflow Express sections are included as Figure 5.

A 100-year, 24-hour design storm event with a total rainfall depth of 2.76 inches was used to size retention/infiltration sumps, to verify that flows could be conveyed through the proposed drainage system and streets, and to ensure peak discharge flow rates are not increased in the post-developed condition.

Two separate scenarios were analyzed to determine the development's effects on drainage. First, pre-developed conditions were analyzed to determine the peak discharge flow rates from the site. The second scenario analyzed flows in the post-developed condition, including off-site flows entering the site and proposed stormwater management facilities. Post-developed analysis results were compared to the pre-developed analysis to assess differences in peak discharge flow rates during the post-developed 100-year storm event. Results for each analysis are summarized in this report and presented in the appendices.

Throughout the analysis, curve numbers were selected based upon hydrologic soil types provided by the NRCS Web Soil Survey (see Figure 4—*NRCS Hydrologic Soils Map*) and using the existing and proposed land use.

The development's proposed street sections include paved roadways with curb and gutter and infiltration sumps, which convey runoff from streets. See the Civil Improvement Plans for additional information.

2.0 PRE-DEVELOPED CONDITIONS

2.1 Site Description

The proposed site is located east of Canyon Road/SR-146, just north of West Cedar Hills Drive, and south of the existing *Cedars at Cedar Hills Subdivision*. The proposed site is currently undeveloped land, except for the existing Salt Lake Aqueduct (SLA) that bisects the site. There is approximately 200 feet of elevation difference from Canyon Road to the east edge of project. Elevation continues to rise to the east towards the Uinta-Wasatch-Cache National Forest. Land north of the proposed project is a completed residential subdivision, while land east and south of the proposed project is undeveloped. The project lies within the H-1 Hillside Zone.

2.2 Drainage Description and Analysis

Existing topography in the area generally drains from east to west. Refer to Figure 1 – *Off-Site Pre-Developed Condition*, Figure 2 – *On-Site Pre-Developed Condition*, and Figure 6 – *Off-site Topography* for additional information. Runoff from the project site currently enters Canyon Road in two primary locations (from subbasins PRE-2 and PRE-CANYONRD) as shallow concentrated flow. Peak runoff flow rates generated during the 100-year 24-hour storm are 0.4 cfs and 1.1 cfs for subbasins PRE-2 and PRE-CANYONRD, respectively. Subbasin PRE-2 includes subbasins PRE-4, PRE-5, and PRE-6. Off-site peak flows from subbasin PRE-4, 0.02 cfs, enter the project from the east and continue through the project, ultimately discharging into Canyon Road. Off-site peak flows from subbasin PRE-6, 0.7 cfs, enter the northwest corner of the project, ultimately discharging into Canyon Road. Runoff from subbasin PRE-5, 0.05 cfs, includes runoff from subbasin PRE-4 and drains to an existing shallow detention area just south of the existing SLA pipeline and just north of the existing trail. Runoff from subbasin PRE-BYPASS1 currently drains into the existing Bayhill Drive improvements north of the proposed project and are conveyed north, away from the proposed project, by existing infrastructure. Based on discussion between the City of Cedar Hills staff and Civil Science it is assumed that subbasins PRE-6, and PRE-BYPASS1 will continue maintain existing runoff patterns, with subbasin PRE-6 allowed to flow through the site, and into Canyon Road without detention/retention, and PRE-BYPASS1 continuing to flow north of the project site and into Bayhill Drive. Runoff generated by existing Canyon Road improvements (subbasin PRE-CANYONRD) flows south in a graded ditch along the east side of Canyon Road, and has a peak flow rate of 1.1 cfs for the 100-year 24-hour design event. Refer to Appendix A–*100-Year 24-Hour Storm Analysis Output* for further information.

3.0 POST-DEVELOPED CONDITIONS

3.1 Site Description

The Lakeview Trails subdivision is proposing paved streets with curb, gutter, and storm water pre-treatment manholes with infiltration sumps to be constructed per Cedar Hills standard details. Bayhill Drive will terminate in a cul-de-sac inside the proposed development, while Lakeview Drive will terminate in a temporary turn-around at the southern project boundary until future development extends it to the south. The Hunters Court cul-de-sac abuts Canyon Road and serves as access to four lots. Sanitary sewer, water, and pressurized irrigation will be installed along each street section with service stubs provided to each proposed lot.

The project is a proposed Planned Residential Development (PRD) overlay within the H-1 Hillside Zone.

Refer to Figure 3—*Post-Developed Condition* and Civil Improvement Plans for additional information.

3.2 Drainage Description and Analysis

Drainage was analyzed to include areas within all public rights-of-way, while individual lots were assumed to retain runoff without discharge to public improvements. Catch basins with pre-treatment snouts and infiltration sumps, installed according to Cedar Hills standard drawings 507A and 507B, will collect and retain runoff. Infiltration sumps will be placed adjacent to Bayhill Drive, along Lakeview Drive, along Canyon Road, and in Hunters Court to retain runoff, as analyzed. Infiltration sumps will be located in public easements on private lots, outside the public right-of-way.

In locations where one infiltration sump is not adequate to retain runoff volumes from the 100-year 24-hour storm event, multiple infiltration sumps are connected in series with 20’ minimum separation, to increase volume capacity to calculated amounts. Percolation tests were performed to determine appropriate infiltration rates. Four tests were performed and had results ranging from 8 inches per hour to 20 inches per hour. Tests were performed near proposed infiltration sump locations, and resulting values were used in the analysis as appropriate to properly size infiltration sumps. Percolation test results are included as Figure 8.

Flows along the improved section of Canyon Road will be collected in curb inlets and retained in infiltration sumps with 1.1 cfs peak discharging past the proposed improvements and continuing south within the Canyon Road right-of-way, as in the pre-developed condition. A flow cross-section was analyzed at the south end of Canyon Road, just upstream of curb inlet CB-3A to verify gutter spread. Results

show that during the 100-year event, water spreads approximately 3.5-feet from lip of gutter, which leaves a dry lane, which meets city standards. Additionally, the west half of Canyon Road should carry lower flows during the 100-year storm event, allowing northbound traffic to use the entire existing two-way center left lane if needed.

A flow cross-section was analyzed at the west end of Lakeview Drive, just upstream of curb inlet CB-5A to verify flow depth. Results show that during the 100-year event, water depth is below top of gutter, which meets city standards.

Flow cross-sections were analyzed for the graded channel around Lot 1 (which receives off-site flows from subbasin PRE-6) and for the graded channel between SDMH 10B and retention basin RET-BASIN-1 (which receives flows from subbasin POST-BAYHILL). Both channels show adequate capacity to convey expected flows. Further information can be found on Figure 3—*Post-Developed Condition* and Figure 5—*Hydraflow Express Sections*.

Retention basin RET-BASIN-1 will modify an existing shallow detention area to provide capacity to retain the 100-year event. A 12-inch overflow pipe will be installed above the expected 100-year water surface elevation to convey emergency overflow between Lots 3 and 4, alongside the proposed trail connection. Further information can be found on Figure 3—*Post-Developed Condition*, the Civil Improvement Plans, and in Appendix A–*100-Year 24-Hour Storm Analysis Output*.

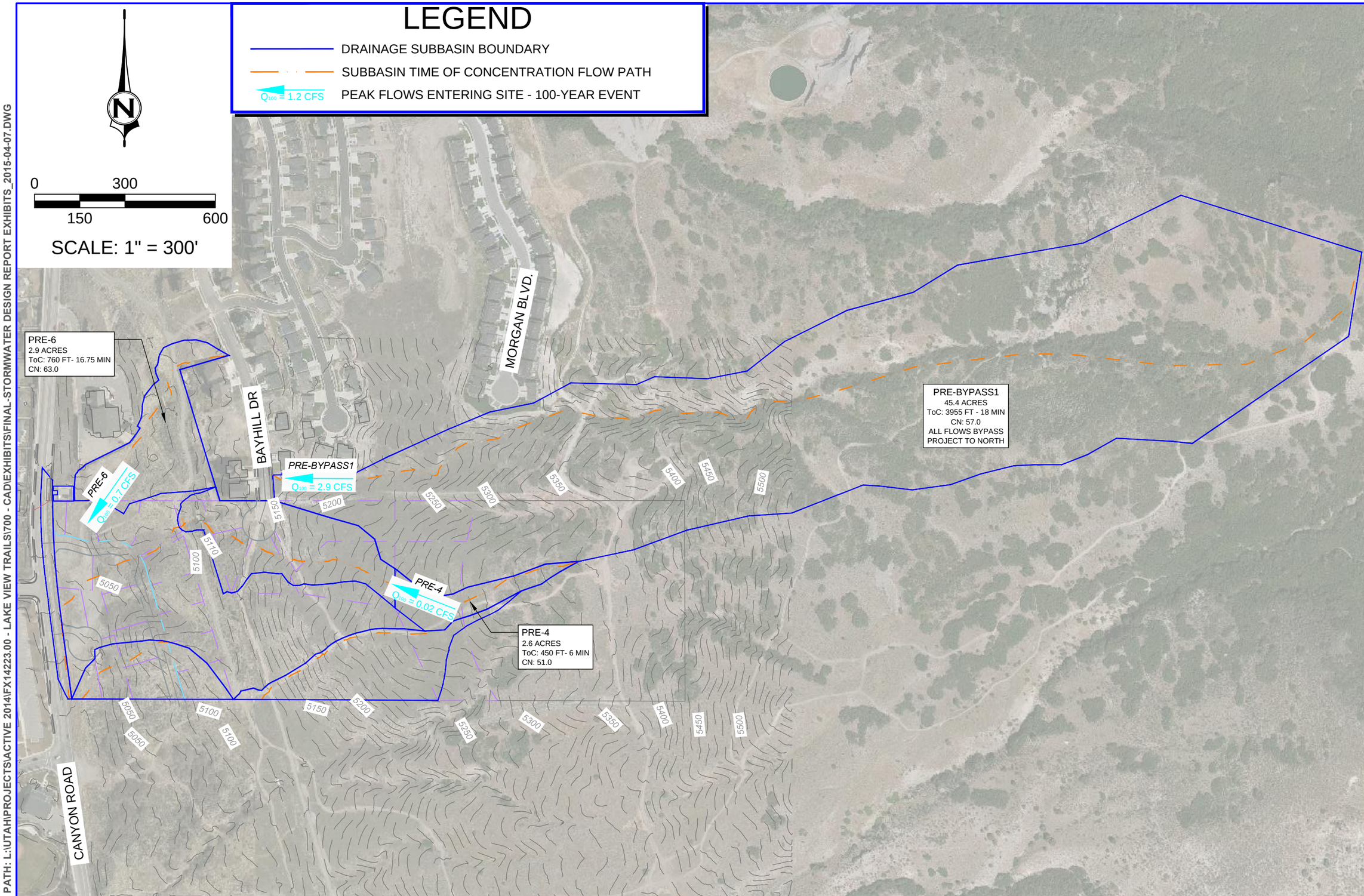
4.0 CONCLUSIONS

All runoff generated in public right-of-way within the proposed project is retained in infiltration sumps as directed by the City of Cedar Hills, while runoff along Canyon Road is maintained at 1.1 cfs by installation of curb and gutter, curb inlets and infiltration sumps.

All proposed streets meet minimum requirements for flow depth or gutter spread and the proposed drainage channels and retention basin provide adequate capacity during the 100-year storm event.

This report has shown that the Lakeview Trails development meets or exceeds all requirements for stormwater management design put forth by the City of Cedar Hills. This report was prepared to assist the City of Cedar Hills in the review and approval process of the final plat and improvement plans.

FIGURES



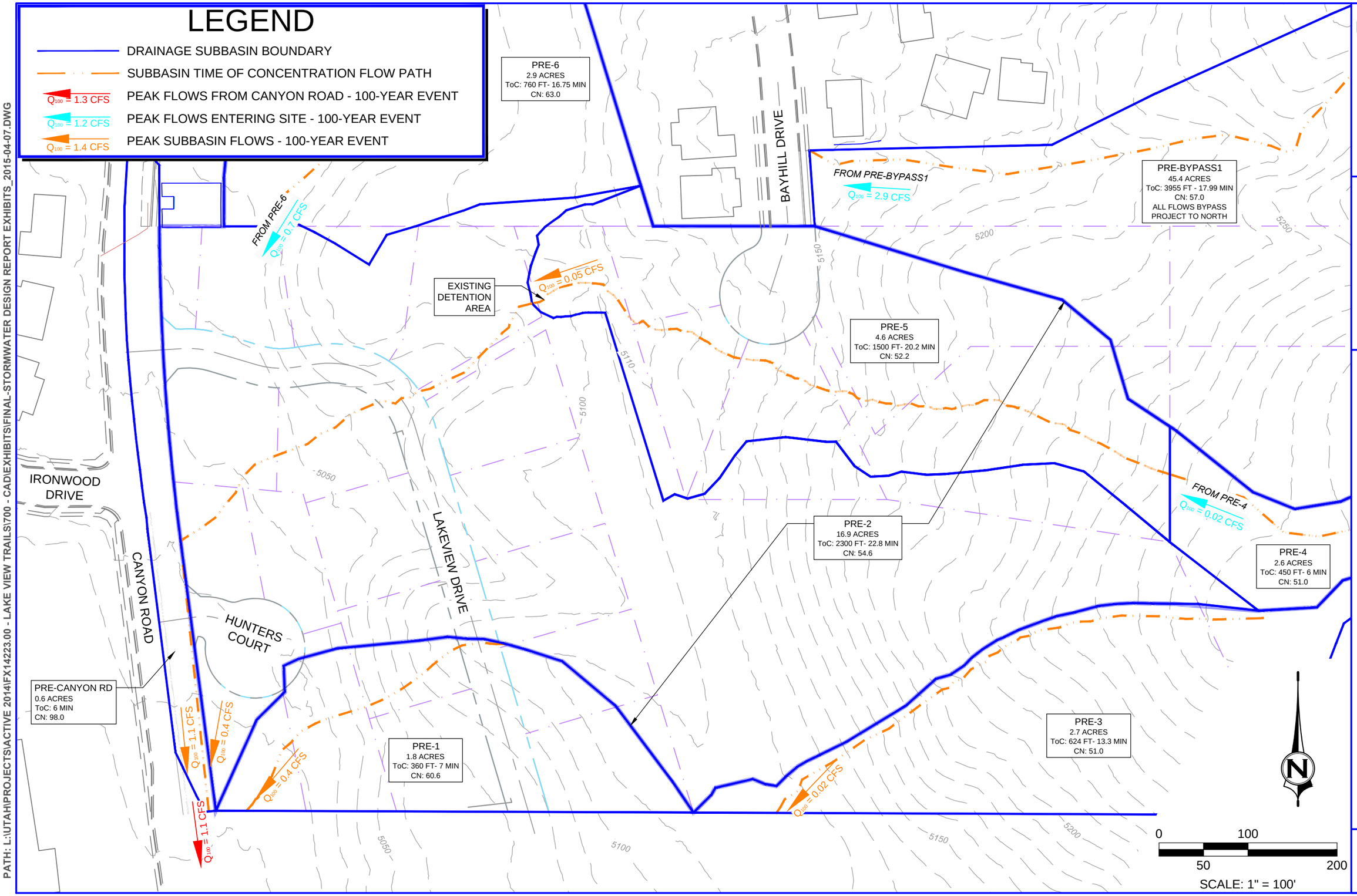
CIVIL SCIENCE
INFRASTRUCTURE, INC.
3160 WEST CLUBHOUSE DRIVE
LEHI, UT 84043
801.768.7200

FIGURE 1 OFF-SITE PRE-DEVELOPED CONDITION

LAKEVIEW TRAILS
CEDAR HILLS, UT

SHEET
1 OF 1

PLOT: 2015-04-08 02:54 PM
PATH: L:\UTAH\PROJECTS\ACTIVE 2014\FX14223.00 - LAKE VIEW TRAILS\700 - CAD\EXHIBITS\FINAL-STORMWATER DESIGN REPORT EXHIBITS_2015-04-07.DWG



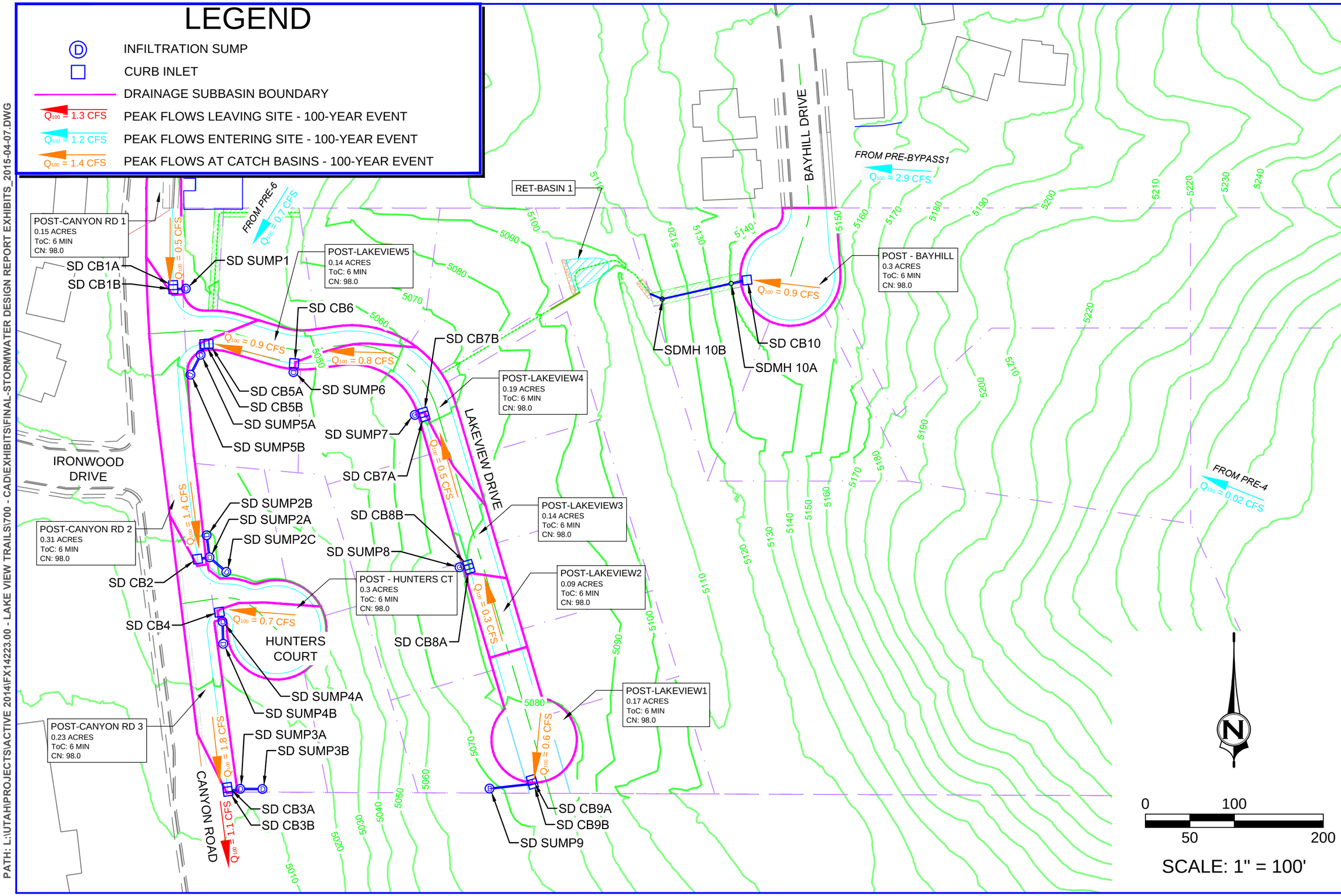
CIVIL SCIENCE
INFRASTRUCTURE, INC.
3160 WEST CLUBHOUSE DRIVE
LEHI, UT 84043
801.768.7200

FIGURE 2 ON-SITE PRE-DEVELOPED CONDITION

LAKEVIEW TRAILS
CEDAR HILLS, UT

SHEET
1 OF 1

PLOT: 2015-04-08 02:54 PM
PATH: L:\UTAH\PROJECTS\ACTIVE 2014\FX14223.00 - LAKE VIEW TRAILS\700 - CAD\EXHIBITS\FINAL-STORMWATER DESIGN REPORT EXHIBITS_2015-04-07.DWG



CIVIL SCIENCE INFRASTRUCTURE, INC.
3160 WEST CLUBHOUSE DRIVE
LEHI, UT 84043
801.768.7200

FIGURE 3 POST-DEVELOPED CONDITION

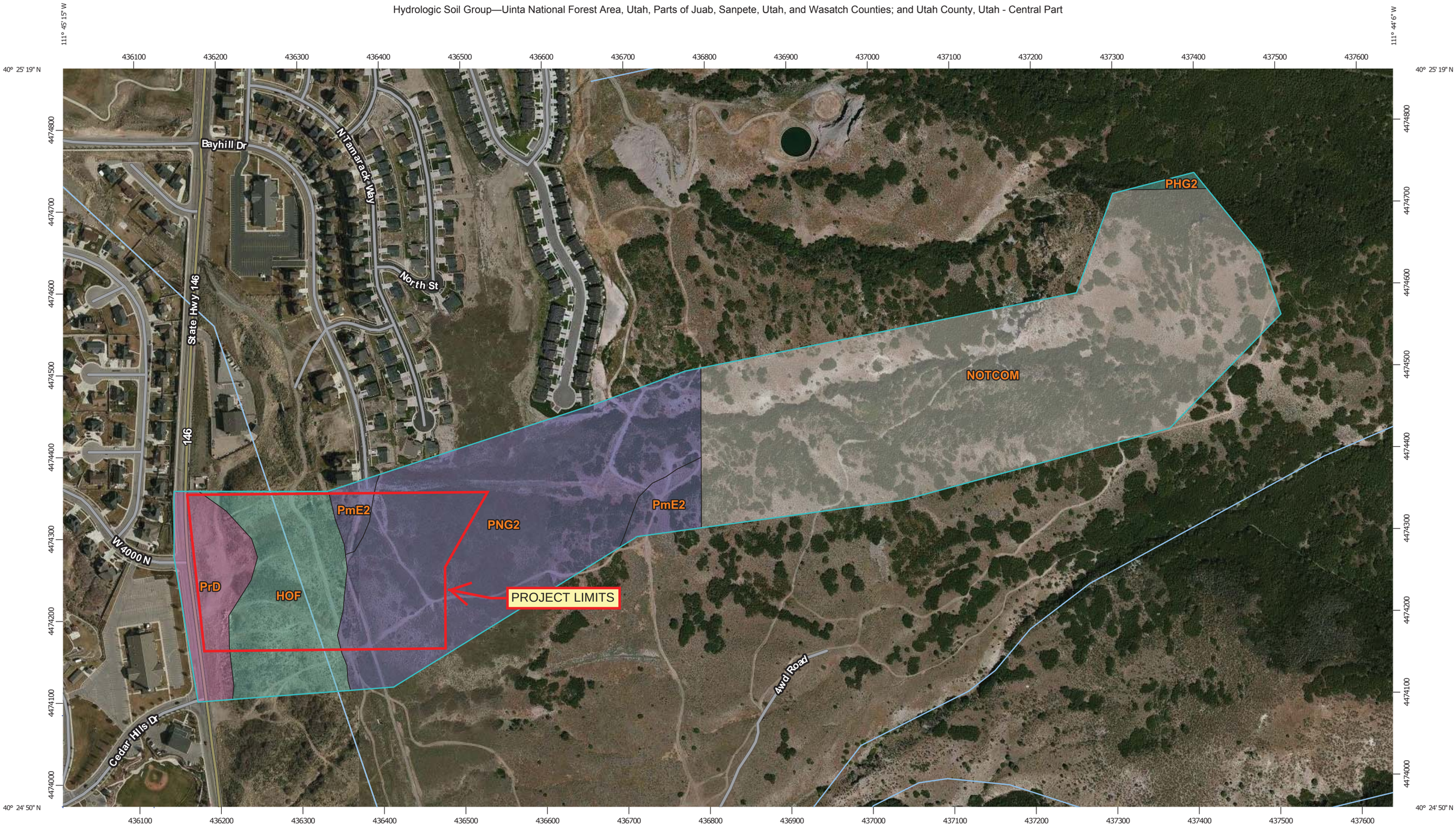
LAKEVIEW TRAILS
CEDAR HILLS, UT

SHEET 1 OF 1

PLOT: 2015-04-08 02:55 PM
PATH: L:\UTAH\PROJECTS\ACTIVE 2014\FX14223.00 - LAKE VIEW TRAILS\700 - CAD\EXHIBITS\FINAL-STORMWATER DESIGN REPORT EXHIBITS_2015-04-07.DWG

FIGURE 4 -- NRCS HYDROLOGIC SOILS MAP

Hydrologic Soil Group—Uinta National Forest Area, Utah, Parts of Juab, Sanpete, Utah, and Wasatch Counties; and Utah County, Utah - Central Part



Map Scale: 1:4,400 if printed on B landscape (17" x 11") sheet.

Meters: 0 50 100 200 300

Feet: 0 200 400 800 1200

N

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 12N WGS84

USDA

Natural Resources Conservation Service

Web Soil Survey
National Cooperative Soil Survey

12/22/2014
Page 1 of 4

FIGURE 4 -- NRCS HYDROLOGIC SOILS MAP

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 scales ranging from 1:20,000 to 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: http://websoilsurvey.nrcs.usda.gov
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: Uinta National Forest Area, Utah, Parts of Juab, Sanpete, Utah, and Wasatch Counties
Survey Area Data: Version 1, Dec 27, 2013

Soil Survey Area: Utah County, Utah - Central Part
Survey Area Data: Version 7, Aug 4, 2014

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

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

Date(s) aerial images were photographed: May 2, 2011—Apr 28, 2012

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.

FIGURE 4 -- NRCS HYDROLOGIC SOILS MAP

Hydrologic Soil Group

Hydrologic Soil Group— Summary by Map Unit — Uinta National Forest Area, Utah, Parts of Juab, Sanpete, Utah, and Wasatch Counties (UT650)				
Map unit symbol	**Map unit name**	**Rating**	**Acres in AOI**	**Percent of AOI**
NOTCOM	No Digital Data Available		37.4	50.5%
Subtotals for Soil Survey Area			**37.4**	**50.5%**
Totals for Area of Interest			**74.0**	**100.0%**

Hydrologic Soil Group— Summary by Map Unit — Utah County, Utah - Central Part (UT621)				
Map unit symbol	**Map unit name**	**Rating**	**Acres in AOI**	**Percent of AOI**
HOF	Hillfield-Sterling complex, 20 to 35 percent slopes	C	8.0	10.8%
PHG2	Picayune cobbly silt loam, 35 to 70 percent slopes, eroded	C	0.2	0.3%
PmE2	Pleasant Grove stony loam, 10 to 25 percent slopes, eroded	B	2.3	3.1%
PNG2	Pleasant Grove-Terrace escarpments complex, 30 to 60 percent slopes, eroded	B	21.9	29.6%
PrD	Pleasant Vale gravelly sandy loam, extended season, 6 to 10 percent slopes	A	4.2	5.7%
Subtotals for Soil Survey Area			**36.6**	**49.5%**
Totals for Area of Interest			**74.0**	**100.0%**

FIGURE 4 -- NRCS HYDROLOGIC SOILS MAP

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.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: *None Specified*

Tie-break Rule: Higher

FIGURE 4 -- NRCS HYDROLOGIC SOILS MAP

FIGURE 5 -- HYDRAFLOW EXPRESS SECTIONS

Channel Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Wednesday, Mar 11 2015

Lot 1 Swale

Trapezoidal

Bottom Width (ft)	=	2.00
Side Slopes (z:1)	=	3.00, 3.00
Total Depth (ft)	=	1.00
Invert Elev (ft)	=	100.00
Slope (%)	=	7.00
N-Value	=	0.020

Calculations

Compute by:		Known Q
Known Q (cfs)	=	0.71

Highlighted

Depth (ft)	=	0.09
Q (cfs)	=	0.710
Area (sqft)	=	0.20
Velocity (ft/s)	=	3.48
Wetted Perim (ft)	=	2.57
Crit Depth, Yc (ft)	=	0.15
Top Width (ft)	=	2.54
EGL (ft)	=	0.28

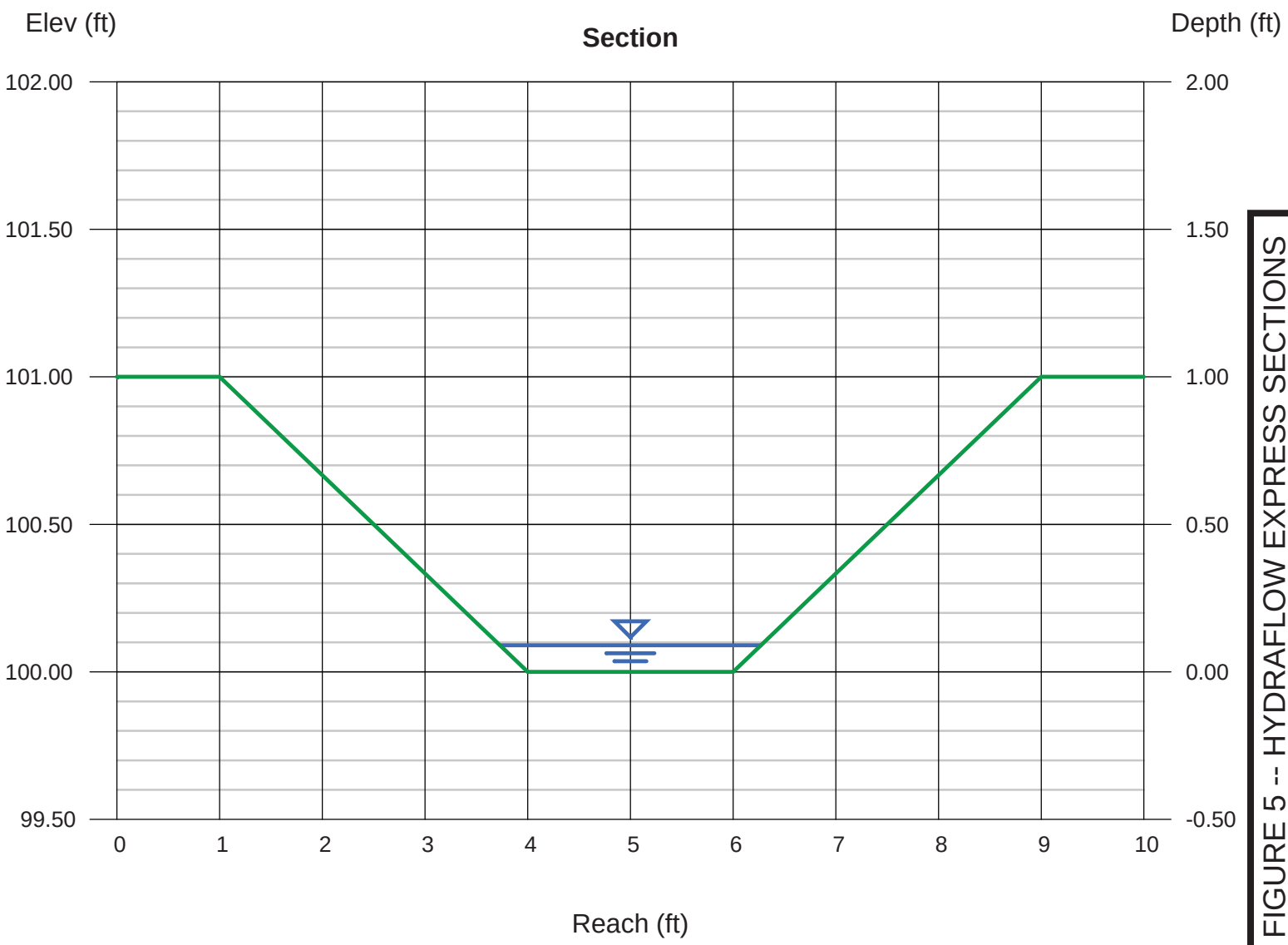


FIGURE 5 -- HYDRAFLOW EXPRESS SECTIONS

Channel Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Tuesday, Mar 10 2015

Bayhill SD Outfall

Trapezoidal

Bottom Width (ft)	= 2.00
Side Slopes (z:1)	= 4.00, 3.00
Total Depth (ft)	= 1.00
Invert Elev (ft)	= 100.00
Slope (%)	= 11.00
N-Value	= 0.030

Calculations

Compute by:	Known Q
Known Q (cfs)	= 1.14

Highlighted

Depth (ft)	= 0.13
Q (cfs)	= 1.140
Area (sqft)	= 0.32
Velocity (ft/s)	= 3.57
Wetted Perim (ft)	= 2.95
Crit Depth, Yc (ft)	= 0.20
Top Width (ft)	= 2.91
EGL (ft)	= 0.33

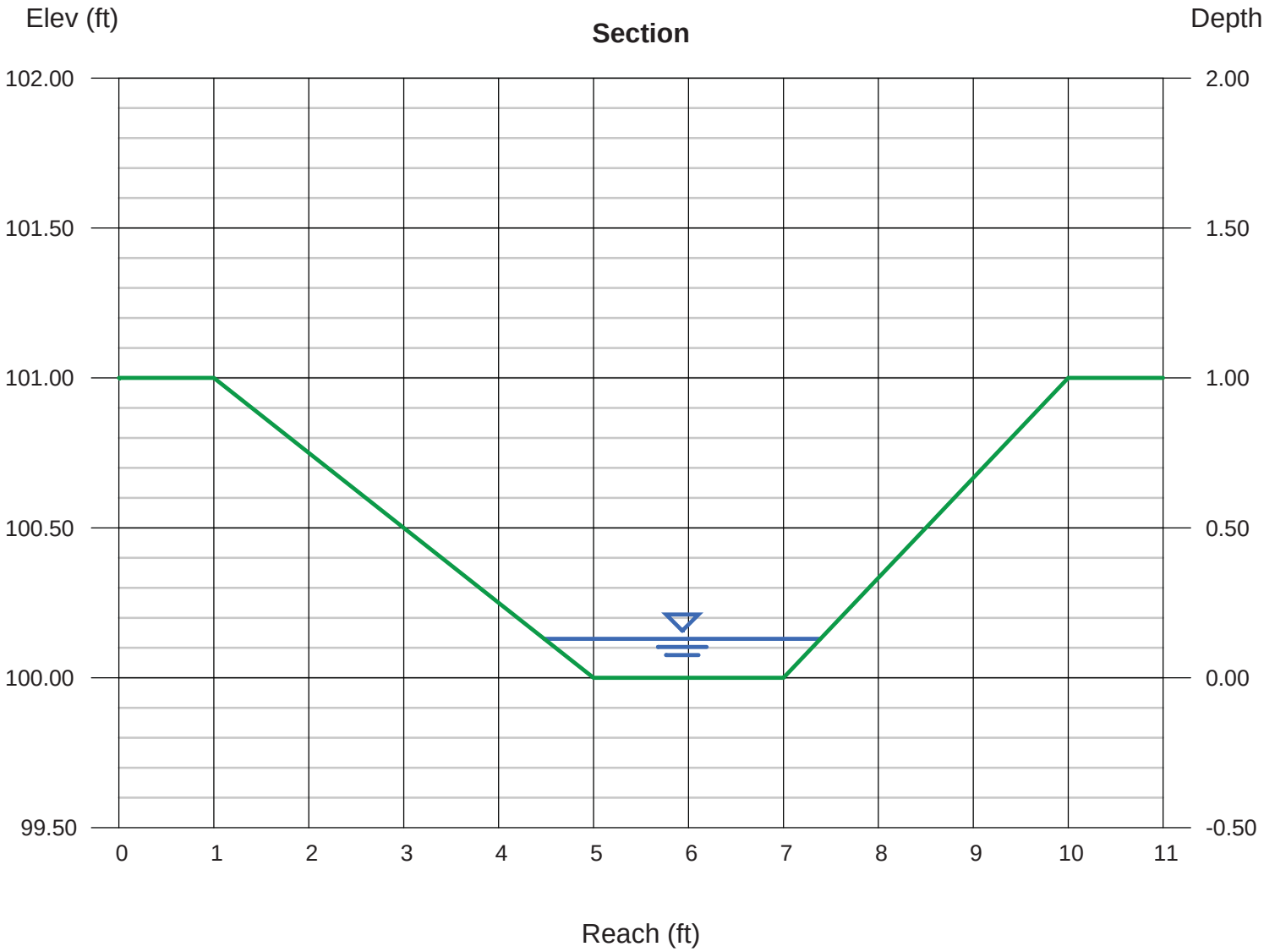


FIGURE 5 -- HYDRAFLOW EXPRESS SECTIONS

Channel Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Thursday, Mar 26 2015

Canyon Road-South Inlet

Gutter

Cross Sl, Sx (ft/ft)	=	0.020
Cross Sl, Sw (ft/ft)	=	0.120
Gutter Width (ft)	=	1.50
Invert Elev (ft)	=	100.00
Slope (%)	=	6.00
N-Value	=	0.013

Calculations

Compute by:		Known Q
Known Q (cfs)	=	2.29

Highlighted

Depth (ft)	=	0.24
Q (cfs)	=	2.290
Area (sqft)	=	0.33
Velocity (ft/s)	=	6.87
Wetted Perim (ft)	=	4.96
Crit Depth, Yc (ft)	=	0.36
Spread Width (ft)	=	4.70
EGL (ft)	=	0.98

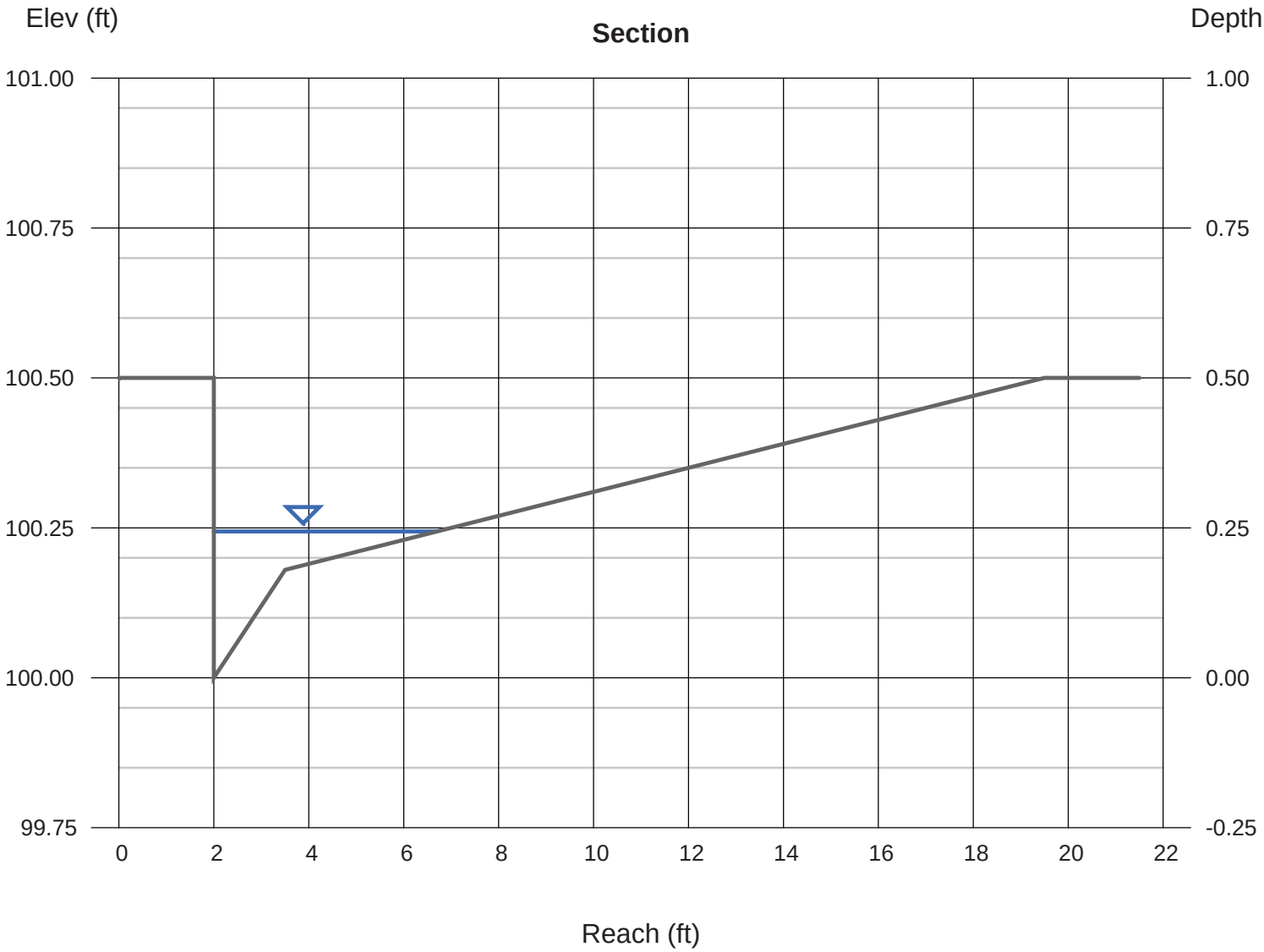


FIGURE 5 -- HYDRAFLOW EXPRESS SECTIONS

Channel Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Thursday, Mar 26 2015

Lakeview Drive

Gutter

Cross Sl, Sx (ft/ft)	=	0.020
Cross Sl, Sw (ft/ft)	=	0.120
Gutter Width (ft)	=	1.50
Invert Elev (ft)	=	100.00
Slope (%)	=	3.00
N-Value	=	0.013

Calculations

Compute by:		Known Q
Known Q (cfs)	=	1.96

Highlighted

Depth (ft)	=	0.26
Q (cfs)	=	1.960
Area (sqft)	=	0.40
Velocity (ft/s)	=	4.92
Wetted Perim (ft)	=	5.62
Crit Depth, Yc (ft)	=	0.35
Spread Width (ft)	=	5.35
EGL (ft)	=	0.63

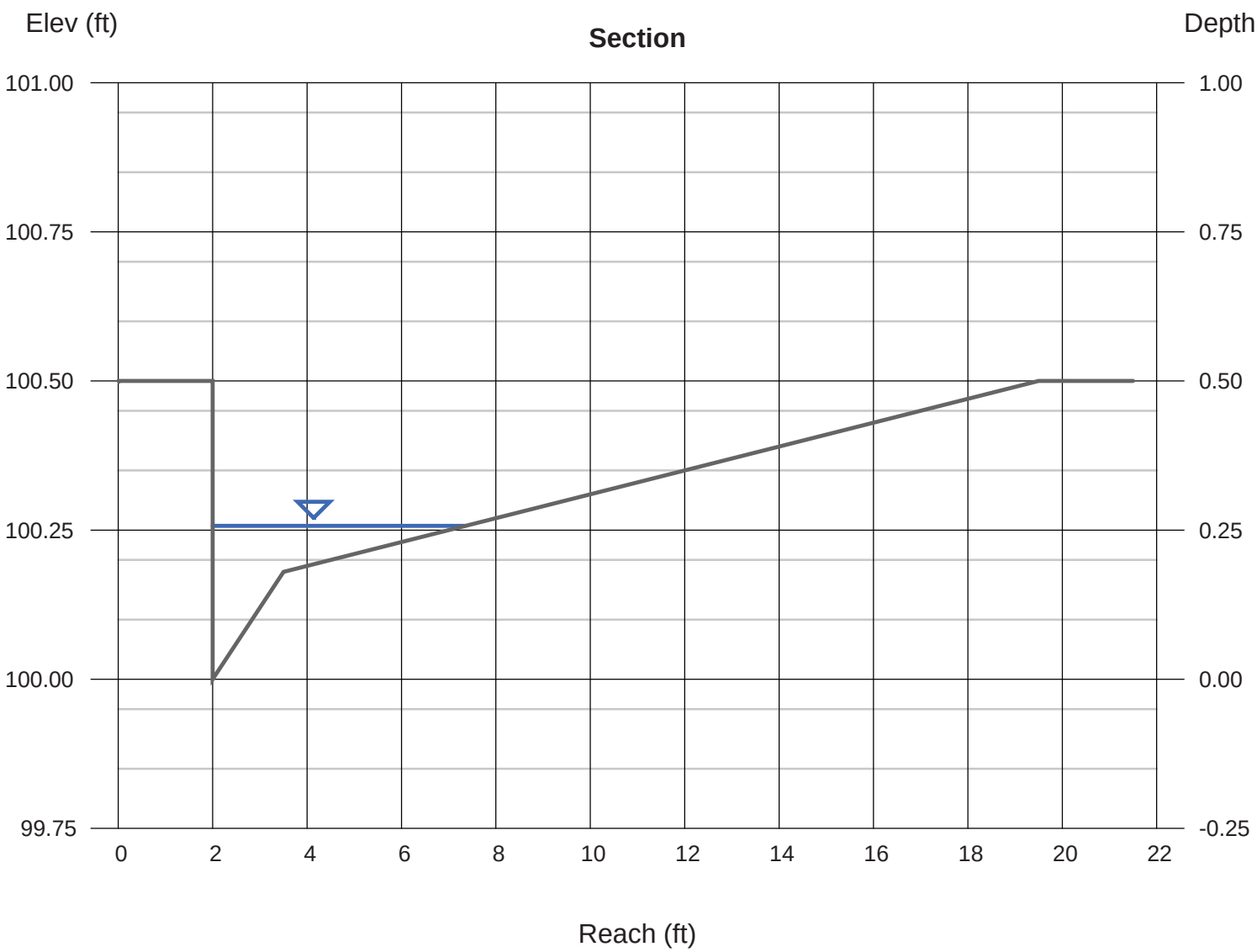


FIGURE 5 -- HYDRAFLOW EXPRESS SECTIONS

FIGURE 6 -- OFF-SITE TOPOGRAPHY

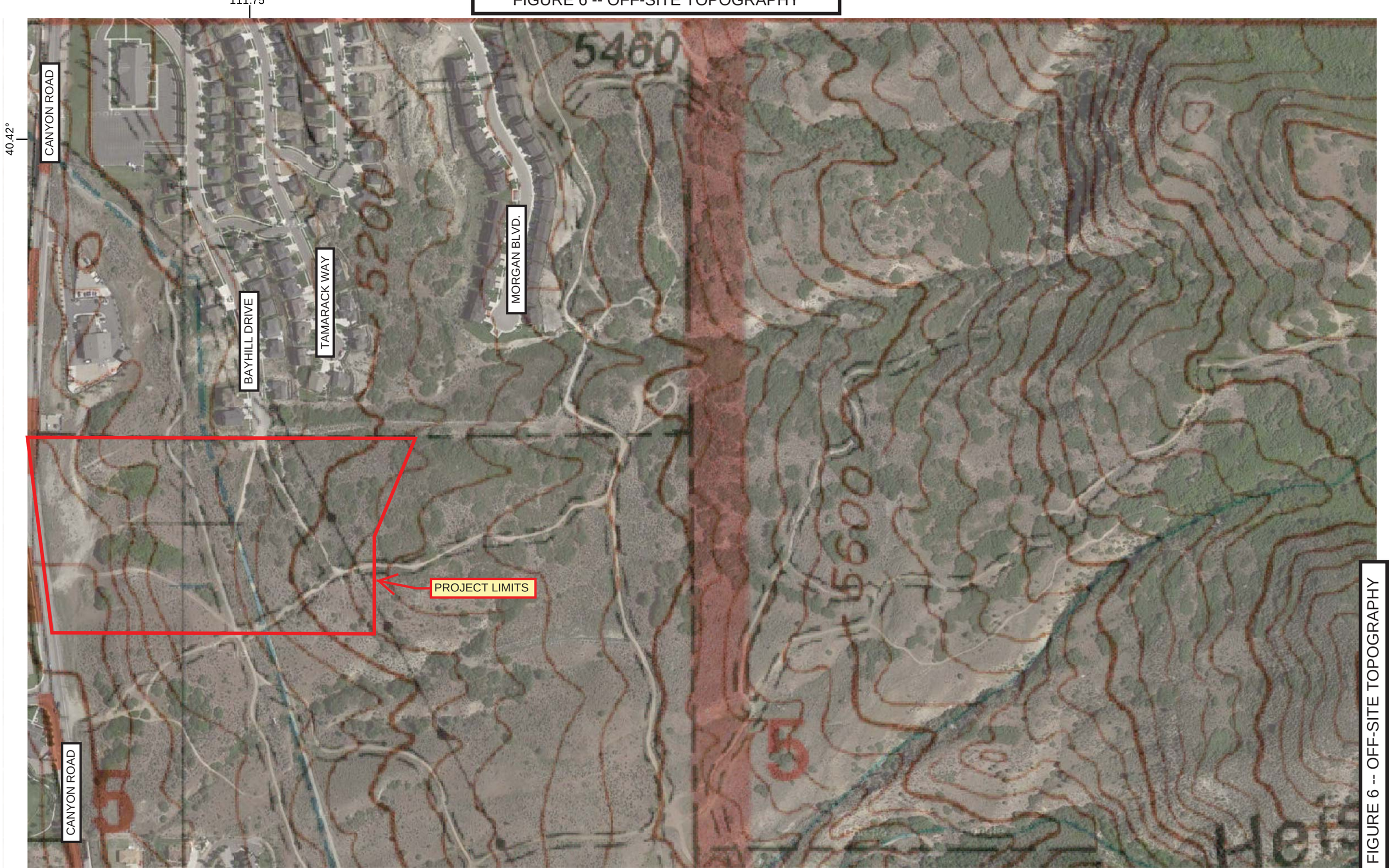


FIGURE 6 -- OFF-SITE TOPOGRAPHY

FIGURE 7 -- 5-FT DIA. SUMP STORAGE CURVE

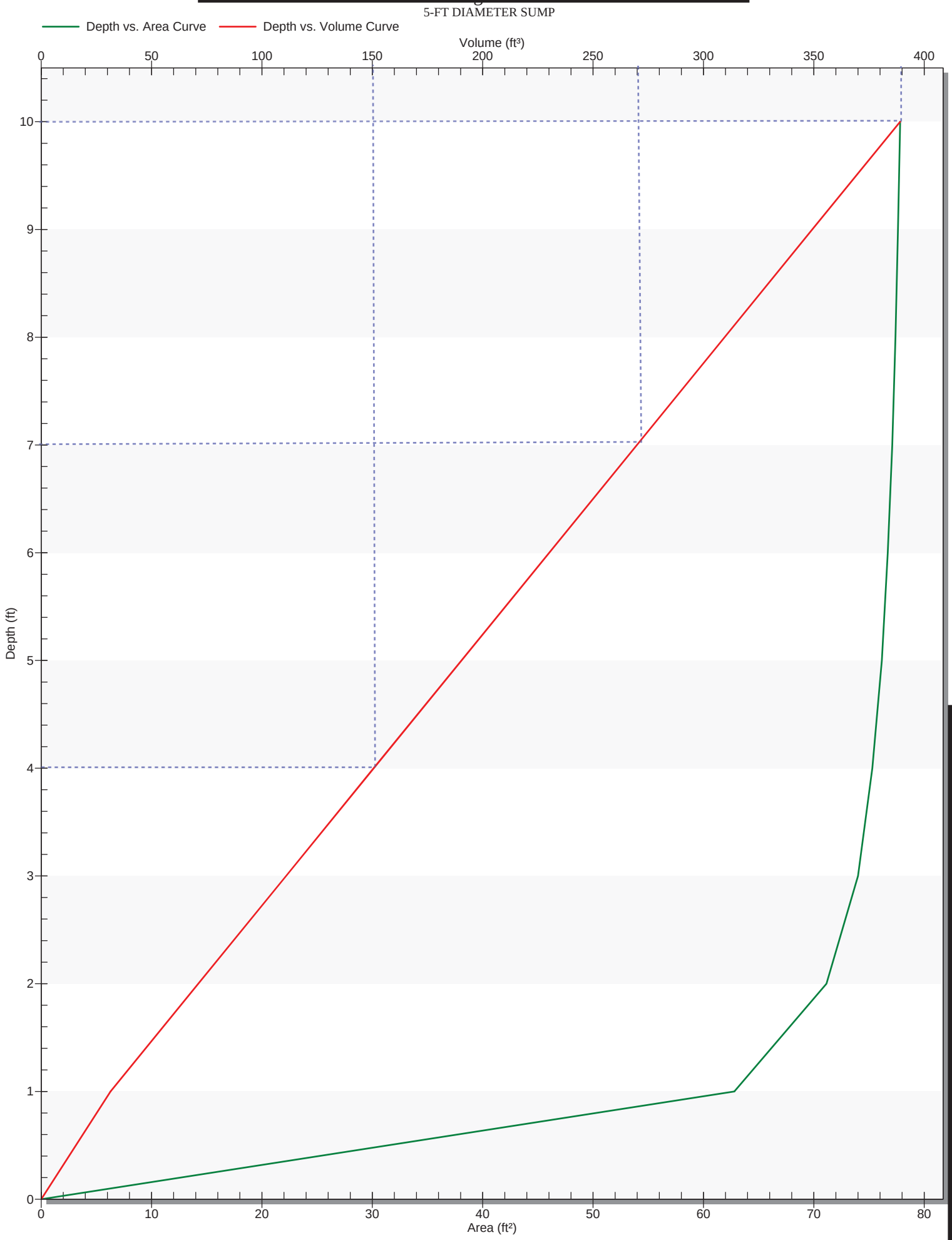


FIGURE 7 -- 5-FT DIA. SUMP STORAGE CURVE

1497 West 40 South
Lindon, Utah - 84042
Phone (801) 225-5711

3662 West 2100 South
Salt Lake City, Utah - 84120
Phone (801) 787-9138

1596 W. 2650 S. #108
Ogden, Utah - 84401
Phone (801) 399-9516

April 3, 2015

Mr. Daniel V. Wilson
3709 Box Elder Drive
Cedar Hills, UT 84062

Re: Percolation Testing
Wilson-Geddes Subdivision
Approximately 10246 North Canyon Road
Cedar Hills, Utah
Project No. 141129

Mr. Willson:

This letter summarizes our percolation testing on the property on Wilson-Geddes Subdivision in Cedar Hills, Utah. Our scope of work consisted of the performing percolation tests in the base of four excavated test pits.

Observations
At your request a representative from Earthtec Engineering visited the subject lot April 2, 2015. Locations of the percolation tests are showing in the attached Figure No. 1. Soils exposed in the test pits consisted of varying layers of Silty Gravel (GM) and Silty Sand (SM) to the base of the excavations. The test pits extended between 4½ to 8 feet below the adjacent ground surface.

Percolation Testing
The test was performed at the specified depth by digging a small hole with a shovel, filling the hole with water, allowing the water to soak, and measuring the water loss over time. The test was performed several times until the rate stabilized. The final measured rate for the percolation test performed in the proposed retention basins are shown in the table below.

Percolation Test Results

Perc. Test No.	Depth (ft.)	Percolation Rate (min/in)	Soil Type
PERC-1	6	5.7	GM
PERC-2	8	7.5	GM
PERC-3	8	4.4	SM
PERC-4	5	3.0	SM

General Conditions
The information presented in this letter applies only to the soils exposed in the percolation test pit at the locations tested. The observations and recommendations presented in this letter were conducted within the limits prescribed by our client, with the usual thoroughness and competence of the engineering profession in the area. No warranty or representation is intended in our proposals, contracts, letters, or reports.

FIGURE 8 -- PERCOLATION TEST RESULTS

Closure

We appreciate the opportunity of providing our services on this project. If we can answer questions or be of further service, please call.

Respectfully;
EARTHTEC ENGINEERING

Caleb R. Allred, E.I.T.
Project Engineer

Timothy A. Mitchell, P.E.
Geotechnical Engineer

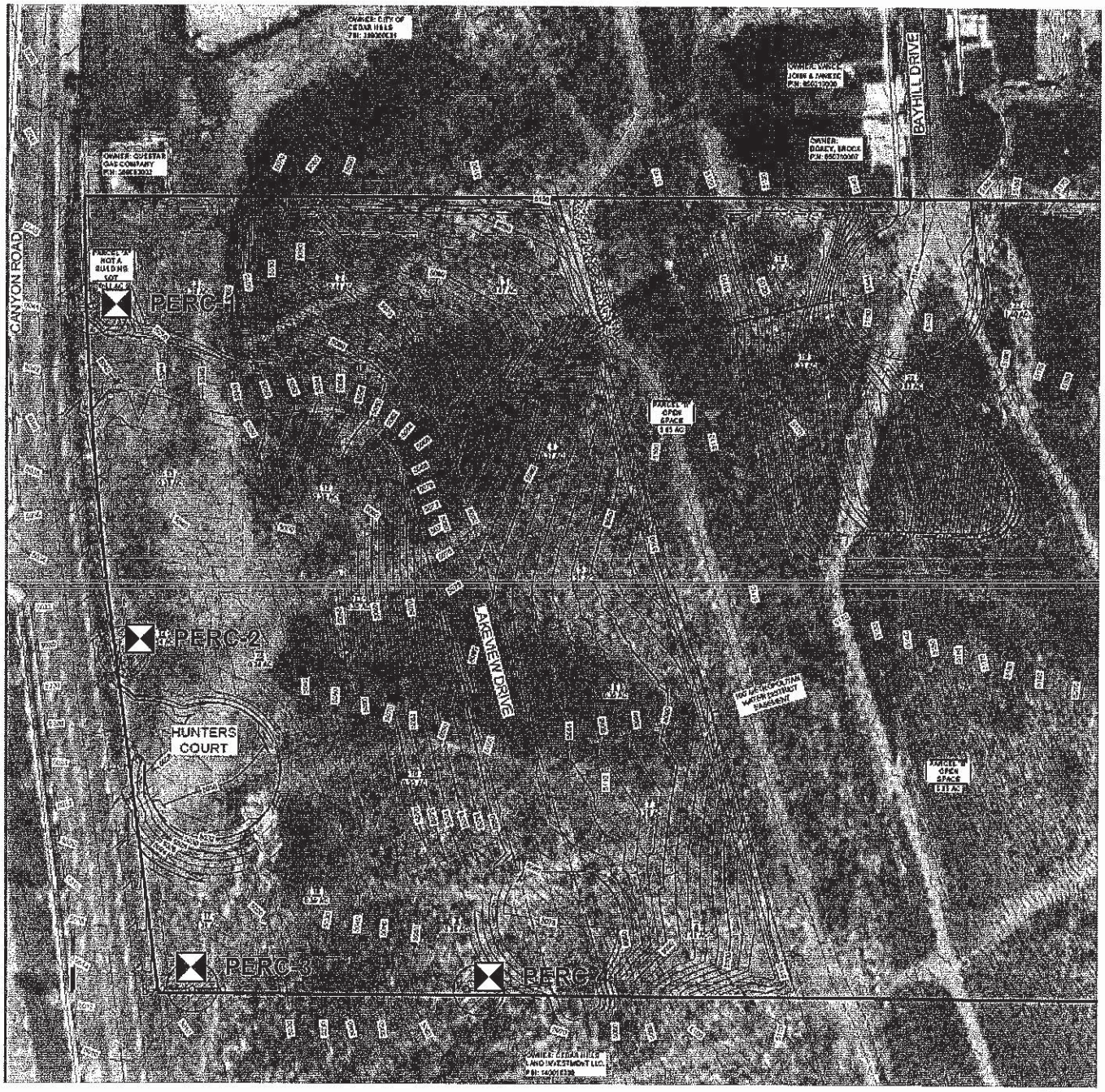
Attached Figure:

Figure No. 1 Site Plan Showing Location of Percolation Tests

FIGURE 8 -- PERCOLATION TEST RESULTS

SITE PLAN SHOWING LOCATION OF PERCOLATION TESTS

WILSON-GEDDES SUBDIVISION
APPROXIMATELY 10246 NORTH CANYON ROAD
CEDAR HILLS, UTAH
PROJECT NO. 141129



Approximate Percolation Test Location

N

Not to Scale

PROJECT NO.: 141129	Earthtec Engineering	FIGURE NO.: 1

FIGURE 8 -- PERCOLATION TEST RESULTS

INFILTRATION SUMP OUTPUT

SUBBASIN	SUMP GROUP	SUMP INFLOW VOLUME (ft^3)	SUMP EXFILTRATION VOLUME (ft^3)	SUMP PEAK VOLUME (ft^3)**	QUANTITY OF 5-FOOT DIA. INFILTRATION SUMPS USED	SUBBASIN AREA (acres)	SUBBASIN RUNOFF (inches)	SUBBASIN RUNOFF VOLUME (acre-in)	SUBBASIN RUNOFF VOLUME (ft^3)***	BYPASS VOLUME (ft^3)	OUTFALL NODE ID
POST-CANYON RD 1	SD-SUMP1	1,206	1,216	398	(1) 10' DEEP SUMP	0.1524	2.53	0.3851	1398.0		
POST-CANYON RD 2	SD-SUMP2	3,062	2,997	794	(3) 7' DEEP SUMPS	0.3137	2.53	0.7933	2879.9		
POST-CANYON RD 3	SD-SUMP3	2,995	2,986	721	(2) 10' DEEP SUMPS	0.2790	2.53	0.7056	2561.3	3625	Out-POST-CanyonRd
POST-HUNTERS CT	SD-SUMP4	1,560	1,566	449	(2) 7' DEEP SUMPS	0.1885	2.53	0.4765	1729.8		
POST-LAKEVIEW 5	SD-SUMP5	2,209	2,163	746	(2) 10' DEEP SUMPS	0.1447	2.53	0.3657	1327.3		
POST-LAKEVIEW 4	SD-SUMP6	921	942	303	(1) 10' DEEP SUMP	0.1891	2.53	0.4780	1735.1		
POST-LAKEVIEW 3	SD-SUMP7	975	1,000	333	(1) 10' DEEP SUMP	0.1380	2.53	0.3488	1266.2		
POST-LAKEVIEW 2	SD-SUMP8	627	632	98	(1) 4' DEEP SUMP	0.0910	2.53	0.2300	834.9		
POST-LAKEVIEW 1	SD-SUMP9	1,395	1,401	320	(1) 10' DEEP SUMP	0.1671	2.53	0.4223	1533.1	164	Out-Lakeview-Bypass

APPROXIMATE VOLUME OF 5-FOOT DIAMETER INFILTRATION SUMPS*	
10' DEEP	390 ft^3
7' DEEP	270 ft^3
4' DEEP	150 ft^3

*Volume determined from storage/volume curve included as Figure XX.
Excludes capacity in cone section, pipes and curb inlets

**Peak sump volume determined by subtracting the exfiltration volume from the inflow volume during a time step analysis, this value is the required sump storage volume

***When comparing subbasin runoff to sump inflow, curb inlet bypass flows must be accounted for.

FIGURE 9 -- INFILTRATION SUMP OUTPUT

FIGURE 9 -- INFILTRATION SUMP OUTPUT

APPENDIX A

100-YEAR, 24-HOUR STORM ANALYSIS OUTPUT

Project Description

File Name	14223_Drainage_2015-04-08.SPF
Description	
	Lakeview Trails
	Residential Subdivision
	Client: MJG Holdings LLC
	Engineer: Civil Science, Inc.

Project Options

Flow Units	CFS
Elevation Type	Elevation
Hydrology Method	SCS TR-55
Time of Concentration (TOC) Method	SCS TR-55
Link Routing Method	Hydrodynamic
Enable Overflow Ponding at Nodes	YES
Skip Steady State Analysis Time Periods	YES

Analysis Options

Start Analysis On	Jan 05, 2015	00:00:00
End Analysis On	Jan 08, 2015	00:00:00
Start Reporting On	Jan 05, 2015	00:00:00
Antecedent Dry Days	0	days
Runoff (Dry Weather) Time Step	0 01:00:00	days hh:mm:ss
Runoff (Wet Weather) Time Step	0 00:05:00	days hh:mm:ss
Reporting Time Step	0 00:00:10	days hh:mm:ss
Routing Time Step	10	seconds

Number of Elements

	Qty
Rain Gages	0
Subbasins	18
Nodes	36
Junctions	3
Outfalls	8
Flow Diversions	0
Inlets	10
Storage Nodes	15
Links	27
Channels	11
Pipes	16
Pumps	0
Orifices	0
Weirs	0
Outlets	0
Pollutants	0
Land Uses	0

Subbasin Summary

SN	Subbasin ID	Area (ac)	Weighted Curve Number	Total Rainfall (in)	Total Runoff (in)	Total Runoff Volume (ft^3)	Peak Runoff (cfs)	Time of Concentration (days hh:mm:ss)
1	A_PRE-1	1.79	60.60	2.76	0.27	1739.44	0.47	0 00:06:59
2	A_PRE-2	16.86	54.60	2.76	0.13	7832.44	0.42	0 00:22:45
3	A_PRE-3	2.74	51.00	2.76	0.07	666.88	0.02	0 00:13:16
4	A_PRE-4	2.65	51.00	2.76	0.07	643.97	0.02	0 00:06:00
5	A_PRE-5	4.62	52.20	2.76	0.09	1425.50	0.05	0 00:20:10
6	A_PRE-6	2.90	63.00	2.76	0.34	3545.15	0.75	0 00:16:45
7	A_PRE-ByPass1	45.40	57.00	2.76	0.18	29332.17	2.90	0 00:17:59
8	A_PRE-CanyonRd	0.56	83.00	2.76	1.26	2530.40	1.07	0 00:06:00
9	B_POST-Bayhill	0.27	98.00	2.76	2.53	2468.52	0.94	0 00:06:00
10	B_POST-CanyonRd1	0.15	98.00	2.76	2.53	1397.97	0.53	0 00:06:00
11	B_POST-CanyonRd2	0.31	98.00	2.76	2.53	2879.85	1.09	0 00:06:00
12	B_POST-CanyonRd3	0.28	98.00	2.76	2.53	2561.30	0.98	0 00:06:00
13	B_POST-Hunters-Ct	0.19	98.00	2.76	2.53	1729.80	0.65	0 00:06:00
14	B_POST-LakeView1	0.17	98.00	2.76	2.53	1532.81	0.58	0 00:06:00
15	B_POST-LakeView2	0.09	98.00	2.76	2.52	833.09	0.31	0 00:06:00
16	B_POST-LakeView3	0.14	98.00	2.76	2.53	1265.37	0.49	0 00:06:00
17	B_POST-LakeView4	0.19	98.00	2.76	2.53	1735.30	0.67	0 00:06:00
18	B_POST-LakeView5	0.14	98.00	2.76	2.53	1327.33	0.51	0 00:06:00

Node Summary

SN	Element ID	Element Type	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Initial Water Elevation (ft)	Surcharge Elevation (ft)	Peak Inflow (cfs)	Max HGL Elevation Attained (ft)	Total Flooded Volume (ft³)
1	Jun-6	Junction	5048.00	5049.00	5048.00	5049.00	0.75	5048.20	0.00
2	SDMH-10A	Junction	5138.00	5143.00	5138.00	5143.00	0.94	5138.13	0.00
3	SDMH-10B	Junction	5108.70	5114.20	5108.70	5114.20	0.94	5108.82	0.00
4	Out-Bypass1	Outfall	5147.00				2.90	5147.00	
5	Out-Lakeview-Bypass	Outfall	5075.26				0.06	5075.32	
6	Out-POST-CanyonRd	Outfall	5012.04				1.12	5012.26	
7	Out-PRE-1	Outfall	5012.00				0.47	5012.00	
8	Out-PRE-3	Outfall	5115.00				0.02	5115.00	
9	Out-PRE-4	Outfall	5263.00				0.02	5263.00	
10	Out-PRE-5	Outfall	5094.00				0.05	5094.00	
11	Out-PRE-CanyonRd	Outfall	5012.04				1.07	5012.04	
12	Ret-Basin-1	Storage Node	5094.00	5096.00	5094.00		0.93	5094.87	0.00
13	SD-SUMP1	Storage Node	5033.00	5043.00	5033.00		0.48	5038.63	0.00
14	SD-SUMP2A	Storage Node	5018.36	5025.40	5018.36		0.65	5021.28	0.00
15	SD-SUMP2B	Storage Node	5019.83	5025.40	5019.83		0.28	5021.29	0.00
16	SD-SUMP2C	Storage Node	5018.24	5025.40	5018.24		0.54	5021.28	0.00
17	SD-SUMP3A	Storage Node	4999.00	5009.00	4999.00		0.82	5002.29	0.00
18	SD-SUMP3B	Storage Node	4998.88	5009.00	4998.88		0.61	5002.29	0.00
19	SD-SUMP4A	Storage Node	5015.36	5022.30	5015.36		0.58	5017.16	0.00
20	SD-SUMP4B	Storage Node	5015.23	5022.30	5015.23		0.30	5017.16	0.00
21	SD-SUMP5A	Storage Node	5029.82	5039.50	5029.82		0.83	5033.60	0.00
22	SD-SUMP5B	Storage Node	5029.48	5039.50	5029.48		0.79	5033.60	0.00
23	SD-SUMP6	Storage Node	5034.50	5044.50	5034.50		0.37	5038.94	0.00
24	SD-SUMP7	Storage Node	5054.30	5064.30	5054.30		0.40	5059.15	0.00
25	SD-SUMP8	Storage Node	5072.03	5076.03	5072.03		0.28	5073.65	0.00
26	SD-SUMP9	Storage Node	5053.90	5063.90	5053.90		0.52	5058.53	0.00

Link Summary

SN	Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length (ft)	Inlet Invert Elevation (ft)	Outlet Invert Elevation (ft)	Average Slope (%)	Diameter or Height (in)	Manning's Roughness	Peak Flow (cfs)	Design Flow Capacity (cfs)	Peak Flow/ Design Flow Ratio	Peak Flow Velocity (ft/sec)	Peak Flow Depth (ft)	Peak Flow Depth/ Total Depth Ratio	Reported Condition
1	Link-10A	Pipe	SD-CB10	SDMH-10A	15.18	5138.17	5138.00	1.1200	18.000	0.0130	0.94	11.12	0.08	4.69	0.26	0.17	Calculated
2	Link-10B	Pipe	SDMH-10A	SDMH-10B	80.31	5137.50	5108.70	35.8600	12.000	0.0100	0.94	27.98	0.03	16.44	0.13	0.13	Calculated
3	Link-1A	Pipe	SD-CB1ab	SD-SUMP1	10.62	5039.54	5039.43	1.0400	18.000	0.0130	0.48	10.69	0.04	2.56	0.25	0.16	Calculated
4	Link-2A	Pipe	SD-CB2	SD-SUMP2A	10.62	5024.59	5024.45	1.3200	18.000	0.0130	0.65	12.06	0.05	2.96	0.27	0.18	Calculated
5	Link-2B	Pipe	SD-SUMP2A	SD-SUMP2B	20.00	5020.95	5020.83	0.6000	18.000	0.0130	0.28	8.14	0.03	1.99	0.39	0.26	Calculated
6	Link-2C	Pipe	SD-SUMP2A	SD-SUMP2C	20.00	5019.36	5019.24	0.6000	18.000	0.0130	0.54	8.14	0.07	2.07	1.50	1.00	SURCHARGED
7	Link-3A	Pipe	SD-CB3ab	SD-SUMP3A	11.75	5009.16	5009.05	0.9400	18.000	0.0130	0.82	10.16	0.08	2.97	0.32	0.21	Calculated
8	Link-3B	Pipe	SD-SUMP3A	SD-SUMP3B	20.00	5000.00	4999.88	0.6000	18.000	0.0130	0.61	8.14	0.08	2.15	1.50	1.00	SURCHARGED
9	Link-4A	Pipe	SD-CB4	SD-SUMP4A	7.70	5022.11	5021.70	5.3200	18.000	0.0130	0.58	24.24	0.02	4.59	0.19	0.12	Calculated
10	Link-4B	Pipe	SD-SUMP4A	SD-SUMP4B	24.41	5015.36	5015.36	0.0000	18.000	0.0130	0.30	6.64	0.04	1.12	1.50	1.00	SURCHARGED
11	Link-5A	Pipe	SD-CB5ab	SD-SUMP5A	9.00	5038.54	5037.28	14.0000	18.000	0.0130	0.83	39.30	0.02	7.36	0.17	0.11	Calculated
12	Link-5B	Pipe	SD-SUMP5A	SD-SUMP5B	20.00	5032.51	5032.38	0.6500	18.000	0.0130	0.79	8.47	0.09	2.65	1.13	0.75	Calculated
13	Link-6A	Pipe	SD-CB6	SD-SUMP6	6.63	5044.53	5044.19	5.1300	18.000	0.0130	0.37	23.79	0.02	3.91	0.15	0.10	Calculated
14	Link-7A	Pipe	SD-CB7ab	SD-SUMP7	6.63	5064.89	5064.79	1.5100	18.000	0.0130	0.40	12.90	0.03	2.65	0.21	0.14	Calculated
15	Link-8A	Pipe	SD-CB8ab	SD-SUMP8	6.63	5076.59	5076.49	1.5100	18.000	0.0130	0.28	12.90	0.02	2.46	0.17	0.11	Calculated
16	Link-9A	Pipe	SD-CB9ab	SD-SUMP9	45.40	5072.54	5063.90	19.0300	18.000	0.0130	0.52	45.82	0.01	8.40	0.11	0.08	Calculated
17	C&G4-3	Channel	SD-CB4	SD-CB3ab	210.00	5025.55	5012.33	6.3000	6.000	0.0320	0.07	32.91	0.00	0.82	0.14	0.28	
18	C&G5-2	Channel	SD-CB5ab	SD-CB2	266.00	5041.54	5027.32	5.3500	6.000	0.0320	0.10	30.37	0.00	1.20	0.14	0.28	
19	C&G6-5	Channel	SD-CB6	SD-CB5ab	98.00	5047.69	5041.71	6.1000	6.000	0.0320	0.42	32.75	0.01	6.24	0.13	0.25	
20	C&G7-6	Channel	SD-CB7ab	SD-CB6	118.78	5072.42	5040.36	26.9900	6.000	0.0320	0.12	54.90	0.00	2.02	0.12	0.24	
21	C&G8-7	Channel	SD-CB8ab	SD-CB7ab	360.00	5075.71	5047.69	7.7800	6.000	0.0320	0.04	23.89	0.00	1.71	0.07	0.14	
22	C&G-9-Bypass	Channel	SD-CB9ab	Out-Lakeview-Bypass	5.00	5075.49	5075.26	4.6000	6.000	0.0320	0.06	39.77	0.00	3.48	0.06	0.13	
23	CanyonC&G1	Channel	SD-CB1ab	SD-CB2	312.21	5042.71	5027.32	4.9300	6.000	0.0320	0.05	29.25	0.00	0.72	0.13	0.26	
24	CanyonC&G2	Channel	SD-CB2	SD-CB3ab	255.01	5027.32	5012.33	5.8800	6.000	0.0320	0.78	32.60	0.02	4.47	0.20	0.40	
25	CanyonC&G-Bypass	Channel	SD-CB3ab	Out-POST-CanyonRd	5.00	5012.33	5012.04	5.8000	6.000	0.0320	1.12	31.93	0.04	4.60	0.21	0.43	
26	Link-10C	Channel	SDMH-10B	Ret-Basin-1	114.00	5106.70	5094.00	11.1400	12.000	0.0350	0.93	59.14	0.02	2.74	0.45	0.45	
27	PRE-6-OUTLET	Channel	Jun-6	SD-CB2	297.00	5048.00	5027.32	6.9600	6.000	0.0320	0.73	34.62	0.02	5.47	0.18	0.36	

Inlet Summary

SN	Element ID	Inlet Manufacturer	Manufacturer Part Number	Inlet Location	Number of Inlets	Catchbasin Invert Elevation (ft)	Max (Rim) Elevation (ft)	Initial Water Elevation (ft)	Peak Flow (cfs)	Peak Flow Intercepted by Inlet (cfs)	Peak Flow Bypassing Inlet (cfs)	Inlet Efficiency during Peak Flow (%)	Max Gutter Water Elev. during Peak Flow (ft)
1	SD-CB10	NEENAH FOUNDRY	R-3246-A	On Sag	1	5138.17	5142.77	5138.17	0.94	N/A	N/A	N/A	5142.89
2	SD-CB1ab	NEENAH FOUNDRY	R 3067 V Type V	On Grade	2	5035.38	5042.95	5035.38	0.53	0.48	0.05	89.96	5043.01
3	SD-CB2	NEENAH FOUNDRY	R 3067 V Type V	On Grade	1	5020.42	5027.75	5020.42	1.43	0.56	0.87	39.22	5027.85
4	SD-CB3ab	NEENAH FOUNDRY	R 3067 V Type V	On Grade	1	5005.00	5012.33	5005.00	1.78	0.65	1.12	36.83	5012.45
5	SD-CB4	NEENAH FOUNDRY	R 3067 V Type V	On Grade	1	5017.95	5025.27	5017.95	0.65	0.57	0.07	88.87	5025.37
6	SD-CB5ab	NEENAH FOUNDRY	R 3067 V Type V	On Grade	2	5034.38	5041.71	5034.38	0.93	0.82	0.10	88.81	5041.81
7	SD-CB6	NEENAH FOUNDRY	R 3067 V Type V	On Grade	1	5040.36	5047.69	5040.36	0.79	0.37	0.42	47.01	5047.76
8	SD-CB7ab	NEENAH FOUNDRY	R 3067 V Type V	On Grade	2	5060.72	5068.06	5060.72	0.52	0.40	0.13	76.10	5068.10
9	SD-CB8ab	NEENAH FOUNDRY	R 3067 V Type V	On Grade	2	5072.42	5079.75	5072.42	0.31	0.27	0.04	88.03	5079.79
10	SD-CB9ab	NEENAH FOUNDRY	R 3067 V Type V	On Grade	2	5072.54	5075.71	5072.54	0.58	0.52	0.06	89.91	5075.77

Subbasin Hydrology

Subbasin : A_PRE-1

Input Data

Area (ac) 1.79
Weighted Curve Number 60.60
Rain Gage ID ..... *

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Sagebrush range, Fair	0.36	B	51.00
Sagebrush range, Fair	1.43	C	63.00
Composite Area & Weighted CN	1.79		60.60

Time of Concentration

TOC Method : SCS TR-55

Sheet Flow Equation :

Tc = (0.007 * ((n * Lf)^0.8)) / ((P^0.5) * (Sf^0.4))

Where :

Tc = Time of Concentration (hr)
n = Manning's roughness
Lf = Flow Length (ft)
P = 2 yr, 24 hr Rainfall (inches)
Sf = Slope (ft/ft)

Shallow Concentrated Flow Equation :

V = 16.1345 * (Sf^0.5) (unpaved surface)
V = 20.3282 * (Sf^0.5) (paved surface)
V = 15.0 * (Sf^0.5) (grassed waterway surface)
V = 10.0 * (Sf^0.5) (nearly bare & untilled surface)
V = 9.0 * (Sf^0.5) (cultivated straight rows surface)
V = 7.0 * (Sf^0.5) (short grass pasture surface)
V = 5.0 * (Sf^0.5) (woodland surface)
V = 2.5 * (Sf^0.5) (forest w/heavy litter surface)
Tc = (Lf / V) / (3600 sec/hr)

Where:

Tc = Time of Concentration (hr)
Lf = Flow Length (ft)
V = Velocity (ft/sec)
Sf = Slope (ft/ft)

Channel Flow Equation :

V = (1.49 * (R^(2/3)) * (Sf^0.5)) / n
R = Aq / Wp
Tc = (Lf / V) / (3600 sec/hr)

Where :

Tc = Time of Concentration (hr)
Lf = Flow Length (ft)
R = Hydraulic Radius (ft)
Aq = Flow Area (ft²)
Wp = Wetted Perimeter (ft)
V = Velocity (ft/sec)
Sf = Slope (ft/ft)
n = Manning's roughness

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	.2	0.00	0.00
Flow Length (ft) :	100	0.00	0.00
Slope (%) :	25	0.00	0.00
2 yr, 24 hr Rainfall (in) :	1.57	0.00	0.00
Velocity (ft/sec) :	0.26	0.00	0.00
Computed Flow Time (min) :	6.41	0.00	0.00

Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	260	0.00	0.00
Slope (%) :	25	0.00	0.00
Surface Type :	Grassed waterway	Unpaved	Unpaved
Velocity (ft/sec) :	7.50	0.00	0.00
Computed Flow Time (min) :	0.58	0.00	0.00

Total TOC (min) 6.99

Subbasin Runoff Results

Total Rainfall (in) 2.76
Total Runoff (in) 0.27
Peak Runoff (cfs) 0.47
Weighted Curve Number 60.60
Time of Concentration (days hh:mm:ss) 0 00:06:59

Subbasin : A_PRE-2

Input Data

Area (ac) 16.86
Weighted Curve Number 54.60
Rain Gage ID ..... *

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Sagebrush range, Fair	6.74	C	63.00
Sagebrush range, Fair	6.74	B	51.00
Sagebrush range, Fair	3.37	A	45.00
Composite Area & Weighted CN	16.85		54.60

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	.2	0.00	0.00
Flow Length (ft) :	200	0.00	0.00
Slope (%) :	9	0.00	0.00
2 yr, 24 hr Rainfall (in) :	1.57	0.00	0.00
Velocity (ft/sec) :	0.20	0.00	0.00
Computed Flow Time (min) :	16.80	0.00	0.00

Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	2100	0.00	0.00
Slope (%) :	15.3	0.00	0.00
Surface Type :	Grassed waterway	Unpaved	Unpaved
Velocity (ft/sec) :	5.87	0.00	0.00
Computed Flow Time (min) :	5.96	0.00	0.00

Total TOC (min) 22.76

Subbasin Runoff Results

Total Rainfall (in) 2.76
Total Runoff (in) 0.13
Peak Runoff (cfs) 0.42
Weighted Curve Number 54.60
Time of Concentration (days hh:mm:ss) 0 00:22:46

Subbasin : A_PRE-3

Input Data

Area (ac) 2.74
Weighted Curve Number 51.00
Rain Gage ID ..... *

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Sagebrush range, Fair	2.74	B	51.00
Composite Area & Weighted CN	2.74		51.00

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.2	0.00	0.00
Flow Length (ft) :	200	0.00	0.00
Slope (%) :	19	0.00	0.00
2 yr, 24 hr Rainfall (in) :	1.57	0.00	0.00
Velocity (ft/sec) :	0.27	0.00	0.00
Computed Flow Time (min) :	12.46	0.00	0.00

Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	424	0.00	0.00
Slope (%) :	33.5	0.00	0.00
Surface Type :	Grassed waterway	Unpaved	Unpaved
Velocity (ft/sec) :	8.68	0.00	0.00
Computed Flow Time (min) :	0.81	0.00	0.00

Total TOC (min) 13.27

Subbasin Runoff Results

Total Rainfall (in) 2.76
Total Runoff (in) 0.07
Peak Runoff (cfs) 0.02
Weighted Curve Number 51.00
Time of Concentration (days hh:mm:ss) 0 00:13:16

Subbasin : A_PRE-4

Input Data

Area (ac) 2.65
Weighted Curve Number 51.00
Rain Gage ID ..... *

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Sagebrush range, Fair	2.65	B	51.00
Composite Area & Weighted CN	2.65		51.00

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	.2	0.00	0.00
Flow Length (ft) :	50	0.00	0.00
Slope (%) :	30	0.00	0.00
2 yr, 24 hr Rainfall (in) :	1.57	0.00	0.00
Velocity (ft/sec) :	0.24	0.00	0.00
Computed Flow Time (min) :	3.42	0.00	0.00

Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	400	0.00	0.00
Slope (%) :	30	0.00	0.00
Surface Type :	Grassed waterway	Unpaved	Unpaved
Velocity (ft/sec) :	8.22	0.00	0.00
Computed Flow Time (min) :	0.81	0.00	0.00

Total TOC (min) 4.23

Subbasin Runoff Results

Total Rainfall (in) 2.76
Total Runoff (in) 0.07
Peak Runoff (cfs) 0.02
Weighted Curve Number 51.00
Time of Concentration (days hh:mm:ss) 0 00:04:14

Subbasin : A_PRE-5

Input Data

Area (ac) 4.62
Weighted Curve Number 52.20
Rain Gage ID ..... *

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Sagebrush range, Fair	4.16	B	51.00
Sagebrush range, Fair	0.46	C	63.00
Composite Area & Weighted CN	4.62		52.20

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	.2	0.00	0.00
Flow Length (ft) :	200	0.00	0.00
Slope (%) :	9	0.00	0.00
2 yr, 24 hr Rainfall (in) :	1.57	0.00	0.00
Velocity (ft/sec) :	0.20	0.00	0.00
Computed Flow Time (min) :	16.80	0.00	0.00

Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	1300	0.00	0.00
Slope (%) :	18.3	0.00	0.00
Surface Type :	Grassed waterway	Unpaved	Unpaved
Velocity (ft/sec) :	6.42	0.00	0.00
Computed Flow Time (min) :	3.37	0.00	0.00

Total TOC (min) 20.17

Subbasin Runoff Results

Total Rainfall (in) 2.76
Total Runoff (in) 0.09
Peak Runoff (cfs) 0.05
Weighted Curve Number 52.20
Time of Concentration (days hh:mm:ss) 0 00:20:10

Subbasin : A_PRE-6

Input Data

Area (ac) 2.90
Weighted Curve Number 63.00
Rain Gage ID ..... *

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Sagebrush range, Fair	2.90	C	63.00
Composite Area & Weighted CN	2.90		63.00

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	.2	0.00	0.00
Flow Length (ft) :	200	0.00	0.00
Slope (%) :	12.8	0.00	0.00
2 yr, 24 hr Rainfall (in) :	1.57	0.00	0.00
Velocity (ft/sec) :	0.23	0.00	0.00
Computed Flow Time (min) :	14.59	0.00	0.00

Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	560	0.00	0.00
Slope (%) :	8.3	0.00	0.00
Surface Type :	Grassed waterway	Unpaved	Unpaved
Velocity (ft/sec) :	4.32	0.00	0.00
Computed Flow Time (min) :	2.16	0.00	0.00

Total TOC (min) 16.75

Subbasin Runoff Results

Total Rainfall (in) 2.76
Total Runoff (in) 0.34
Peak Runoff (cfs) 0.75
Weighted Curve Number 63.00
Time of Concentration (days hh:mm:ss) 0 00:16:45

Subbasin : A_PRE-ByPass1

Input Data

Area (ac) 45.40
Weighted Curve Number 57.00
Rain Gage ID ..... *

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Sagebrush range, Fair	22.70	B	51.00
Sagebrush range, Fair	22.70	C	63.00
Composite Area & Weighted CN	45.40		57.00

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	.2	0.00	0.00
Flow Length (ft) :	200	0.00	0.00
Slope (%) :	30	0.00	0.00
2 yr, 24 hr Rainfall (in) :	1.57	0.00	0.00
Velocity (ft/sec) :	0.32	0.00	0.00
Computed Flow Time (min) :	10.38	0.00	0.00

Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	3755	0.00	0.00
Slope (%) :	30	0.00	0.00
Surface Type :	Grassed waterway	Unpaved	Unpaved
Velocity (ft/sec) :	8.22	0.00	0.00
Computed Flow Time (min) :	7.61	0.00	0.00

Total TOC (min) 17.99

Subbasin Runoff Results

Total Rainfall (in) 2.76
Total Runoff (in) 0.18
Peak Runoff (cfs) 2.90
Weighted Curve Number 57.00
Time of Concentration (days hh:mm:ss) 0 00:17:59

Subbasin : A_PRE-CanyonRd

Input Data

Area (ac) 0.56
Weighted Curve Number 83.00
Rain Gage ID ..... *

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Paved roads with open ditches, 50% imp	0.56	A	83.00
Composite Area & Weighted CN	0.56		83.00

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	.01	0.00	0.00
Flow Length (ft) :	45	0.00	0.00
Slope (%) :	2.5	0.00	0.00
2 yr, 24 hr Rainfall (in) :	1.57	0.00	0.00
Velocity (ft/sec) :	0.97	0.00	0.00
Computed Flow Time (min) :	0.77	0.00	0.00

Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	625	0.00	0.00
Slope (%) :	5.4	0.00	0.00
Surface Type :	Grassed waterway	Unpaved	Unpaved
Velocity (ft/sec) :	3.49	0.00	0.00
Computed Flow Time (min) :	2.98	0.00	0.00

Total TOC (min) 3.76

Subbasin Runoff Results

Total Rainfall (in) 2.76
Total Runoff (in) 1.26
Peak Runoff (cfs) 1.07
Weighted Curve Number 83.00
Time of Concentration (days hh:mm:ss) 0 00:03:46

Subbasin : B_POST-Bayhill

Input Data

Area (ac) 0.27
Weighted Curve Number 98.00
Rain Gage ID ..... *

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Paved roads with curbs & sewers	0.27	C	98.00
Composite Area & Weighted CN	0.27		98.00

Time of Concentration

User-Defined TOC override (minutes): 6

Subbasin Runoff Results

Total Rainfall (in) 2.76
Total Runoff (in) 2.53
Peak Runoff (cfs) 0.94
Weighted Curve Number 98.00
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : B_POST-CanyonRd1

Input Data

Area (ac) 0.15
Weighted Curve Number 98.00
Rain Gage ID ..... *

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Paved roads with curbs & sewers	0.15	B	98.00
Composite Area & Weighted CN	0.15		98.00

Time of Concentration

User-Defined TOC override (minutes): 6.00

Subbasin Runoff Results

Total Rainfall (in) 2.76
Total Runoff (in) 2.53
Peak Runoff (cfs) 0.53
Weighted Curve Number 98.00
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : B_POST-CanyonRd2

Input Data

Area (ac) 0.31
Weighted Curve Number 98.00
Rain Gage ID ..... *

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Paved roads with curbs & sewers	0.31	B	98.00
Composite Area & Weighted CN	0.31		98.00

Time of Concentration

User-Defined TOC override (minutes): 6

Subbasin Runoff Results

Total Rainfall (in) 2.76
Total Runoff (in) 2.53
Peak Runoff (cfs) 1.09
Weighted Curve Number 98.00
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : B_POST-CanyonRd3

Input Data

Area (ac) 0.28
Weighted Curve Number 98.00
Rain Gage ID ..... *

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Paved roads with curbs & sewers	0.28	B	98.00
Composite Area & Weighted CN	0.28		98.00

Time of Concentration

User-Defined TOC override (minutes): 6

Subbasin Runoff Results

Total Rainfall (in) 2.76
Total Runoff (in) 2.53
Peak Runoff (cfs) 0.98
Weighted Curve Number 98.00
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : B_POST-Hunters-Ct

Input Data

Area (ac) 0.19
Weighted Curve Number 98.00
Rain Gage ID ..... *

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Paved roads with curbs & sewers	0.19	C	98.00
Composite Area & Weighted CN	0.19		98.00

Time of Concentration

User-Defined TOC override (minutes): 6

Subbasin Runoff Results

Total Rainfall (in) 2.76
Total Runoff (in) 2.53
Peak Runoff (cfs) 0.65
Weighted Curve Number 98.00
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : B_POST-LakeView1

Input Data

Area (ac) 0.17
Weighted Curve Number 98.00
Rain Gage ID ..... *

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Paved roads with curbs & sewers	0.17	C	98.00
Composite Area & Weighted CN	0.17		98.00

Time of Concentration

User-Defined TOC override (minutes): 6

Subbasin Runoff Results

Total Rainfall (in) 2.76
Total Runoff (in) 2.53
Peak Runoff (cfs) 0.58
Weighted Curve Number 98.00
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : B_POST-LakeView2

Input Data

Area (ac) 0.09
Weighted Curve Number 98.00
Rain Gage ID ..... *

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Paved roads with curbs & sewers	0.09	C	98.00
Composite Area & Weighted CN	0.09		98.00

Time of Concentration

User-Defined TOC override (minutes): 6.00

Subbasin Runoff Results

Total Rainfall (in) 2.76
Total Runoff (in) 2.52
Peak Runoff (cfs) 0.31
Weighted Curve Number 98.00
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : B_POST-LakeView3

Input Data

Area (ac) 0.14
Weighted Curve Number 98.00
Rain Gage ID ..... *

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Paved roads with curbs & sewers	0.14	C	98.00
Composite Area & Weighted CN	0.14		98.00

Time of Concentration

User-Defined TOC override (minutes): 6.00

Subbasin Runoff Results

Total Rainfall (in) 2.76
Total Runoff (in) 2.53
Peak Runoff (cfs) 0.49
Weighted Curve Number 98.00
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : B_POST-LakeView4

Input Data

Area (ac) 0.19
Weighted Curve Number 98.00
Rain Gage ID ..... *

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Paved roads with curbs & sewers	0.19	C	98.00
Composite Area & Weighted CN	0.19		98.00

Time of Concentration

User-Defined TOC override (minutes): 6.00

Subbasin Runoff Results

Total Rainfall (in) 2.76
Total Runoff (in) 2.53
Peak Runoff (cfs) 0.67
Weighted Curve Number 98.00
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : B_POST-LakeView5

Input Data

Area (ac) 0.14
Weighted Curve Number 98.00
Rain Gage ID ..... *

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Paved roads with curbs & sewers	0.14	C	98.00
Composite Area & Weighted CN	0.14		98.00

Time of Concentration

User-Defined TOC override (minutes): 6.00

Subbasin Runoff Results

Total Rainfall (in) 2.76
Total Runoff (in) 2.53
Peak Runoff (cfs) 0.51
Weighted Curve Number 98.00
Time of Concentration (days hh:mm:ss) 0 00:06:00

Junction Input

SN	Element ID	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Ground/Rim (Max) Offset (ft)	Initial Water Elevation (ft)	Initial Water Depth (ft)	Minimum Pipe Cover (in)
1	Jun-6	5048.00	5049.00	1.00	5048.00	0.00	0.00
2	SDMH-10A	5138.00	5143.00	5.00	5138.00	0.00	0.00
3	SDMH-10B	5108.70	5114.20	5.50	5108.70	0.00	0.00

Junction Results

SN	Element ID	Peak Inflow (cfs)	Peak Lateral Inflow (cfs)	Max HGL Elevation Attained (ft)	Max HGL Depth Attained (ft)	Max Surcharge Depth Attained (ft)	Min Freeboard Attained (ft)	Average HGL Elevation Attained (ft)	Average HGL Depth Attained (ft)	Time of Max HGL Occurrence (days hh:mm)	Time of Peak Flooding Occurrence (days hh:mm)	Total Flooded Volume (ac-in)	Total Time Flooded (min)
1	Jun-6	0.75	0.75	5048.20	0.20	0.00	0.80	5048.02	0.02	0 12:08	0 00:00	0.00	0.00
2	SDMH-10A	0.94	0.00	5138.13	0.13	0.00	4.87	5138.01	0.01	0 11:56	0 00:00	0.00	0.00
3	SDMH-10B	0.94	0.00	5108.82	0.12	0.00	5.38	5108.70	0.00	0 11:57	0 00:00	0.00	0.00

Channel Input

SN	Element ID	Length (ft)	Inlet Invert Elevation (ft)	Inlet Invert Offset (ft)	Outlet Invert Elevation (ft)	Total Drop (ft)	Average Slope (%)	Shape	Height (ft)	Width (ft)	Manning's Roughness	Entrance Losses	Exit/Bend Losses	Additional Losses
1	C&G4-3	210.00	5025.55	7.60	5012.33	13.22	6.3000	User-Defined	0.500	16.000	0.0320	0.5000	0.5000	0.0000
2	C&G5-2	266.00	5041.54	7.16	5027.32	14.22	5.3500	User-Defined	0.500	16.000	0.0320	0.5000	0.5000	0.0000
3	C&G6-5	98.00	5047.69	7.33	5041.71	5.98	6.1000	User-Defined	0.500	16.000	0.0320	0.5000	0.5000	0.0000
4	C&G7-6	118.78	5072.42	11.70	5040.36	32.06	26.9900	User-Defined	0.500	16.000	0.0320	0.5000	0.5000	0.0000
5	C&G8-7	360.00	5075.71	3.29	5047.69	28.02	7.7800	User-Defined	0.500	16.000	0.0320	0.5000	0.5000	0.0000
6	C&G-9-Bypass	5.00	5075.49	2.95	5075.26	0.23	4.6000	User-Defined	0.500	16.000	0.0320	0.5000	0.5000	0.0000
7	CanyonC&G1	312.21	5042.71	7.33	5027.32	15.39	4.9300	User-Defined	0.500	16.000	0.0320	0.5000	0.5000	0.0000
8	CanyonC&G2	255.01	5027.32	6.90	5012.33	14.99	5.8800	User-Defined	0.500	16.000	0.0320	0.5000	0.5000	0.0000
9	CanyonC&G-Bypass	5.00	5012.33	7.33	5012.04	0.29	5.8000	User-Defined	0.500	16.000	0.0320	0.5000	0.5000	0.0000
10	Link-10C	114.00	5106.70	-2.00	5094.00	12.70	11.1400	Trapezoidal	1.000	9.000	0.0350	0.5000	0.5000	0.0000
11	PRE-6-OUTLET	297.00	5048.00	0.00	5027.32	20.68	6.9600	User-Defined	0.500	16.000	0.0320	0.5000	0.5000	0.0000

Channel Results

SN	Element ID	Peak Flow (cfs)	Design Flow Capacity (cfs)	Peak Flow/ Design Flow Ratio	Peak Flow Velocity (ft/sec)	Peak Flow Depth (ft)	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged (min)	Reported Condition
1	C&G4-3	0.07	32.91	0.00	0.82	0.14	0.28	0.00	
2	C&G5-2	0.10	30.37	0.00	1.20	0.14	0.28	0.00	
3	C&G6-5	0.42	32.75	0.01	6.24	0.13	0.25	0.00	
4	C&G7-6	0.12	54.90	0.00	2.02	0.12	0.24	0.00	
5	C&G8-7	0.04	23.89	0.00	1.71	0.07	0.14	0.00	
6	C&G-9-Bypass	0.06	39.77	0.00	3.48	0.06	0.13	0.00	
7	CanyonC&G1	0.05	29.25	0.00	0.72	0.13	0.26	0.00	
8	CanyonC&G2	0.78	32.60	0.02	4.47	0.20	0.40	0.00	
9	CanyonC&G-Bypass	1.12	31.93	0.04	4.60	0.21	0.43	0.00	
10	Link-10C	0.93	59.14	0.02	2.74	0.45	0.45	0.00	
11	PRE-6-OUTLET	0.73	34.62	0.02	5.47	0.18	0.36	0.00	

Pipe Input

SN	Element ID	Length (ft)	Inlet Invert Elevation (ft)	Inlet Invert Offset (ft)	Outlet Invert Elevation (ft)	Outlet Invert Offset (ft)	Total Drop (ft)	Average Slope (%)	Pipe Shape	Pipe Diameter or Height (in)	Pipe Width (in)	Manning's Roughness	Entrance Losses	Exit/Bend Losses	Additional Losses	Initial Flow (cfs)	No. of Barrels
1	Link-10A	15.18	5138.17	0.00	5138.00	0.00	0.17	1.1200	CIRCULAR	18.000	18.000	0.0130	0.5000	0.5000	0.0000	0.00	1
2	Link-10B	80.31	5137.50	-0.50	5108.70	0.00	28.80	35.8600	CIRCULAR	12.000	12.000	0.0100	0.5000	0.6000	0.0000	0.00	1
3	Link-1A	10.62	5039.54	4.16	5039.43	6.43	0.11	1.0400	CIRCULAR	18.000	18.000	0.0130	0.5000	0.8000	0.0000	0.00	1
4	Link-2A	10.62	5024.59	4.17	5024.45	6.09	0.14	1.3200	CIRCULAR	18.000	18.000	0.0130	0.5000	0.8000	0.0000	0.00	1
5	Link-2B	20.00	5020.95	2.59	5020.83	1.00	0.12	0.6000	CIRCULAR	18.000	18.000	0.0130	0.5000	0.5000	0.0000	0.00	1
6	Link-2C	20.00	5019.36	1.00	5019.24	1.00	0.12	0.6000	CIRCULAR	18.000	18.000	0.0130	0.5000	0.5000	0.0000	0.00	1
7	Link-3A	11.75	5009.16	4.16	5009.05	10.05	0.11	0.9400	CIRCULAR	18.000	18.000	0.0130	0.5000	0.5000	0.0000	0.00	1
8	Link-3B	20.00	5000.00	1.00	4999.88	1.00	0.12	0.6000	CIRCULAR	18.000	18.000	0.0130	0.5000	0.5000	0.0000	0.00	1
9	Link-4A	7.70	5022.11	4.16	5021.70	6.34	0.41	5.3200	CIRCULAR	18.000	18.000	0.0130	0.5000	0.5000	0.0000	0.00	1
10	Link-4B	24.41	5015.36	0.00	5015.36	0.13	0.00	0.0000	CIRCULAR	18.000	18.000	0.0130	0.5000	0.5000	0.0000	0.00	1
11	Link-5A	9.00	5038.54	4.16	5037.28	7.46	1.26	14.0000	CIRCULAR	18.000	18.000	0.0130	0.5000	0.5000	0.0000	0.00	1
12	Link-5B	20.00	5032.51	2.69	5032.38	2.90	0.13	0.6500	CIRCULAR	18.000	18.000	0.0130	0.5000	0.5000	0.0000	0.00	1
13	Link-6A	6.63	5044.53	4.17	5044.19	9.69	0.34	5.1300	CIRCULAR	18.000	18.000	0.0130	0.5000	0.8000	0.0000	0.00	1
14	Link-7A	6.63	5064.89	4.17	5064.79	10.49	0.10	1.5100	CIRCULAR	18.000	18.000	0.0130	0.5000	0.8000	0.0000	0.00	1
15	Link-8A	6.63	5076.59	4.17	5076.49	4.46	0.10	1.5100	CIRCULAR	18.000	18.000	0.0130	0.5000	0.5000	0.0000	0.00	1
16	Link-9A	45.40	5072.54	0.00	5063.90	10.00	8.64	19.0300	CIRCULAR	18.000	18.000	0.0130	0.5000	0.5000	0.0000	0.00	1

Pipe Results

SN	Element ID	Peak Flow (cfs)	Time of Peak Flow Occurrence (days hh:mm)	Design Flow Capacity (cfs)	Peak Flow/ Design Flow Ratio	Peak Flow Velocity (ft/sec)	Travel Time (min)	Peak Flow Depth (ft)	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged (min)	Froude Number	Reported Condition
1	Link-10A	0.94	0 11:56	11.12	0.08	4.69	0.05	0.26	0.17	0.00		Calculated
2	Link-10B	0.94	0 11:56	27.98	0.03	16.44	0.08	0.13	0.13	0.00		Calculated
3	Link-1A	0.48	0 11:56	10.69	0.04	2.56	0.07	0.25	0.16	0.00		Calculated
4	Link-2A	0.65	0 12:02	12.06	0.05	2.96	0.06	0.27	0.18	0.00		Calculated
5	Link-2B	0.28	0 12:13	8.14	0.03	1.99	0.17	0.39	0.26	0.00		Calculated
6	Link-2C	0.54	0 12:01	8.14	0.07	2.07	0.16	1.50	1.00	84.00		SURCHARGED
7	Link-3A	0.82	0 11:57	10.16	0.08	2.97	0.07	0.32	0.21	0.00		Calculated
8	Link-3B	0.61	0 11:57	8.14	0.08	2.15	0.16	1.50	1.00	58.00		SURCHARGED
9	Link-4A	0.58	0 11:56	24.24	0.02	4.59	0.03	0.19	0.12	0.00		Calculated
10	Link-4B	0.30	0 11:55	6.64	0.04	1.12	0.36	1.50	1.00	33.00		SURCHARGED
11	Link-5A	0.83	0 11:56	39.30	0.02	7.36	0.02	0.17	0.11	0.00		Calculated
12	Link-5B	0.79	0 12:01	8.47	0.09	2.65	0.13	1.13	0.75	0.00		Calculated
13	Link-6A	0.37	0 11:56	23.79	0.02	3.91	0.03	0.15	0.10	0.00		Calculated
14	Link-7A	0.40	0 11:56	12.90	0.03	2.65	0.04	0.21	0.14	0.00		Calculated
15	Link-8A	0.28	0 11:56	12.90	0.02	2.46	0.04	0.17	0.11	0.00		Calculated
16	Link-9A	0.52	0 11:56	45.82	0.01	8.40	0.09	0.11	0.08	0.00		Calculated

Inlet Input

SN	Element ID	Inlet Manufacturer	Manufacturer Part Number	Inlet Location	Number of Inlets	Catchbasin Invert Elevation (ft)	Max (Rim) Elevation (ft)	Inlet Depth (ft)	Initial Water Elevation (ft)	Initial Water Depth (ft)	Ponded Area (ft^2)	Grate Clogging Factor (%)
1	SD-CB10	NEENAH FOUNDRY	R-3246-A	On Sag	1	5138.17	5142.77	4.60	5138.17	0.00	292.00	50.00
2	SD-CB1ab	NEENAH FOUNDRY	R 3067 V Type V	On Grade	2	5035.38	5042.95	7.57	5035.38	0.00	N/A	50.00
3	SD-CB2	NEENAH FOUNDRY	R 3067 V Type V	On Grade	1	5020.42	5027.75	7.33	5020.42	0.00	N/A	50.00
4	SD-CB3ab	NEENAH FOUNDRY	R 3067 V Type V	On Grade	1	5005.00	5012.33	7.33	5005.00	0.00	N/A	50.00
5	SD-CB4	NEENAH FOUNDRY	R 3067 V Type V	On Grade	1	5017.95	5025.27	7.32	5017.95	0.00	N/A	50.00
6	SD-CB5ab	NEENAH FOUNDRY	R 3067 V Type V	On Grade	2	5034.38	5041.71	7.33	5034.38	0.00	N/A	50.00
7	SD-CB6	NEENAH FOUNDRY	R 3067 V Type V	On Grade	1	5040.36	5047.69	7.33	5040.36	0.00	N/A	50.00
8	SD-CB7ab	NEENAH FOUNDRY	R 3067 V Type V	On Grade	2	5060.72	5068.06	7.34	5060.72	0.00	N/A	50.00
9	SD-CB8ab	NEENAH FOUNDRY	R 3067 V Type V	On Grade	2	5072.42	5079.75	7.33	5072.42	0.00	N/A	50.00
10	SD-CB9ab	NEENAH FOUNDRY	R 3067 V Type V	On Grade	2	5072.54	5075.71	3.17	5072.54	0.00	N/A	50.00

Inlet Results

SN	Element ID	Peak Flow (cfs)	Peak Lateral Inflow (cfs)	Peak Flow Intercepted by Inlet (cfs)	Peak Flow Bypassing Inlet (cfs)	Inlet Efficiency during Peak Flow (%)	Max Gutter Water Elev. during Peak Flow (ft)	Max Gutter Water Depth during Peak Flow (ft)	Time of Max Depth Occurrence (days hh:mm)
1	SD-CB10	0.94	0.94	N/A	N/A	N/A	5142.89	0.12	0 11:56
2	SD-CB1ab	0.53	0.53	0.48	0.05	89.96	5043.01	0.06	0 11:56
3	SD-CB2	1.43	1.09	0.56	0.87	39.22	5027.85	0.10	0 12:02
4	SD-CB3ab	1.78	0.98	0.65	1.12	36.83	5012.45	0.12	0 11:56
5	SD-CB4	0.65	0.65	0.57	0.07	88.87	5025.37	0.10	0 11:55
6	SD-CB5ab	0.93	0.51	0.82	0.10	88.81	5041.81	0.10	0 11:56
7	SD-CB6	0.79	0.67	0.37	0.42	47.01	5047.76	0.07	0 11:56
8	SD-CB7ab	0.52	0.49	0.40	0.13	76.10	5068.10	0.04	0 11:56
9	SD-CB8ab	0.31	0.31	0.27	0.04	88.03	5079.79	0.04	0 11:56
10	SD-CB9ab	0.58	0.58	0.52	0.06	89.91	5075.77	0.06	0 11:56

Storage Nodes

Storage Node : Ret-Basin-1

Input Data

Invert Elevation (ft)	5094.00
Max (Rim) Elevation (ft)	5096.00
Max (Rim) Offset (ft)	2.00
Initial Water Elevation (ft)	5094.00
Initial Water Depth (ft)	0.00
Ponded Area (ft²)	0.00
Evaporation Loss	0.00

Infiltration/Exfiltration

Exfiltration Rate (in/hr)	8.0000

Output Summary Results

Peak Inflow (cfs)	0.93
Peak Lateral Inflow (cfs)	0.00
Peak Outflow (cfs)	0.00
Peak Exfiltration Flow Rate (cfm)	6.68
Max HGL Elevation Attained (ft)	5094.87
Max HGL Depth Attained (ft)	0.87
Average HGL Elevation Attained (ft)	5094.03
Average HGL Depth Attained (ft)	0.0299999999999998
Time of Max HGL Occurrence (days hh:mm)	0 12:21
Total Exfiltration Volume (1000-ft³)	2.556
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0.00

Storage Node : SD-SUMP1

Input Data

Invert Elevation (ft)	5033.00
Max (Rim) Elevation (ft)	5043.00
Max (Rim) Offset (ft)	10.00
Initial Water Elevation (ft)	5033.00
Initial Water Depth (ft)	0.00
Ponded Area (ft²)	0.00
Evaporation Loss	0.00

Infiltration/Exfiltration

Exfiltration Rate (in/hr)	40.0000

Output Summary Results

Peak Inflow (cfs)	0.48
Peak Lateral Inflow (cfs)	0.00
Peak Outflow (cfs)	0.00
Peak Exfiltration Flow Rate (cfm)	4.25
Max HGL Elevation Attained (ft)	5038.63
Max HGL Depth Attained (ft)	5.63
Average HGL Elevation Attained (ft)	5033.14
Average HGL Depth Attained (ft)	0.14
Time of Max HGL Occurrence (days hh:mm)	0 12:13
Total Exfiltration Volume (1000-ft³)	1.214
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0.00

Storage Node : SD-SUMP2A

Input Data

Invert Elevation (ft)	5018.36
Max (Rim) Elevation (ft)	5025.40
Max (Rim) Offset (ft)	7.04
Initial Water Elevation (ft)	5018.36
Initial Water Depth (ft)	0.00
Ponded Area (ft²)	0.00
Evaporation Loss	0.00

Infiltration/Exfiltration

Exfiltration Rate (in/hr)	32.0000

Output Summary Results

Peak Inflow (cfs)	0.65
Peak Lateral Inflow (cfs)	0.00
Peak Outflow (cfs)	0.54
Peak Exfiltration Flow Rate (cfm)	3.28
Max HGL Elevation Attained (ft)	5021.28
Max HGL Depth Attained (ft)	2.92
Average HGL Elevation Attained (ft)	5018.50
Average HGL Depth Attained (ft)	0.14
Time of Max HGL Occurrence (days hh:mm)	0 12:30
Total Exfiltration Volume (1000-ft³)	1.949
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0.00

Storage Node : SD-SUMP2B

Input Data

Invert Elevation (ft)	5019.83
Max (Rim) Elevation (ft)	5025.40
Max (Rim) Offset (ft)	5.57
Initial Water Elevation (ft)	5019.83
Initial Water Depth (ft)	0.00
Ponded Area (ft²)	0.00
Evaporation Loss	0.00

Infiltration/Exfiltration

Exfiltration Rate (in/hr)	32.0000

Output Summary Results

Peak Inflow (cfs)	0.28
Peak Lateral Inflow (cfs)	0.00
Peak Outflow (cfs)	0.07
Peak Exfiltration Flow Rate (cfm)	3.02
Max HGL Elevation Attained (ft)	5021.29
Max HGL Depth Attained (ft)	1.46
Average HGL Elevation Attained (ft)	5019.85
Average HGL Depth Attained (ft)	0.02
Time of Max HGL Occurrence (days hh:mm)	0 12:32
Total Exfiltration Volume (1000-ft³)	0.266
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0.00

Storage Node : SD-SUMP2C

Input Data

Invert Elevation (ft)	5018.24
Max (Rim) Elevation (ft)	5025.40
Max (Rim) Offset (ft)	7.16
Initial Water Elevation (ft)	5018.24
Initial Water Depth (ft)	0.00
Ponded Area (ft²)	0.00
Evaporation Loss	0.00

Infiltration/Exfiltration

Exfiltration Rate (in/hr)	32.0000

Output Summary Results

Peak Inflow (cfs)	0.54
Peak Lateral Inflow (cfs)	0.00
Peak Outflow (cfs)	0.02
Peak Exfiltration Flow Rate (cfm)	3.29
Max HGL Elevation Attained (ft)	5021.28
Max HGL Depth Attained (ft)	3.04
Average HGL Elevation Attained (ft)	5018.37
Average HGL Depth Attained (ft)	0.13
Time of Max HGL Occurrence (days hh:mm)	0 12:33
Total Exfiltration Volume (1000-ft³)	0.838
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0.00

Storage Node : SD-SUMP3A

Input Data

Invert Elevation (ft)	4999.00
Max (Rim) Elevation (ft)	5009.00
Max (Rim) Offset (ft)	10.00
Initial Water Elevation (ft)	4999.00
Initial Water Depth (ft)	0.00
Ponded Area (ft²)	0.00
Evaporation Loss	0.00

Infiltration/Exfiltration

Exfiltration Rate (in/hr)	54.0000

Output Summary Results

Peak Inflow (cfs)	0.82
Peak Lateral Inflow (cfs)	0.00
Peak Outflow (cfs)	0.61
Peak Exfiltration Flow Rate (cfm)	5.58
Max HGL Elevation Attained (ft)	5002.29
Max HGL Depth Attained (ft)	3.29
Average HGL Elevation Attained (ft)	4999.08
Average HGL Depth Attained (ft)	0.0800000000000001
Time of Max HGL Occurrence (days hh:mm)	0 12:21
Total Exfiltration Volume (1000-ft³)	2.139
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0.00

Storage Node : SD-SUMP3B

Input Data

Invert Elevation (ft)	4998.88
Max (Rim) Elevation (ft)	5009.00
Max (Rim) Offset (ft)	10.12
Initial Water Elevation (ft)	4998.88
Initial Water Depth (ft)	0.00
Ponded Area (ft²)	0.00
Evaporation Loss	0.00

Infiltration/Exfiltration

Exfiltration Rate (in/hr)	54.0000

Output Summary Results

Peak Inflow (cfs)	0.61
Peak Lateral Inflow (cfs)	0.00
Peak Outflow (cfs)	0.00
Peak Exfiltration Flow Rate (cfm)	5.59
Max HGL Elevation Attained (ft)	5002.29
Max HGL Depth Attained (ft)	3.41
Average HGL Elevation Attained (ft)	4998.96
Average HGL Depth Attained (ft)	0.0800000000000001
Time of Max HGL Occurrence (days hh:mm)	0 12:21
Total Exfiltration Volume (1000-ft³)	0.801
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0.00

Storage Node : SD-SUMP4A

Input Data

Invert Elevation (ft)	5015.36
Max (Rim) Elevation (ft)	5022.30
Max (Rim) Offset (ft)	6.94
Initial Water Elevation (ft)	5015.36
Initial Water Depth (ft)	0.00
Ponded Area (ft²)	0.00
Evaporation Loss	0.00

Infiltration/Exfiltration

Exfiltration Rate (in/hr)	32.0000

Output Summary Results

Peak Inflow (cfs)	0.58
Peak Lateral Inflow (cfs)	0.00
Peak Outflow (cfs)	0.30
Peak Exfiltration Flow Rate (cfm)	3.11
Max HGL Elevation Attained (ft)	5017.16
Max HGL Depth Attained (ft)	1.8
Average HGL Elevation Attained (ft)	5015.40
Average HGL Depth Attained (ft)	0.04
Time of Max HGL Occurrence (days hh:mm)	0 12:10
Total Exfiltration Volume (1000-ft³)	0.989
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0.00

Storage Node : SD-SUMP4B

Input Data

Invert Elevation (ft)	5015.23
Max (Rim) Elevation (ft)	5022.30
Max (Rim) Offset (ft)	7.07
Initial Water Elevation (ft)	5015.23
Initial Water Depth (ft)	0.00
Ponded Area (ft²)	0.00
Evaporation Loss	0.00

Infiltration/Exfiltration

Exfiltration Rate (in/hr)	32.0000

Output Summary Results

Peak Inflow (cfs)	0.30
Peak Lateral Inflow (cfs)	0.00
Peak Outflow (cfs)	0.00
Peak Exfiltration Flow Rate (cfm)	3.14
Max HGL Elevation Attained (ft)	5017.16
Max HGL Depth Attained (ft)	1.93
Average HGL Elevation Attained (ft)	5015.27
Average HGL Depth Attained (ft)	0.04
Time of Max HGL Occurrence (days hh:mm)	0 12:10
Total Exfiltration Volume (1000-ft³)	0.470
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0.00

Storage Node : SD-SUMP5A

Input Data

Invert Elevation (ft)	5029.82
Max (Rim) Elevation (ft)	5039.50
Max (Rim) Offset (ft)	9.68
Initial Water Elevation (ft)	5029.82
Initial Water Depth (ft)	0.00
Ponded Area (ft²)	0.00
Evaporation Loss	0.00

Infiltration/Exfiltration

Exfiltration Rate (in/hr)	40.0000

Output Summary Results

Peak Inflow (cfs)	0.83
Peak Lateral Inflow (cfs)	0.00
Peak Outflow (cfs)	0.79
Peak Exfiltration Flow Rate (cfm)	4.17
Max HGL Elevation Attained (ft)	5033.60
Max HGL Depth Attained (ft)	3.78
Average HGL Elevation Attained (ft)	5029.93
Average HGL Depth Attained (ft)	0.11
Time of Max HGL Occurrence (days hh:mm)	0 12:11
Total Exfiltration Volume (1000-ft³)	1.549
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0.00

Storage Node : SD-SUMP5B

Input Data

Invert Elevation (ft)	5029.48
Max (Rim) Elevation (ft)	5039.50
Max (Rim) Offset (ft)	10.02
Initial Water Elevation (ft)	5029.48
Initial Water Depth (ft)	0.00
Ponded Area (ft²)	0.00
Evaporation Loss	0.00

Infiltration/Exfiltration

Exfiltration Rate (in/hr)	40.0000

Output Summary Results

Peak Inflow (cfs)	0.79
Peak Lateral Inflow (cfs)	0.00
Peak Outflow (cfs)	0.27
Peak Exfiltration Flow Rate (cfm)	4.19
Max HGL Elevation Attained (ft)	5033.60
Max HGL Depth Attained (ft)	4.12
Average HGL Elevation Attained (ft)	5029.57
Average HGL Depth Attained (ft)	0.0899999999999999
Time of Max HGL Occurrence (days hh:mm)	0 12:11
Total Exfiltration Volume (1000-ft³)	0.580
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0.00

Storage Node : SD-SUMP6

Input Data

Invert Elevation (ft)	5034.50
Max (Rim) Elevation (ft)	5044.50
Max (Rim) Offset (ft)	10.00
Initial Water Elevation (ft)	5034.50
Initial Water Depth (ft)	0.00
Ponded Area (ft²)	0.00
Evaporation Loss	0.00

Infiltration/Exfiltration

Exfiltration Rate (in/hr)	32.0000

Output Summary Results

Peak Inflow (cfs)	0.37
Peak Lateral Inflow (cfs)	0.00
Peak Outflow (cfs)	0.00
Peak Exfiltration Flow Rate (cfm)	3.37
Max HGL Elevation Attained (ft)	5038.94
Max HGL Depth Attained (ft)	4.44
Average HGL Elevation Attained (ft)	5034.61
Average HGL Depth Attained (ft)	0.11
Time of Max HGL Occurrence (days hh:mm)	0 12:13
Total Exfiltration Volume (1000-ft³)	0.932
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0.00

Storage Node : SD-SUMP7

Input Data

Invert Elevation (ft)	5054.30
Max (Rim) Elevation (ft)	5064.30
Max (Rim) Offset (ft)	10.00
Initial Water Elevation (ft)	5054.30
Initial Water Depth (ft)	0.00
Ponded Area (ft²)	0.00
Evaporation Loss	0.00

Infiltration/Exfiltration

Exfiltration Rate (in/hr)	32.0000

Output Summary Results

Peak Inflow (cfs)	0.40
Peak Lateral Inflow (cfs)	0.00
Peak Outflow (cfs)	0.00
Peak Exfiltration Flow Rate (cfm)	3.38
Max HGL Elevation Attained (ft)	5059.15
Max HGL Depth Attained (ft)	4.85
Average HGL Elevation Attained (ft)	5054.43
Average HGL Depth Attained (ft)	0.13
Time of Max HGL Occurrence (days hh:mm)	0 12:15
Total Exfiltration Volume (1000-ft³)	1.005
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0.00

Storage Node : SD-SUMP8

Input Data

Invert Elevation (ft)	5072.03
Max (Rim) Elevation (ft)	5076.03
Max (Rim) Offset (ft)	4.00
Initial Water Elevation (ft)	5072.03
Initial Water Depth (ft)	0.00
Ponded Area (ft²)	0.00
Evaporation Loss	0.00

Infiltration/Exfiltration

Exfiltration Rate (in/hr)	80.0000

Output Summary Results

Peak Inflow (cfs)	0.28
Peak Lateral Inflow (cfs)	0.00
Peak Outflow (cfs)	0.00
Peak Exfiltration Flow Rate (cfm)	7.67
Max HGL Elevation Attained (ft)	5073.65
Max HGL Depth Attained (ft)	1.62
Average HGL Elevation Attained (ft)	5072.04
Average HGL Depth Attained (ft)	0.0100000000000002
Time of Max HGL Occurrence (days hh:mm)	0 12:05
Total Exfiltration Volume (1000-ft³)	0.669
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0.00

Storage Node : SD-SUMP9

Input Data

Invert Elevation (ft)	5053.90
Max (Rim) Elevation (ft)	5063.90
Max (Rim) Offset (ft)	10.00
Initial Water Elevation (ft)	5053.90
Initial Water Depth (ft)	0.00
Ponded Area (ft²)	0.00
Evaporation Loss	0.00

Infiltration/Exfiltration

Exfiltration Rate (in/hr)	80.0000

Output Summary Results

Peak Inflow (cfs)	0.52
Peak Lateral Inflow (cfs)	0.00
Peak Outflow (cfs)	0.00
Peak Exfiltration Flow Rate (cfm)	8.43
Max HGL Elevation Attained (ft)	5058.53
Max HGL Depth Attained (ft)	4.63
Average HGL Elevation Attained (ft)	5053.95
Average HGL Depth Attained (ft)	0.0500000000000003
Time of Max HGL Occurrence (days hh:mm)	0 12:07
Total Exfiltration Volume (1000-ft³)	1.371
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0.00