HYDROLOGY & HYDRAULICS REPORT

for

WEST WINDS STREAM RESTORATION

NEW MARKET
FREDERICK COUNTY, MARYLAND

TCH
Job #: 2024-0317
Date: SEPTEMBER 2025
Revised: FEBRURARY 2026

Prepared by:

FREDERICK, SEIBERT & ASSOCIATES, INC.
Civil Engineering
Land Surveying
Landscape Architecture

Professional Certification
I hereby certify that this document was prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 20945, Expiration Date: 2027-08-23.

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Introduction

West Winds Stream Restoration is located within the West Winds subdivision of the Lake Linganore Association of Frederick County, MD. The project reach is located at the pond East of Country Club Road, south of Pond Fountain Court. The project lies within parcel 29 of grid 22 on tax map 69 in the Land Records of Frederick County. This parcel encompasses 75.51 acres of land that has previously been used as a golf course. The golf course ceased operations in 2018. The purpose of this analysis is to evaluate the existing hydrology in order to model and understand how the proposed work might impact the hydrology and hydraulics of the stream system and its floodplain.

Multiple design alternatives were evaluated and assessed for their impacts on natural resources, with the goal of selecting a sustainable and environmentally responsible solution to address the failure of the existing pond outlet system. See Figure 1 below for a vicinity map of the project's location.

The existing pond has contributing flow from an unnamed tributary, groundwater springs, and direct runoff from uphill watersheds. The 2023 structural failure of the corrugated metal pipe (CMP) near the pond outlet structure initiated rapid pond dewatering. Another downstream section of CMP also collapsed and led to the formation of a surface depression that now captures all upstream flow and discharges overland across the path and into an unnamed tributary of Ben's Branch. The surface depression remains inundated, and its depth is assumed to be the pipe invert. Downstream of the surface depression, the unnamed tributary flows through a 6'x8' box culvert beneath Country Club Road. The reach between the surface depression and the culvert is characterized by a deep and overwide channel with severely eroded banks. Within the pond embankment, wetlands have formed as a result of the continuous flow from the unnamed tributary and internal groundwater springs.

The purpose of this project is to daylight the existing enclosed stream by removing the pipe and a section of existing pond berm in order to reconnect the floodplain and return the stream channel to the natural valley bottom. The proposed channel geometry has been designed based on field surveys, pebble counts, regional curve data and observations of sections of downstream reaches below Country Club Road. Implementing converging step pools at the downstream end of the restoration reach allows for efficient energy dissipation and a stable transition between the proposed floodplain and existing channel grades.

Hydrology Study

The contributing watershed has been delineated with a study point at the upstream end of the Country Club Road culvert. The total drainage area is 62.71 acres, divided into three sub-watersheds:

1. Watershed 'A' (30.05 Ac): Runoff bypassing the pond to the north.
2. Watershed 'B' (25.09 Ac): Direct drainage into the pond.
3. Watershed 'C' (7.57 Ac): Roadside stormwater runoff from the south.

See Figure 2 for the Drainage Area Map.

The existing watershed land use areas and time of concentrations were input to a HydroCAD model. This model describes all of flows from all three sub-watersheds connecting to the upstream toe of the road culvert mentioned above. The model ran for the 2-yr, 10-yr, and 100-yr storms. The 2-yr storm outputs were utilized to give targets for the proposed bankfull channel design. The 10-yr and 100-yr

storms were used when creating the overbank and floodplain area for the new channel. To see specific outputs from this model, see the HydroCAD report in Appendix A.

Hydraulic Study

Hydrologic and Hydraulic Modeling
Existing and proposed hydraulic conditions were simulated using HEC-RAS (v. 6.4.1). The model was parameterized using digital elevation models (DEMs) for both scenarios, with boundary conditions and peak flow rates derived from the previously referenced HydroCAD analysis. As the project reach is located outside of FEMA-regulated Special Flood Hazard Areas (SFHA), the HEC-RAS model serves to delineate the baseline and post-restoration floodplains.

Comparative Analysis of Water Surface Elevations (WSE)
Direct comparison of existing and proposed WSEs requires context regarding the current site geometry. Under existing conditions, the pond embankment functions as a hydraulic control, providing storage and attenuation until the stage exceeds the berm elevation. Consequently, existing WSEs are primarily governed by this impoundment. The proposed design involves a partial breach of the embankment to facilitate stream daylighting, which fundamentally alters the stage-discharge relationship throughout the restoration reach.

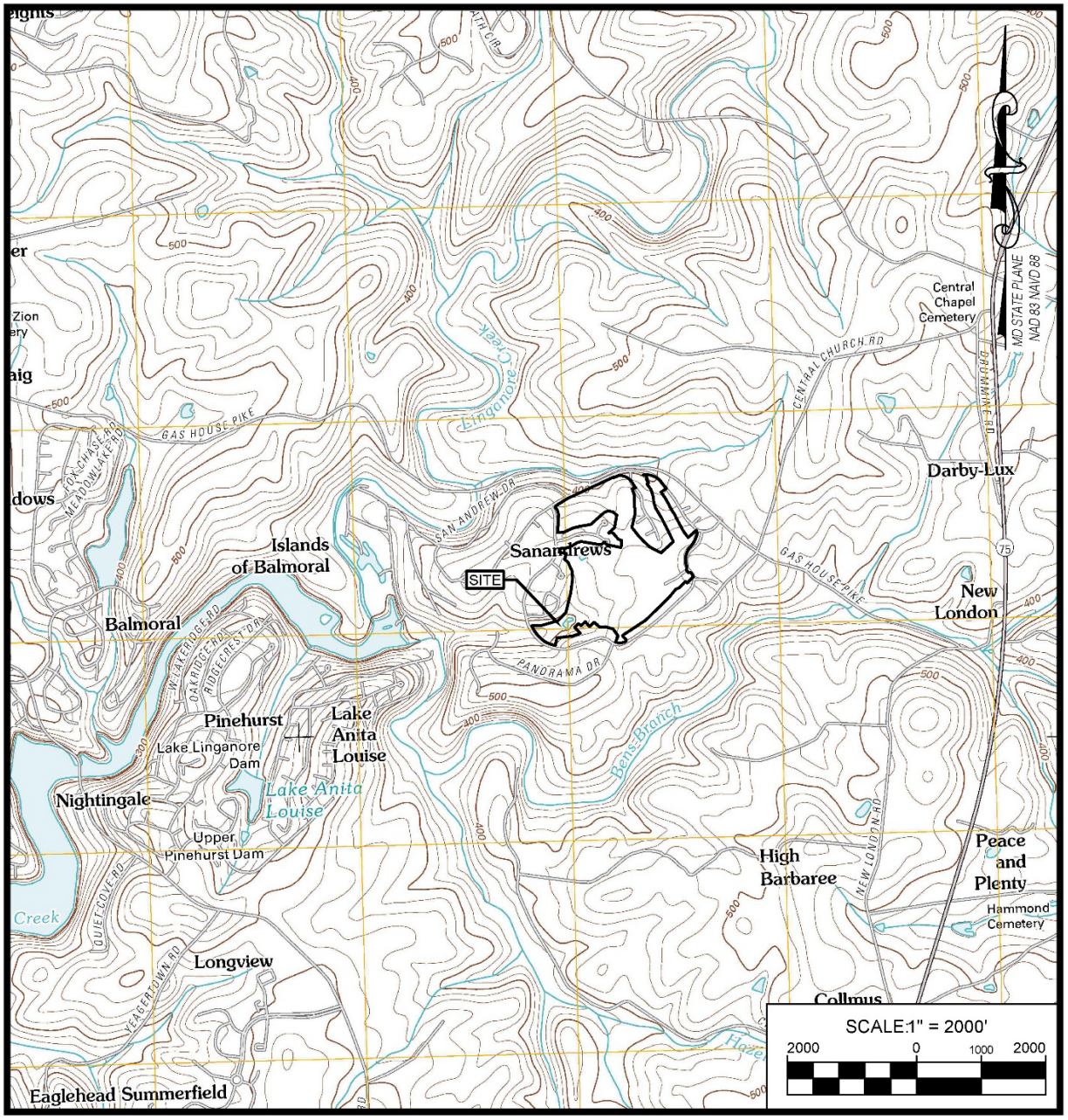
Floodplain Delineation and Property Impacts
Comparative analysis of the 100-year floodplain boundaries indicates that the proposed grading and embankment removal results in a net reduction of the inundated area. Despite the reduced footprint, the proposed design enhances longitudinal and lateral hydraulic connectivity within the natural valley bottom. Furthermore, the simulation confirms that the proposed modifications yield no adverse WSE impacts on adjacent properties. Refer to Appendix B for the full HEC-RAS submittal and Appendix C for the Floodplain Exhibit and cross-section alignments.

Summary

This report summarizes the hydraulic modeling and comparative analysis performed to quantify the impact of the proposed stream restoration on the project reach and adjacent properties. The project objective is the restoration of a stream system currently fragmented by a defunct pond and failed outlet structure.

Hydrologic analysis demonstrates that the proposed design maintains existing drainage patterns and does not adversely impact conditions at the designated study point. Furthermore, HEC-RAS simulations confirm that the proposed restoration and floodplain reconnection maintain flooding within the subject property and do not affect adjacent properties.

Figure 1 – USGS - Walkersville, Maryland



PROPERTY INFORMATION	69 - 22 - 29
DWN BY: TCH	DATE: 10-29-2024
PROJECT MANAGER: KDM	EMAIL: KMOORE@FSA-INC.COM
SCALE	1" = 2000'
SHEET 01 OF 01	

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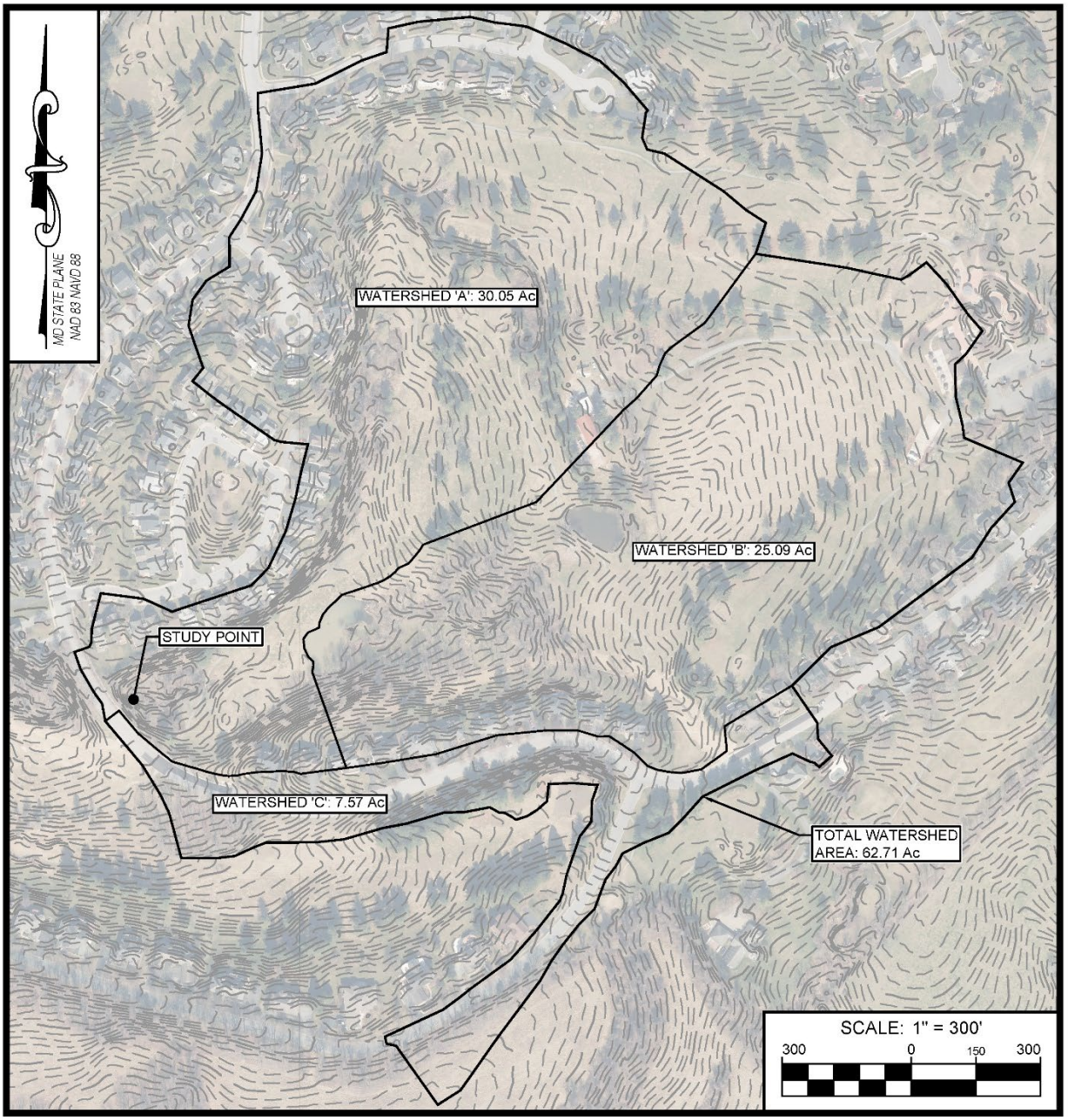
PROJECT NO. 2024-0317

P:\SHARED FOLDERS\PROJECTS\2024S\2024-0317\DWG\CONSTRUCITON SET\2024-0317 COVER SHEET & GENERAL NOTES.DWG 2024-10-29

Figure 2 - Drainage Area Map



PROPERTY INFORMATION: 69 - 22 - 29	
DWN BY: TCH	DATE: 09-16-2025
PROJECT MANAGER: KDM	EMAIL: KMOORE@FSA-INC.COM
SCALE: 1" = 300'	
SHEET 01 OF 01	

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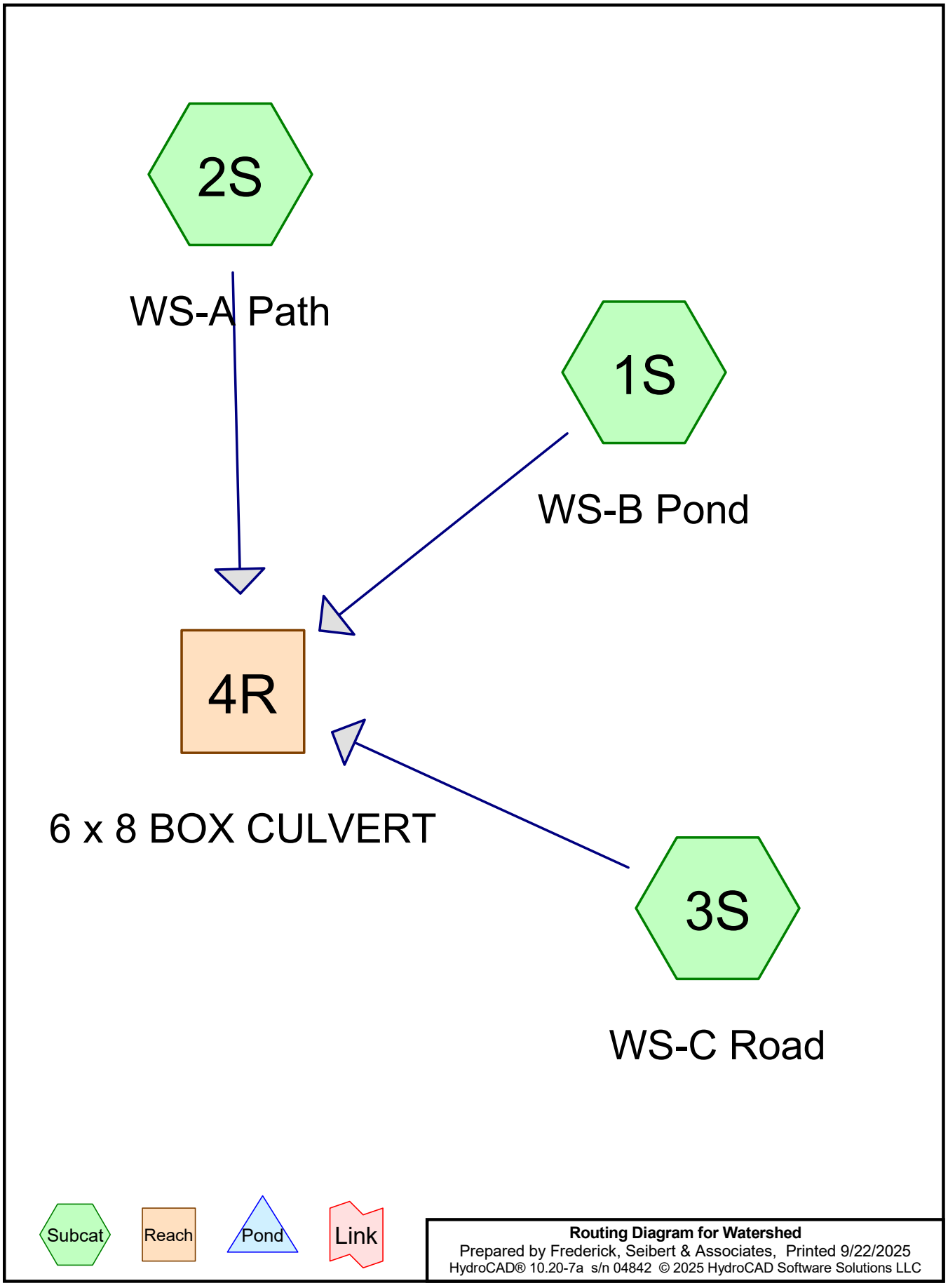
Appendix A

HydroCAD Report



Routing Diagram for Watershed
Prepared by Frederick, Seibert & Associates, Printed 9/22/2025

Project Notes

Rainfall events imported from "Atlas-14-Rain.txt" for 1480 MD Washington

Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-Year	NOAA 24-hr	B	Default	24.00	1	2.85	2
2	10-Year	NOAA 24-hr	B	Default	24.00	1	4.11	2
3	100-Year	NOAA 24-hr	B	Default	24.00	1	6.40	2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
16.770	61	>75% Grass cover, Good, HSG B (1S, 2S, 3S)
37.830	74	>75% Grass cover, Good, HSG C (1S, 2S, 3S)
1.780	98	Paved parking, HSG C (1S, 2S, 3S)
3.560	98	Paved roads w/curbs & sewers, HSG C (2S, 3S)
2.770	98	Unconnected roofs, HSG C (1S, 2S)
62.710	**74**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
16.770	HSG B	1S, 2S, 3S
45.940	HSG C	1S, 2S, 3S
0.000	HSG D	
0.000	Other	
62.710		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	16.770	37.830	0.000	0.000	54.600	>75% Grass cover, Good	1S, 2S, 3S
0.000	0.000	1.780	0.000	0.000	1.780	Paved parking	1S, 2S, 3S
0.000	0.000	3.560	0.000	0.000	3.560	Paved roads w/curbs & sewers	2S, 3S
0.000	0.000	2.770	0.000	0.000	2.770	Unconnected roofs	1S, 2S
0.000	**16.770**	**45.940**	**0.000**	**0.000**	**62.710**	**TOTAL AREA**	

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Width (inches)	Diam/Height (inches)	Inside-Fill (inches)	Node Name
1	3S	0.00	0.00	2,023.0	0.0535	0.025	0.0	18.0	0.0	
2	4R	372.75	371.39	148.0	0.0092	0.012	72.0	96.0	0.0	

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: WS-B Pond Runoff Area=25.090 ac 6.50% Impervious Runoff Depth>0.57"
Flow Length=1,593' Tc=25.4 min CN=70 Runoff=11.40 cfs 1.184 af

Subcatchment 2S: WS-A Path Runoff Area=30.050 ac 13.78% Impervious Runoff Depth>0.74"
Flow Length=1,836' Tc=24.1 min UI Adjusted CN=74 Runoff=19.48 cfs 1.848 af

Subcatchment 3S: WS-C Road Runoff Area=7.570 ac 30.91% Impervious Runoff Depth>0.94"
Flow Length=2,411' Tc=16.8 min CN=78 Runoff=7.70 cfs 0.593 af

Reach 4R: 6 x 8 BOX CULVERT Avg. Flow Depth=0.74' Max Vel=8.36 fps Inflow=37.02 cfs 3.624 af
72.0" x 96.0" Box Pipe n=0.012 L=148.0' S=0.0092 '/' Capacity=816.16 cfs Outflow=36.84 cfs 3.622 af

Total Runoff Area = 62.710 ac Runoff Volume = 3.624 af Average Runoff Depth = 0.69"
87.07% Pervious = 54.600 ac 12.93% Impervious = 8.110 ac

Summary for Subcatchment 1S: WS-B Pond

[47] Hint: Peak is 4700% of capacity of segment #3
[47] Hint: Peak is 18721% of capacity of segment #4

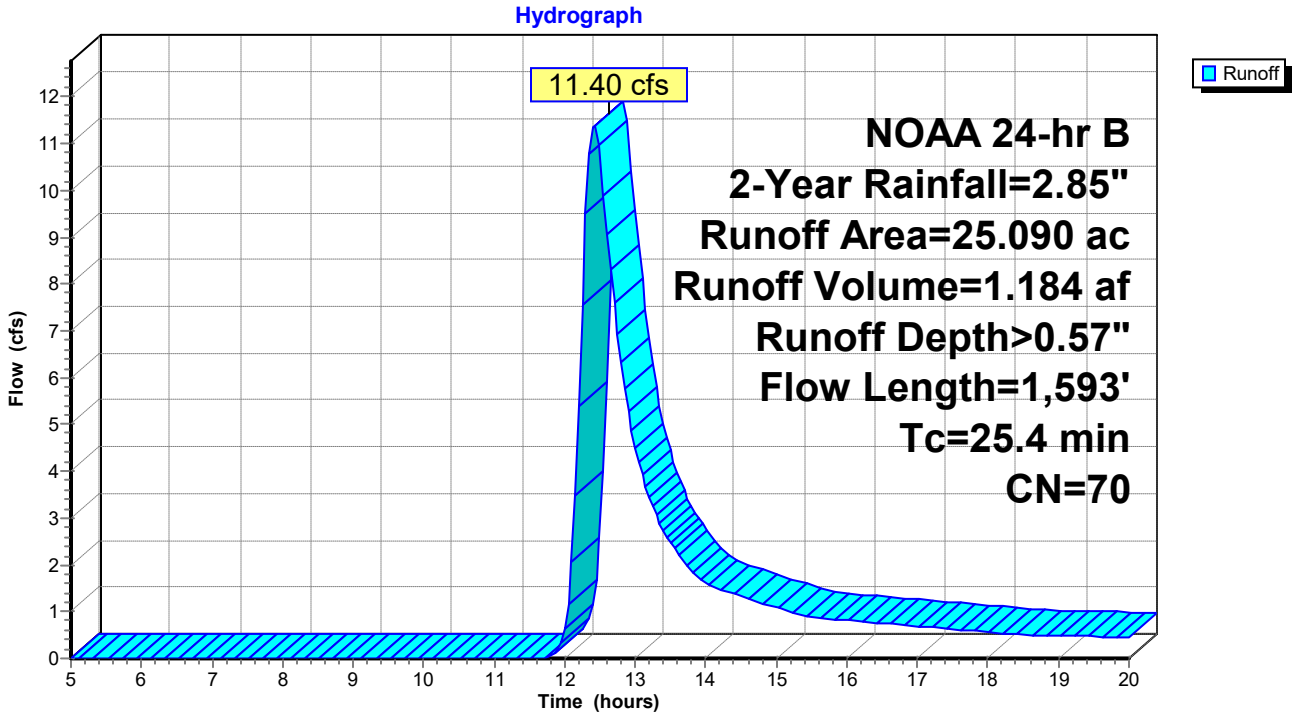
Runoff = 11.40 cfs @ 12.42 hrs, Volume= 1.184 af, Depth> 0.57"
Routed to Reach 4R : 6 x 8 BOX CULVERT

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
NOAA 24-hr B 2-Year Rainfall=2.85"

Area (ac)	CN	Description
0.820	98	Paved parking, HSG C
9.800	61	>75% Grass cover, Good, HSG B
13.660	74	>75% Grass cover, Good, HSG C
0.810	98	Unconnected roofs, HSG C
25.090	70	Weighted Average
23.460		93.50% Pervious Area
1.630		6.50% Impervious Area
0.810		49.69% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.4	100	0.0200	0.13		**Sheet Flow, SHEET FLOW** Grass: Short n= 0.150 P2= 2.00"
4.5	504	0.0715	1.87		**Shallow Concentrated Flow, SHALLOW CONCRENTRATED FLOW** Short Grass Pasture Kv= 7.0 fps
3.6	397	0.0503	1.82	0.24	**Parabolic Channel, CHANNEL FLOW 1** W=2.00' D=0.10' Area=0.1 sf Perim=2.0' n= 0.030 Short grass
2.6	203	0.1086	1.31	0.06	**Trap/Vee/Rect Channel Flow, CHANNEL FLOW 2** Bot.W=0.00' D=0.10' Z= 4.1 & 5.2 '/' Top.W=0.93' n= 0.050 Scattered brush, heavy weeds
2.3	389	0.0527	2.85	12.67	**Trap/Vee/Rect Channel Flow, CHANNEL FLOW 3** Bot.W=1.00' D=0.37' Z= 23.5 & 36.1 '/' Top.W=23.05' n= 0.040 Winding stream, pools & shoals
25.4	1,593	Total			

Subcatchment 1S: WS-B Pond



Summary for Subcatchment 2S: WS-A Path

[47] Hint: Peak is 1392% of capacity of segment #7

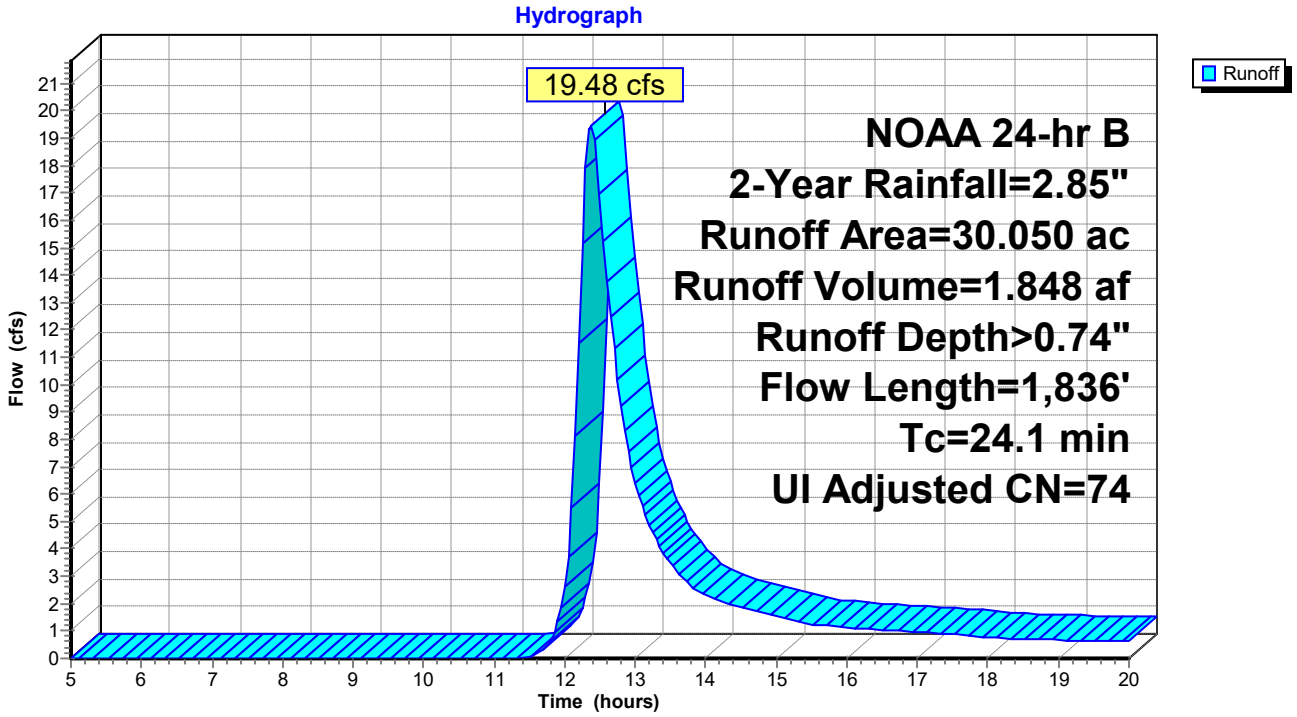
Runoff = 19.48 cfs @ 12.38 hrs, Volume= 1.848 af, Depth> 0.74"
Routed to Reach 4R : 6 x 8 BOX CULVERT

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
NOAA 24-hr B 2-Year Rainfall=2.85"

Area (ac)	CN	Adj	Description
1.960	98		Unconnected roofs, HSG C
0.650	98		Paved parking, HSG C
1.530	98		Paved roads w/curbs & sewers, HSG C
5.260	61		>75% Grass cover, Good, HSG B
20.650	74		>75% Grass cover, Good, HSG C
30.050	75	74	Weighted Average, UI Adjusted
25.910			86.22% Pervious Area
4.140			13.78% Impervious Area
1.960			47.34% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.6	100	0.0600	0.14		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.00"
3.0	303	0.0593	1.70		**Shallow Concentrated Flow, SHALLOW CONCENTRATED FLOW** Short Grass Pasture Kv= 7.0 fps
2.3	196	0.0408	1.41		**Shallow Concentrated Flow, SHALLOW CONCENTRATED FLOW 2** Short Grass Pasture Kv= 7.0 fps
1.3	182	0.1101	2.32		**Shallow Concentrated Flow, SCF 3** Short Grass Pasture Kv= 7.0 fps
1.2	130	0.0616	1.74		**Shallow Concentrated Flow, SCF4** Short Grass Pasture Kv= 7.0 fps
2.8	757	0.0396	4.56	22.62	**Trap/Vee/Rect Channel Flow, CHANNEL FLOW 1** Bot.W=0.00' D=0.80' Z= 6.4 & 9.1 '/' Top.W=12.40' n= 0.035 High grass
1.9	168	0.0357	1.51	1.40	**Trap/Vee/Rect Channel Flow, CHANNEL FLOW 2** Bot.W=0.00' D=0.20' Z= 21.6 & 24.7 '/' Top.W=9.26' n= 0.040 Winding stream, pools & shoals
24.1	1,836	Total			

Subcatchment 2S: WS-A Path



Summary for Subcatchment 3S: WS-C Road

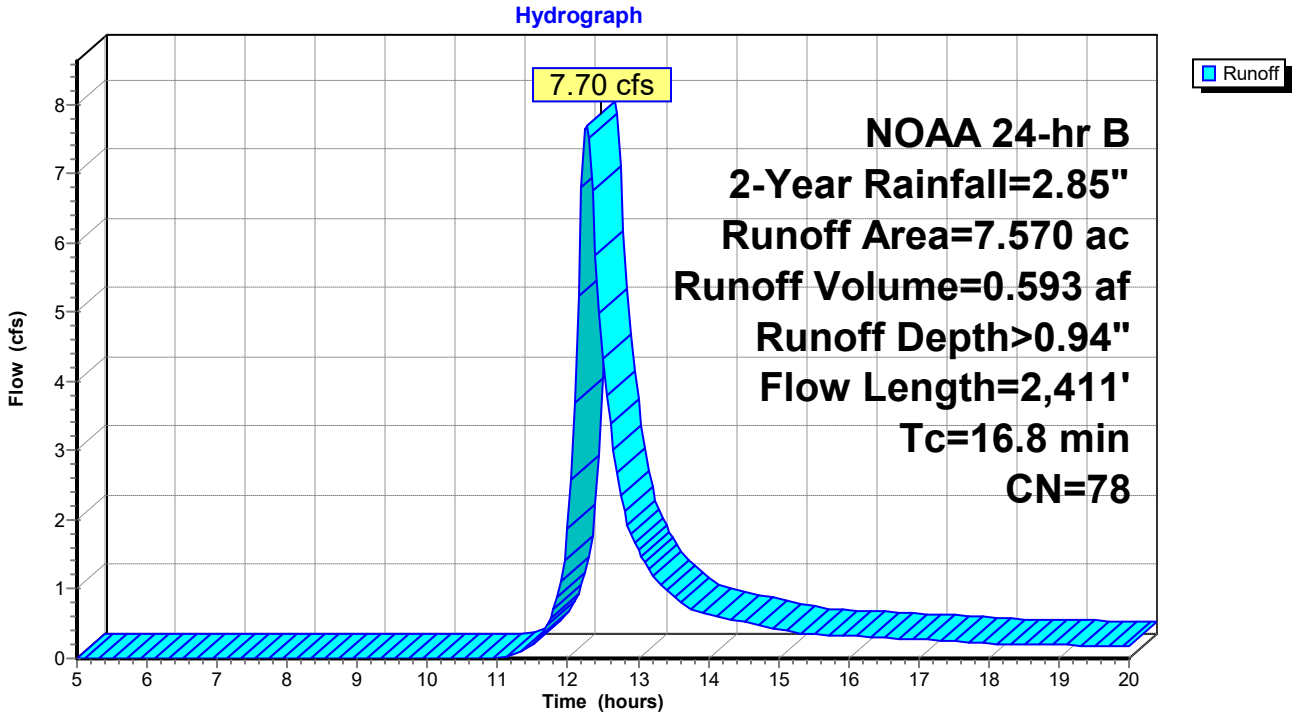
Runoff = 7.70 cfs @ 12.27 hrs, Volume= 0.593 af, Depth> 0.94"
Routed to Reach 4R : 6 x 8 BOX CULVERT

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
NOAA 24-hr B 2-Year Rainfall=2.85"

Area (ac)	CN	Description
0.310	98	Paved parking, HSG C
2.030	98	Paved roads w/curbs & sewers, HSG C
1.710	61	>75% Grass cover, Good, HSG B
3.520	74	>75% Grass cover, Good, HSG C
7.570	78	Weighted Average
5.230		69.09% Pervious Area
2.340		30.91% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.5	100	0.0300	0.16		**Sheet Flow, SHEET FLOW** Grass: Short n= 0.150 P2= 2.00"
1.6	288	0.0382	2.93		**Shallow Concentrated Flow, SCF** Grassed Waterway Kv= 15.0 fps
4.7	2,023	0.0535	7.15	12.63	**Pipe Channel, CMP_Round 18"** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.025 Corrugated metal
16.8	2,411	Total			

Subcatchment 3S: WS-C Road



Summary for Reach 4R: 6 x 8 BOX CULVERT

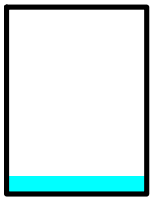
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 62.710 ac, 12.93% Impervious, Inflow Depth > 0.69" for 2-Year event
Inflow = 37.02 cfs @ 12.37 hrs, Volume= 3.624 af
Outflow = 36.84 cfs @ 12.38 hrs, Volume= 3.622 af, Atten= 0%, Lag= 0.5 min

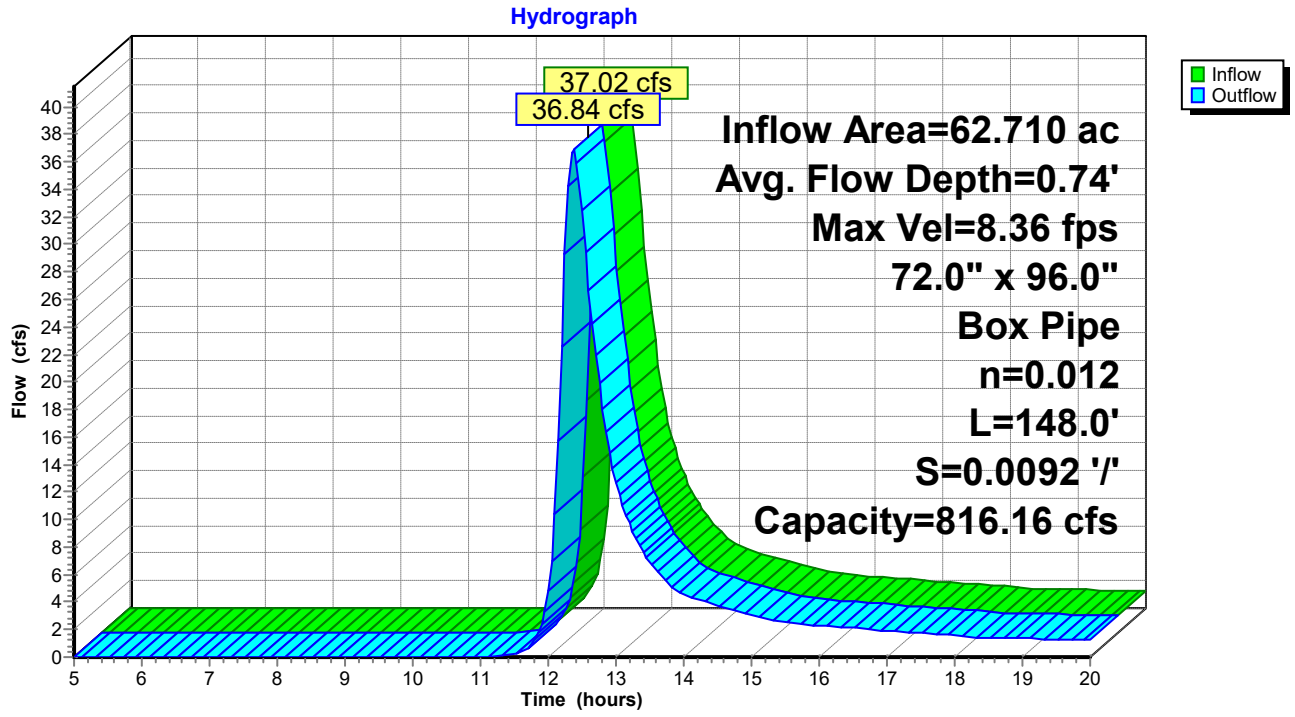
Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 8.36 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 3.45 fps, Avg. Travel Time= 0.7 min

Peak Storage= 655 cf @ 12.37 hrs
Average Depth at Peak Storage= 0.74' , Surface Width= 6.00'
Bank-Full Depth= 8.00' Flow Area= 48.0 sf, Capacity= 816.16 cfs

72.0" W x 96.0" H Box Pipe
n= 0.012 Concrete pipe, finished
Length= 148.0' Slope= 0.0092 '/'
Inlet Invert= 372.75', Outlet Invert= 371.39'



Reach 4R: 6 x 8 BOX CULVERT



Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: WS-B Pond Runoff Area=25.090 ac 6.50% Impervious Runoff Depth>1.28"
Flow Length=1,593' Tc=25.4 min CN=70 Runoff=28.25 cfs 2.679 af

Subcatchment 2S: WS-A Path Runoff Area=30.050 ac 13.78% Impervious Runoff Depth>1.54"
Flow Length=1,836' Tc=24.1 min UI Adjusted CN=74 Runoff=42.77 cfs 3.866 af

Subcatchment 3S: WS-C Road Runoff Area=7.570 ac 30.91% Impervious Runoff Depth>1.83"
Flow Length=2,411' Tc=16.8 min CN=78 Runoff=15.27 cfs 1.157 af

Reach 4R: 6 x 8 BOX CULVERT Avg. Flow Depth=1.27' Max Vel=10.99 fps Inflow=83.51 cfs 7.702 af
72.0" x 96.0" Box Pipe n=0.012 L=148.0' S=0.0092 '/' Capacity=816.16 cfs Outflow=83.35 cfs 7.699 af

Total Runoff Area = 62.710 ac Runoff Volume = 7.702 af Average Runoff Depth = 1.47"
87.07% Pervious = 54.600 ac 12.93% Impervious = 8.110 ac

Summary for Subcatchment 1S: WS-B Pond

[47] Hint: Peak is 11651% of capacity of segment #3
[47] Hint: Peak is 46406% of capacity of segment #4
[47] Hint: Peak is 223% of capacity of segment #5

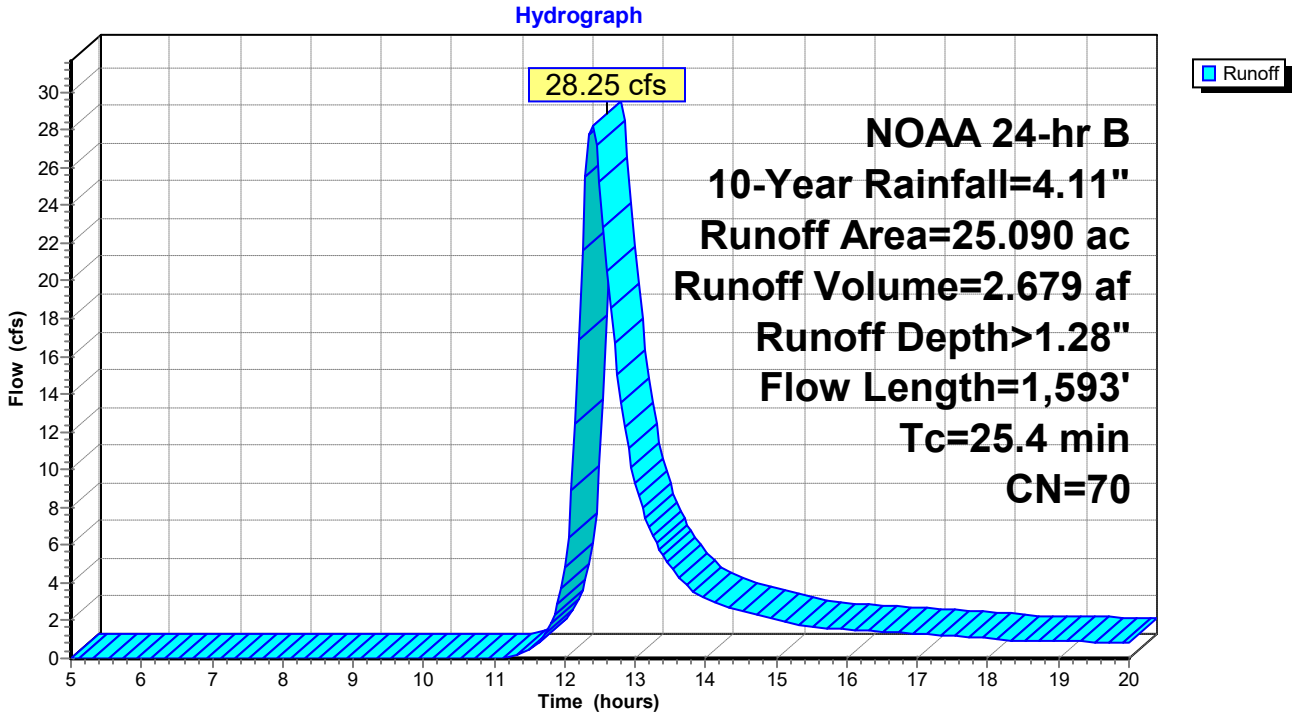
Runoff = 28.25 cfs @ 12.39 hrs, Volume= 2.679 af, Depth> 1.28"
Routed to Reach 4R : 6 x 8 BOX CULVERT

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
NOAA 24-hr B 10-Year Rainfall=4.11"

Area (ac)	CN	Description
0.820	98	Paved parking, HSG C
9.800	61	>75% Grass cover, Good, HSG B
13.660	74	>75% Grass cover, Good, HSG C
0.810	98	Unconnected roofs, HSG C
25.090	70	Weighted Average
23.460		93.50% Pervious Area
1.630		6.50% Impervious Area
0.810		49.69% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.4	100	0.0200	0.13		**Sheet Flow, SHEET FLOW** Grass: Short n= 0.150 P2= 2.00"
4.5	504	0.0715	1.87		**Shallow Concentrated Flow, SHALLOW CONCRENTRATED FLOW** Short Grass Pasture Kv= 7.0 fps
3.6	397	0.0503	1.82	0.24	**Parabolic Channel, CHANNEL FLOW 1** W=2.00' D=0.10' Area=0.1 sf Perim=2.0' n= 0.030 Short grass
2.6	203	0.1086	1.31	0.06	**Trap/Vee/Rect Channel Flow, CHANNEL FLOW 2** Bot.W=0.00' D=0.10' Z= 4.1 & 5.2 '/' Top.W=0.93' n= 0.050 Scattered brush, heavy weeds
2.3	389	0.0527	2.85	12.67	**Trap/Vee/Rect Channel Flow, CHANNEL FLOW 3** Bot.W=1.00' D=0.37' Z= 23.5 & 36.1 '/' Top.W=23.05' n= 0.040 Winding stream, pools & shoals
25.4	1,593	Total			

Subcatchment 1S: WS-B Pond



Summary for Subcatchment 2S: WS-A Path

[47] Hint: Peak is 189% of capacity of segment #6
[47] Hint: Peak is 3056% of capacity of segment #7

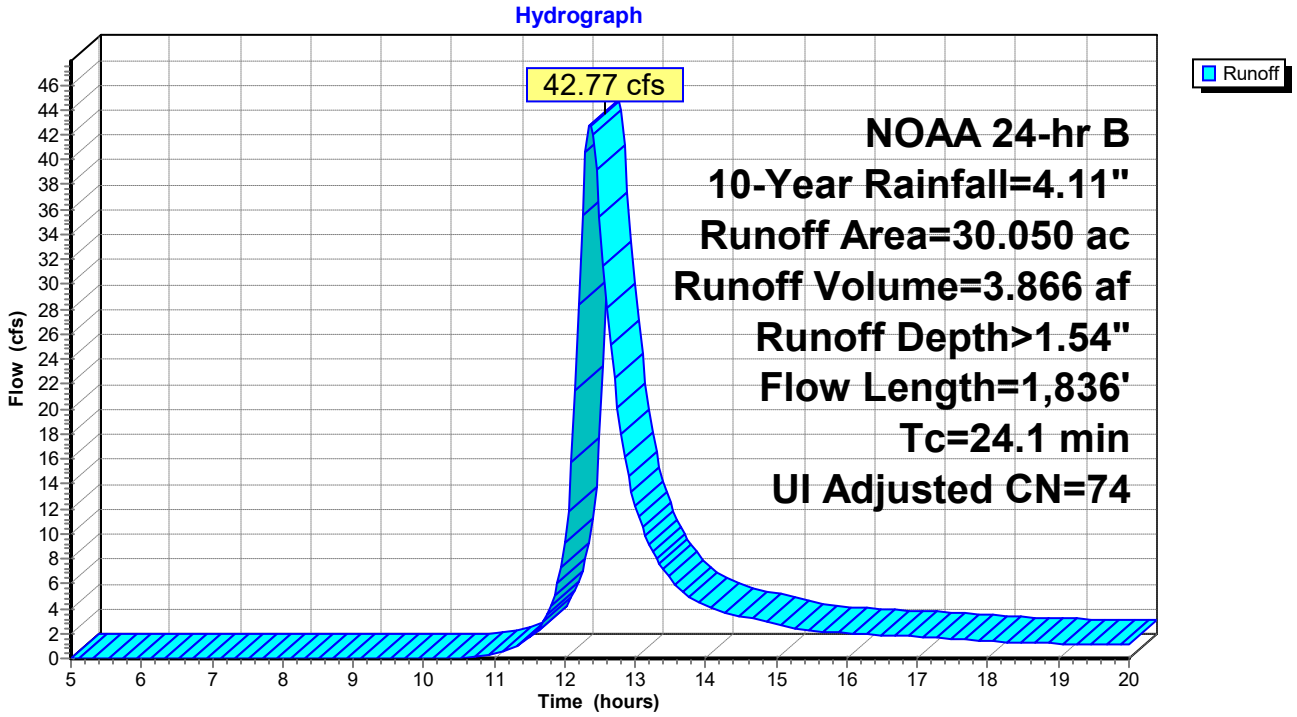
Runoff = 42.77 cfs @ 12.36 hrs, Volume= 3.866 af, Depth> 1.54"
Routed to Reach 4R : 6 x 8 BOX CULVERT

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
NOAA 24-hr B 10-Year Rainfall=4.11"

Area (ac)	CN	Adj	Description
1.960	98		Unconnected roofs, HSG C
0.650	98		Paved parking, HSG C
1.530	98		Paved roads w/curbs & sewers, HSG C
5.260	61		>75% Grass cover, Good, HSG B
20.650	74		>75% Grass cover, Good, HSG C
30.050	75	74	Weighted Average, UI Adjusted
25.910			86.22% Pervious Area
4.140			13.78% Impervious Area
1.960			47.34% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.6	100	0.0600	0.14		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.00"
3.0	303	0.0593	1.70		**Shallow Concentrated Flow, SHALLOW CONCENTRATED FLOW** Short Grass Pasture Kv= 7.0 fps
2.3	196	0.0408	1.41		**Shallow Concentrated Flow, SHALLOW CONCENTRATED FLOW 2** Short Grass Pasture Kv= 7.0 fps
1.3	182	0.1101	2.32		**Shallow Concentrated Flow, SCF 3** Short Grass Pasture Kv= 7.0 fps
1.2	130	0.0616	1.74		**Shallow Concentrated Flow, SCF4** Short Grass Pasture Kv= 7.0 fps
2.8	757	0.0396	4.56	22.62	**Trap/Vee/Rect Channel Flow, CHANNEL FLOW 1** Bot.W=0.00' D=0.80' Z= 6.4 & 9.1 '/' Top.W=12.40' n= 0.035 High grass
1.9	168	0.0357	1.51	1.40	**Trap/Vee/Rect Channel Flow, CHANNEL FLOW 2** Bot.W=0.00' D=0.20' Z= 21.6 & 24.7 '/' Top.W=9.26' n= 0.040 Winding stream, pools & shoals
24.1	1,836	Total			

Subcatchment 2S: WS-A Path



Summary for Subcatchment 3S: WS-C Road

[47] Hint: Peak is 121% of capacity of segment #3

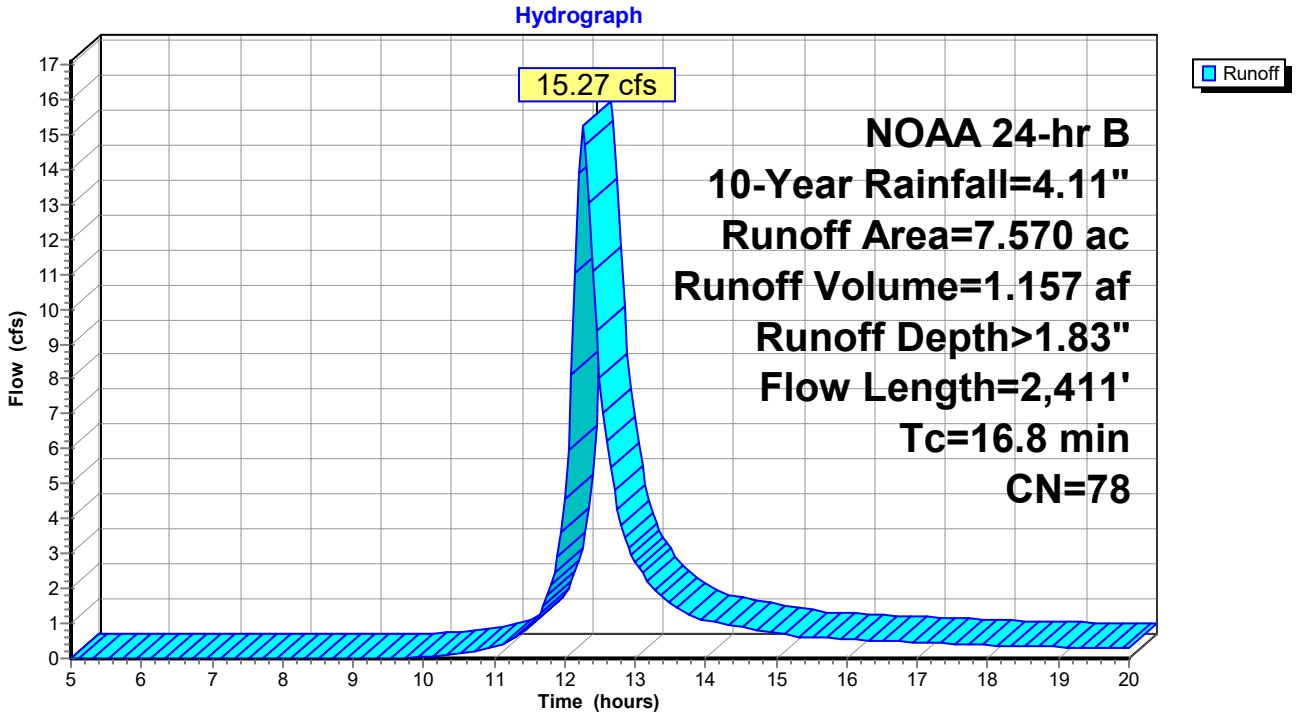
Runoff = 15.27 cfs @ 12.26 hrs, Volume= 1.157 af, Depth> 1.83"
Routed to Reach 4R : 6 x 8 BOX CULVERT

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
NOAA 24-hr B 10-Year Rainfall=4.11"

Area (ac)	CN	Description
0.310	98	Paved parking, HSG C
2.030	98	Paved roads w/curbs & sewers, HSG C
1.710	61	>75% Grass cover, Good, HSG B
3.520	74	>75% Grass cover, Good, HSG C
7.570	78	Weighted Average
5.230		69.09% Pervious Area
2.340		30.91% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.5	100	0.0300	0.16		**Sheet Flow, SHEET FLOW** Grass: Short n= 0.150 P2= 2.00"
1.6	288	0.0382	2.93		**Shallow Concentrated Flow, SCF** Grassed Waterway Kv= 15.0 fps
4.7	2,023	0.0535	7.15	12.63	**Pipe Channel, CMP_Round 18"** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.025 Corrugated metal
16.8	2,411	Total			

Subcatchment 3S: WS-C Road



Summary for Reach 4R: 6 x 8 BOX CULVERT

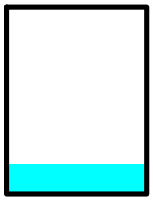
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 62.710 ac, 12.93% Impervious, Inflow Depth > 1.47" for 10-Year event
Inflow = 83.51 cfs @ 12.35 hrs, Volume= 7.702 af
Outflow = 83.35 cfs @ 12.36 hrs, Volume= 7.699 af, Atten= 0%, Lag= 0.4 min

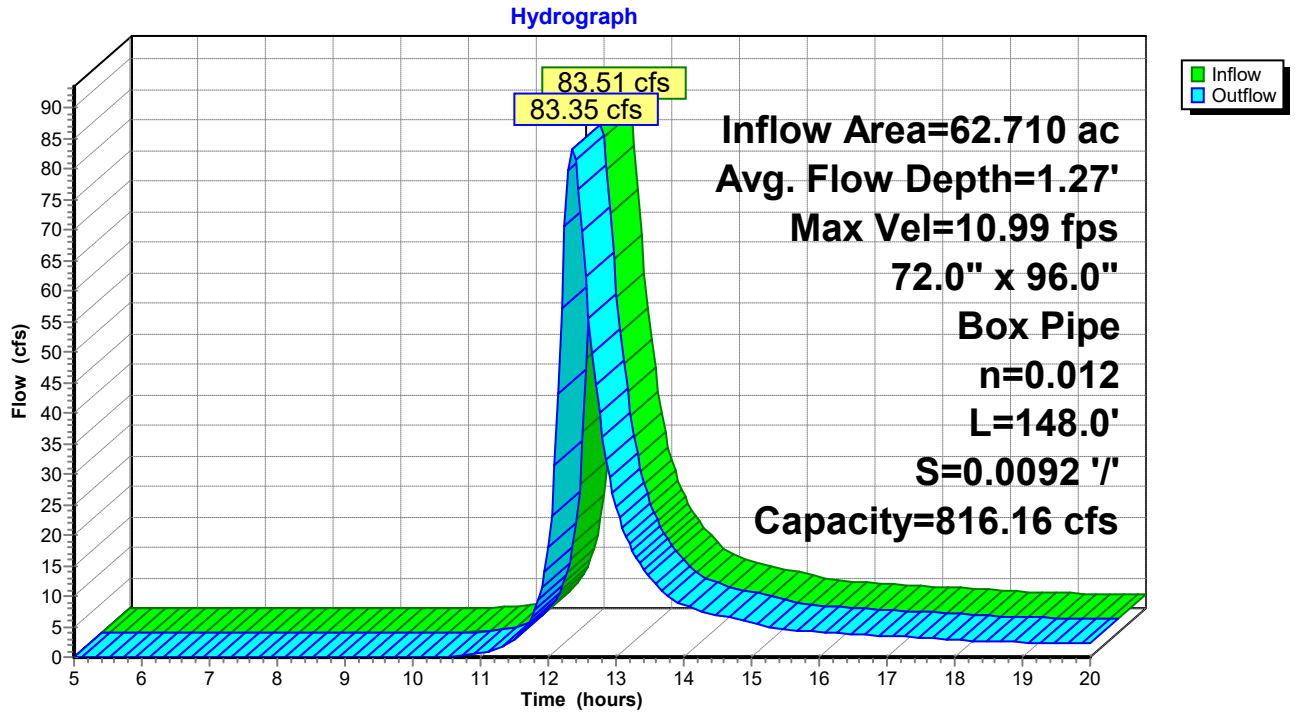
Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 10.99 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 4.14 fps, Avg. Travel Time= 0.6 min

Peak Storage= 1,125 cf @ 12.35 hrs
Average Depth at Peak Storage= 1.27' , Surface Width= 6.00'
Bank-Full Depth= 8.00' Flow Area= 48.0 sf, Capacity= 816.16 cfs

72.0" W x 96.0" H Box Pipe
n= 0.012 Concrete pipe, finished
Length= 148.0' Slope= 0.0092 '/'
Inlet Invert= 372.75', Outlet Invert= 371.39'



Reach 4R: 6 x 8 BOX CULVERT



Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: WS-B Pond Runoff Area=25.090 ac 6.50% Impervious Runoff Depth>2.90"
Flow Length=1,593' Tc=25.4 min CN=70 Runoff=65.53 cfs 6.057 af

Subcatchment 2S: WS-A Path Runoff Area=30.050 ac 13.78% Impervious Runoff Depth>3.28"
Flow Length=1,836' Tc=24.1 min UI Adjusted CN=74 Runoff=91.46 cfs 8.222 af

Subcatchment 3S: WS-C Road Runoff Area=7.570 ac 30.91% Impervious Runoff Depth>3.69"
Flow Length=2,411' Tc=16.8 min CN=78 Runoff=30.36 cfs 2.328 af

Reach 4R: 6 x 8 BOX CULVERT Avg. Flow Depth=2.19' Max Vel=13.88 fps Inflow=182.13 cfs 16.607 af
72.0" x 96.0" Box Pipe n=0.012 L=148.0' S=0.0092 '/' Capacity=816.16 cfs Outflow=181.86 cfs 16.602 af

Total Runoff Area = 62.710 ac Runoff Volume = 16.607 af Average Runoff Depth = 3.18"
87.07% Pervious = 54.600 ac 12.93% Impervious = 8.110 ac

Summary for Subcatchment 1S: WS-B Pond

[47] Hint: Peak is 27027% of capacity of segment #3
[47] Hint: Peak is 107650% of capacity of segment #4
[47] Hint: Peak is 517% of capacity of segment #5

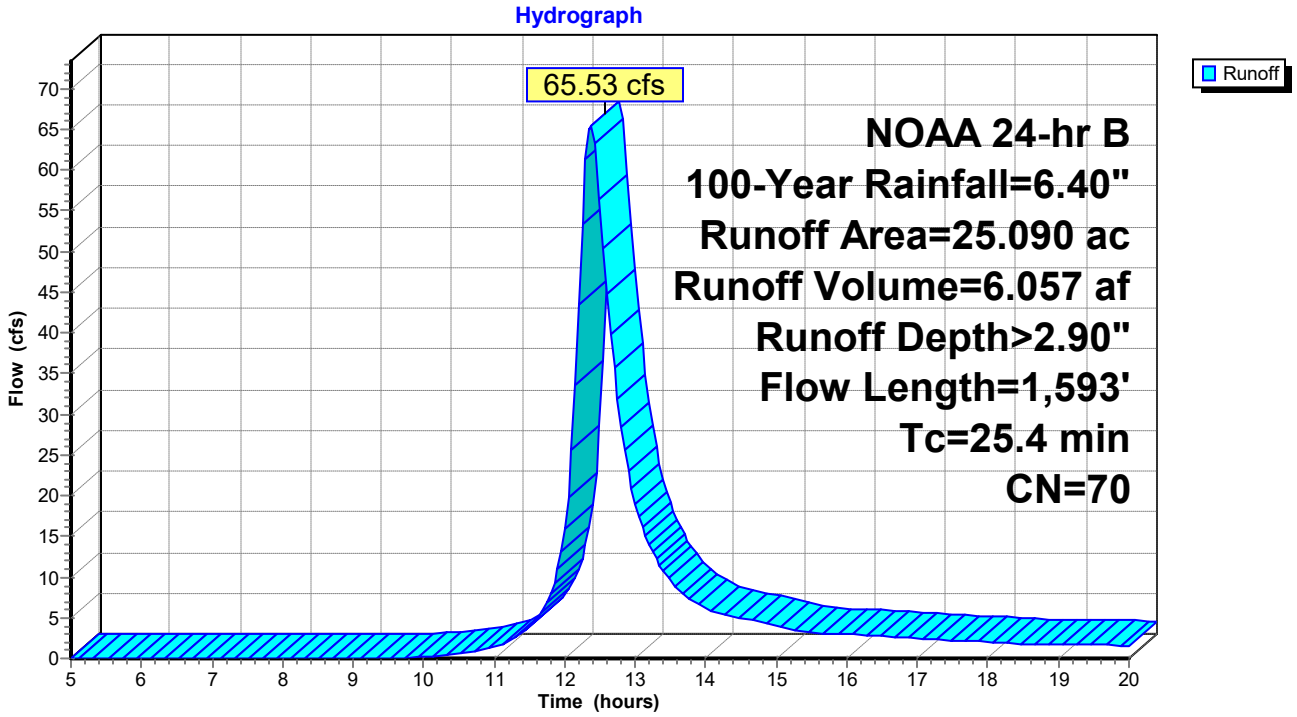
Runoff = 65.53 cfs @ 12.37 hrs, Volume= 6.057 af, Depth> 2.90"
Routed to Reach 4R : 6 x 8 BOX CULVERT

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
NOAA 24-hr B 100-Year Rainfall=6.40"

Area (ac)	CN	Description
0.820	98	Paved parking, HSG C
9.800	61	>75% Grass cover, Good, HSG B
13.660	74	>75% Grass cover, Good, HSG C
0.810	98	Unconnected roofs, HSG C
25.090	70	Weighted Average
23.460		93.50% Pervious Area
1.630		6.50% Impervious Area
0.810		49.69% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.4	100	0.0200	0.13		**Sheet Flow, SHEET FLOW** Grass: Short n= 0.150 P2= 2.00"
4.5	504	0.0715	1.87		**Shallow Concentrated Flow, SHALLOW CONCRENTRATED FLOW** Short Grass Pasture Kv= 7.0 fps
3.6	397	0.0503	1.82	0.24	**Parabolic Channel, CHANNEL FLOW 1** W=2.00' D=0.10' Area=0.1 sf Perim=2.0' n= 0.030 Short grass
2.6	203	0.1086	1.31	0.06	**Trap/Vee/Rect Channel Flow, CHANNEL FLOW 2** Bot.W=0.00' D=0.10' Z= 4.1 & 5.2 '/' Top.W=0.93' n= 0.050 Scattered brush, heavy weeds
2.3	389	0.0527	2.85	12.67	**Trap/Vee/Rect Channel Flow, CHANNEL FLOW 3** Bot.W=1.00' D=0.37' Z= 23.5 & 36.1 '/' Top.W=23.05' n= 0.040 Winding stream, pools & shoals
25.4	1,593	Total			

Subcatchment 1S: WS-B Pond



Summary for Subcatchment 2S: WS-A Path

[47] Hint: Peak is 404% of capacity of segment #6
[47] Hint: Peak is 6535% of capacity of segment #7

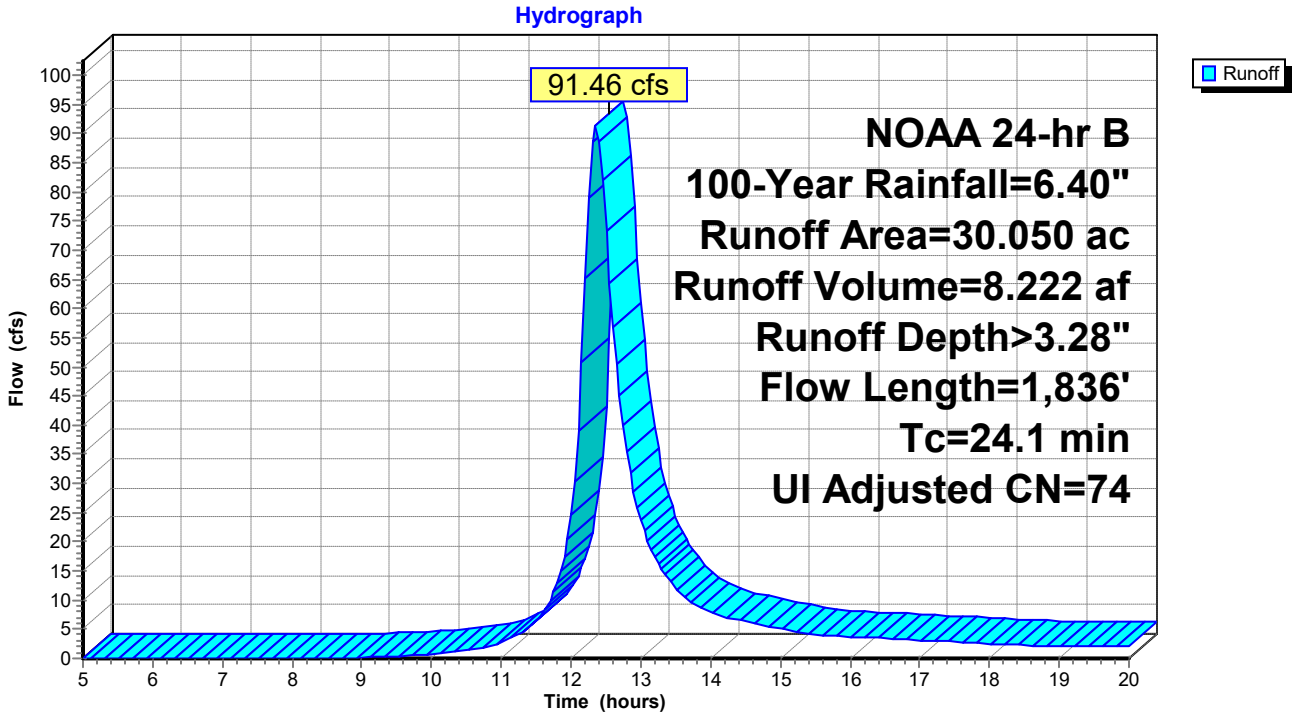
Runoff = 91.46 cfs @ 12.35 hrs, Volume= 8.222 af, Depth> 3.28"
Routed to Reach 4R : 6 x 8 BOX CULVERT

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
NOAA 24-hr B 100-Year Rainfall=6.40"

Area (ac)	CN	Adj	Description
1.960	98		Unconnected roofs, HSG C
0.650	98		Paved parking, HSG C
1.530	98		Paved roads w/curbs & sewers, HSG C
5.260	61		>75% Grass cover, Good, HSG B
20.650	74		>75% Grass cover, Good, HSG C
30.050	75	74	Weighted Average, UI Adjusted
25.910			86.22% Pervious Area
4.140			13.78% Impervious Area
1.960			47.34% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.6	100	0.0600	0.14		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.00"
3.0	303	0.0593	1.70		**Shallow Concentrated Flow, SHALLOW CONCENTRATED FLOW** Short Grass Pasture Kv= 7.0 fps
2.3	196	0.0408	1.41		**Shallow Concentrated Flow, SHALLOW CONCENTRATED FLOW 2** Short Grass Pasture Kv= 7.0 fps
1.3	182	0.1101	2.32		**Shallow Concentrated Flow, SCF 3** Short Grass Pasture Kv= 7.0 fps
1.2	130	0.0616	1.74		**Shallow Concentrated Flow, SCF4** Short Grass Pasture Kv= 7.0 fps
2.8	757	0.0396	4.56	22.62	**Trap/Vee/Rect Channel Flow, CHANNEL FLOW 1** Bot.W=0.00' D=0.80' Z= 6.4 & 9.1 '/' Top.W=12.40' n= 0.035 High grass
1.9	168	0.0357	1.51	1.40	**Trap/Vee/Rect Channel Flow, CHANNEL FLOW 2** Bot.W=0.00' D=0.20' Z= 21.6 & 24.7 '/' Top.W=9.26' n= 0.040 Winding stream, pools & shoals
24.1	1,836	Total			

Subcatchment 2S: WS-A Path



Summary for Subcatchment 3S: WS-C Road

[47] Hint: Peak is 240% of capacity of segment #3

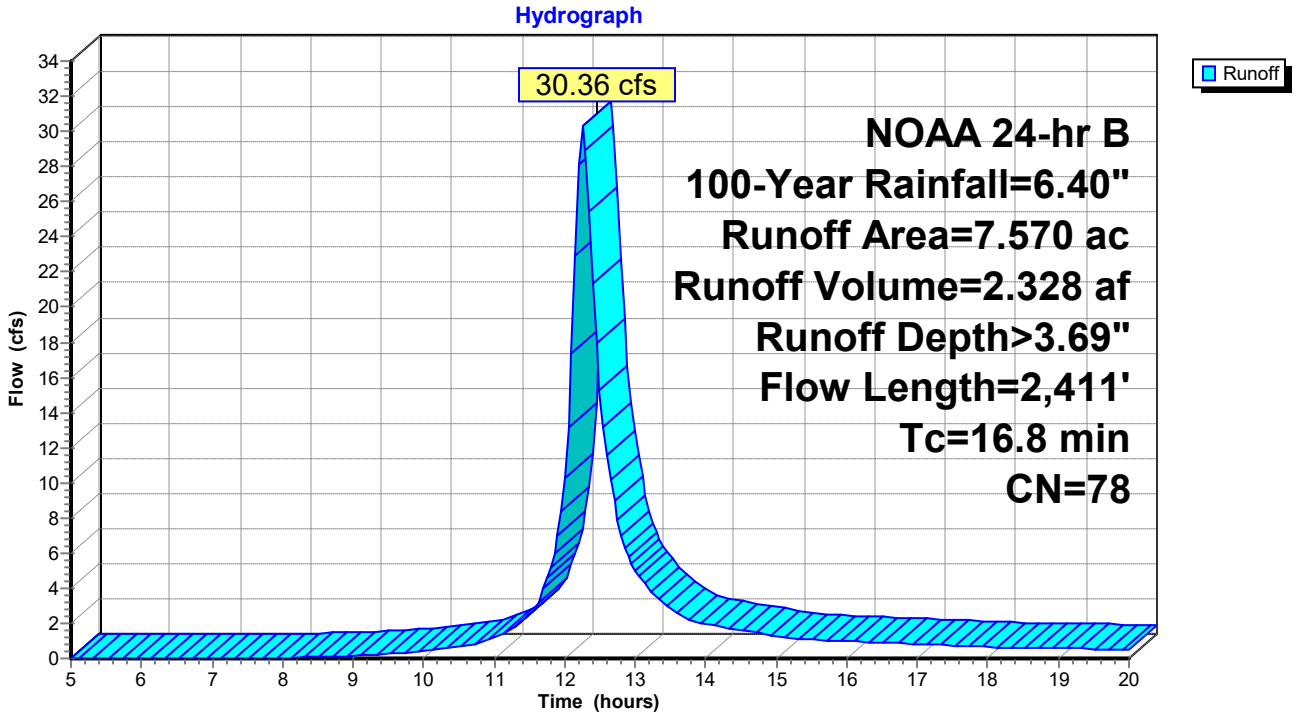
Runoff = 30.36 cfs @ 12.26 hrs, Volume= 2.328 af, Depth> 3.69"
Routed to Reach 4R : 6 x 8 BOX CULVERT

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
NOAA 24-hr B 100-Year Rainfall=6.40"

Area (ac)	CN	Description
0.310	98	Paved parking, HSG C
2.030	98	Paved roads w/curbs & sewers, HSG C
1.710	61	>75% Grass cover, Good, HSG B
3.520	74	>75% Grass cover, Good, HSG C
7.570	78	Weighted Average
5.230		69.09% Pervious Area
2.340		30.91% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.5	100	0.0300	0.16		**Sheet Flow, SHEET FLOW** Grass: Short n= 0.150 P2= 2.00"
1.6	288	0.0382	2.93		**Shallow Concentrated Flow, SCF** Grassed Waterway Kv= 15.0 fps
4.7	2,023	0.0535	7.15	12.63	**Pipe Channel, CMP_Round 18"** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.025 Corrugated metal
16.8	2,411	Total			

Subcatchment 3S: WS-C Road



Summary for Reach 4R: 6 x 8 BOX CULVERT

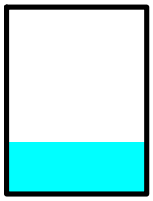
[52] Hint: Inlet/Outlet conditions not evaluated

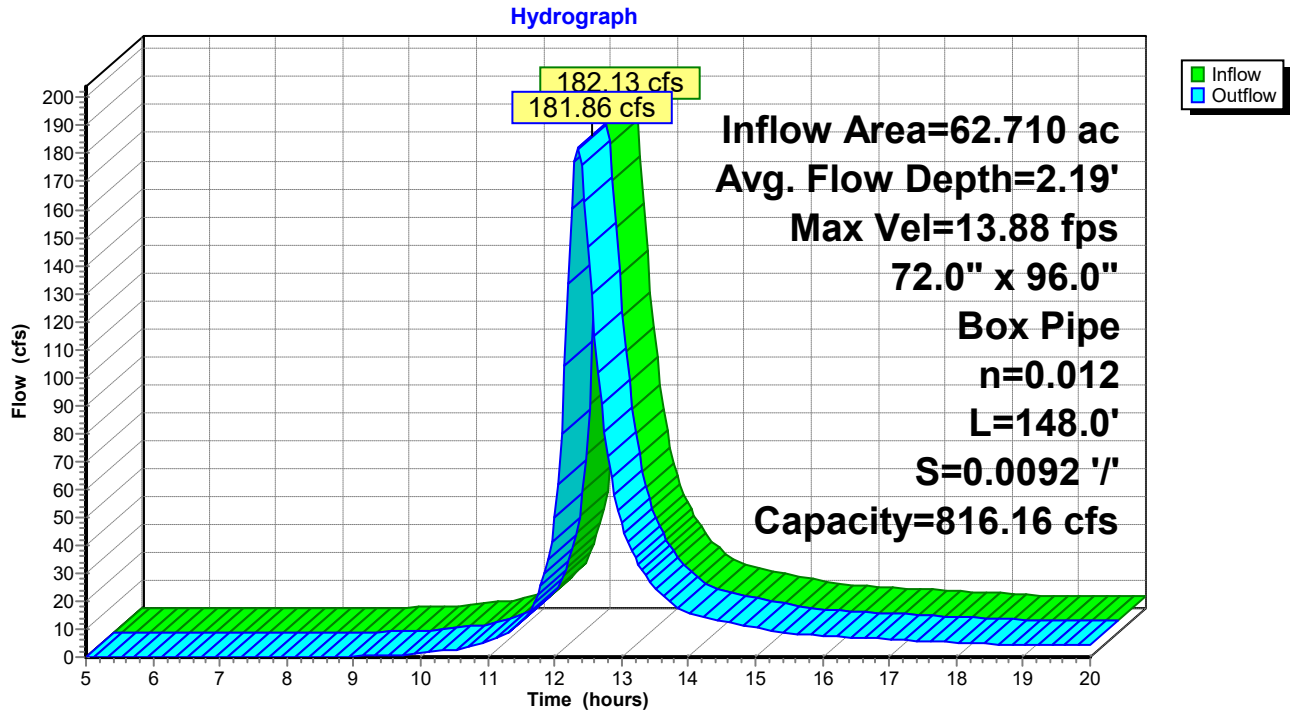
Inflow Area = 62.710 ac, 12.93% Impervious, Inflow Depth > 3.18" for 100-Year event
Inflow = 182.13 cfs @ 12.34 hrs, Volume= 16.607 af
Outflow = 181.86 cfs @ 12.35 hrs, Volume= 16.602 af, Atten= 0%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 13.88 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 4.87 fps, Avg. Travel Time= 0.5 min

Peak Storage= 1,942 cf @ 12.34 hrs
Average Depth at Peak Storage= 2.19' , Surface Width= 6.00'
Bank-Full Depth= 8.00' Flow Area= 48.0 sf, Capacity= 816.16 cfs

72.0" W x 96.0" H Box Pipe
n= 0.012 Concrete pipe, finished
Length= 148.0' Slope= 0.0092 '/'
Inlet Invert= 372.75', Outlet Invert= 371.39'



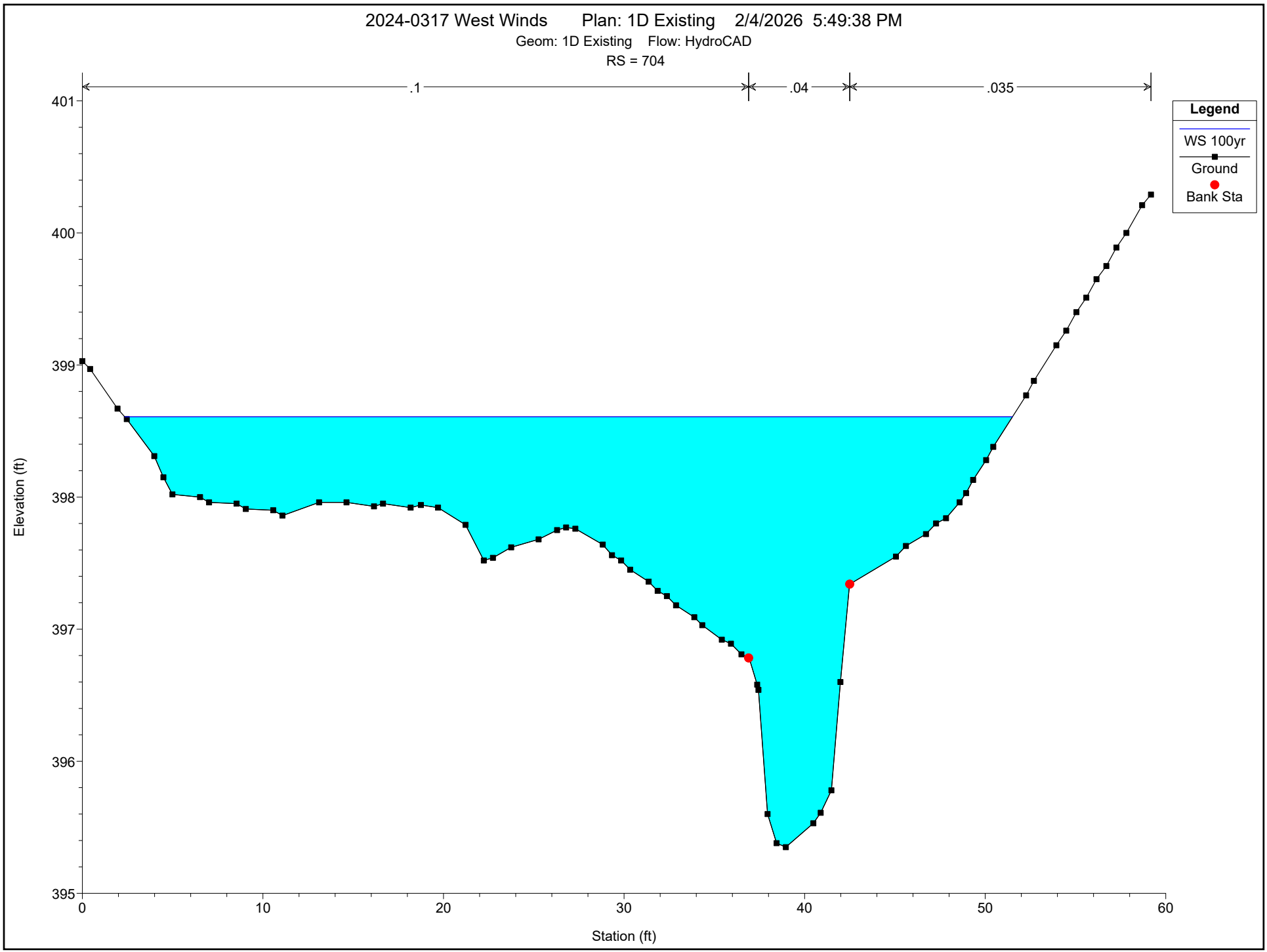


Appendix B

HEC-RAS Report

HEC-RAS River: River 1 Reach: Reach 1 Profile: 100yr

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach 1	704	100yr	1DEX	182.00	395.35	398.61	398.61	399.11	0.012796	7.00	52.57	49.17	0.74
Reach 1	704	100yr	1DPR	182.00	395.35	398.81	398.34	398.95	0.071234	3.47	62.72	51.17	0.36
Reach 1	693	100yr	1DEX	182.00	394.94	397.59	397.59	397.86	0.008553	5.95	64.75	88.24	0.72
Reach 1	693	100yr	1DPR	182.00	395.00	397.97	397.97	398.49	0.023462	7.38	64.78	61.06	0.83
Reach 1	680	100yr	1DPR	182.00	394.52	397.06	397.37	398.04	0.043003	9.41	46.25	51.88	1.15
Reach 1	652.5985	100yr	1DEX	182.00	393.76	395.99		396.03	0.000785	1.66	116.90	80.20	0.23
Reach 1	652.5985	100yr	1DPR	182.00	394.36	395.89	395.85	396.24	0.023473	6.90	67.73	79.06	1.04
Reach 1	590.6599	100yr	1DEX	182.00	391.38	395.99		396.00	0.000137	0.94	200.94	95.16	0.10
Reach 1	590.6599	100yr	1DPR	182.00	393.50	395.34		395.47	0.006811	4.41	94.11	69.96	0.59
Reach 1	546.5484	100yr	1DEX	182.00	390.86	395.99	393.11	396.00	0.000056	0.66	297.19	185.89	0.07
Reach 1	546.5484	100yr	1DPR	182.00	392.81	394.53	394.53	394.96	0.020383	6.79	58.50	62.39	0.98
Reach 1	494.5404	100yr	1DEX	182.00	391.72	395.99		396.00	0.000023	0.45	440.32	221.17	0.04
Reach 1	494.5404	100yr	1DPR	182.00	392.09	393.68	393.45	393.81	0.009343	4.54	92.37	122.49	0.67
Reach 1	479	100yr	1DPR	182.00	391.28	393.00	393.00	393.25	0.023393	5.40	64.62	115.07	0.81
Reach 1	456.8269	100yr	1DEX	182.00	395.08	395.89	395.77	395.99	0.018177	2.91	73.40	159.86	0.65
Reach 1	456.8269	100yr	1DPR	182.00	390.12	391.83	391.85	392.14	0.017269	6.06	57.77	90.91	0.89
Reach 1	419.7252	100yr	1DEX	182.00	394.09	394.67		394.78	0.029897	2.79	66.87	175.01	0.78
Reach 1	419.7252	100yr	1DPR	182.00	389.22	391.14	390.86	391.25	0.005624	3.78	86.58	94.88	0.52
Reach 1	383	100yr	1DPR	182.00	388.76	390.21	390.21	390.49	0.027210	5.96	52.21	81.44	0.95
Reach 1	315.0776	100yr	1DEX	182.00	387.39	388.60	388.60	388.99	0.040552	5.01	36.62	48.72	1.01
Reach 1	315.0776	100yr	1DPR	182.00	387.78	389.59	389.19	389.72	0.006485	4.12	73.85	65.29	0.56
Reach 1	290	100yr	1DPR	182.00	386.88	388.93		389.06	0.007759	3.89	69.48	60.61	0.51
Reach 1	263	100yr	1DPR	182.00	385.94	388.87	387.70	388.91	0.001228	2.40	129.27	78.28	0.26
Reach 1	259	100yr	1DPR	182.00	385.75	387.61	387.53	387.92	0.013722	5.90	52.61	58.78	0.81
Reach 1	228	100yr	1DPR	182.00	385.03	387.15		387.23	0.024772	1.73	96.33	76.03	0.22
Reach 1	193.9538	100yr	1DEX	182.00	380.99	383.43	383.43	383.99	0.031012	8.14	45.06	43.57	1.24
Reach 1	193.9538	100yr	1DPR	182.00	384.21	385.64	385.57	386.00	0.065211	7.02	63.29	67.85	1.13
Reach 1	170	100yr	1DPR	182.00	380.27	383.58	383.40	383.91	0.175955	5.17	46.37	70.14	0.58
Reach 1	138	100yr	1DPR	182.00	377.98	381.52	379.97	381.63	0.045497	2.69	67.57	42.66	0.31
Reach 1	102	100yr	1DPR	182.00	375.88	379.55		379.87	0.070463	4.52	40.23	16.98	0.52
Reach 1	47.49758	100yr	1DEX	182.00	374.90	378.20	377.47	378.69	0.005776	5.68	36.15	19.98	0.61
Reach 1	47.49758	100yr	1DPR	182.00	374.90	378.20	377.48	378.70	0.011927	5.71	36.15	19.98	0.61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.035
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Station (ft)
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395
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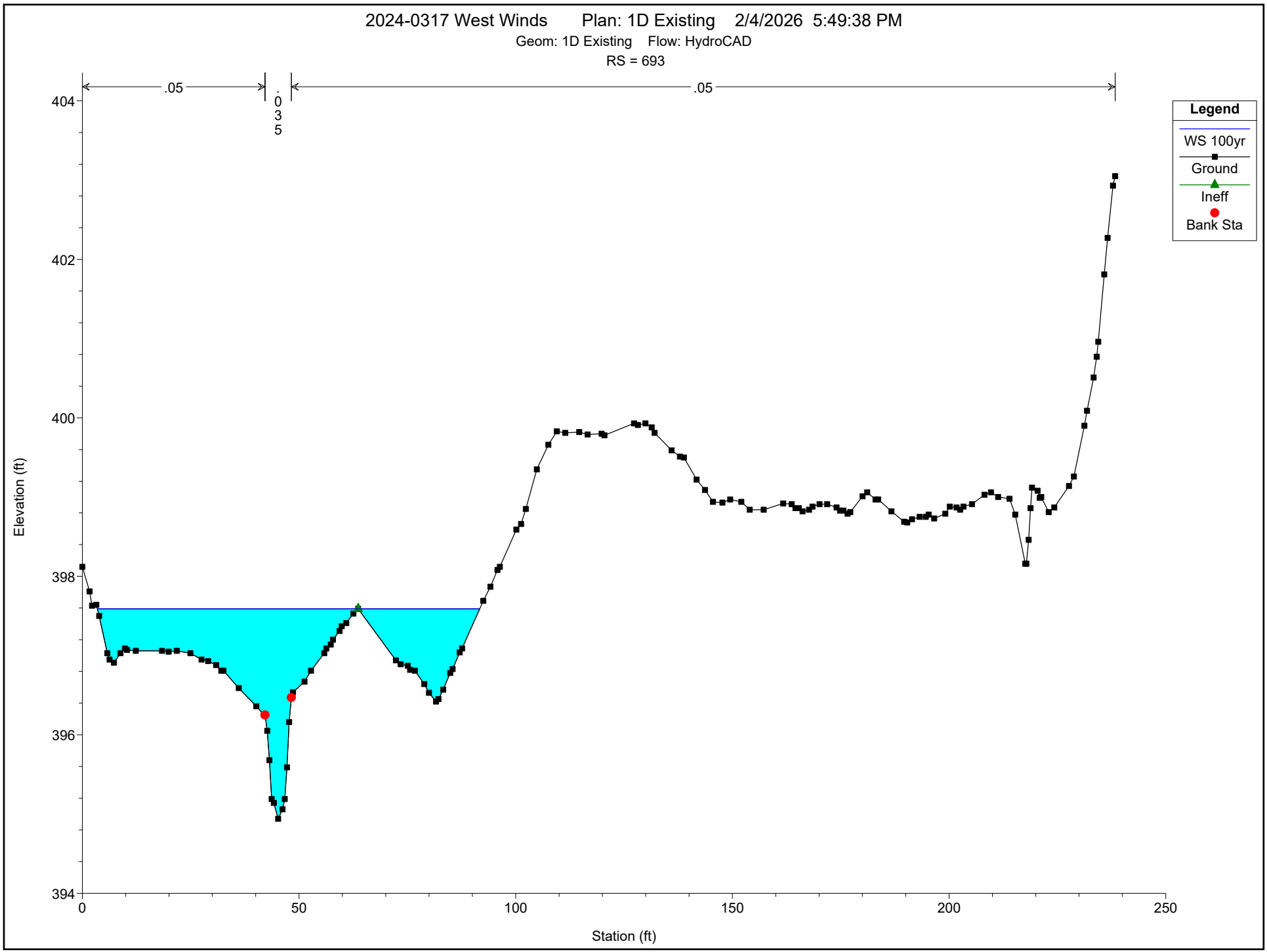
20
30
40
50
60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WS 100yr
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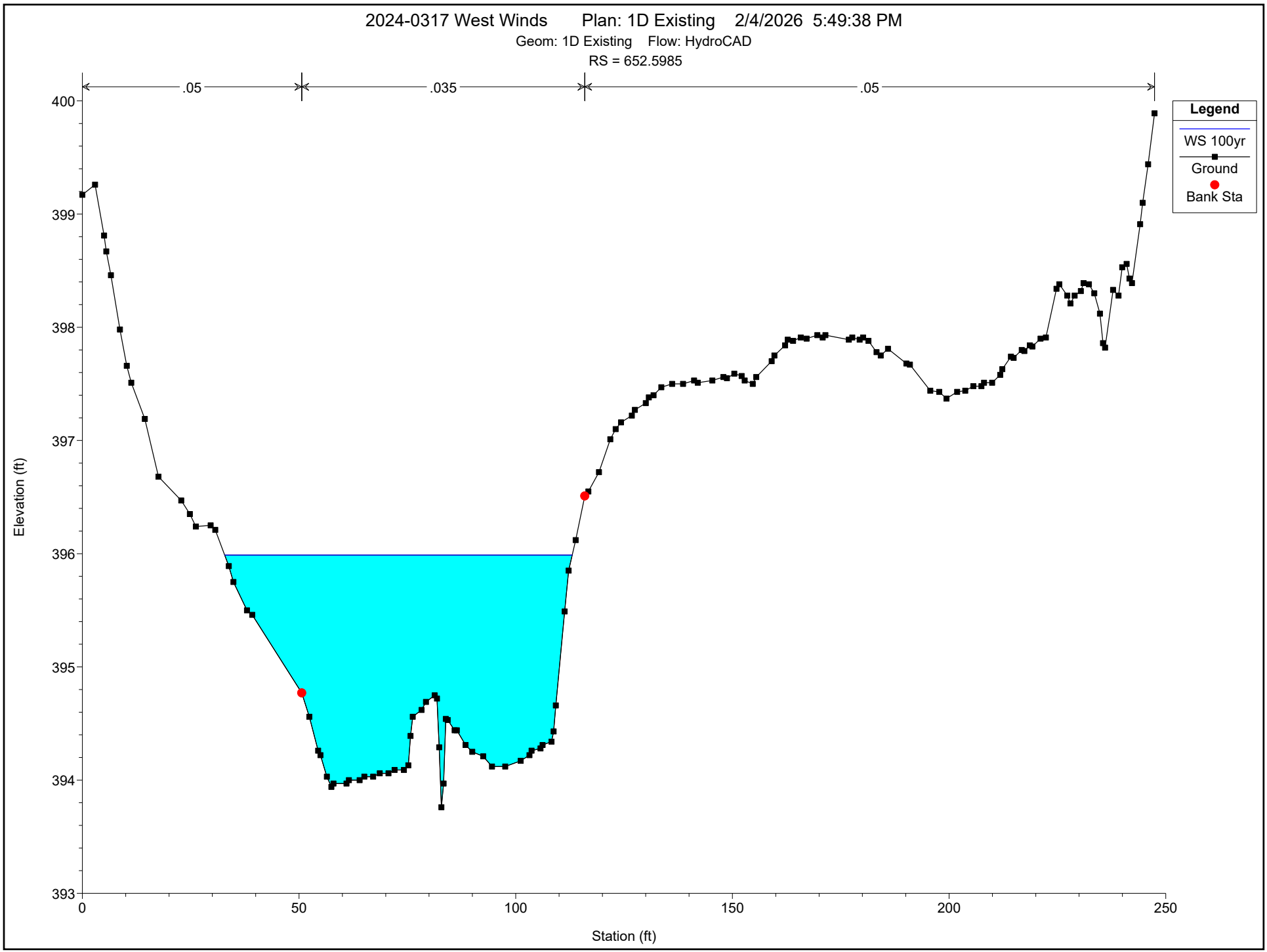
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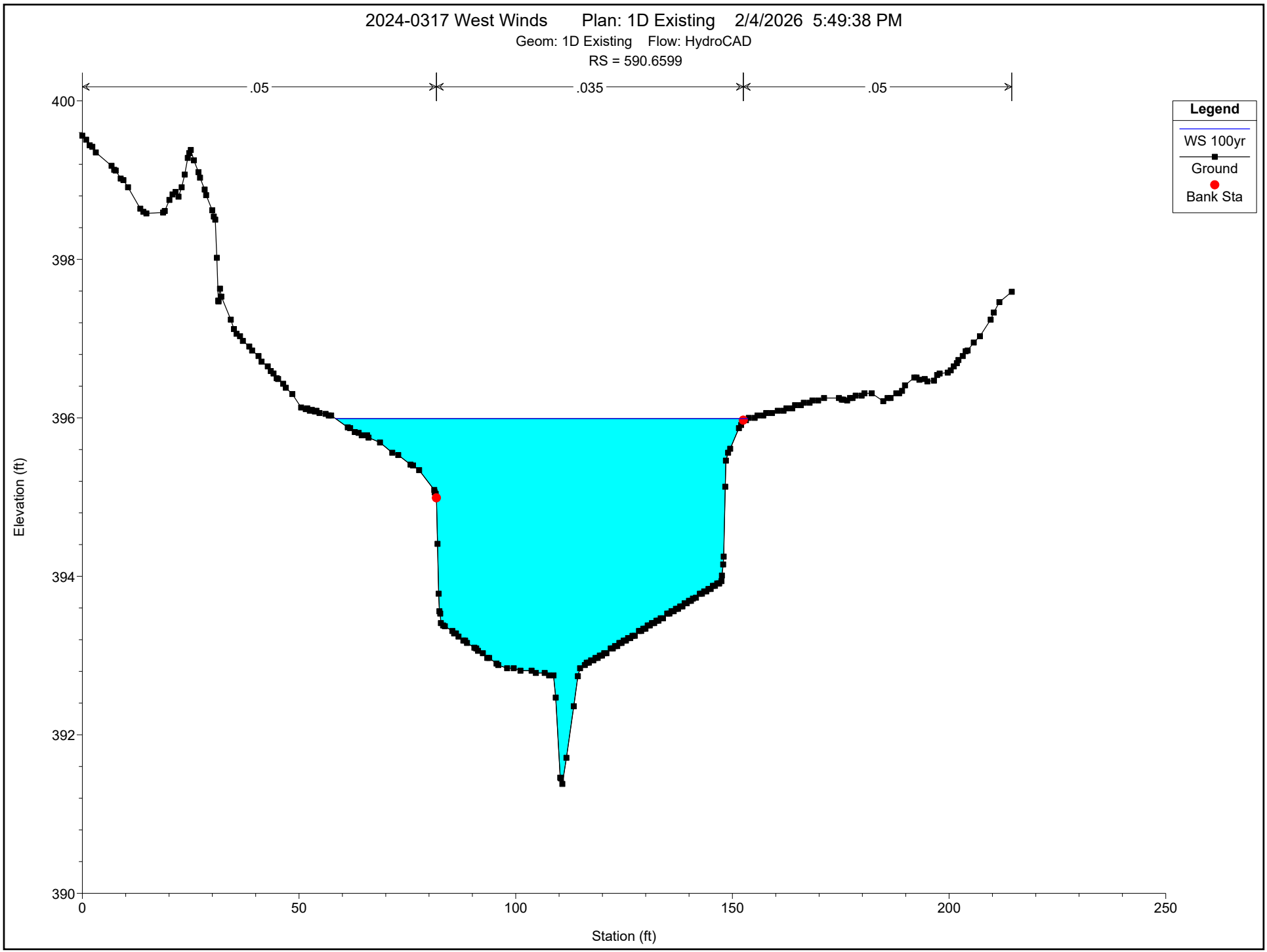
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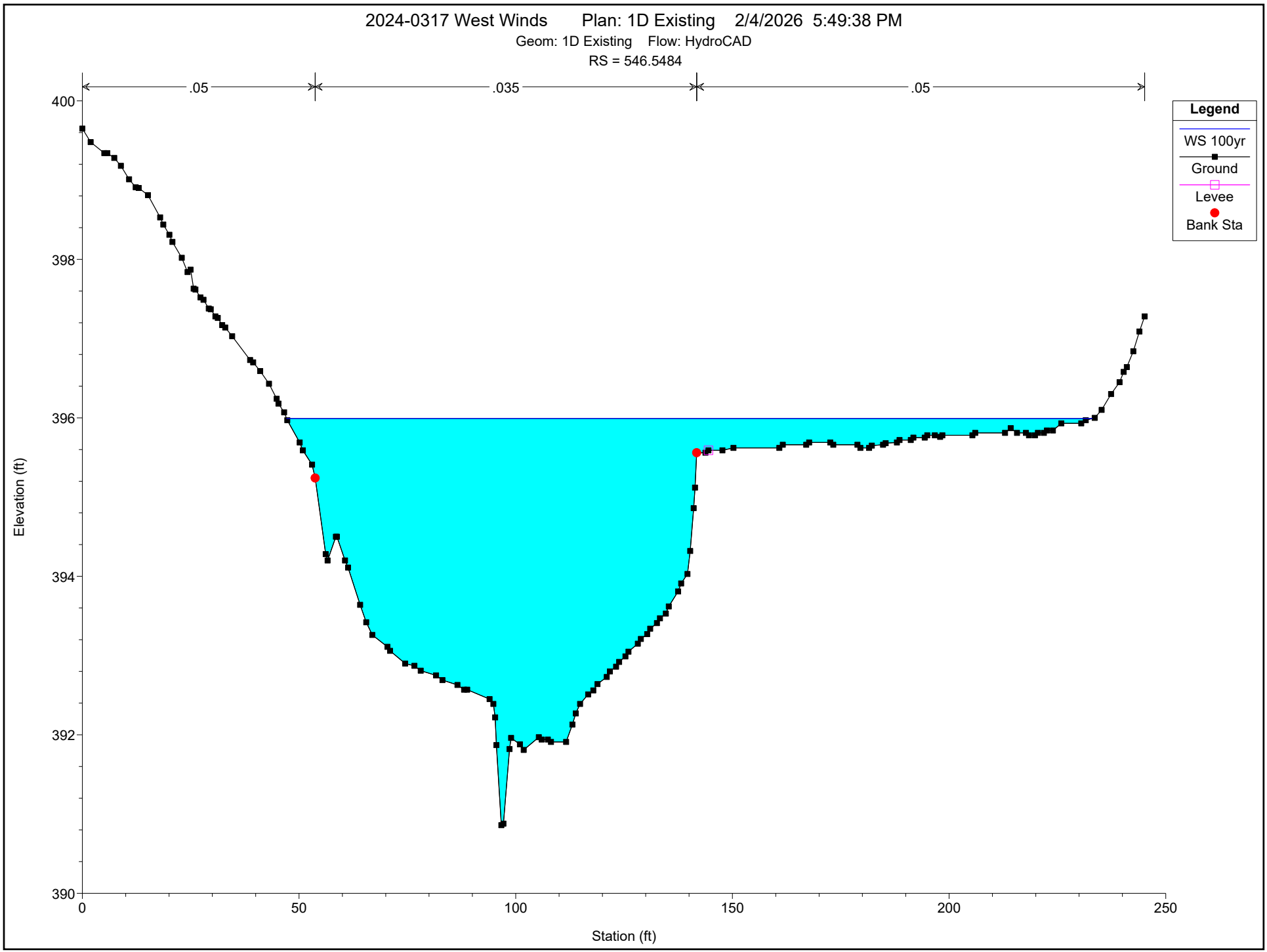
Geom: 1D Existing Flow: HydroCAD
RS = 590.6599
.05
.035
.05
Legend
WS 100yr
Ground
Bank Sta
400
398
396
394
392
390
Elevation (ft)
0
50
100
150
200
250
Station (ft)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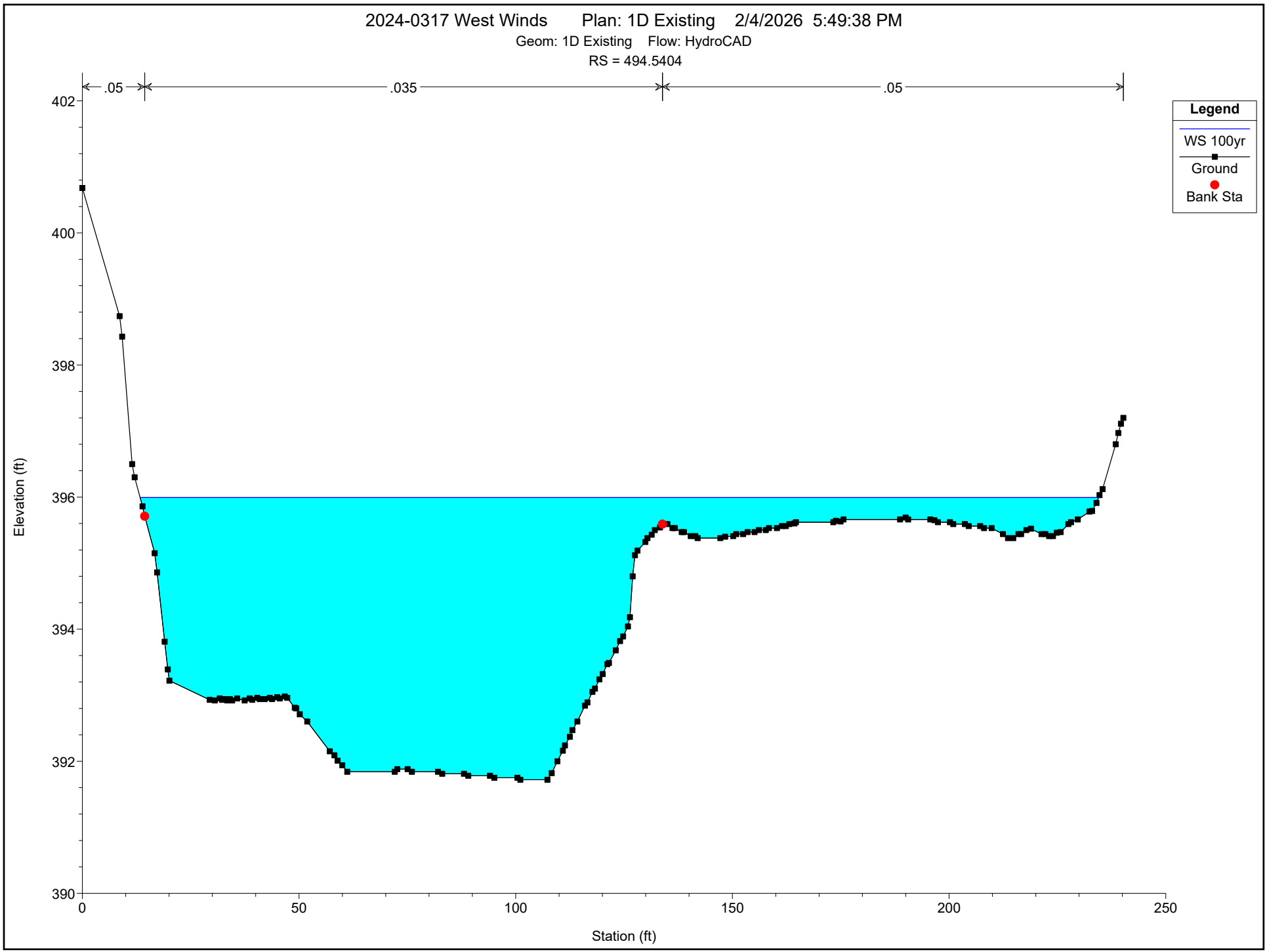
Geom: 1D Existing Flow: HydroCAD
RS = 546.5484
.05
.035
.05
Legend
WS 100yr
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
400
398
396
394
392
390
0
50
100
150
200
250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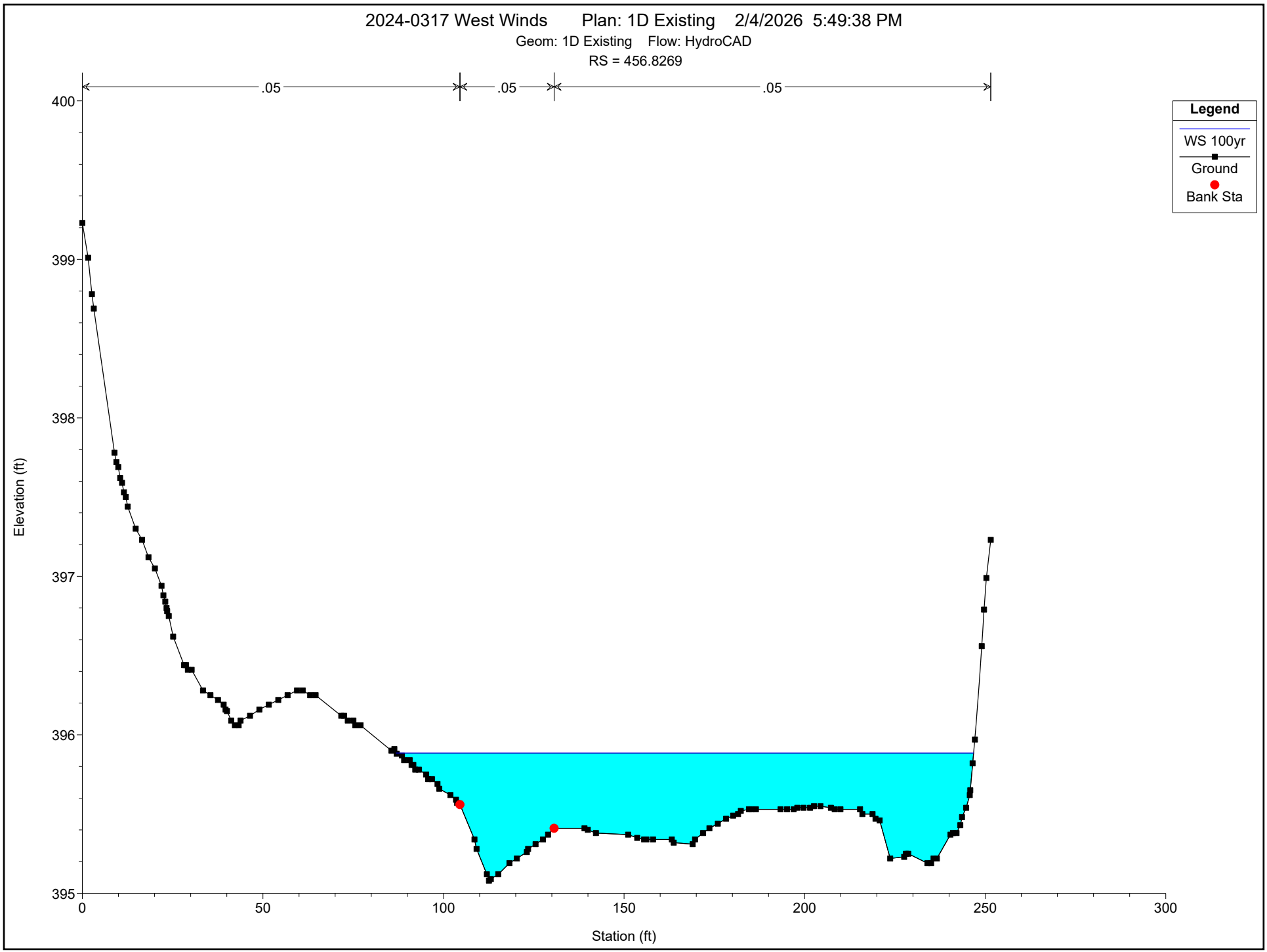
Geom: 1D Existing Flow: HydroCAD
RS = 494.5404
.05
.035
.05
Legend
WS 100yr
Ground
Bank Sta
Elevation (ft)
Station (ft)
402
400
398
396
394
392
390
0
50
100
150
200
250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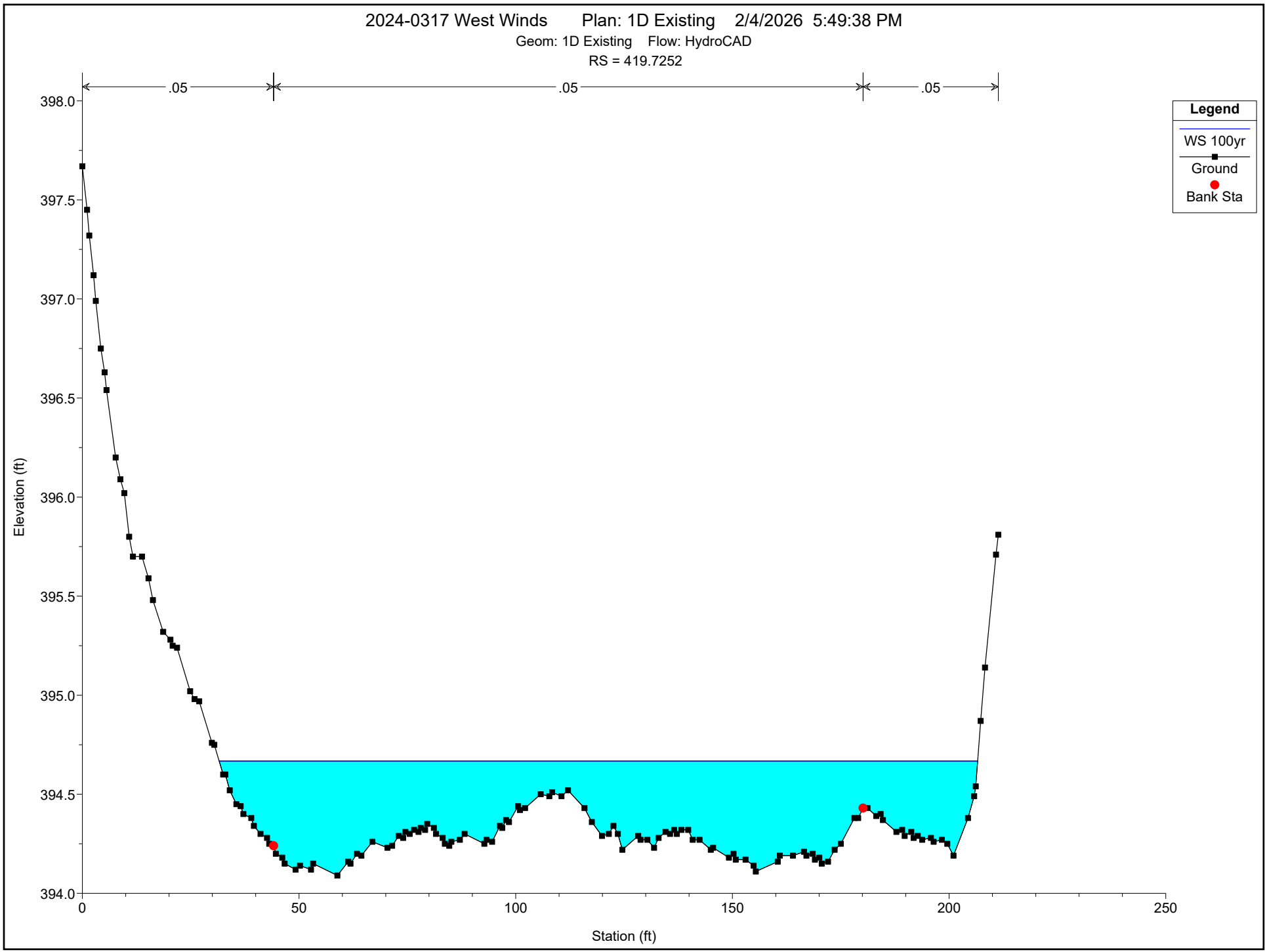
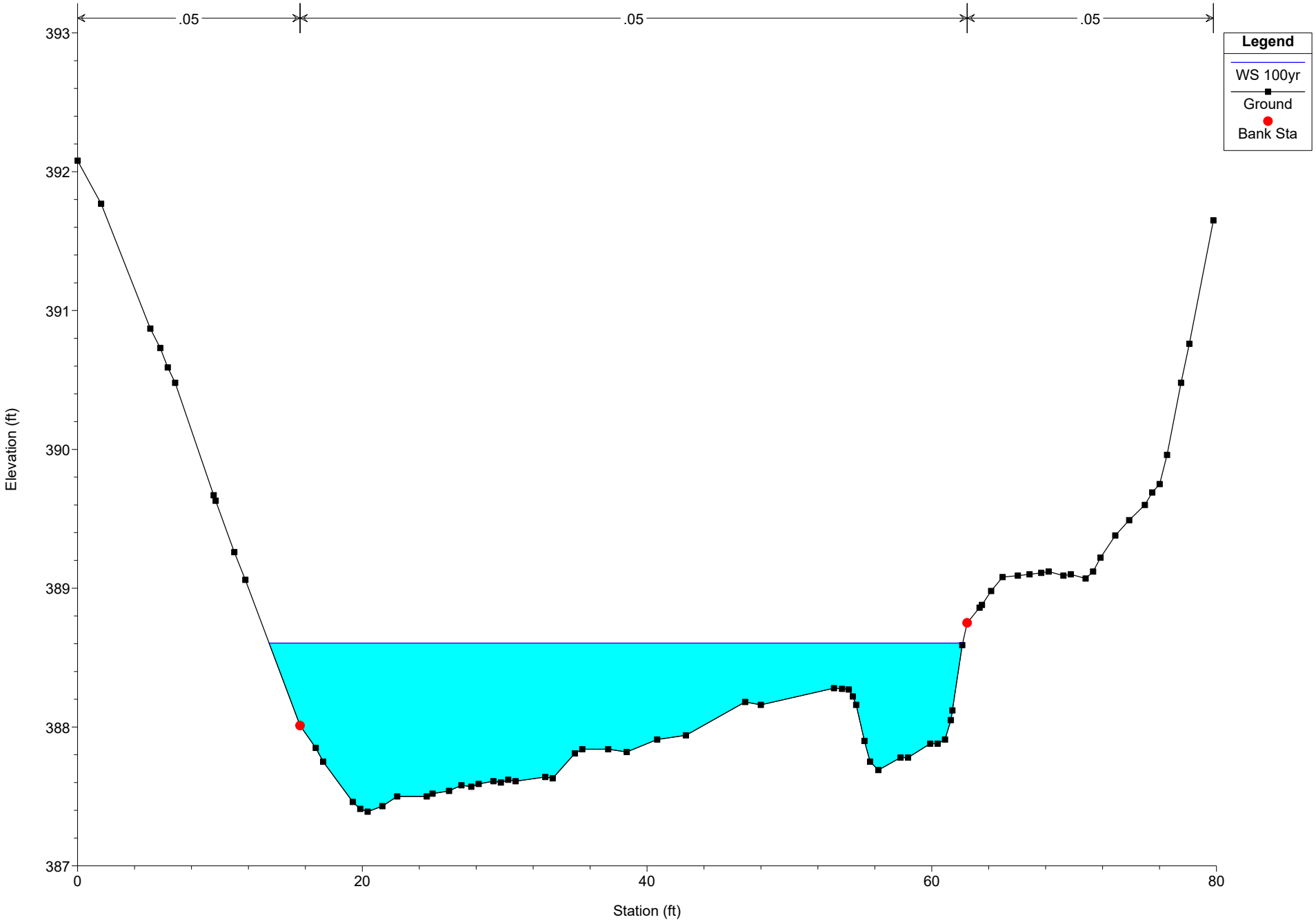
Geom: 1D Existing Flow: HydroCAD
RS = 456.8269
.05
.05
.05
Legend
WS 100yr
Ground
Bank Sta
Elevation (ft)
Station (ft)
400
399
398
397
396
395
0
50
100
150
200
250
300

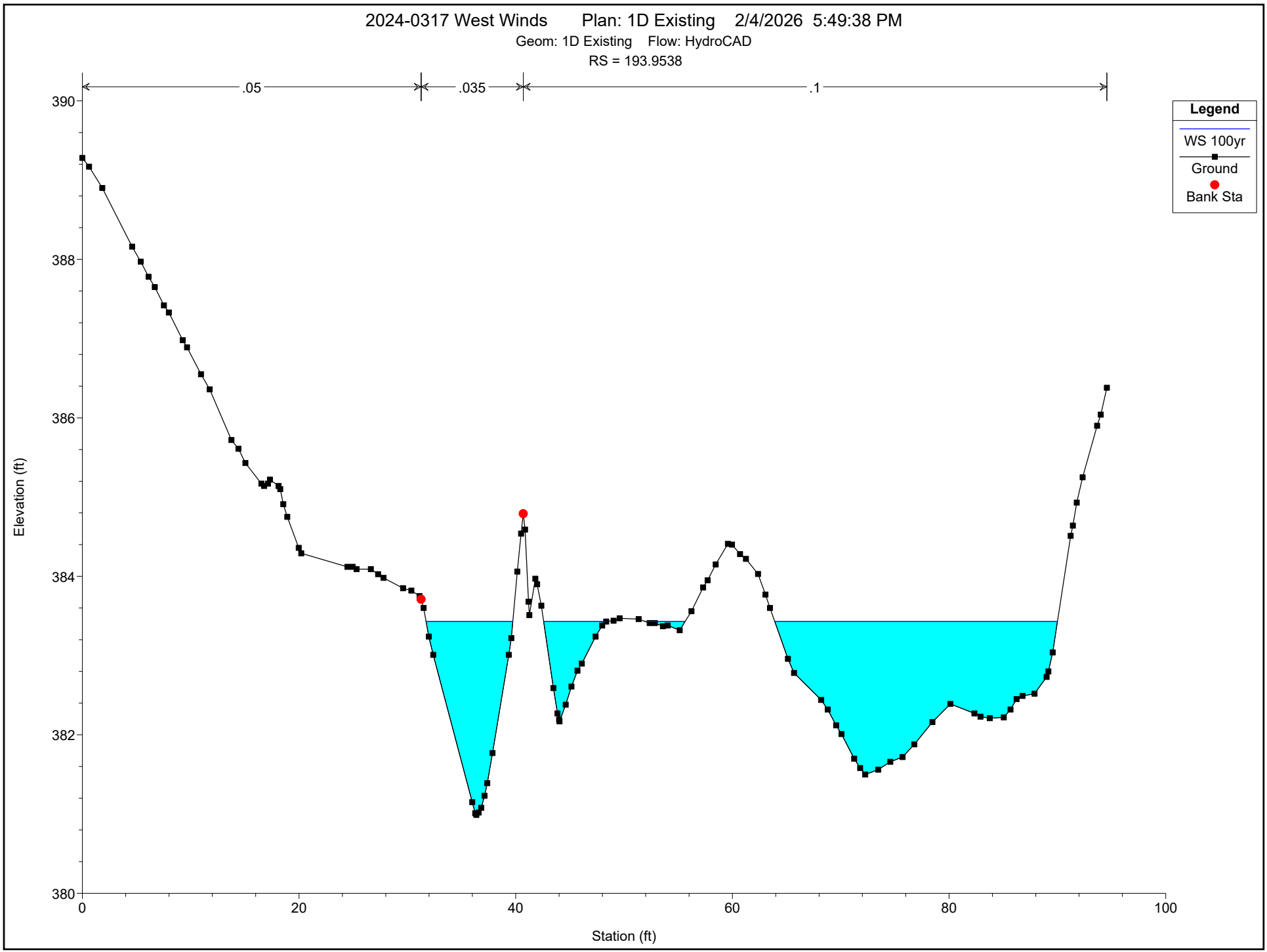

2024-0317 West Winds Plan: 1D Existing 2/4/2026 5:49:38 PM
Geom: 1D Existing Flow: HydroCAD
RS = 419.7252
.05
.05
.05
Legend
WS 100yr
Ground
Bank Sta
Elevation (ft)
Station (ft)
398.0
397.5
397.0
396.5
396.0
395.5
395.0
394.5
394.0
0
50
100
150
200
250

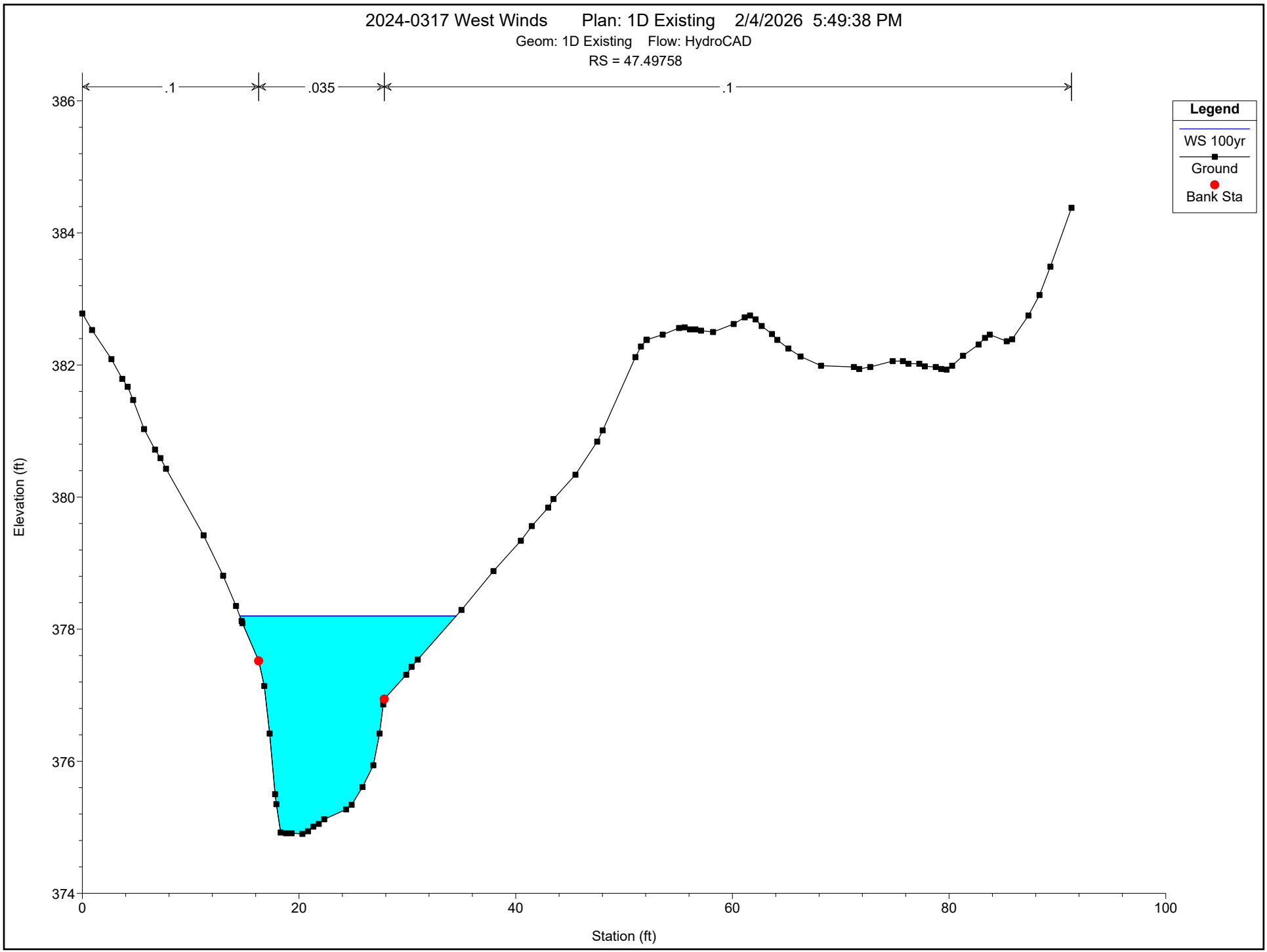
2024-0317 West Winds Plan: 1D Existing 2/4/2026 5:49:38 PM

Geom: 1D Existing Flow: HydroCAD

RS = 315.0776




2024-0317 West Winds Plan: 1D Existing 2/4/2026 5:49:38 PM
Geom: 1D Existing Flow: HydroCAD
RS = 193.9538
.05
.035
.1
Legend
WS 100yr
Ground
Bank Sta
Elevation (ft)
Station (ft)
390
388
386
384
382
380
0
20
40
60
80
100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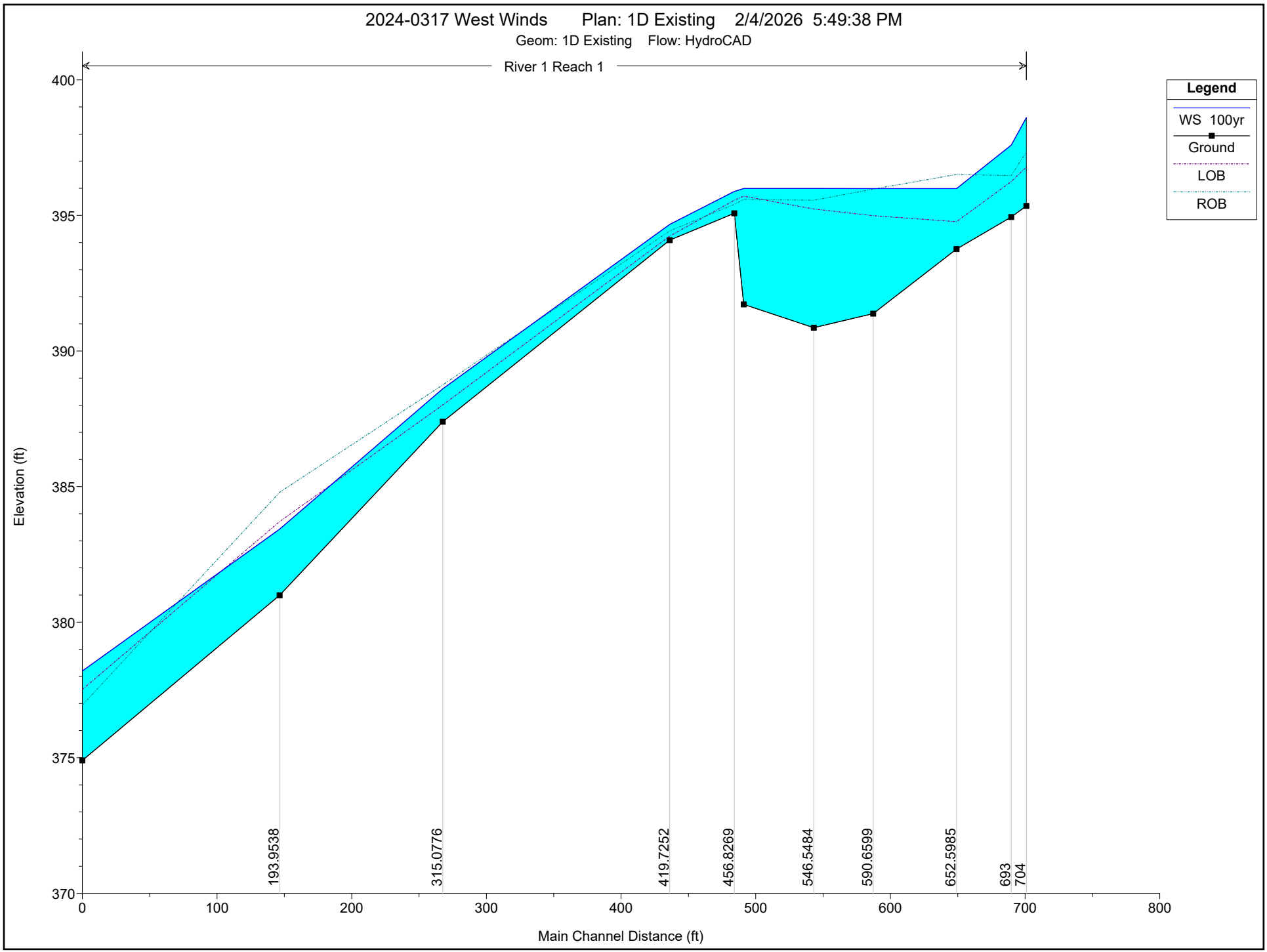
Geom: 1D Existing Flow: HydroCAD
RS = 47.49758
.1
.035
.1
Legend
WS 100yr
Ground
Bank Sta
Elevation (ft)
386
384
382
380
378
376
374
0
20
40
60
80
100
Station (ft)


2024-0317 West Winds Plan: 1D Existing 2/4/2026 5:49:38 PM
Geom: 1D Existing Flow: HydroCAD
River 1 Reach 1
Legend
WS 100yr
Ground
LOB
ROB
Elevation (ft)
400
395
390
385
380
375
370
0
100
200
300
400
500
600
700
800
Main Channel Distance (ft)
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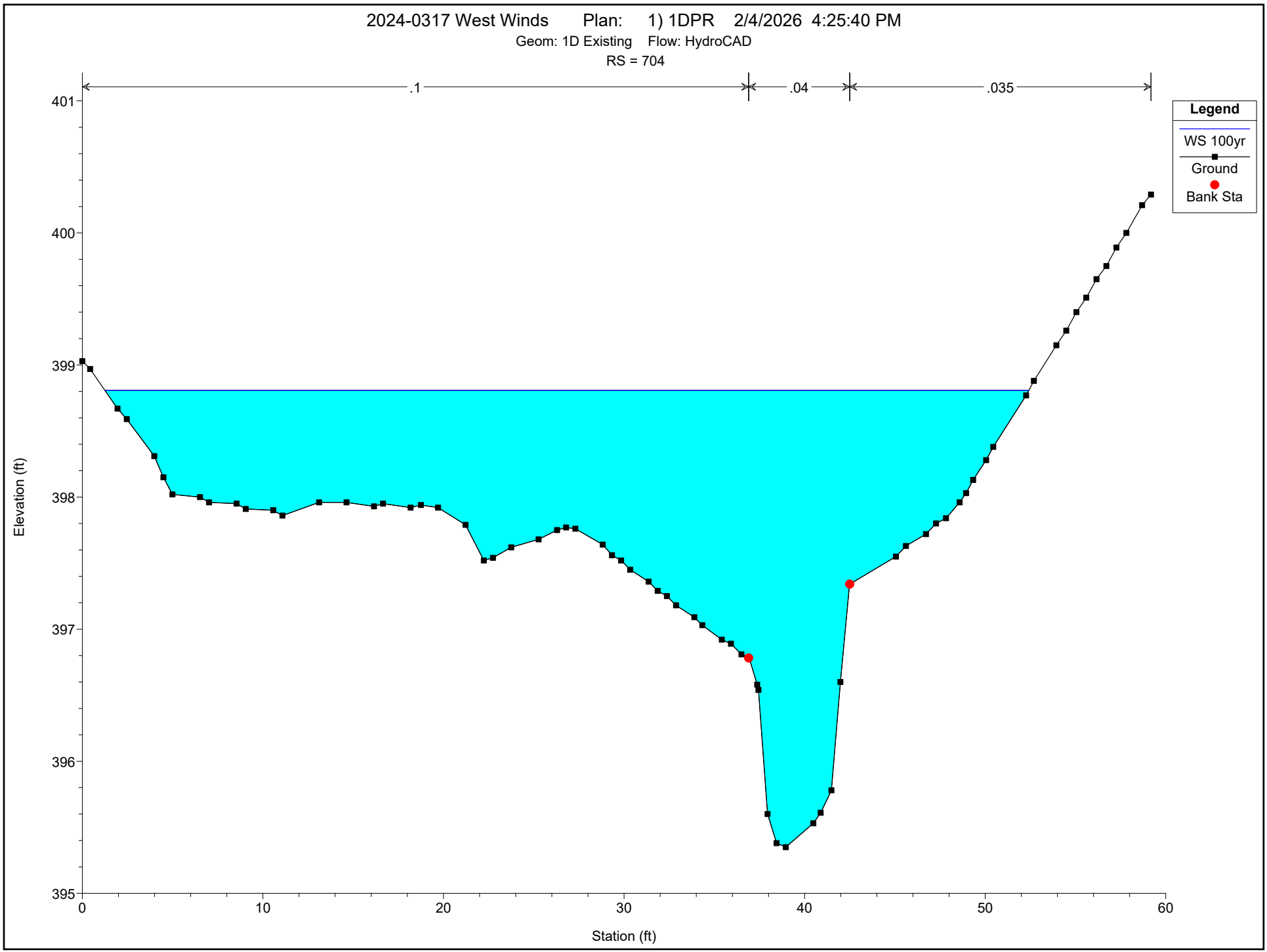
315.0776
419.7252
456.8269
546.5484
590.6599
652.5985
693
704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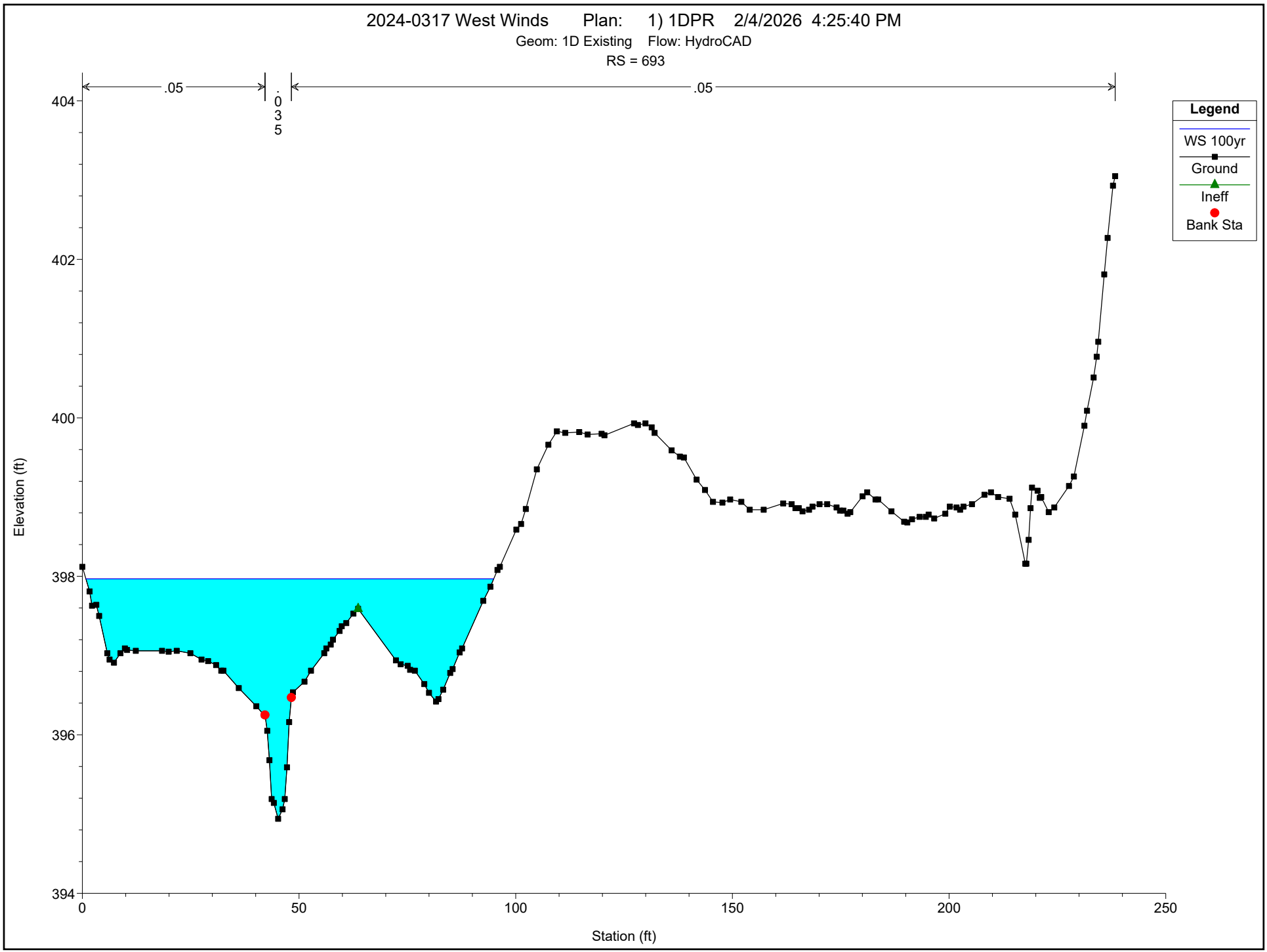
Geom: 1D Existing Flow: HydroCAD
RS = 704
.1
.04
.035
Legend
WS 100yr
Ground
Bank Sta
Elevation (ft)
Station (ft)
401
400
399
398
397
396
395
0
10
20
30
40
50
60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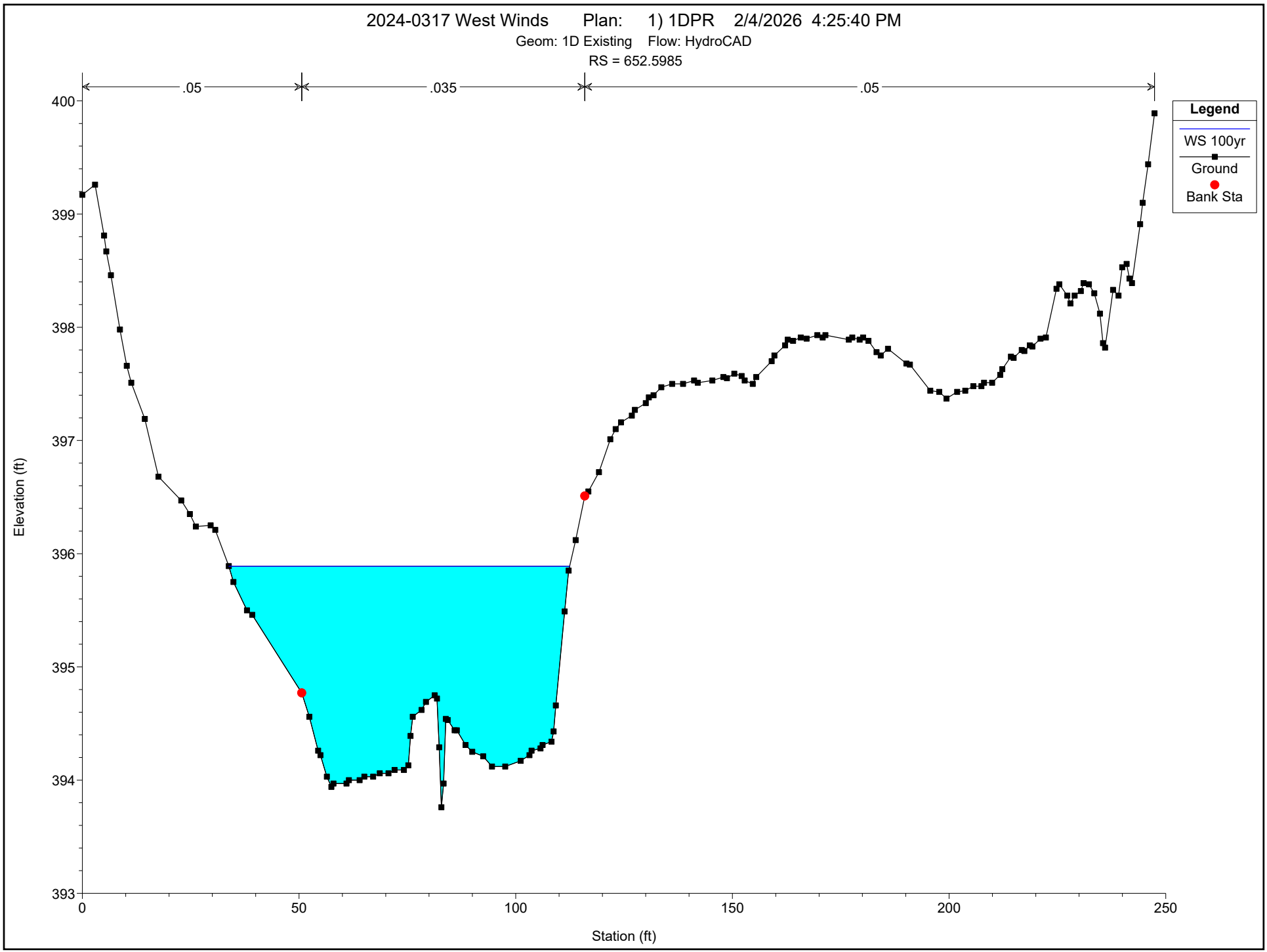
Geom: 1D Existing Flow: HydroCAD
RS = 693
.05
.035
.05
Legend
WS 100yr
Ground
Ineff
Bank Sta
Elevation (ft)
404
402
400
398
396
394
0
50
100
150
200
250
Station (ft)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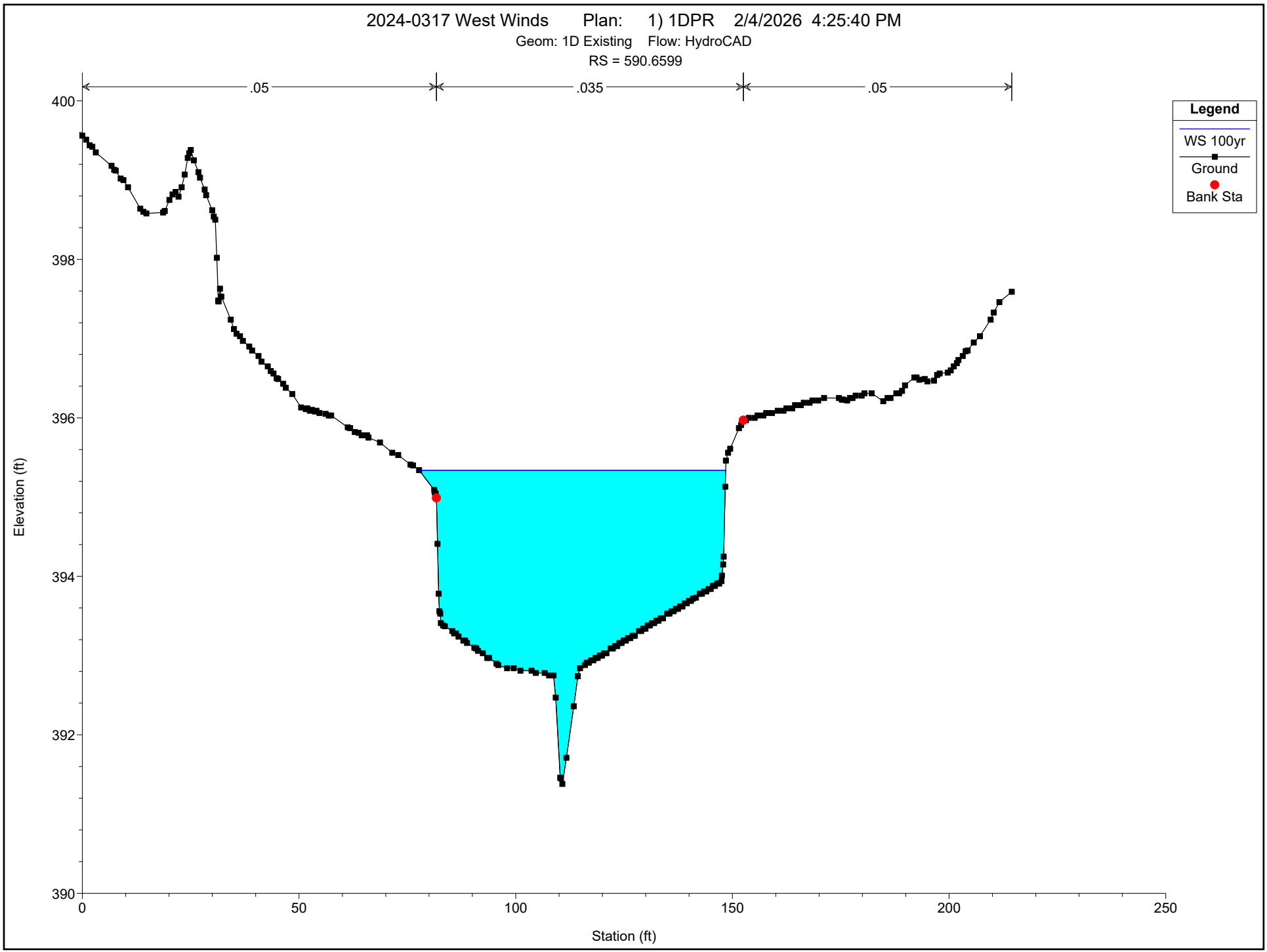
Geom: 1D Existing Flow: HydroCAD
RS = 652.5985
.05
.035
.05
Legend
WS 100yr
Ground
Bank Sta
Elevation (ft)
Station (ft)
400
399
398
397
396
395
394
393
0
50
100
150
200
250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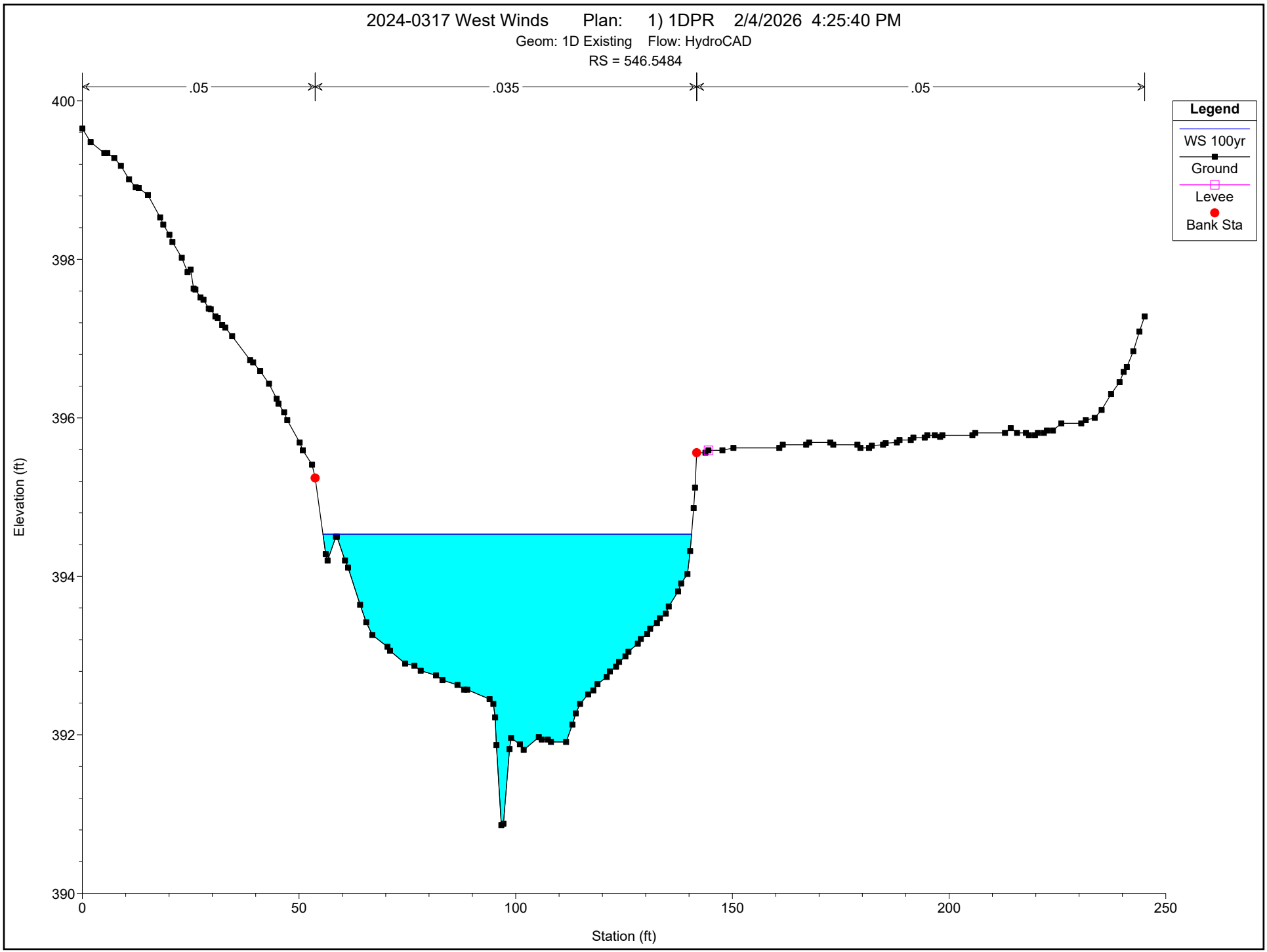
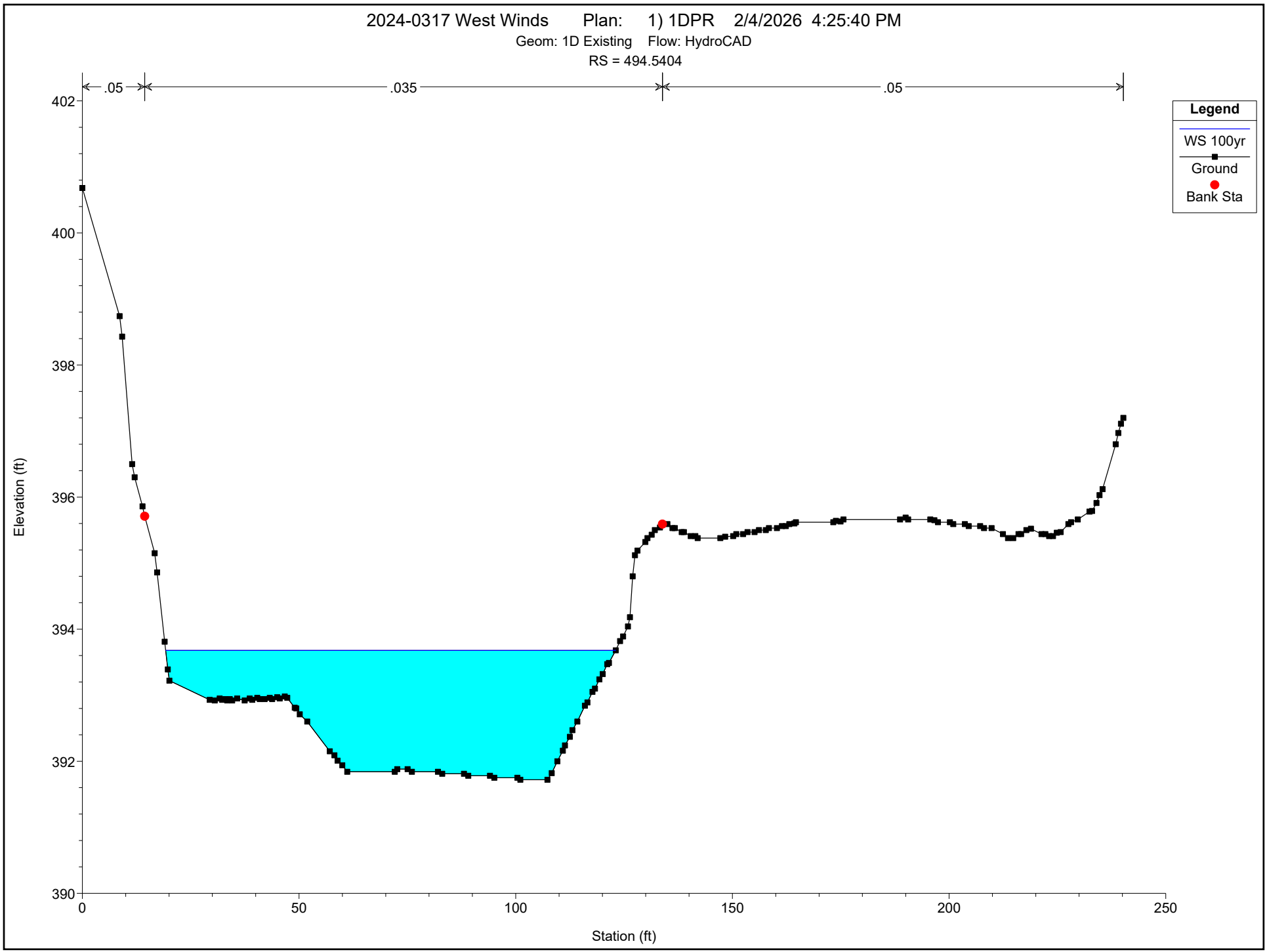
Geom: 1D Existing Flow: HydroCAD
RS = 590.6599
.05
.035
.05
Legend
WS 100yr
Ground
Bank Sta
Elevation (ft)
400
398
396
394
392
390
0
50
100
150
200
250
Station (ft)


2024-0317 West Winds Plan: 1) 1DPR 2/4/2026 4:25:40 PM
Geom: 1D Existing Flow: HydroCAD
RS = 546.5484
.05
.035
.05
Legend
WS 100yr
Ground
Levee
Bank Sta
Elevation (ft)
400
398
396
394
392
390
0
50
100
150
200
250
Station (ft)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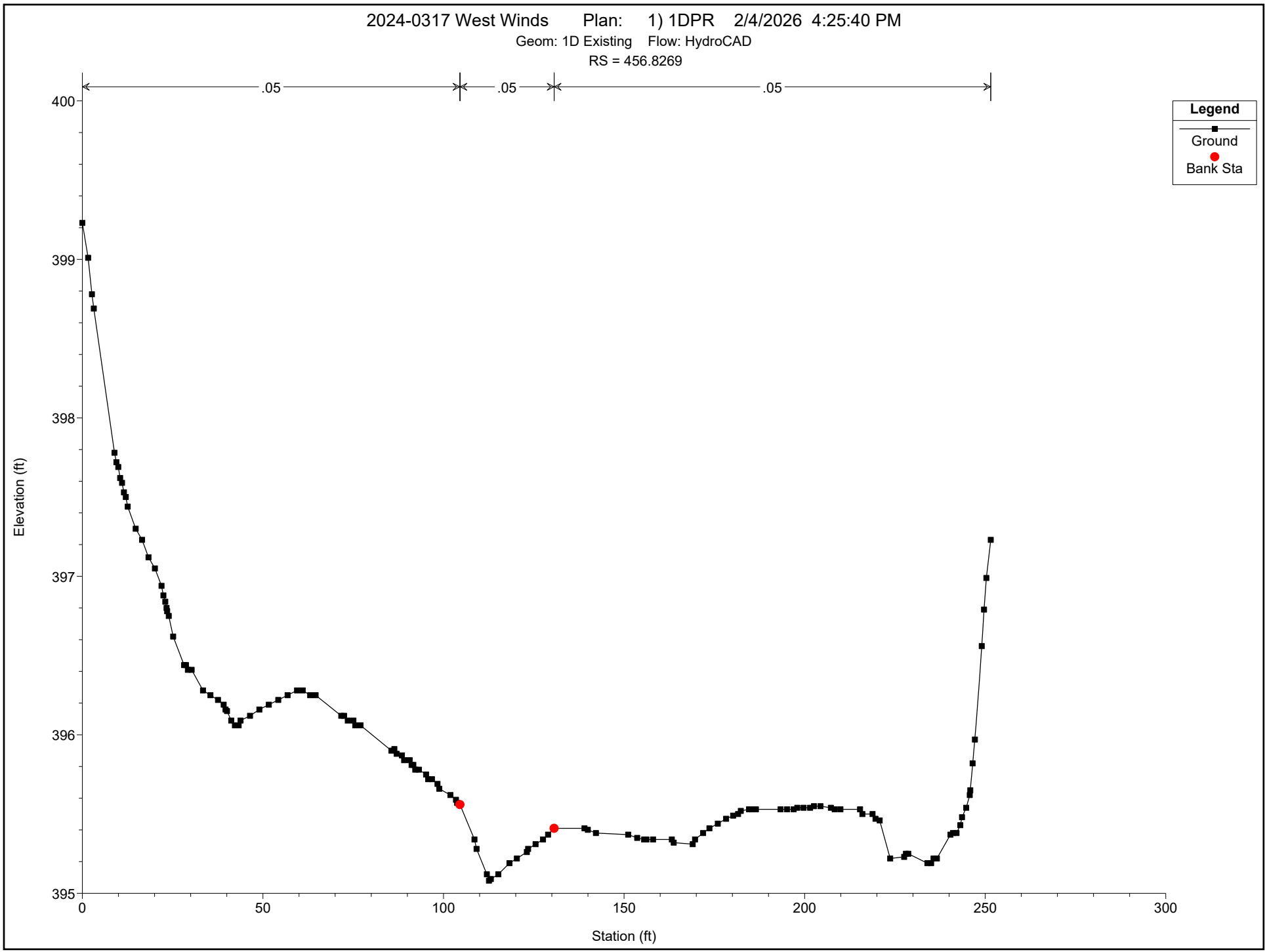
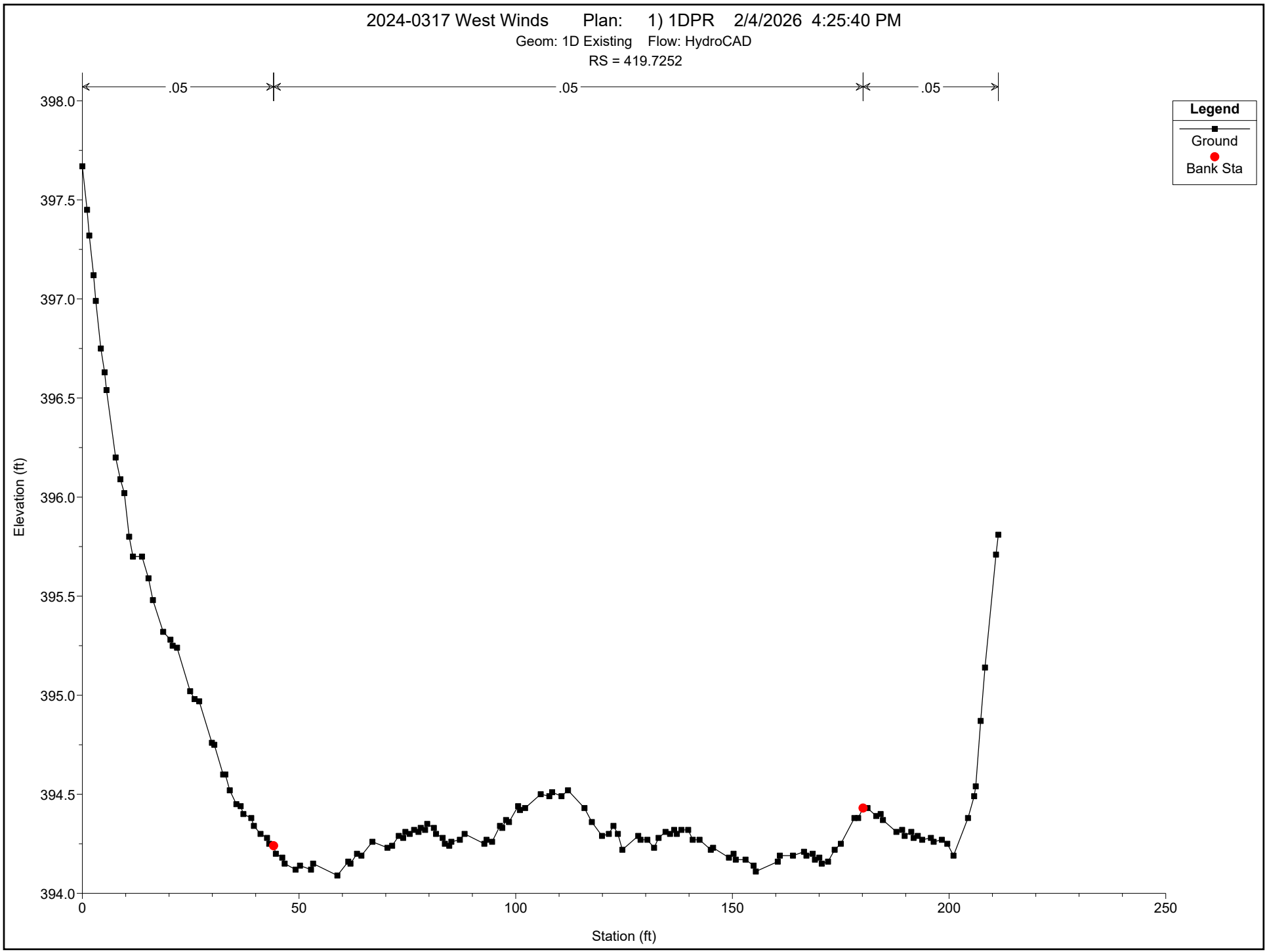
Geom: 1D Existing Flow: HydroCAD
RS = 494.5404
.05
.035
.05
Legend
WS 100yr
Ground
Bank Sta
Elevation (ft)
Station (ft)
402
400
398
396
394
392
390
0
50
100
150
200
250


2024-0317 West Winds Plan: 1) 1DPR 2/4/2026 4:25:40 PM
Geom: 1D Existing Flow: HydroCAD
RS = 456.8269
.05
.05
.05
Legend
Ground
Bank Sta
Elevation (ft)
Station (ft)
400
399
398
397
396
395
0
50
100
150
200
250
300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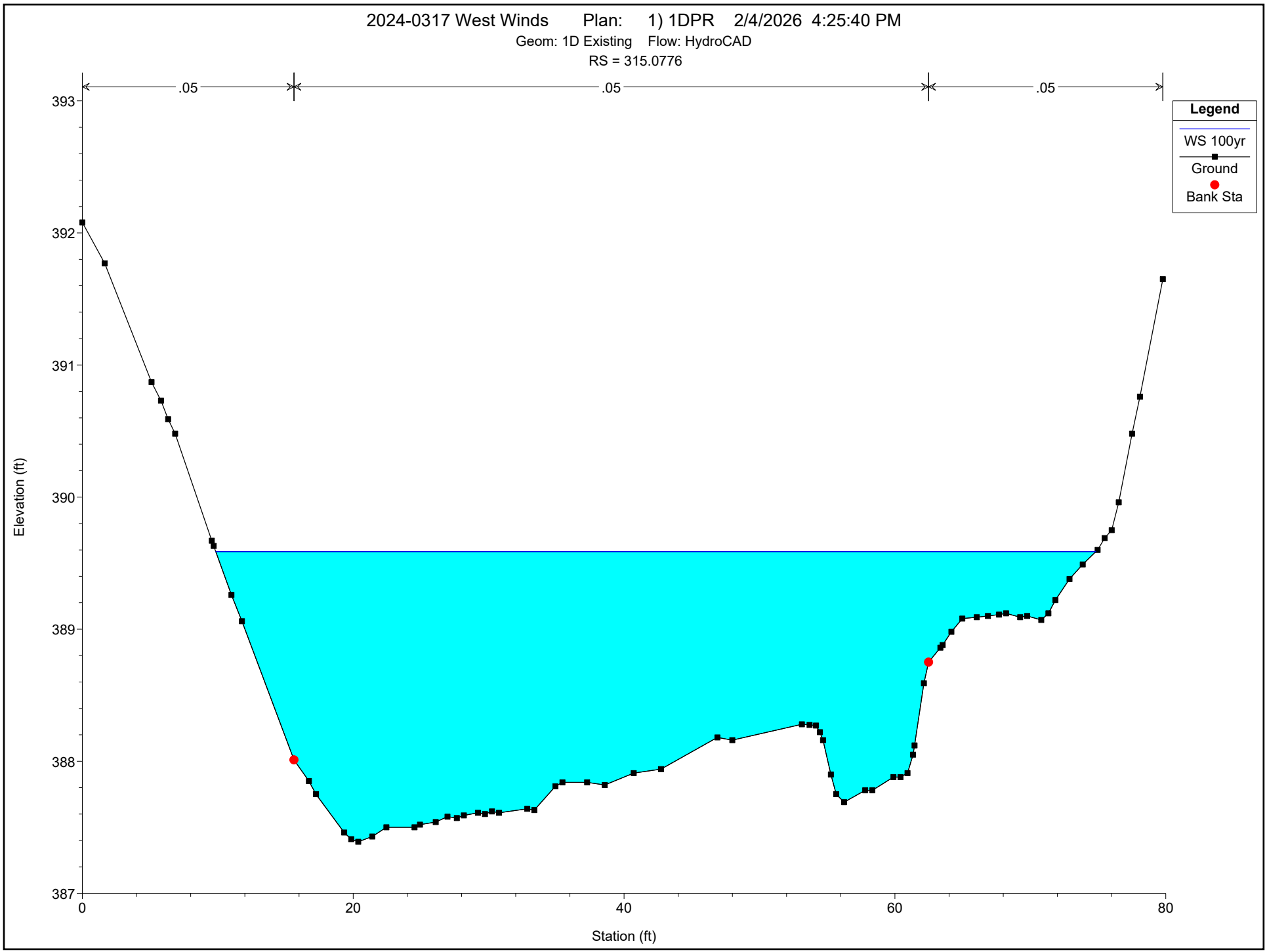
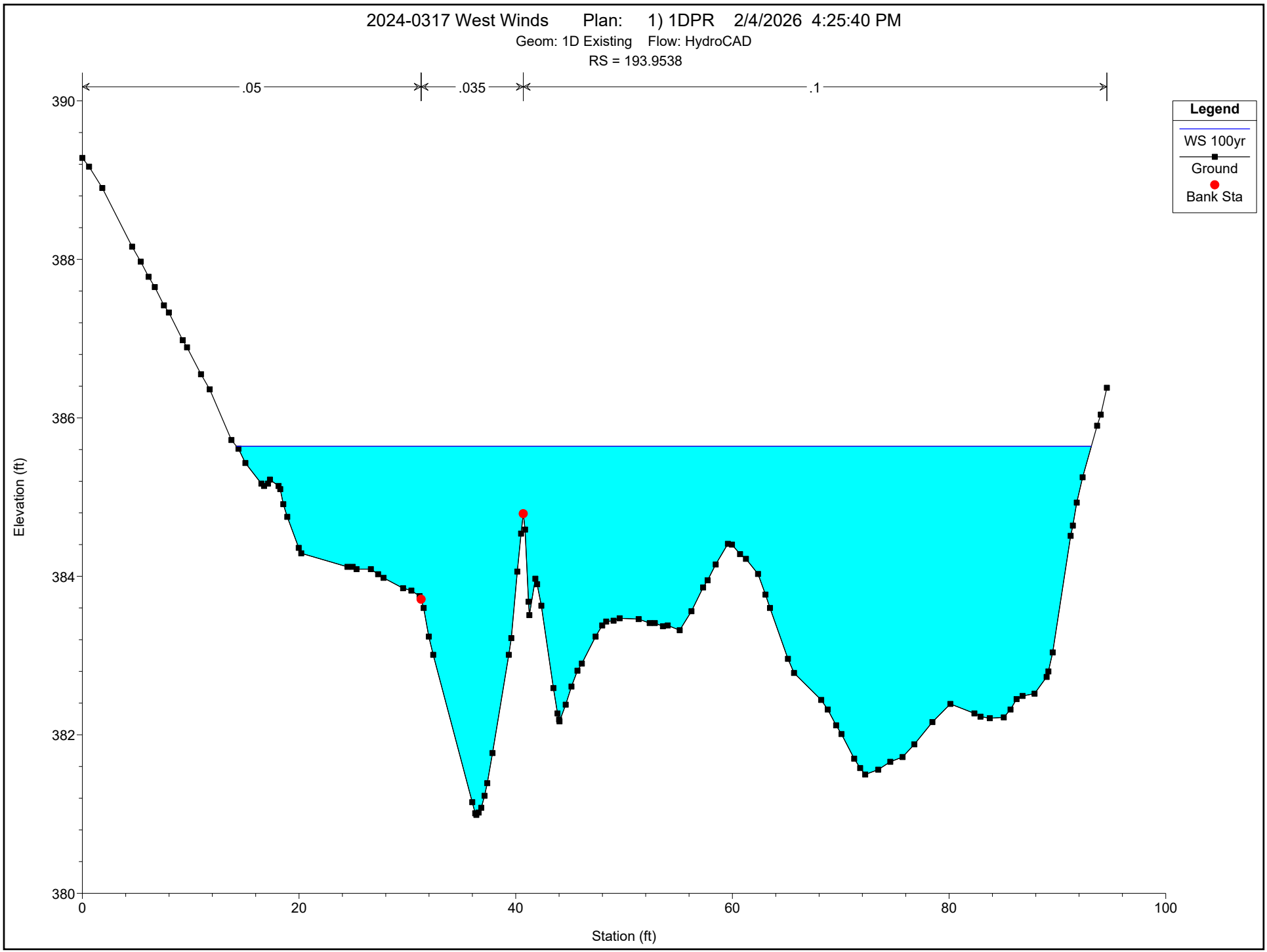
Geom: 1D Existing Flow: HydroCAD
RS = 419.7252
.05
.05
.05
Legend
Ground
Bank Sta
Elevation (ft)
Station (ft)
398.0
397.5
397.0
396.5
396.0
395.5
395.0
394.5
394.0
0
50
100
150
200
250


2024-0317 West Winds Plan: 1) 1DPR 2/4/2026 4:25:40 PM
Geom: 1D Existing Flow: HydroCAD
RS = 315.0776
.05
.05
.05
Legend
WS 100yr
Ground
Bank Sta
Elevation (ft)
393
392
391
390
389
388
387
0
20
40
60
80
Station (ft)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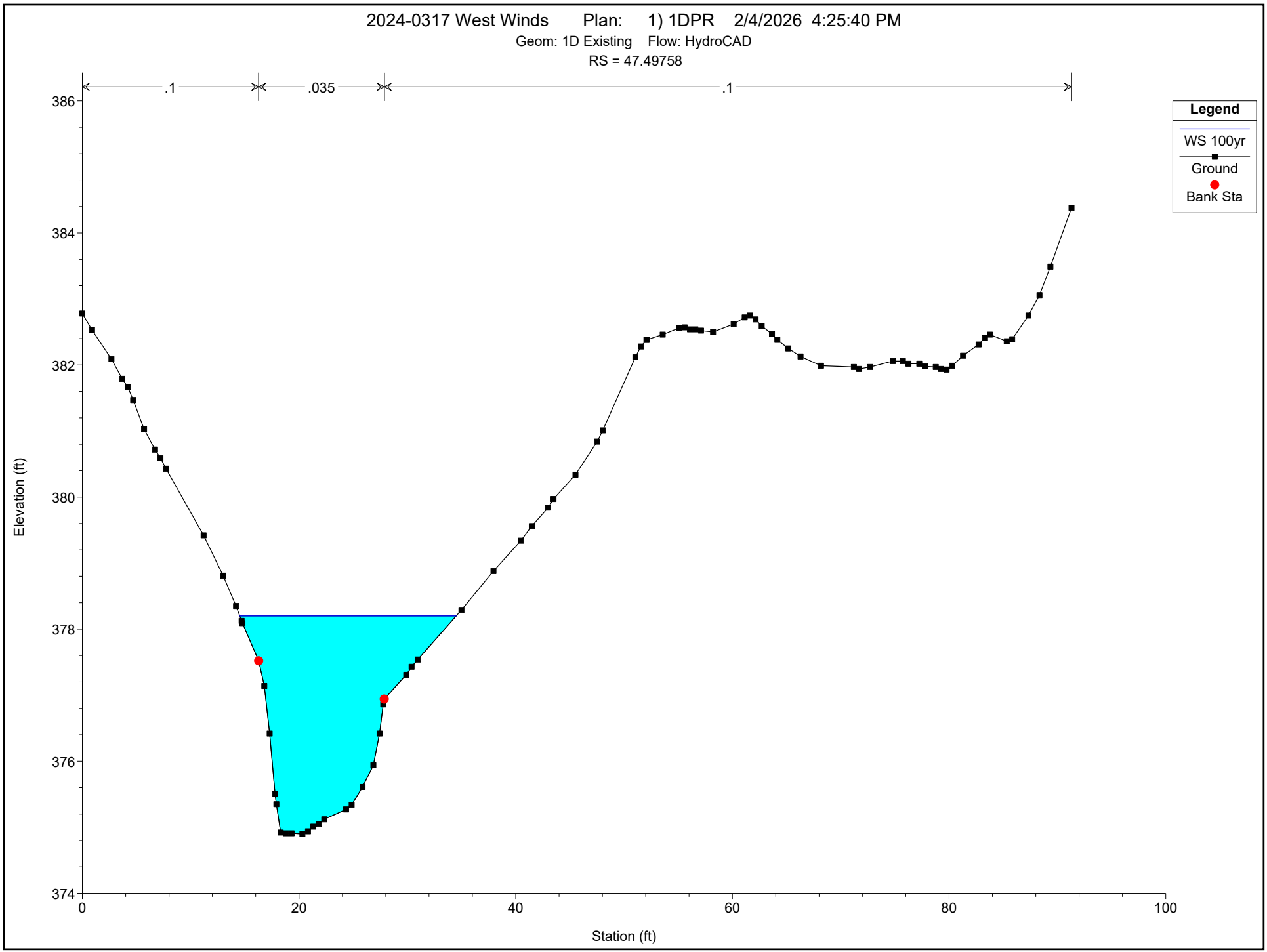
Geom: 1D Existing Flow: HydroCAD
RS = 193.9538
.05
.035
.1
Legend
WS 100yr
Ground
Bank Sta
Elevation (ft)
390
388
386
384
382
380
0
20
40
60
80
100
Station (ft)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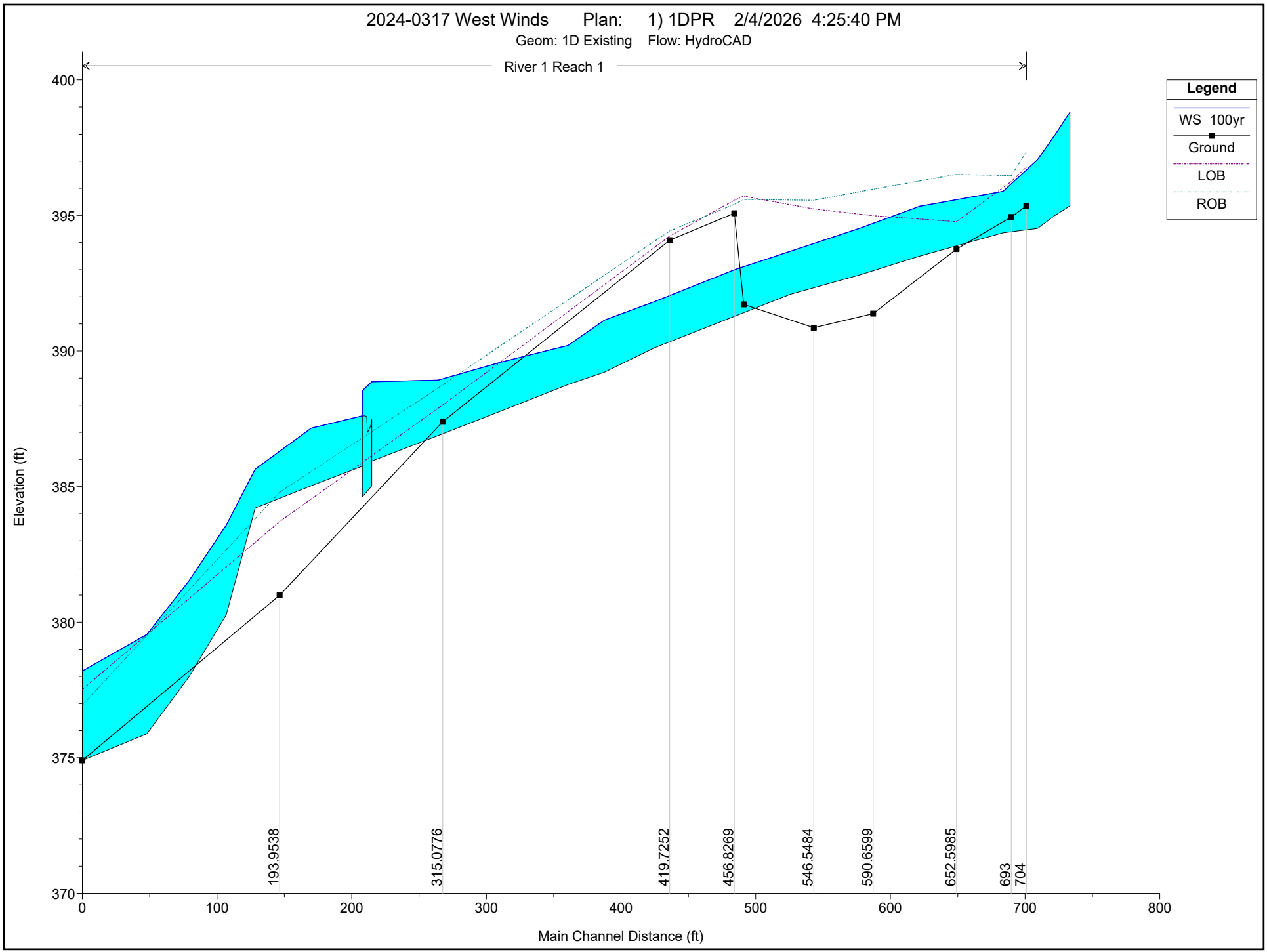
Geom: 1D Existing Flow: HydroCAD
RS = 47.49758
.1
.035
.1
Legend
WS 100yr
Ground
Bank Sta
Elevation (ft)
386
384
382
380
378
376
374
0
20
40
60
80
100
Station (ft)


2024-0317 West Winds Plan: 1) 1DPR 2/4/2026 4:25:40 PM
Geom: 1D Existing Flow: HydroCAD
River 1 Reach 1
Legend
WS 100yr
Ground
LOB
ROB
Elevation (ft)
Main Channel Distance (ft)
400
395
390
385
380
375
370
0
100
200
300
400
500
600
700
800
193.9538
315.0776
419.7252
456.8269
546.5484
590.6599
652.5985
693
704

Appendix C

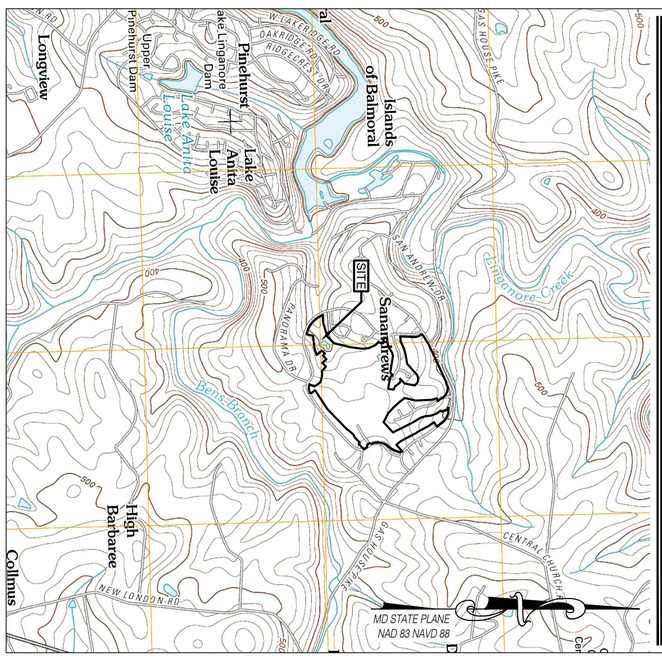
Floodplain Exhibit

P:\SHARED FOLDERS\PROJECTS\2024\S\2024-0317\DWG\2024-0317 - FLOODPLAIN EXHIBIT.DWG 2026-02-09

VICINITY MAP

SCALE: 1" = 2000'

USGS MAP
WALKERSVILLE, MD



NOTES

1. THE PURPOSE OF THIS EXHIBIT IS TO SHOW THE CHANGES TO THE 100 YEAR FLOODPLAIN DUE TO PROPOSED CROSSING IMPACTS.
2. EXISTING AND PROPOSED FLOODPLAIN SHOWN BASED ON A HYDRAULICS AND HYDROLOGIC STUDY BY FREDERICK, SEIBERT AND ASSOCIATES, INC.
3. STREAM IS A DESIGNATED USE CLASS IV-P AND CLOSED TO IN-STREAM CONSTRUCTION MARCH 1ST - MAY 31ST, INCLUSIVE.

LEGEND

- STREAM OUTLINE
- 100 YEAR FLOODPLAIN (EXISTING)
- 100 YEAR FLOODPLAIN (PROPOSED)
- EXISTING INDEX CONTOUR
- EXISTING INTERMEDIATE CONTOUR
- FINISHED GRADE INDEX CONTOUR
- FINISHED GRADE INTERMEDIATE CONTOUR

SCALE: 1" = 30'

30 0 15 30 60

WEST WINDS STREAM RESTORATION

COUNTRY CLUB ROAD

NEW MARKET
FREDERICK COUNTY, MARYLAND

LAKE LINGANORE ASSOCIATION INC.
8718 COLDSTREAM DRIVE, NEW MARKET, MD 21774
301.831.6400 EXT. 112

MARK:	DESCRIPTION:	DATE:

FSA
FREDERICK, SEIBERT & ASSOCIATES, INC.

fsa-inc.com
CIVIL ENGINEERS • SURVEYORS • LANDSCAPE ARCHITECTS • LAND PLANNERS

128 SOUTH POTOMAC STREET
HAGERSTOWN, MD 21740
301.791.3650

11142 WILLIAMSPORT PIKE
GREENCASTLE, PA 17225
717.597.1007

505 SOUTH HANOVER STREET
CARLISLE, PA 17013
717.701.8111

15 EAST MAIN STREET
NEW BLOOMFIELD, PA 17068
717.275.7531

Professional Certification:
I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional under the laws of the State of MARYLAND License # 22945
Expiration Date 09.23.2027

PROJECT NO. 2024-0317
DWN BY TCH
DATE 9-22-2025
PROJECT MANAGER KDM
EMAIL KMOORE@fsa-inc.com
TAX MAP - GRID - PARCEL 69 - 22 - 29
SCALE 1" = 30'
SHEET TITLE

EXISTING FLOODPLAIN

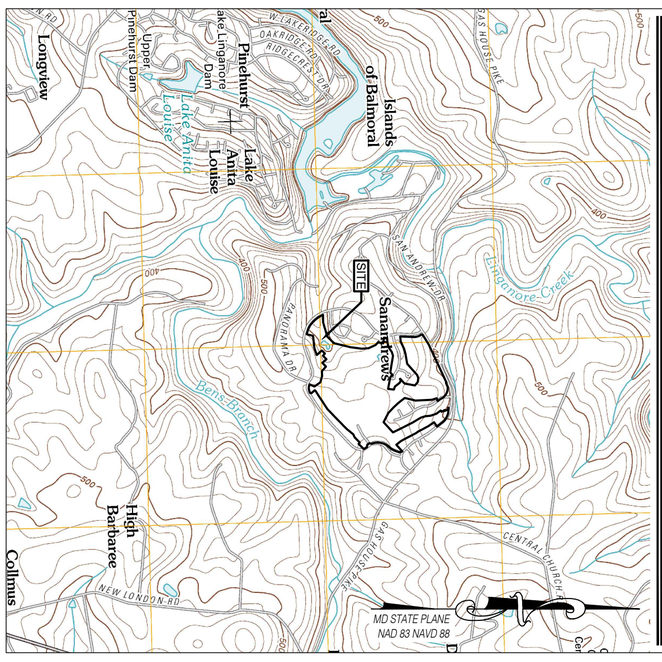
C-101
SHEET 01 OF 02

P:\SHARED FOLDERS\PROJECTS\2024\S\2024-0317\DWG\2024-0317 - FLOODPLAIN EXHIBIT.DWG 2026-02-09

VICINITY MAP

SCALE: 1" = 2000'

USGS MAP
WALKERSVILLE, MD



NOTES

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LEGEND

- STREAM OUTLINE
- 100 YEAR FLOODPLAIN (EXISTING)
- 100 YEAR FLOODPLAIN (PROPOSED)
- EXISTING INDEX CONTOUR
- EXISTING INTERMEDIATE CONTOUR
- FINISHED GRADE INDEX CONTOUR
- FINISHED GRADE INTERMEDIATE CONTOUR

SCALE: 1" = 30'

0 15 30 60

MD STATE PLANE
NAD 83 NAVD 88

WEST WINDS STREAM RESTORATION

COUNTRY CLUB ROAD

NEW MARKET
FREDERICK COUNTY, MARYLAND

LAKE LINGANORE ASSOCIATION INC.
8718 COLDSTREAM DRIVE, NEW MARKET, MD 21774
301.831.6400 EXT. 112

MARK:	DESCRIPTION:	DATE:

FSA
FREDERICK, SEIBERT & ASSOCIATES, INC.

fsa-inc.com
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128 SOUTH POTOMAC STREET
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NEW BLOOMFIELD, PA 17068
717.275.7531

Professional Certification:
I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional under the laws of the State of MARYLAND License # 22945
Expiration Date 09.23.2027

PROJECT NO. 2024-0317
DWN BY TCH
DATE 9-22-2025
PROJECT MANAGER KDM
EMAIL KMOORE@fsa-inc.com
TAX MAP - GRID - PARCEL 69 - 22 - 29
SCALE 1" = 30'

SHEET TITLE
PROPOSED FLOODPLAIN

C-102
SHEET 02 OF 02