

LEGENDS INDIANA BUILDING ADDITION

Johnson County, Indiana

Drainage

March 22, 2013

Prepared By:



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Engineering Surveying Consulting Inspection

LEGENDS INDIANA BUILDING ADDITION

Johnson, Indiana

Drainage Study

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LEGENDS INDIANA BUILDING ADDITION

Johnson County, Indiana

Drainage Study

PROFESSIONAL CERTIFICATION

The following report and accompanying computations have been developed by me or under my direct supervision.



Venus L.L. Thorne
Professional Engineer
Registration Number: 11200278
Northpointe Surveying, Inc.



LEGENDS INDIANA BUILDING ADDITION

Drainage Summary

Project Overview

The proposed project entails construction of a building addition at the existing Legends of Indiana Golf Course. The expansion covers approximately 5,017 square feet (0.12 ac). The facility is located at 2555 Hurricane Road in Franklin, Indiana.

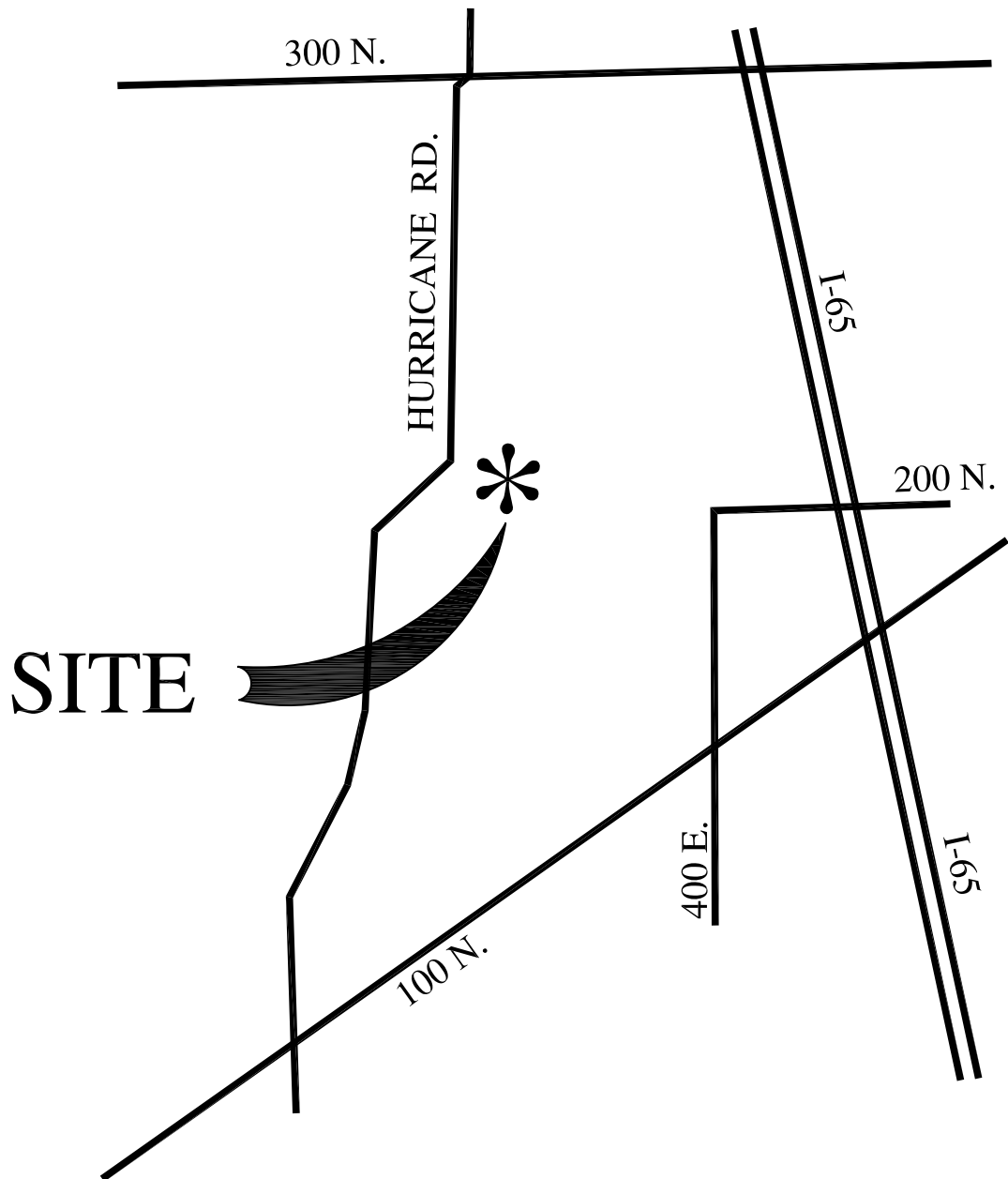
Existing Site Conditions

The area where the proposed club house is to be constructed currently consists of grass area. There is an existing swale running through the proposed building location. An aerial map as well as a site map showing the impervious areas and grass areas is included within this report.

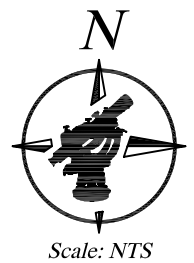
Proposed Site Conditions

The proposed building is located to the northeast of the existing structures on the site. The building area is shown on the attached Proposed Site Conditions Map. The existing swale on the site will be relocated to the south of the proposed building. The runoff from the area was calculated using the Type II rainfall distribution. The site drains to an existing ditch located to the east of the proposed building. Since this is a small drainage area (0.12 ac), the runoff from the construction area is minimal during existing and proposed conditions. A summary of existing and proposed runoff rates is as follows:

	Existing Runoff (cfs)	Proposed Runoff (cfs)
2-yr	0.12	0.39
10-yr	0.30	0.60
100-yr	0.58	0.89



Area Map



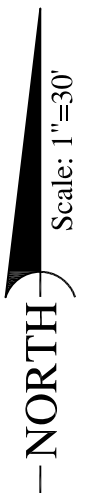
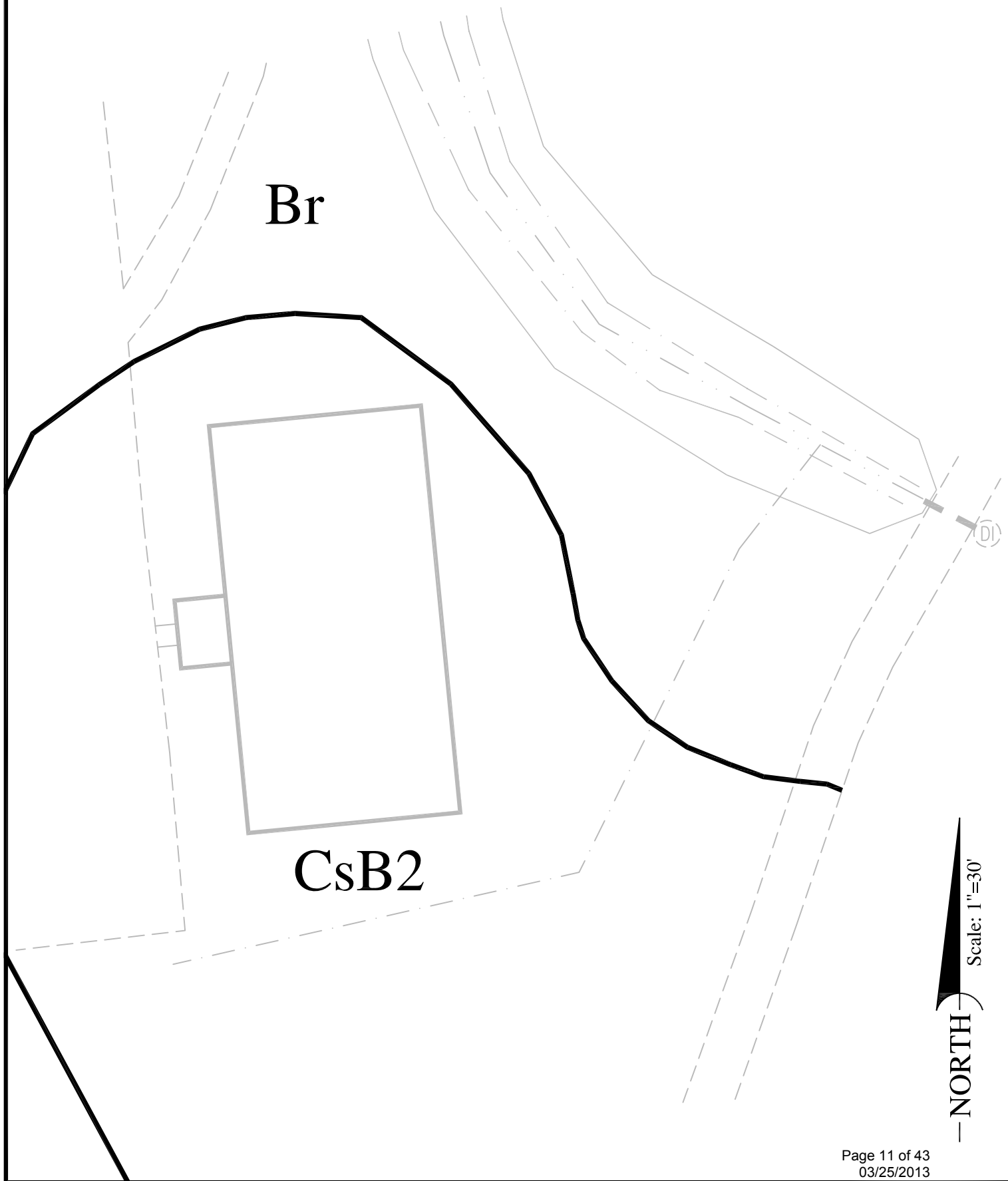
Site Aerial



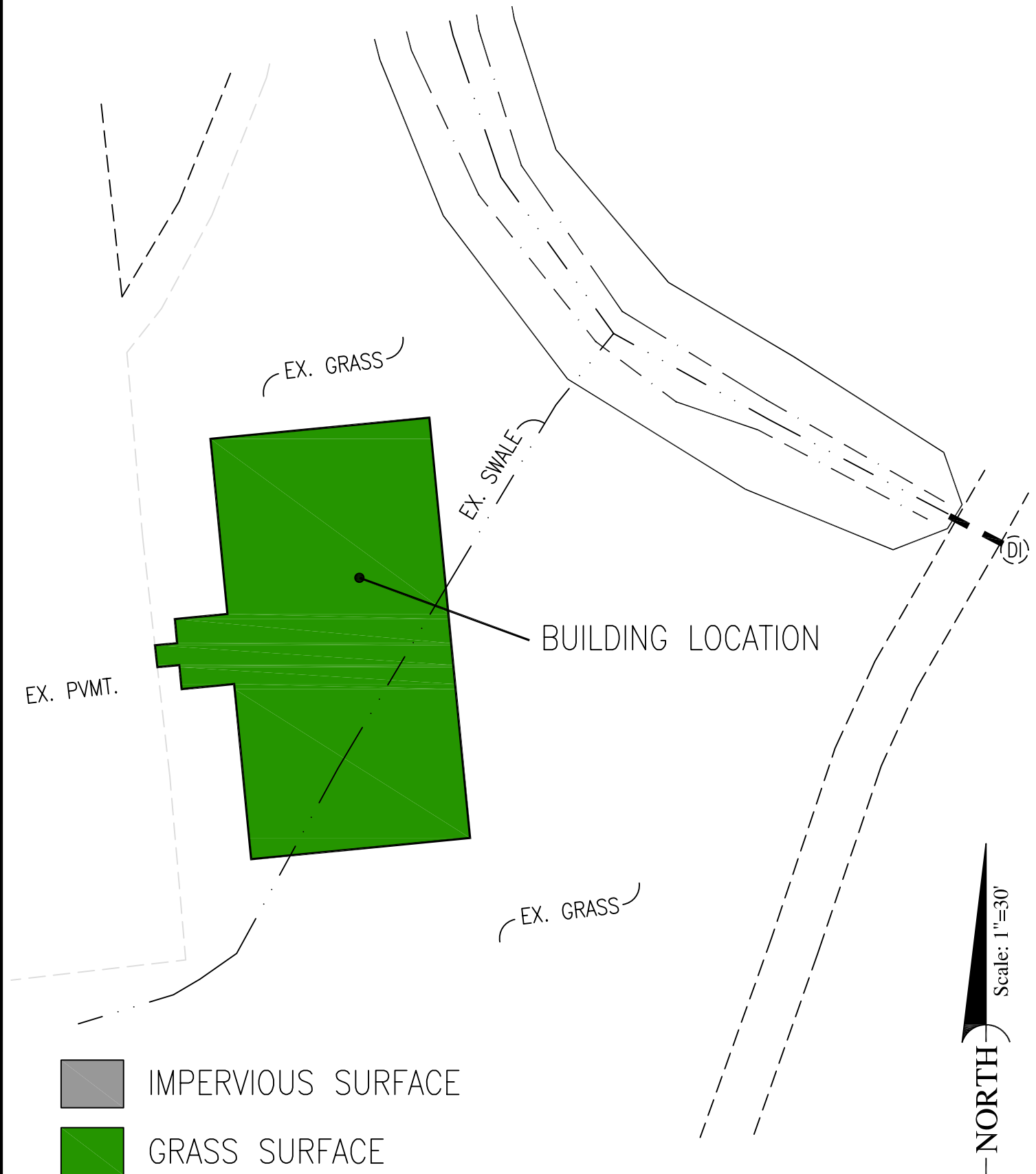
PROPOSED
BUILDING
LOCATION



Soils Map



Existing Conditions Map



Runoff Curve Number

Project	Legends Building Addition	By	VT	Date	3/22/2013
Location	Johnson County	Checked	DJS	Date	3/22/2013
☒ Present ☐ Developed					
Soil Name and hydrologic group	Cover Description	CN	Area (ac)	Product	
CsB2 - C	Good Condition Grass	74	0.12	8.88	
				0	
				0	
				0	
				0	
Totals =			0.12	8.88	

CN = 74

Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Return period (yrs)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	0.12	3	720	281	2	----	-----	-----	EX 2YR
2	SCS Runoff	0.30	3	717	676	10	----	-----	-----	EX 10YR
3	SCS Runoff	0.58	3	717	1,301	100	----	-----	-----	EX 100YR
5	SCS Runoff	0.39	3	717	984	2	----	-----	-----	PR 2YR
6	SCS Runoff	0.60	3	717	1,570	10	----	-----	-----	PR 10YR
7	SCS Runoff	0.89	3	717	2,353	100	----	-----	-----	PR 100YR
Proj. file: Runoff.GPW				IDF file: Central IN.IDF				Run date: 03-25-2013		

Hydrograph Report

Page 1

English

Hyd. No. 1

EX 2YR

Hydrograph type	= SCS Runoff	Peak discharge	= 0.12 cfs
Storm frequency	= 2 yrs	Time interval	= 3 min
Drainage area	= 0.12 ac	Curve number	= 74
Basin Slope	= 1.0 %	Hydraulic length	= 64 ft
Tc method	= USER	Time of conc. (Tc)	= 5 min
Total precip.	= 2.64 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Total Volume = 281 cuft

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)	Time -- Outflow (hrs cfs)	Time -- Outflow (hrs cfs)	Time -- Outflow (hrs cfs)
11.60 0.00	13.20 0.01	14.80 0.00	16.40 0.00
11.65 0.00	13.25 0.01	14.85 0.00	16.45 0.00
11.70 0.01	13.30 0.01	14.90 0.00	16.50 0.00
11.75 0.02	13.35 0.01	14.95 0.00	16.55 0.00
11.80 0.03	13.40 0.01	15.00 0.00	16.60 0.00
11.85 0.05	13.45 0.01	15.05 0.00	16.65 0.00
11.90 0.08	13.50 0.01	15.10 0.00	16.70 0.00
11.95 0.11	13.55 0.01	15.15 0.00	16.75 0.00
12.00 0.12 <<	13.60 0.01	15.20 0.00	16.80 0.00
12.05 0.09	13.65 0.01	15.25 0.00	16.85 0.00
12.10 0.05	13.70 0.01	15.30 0.00	16.90 0.00
12.15 0.03	13.75 0.01	15.35 0.00	16.95 0.00
12.20 0.02	13.80 0.01	15.40 0.00	17.00 0.00
12.25 0.02	13.85 0.01	15.45 0.00	17.05 0.00
12.30 0.02	13.90 0.01	15.50 0.00	17.10 0.00
12.35 0.02	13.95 0.01	15.55 0.00	17.15 0.00
12.40 0.02	14.00 0.01	15.60 0.00	17.20 0.00
12.45 0.02	14.05 0.01	15.65 0.00	17.25 0.00
12.50 0.01	14.10 0.01	15.70 0.00	17.30 0.00
12.55 0.01	14.15 0.01	15.75 0.00	17.35 0.00
12.60 0.01	14.20 0.01	15.80 0.00	17.40 0.00
12.65 0.01	14.25 0.01	15.85 0.00	17.45 0.00
12.70 0.01	14.30 0.01	15.90 0.00	17.50 0.00
12.75 0.01	14.35 0.01	15.95 0.00	17.55 0.00
12.80 0.01	14.40 0.01	16.00 0.00	17.60 0.00
12.85 0.01	14.45 0.01	16.05 0.00	17.65 0.00
12.90 0.01	14.50 0.01	16.10 0.00	17.70 0.00
12.95 0.01	14.55 0.01	16.15 0.00	17.75 0.00
13.00 0.01	14.60 0.01	16.20 0.00	17.80 0.00
13.05 0.01	14.65 0.01	16.25 0.00	17.85 0.00
13.10 0.01	14.70 0.01	16.30 0.00	17.90 0.00
13.15 0.01	14.75 0.00	16.35 0.00	17.95 0.00

Continues on next page...

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)	Time -- Outflow (hrs cfs)	Time -- Outflow (hrs cfs)
18.00	0.00	22.90
18.05	0.00	22.95
18.10	0.00	23.00
18.15	0.00	23.05
18.20	0.00	23.10
18.25	0.00	23.15
18.30	0.00	23.20
18.35	0.00	23.25
18.40	0.00	23.30
18.45	0.00	23.35
18.50	0.00	23.40
18.55	0.00	23.45
18.60	0.00	23.50
18.65	0.00	23.55
18.70	0.00	23.60
18.75	0.00	23.65
18.80	0.00	23.70
18.85	0.00	23.75
18.90	0.00	23.80
18.95	0.00	23.85
19.00	0.00	23.90
19.05	0.00	23.95
19.10	0.00	24.00
19.15	0.00	24.05
19.20	0.00	
19.25	0.00	
19.30	0.00	...End
19.35	0.00	
19.40	0.00	
19.45	0.00	
19.50	0.00	
19.55	0.00	
19.60	0.00	
19.65	0.00	
19.70	0.00	
19.75	0.00	
19.80	0.00	
19.85	0.00	
19.90	0.00	
19.95	0.00	
20.00	0.00	
20.05	0.00	
20.10	0.00	
20.15	0.00	
20.20	0.00	
20.25	0.00	
20.30	0.00	
20.35	0.00	
20.40	0.00	

Hydrograph Report

Page 1

English

Hyd. No. 2

EX 10YR

Hydrograph type = SCS Runoff
Storm frequency = 10 yrs
Drainage area = 0.12 ac
Basin Slope = 1.0 %
Tc method = USER
Total precip. = 4.08 in
Storm duration = 24 hrs

Peak discharge = 0.30 cfs
Time interval = 3 min
Curve number = 74
Hydraulic length = 64 ft
Time of conc. (Tc) = 5 min
Distribution = Type II
Shape factor = 484

Total Volume = 676 cuft

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)	Time -- Outflow (hrs cfs)	Time -- Outflow (hrs cfs)	Time -- Outflow (hrs cfs)
10.90 0.00	12.50 0.03	14.10 0.01	15.70 0.01
10.95 0.00	12.55 0.03	14.15 0.01	15.75 0.01
11.00 0.00	12.60 0.03	14.20 0.01	15.80 0.01
11.05 0.00	12.65 0.02	14.25 0.01	15.85 0.01
11.10 0.00	12.70 0.02	14.30 0.01	15.90 0.01
11.15 0.00	12.75 0.02	14.35 0.01	15.95 0.01
11.20 0.01	12.80 0.02	14.40 0.01	16.00 0.01
11.25 0.01	12.85 0.02	14.45 0.01	16.05 0.01
11.30 0.01	12.90 0.02	14.50 0.01	16.10 0.01
11.35 0.01	12.95 0.02	14.55 0.01	16.15 0.01
11.40 0.01	13.00 0.02	14.60 0.01	16.20 0.01
11.45 0.01	13.05 0.02	14.65 0.01	16.25 0.01
11.50 0.01	13.10 0.02	14.70 0.01	16.30 0.01
11.55 0.01	13.15 0.02	14.75 0.01	16.35 0.01
11.60 0.02	13.20 0.02	14.80 0.01	16.40 0.01
11.65 0.03	13.25 0.02	14.85 0.01	16.45 0.01
11.70 0.05	13.30 0.02	14.90 0.01	16.50 0.01
11.75 0.07	13.35 0.02	14.95 0.01	16.55 0.01
11.80 0.10	13.40 0.02	15.00 0.01	16.60 0.01
11.85 0.15	13.45 0.02	15.05 0.01	16.65 0.01
11.90 0.22	13.50 0.02	15.10 0.01	16.70 0.01
11.95 0.30 <<	13.55 0.01	15.15 0.01	16.75 0.01
12.00 0.29	13.60 0.01	15.20 0.01	16.80 0.01
12.05 0.21	13.65 0.01	15.25 0.01	16.85 0.01
12.10 0.12	13.70 0.01	15.30 0.01	16.90 0.01
12.15 0.07	13.75 0.01	15.35 0.01	16.95 0.01
12.20 0.05	13.80 0.01	15.40 0.01	17.00 0.01
12.25 0.05	13.85 0.01	15.45 0.01	17.05 0.01
12.30 0.04	13.90 0.01	15.50 0.01	17.10 0.01
12.35 0.04	13.95 0.01	15.55 0.01	17.15 0.01
12.40 0.04	14.00 0.01	15.60 0.01	17.20 0.01
12.45 0.03	14.05 0.01	15.65 0.01	17.25 0.01

Continues on next page...

Hydrograph Discharge Table

Time -- Outflow		Time -- Outflow		Time -- Outflow	
(hrs	cfs)	(hrs	cfs)	(hrs	cfs)
17.30	0.01	19.75	0.00	22.20	0.00
17.35	0.01	19.80	0.00	22.25	0.00
17.40	0.01	19.85	0.00	22.30	0.00
17.45	0.01	19.90	0.00	22.35	0.00
17.50	0.01	19.95	0.00	22.40	0.00
17.55	0.01	20.00	0.00	22.45	0.00
17.60	0.01	20.05	0.00	22.50	0.00
17.65	0.01	20.10	0.00	22.55	0.00
17.70	0.01	20.15	0.00	22.60	0.00
17.75	0.01	20.20	0.00	22.65	0.00
17.80	0.01	20.25	0.00	22.70	0.00
17.85	0.01	20.30	0.00	22.75	0.00
17.90	0.01	20.35	0.00	22.80	0.00
17.95	0.01	20.40	0.00	22.85	0.00
18.00	0.01	20.45	0.00	22.90	0.00
18.05	0.01	20.50	0.00	22.95	0.00
18.10	0.01	20.55	0.00	23.00	0.00
18.15	0.01	20.60	0.00	23.05	0.00
18.20	0.01	20.65	0.00	23.10	0.00
18.25	0.01	20.70	0.00	23.15	0.00
18.30	0.01	20.75	0.00	23.20	0.00
18.35	0.01	20.80	0.00	23.25	0.00
18.40	0.01	20.85	0.00	23.30	0.00
18.45	0.01	20.90	0.00	23.35	0.00
18.50	0.01	20.95	0.00	23.40	0.00
18.55	0.01	21.00	0.00	23.45	0.00
18.60	0.01	21.05	0.00	23.50	0.00
18.65	0.01	21.10	0.00	23.55	0.00
18.70	0.01	21.15	0.00	23.60	0.00
18.75	0.01	21.20	0.00	23.65	0.00
18.80	0.01	21.25	0.00	23.70	0.00
18.85	0.01	21.30	0.00	23.75	0.00
18.90	0.01	21.35	0.00	23.80	0.00
18.95	0.01	21.40	0.00	23.85	0.00
19.00	0.01	21.45	0.00	23.90	0.00
19.05	0.01	21.50	0.00	23.95	0.00
19.10	0.01	21.55	0.00	24.00	0.00
19.15	0.01	21.60	0.00	24.05	0.00
19.20	0.01	21.65	0.00		
19.25	0.01	21.70	0.00		
19.30	0.00	21.75	0.00	...End	
19.35	0.00	21.80	0.00		
19.40	0.00	21.85	0.00		
19.45	0.00	21.90	0.00		
19.50	0.00	21.95	0.00		
19.55	0.00	22.00	0.00		
19.60	0.00	22.05	0.00		
19.65	0.00	22.10	0.00		
19.70	0.00	22.15	0.00		

Hydrograph Report

Page 1

English

Hyd. No. 3

EX 100YR

Hydrograph type	= SCS Runoff	Peak discharge	= 0.58 cfs
Storm frequency	= 100 yrs	Time interval	= 3 min
Drainage area	= 0.12 ac	Curve number	= 74
Basin Slope	= 1.0 %	Hydraulic length	= 64 ft
Tc method	= USER	Time of conc. (Tc)	= 5 min
Total precip.	= 6.00 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Total Volume = 1,301 cuft

Hydrograph Discharge Table

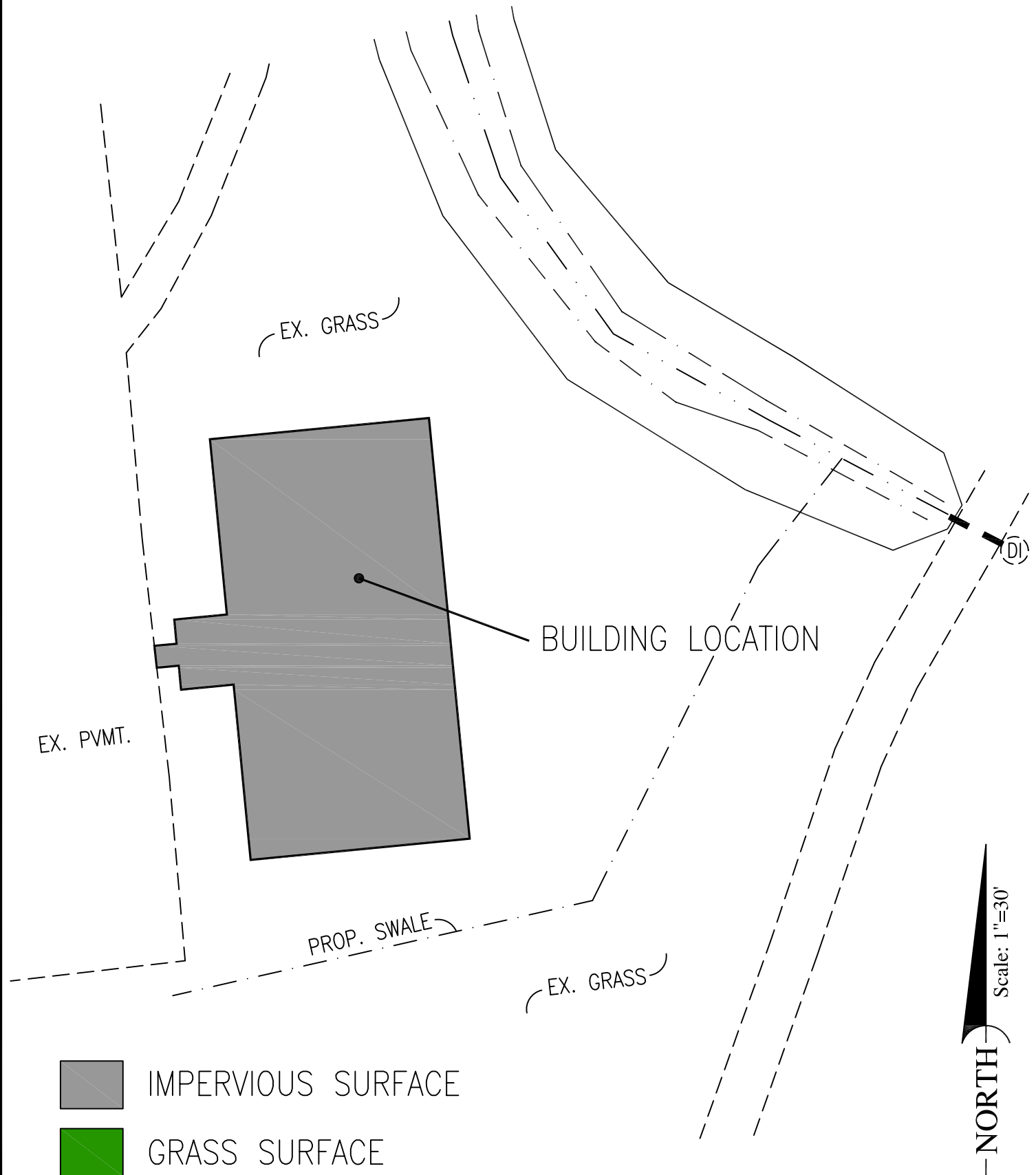
Time -- Outflow (hrs cfs)	Time -- Outflow (hrs cfs)	Time -- Outflow (hrs cfs)	Time -- Outflow (hrs cfs)
10.25 0.01	11.85 0.31	13.45 0.03	15.05 0.02
10.30 0.01	11.90 0.45	13.50 0.03	15.10 0.02
10.35 0.01	11.95 0.58 <<	13.55 0.03	15.15 0.02
10.40 0.01	12.00 0.56	13.60 0.03	15.20 0.02
10.45 0.01	12.05 0.39	13.65 0.02	15.25 0.02
10.50 0.01	12.10 0.22	13.70 0.02	15.30 0.02
10.55 0.01	12.15 0.12	13.75 0.02	15.35 0.02
10.60 0.01	12.20 0.09	13.80 0.02	15.40 0.02
10.65 0.01	12.25 0.08	13.85 0.02	15.45 0.02
10.70 0.01	12.30 0.08	13.90 0.02	15.50 0.01
10.75 0.01	12.35 0.07	13.95 0.02	15.55 0.01
10.80 0.01	12.40 0.07	14.00 0.02	15.60 0.01
10.85 0.01	12.45 0.06	14.05 0.02	15.65 0.01
10.90 0.01	12.50 0.06	14.10 0.02	15.70 0.01
10.95 0.01	12.55 0.05	14.15 0.02	15.75 0.01
11.00 0.01	12.60 0.05	14.20 0.02	15.80 0.01
11.05 0.01	12.65 0.04	14.25 0.02	15.85 0.01
11.10 0.01	12.70 0.04	14.30 0.02	15.90 0.01
11.15 0.02	12.75 0.04	14.35 0.02	15.95 0.01
11.20 0.02	12.80 0.04	14.40 0.02	16.00 0.01
11.25 0.02	12.85 0.04	14.45 0.02	16.05 0.01
11.30 0.02	12.90 0.04	14.50 0.02	16.10 0.01
11.35 0.02	12.95 0.04	14.55 0.02	16.15 0.01
11.40 0.02	13.00 0.03	14.60 0.02	16.20 0.01
11.45 0.03	13.05 0.03	14.65 0.02	16.25 0.01
11.50 0.03	13.10 0.03	14.70 0.02	16.30 0.01
11.55 0.03	13.15 0.03	14.75 0.02	16.35 0.01
11.60 0.05	13.20 0.03	14.80 0.02	16.40 0.01
11.65 0.08	13.25 0.03	14.85 0.02	16.45 0.01
11.70 0.11	13.30 0.03	14.90 0.02	16.50 0.01
11.75 0.16	13.35 0.03	14.95 0.02	16.55 0.01
11.80 0.22	13.40 0.03	15.00 0.02	16.60 0.01

Continues on next page...

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)	Time -- Outflow (hrs cfs)	Time -- Outflow (hrs cfs)	Time -- Outflow (hrs cfs)
16.65 0.01	19.10 0.01	21.55 0.01	24.00 0.01
16.70 0.01	19.15 0.01	21.60 0.01	
16.75 0.01	19.20 0.01	21.65 0.01	
16.80 0.01	19.25 0.01	21.70 0.01	...End
16.85 0.01	19.30 0.01	21.75 0.01	
16.90 0.01	19.35 0.01	21.80 0.01	
16.95 0.01	19.40 0.01	21.85 0.01	
17.00 0.01	19.45 0.01	21.90 0.01	
17.05 0.01	19.50 0.01	21.95 0.01	
17.10 0.01	19.55 0.01	22.00 0.01	
17.15 0.01	19.60 0.01	22.05 0.01	
17.20 0.01	19.65 0.01	22.10 0.01	
17.25 0.01	19.70 0.01	22.15 0.01	
17.30 0.01	19.75 0.01	22.20 0.01	
17.35 0.01	19.80 0.01	22.25 0.01	
17.40 0.01	19.85 0.01	22.30 0.01	
17.45 0.01	19.90 0.01	22.35 0.01	
17.50 0.01	19.95 0.01	22.40 0.01	
17.55 0.01	20.00 0.01	22.45 0.01	
17.60 0.01	20.05 0.01	22.50 0.01	
17.65 0.01	20.10 0.01	22.55 0.01	
17.70 0.01	20.15 0.01	22.60 0.01	
17.75 0.01	20.20 0.01	22.65 0.01	
17.80 0.01	20.25 0.01	22.70 0.01	
17.85 0.01	20.30 0.01	22.75 0.01	
17.90 0.01	20.35 0.01	22.80 0.01	
17.95 0.01	20.40 0.01	22.85 0.01	
18.00 0.01	20.45 0.01	22.90 0.01	
18.05 0.01	20.50 0.01	22.95 0.01	
18.10 0.01	20.55 0.01	23.00 0.01	
18.15 0.01	20.60 0.01	23.05 0.01	
18.20 0.01	20.65 0.01	23.10 0.01	
18.25 0.01	20.70 0.01	23.15 0.01	
18.30 0.01	20.75 0.01	23.20 0.01	
18.35 0.01	20.80 0.01	23.25 0.01	
18.40 0.01	20.85 0.01	23.30 0.01	
18.45 0.01	20.90 0.01	23.35 0.01	
18.50 0.01	20.95 0.01	23.40 0.01	
18.55 0.01	21.00 0.01	23.45 0.01	
18.60 0.01	21.05 0.01	23.50 0.01	
18.65 0.01	21.10 0.01	23.55 0.01	
18.70 0.01	21.15 0.01	23.60 0.01	
18.75 0.01	21.20 0.01	23.65 0.01	
18.80 0.01	21.25 0.01	23.70 0.01	
18.85 0.01	21.30 0.01	23.75 0.01	
18.90 0.01	21.35 0.01	23.80 0.01	
18.95 0.01	21.40 0.01	23.85 0.01	
19.00 0.01	21.45 0.01	23.90 0.01	
19.05 0.01	21.50 0.01	23.95 0.01	

Developed Conditions Map



Runoff Curve Number

Project	Legends Building Addition	By	VT	Date	3/22/2013
Location	Johnson County	Checked	DJS	Date	3/22/2013
☒ Present ☐ Developed					
Soil Name and hydrologic group	Cover Description	CN	Area (ac)	Product	
CsB2 - C	Impervious Surface	98	0.12	11.76	
				0	
				0	
				0	
				0	
		Totals =	0.12	11.76	

CN = 98

Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Return period (yrs)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	0.12	3	720	281	2	----	-----	-----	EX 2YR
2	SCS Runoff	0.30	3	717	676	10	----	-----	-----	EX 10YR
3	SCS Runoff	0.58	3	717	1,301	100	----	-----	-----	EX 100YR
5	SCS Runoff	0.39	3	717	984	2	----	-----	-----	PR 2YR
6	SCS Runoff	0.60	3	717	1,570	10	----	-----	-----	PR 10YR
7	SCS Runoff	0.89	3	717	2,353	100	----	-----	-----	PR 100YR
Proj. file: Runoff.GPW				IDF file: Central IN.IDF				Run date: 03-25-2013		

Hydrograph Report

Page 1

English

Hyd. No. 1

EX 2YR

Hydrograph type = SCS Runoff
Storm frequency = 2 yrs
Drainage area = 0.12 ac
Basin Slope = 1.0 %
Tc method = USER
Total precip. = 2.64 in
Storm duration = 24 hrs

Peak discharge = 0.12 cfs
Time interval = 3 min
Curve number = 74
Hydraulic length = 64 ft
Time of conc. (Tc) = 5 min
Distribution = Type II
Shape factor = 484

Total Volume = 281 cuft

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)	Time -- Outflow (hrs cfs)	Time -- Outflow (hrs cfs)	Time -- Outflow (hrs cfs)
11.60 0.00	13.20 0.01	14.80 0.00	16.40 0.00
11.65 0.00	13.25 0.01	14.85 0.00	16.45 0.00
11.70 0.01	13.30 0.01	14.90 0.00	16.50 0.00
11.75 0.02	13.35 0.01	14.95 0.00	16.55 0.00
11.80 0.03	13.40 0.01	15.00 0.00	16.60 0.00
11.85 0.05	13.45 0.01	15.05 0.00	16.65 0.00
11.90 0.08	13.50 0.01	15.10 0.00	16.70 0.00
11.95 0.11	13.55 0.01	15.15 0.00	16.75 0.00
12.00 0.12 <<	13.60 0.01	15.20 0.00	16.80 0.00
12.05 0.09	13.65 0.01	15.25 0.00	16.85 0.00
12.10 0.05	13.70 0.01	15.30 0.00	16.90 0.00
12.15 0.03	13.75 0.01	15.35 0.00	16.95 0.00
12.20 0.02	13.80 0.01	15.40 0.00	17.00 0.00
12.25 0.02	13.85 0.01	15.45 0.00	17.05 0.00
12.30 0.02	13.90 0.01	15.50 0.00	17.10 0.00
12.35 0.02	13.95 0.01	15.55 0.00	17.15 0.00
12.40 0.02	14.00 0.01	15.60 0.00	17.20 0.00
12.45 0.02	14.05 0.01	15.65 0.00	17.25 0.00
12.50 0.01	14.10 0.01	15.70 0.00	17.30 0.00
12.55 0.01	14.15 0.01	15.75 0.00	17.35 0.00
12.60 0.01	14.20 0.01	15.80 0.00	17.40 0.00
12.65 0.01	14.25 0.01	15.85 0.00	17.45 0.00
12.70 0.01	14.30 0.01	15.90 0.00	17.50 0.00
12.75 0.01	14.35 0.01	15.95 0.00	17.55 0.00
12.80 0.01	14.40 0.01	16.00 0.00	17.60 0.00
12.85 0.01	14.45 0.01	16.05 0.00	17.65 0.00
12.90 0.01	14.50 0.01	16.10 0.00	17.70 0.00
12.95 0.01	14.55 0.01	16.15 0.00	17.75 0.00
13.00 0.01	14.60 0.01	16.20 0.00	17.80 0.00
13.05 0.01	14.65 0.01	16.25 0.00	17.85 0.00
13.10 0.01	14.70 0.01	16.30 0.00	17.90 0.00
13.15 0.01	14.75 0.00	16.35 0.00	17.95 0.00

Continues on next page...

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)	Time -- Outflow (hrs cfs)	Time -- Outflow (hrs cfs)
18.00	0.00	22.90
18.05	0.00	22.95
18.10	0.00	23.00
18.15	0.00	23.05
18.20	0.00	23.10
18.25	0.00	23.15
18.30	0.00	23.20
18.35	0.00	23.25
18.40	0.00	23.30
18.45	0.00	23.35
18.50	0.00	23.40
18.55	0.00	23.45
18.60	0.00	23.50
18.65	0.00	23.55
18.70	0.00	23.60
18.75	0.00	23.65
18.80	0.00	23.70
18.85	0.00	23.75
18.90	0.00	23.80
18.95	0.00	23.85
19.00	0.00	23.90
19.05	0.00	23.95
19.10	0.00	24.00
19.15	0.00	24.05
19.20	0.00	
19.25	0.00	
19.30	0.00	...End
19.35	0.00	
19.40	0.00	
19.45	0.00	
19.50	0.00	
19.55	0.00	
19.60	0.00	
19.65	0.00	
19.70	0.00	
19.75	0.00	
19.80	0.00	
19.85	0.00	
19.90	0.00	
19.95	0.00	
20.00	0.00	
20.05	0.00	
20.10	0.00	
20.15	0.00	
20.20	0.00	
20.25	0.00	
20.30	0.00	
20.35	0.00	
20.40	0.00	

Hydrograph Report

Page 1

English

Hyd. No. 2

EX 10YR

Hydrograph type = SCS Runoff
Storm frequency = 10 yrs
Drainage area = 0.12 ac
Basin Slope = 1.0 %
Tc method = USER
Total precip. = 4.08 in
Storm duration = 24 hrs

Peak discharge = 0.30 cfs
Time interval = 3 min
Curve number = 74
Hydraulic length = 64 ft
Time of conc. (Tc) = 5 min
Distribution = Type II
Shape factor = 484

Total Volume = 676 cuft

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)	Time -- Outflow (hrs cfs)	Time -- Outflow (hrs cfs)	Time -- Outflow (hrs cfs)
10.90 0.00	12.50 0.03	14.10 0.01	15.70 0.01
10.95 0.00	12.55 0.03	14.15 0.01	15.75 0.01
11.00 0.00	12.60 0.03	14.20 0.01	15.80 0.01
11.05 0.00	12.65 0.02	14.25 0.01	15.85 0.01
11.10 0.00	12.70 0.02	14.30 0.01	15.90 0.01
11.15 0.00	12.75 0.02	14.35 0.01	15.95 0.01
11.20 0.01	12.80 0.02	14.40 0.01	16.00 0.01
11.25 0.01	12.85 0.02	14.45 0.01	16.05 0.01
11.30 0.01	12.90 0.02	14.50 0.01	16.10 0.01
11.35 0.01	12.95 0.02	14.55 0.01	16.15 0.01
11.40 0.01	13.00 0.02	14.60 0.01	16.20 0.01
11.45 0.01	13.05 0.02	14.65 0.01	16.25 0.01
11.50 0.01	13.10 0.02	14.70 0.01	16.30 0.01
11.55 0.01	13.15 0.02	14.75 0.01	16.35 0.01
11.60 0.02	13.20 0.02	14.80 0.01	16.40 0.01
11.65 0.03	13.25 0.02	14.85 0.01	16.45 0.01
11.70 0.05	13.30 0.02	14.90 0.01	16.50 0.01
11.75 0.07	13.35 0.02	14.95 0.01	16.55 0.01
11.80 0.10	13.40 0.02	15.00 0.01	16.60 0.01
11.85 0.15	13.45 0.02	15.05 0.01	16.65 0.01
11.90 0.22	13.50 0.02	15.10 0.01	16.70 0.01
11.95 0.30 <<	13.55 0.01	15.15 0.01	16.75 0.01
12.00 0.29	13.60 0.01	15.20 0.01	16.80 0.01
12.05 0.21	13.65 0.01	15.25 0.01	16.85 0.01
12.10 0.12	13.70 0.01	15.30 0.01	16.90 0.01
12.15 0.07	13.75 0.01	15.35 0.01	16.95 0.01
12.20 0.05	13.80 0.01	15.40 0.01	17.00 0.01
12.25 0.05	13.85 0.01	15.45 0.01	17.05 0.01
12.30 0.04	13.90 0.01	15.50 0.01	17.10 0.01
12.35 0.04	13.95 0.01	15.55 0.01	17.15 0.01
12.40 0.04	14.00 0.01	15.60 0.01	17.20 0.01
12.45 0.03	14.05 0.01	15.65 0.01	17.25 0.01

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Hydrograph Discharge Table

Time -- Outflow		Time -- Outflow		Time -- Outflow	
(hrs	cfs)	(hrs	cfs)	(hrs	cfs)
17.30	0.01	19.75	0.00	22.20	0.00
17.35	0.01	19.80	0.00	22.25	0.00
17.40	0.01	19.85	0.00	22.30	0.00
17.45	0.01	19.90	0.00	22.35	0.00
17.50	0.01	19.95	0.00	22.40	0.00
17.55	0.01	20.00	0.00	22.45	0.00
17.60	0.01	20.05	0.00	22.50	0.00
17.65	0.01	20.10	0.00	22.55	0.00
17.70	0.01	20.15	0.00	22.60	0.00
17.75	0.01	20.20	0.00	22.65	0.00
17.80	0.01	20.25	0.00	22.70	0.00
17.85	0.01	20.30	0.00	22.75	0.00
17.90	0.01	20.35	0.00	22.80	0.00
17.95	0.01	20.40	0.00	22.85	0.00
18.00	0.01	20.45	0.00	22.90	0.00
18.05	0.01	20.50	0.00	22.95	0.00
18.10	0.01	20.55	0.00	23.00	0.00
18.15	0.01	20.60	0.00	23.05	0.00
18.20	0.01	20.65	0.00	23.10	0.00
18.25	0.01	20.70	0.00	23.15	0.00
18.30	0.01	20.75	0.00	23.20	0.00
18.35	0.01	20.80	0.00	23.25	0.00
18.40	0.01	20.85	0.00	23.30	0.00
18.45	0.01	20.90	0.00	23.35	0.00
18.50	0.01	20.95	0.00	23.40	0.00
18.55	0.01	21.00	0.00	23.45	0.00
18.60	0.01	21.05	0.00	23.50	0.00
18.65	0.01	21.10	0.00	23.55	0.00
18.70	0.01	21.15	0.00	23.60	0.00
18.75	0.01	21.20	0.00	23.65	0.00
18.80	0.01	21.25	0.00	23.70	0.00
18.85	0.01	21.30	0.00	23.75	0.00
18.90	0.01	21.35	0.00	23.80	0.00
18.95	0.01	21.40	0.00	23.85	0.00
19.00	0.01	21.45	0.00	23.90	0.00
19.05	0.01	21.50	0.00	23.95	0.00
19.10	0.01	21.55	0.00	24.00	0.00
19.15	0.01	21.60	0.00	24.05	0.00
19.20	0.01	21.65	0.00		
19.25	0.01	21.70	0.00		
19.30	0.00	21.75	0.00	...End	
19.35	0.00	21.80	0.00		
19.40	0.00	21.85	0.00		
19.45	0.00	21.90	0.00		
19.50	0.00	21.95	0.00		
19.55	0.00	22.00	0.00		
19.60	0.00	22.05	0.00		
19.65	0.00	22.10	0.00		
19.70	0.00	22.15	0.00		

Hydrograph Report

Page 1

English

Hyd. No. 3

EX 100YR

Hydrograph type = SCS Runoff
Storm frequency = 100 yrs
Drainage area = 0.12 ac
Basin Slope = 1.0 %
Tc method = USER
Total precip. = 6.00 in
Storm duration = 24 hrs

Peak discharge = 0.58 cfs
Time interval = 3 min
Curve number = 74
Hydraulic length = 64 ft
Time of conc. (Tc) = 5 min
Distribution = Type II
Shape factor = 484

Total Volume = 1,301 cuft

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)	Time -- Outflow (hrs cfs)	Time -- Outflow (hrs cfs)	Time -- Outflow (hrs cfs)
10.25 0.01	11.85 0.31	13.45 0.03	15.05 0.02
10.30 0.01	11.90 0.45	13.50 0.03	15.10 0.02
10.35 0.01	11.95 0.58 <<	13.55 0.03	15.15 0.02
10.40 0.01	12.00 0.56	13.60 0.03	15.20 0.02
10.45 0.01	12.05 0.39	13.65 0.02	15.25 0.02
10.50 0.01	12.10 0.22	13.70 0.02	15.30 0.02
10.55 0.01	12.15 0.12	13.75 0.02	15.35 0.02
10.60 0.01	12.20 0.09	13.80 0.02	15.40 0.02
10.65 0.01	12.25 0.08	13.85 0.02	15.45 0.02
10.70 0.01	12.30 0.08	13.90 0.02	15.50 0.01
10.75 0.01	12.35 0.07	13.95 0.02	15.55 0.01
10.80 0.01	12.40 0.07	14.00 0.02	15.60 0.01
10.85 0.01	12.45 0.06	14.05 0.02	15.65 0.01
10.90 0.01	12.50 0.06	14.10 0.02	15.70 0.01
10.95 0.01	12.55 0.05	14.15 0.02	15.75 0.01
11.00 0.01	12.60 0.05	14.20 0.02	15.80 0.01
11.05 0.01	12.65 0.04	14.25 0.02	15.85 0.01
11.10 0.01	12.70 0.04	14.30 0.02	15.90 0.01
11.15 0.02	12.75 0.04	14.35 0.02	15.95 0.01
11.20 0.02	12.80 0.04	14.40 0.02	16.00 0.01
11.25 0.02	12.85 0.04	14.45 0.02	16.05 0.01
11.30 0.02	12.90 0.04	14.50 0.02	16.10 0.01
11.35 0.02	12.95 0.04	14.55 0.02	16.15 0.01
11.40 0.02	13.00 0.03	14.60 0.02	16.20 0.01
11.45 0.03	13.05 0.03	14.65 0.02	16.25 0.01
11.50 0.03	13.10 0.03	14.70 0.02	16.30 0.01
11.55 0.03	13.15 0.03	14.75 0.02	16.35 0.01
11.60 0.05	13.20 0.03	14.80 0.02	16.40 0.01
11.65 0.08	13.25 0.03	14.85 0.02	16.45 0.01
11.70 0.11	13.30 0.03	14.90 0.02	16.50 0.01
11.75 0.16	13.35 0.03	14.95 0.02	16.55 0.01
11.80 0.22	13.40 0.03	15.00 0.02	16.60 0.01

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Hydrograph Discharge Table

Time -- Outflow (hrs cfs)	Time -- Outflow (hrs cfs)	Time -- Outflow (hrs cfs)	Time -- Outflow (hrs cfs)
16.65 0.01	19.10 0.01	21.55 0.01	24.00 0.01
16.70 0.01	19.15 0.01	21.60 0.01	
16.75 0.01	19.20 0.01	21.65 0.01	
16.80 0.01	19.25 0.01	21.70 0.01	...End
16.85 0.01	19.30 0.01	21.75 0.01	
16.90 0.01	19.35 0.01	21.80 0.01	
16.95 0.01	19.40 0.01	21.85 0.01	
17.00 0.01	19.45 0.01	21.90 0.01	
17.05 0.01	19.50 0.01	21.95 0.01	
17.10 0.01	19.55 0.01	22.00 0.01	
17.15 0.01	19.60 0.01	22.05 0.01	
17.20 0.01	19.65 0.01	22.10 0.01	
17.25 0.01	19.70 0.01	22.15 0.01	
17.30 0.01	19.75 0.01	22.20 0.01	
17.35 0.01	19.80 0.01	22.25 0.01	
17.40 0.01	19.85 0.01	22.30 0.01	
17.45 0.01	19.90 0.01	22.35 0.01	
17.50 0.01	19.95 0.01	22.40 0.01	
17.55 0.01	20.00 0.01	22.45 0.01	
17.60 0.01	20.05 0.01	22.50 0.01	
17.65 0.01	20.10 0.01	22.55 0.01	
17.70 0.01	20.15 0.01	22.60 0.01	
17.75 0.01	20.20 0.01	22.65 0.01	
17.80 0.01	20.25 0.01	22.70 0.01	
17.85 0.01	20.30 0.01	22.75 0.01	
17.90 0.01	20.35 0.01	22.80 0.01	
17.95 0.01	20.40 0.01	22.85 0.01	
18.00 0.01	20.45 0.01	22.90 0.01	
18.05 0.01	20.50 0.01	22.95 0.01	
18.10 0.01	20.55 0.01	23.00 0.01	
18.15 0.01	20.60 0.01	23.05 0.01	
18.20 0.01	20.65 0.01	23.10 0.01	
18.25 0.01	20.70 0.01	23.15 0.01	
18.30 0.01	20.75 0.01	23.20 0.01	
18.35 0.01	20.80 0.01	23.25 0.01	
18.40 0.01	20.85 0.01	23.30 0.01	
18.45 0.01	20.90 0.01	23.35 0.01	
18.50 0.01	20.95 0.01	23.40 0.01	
18.55 0.01	21.00 0.01	23.45 0.01	
18.60 0.01	21.05 0.01	23.50 0.01	
18.65 0.01	21.10 0.01	23.55 0.01	
18.70 0.01	21.15 0.01	23.60 0.01	
18.75 0.01	21.20 0.01	23.65 0.01	
18.80 0.01	21.25 0.01	23.70 0.01	
18.85 0.01	21.30 0.01	23.75 0.01	
18.90 0.01	21.35 0.01	23.80 0.01	
18.95 0.01	21.40 0.01	23.85 0.01	
19.00 0.01	21.45 0.01	23.90 0.01	
19.05 0.01	21.50 0.01	23.95 0.01	

Hydrograph Report

Page 1

English

Hyd. No. 1

100 Year Runoff

Hydrograph type = Rational
Storm frequency = 100 yrs
Drainage area = 33.0 ac
Intensity = 4.41 in
I-D-F Curve = Central IN.IDF

Peak discharge = 50.97 cfs
Time interval = 1 min
Runoff coeff. = 0.35
Time of conc. (Tc) = 31 min
Reced. limb factor = 1

Total Volume = 94,798 cuft

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)	Time -- Outflow (hrs cfs)
0.02 1.64	0.55 47.68
0.03 3.29	0.57 46.03
0.05 4.93	0.58 44.39
0.07 6.58	0.60 42.75
0.08 8.22	0.62 41.10
0.10 9.86	0.63 39.46
0.12 11.51	0.65 37.81
0.13 13.15	0.67 36.17
0.15 14.80	0.68 34.53
0.17 16.44	0.70 32.88
0.18 18.08	0.72 31.24
0.20 19.73	0.73 29.59
0.22 21.37	0.75 27.95
0.23 23.02	0.77 26.31
0.25 24.66	0.78 24.66
0.27 26.31	0.80 23.02
0.28 27.95	0.82 21.37
0.30 29.59	0.83 19.73
0.32 31.24	0.85 18.08
0.33 32.88	0.87 16.44
0.35 34.53	0.88 14.80
0.37 36.17	0.90 13.15
0.38 37.81	0.92 11.51
0.40 39.46	0.93 9.86
0.42 41.10	0.95 8.22
0.43 42.75	0.97 6.58
0.45 44.39	0.98 4.93
0.47 46.03	1.00 3.29
0.48 47.68	1.02 1.64
0.50 49.32	
0.52 50.97 <<	
0.53 49.32	...End

Hyd. No. 1

100 Year Runoff

Storm frequency = 100 yrs

Sheet Flow

Manning's n-value = 0.150
Flow length = 100.0 ft
Two-year 24-hr precip. = 2.64 in
Land slope = 1.0 %

Travel Time = 14.2 min

Shallow Concentrated Flow

Flow length = 1590 ft
Watercourse slope = 1.0 %
Surface description = Unpaved
Average velocity = 1.61 ft/s

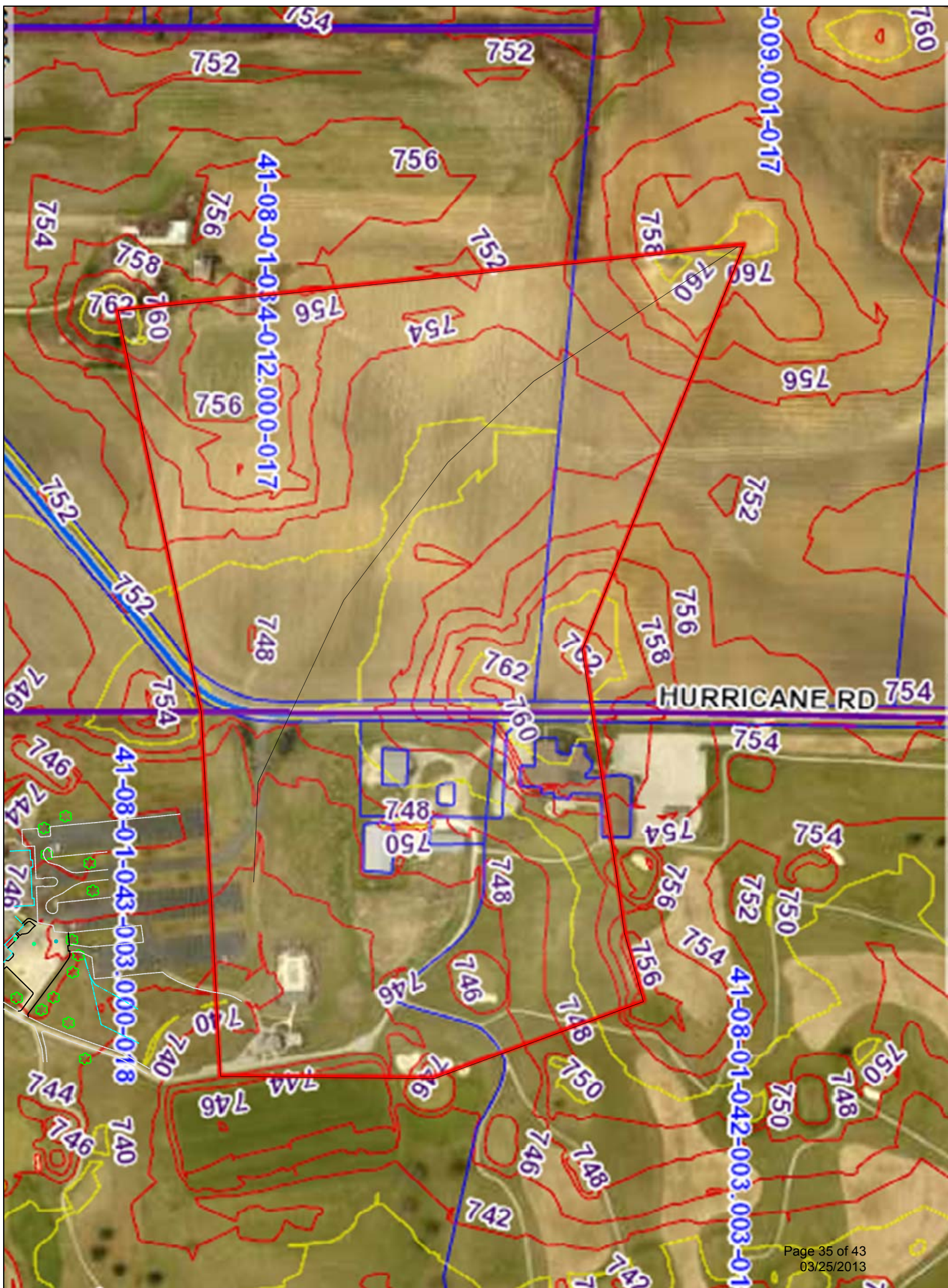
Travel Time = 16.4 min

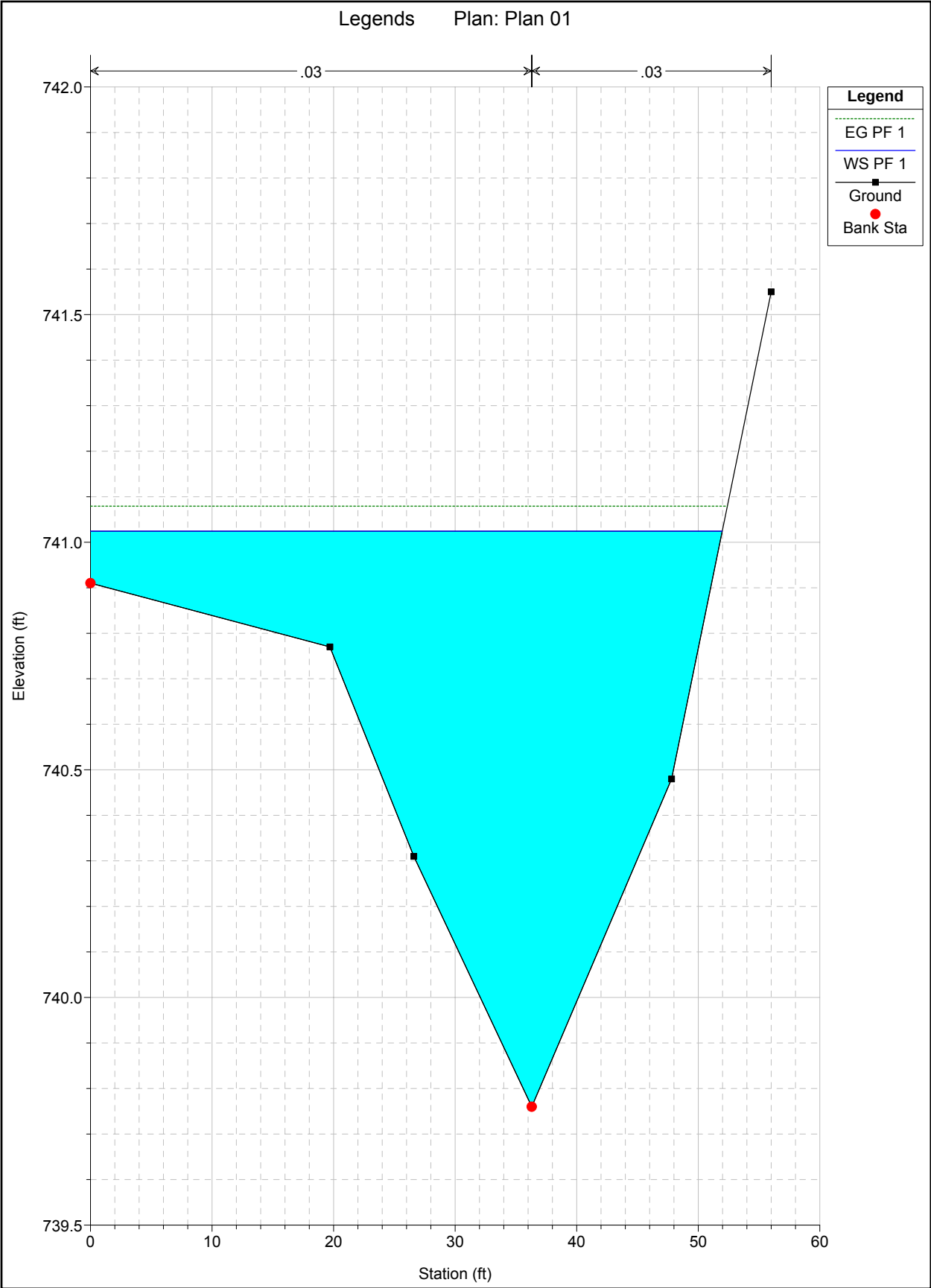
Channel Flow

Cross section flow area = 0.0 sqft
Wetted perimeter = 0.0 ft
Channel slope = 0.0 %
Manning's n-value = 0.015
Velocity = 0.00 ft/s
Flow length = 0.0 ft

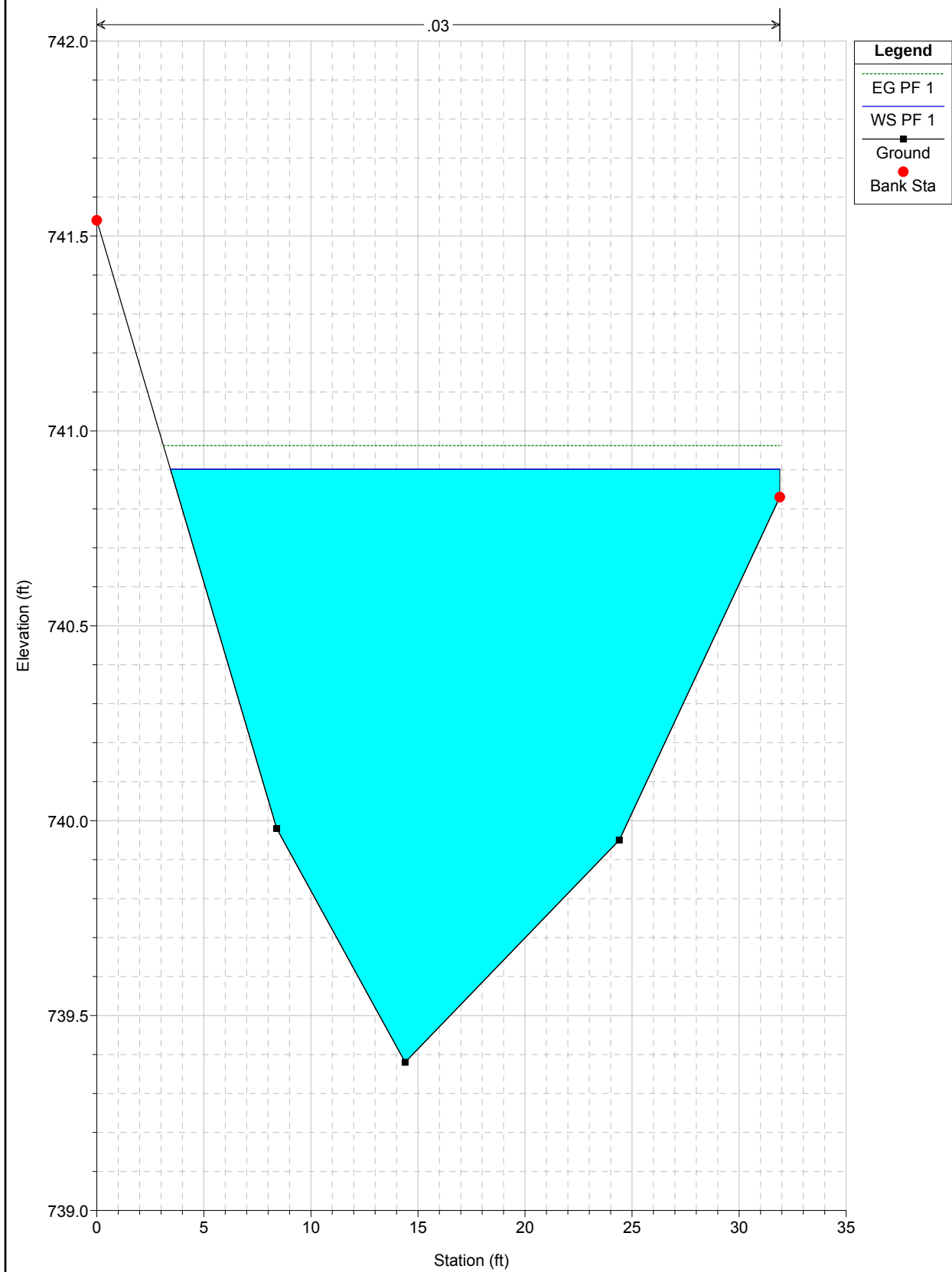
Travel Time = min

Total Travel Time, Tc = 31.0 min

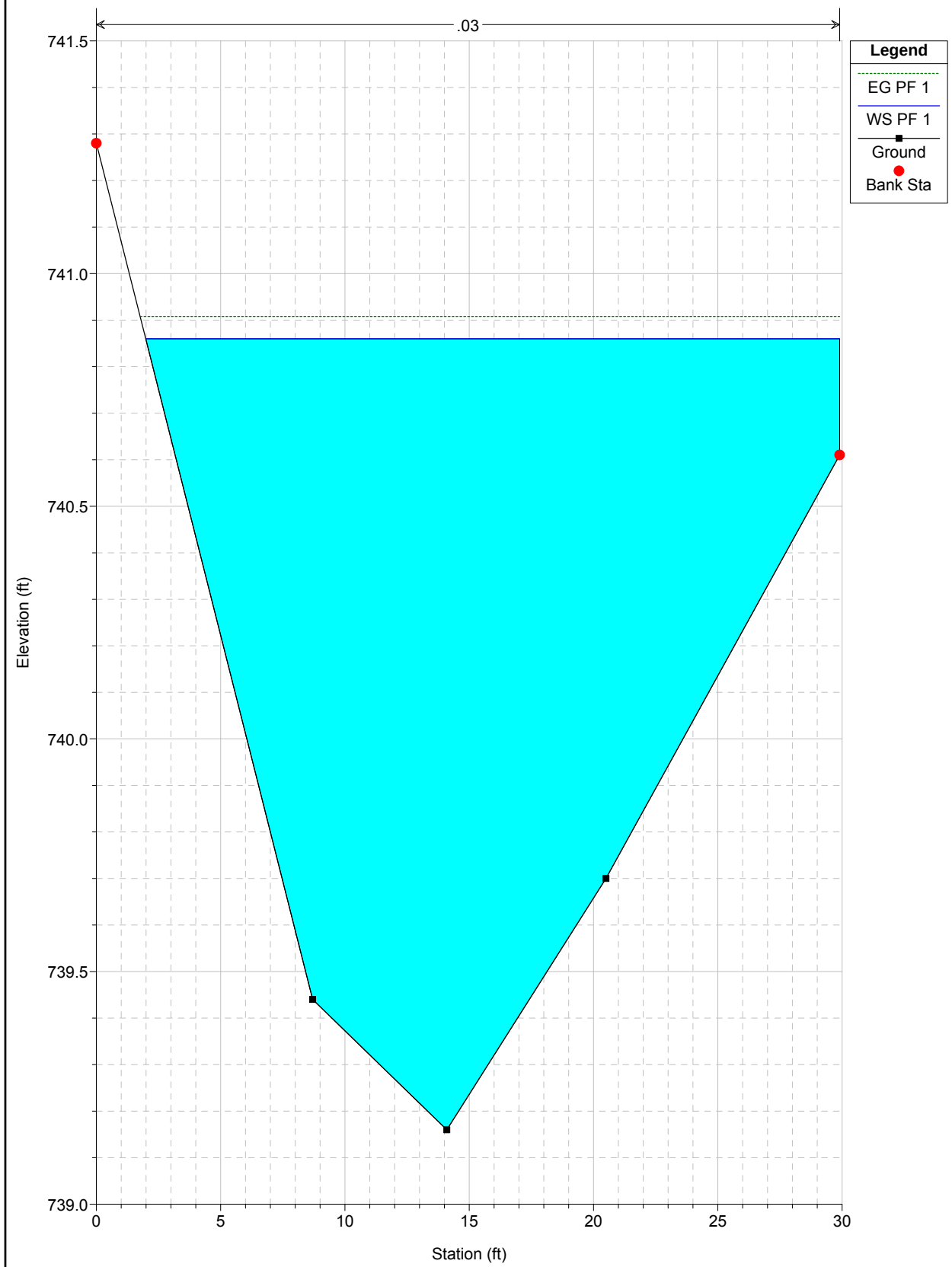




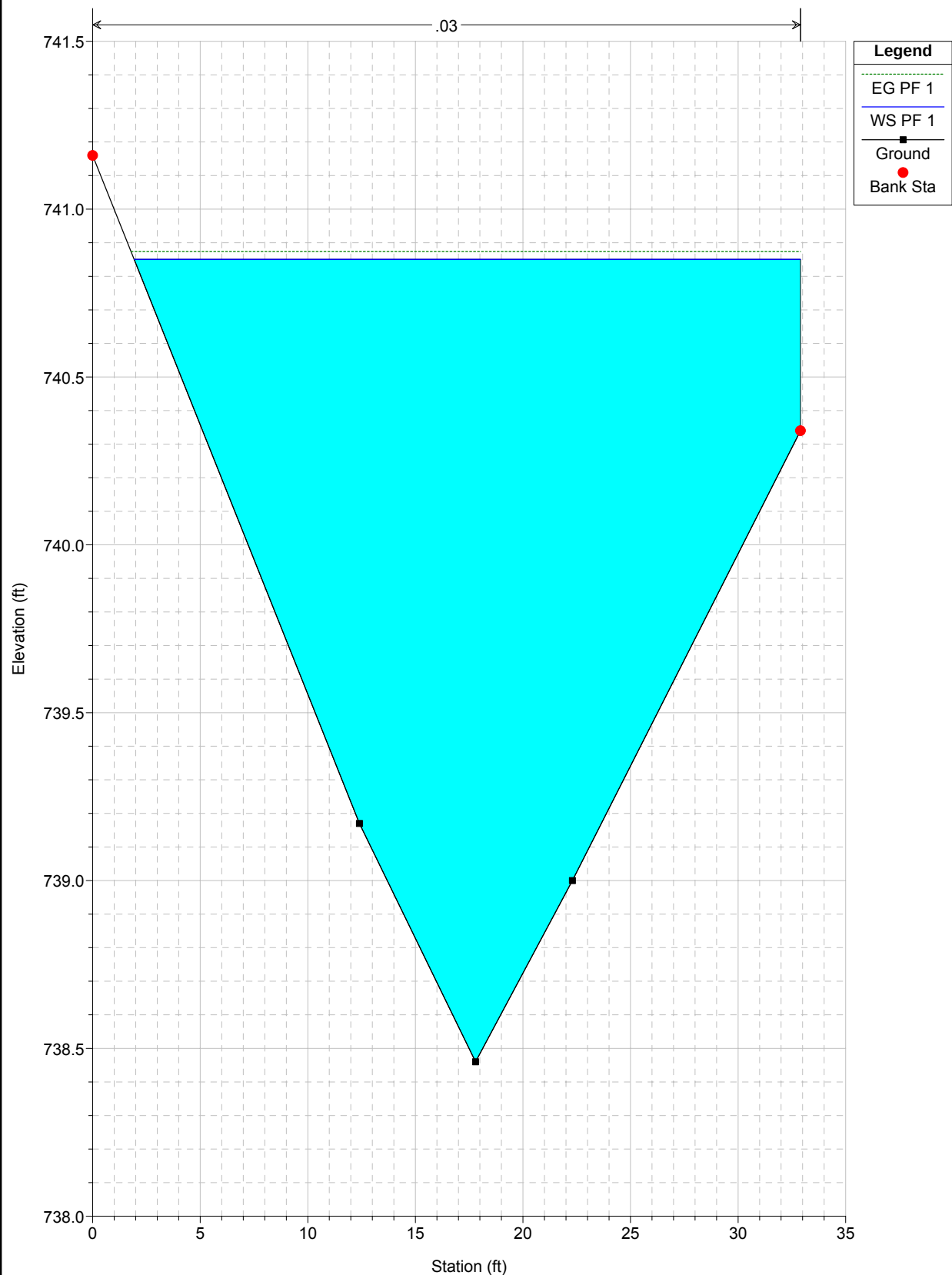
Legends Plan: Plan 01



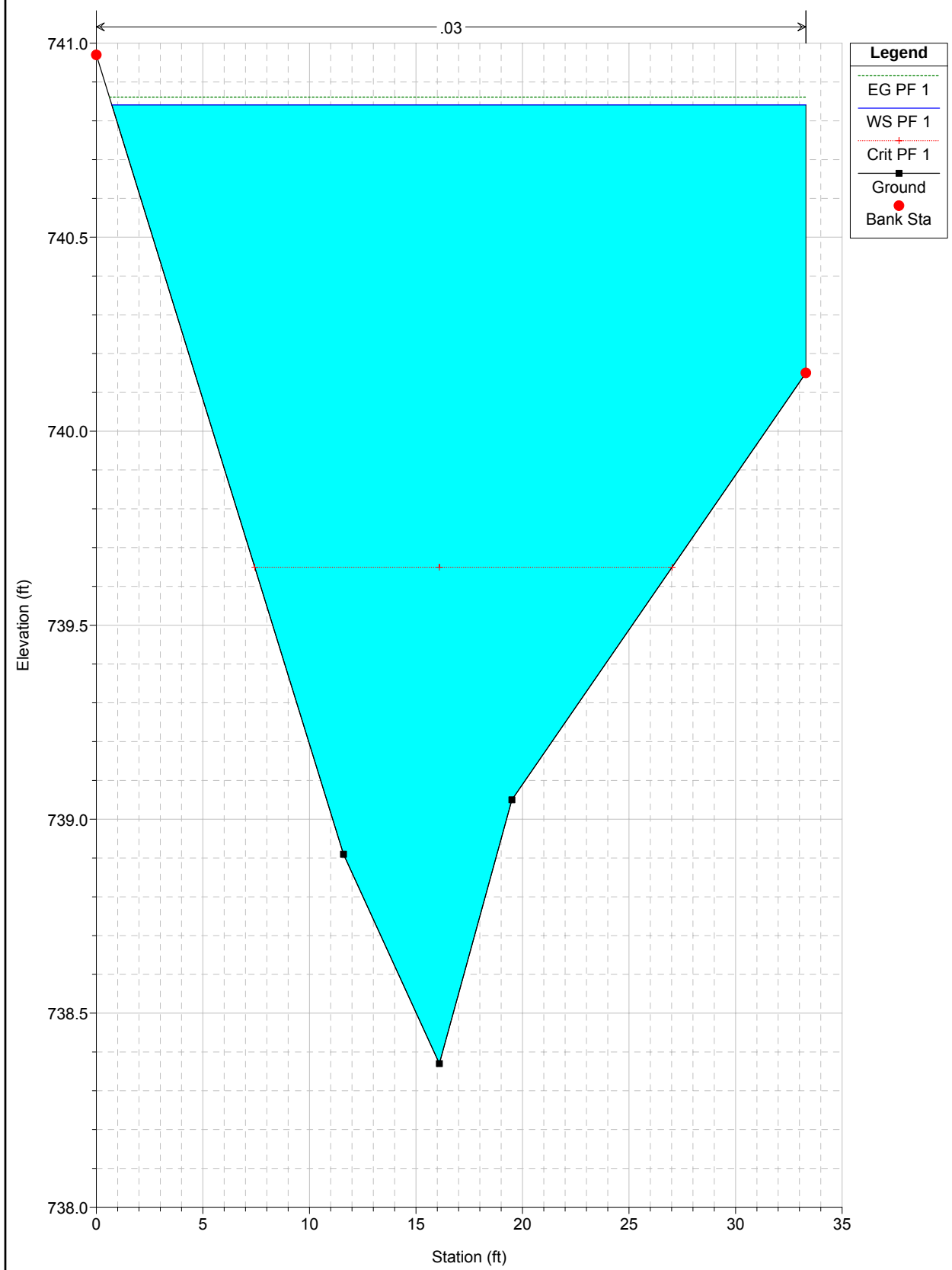
Legends Plan: Plan 01



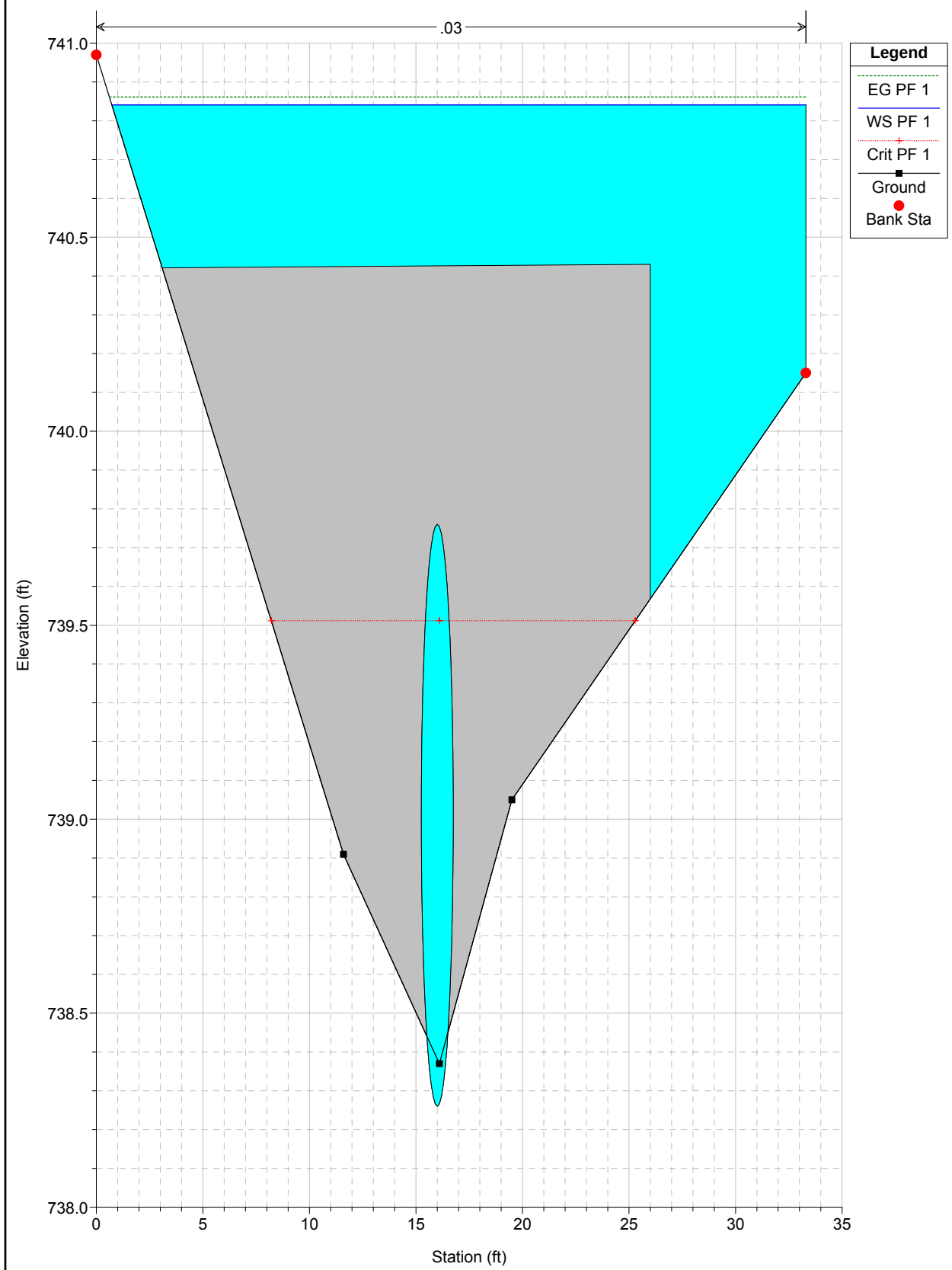
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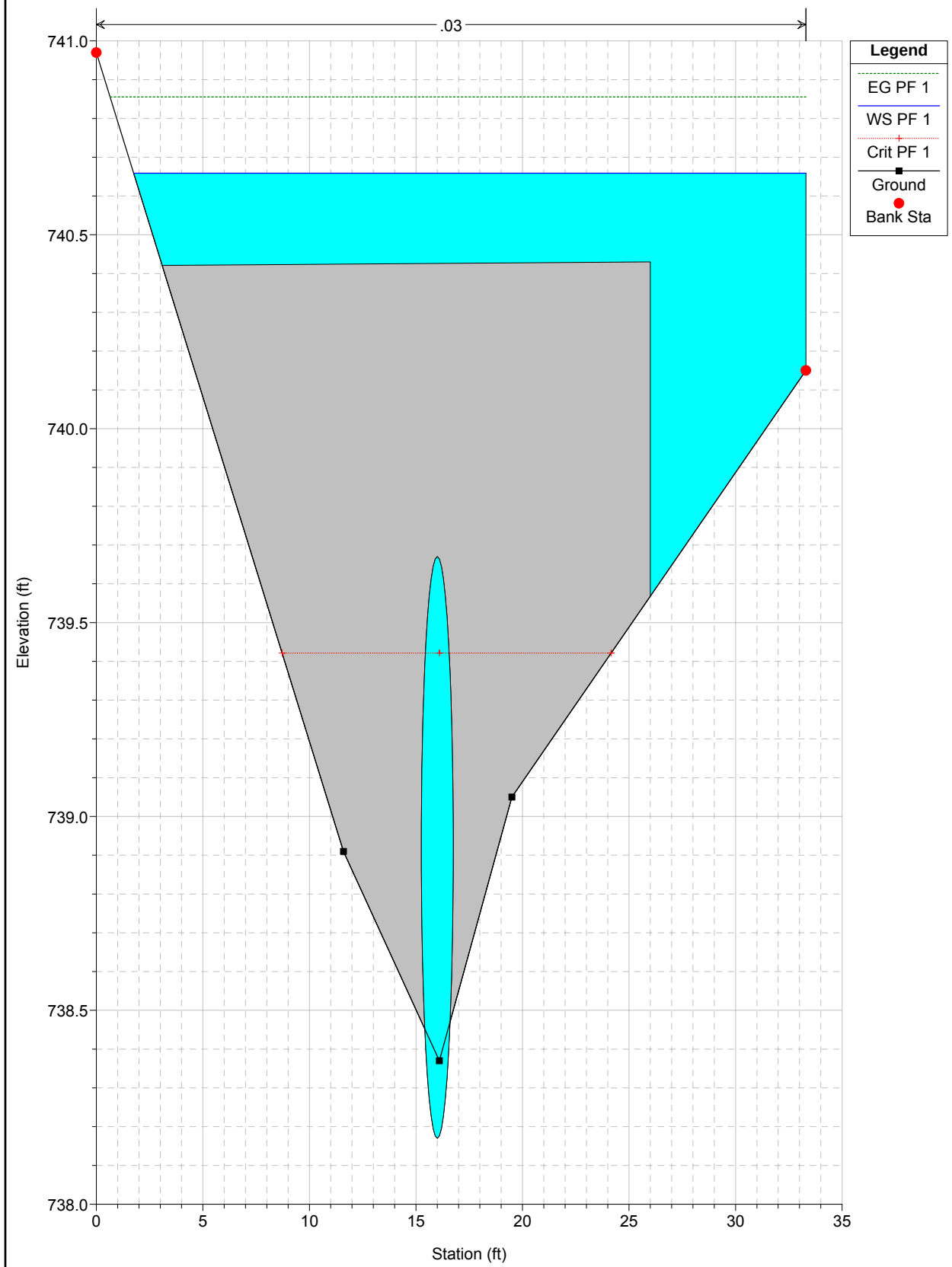
Legends Plan: Plan 01



Legends Plan: Plan 01



Legends Plan: Plan 01



Legends Plan: Plan 01

