March 25, 2024
AVO 37449.004

Ms. Ramie Hammonds
Development Services Director/Building Official
City of Sanger
201 Bolivar Street
P.O. Box 1729
Sanger, Texas 76266

Re: **Lakeside Estates Drainage Study -Review #1**

Dear Ms. Hammonds,

Halff Associates, Inc. (Halff) was requested by the City of Sanger to review the final plat and drainage study in support of the engineering plans for the Lakeside Estates located near the intersection of McReynolds Road and FM 455 E. The subject tract is located within the City of Sanger's ETJ. The submittal was prepared by Kirkman Engineering and dated March, 2024. The preliminary plat and drainage comments were found acceptable by Halff in September 2023.

We have completed our review and offer the following comments. Please address comments on attached markups and in the Drianage Study and provide annotated responses on markups. Please note, not all comments are written on letter since some comments are easier to show and explain on the markups. Please annotate markup with responses. Please note, an accepted drainage study is required prior to plans acceptance.

Drainage Study

1. The proposed increase in runoff will impact private property (ZOI-1). This is not allowed (DCSRR IV.B). Please provide mitigation to reduce flows back to or less than existing or revise drainage to prevent increases onto private property.
2. Existing and proposed ponds on site will need to be analyzed using computation model. HEC-HMS is recommended.
3. Please note Lake Ray Roberts contains a flowage easement at elevation 645.5 ft. Please show on plans.
4. Please note multiple storm frequencies must be analyzed for project areas with detention.
5. Please provide additional detail for the proposed pond:
    a. Is it detention or retention?
    b. Pond Layout details
    c. Pond must have 1-ft of freeboard for the 100-year storm event
    d. Provide calculations that proposed volume meets the Modified Rational Method, with adjustment factors, required volume (Vmax) outlined in DCSRR IV.1.4
    e. Outfall design and proposed discharge
    f. Elevation vs Storage table
6. Ensure culverts have required 1-foot of freeboard for the 100-year storm event for SD-1 and SD-L.
7. Are there proposed culverts for the proposed driveway for the existing structure along HD-L?

If you have any questions or need additional information, please do not hesitate to call me at (214) 937-3953.

Sincerely,
HALFF
TBPELS Firm No. 312

Parker C. Moore, P.E., CFM

Attachments:

- Plans markups

DRAINAGE REPORT FOR LAKESIDE ESTATES IN

Sanger, Texas

March 8, 2024

Prepared by:

STATE OF TEXAS
KAMARON M. ERBATUR
100085
LICENSED
PROFESSIONAL ENGINEER

3/8/2024

KCE Engineering, LLC

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Prepared for:

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Introduction

The proposed Project site is an approximately 68-acre site located near the northeast corner of FM 455 and McReynolds Rd in the city of Sanger, Texas, as shown in **Appendix A – Figure 1**. The Project site is currently in use as a ranch and is proposed to be developed as a large-lot subdivision with the existing ranch house and surrounding buildings to remain. The proposed minimum lot size is 2-acres, and the construction plans for the infrastructure associated with the development are designed by Kirkman Engineering (KE). KCE Engineering, LLC (KCE) will provide guidance and stormwater runoff calculations for the proposed roadside ditches and culverts.

Per the FIRM 48121C0230G, revised April 18, 2011, there is not FEMA floodplain on the Project site with the exception of the far west side where the Project extends into the Zone AE floodplain of Lake Ray Roberts. The proposed construction plans for the Project site include the construction of access roads and roadside ditches with each lot to provide more detailed design as it develops.

The purpose of this drainage study is to determine the peak discharges for the required storm events to the downstream zones of influence, to ensure no adverse hydrologic impacts to adjacent properties, to determine the required driveway culvert sizes, and to provide HEC-RAS models of all proposed ditches with 10-cfs or more of proposed stormwater runoff.

Overall Hydrologic Analysis

KCE used the existing contour data provided by Kirkman Engineering (KE) as well as the lidar contour data to delineate the existing drainage areas. Since the Project site is at the top of the watershed, there are numerous locations where the stormwater runoff leaves the Project site. All stormwater runoff from the Project site reaches Lake Ray Roberts which has a 100-year WSEL of 646, but there are some intermediate properties prior to the stormwater runoff reaching Lake Ray Roberts with the exception of the far west side of the Project site. At the far west side of the Project site, the Project reaches the 100-year floodplain of Lake Ray Roberts. At this location, the Project site no longer has a hydrologic impact since the area of the Project site is much less than the contributing drainage area of Lake Ray Roberts.

For the proposed drainage areas, the current construction plans include the grading required for the access roads and roadside ditches with only minor grading within each proposed lot. As each lot develops, they will need to provide their own detailed grading plan with the major divides matching the divides from this drainage study. The existing and proposed drainage areas are shown in **Appendix A – Figures 2 and 3**, respectively.

The time of concentration is defined as the time required for water to flow from the most hydraulically remote point of the basin to the design point of interest. The path of travel is divided into sheet flow, shallow concentrated flow, and open channel flow (or closed storm

Increases on private property are not allowed DCSRR IV.B

This assumes a peak on peak scenario which should not be assumed system flow). The time of concentration for the existing and proposed conditions were calculated based on the SCS Publication Technical Release (TR-55). The existing flowpaths are shown on **Appendix A – Figure 2**, and the time of concentration calculations are shown in **Appendix B**. KCE used a maximum overland flow length of 100-ft and estimated the velocity in each concentrated channel using the Manning's equation. For the proposed conditions, KCE used a minimum time of concentration of 15 minutes. **Tables 1 and 2** below show the existing and proposed stormwater runoff calculations for the Project site.

Table 1 – Existing Runoff Calculations

Existing Hydrologic Calculations																
DA Designation	**Acres**	**Single-Family**	**Pavement**	**Open Space**	**Weighted C-Factor**	**T_c**	**I_2**	**Q_2**	**I_5**	**Q_5**	**I_{10}**	**Q_{10}**	**I_{25}**	**Q_{25}**	**I_{100}**	**Q_{100}**
		0.45	**0.90**	**0.35**		**(min)**	**(in/hr)**	**(cfs)**	**(in/hr)**	**(cfs)**	**(in/hr)**	**(cfs)**	**(in/hr)**	**(cfs)**	**(in/hr)**	**(cfs)**
EX-1	12.80	5%	0%	95%	0.36	18.7	3.47	15.79	4.36	19.81	4.95	22.51	5.79	26.29	7.18	32.62
EX-2	4.91	0%	0%	100%	0.35	7.9	5.17	8.89	6.26	10.75	7.06	12.13	8.19	14.08	9.97	17.13
EX-3	1.60	100%	0%	0%	0.45	7.0	5.41	3.89	6.50	4.68	7.33	5.28	8.50	6.12	10.32	7.43
EX-4	6.14	25%	0%	75%	0.38	5.9	5.73	13.18	6.84	15.75	7.71	17.74	8.93	20.55	10.80	24.86
EX-5	12.96	0%	0%	100%	0.35	7.5	5.27	23.93	6.36	28.86	7.18	32.56	8.33	37.77	10.12	45.91
EX-6	4.15	0%	0%	100%	0.35	6.5	5.55	8.06	6.65	9.66	7.50	10.89	8.69	12.62	10.53	15.30
EX-7	2.46	0%	0%	100%	0.35	6.3	5.61	4.83	6.71	5.78	7.57	6.51	8.77	7.55	10.62	9.14
EX-8	1.81	0%	0%	100%	0.35	6.0	5.70	3.61	6.81	4.31	7.67	4.86	8.89	5.63	10.75	6.81
EX-9	0.45	0%	0%	100%	0.35	8.9	4.94	0.78	6.00	0.95	6.78	1.07	7.87	1.24	9.60	1.51
EX-10	1.18	0%	10%	90%	0.41	8.2	5.10	2.44	6.18	2.95	6.97	3.33	8.09	3.87	9.85	4.71
EX-11	1.30	0%	10%	90%	0.41	9.4	4.83	2.54	5.88	3.10	6.65	3.50	7.72	4.07	9.43	4.97
EX-12	7.48	0%	10%	90%	0.41	12.2	4.31	13.06	5.31	16.09	6.01	18.21	7.00	21.19	8.60	26.04
EX-13	1.70	0%	0%	100%	0.35	6.5	5.55	3.30	6.65	3.96	7.50	4.46	8.69	5.17	10.53	6.27
EX-14	1.77	0%	0%	100%	0.35	10.5	4.61	2.86	5.64	3.50	6.38	3.95	7.42	4.60	9.08	5.63
EX-15	9.95	0%	5%	95%	0.38	9.8	4.75	17.83	5.79	21.76	6.55	24.60	7.61	28.58	9.30	34.94
EX-16	2.68	0%	5%	95%	0.38	8.5	5.03	5.09	6.10	6.17	6.89	6.97	8.00	8.09	9.75	9.86
EX-17	1.94	0%	5%	95%	0.38	7.2	5.35	3.92	6.45	4.72	7.27	5.32	8.43	6.18	10.24	7.50

Table 2 – Proposed Runoff Calculations

Proposed Hydrologic Calculations																
DA Designation	Acres	Single-Family	Pavement	Open Space	Weighted C-Factor	T_c	I_2	Q_2	I_5	Q_5	I_{10}	Q_{10}	I_{25}	Q_{25}	I_{100}	Q_{100}
		0.45	0.90	0.35		(min)	(in/hr)	(cfs)	(in/hr)	(cfs)	(in/hr)	(cfs)	(in/hr)	(cfs)	(in/hr)	(cfs)
DA1a	3.83	100%	0%	0%	0.45	15.0	3.90	6.72	4.85	8.36	5.50	9.47	6.41	11.05	7.91	13.64
DA1b	0.50	75%	25%	0%	0.56	15.0	3.90	1.10	4.85	1.36	5.50	1.55	6.41	1.80	7.91	2.23
DA2	0.46	100%	0%	0%	0.45	15.0	3.90	0.81	4.85	1.00	5.50	1.14	6.41	1.33	7.91	1.64
DA3	1.34	100%	0%	0%	0.45	15.0	3.90	2.35	4.85	2.92	5.50	3.31	6.41	3.86	7.91	4.77
DA4	2.06	100%	0%	0%	0.45	15.0	3.90	3.62	4.85	4.49	5.50	5.10	6.41	5.94	7.91	7.33
DA5	3.80	100%	0%	0%	0.45	15.0	3.90	6.67	4.85	8.29	5.50	9.40	6.41	10.96	7.91	13.53
DA6	0.75	100%	0%	0%	0.45	15.0	3.90	1.32	4.85	1.64	5.50	1.86	6.41	2.16	7.91	2.67
DA7a	1.98	100%	0%	0%	0.45	15.0	3.90	3.48	4.85	4.32	5.50	4.90	6.41	5.71	7.91	7.05
DA7b	2.96	100%	0%	0%	0.45	15.0	3.90	5.20	4.85	6.46	5.50	7.32	6.41	8.54	7.91	10.54
DA8	0.56	100%	0%	0%	0.45	15.0	3.90	0.98	4.85	1.22	5.50	1.39	6.41	1.62	7.91	1.99
DA9	0.52	100%	0%	0%	0.45	15.0	3.90	0.91	4.85	1.13	5.50	1.29	6.41	1.50	7.91	1.85
DA10	1.06	100%	0%	0%	0.45	15.0	3.90	1.86	4.85	2.31	5.50	2.62	6.41	3.06	7.91	3.77
DA11	0.28	100%	0%	0%	0.45	15.0	3.90	0.49	4.85	0.61	5.50	0.69	6.41	0.81	7.91	1.00
DA12	1.10	100%	0%	0%	0.45	15.0	3.90	1.93	4.85	2.40	5.50	2.72	6.41	3.17	7.91	3.92
DA13	1.69	100%	0%	0%	0.45	15.0	3.90	2.97	4.85	3.69	5.50	4.18	6.41	4.87	7.91	6.02
DA14	1.12	100%	0%	0%	0.45	15.0	3.90	1.97	4.85	2.44	5.50	2.77	6.41	3.23	7.91	3.99
DA15	1.27	100%	0%	0%	0.45	15.0	3.90	2.23	4.85	2.77	5.50	3.14	6.41	3.66	7.91	4.52
DA16	1.57	100%	0%	0%	0.45	15.0	3.90	2.76	4.85	3.43	5.50	3.88	6.41	4.53	7.91	5.59
DA17	0.43	100%	0%	0%	0.45	15.0	3.90	0.75	4.85	0.94	5.50	1.06	6.41	1.24	7.91	1.53
DA18	1.28	100%	0%	0%	0.45	15.0	3.90	2.25	4.85	2.79	5.50	3.17	6.41	3.69	7.91	4.56
DA19	0.81	100%	0%	0%	0.45	15.0	3.90	1.42	4.85	1.77	5.50	2.00	6.41	2.34	7.91	2.88
DA20	0.78	100%	0%	0%	0.45	15.0	3.90	1.37	4.85	1.70	5.50	1.93	6.41	2.25	7.91	2.78
DA21	2.68	0%	5%	95%	0.38	8.5	5.03	5.09	6.10	6.17	6.89	6.97	8.00	8.09	9.75	9.86

Proposed Hydrologic Calculations																
DA Designation	Acres	Single-Family	Pavement	Open Space	Weighted C-Factor	T_c	I_2	Q_2	I_5	Q_5	I_{10}	Q_{10}	I_{25}	Q_{25}	I_{100}	Q_{100}
		0.45	0.90	0.35		(min)	(in/hr)	(cfs)	(in/hr)	(cfs)	(in/hr)	(cfs)	(in/hr)	(cfs)	(in/hr)	(cfs)
DA22	7.40	0%	5%	95%	0.38	9.8	4.75	13.26	5.79	16.19	6.55	18.29	7.61	21.26	9.30	25.99
DA24a	2.04	100%	0%	0%	0.45	15.0	3.90	3.58	4.85	4.45	5.50	5.05	6.41	5.88	7.91	7.26
DA24b	0.35	100%	0%	0%	0.45	15.0	3.90	0.61	4.85	0.76	5.50	0.87	6.41	1.01	7.91	1.25
DA24c	0.13	100%	0%	0%	0.45	15.0	3.90	0.23	4.85	0.28	5.50	0.32	6.41	0.37	7.91	0.46
DA25a	2.09	100%	0%	0%	0.45	15.0	3.90	3.67	4.85	4.56	5.50	5.17	6.41	6.03	7.91	7.44
DA25b	5.85	100%	0%	0%	0.45	15.0	3.90	10.27	4.85	12.76	5.50	14.47	6.41	16.87	7.91	20.83
DA26a	1.60	100%	0%	0%	0.45	15.0	3.90	2.81	4.85	3.49	5.50	3.96	6.41	4.61	7.91	5.70
DA26b	6.69	50%	0%	50%	0.40	15.0	3.90	10.44	4.85	12.97	5.50	14.71	6.41	17.15	7.91	21.17
DA27	2.92	100%	0%	0%	0.45	15.0	3.90	5.13	4.85	6.37	5.50	7.22	6.41	8.42	7.91	10.40
DA28	4.08	100%	0%	0%	0.45	15.0	3.90	7.16	4.85	8.90	5.50	10.09	6.41	11.77	7.91	14.53
DA29	2.49	100%	0%	0%	0.45	15.0	3.90	4.37	4.85	5.43	5.50	6.16	6.41	7.18	7.91	8.87
DA30	1.88	100%	0%	0%	0.45	15.0	3.90	3.30	4.85	4.10	5.50	4.65	6.41	5.42	7.91	6.69
DA31	1.21	0%	0%	100%	0.35	7.2	5.35	2.27	6.45	2.73	7.27	3.08	8.43	3.57	10.24	4.34
DA32	2.55	0%	10%	90%	0.41	10.0	4.71	4.86	5.75	5.94	6.50	6.71	7.55	7.80	9.24	9.54

KCE then used the proposed grading to route the stormwater runoff along the proposed roadside ditches to the downstream Zones of Influence (ZOI). KCE added design points along each roadside ditch at the middle of the proposed pad sites to provide minimum required culvert sizes for each pad. As these pads develop in the future, they will submit their own individual lot grading plans along with the detailed grading required for the proposed culverts. At that time, the minimum culvert size should be equivalent to the size modeled for each driveway culvert in this drainage report.

The primary access for the Project site will be along Megaview Drive which is the current private drive for the ranch. This road will be improved as part of this proposed Project with drainage ditches graded on either side and an existing 4-24” storm drain culvert replaced by 3-30” culverts. Just downstream of the culvert crossing at Megaview Drive is a private driveway with a 4-24” culvert crossing. KCE has set a ZOI at the upstream side of each culvert crossing to ensure that there is no increase in the peak discharge to each culvert crossing and has included the offsite area to each culvert in the overall calculations. KCE has used the proposed site and grading plans to route the peak discharges along each proposed roadside ditch or channel. **Table 3** below has the existing routed flows to the existing culverts at Megaview Drive, **Table 4** below shows the proposed routed peak discharges along all the proposed ditches and channels, and **Table 5** below shows the comparison at the ZOIs between the existing and proposed conditions.

Table 3 – Existing Routed Peak Discharges

100-yr Existing Routed Peak Discharges													
Design Point		Time of Concentration Calculations				I_{100} (in/hr)	Drainage Area						Q100 (cfs)
From	To	Inlet Tc (min)	Distance (feet)	Velocity (fps)	Travel Time (min)		DA	Incr. Area (ac)	Total Area (ac)	Runoff C	Incr. C x A	Total C x A	
Existing Megaview Drive													
ZOI-11	ZOI-15	9.4	993	5.0	12.7	9.43	EX-11	1.30	1.30	0.41	0.53	0.53	5.0
ZOI-15	ZOI-16	12.7	66	5.0	12.9	8.46	EX-15	9.95	11.25	0.38	3.76	4.28	36.2
ZOI-16	-	12.9		5.0	12.9	8.40	EX-1O, EX-16, EX-17	5.80	17.05	0.38	2.22	6.50	54.7

Table 4 – Proposed Routed Peak Discharges

100-yr Proposed Routed Peak Discharges													
Design Point		Time of Concentration Calculations				I_{100} (in/hr)	Drainage Area						Q100 (cfs)
From	To	Inlet Tc (min)	Distance (feet)	Velocity (fps)	Travel Time (min)		DA	Incr. Area (ac)	Total Area (ac)	Runoff C	Incr. C x A	Total C x A	
Hillside Drive Left Ditch													
HD-L1	HD-L2	15.0	604	5.0	17.0	7.91	1/2 DA5	1.90	1.90	0.45	0.86	0.86	6.8
HD-L2	HD-L3	17.0	305	5.0	18.0	7.49	1/2 DA5	1.90	3.80	0.45	0.86	1.71	12.8
HD-L3	HD-L4	18.0	272	5.0	18.9	7.30	DA4	2.06	5.86	0.45	0.93	2.64	19.3
HD-L4	HD-L5	18.9	237	5.0	19.7	7.14	DA3	1.34	7.20	0.45	0.60	3.24	23.1
HD-L5	HD1	19.7	152	5.0	20.2	7.00	DA2	0.46	7.66	0.45	0.21	3.45	24.1
HD1	HD2	20.2	134	5.0	20.7	6.92	DA6, DA7a, DA7b, DA8, DA9, DA10	7.83	15.49	0.45	3.52	6.97	48.2
HD2	ZOI-1	20.7	500	5.0	22.3	6.85	DA1b	0.50	15.99	0.56	0.28	7.25	49.7

100-yr Proposed Routed Peak Discharges												
Design Point		Time of Concentration Calculations				I_{100} (in/hr)	Drainage Area					Q100 (cfs)
From	To	Inlet Tc (min)	Distance (feet)	Velocity (fps)	Travel Time (min)		DA	Incr. Area (ac)	Total Area (ac)	Runoff C	Incr. C x A	Total C x A	
ZOI-1	-	22.3			-				15.99			7.25	49.7
Hillside Drive Right Ditch												
HD-R1	HD-R2	15.0	310	5.0	16.0	7.91	DA6	0.75	0.75	0.45	0.34	0.34	2.7
HD-R2	HD-R3	16.0	280	5.0	17.0	7.69	DA8	0.56	1.31	0.45	0.25	0.59	4.5
HD-R3	HD-R4	17.0	394	5.0	18.3	7.50	DA9	0.52	1.83	0.45	0.23	0.82	6.2
HD-R4	-	18.3		5.0	18.3	7.25	DA7a, DA7b, DA10	6.00	7.83	0.45	2.70	3.52	25.6
Hillside Court Left Ditch												
HC-L1	HC-L2	15.0	175	5.0	15.6	7.91	DA15	1.27	1.27	0.45	0.57	0.57	4.5
HC-L2	POND	15.6	84	5.0	15.9	7.79	DA14	1.12	2.39	0.45	0.50	1.08	8.4
POND	ZOI-12	15.9	22	5.0	15.9	7.73	DA11, DA12, DA13	3.07	5.46	0.45	1.38	2.46	19.0
ZOI-12	-	15.9		6.0	15.9	7.71	DA17	0.43	5.89	0.45	0.19	2.65	20.4
Hillside Court Right Ditch												
HC-R1	HC-R2	15.0	250	5.0	15.8	7.91	DA11	0.28	0.28	0.45	0.13	0.13	1.0
HC-R2	POND	15.8	80	5.0	16.1	7.73	DA12	1.10	1.38	0.45	0.50	0.62	4.8
POND	ZOI-12	16.1	22	5.0	16.2	7.68	DA13, DA14, DA15	4.08	5.46	0.45	1.84	2.46	18.9
ZOI-12	-	16.2		6.0	16.2	7.66	DA17	0.43	5.89	0.45	0.19	2.65	20.3
DA7 Ditch												
DA7-1	DA7-2	15.0	735	5.0	17.5	7.91	DA7a	1.98	1.98	0.45	0.89	0.89	7.0

100-yr Proposed Routed Peak Discharges													
Design Point		Time of Concentration Calculations				I_{100} (in/hr)	Drainage Area						Q100 (cfs)
From	To	Inlet Tc (min)	Distance (feet)	Velocity (fps)	Travel Time (min)		DA	Incr. Area (ac)	Total Area (ac)	Runoff C	Incr. C x A	Total C x A	
DA7-2	ZOI-14	17.5	102	5.0	17.8	7.41	DA7b	2.96	4.94	0.45	1.33	2.22	16.5
ZOI-14	-	17.8		5.0	17.8	7.34			4.94		0.00	2.22	16.3
Megaview Right Ditch													
MD-R1	ZOI-10	15.0	175	5.4	15.5	7.91	DA19	0.81	0.81	0.45	0.36	0.36	2.9
ZOI-10	ZOI-16	15.5	963	5.4	18.5	7.79	DA20	0.78	1.59	0.45	0.35	0.72	5.6
ZOI-16	-	18.5		5.0	18.5	7.21	DA18, DA21, DA22, DA31, DA32	15.12	16.71	0.39	5.84	6.55	47.3
Megaview Left Ditch													
ZOI-11	ZOI-15	15.0	993	3.0	20.5	7.91	DA18	1.28	1.28	0.45	0.58	0.58	4.6
ZOI-15	ZOI-16	20.5	66	5.0	20.7	6.87	DA22, DA32	9.95	11.23	0.38	3.83	4.40	30.3
ZOI-16	-	20.7		5.0	20.7	6.84	DA19, DA20, DA21, DA31	5.48	16.71	0.39	2.15	6.55	44.8
Sunrise Drive Left Ditch													
SD-L1	SD-L2	15.0	178	6.0	15.5	7.91	DA24a	2.04	2.04	0.45	0.92	0.92	7.3
SD-L2	SD-L3	15.5	130	6.0	15.9	7.80	DA24b	0.35	2.39	0.45	0.16	1.08	8.4
SD-L3	SD-1	15.9	101	6.0	16.1	7.73	DA24c	0.13	2.52	0.45	0.06	1.13	8.8
SD-1	ZOI-5	16.1	383	6.0	17.2	7.67	DA25a, DA25b	7.94	10.46	0.45	3.57	4.71	36.1
ZOI-5	-	17.2		5.0	17.2	7.46	DA27	2.92	13.38	0.45	1.31	6.02	44.9

Table 5 – ZOI Comparison

	Contributing DA		100-yr Peak Discharge (cfs)		
ZOI	**Existing**	**Proposed**	**Existing**	**Proposed**	**Proposed - Existing**
ZOI-1	EX-1	DA1b, DA2, DA3, DA4, DA5, DA6, DA8, DA9, DA10	32.6	49.7	17.0
ZOI-2	EX-2	DA1a	17.1	13.6	-3.5
ZOI-3	EX-3	DA26a	7.4	5.7	-1.7
ZOI-4	EX-4	DA26b	24.9	21.2	-3.7
ZOI-5	EX-5	DA24a, DA24b, DA24c, DA25a, DA25b, DA27	45.9	44.9	-1.0
ZOI-6	EX-6	DA28	15.3	14.5	-0.8
ZOI-7	EX-7	DA29	9.1	8.9	-0.3
ZOI-8	EX-8	DA30	6.8	6.7	-0.1
ZOI-9	EX-9	-	1.5	0.0	-1.5
ZOI-10	EX-10	DA19, DA20a	4.7	5.6	0.9
ZOI-11	EX-11	DA18	5.0	4.6	-0.4
ZOI-12	EX-12	DA11, DA12, DA13, DA14, DA15, DA17	26.0	20.4	-5.6
ZOI-13	EX-13	DA16	6.3	5.6	-0.7
ZOI-14	EX-14	-	5.6		-5.6
ZOI-15	EX-11, EX-15	DA18, DA22, DA32	36.2	30.3	-6.0
ZOI-16	EX-10, EX-11, EX-15, EX-16, EX-17	DA18, DA19, DA20, DA21, DA22, DA31, DA32	54.7	47.3	-7.4

Based on the comparison at each ZOI, there is a decrease in the 100-year peak discharge at every location except for at ZOI-1 and ZOI-10. Since ZOI-1 is located within the FEMA 100-year floodplain (Zone AE) of Lake Ray Roberts, this local increase will have no impact on the actual 100-year WSEL within Lake Ray Roberts. The slight increase 0.9-cfs at ZOI-10 should be contained within the proposed roadside ditch along the east side of Megaview Dr. and there is a decrease at the next design point downstream (ZOI-16), therefore, there is not an adverse impact to other properties.

The proposed increase in runoff will impact private property. This is not allowed (DCSRR IV.B). Please provide mitigation to reduce flows back to or less than existing or revise drainage to prevent increases onto private property.

Hydraulic Modeling

Kirkman Engineering provided KCE with the proposed grading plans for the Project site as well as the conceptual pad locations for each lot. KCE assumed that each lot would have a driveway at the middle of the conceptual pad location and created HEC-RAS models for all proposed ditches conveying 10-cfs or more. For any proposed driveways with a ditch that conveys less than 10-cfs, the minimum size driveway culvert should be 24". The proposed culvert at the end of Hillside Dr that outfalls towards the west should be a minimum of 2-24", the proposed culvert under Megaview Dr. should be 2-30", and the culvert under Sunrise Dr that outfalls to the east should be 3-24". If there is not enough cover for a standard culvert, traffic-rated culverts may be required.

The creek banks were set at the edge of road and the peak discharge was applied at the upstream side of each proposed driveway or culvert. The United States Army Corps of Engineers HEC-RAS (version 6.4.1) program was used to calculate the proposed conditions for the channel through Project site. **Table 6** below shows the ditch names, the design points that correspond to each flow change location in RAS, and the applied 100-year peak discharge. **Table 7** below shows the minimum culvert size for each lot based on the RAS models, and **Table 8** shows the RAS results for each ditch. Please refer to **Appendix C** for the profiles and cross-sections of each ditch, and **Appendix A – Figure 4** has the hydraulic key map.

Table 6 – Design Point/RAS Comparison

Reach	Junction	RAS XS	Peak Discharge (cfs)
			100-yr
HD-1	HD-R4	9+13	25.6
	HD1	7+88	48.2
	HD2	6+17	49.7
HD-L	HD-L1	15+93	6.8
	HD-L2	10+13	12.8
	HD-L3	7+07	19.3
	HD-L4	4+32	23.1
	HD-L5	2+37	24.1
SC-1	ZOI-15	3+83	30.3
	ZOI-16	3+07	47.3
SD-1	SD-R1	11+01	28.3
	SD-1	10+40	36.1
	ZOI-5	7+71	44.9
SD-L1	SD-L1	7+21	7.3
	SD-L2	2+39	8.4
	SD-L3	1+30	8.8
SD-R1	SD-R1	6+37	7.4
SD-R2	SD-R1	4+65	20.8

Table 7 – Minimum Culvert Sizes

Block	Lot	Minimum Culvert Size
A	1	24"
	2	24"
	3	24"
	4	24"
	5	2-24"
	6	24"
	7	24"
	8	24"
	9	2-24"
	10	2-24"
	11	3-24"
	12	3-24"
B	1	24"
	2	24"
	3	2-24"
	4	24"
C	1	24"
	2	24"
	3	24"
	4	24"
	5	24"
	6	24"
	7	24"

Table 8 – RAS Results

Reach	River Station	100-yr		
		Q (cfs)	WSEL (ft)	Velocity (fps)
HD-1	913	25.6	659.24	0.95
	909	25.6	659.18	1.89
	908	Culvert		
	788	48.2	656.42	6.78
	715	48.2	654.05	4.07
	617	49.7	652.54	4.68
	514	49.7	650.60	4.58
	408	49.7	648.70	4.49
	298	49.7	646.52	4.53
	200	49.7	644.74	3.98
HD-L	1593	6.8	715.72	3.13
	1507	6.8	713.69	3.14
	1417	6.8	711.69	3.15
	1327	6.8	709.73	3.09
	1240	6.8	707.70	3.17
	1165	6.8	705.75	3.10
	1089	6.8	703.73	3.07
	1027	6.8	702.34	2.40
	1013	12.8	702.34	1.47
	1010	Culvert		
	993	12.8	701.47	3.50
	975	12.8	700.85	3.62
	905	12.8	698.96	3.52
	844	12.8	695.93	3.60
	798	12.8	692.93	3.59
	753	12.8	689.98	3.62
	722	12.8	687.97	3.58
	707	19.3	687.52	2.06
	704	Culvert		
	687	19.3	685.77	3.94
	676	19.3	685.02	3.95
	647	19.3	683.16	3.89
	601	19.3	680.1	3.94
	556	19.3	677.20	3.84

Reach	River Station	100-yr		
		Q (cfs)	WSEL (ft)	Velocity (fps)
	505	19.3	674.24	3.75
	453	19.3	671.3	3.67
	432	23.1	670.3	2.37
	429	Culvert		
	414	23.1	668.97	4.08
	400	23.1	668.26	3.78
	365	23.1	666.32	3.82
	329	23.1	664.35	3.88
	294	23.1	662.99	2.38
	256	23.1	662.81	2.53
	237	24.1	662.75	2.32
	235	Culvert		
	219	24.1	662.06	3.67
	201	24.1	661.98	2.80
	180	24.1	661.72	3.51
	144	24.1	661.29	3.53
	109	24.1	660.77	3.80
	67	24.1	660.04	4.08
	56	24.1	659.31	4.16
	39	24.1	656.94	3.73
	23	24.1	656.42	0.54
SC-1	383	30.3	665.84	1.78
SC-1	374	30.3	665.59	2.01
SC-1	359	30.3	665.54	1.46
SC-1	355	Proposed Culvert		
SC-1	317	30.3	664.52	0.27
SC-1	312	30.3	664.52	0.42
SC-1	307	47.3	664.50	1.17
SC-1	287	Existing Culvert		
SC-1	254	47.3	662.99	1.82
SC-1	238	47.3	662.88	2.04
SC-1	189	47.3	661.99	2.35
SC-1	147	47.3	660.98	2.17
SD-1	1101	28.3	668.73	1.64
SD-1	1100	28.3	668.69	2.11

1-ft freeboard is required for culverts DCSRR IV.3

Reach	River Station	100-yr		
		Q (cfs)	WSEL (ft)	Velocity (fps)
	1099.5	Culvert		
	1040	36.1	667.49	5.24
	1022	36.1	665.88	4.08
	998	36.1	664.02	3.92
	972	36.1	661.97	4.01
	940	36.1	659.43	4.07
	908	36.1	656.96	4.06
	872	36.1	654.14	4.00
	824	36.1	652.40	3.70
	771	44.9	650.71	3.66
	730	44.9	649.70	3.39
	684	44.9	648.71	3.02
	650	44.9	648.32	3.80
SD-L	721	7.3	718.74	3.17
SD-L	665	7.3	717.04	2.96
SD-L	617	7.3	714.02	3.05
SD-L	575	7.3	709.89	3.16
SD-L	534	7.3	705.05	3.07
SD-L	493	7.3	699.97	3.23
SD-L	449	7.3	694.68	3.26
SD-L	427	7.3	692.13	3.25
SD-L	416	7.3	691.50	1.09
SD-L	413	Culvert		
SD-L	397	7.3	688.92	3.44
SD-L	374	7.3	686.36	3.26
SD-L	337	7.3	682.35	3.24
SD-L	298	7.3	679.58	3.20
SD-L	271	7.3	677.97	3.00
SD-L	249	7.3	676.73	1.39
SD-L	239	8.4	676.74	0.87
SD-L	237	Culvert		
SD-L	221	8.4	674.62	3.81
SD-L	192	8.4	673.01	3.08
SD-L	165	8.4	672.02	3.02
SD-L	142	8.4	671.13	2.94
SD-L	130	8.8	671.13	0.93

> 1-ft freeboard is required for culverts DCSRR IV.3

Reach	River Station	100-yr Q (cfs)	100-yr WSEL (ft)	100-yr Velocity (fps)
	128	Culvert		
	113	8.8	669.84	3.44
	92	8.8	669.17	3.00
	39	8.8	668.01	2.92
SD-R1	637	7.4	717.78	3.14
SD-R1	580	7.4	714.77	3.22
SD-R1	526	7.4	710.92	3.09
SD-R1	472	7.4	705.73	3.23
SD-R1	423	7.4	700.93	3.21
SD-R1	370	7.4	695.74	3.23
SD-R1	321	7.4	690.66	3.25
SD-R1	266	7.4	684.73	3.26
SD-R1	224	7.4	679.76	3.25
SD-R1	183	7.4	675.03	3.09
SD-R1	151	7.4	672.01	3.08
SD-R1	121	7.4	669.94	3.01
SD-R1	93	7.4	668.85	3.07
SD-R1	55	7.4	668.63	0.72
SD-R1	42	7.4	668.62	0.86
SD-R1	40	Culvert		
SD-R1	25	7.4	667.59	2.65
SD-R1	22	7.4	667.60	1.84
SD-R1	16	7.4	667.57	1.87
SD-R2	465	20.8	696.97	4.02
SD-R2	414	20.8	695.30	3.88
SD-R2	399	20.8	694.83	2.02
SD-R2	391	20.8	694.84	1.27
SD-R2	387	Culvert		
SD-R2	367	20.8	692.46	3.94
SD-R2	351	20.8	691.24	3.95
SD-R2	305	20.8	687.00	4.03
SD-R2	257	20.8	681.92	4.02
SD-R2	206	20.8	677.24	3.94
SD-R2	149	20.8	673.06	3.97
SD-R2	99	20.8	669.91	4.01

Reach	River Station	100-yr		
		Q (cfs)	WSEL (ft)	Velocity (fps)
	49	20.8	668.49	2.40

Conclusions

Kirkman Engineering and KCE coordinated on the drainage design for this proposed large-lot residential development. Based on the comparison of existing to proposed peak discharges at each location where stormwater runoff leaves the Project site, there are decreases to all locations except for ZOI-1 which is located at the FEMA Zone AE floodplain of Lake Ray Roberts and ZOI-10 where the peak discharge will be contained within the proposed roadside ditch. KCE has modeled all proposed ditches that convey more than 10-cfs in HEC-RAS to determine the required culvert sizes for the future driveways and this information is provided in **Table 7**. As each lot develops it will provide a detailed lot grading plan with the major divides the same as the ones used in this drainage report.

If you have any questions or comments, please feel free to call.

Sincerely,

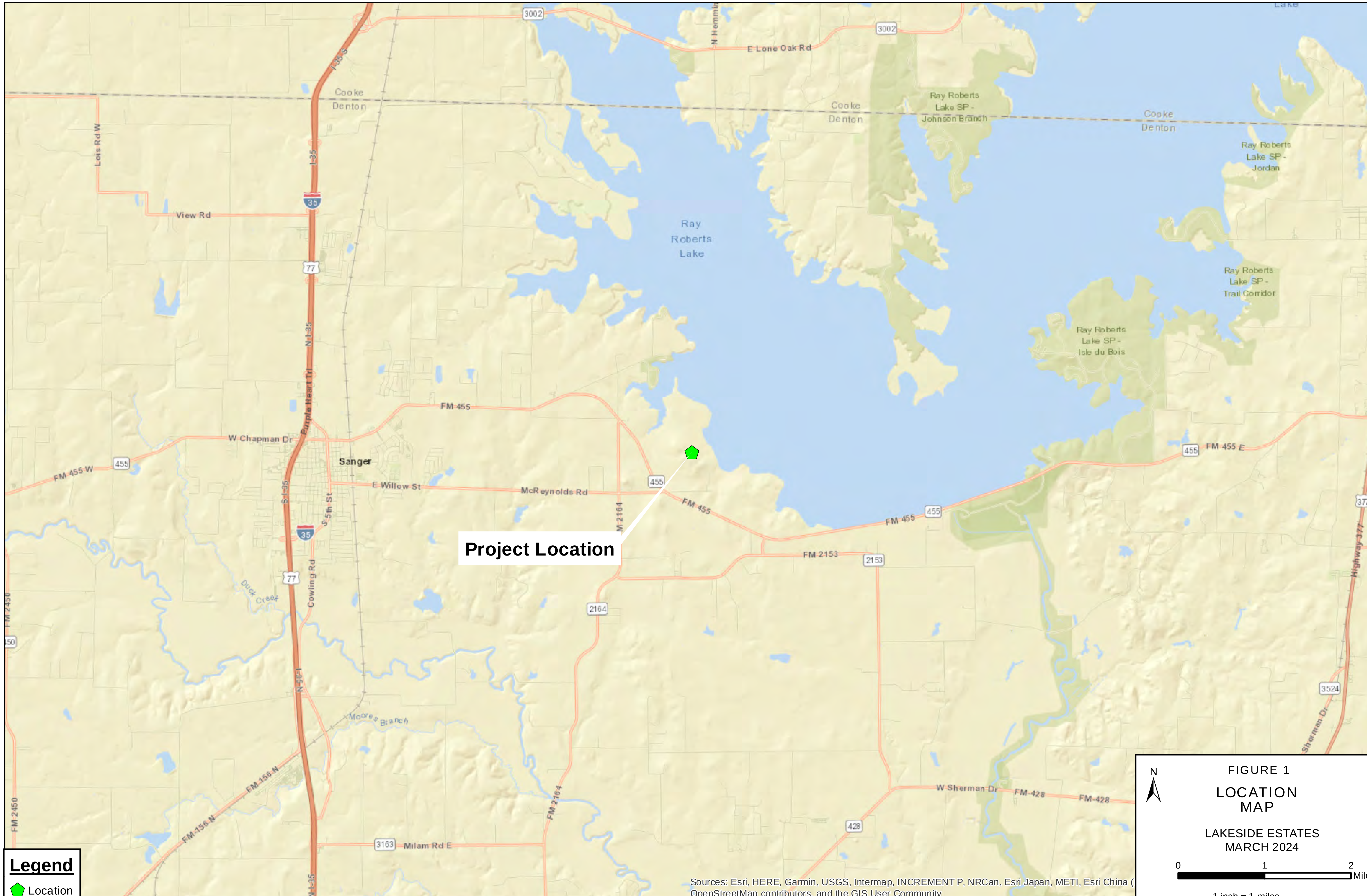
KCE Engineering, LLC

a Texas limited liability corporation
TBPE Reg. No. F-16940

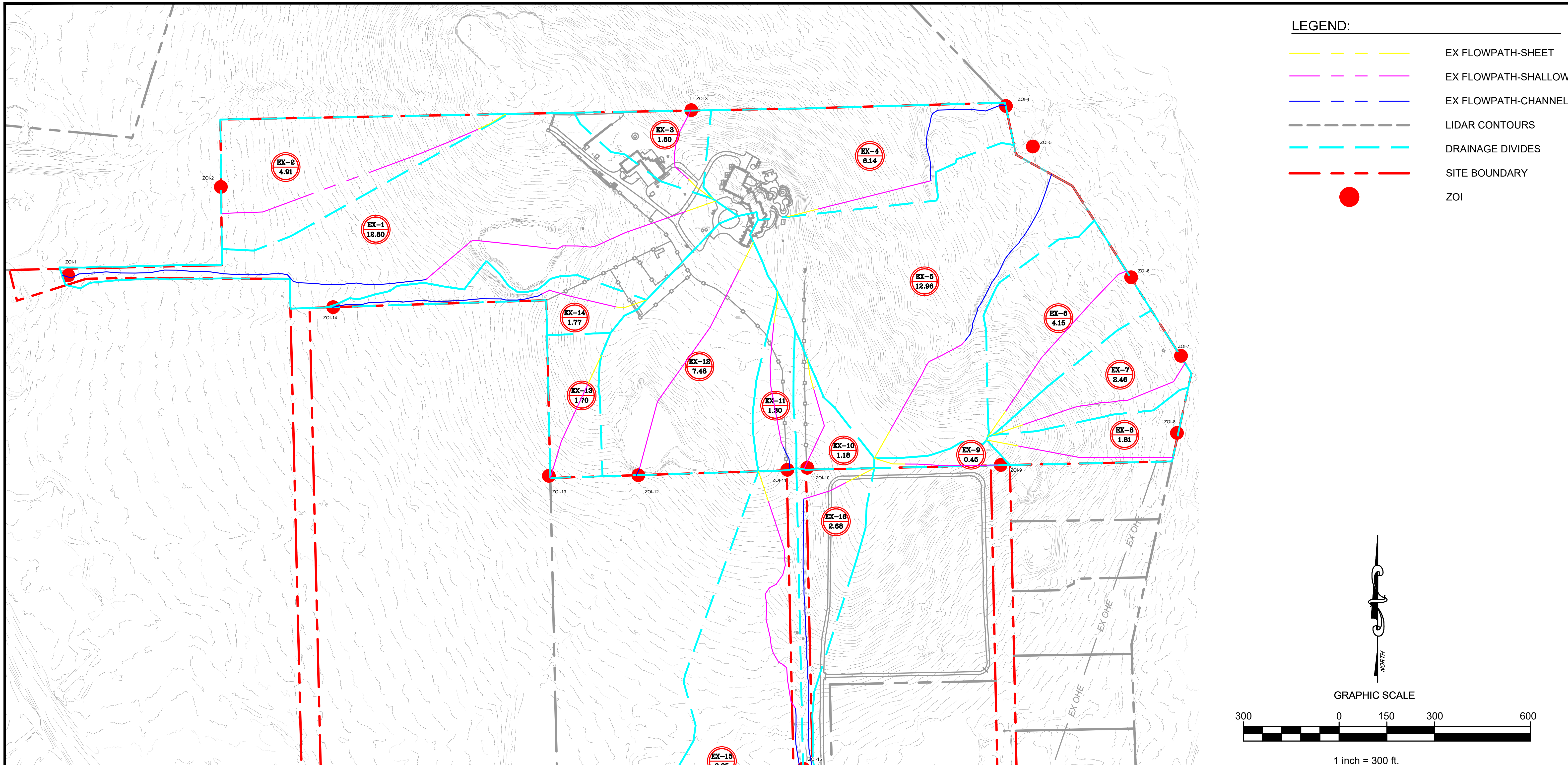
Kamaron Erbatur, P.E., M.Eng., CFM
Principal

Appendices

Appendix A – Exhibits



Ray Roberts Lake
Cooke
Denton
Ray Roberts Lake SP - Johnson Branch
Ray Roberts Lake SP - Jordan
Ray Roberts Lake SP - Trail Corridor
Ray Roberts Lake SP - Isle du Bois
Sanger
Project Location
FM 455
W Chapman Dr
E Willow St
McReynolds Rd
FM 2153
E Lone Oak Rd
View Rd
Milam Rd E
W Sherman Dr
FM 428
Legend
Location
FIGURE 1
LOCATION MAP
LAKESIDE ESTATES
MARCH 2024
0 1 2 Miles
1 inch = 1 miles
Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (
OpenStreetMap contributors, and the GIS User Community

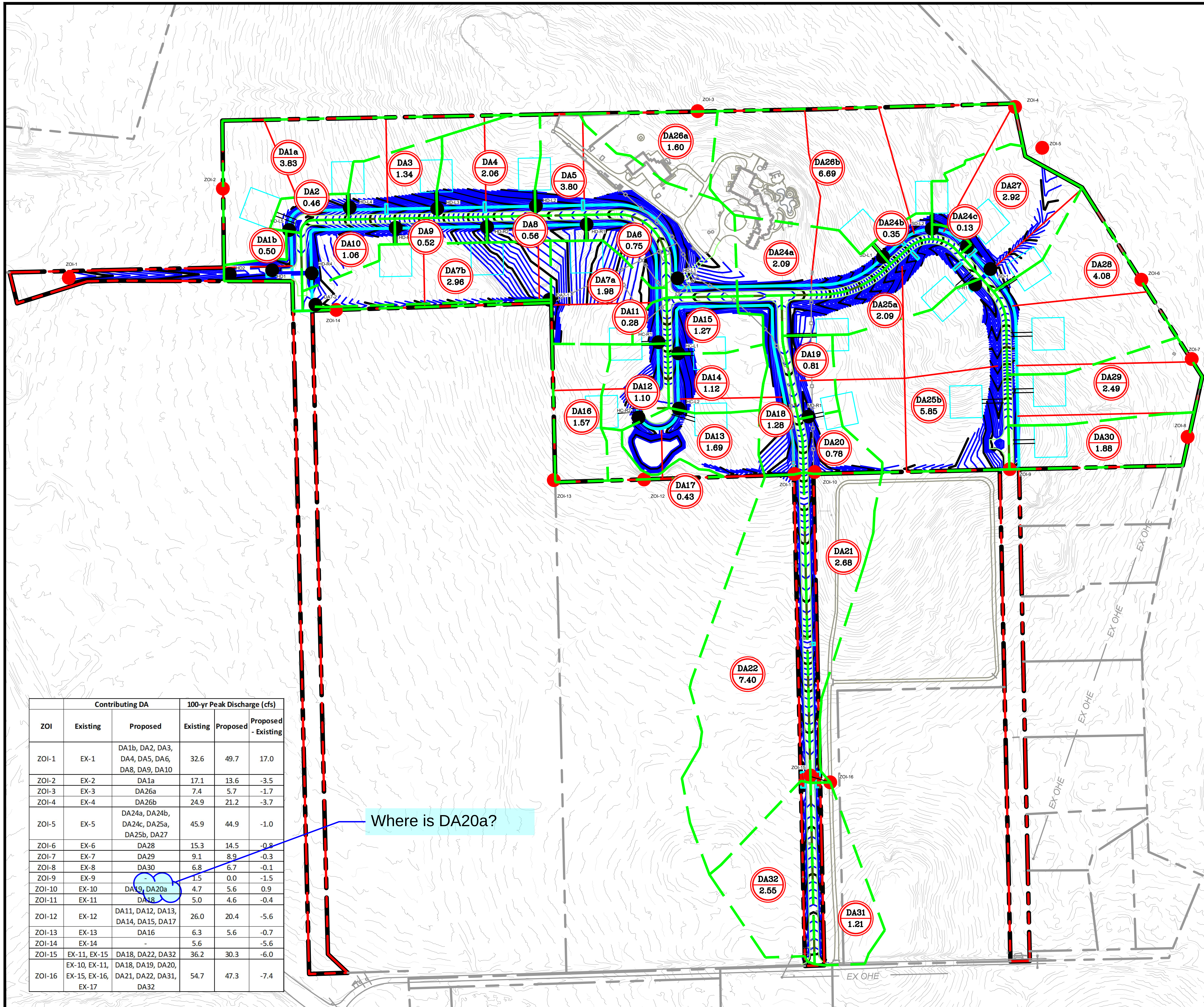


Existing Hydrologic Calculations

DA Designation	Acres	Single-Family	Pavement	Open Space	Weighted C-Factor	T_c	I_2	Q_2	I_5	Q_5	I_{10}	Q_{10}	I_{25}	Q_{25}	I_{100}	Q_{100}
		0.45	0.90	0.35		(min)	(in/hr)	(cfs)	(in/hr)	(cfs)	(in/hr)	(cfs)	(in/hr)	(cfs)	(in/hr)	(cfs)
EX-1	12.80	5%	0%	95%	0.36	18.7	3.47	15.79	4.36	19.81	4.95	22.51	5.79	26.29	7.18	32.62
EX-2	4.91	0%	0%	100%	0.35	7.9	5.17	8.89	6.26	10.75	7.06	12.13	8.19	14.08	9.97	17.13
EX-3	1.60	100%	0%	0%	0.45	7.0	5.41	3.89	6.50	4.68	7.33	5.28	8.50	6.12	10.32	7.43
EX-4	6.14	25%	0%	75%	0.38	5.9	5.73	13.18	6.84	15.75	7.71	17.74	8.93	20.55	10.80	24.86
EX-5	12.96	0%	0%	100%	0.35	7.5	5.27	23.93	6.36	28.86	7.18	32.56	8.33	37.77	10.12	45.91
EX-6	4.15	0%	0%	100%	0.35	6.5	5.55	8.06	6.65	9.66	7.50	10.89	8.69	12.62	10.53	15.30
EX-7	2.46	0%	0%	100%	0.35	6.3	5.61	4.83	6.71	5.78	7.57	6.51	8.77	7.55	10.62	9.14
EX-8	1.81	0%	0%	100%	0.35	6.0	5.70	3.61	6.81	4.31	7.67	4.86	8.89	5.63	10.75	6.81
EX-9	0.45	0%	0%	100%	0.35	8.9	4.94	0.78	6.00	0.95	6.78	1.07	7.87	1.24	9.60	1.51
EX-10	1.18	0%	10%	90%	0.41	8.2	5.10	2.44	6.18	2.95	6.97	3.33	8.09	3.87	9.85	4.71
EX-11	1.30	0%	10%	90%	0.41	9.4	4.83	2.54	5.88	3.10	6.65	3.50	7.72	4.07	9.43	4.97
EX-12	7.48	0%	10%	90%	0.41	12.2	4.31	13.06	5.31	16.09	6.01	18.21	7.00	21.19	8.60	26.04
EX-13	1.70	0%	0%	100%	0.35	6.5	5.55	3.30	6.65	3.96	7.50	4.46	8.69	5.17	10.53	6.27
EX-14	1.77	0%	0%	100%	0.35	10.5	4.61	2.86	5.64	3.50	6.38	3.95	7.42	4.60	9.08	5.63
EX-15	9.95	0%	5%	95%	0.38	9.8	4.75	17.83	5.79	21.76	6.55	24.60	7.61	28.58	9.30	34.94
EX-16	2.68	0%	5%	95%	0.38	8.5	5.03	5.09	6.10	6.17	6.89	6.97	8.00	8.09	9.75	9.86
EX-17	1.94	0%	5%	95%	0.38	7.2	5.35	3.92	6.45	4.72	7.27	5.32	8.43	6.18	10.24	7.50

FIGURE 2 - EXISTING DRAINAGE AREA MAP

LAKESIDE ESTATES
MARCH 2024



	Contributing DA		100-yr Peak Discharge (cfs)		
ZOI	Existing	Proposed	Existing	Proposed	Proposed - Existing
ZOI-1	EX-1	DA1b, DA2, DA3, DA4, DA5, DA6, DA8, DA9, DA10	32.6	49.7	17.0
ZOI-2	EX-2	DA1a	17.1	13.6	-3.5
ZOI-3	EX-3	DA26a	7.4	5.7	-1.7
ZOI-4	EX-4	DA26b	24.9	21.2	-3.7
ZOI-5	EX-5	DA24a, DA24b, DA24c, DA25a, DA25b, DA27	45.9	44.9	-1.0
ZOI-6	EX-6	DA28	15.3	14.5	-0.8
ZOI-7	EX-7	DA29	9.1	8.9	-0.3
ZOI-8	EX-8	DA30	6.8	6.7	-0.1
ZOI-9	EX-9	-	1.5	0.0	-1.5
ZOI-10	EX-10	DA19, DA20a	4.7	5.6	0.9
ZOI-11	EX-11	DA18	5.0	4.6	-0.4
ZOI-12	EX-12	DA11, DA12, DA13, DA14, DA15, DA17	26.0	20.4	-5.6
ZOI-13	EX-13	DA16	6.3	5.6	-0.7
ZOI-14	EX-14	-	5.6		-5.6
ZOI-15	EX-11, EX-15	DA18, DA22, DA32	36.2	30.3	-6.0
ZOI-16	EX-10, EX-11, EX-15, EX-16, EX-17	DA18, DA19, DA20, DA21, DA22, DA31, DA32	54.7	47.3	-7.4

FIGURE 3 - PROPOSED DRAINAGE AREA MAP

LAKESIDE ESTATES
MARCH 2024

FIGURE

4

PREPARED BY: OCE **CHECKED BY:** KME

DATE: March 2024 **PROJECT #:** 550

LAKESIDE ESTATES
HYDRAULIC KEY MAP

Reg. #: F-16940

Appendix B – Hydrologic Calculations

Lag Time Calculations

Existing Time of Concentration

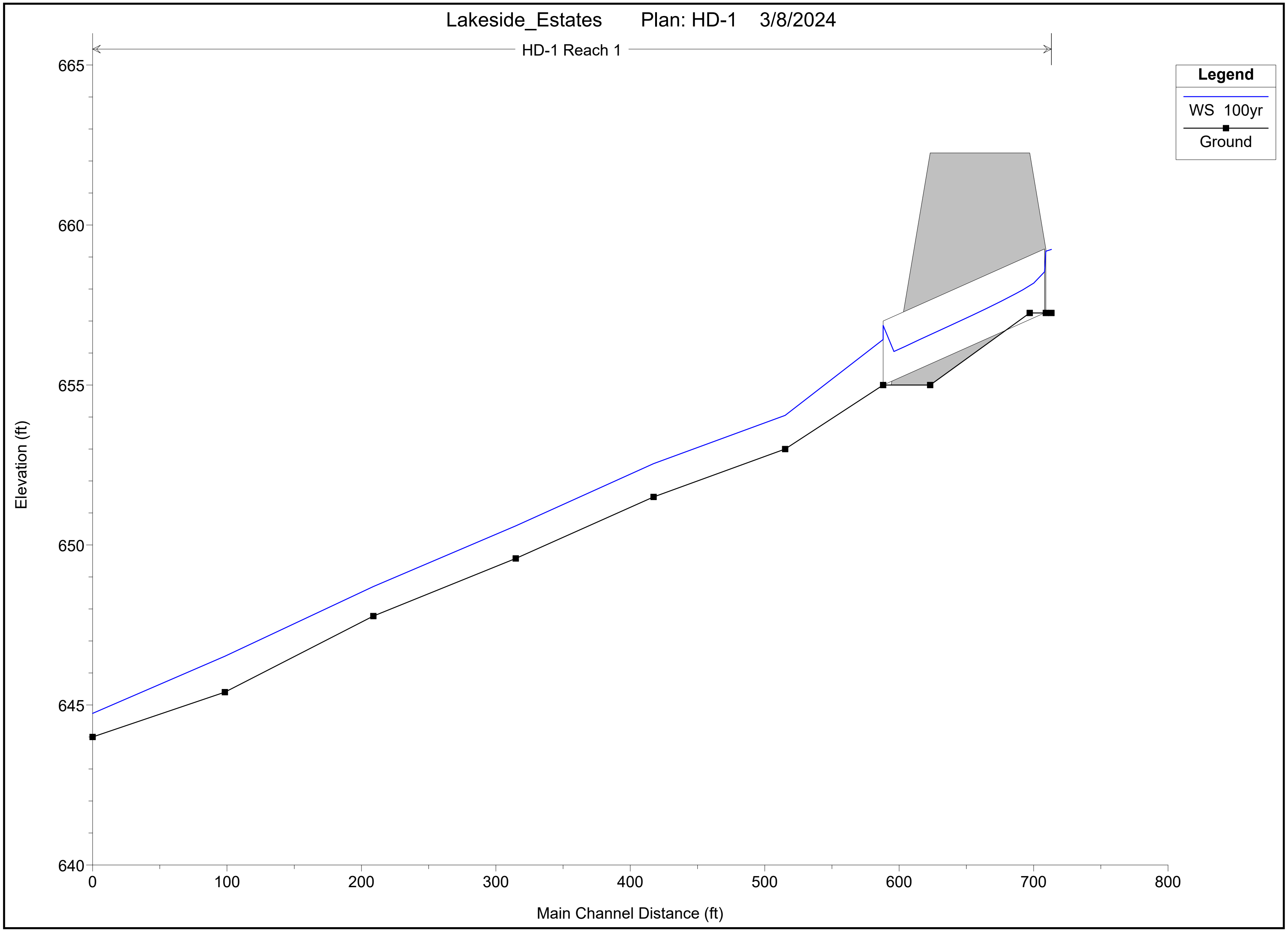
TRAVEL TIME CALCULATIONS

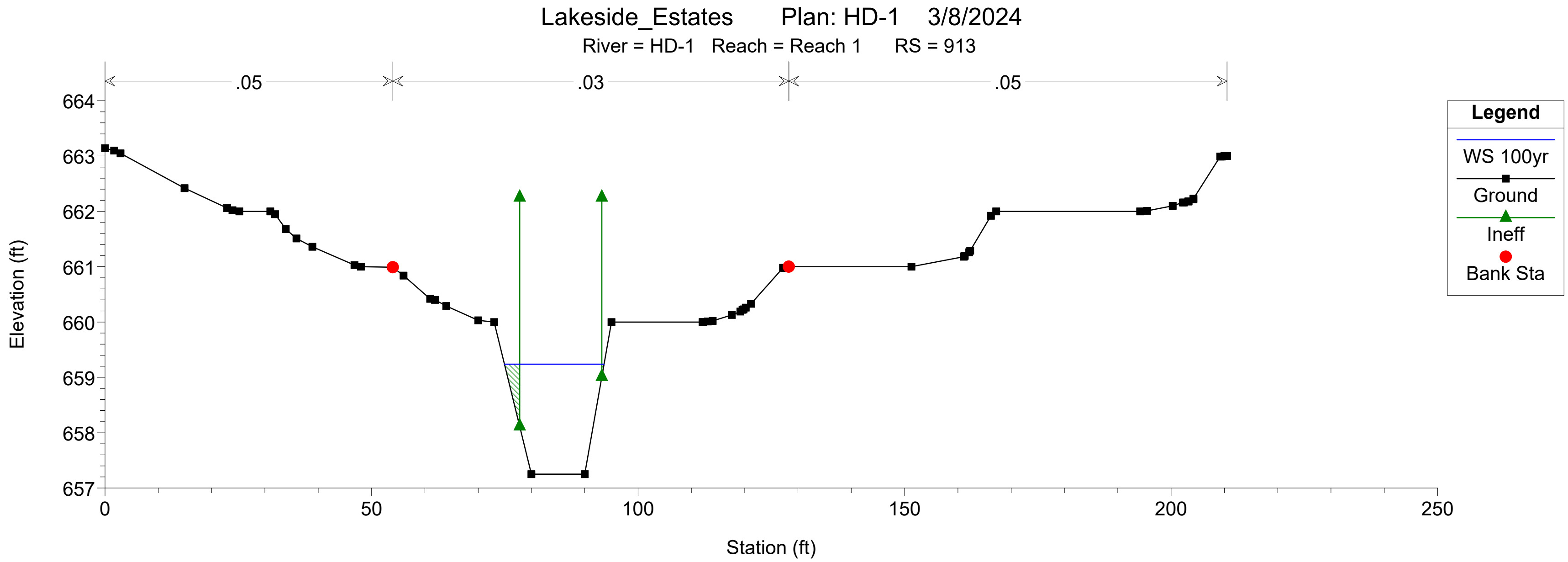
Basin Data		Overland Flow					Shallow Concentrated Flow					Channel/Street Flow								
Basin Name	**Calculated Longest Flowpath (ft) (1)**	**Length (ft) (2)**	**Slope (ft/ft) (3)**	**Surface Type (4)**	**Manning's n (5)**	**T_O (min) (6)**	**Length (ft) (7)**	**Slope (ft/ft) (8)**	**Surface Type (9)**	**K (10)**	**T_S (min) (11)**	**Length (ft) (12)**	**Slope (ft/ft) (13)**	**Manning's n (14)**	**X-Section Type**	**Area (ft^2) (15)**	**WP (ft) (16)**	**Channel Velocity (f/s) (17)**	**T_H (min) (19)**	**Time of Conc. Calc. (min) (20)**
EX-1	1682	100	0.048	Grass	0.150	6.11	425	0.102	unpaved	16.1	1.37	1157	0.025	0.050	Ditch	33.00	35.00	4.30	4.48	
							264	0.004	unpaved	16.1	4.31									
							196	0.007	unpaved	16.1	2.42									
					Total T_O (min)=	**6.11**				**Total T_S (min)=**	**8.11**							**Total T_H (min)=**	**4.48**	**18.7**
EX-2	950	100	0.100	Grass	0.150	4.55	850	0.070	unpaved	16.1	3.32							4.00	0.00	
					Total T_O (min)=	**4.55**				**Total T_S (min)=**	**3.32**							**Total T_H (min)=**	**0.00**	**7.9**
EX-3	343	100	0.045	Grass	0.150	6.27	243	0.110	unpaved	16.1	0.76							4.00	0.00	
					Total T_O (min)=	**6.27**				**Total T_S (min)=**	**0.76**							**Total T_H (min)=**	**0.00**	**7.0**
EX-4	915	100	0.155	Grass	0.150	3.82	364	0.100	unpaved	16.1	1.19	451	0.056	0.050	Ditch	34.00	26.00	8.30	0.91	
					Total T_O (min)=	**3.82**				**Total T_S (min)=**	**1.19**							**Total T_H (min)=**	**0.91**	**5.9**
EX-5	1075	100	0.097	Grass	0.150	4.61	380	0.070	unpaved	16.1	1.48	595	0.035	0.050	Ditch	30.00	22.00	6.90	1.44	
					Total T_O (min)=	**4.61**				**Total T_S (min)=**	**1.48**							**Total T_H (min)=**	**1.44**	**7.5**
EX-6	683	100	0.118	Grass	0.150	4.26	583	0.074	unpaved	16.1	2.21							8.00	0.00	
					Total T_O (min)=	**4.26**				**Total T_S (min)=**	**2.21**							**Total T_H (min)=**	**0.00**	**6.5**
EX-7	662	100	0.123	Grass	0.150	4.19	562	0.076	unpaved	16.1	2.11							8.00	0.00	
					Total T_O (min)=	**4.19**				**Total T_S (min)=**	**2.11**							**Total T_H (min)=**	**0.00**	**6.3**
EX-8	592	100	0.117	Grass	0.150	4.28	492	0.087	unpaved	16.1	1.72							4.00	0.00	
											0.00									
					Total T_O (min)=	**4.28**				**Total T_S (min)=**	**1.72**							**Total T_H (min)=**	**0.00**	**6.0**
EX-9	390	100	0.028	Grass	0.150	7.58	290	0.050	unpaved	16.1	1.34							8.00	0.00	
					Total T_O (min)=	**7.58**				**Total T_S (min)=**	**1.34**							**Total T_H (min)=**	**0.00**	**8.9**
EX-10	368	100	0.032	Grass	0.150	7.18	268	0.070	unpaved	16.1	1.05							5.00	0.00	
					Total T_O (min)=	**7.18**				**Total T_S (min)=**	**1.05**							**Total T_H (min)=**	**0.00**	**8.2**
EX-11	569	100	0.030	Grass	0.150	7.37	395	0.049	unpaved	16.1	1.84	74	0.054	0.050	Ditch	8.00	12.25	5.20	0.24	
					Total T_O (min)=	**7.37**				**Total T_S (min)=**	**1.84**							**Total T_H (min)=**	**0.24**	**9.4**
EX-12	826	100	0.032	Grass	0.150	7.18	485	0.080	unpaved	16.1	1.77	22	0.360	0.050	Ditch	15.00	19.25	15.00	0.02	
							219	0.005	unpaved	16.1	3.20									
					Total T_O (min)=	**7.18**				**Total T_S (min)=**	**4.97**							**Total T_H (min)=**	**0.02**	**12.2**
EX-13	420	100	0.070	Grass	0.150	5.25	320	0.075	unpaved	16.1	1.21							8.00	0.00	
					Total T_O (min)=	**5.25**				**Total T_S (min)=**	**1.21**							**Total T_H (min)=**	**0.00**	**6.5**
EX-14	1003	100	0.025	Grass	0.150	7.93	240	0.080	unpaved	16.1	0.88	663	0.080	0.050	Ditch	20.00	18.50	6.40	1.73	
					Total T_O (min)=	**7.93**				**Total T_S (min)=**	**0.88**							**Total T_H (min)=**	**1.73**	**10.5**

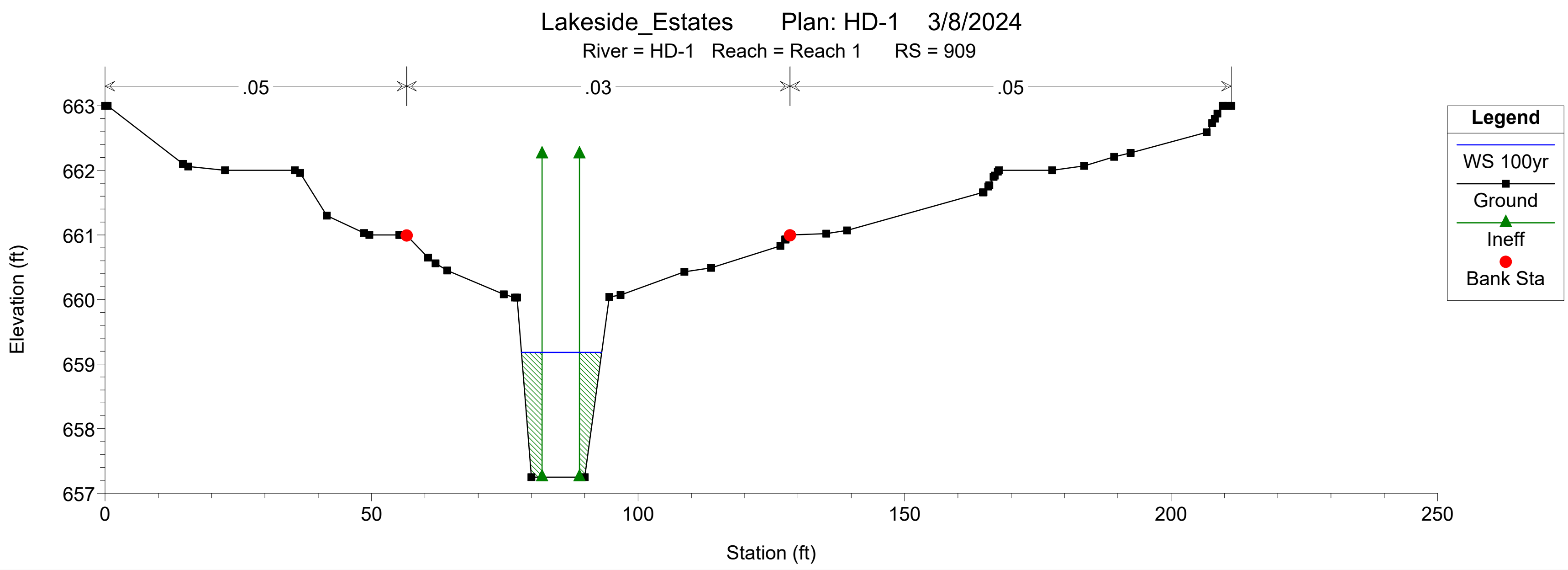
Existing Time of Concentration																				
TRAVEL TIME CALCULATIONS																				
Basin Data		**Overland Flow**					**Shallow Concentrated Flow**					**Channel/Street Flow**								
Basin Name	**Calculated Longest Flowpath (ft) (1)**	**Length (ft) (2)**	**Slope (ft/ft) (3)**	**Surface Type (4)**	**Manning's n (5)**	**T_O (min) (6)**	**Length (ft) (7)**	**Slope (ft/ft) (8)**	**Surface Type (9)**	**K (10)**	**T_S (min) (11)**	**Length (ft) (12)**	**Slope (ft/ft) (13)**	**Manning's n (14)**	**X-Section Type**	**Area (ft^2) (15)**	**WP (ft) (16)**	**Channel Velocity (f/s) (17)**	**T_H (min) (19)**	**Time of Conc. Calc. (min) (20)**
EX-15	997	100	0.079	Grass	0.150	5.00	709	0.038	unpaved	16.1	3.76	188	0.027	0.050	Ditch	15.00	19.25	3.00	1.04	
					Total T_O (min)=	**5.00**				**Total T_S (min)=**	**3.76**							**Total T_H (min)=**	**1.04**	**9.8**
EX-16	1121	100	0.070	Grass	0.150	5.25	142	0.070	unpaved	16.1	0.55	879	0.040	0.050	Ditch	23.00	20.00	5.40	2.71	
					Total T_O (min)=	**5.25**				**Total T_S (min)=**	**0.55**							**Total T_H (min)=**	**2.71**	**8.5**
EX-14	589	100	0.064	Grass	0.150	5.44	134	0.064	unpaved	16.1	0.55	355	0.032	0.050	Ditch	23.00	20.00	4.90	1.21	
					Total T_O (min)=	**5.44**				**Total T_S (min)=**	**0.55**							**Total T_H (min)=**	**1.21**	**7.2**

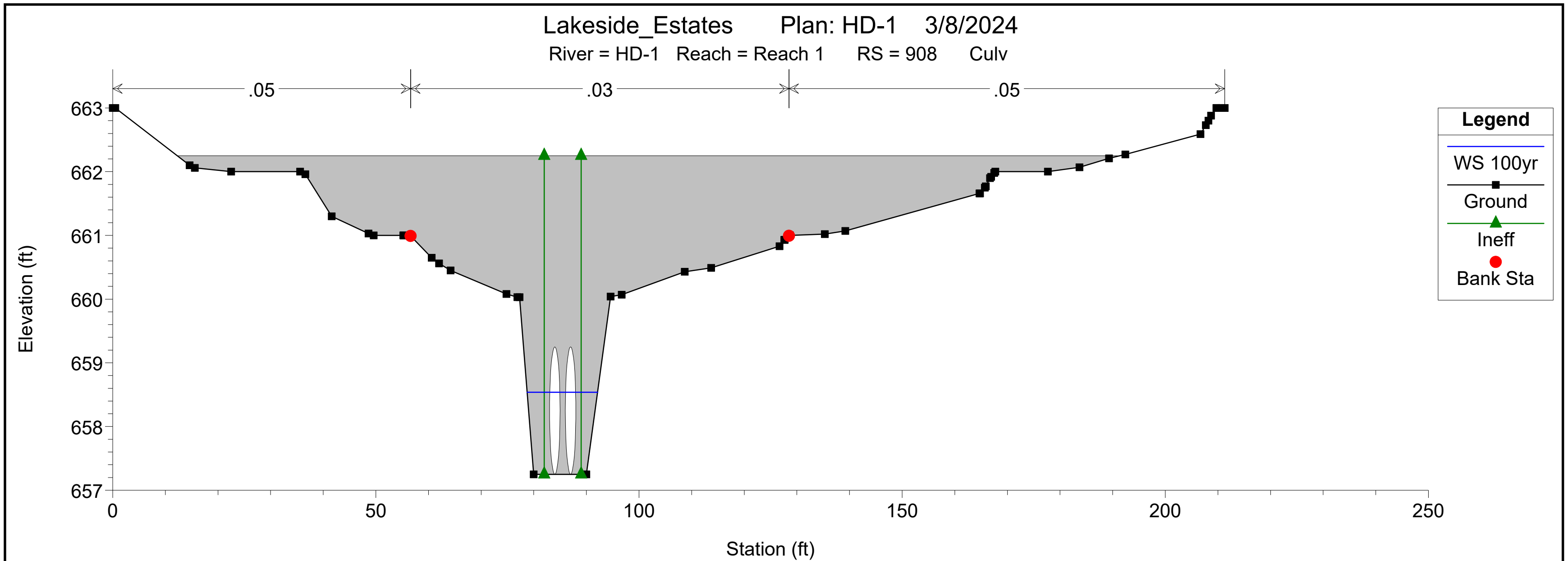
Appendix C – Hydraulic Data

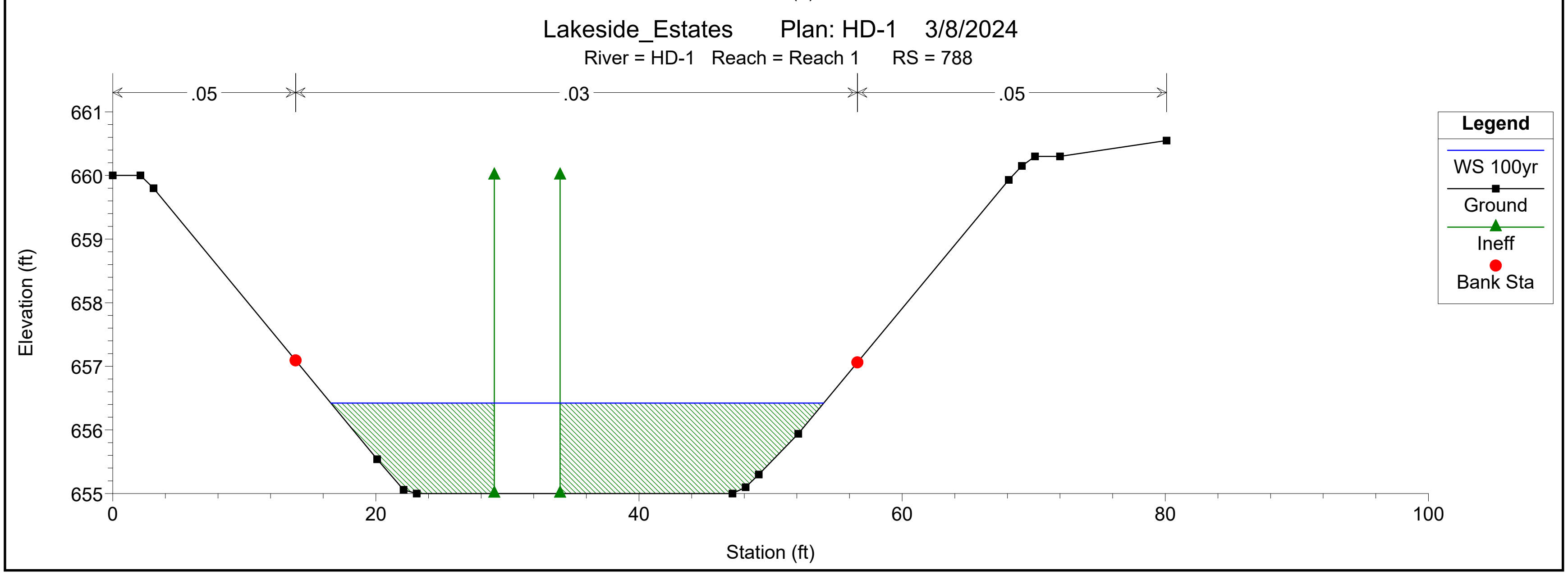
HD-1

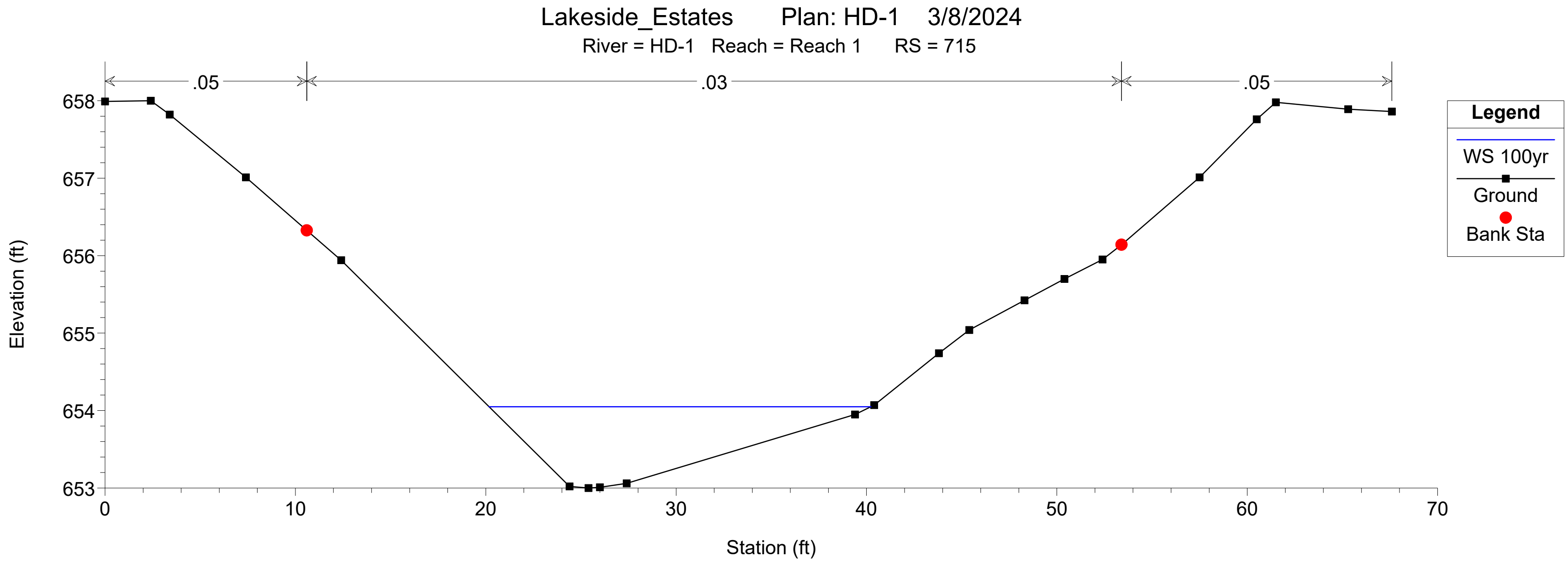

Lakeside_Estates Plan: HD-1 3/8/2024
HD-1 Reach 1
Legend
WS 100yr
Ground
Elevation (ft)
665
660
655
650
645
640
0
100
200
300
400
500
600
700
800
Main Channel Distance (ft)

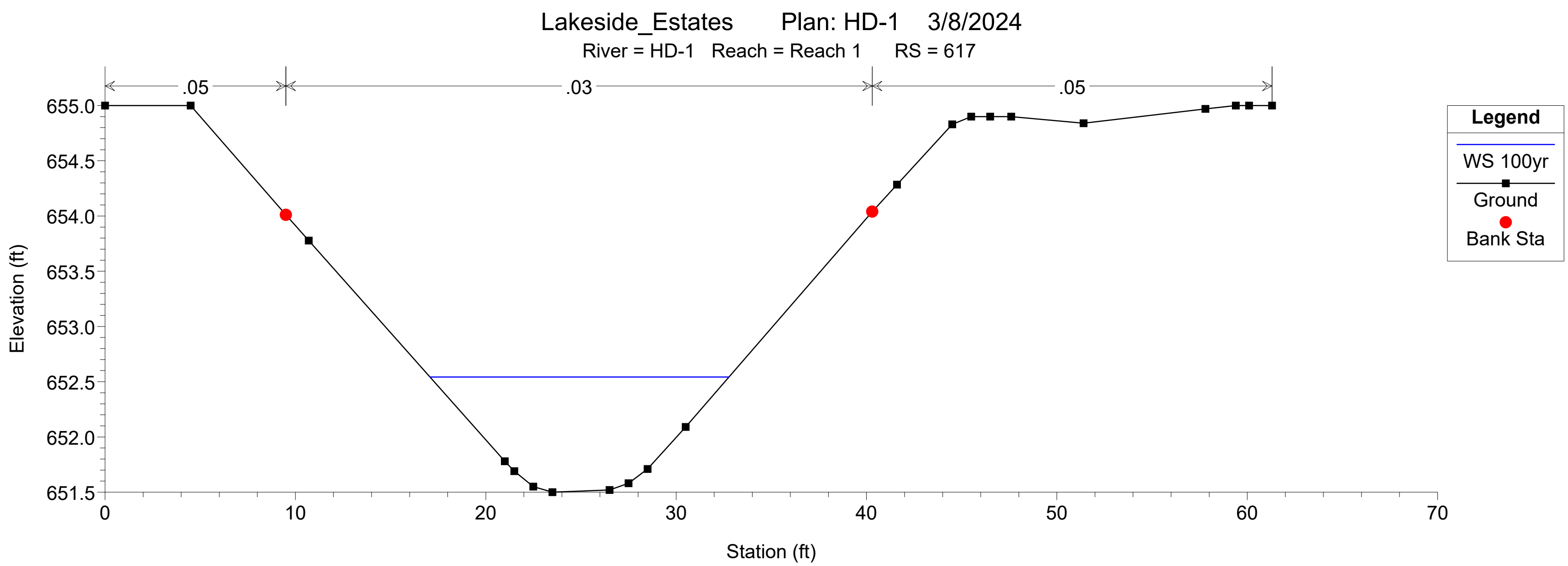

Lakeside_Estates Plan: HD-1 3/8/2024
River = HD-1 Reach = Reach 1 RS = 913
.05
.03
.05
Elevation (ft)
Station (ft)
Legend
WS 100yr
Ground
Ineff
Bank Sta

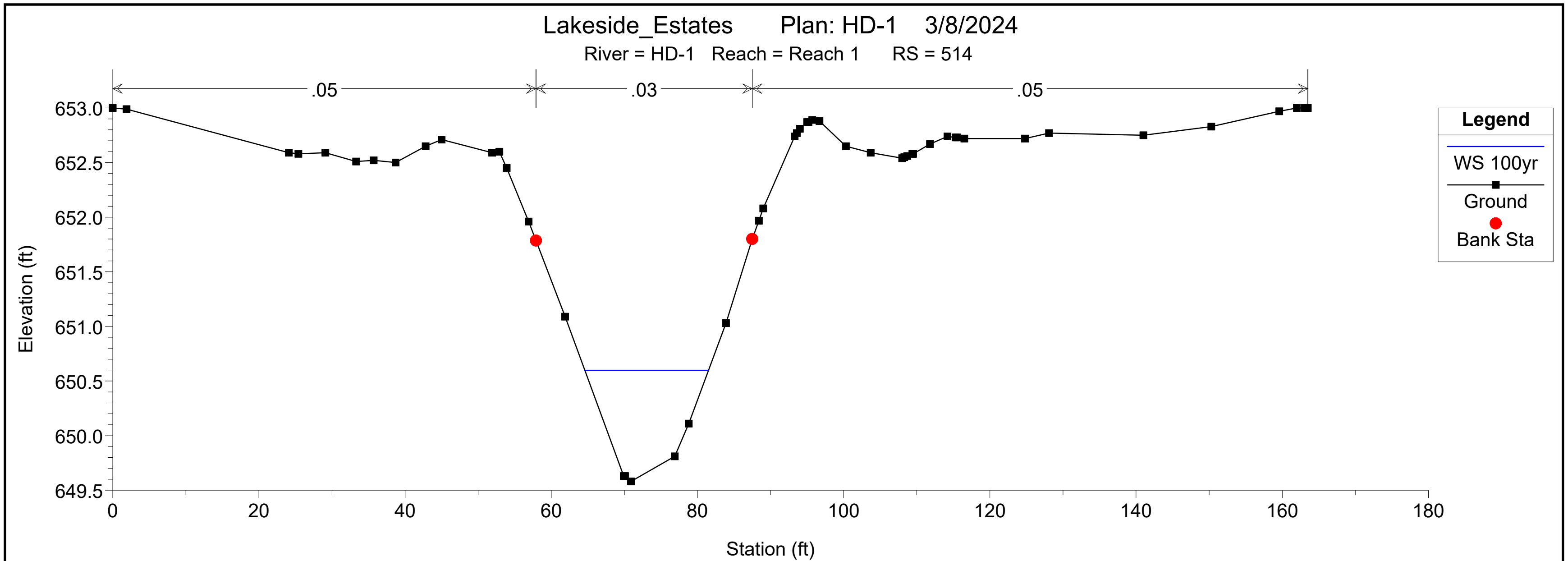

Lakeside_Estates Plan: HD-1 3/8/2024
River = HD-1 Reach = Reach 1 RS = 909
.05
.03
.05
Elevation (ft)
Station (ft)
Legend
WS 100yr
Ground
Ineff
Bank Sta


Lakeside_Estates Plan: HD-1 3/8/2024
River = HD-1 Reach = Reach 1 RS = 908 Culv
.05
.03
.05
Elevation (ft)
663
662
661
660
659
658
657
0
50
100
150
200
250
Station (ft)
Legend
WS 100yr
Ground
Ineff
Bank Sta

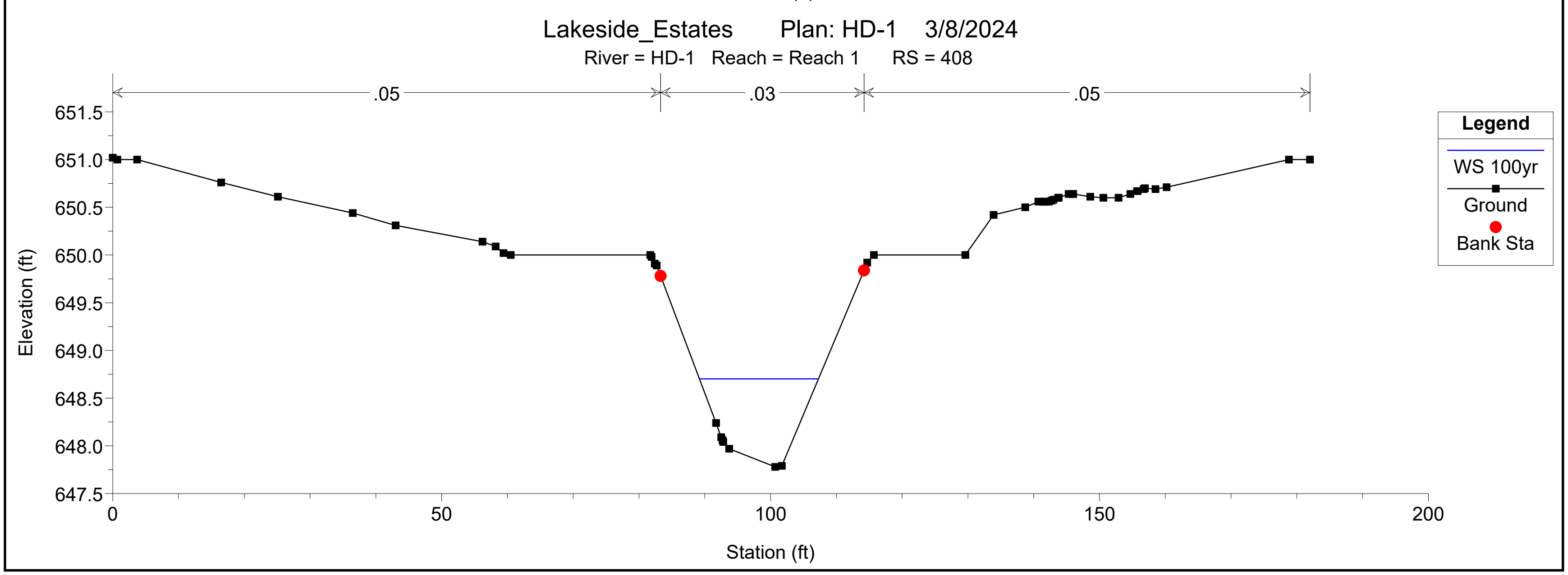

Lakeside_Estates Plan: HD-1 3/8/2024
River = HD-1 Reach = Reach 1 RS = 788
.05
.03
.05
Elevation (ft)
661
660
659
658
657
656
655
0
20
40
60
80
100
Station (ft)
Legend
WS 100yr
Ground
Ineff
Bank Sta


Lakeside_Estates Plan: HD-1 3/8/2024
River = HD-1 Reach = Reach 1 RS = 715
.05
.03
.05
Elevation (ft)
Station (ft)
Legend
WS 100yr
Ground
Bank Sta

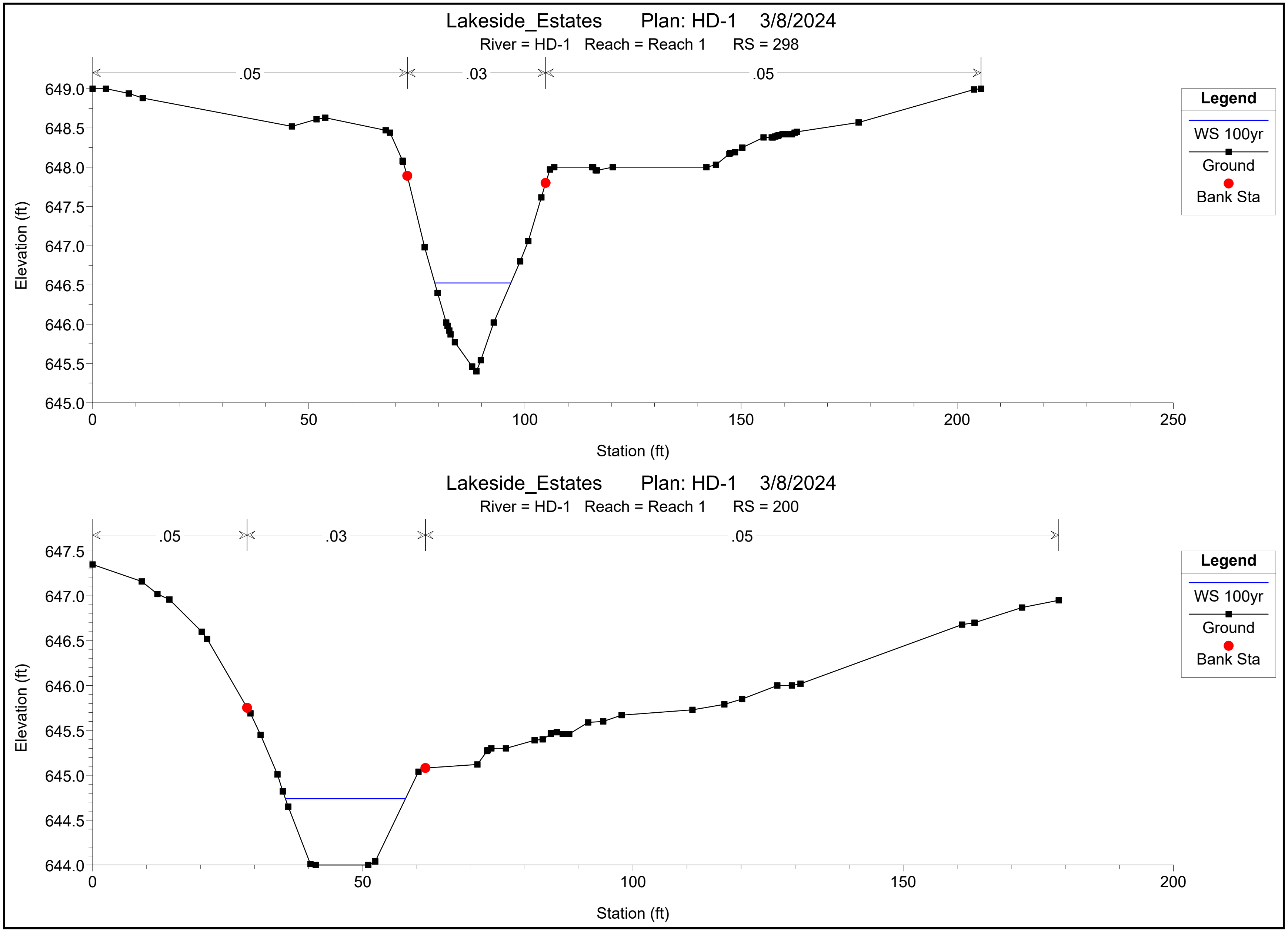

Lakeside_Estates Plan: HD-1 3/8/2024
River = HD-1 Reach = Reach 1 RS = 617
.05
.03
.05
Elevation (ft)
Station (ft)
Legend
WS 100yr
Ground
Bank Sta



Lakeside_Estates Plan: HD-1 3/8/2024
River = HD-1 Reach = Reach 1 RS = 514
.05
.03
.05
Legend
WS 100yr
Ground
Bank Sta
Elevation (ft)
653.0
652.5
652.0
651.5
651.0
650.5
650.0
649.5
0
20
40
60
80
100
120
140
160
180
Station (ft)

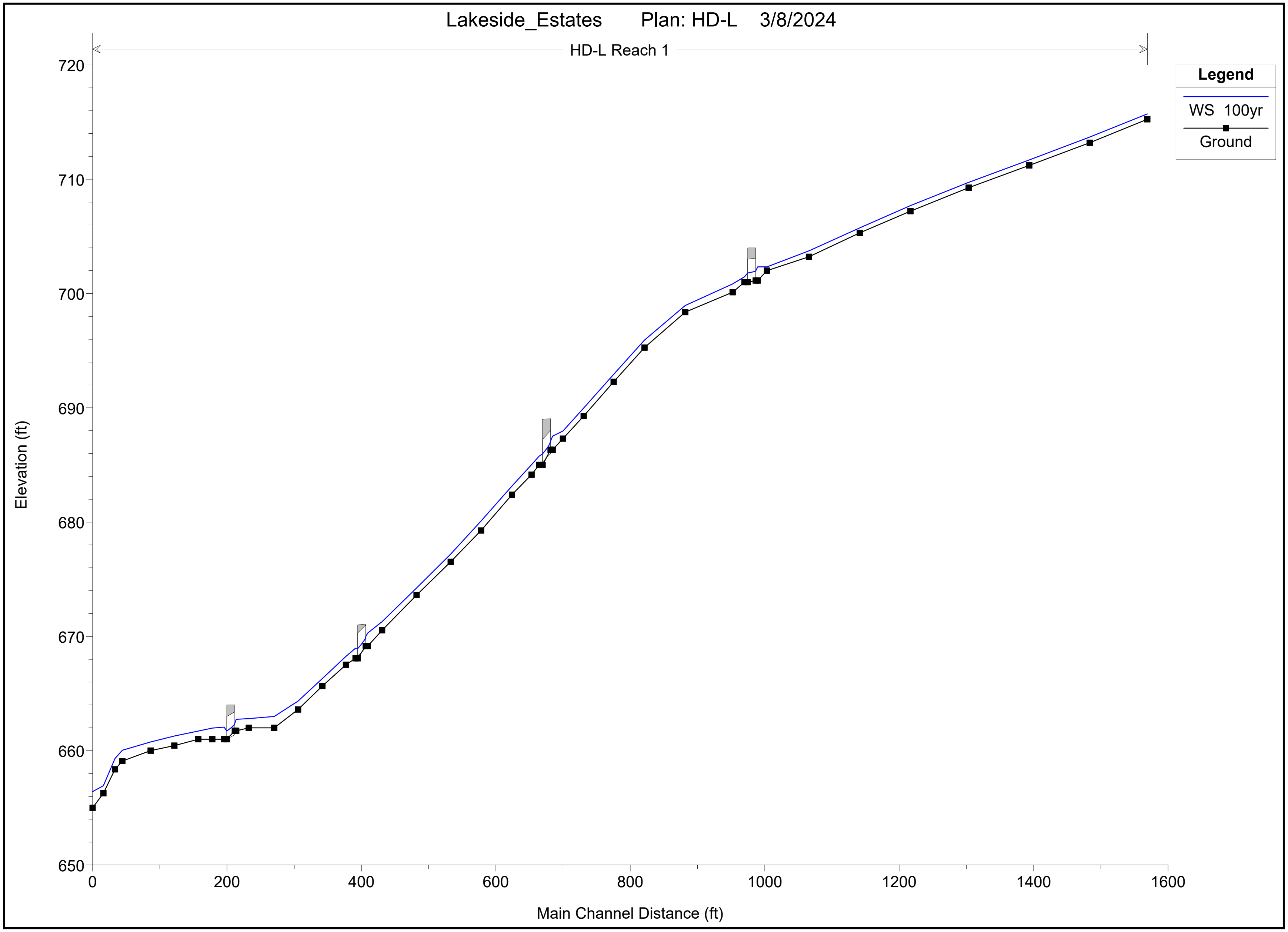


Lakeside_Estates Plan: HD-1 3/8/2024
River = HD-1 Reach = Reach 1 RS = 408
.05
.03
.05
Legend
WS 100yr
Ground
Bank Sta
Elevation (ft)
651.5
651.0
650.5
650.0
649.5
649.0
648.5
648.0
647.5
0
50
100
150
200
Station (ft)

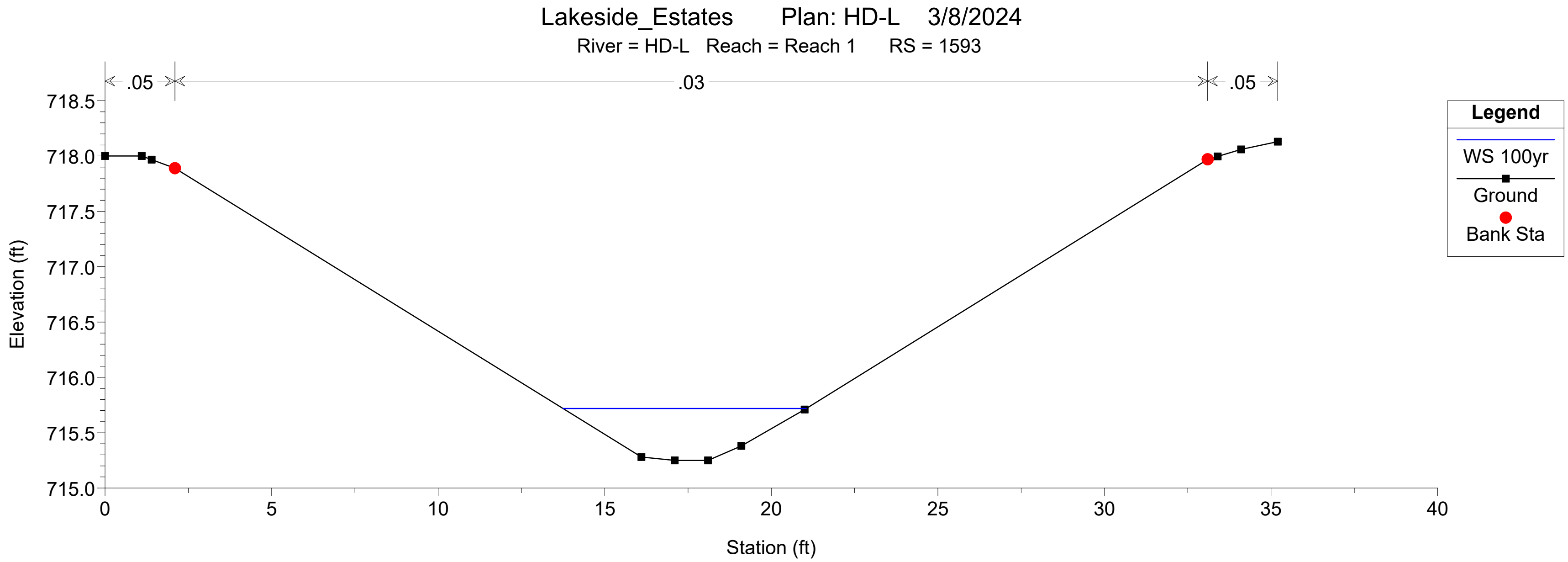


Lakeside_Estates Plan: HD-1 3/8/2024
River = HD-1 Reach = Reach 1 RS = 298
.05
.03
.05
Elevation (ft)
649.0
648.5
648.0
647.5
647.0
646.5
646.0
645.5
645.0
0
50
100
150
200
250
Station (ft)
Legend
WS 100yr
Ground
Bank Sta
Lakeside_Estates Plan: HD-1 3/8/2024
River = HD-1 Reach = Reach 1 RS = 200
.05
.03
.05
Elevation (ft)
647.5
647.0
646.5
646.0
645.5
645.0
644.5
644.0
0
50
100
150
200
Station (ft)
Legend
WS 100yr
Ground
Bank Sta

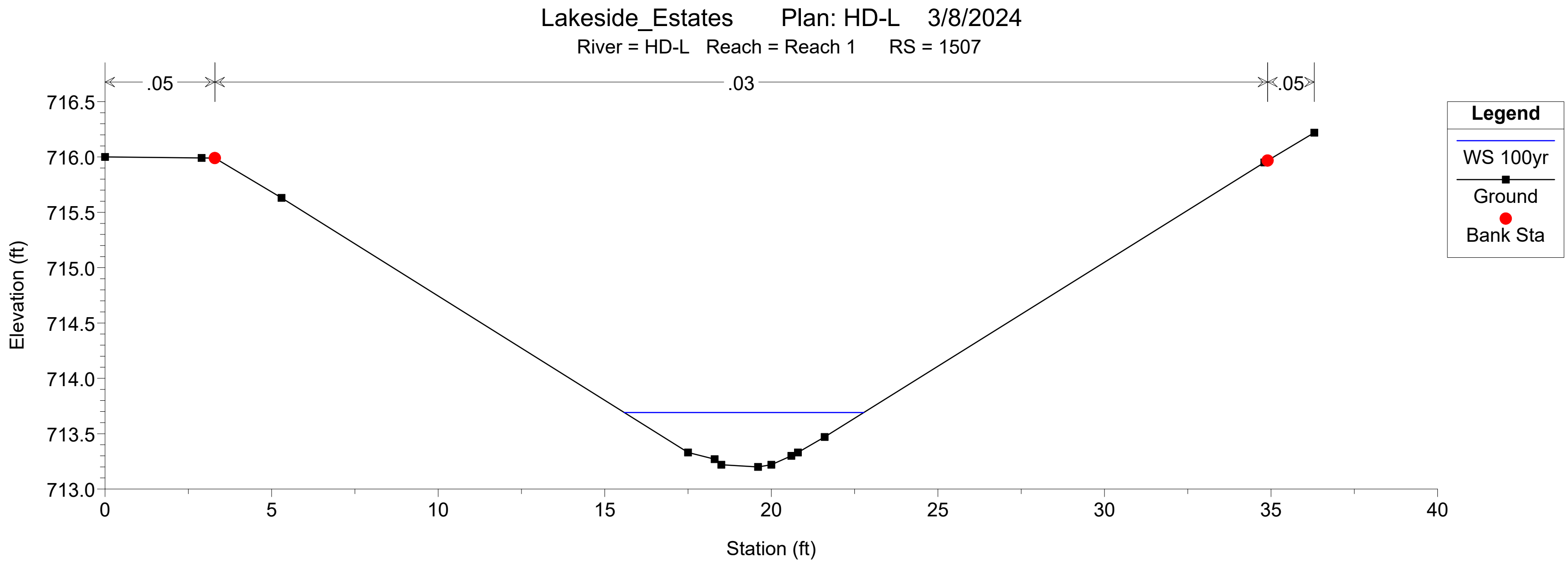
HD-L



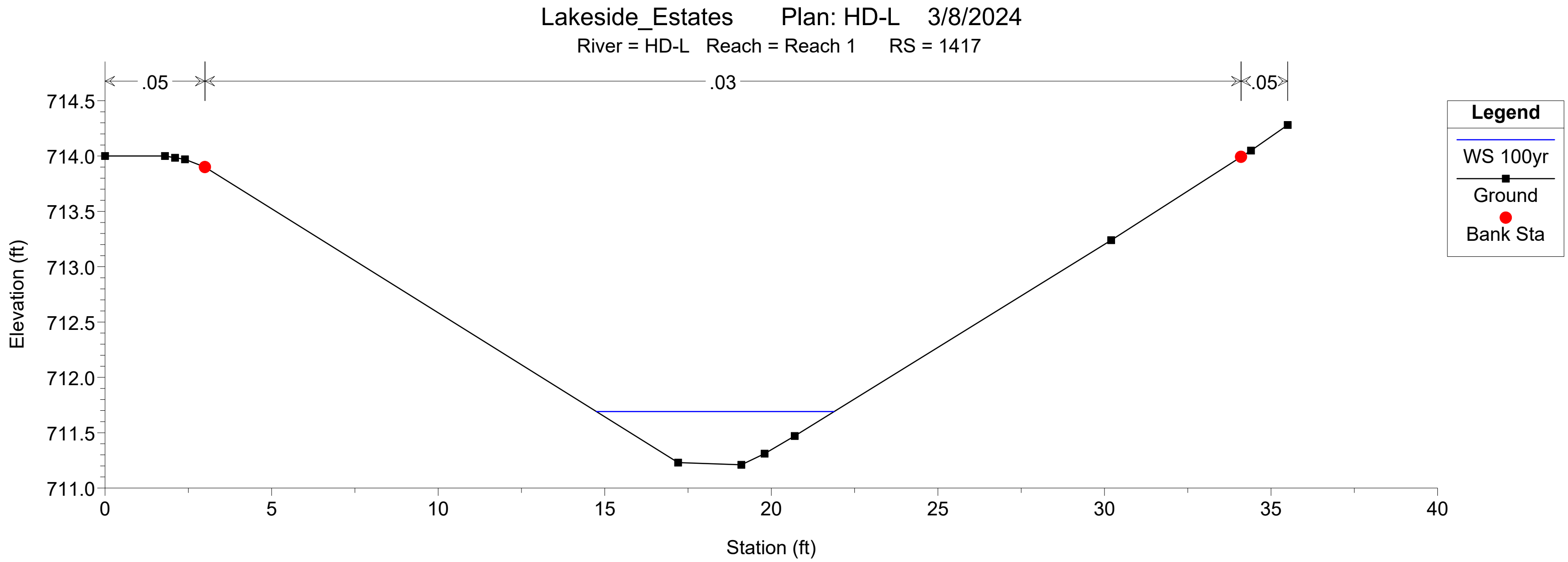
Lakeside_Estates Plan: HD-L 3/8/2024
HD-L Reach 1
Legend
WS 100yr
Ground
Elevation (ft)
Main Channel Distance (ft)
720
710
700
690
680
670
660
650
0
200
400
600
800
1000
1200
1400
1600

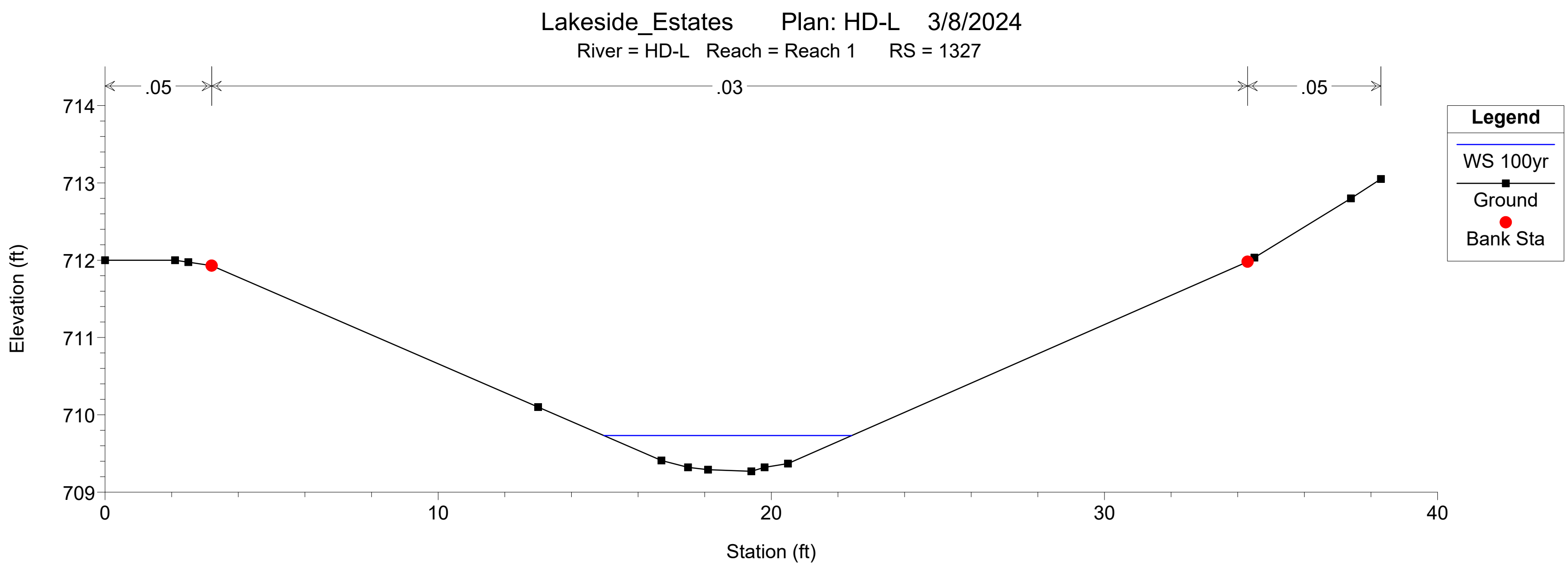


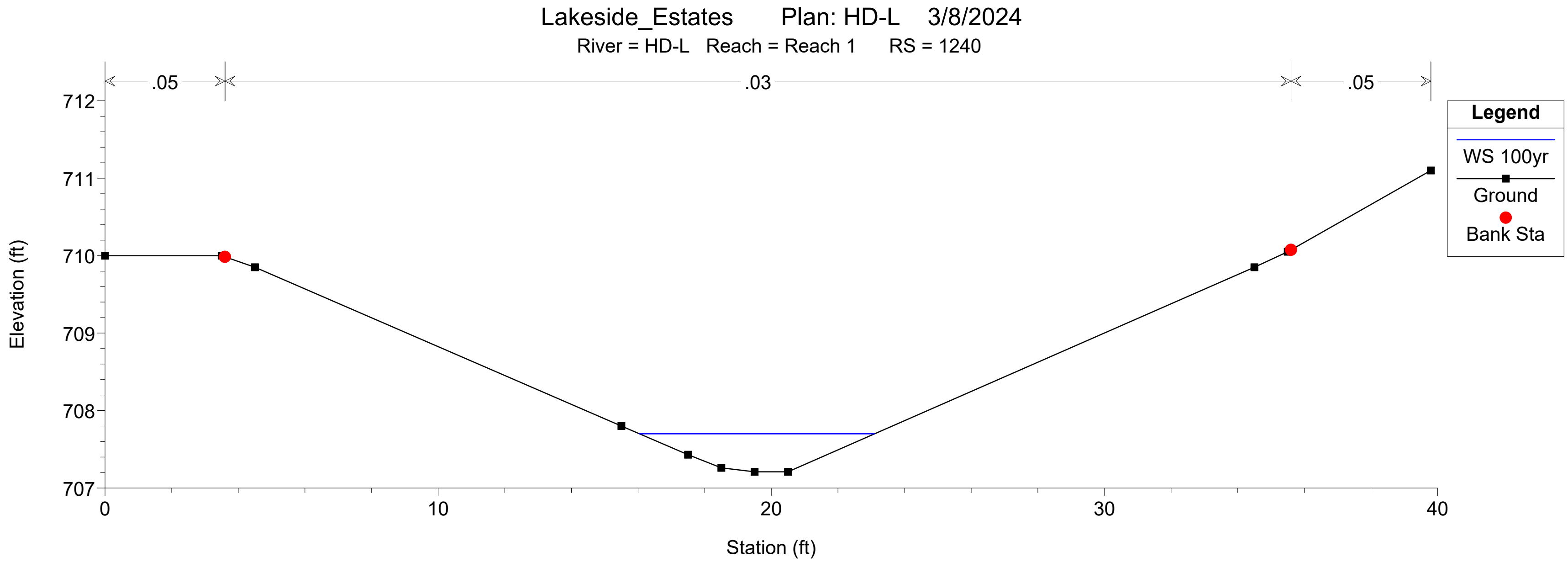
Lakeside_Estates Plan: HD-L 3/8/2024
River = HD-L Reach = Reach 1 RS = 1593
.05
.03
.05
Elevation (ft)
718.5
718.0
717.5
717.0
716.5
716.0
715.5
715.0
0
5
10
15
20
25
30
35
40
Station (ft)
Legend
WS 100yr
Ground
Bank Sta

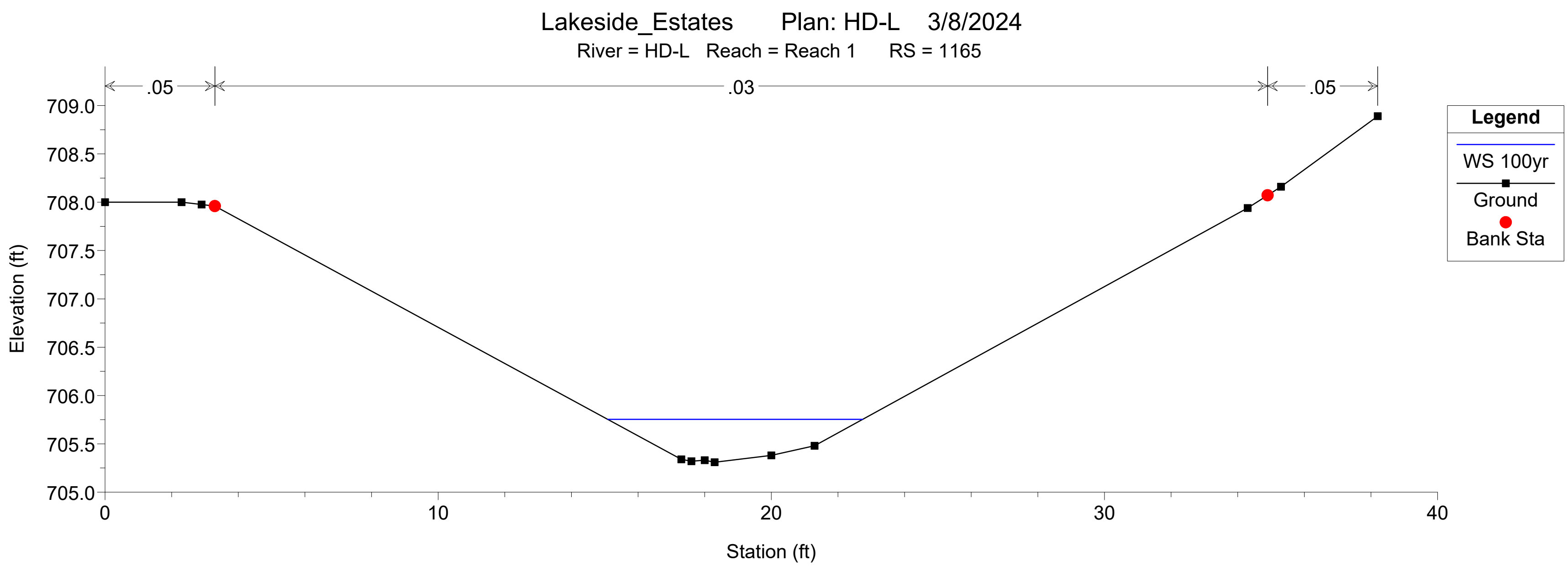


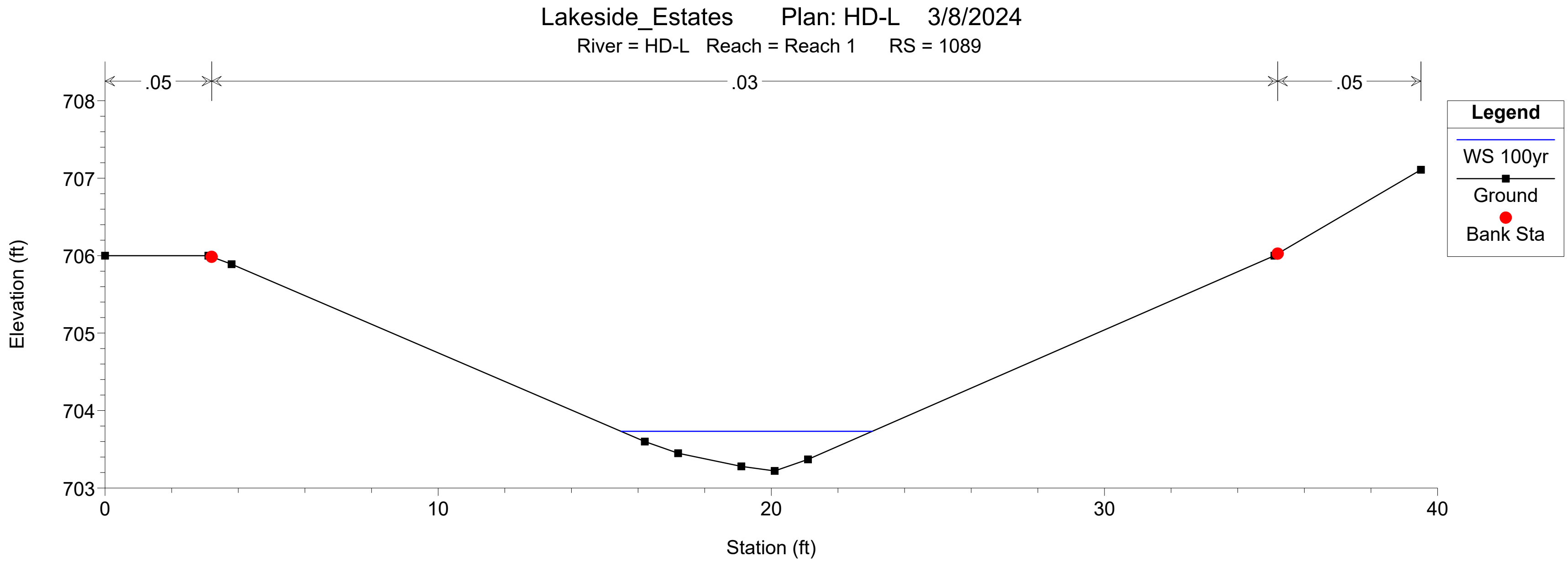
Lakeside_Estates Plan: HD-L 3/8/2024
River = HD-L Reach = Reach 1 RS = 1507
.05
.03
.05
Elevation (ft)
716.5
716.0
715.5
715.0
714.5
714.0
713.5
713.0
0
5
10
15
20
25
30
35
40
Station (ft)
Legend
WS 100yr
Ground
Bank Sta

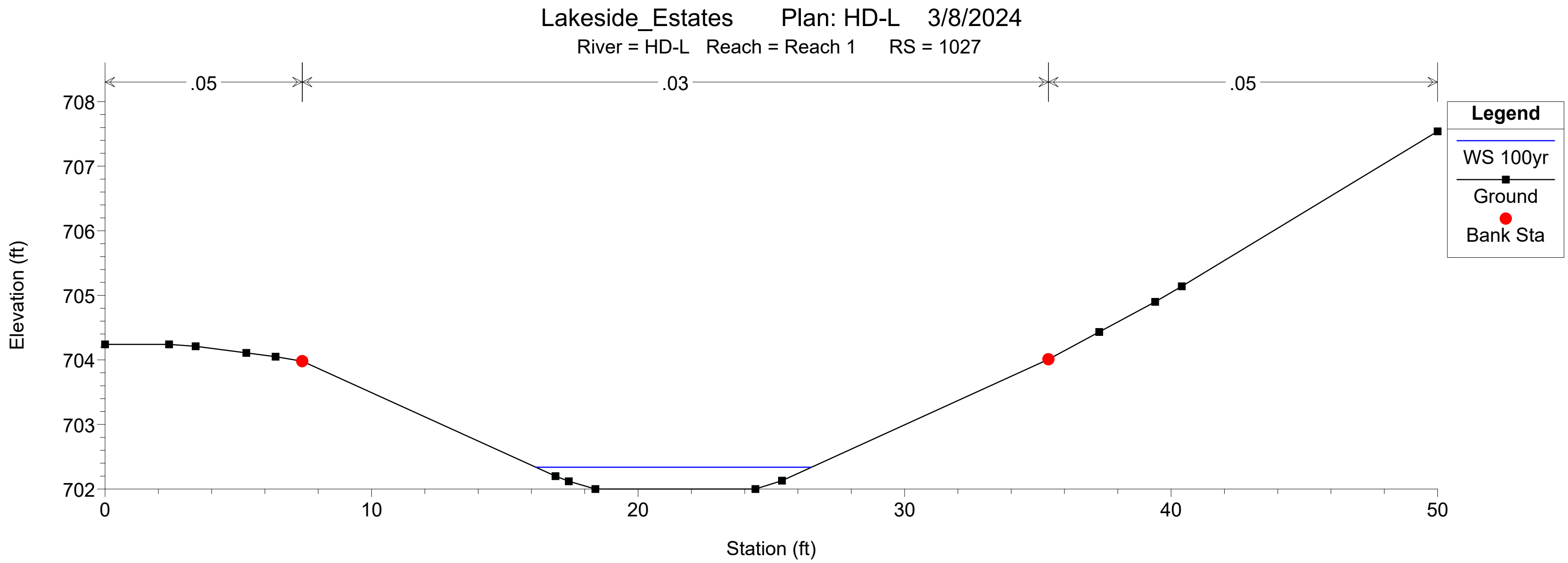

Lakeside_Estates Plan: HD-L 3/8/2024
River = HD-L Reach = Reach 1 RS = 1417
.05
.03
.05
714.5
714.0
713.5
713.0
712.5
712.0
711.5
711.0
Elevation (ft)
0
5
10
15
20
25
30
35
40
Station (ft)
Legend
WS 100yr
Ground
Bank Sta

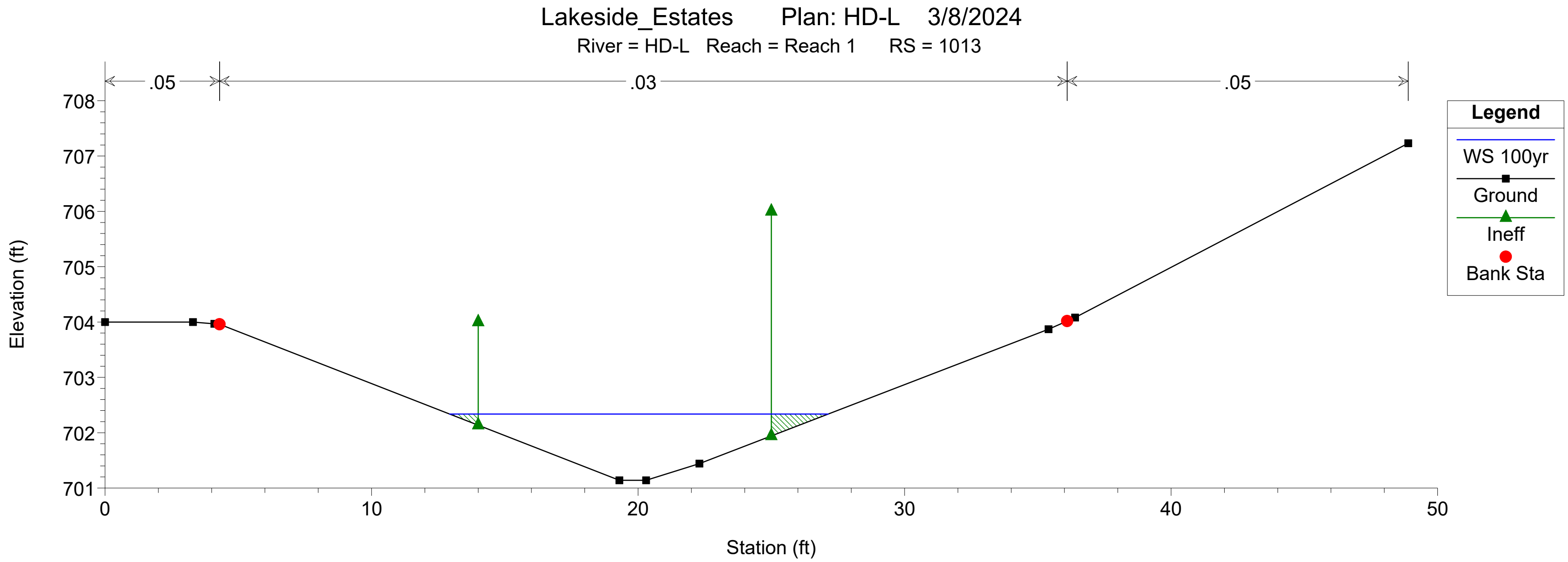

Lakeside_Estates Plan: HD-L 3/8/2024
River = HD-L Reach = Reach 1 RS = 1327
.05
.03
.05
714
713
712
711
710
709
Elevation (ft)
0
10
20
30
40
Station (ft)
Legend
WS 100yr
Ground
Bank Sta

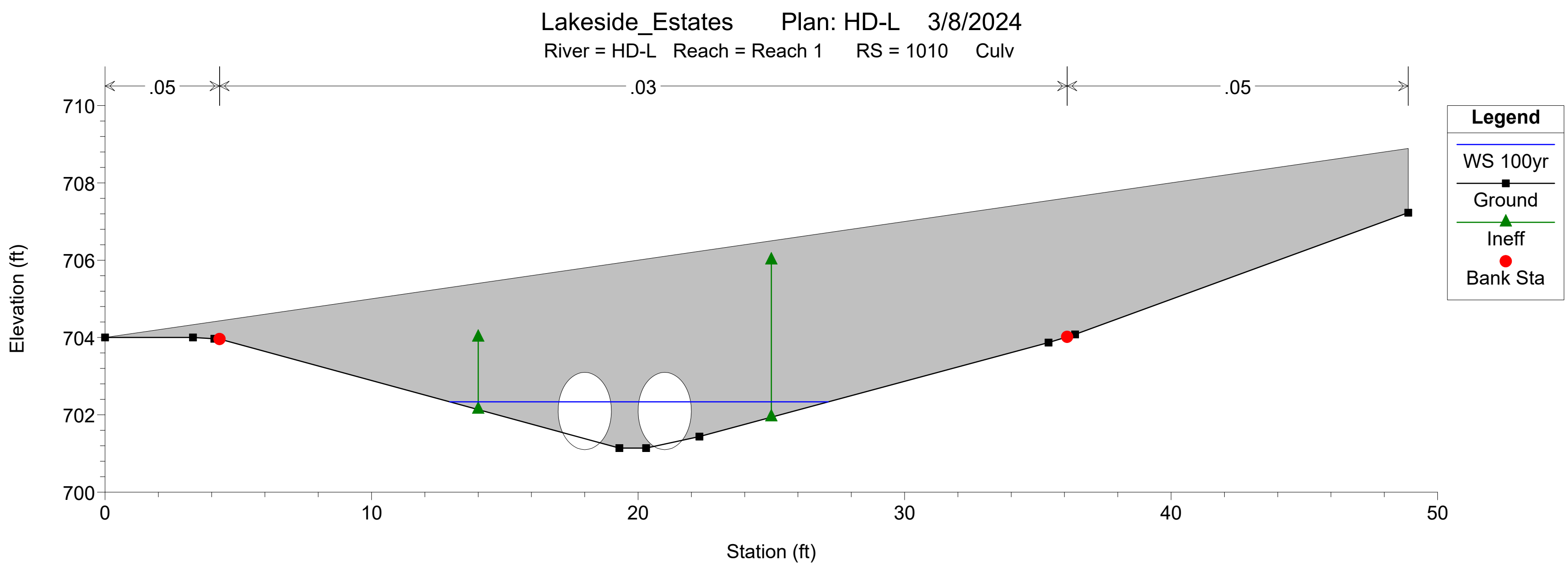

Lakeside_Estates Plan: HD-L 3/8/2024
River = HD-L Reach = Reach 1 RS = 1240
.05
.03
.05
Legend
WS 100yr
Ground
Bank Sta
Elevation (ft)
712
711
710
709
708
707
0
10
20
30
40
Station (ft)

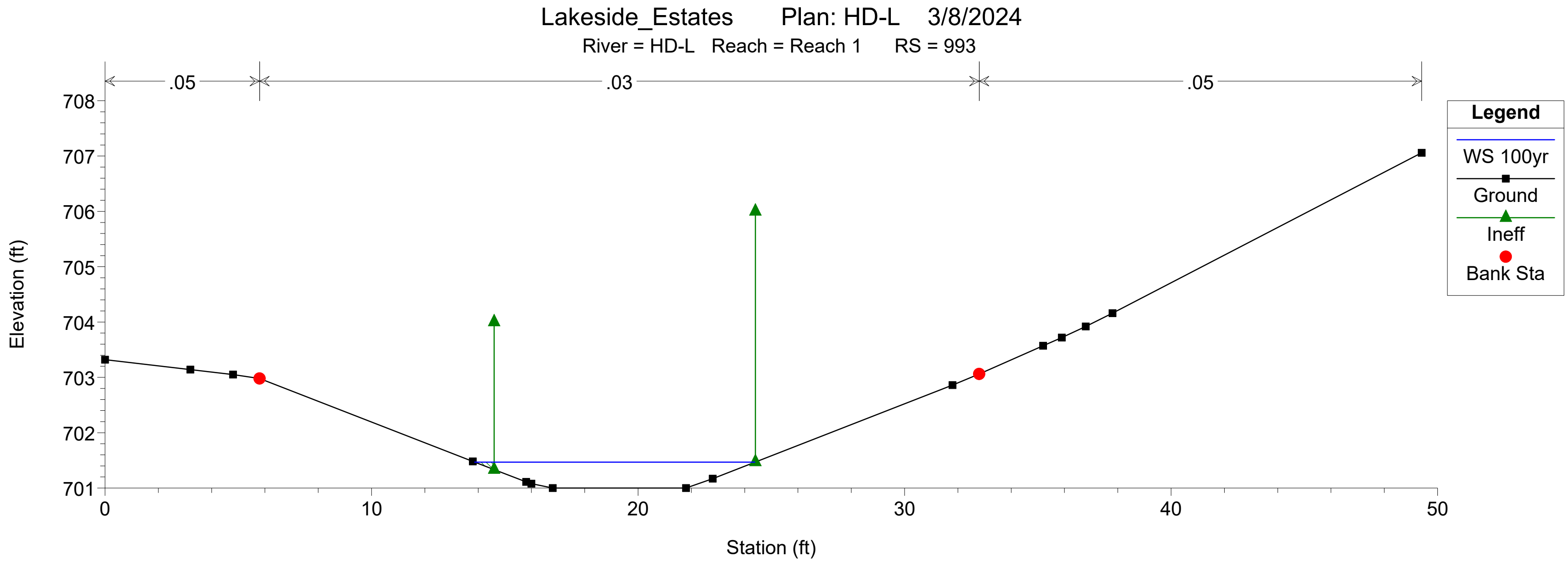

Lakeside_Estates Plan: HD-L 3/8/2024
River = HD-L Reach = Reach 1 RS = 1165
.05
.03
.05
Legend
WS 100yr
Ground
Bank Sta
Elevation (ft)
709.0
708.5
708.0
707.5
707.0
706.5
706.0
705.5
705.0
0
10
20
30
40
Station (ft)


Lakeside_Estates Plan: HD-L 3/8/2024
River = HD-L Reach = Reach 1 RS = 1089
.05
.03
.05
Legend
WS 100yr
Ground
Bank Sta
Elevation (ft)
703
704
705
706
707
708
0
10
20
30
40
Station (ft)

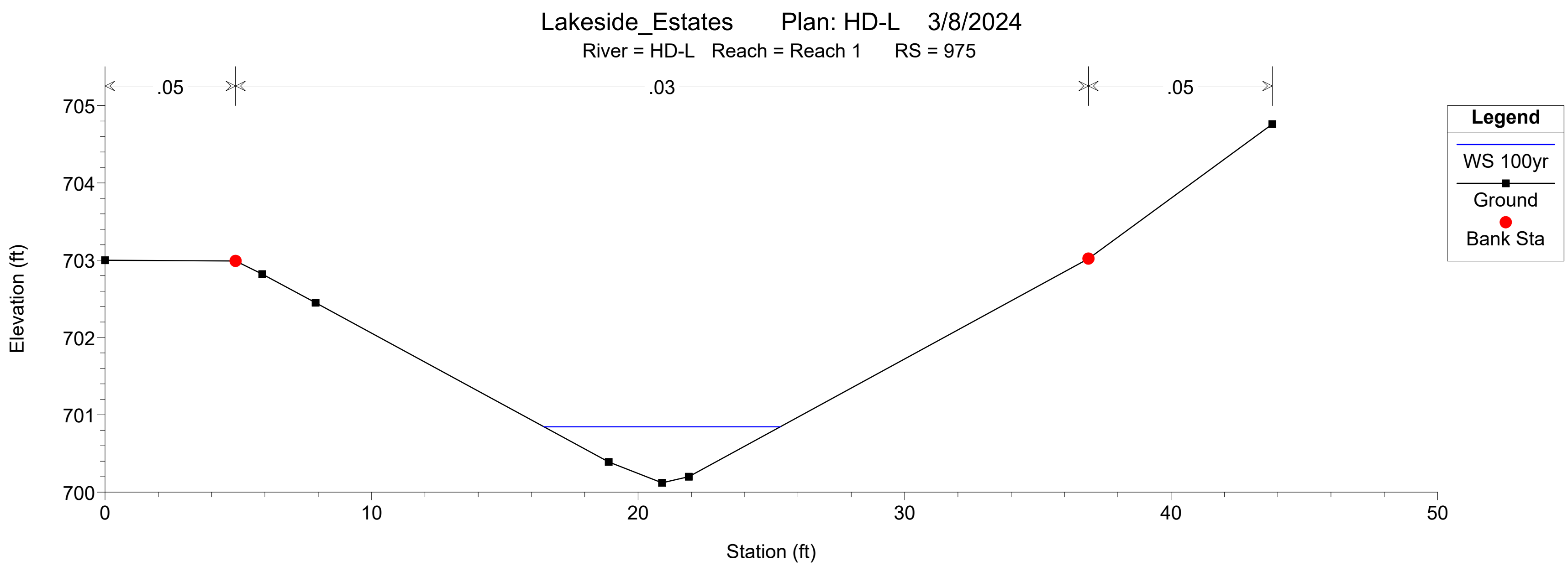

Lakeside_Estates Plan: HD-L 3/8/2024
River = HD-L Reach = Reach 1 RS = 1027
.05
.03
.05
Legend
WS 100yr
Ground
Bank Sta
Elevation (ft)
702
703
704
705
706
707
708
0
10
20
30
40
50
Station (ft)


Lakeside_Estates Plan: HD-L 3/8/2024
River = HD-L Reach = Reach 1 RS = 1013
.05
.03
.05
708
707
706
705
704
703
702
701
Elevation (ft)
0
10
20
30
40
50
Station (ft)
Legend
WS 100yr
Ground
Ineff
Bank Sta

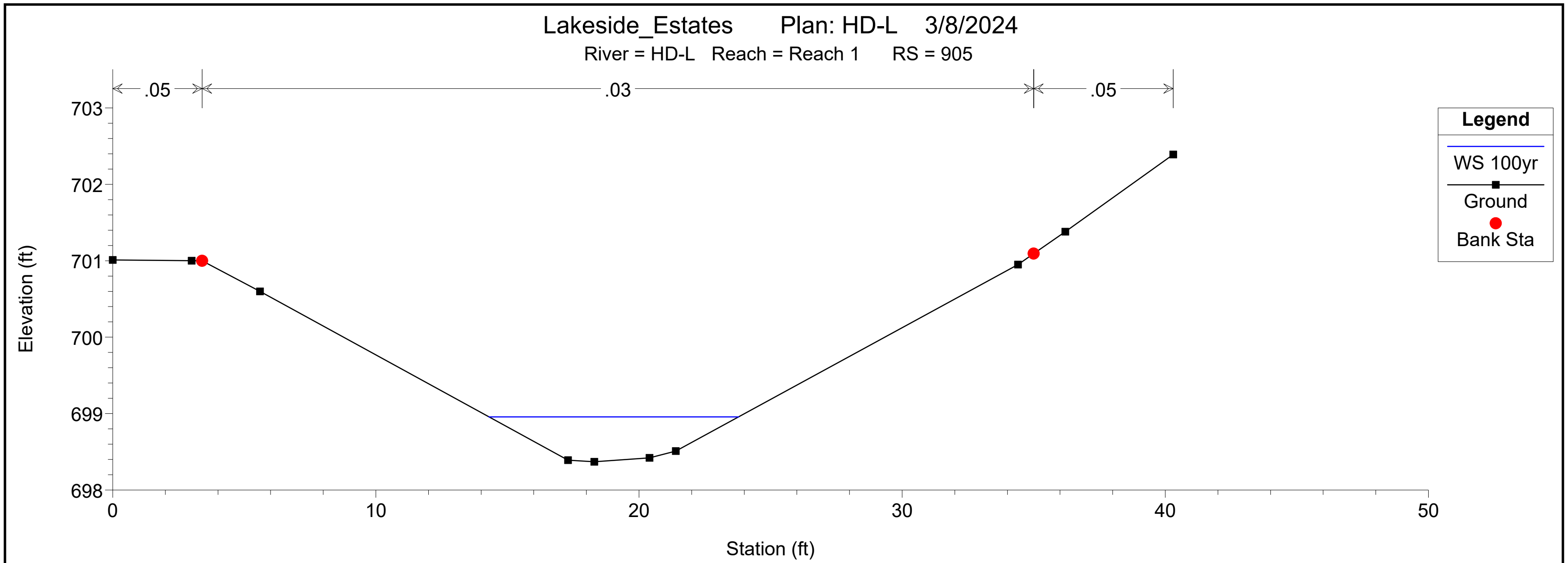

Lakeside_Estates Plan: HD-L 3/8/2024
River = HD-L Reach = Reach 1 RS = 1010 Culv
.05
.03
.05
710
708
706
704
702
700
Elevation (ft)
0
10
20
30
40
50
Station (ft)
Legend
WS 100yr
Ground
Ineff
Bank Sta

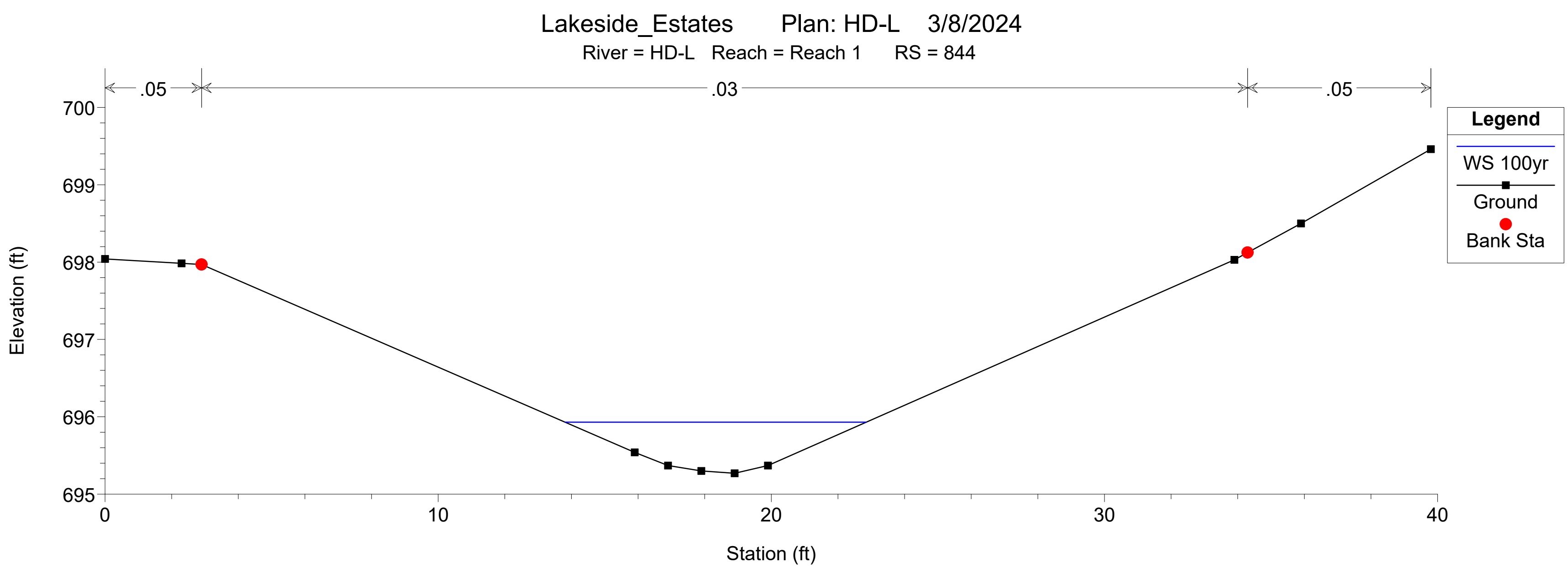


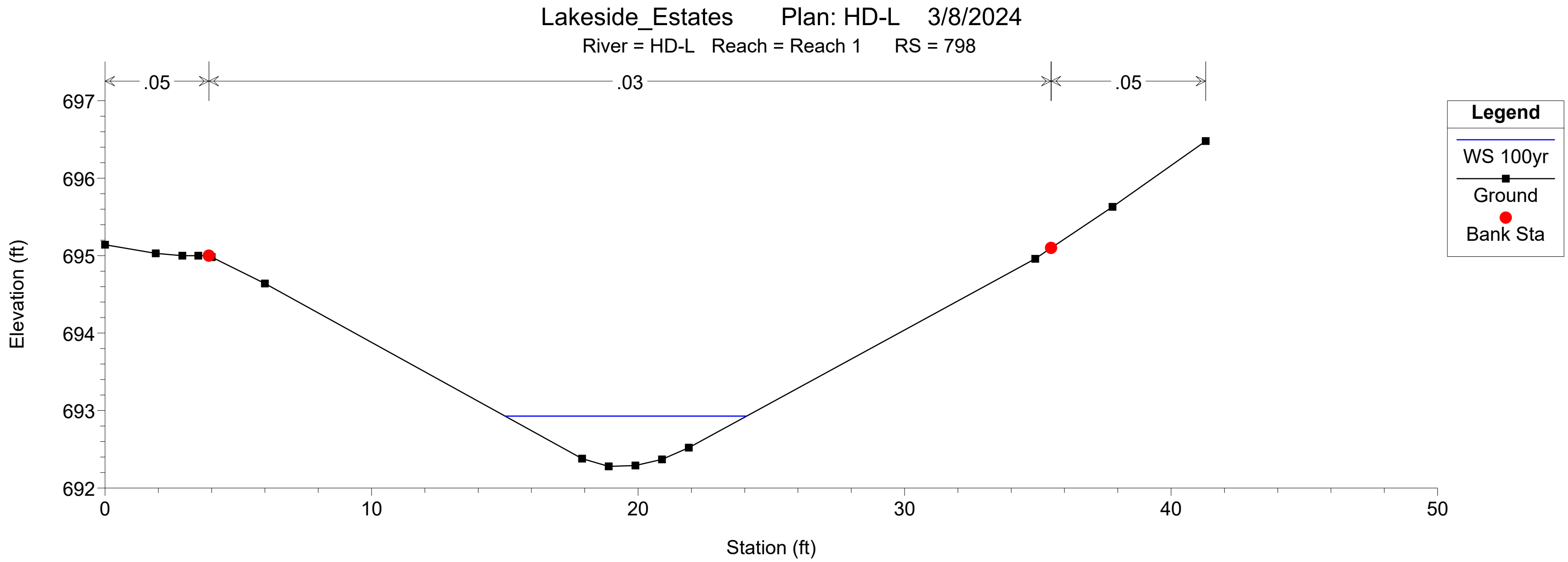
Lakeside_Estates Plan: HD-L 3/8/2024
River = HD-L Reach = Reach 1 RS = 993
.05
.03
.05
708
707
706
705
704
703
702
701
Elevation (ft)
0
10
20
30
40
50
Station (ft)
Legend
WS 100yr
Ground
Ineff
Bank Sta

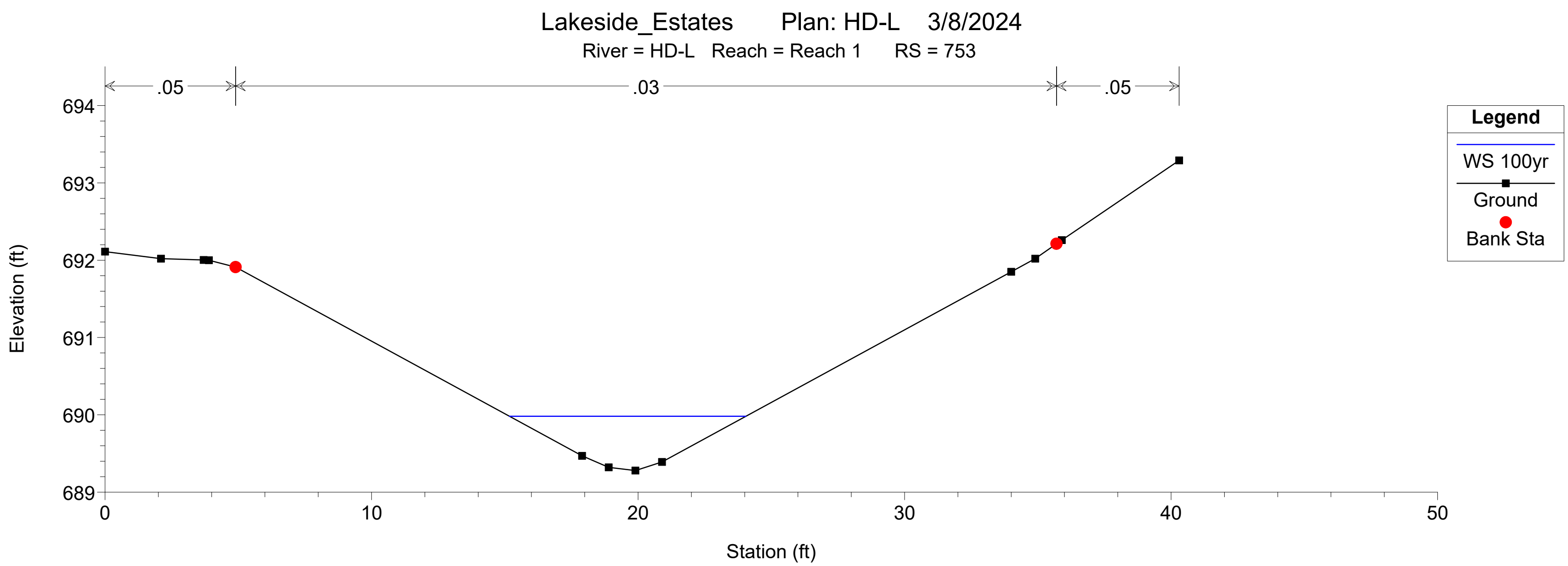


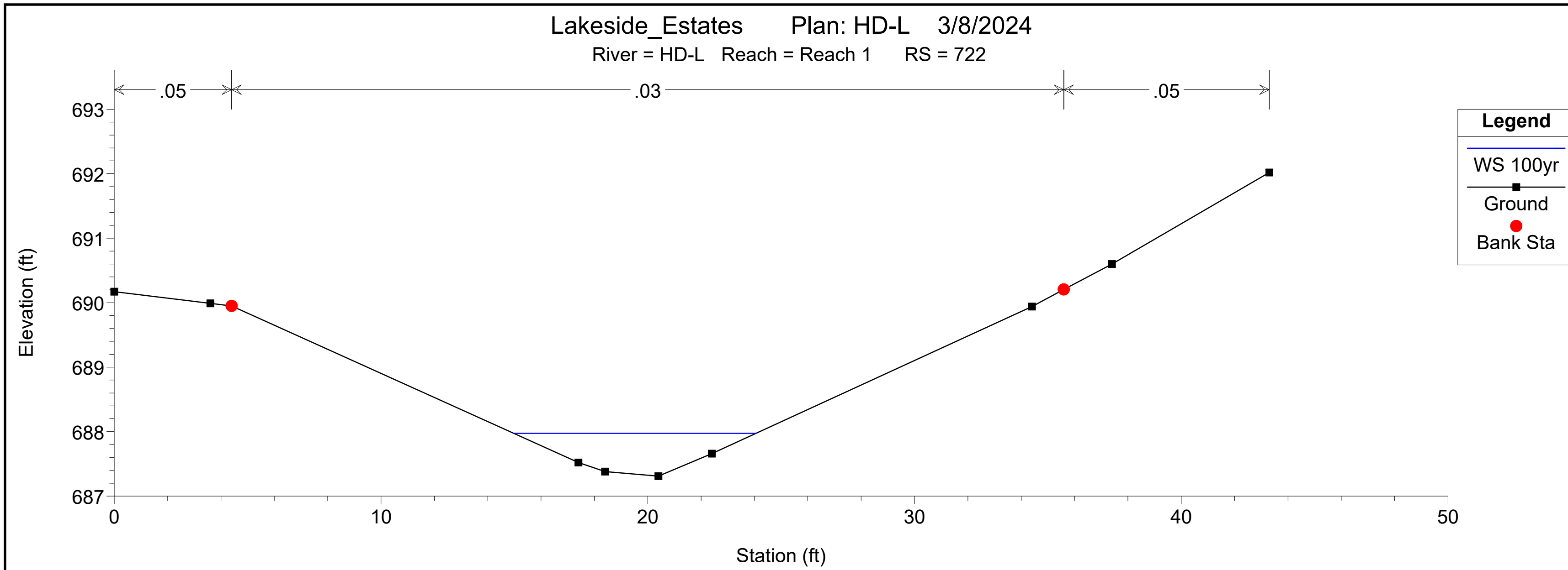
Lakeside_Estates Plan: HD-L 3/8/2024
River = HD-L Reach = Reach 1 RS = 975
.05
.03
.05
705
704
703
702
701
700
Elevation (ft)
0
10
20
30
40
50
Station (ft)
Legend
WS 100yr
Ground
Bank Sta


Lakeside_Estates Plan: HD-L 3/8/2024
River = HD-L Reach = Reach 1 RS = 905
.05
.03
.05
Elevation (ft)
703
702
701
700
699
698
0
10
20
30
40
50
Station (ft)
Legend
WS 100yr
Ground
Bank Sta

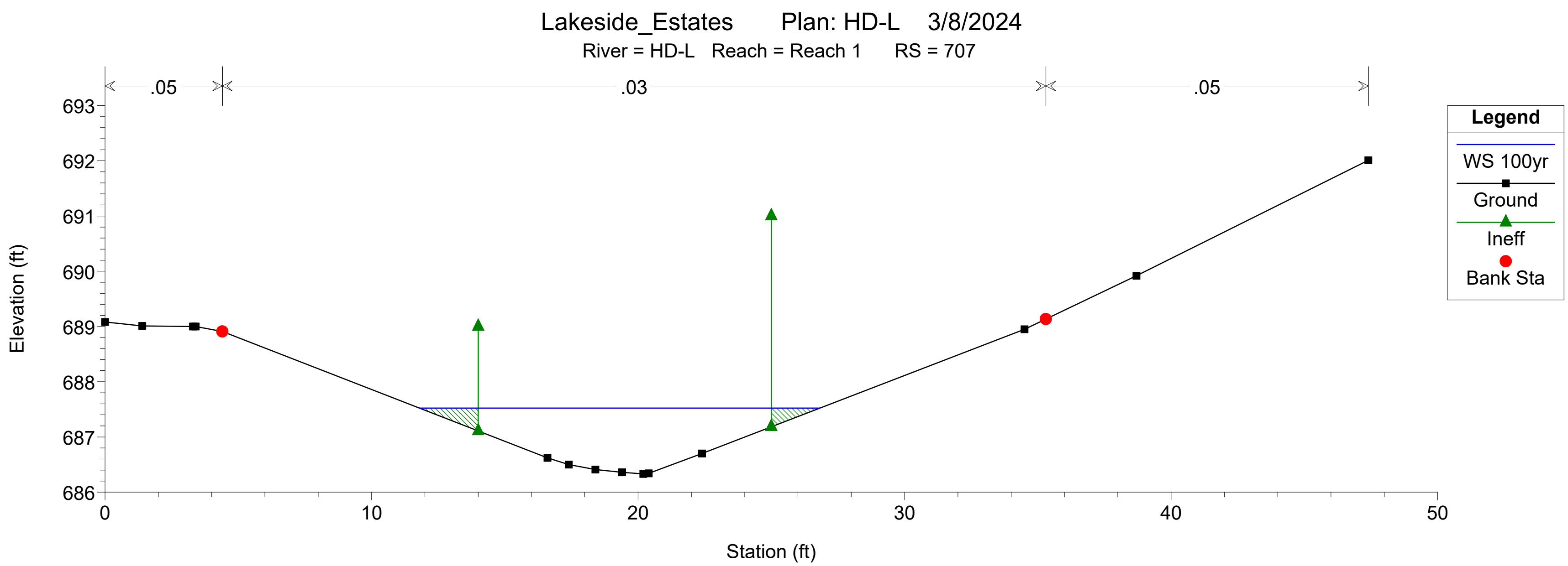

Lakeside_Estates Plan: HD-L 3/8/2024
River = HD-L Reach = Reach 1 RS = 844
.05
.03
.05
Elevation (ft)
700
699
698
697
696
695
0
10
20
30
40
Station (ft)
Legend
WS 100yr
Ground
Bank Sta


Lakeside_Estates Plan: HD-L 3/8/2024
River = HD-L Reach = Reach 1 RS = 798
.05
.03
.05
Elevation (ft)
697
696
695
694
693
692
0
10
20
30
40
50
Station (ft)
Legend
WS 100yr
Ground
Bank Sta

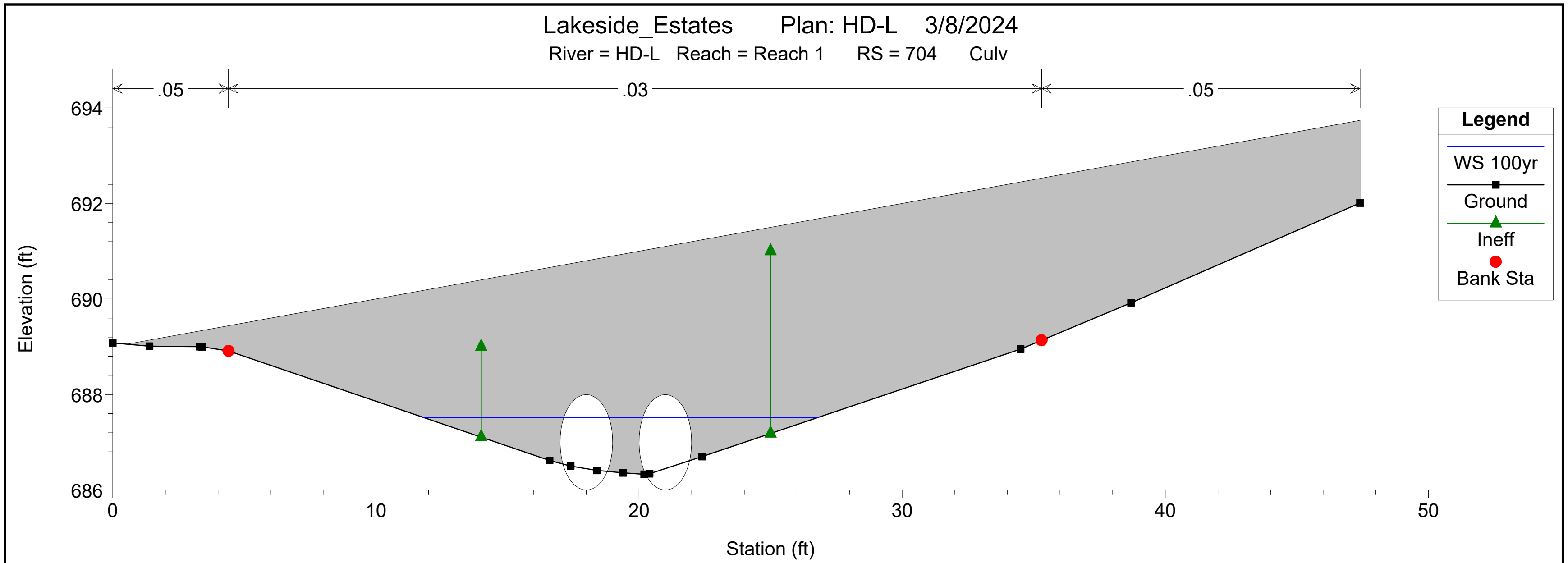

Lakeside_Estates Plan: HD-L 3/8/2024
River = HD-L Reach = Reach 1 RS = 753
.05
.03
.05
Elevation (ft)
694
693
692
691
690
689
0
10
20
30
40
50
Station (ft)
Legend
WS 100yr
Ground
Bank Sta



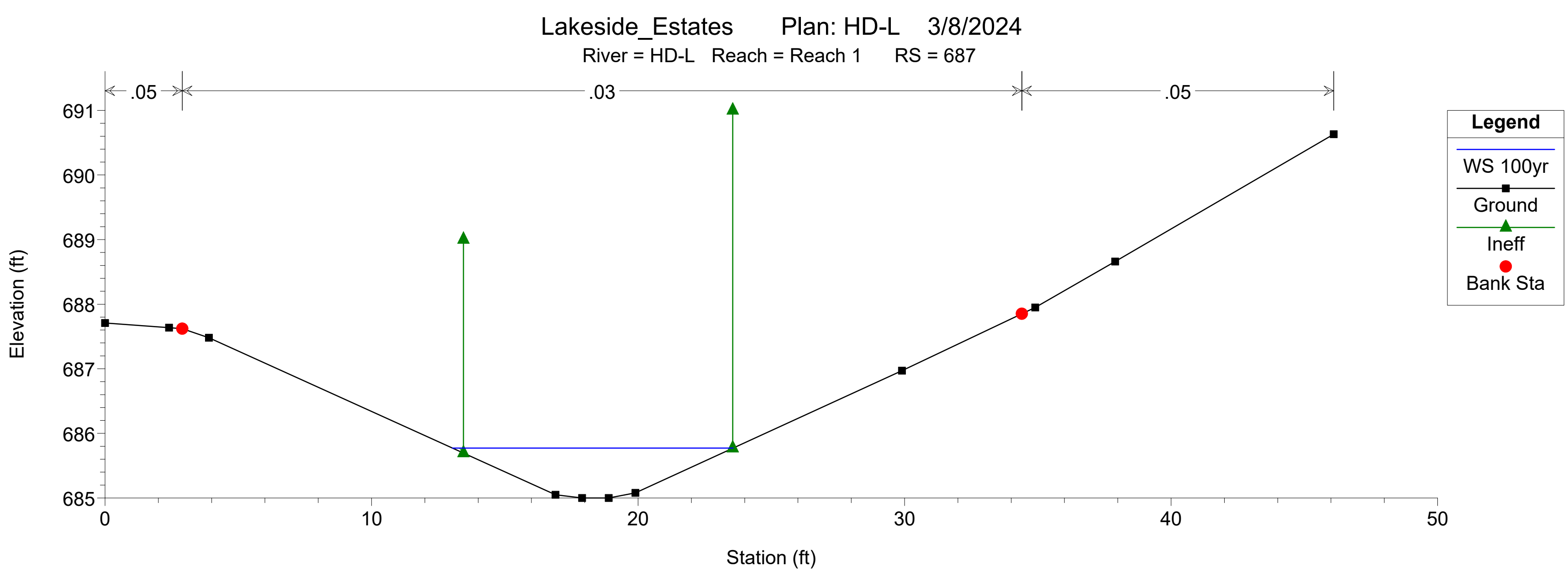
Lakeside_Estates Plan: HD-L 3/8/2024
River = HD-L Reach = Reach 1 RS = 722
.05
.03
.05
Elevation (ft)
Station (ft)
Legend
WS 100yr
Ground
Bank Sta



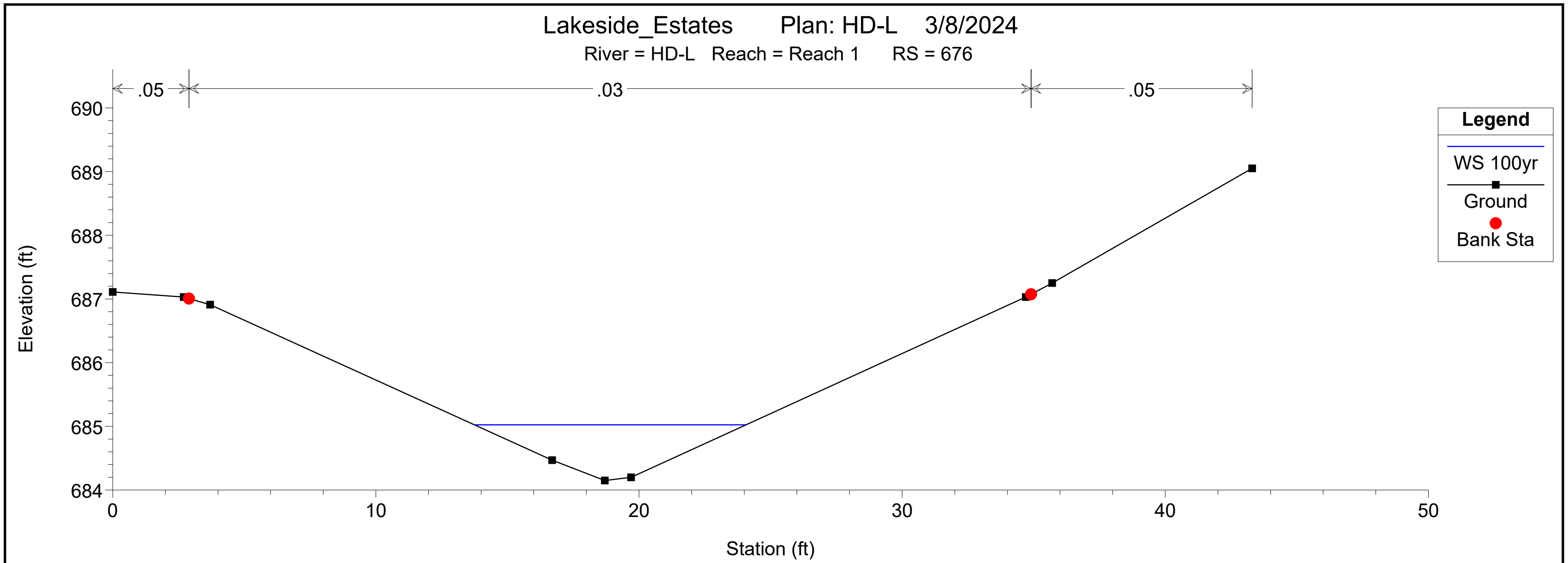
Lakeside_Estates Plan: HD-L 3/8/2024
River = HD-L Reach = Reach 1 RS = 707
.05
.03
.05
Elevation (ft)
Station (ft)
Legend
WS 100yr
Ground
Ineff
Bank Sta

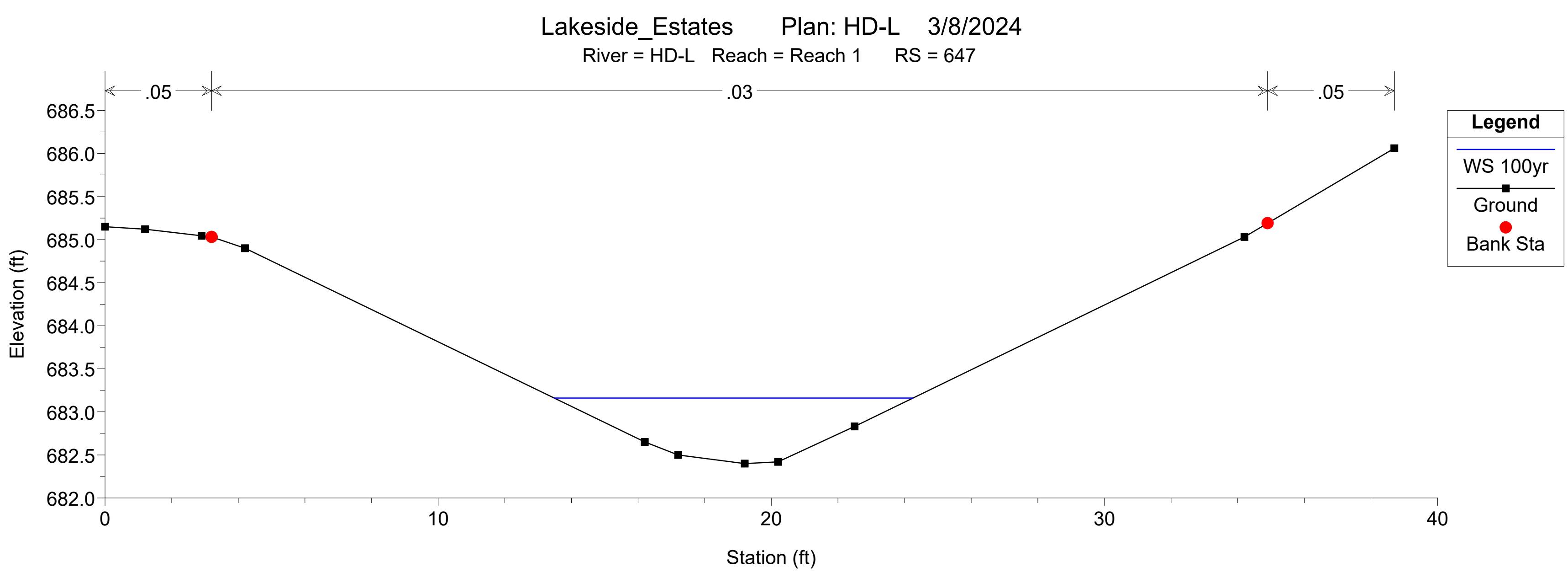


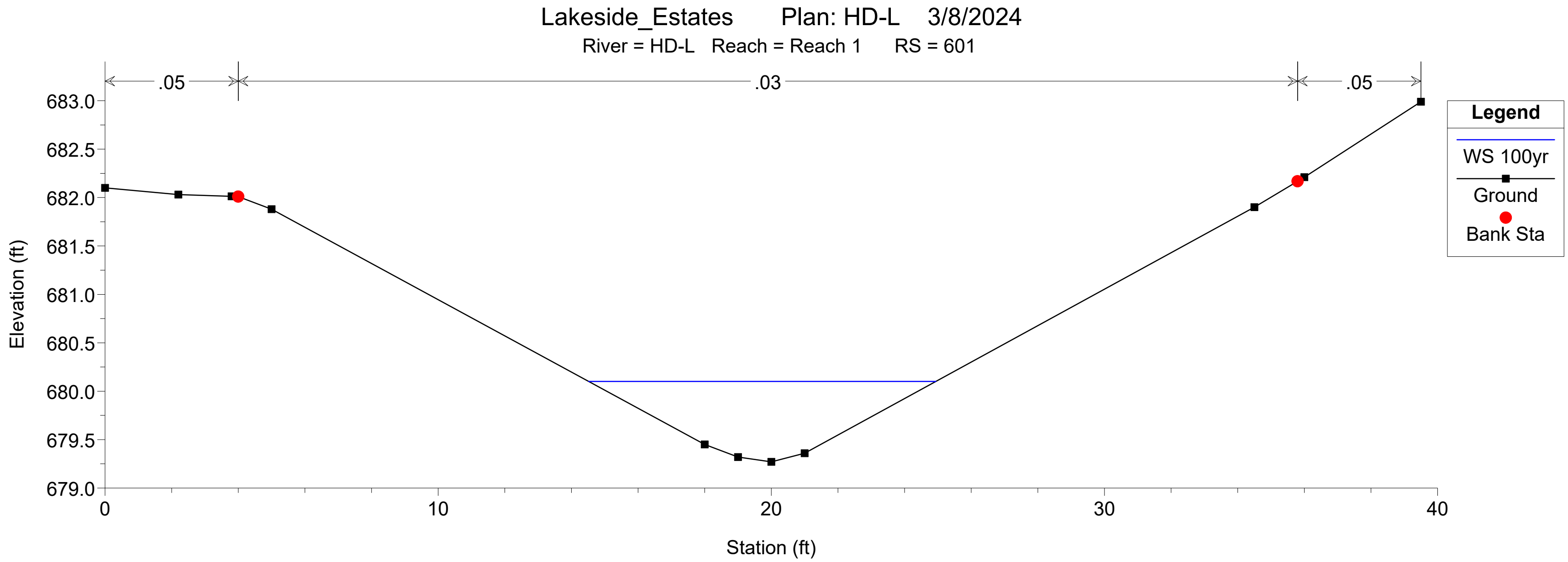
Lakeside_Estates Plan: HD-L 3/8/2024
River = HD-L Reach = Reach 1 RS = 704 Culv
.05
.03
.05
694
692
690
688
686
Elevation (ft)
0
10
20
30
40
50
Station (ft)
Legend
WS 100yr
Ground
Ineff
Bank Sta

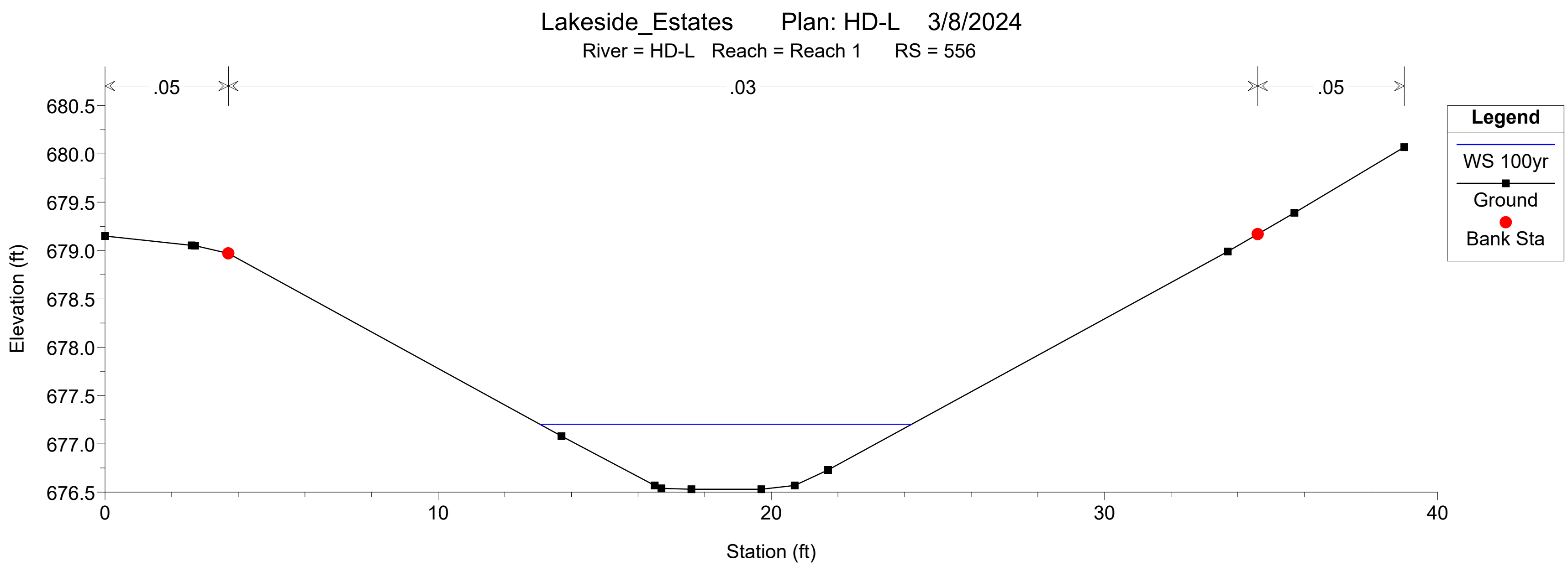


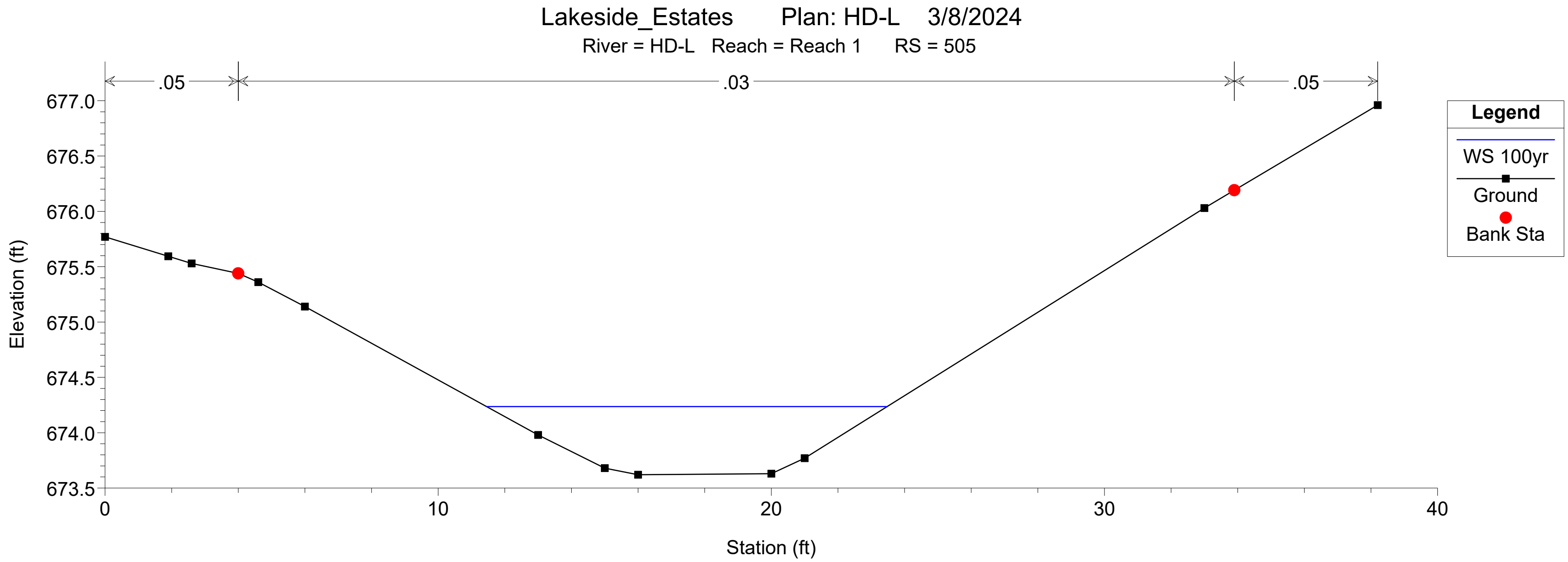
Lakeside_Estates Plan: HD-L 3/8/2024
River = HD-L Reach = Reach 1 RS = 687
.05
.03
.05
691
690
689
688
687
686
685
Elevation (ft)
0
10
20
30
40
50
Station (ft)
Legend
WS 100yr
Ground
Ineff
Bank Sta

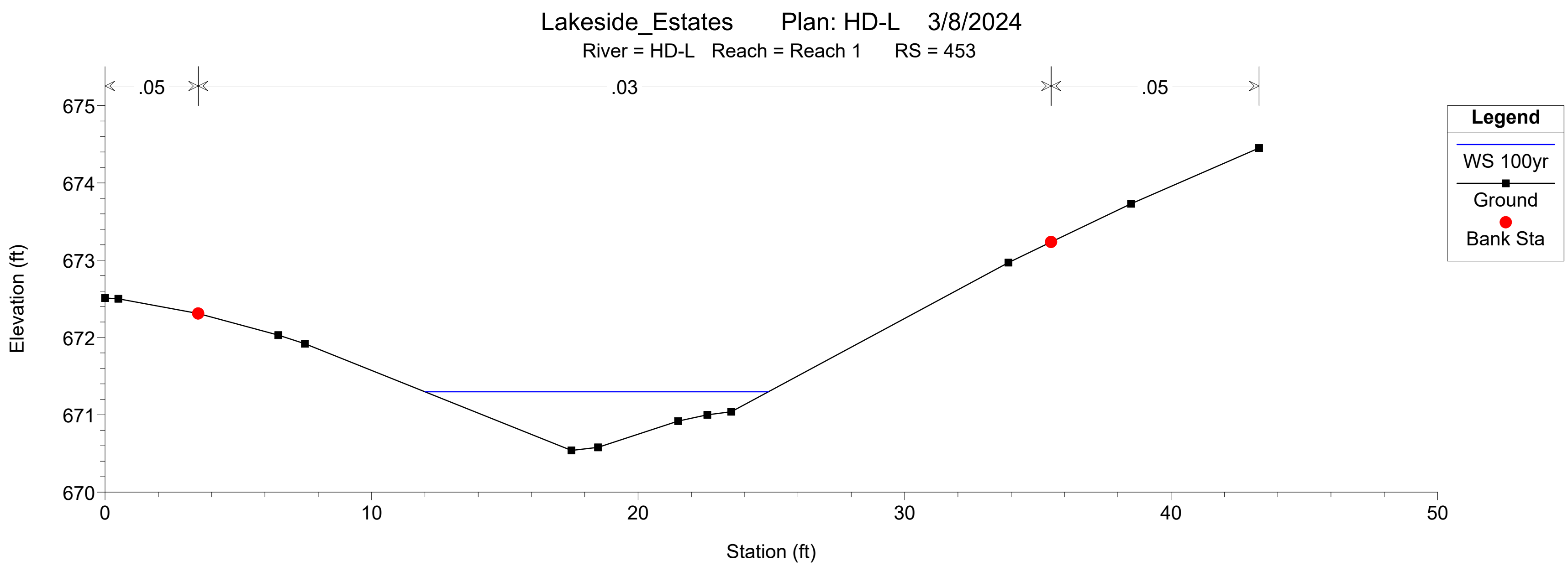

Lakeside_Estates Plan: HD-L 3/8/2024
River = HD-L Reach = Reach 1 RS = 676
.05
.03
.05
Elevation (ft)
690
689
688
687
686
685
684
0
10
20
30
40
50
Station (ft)
Legend
WS 100yr
Ground
Bank Sta

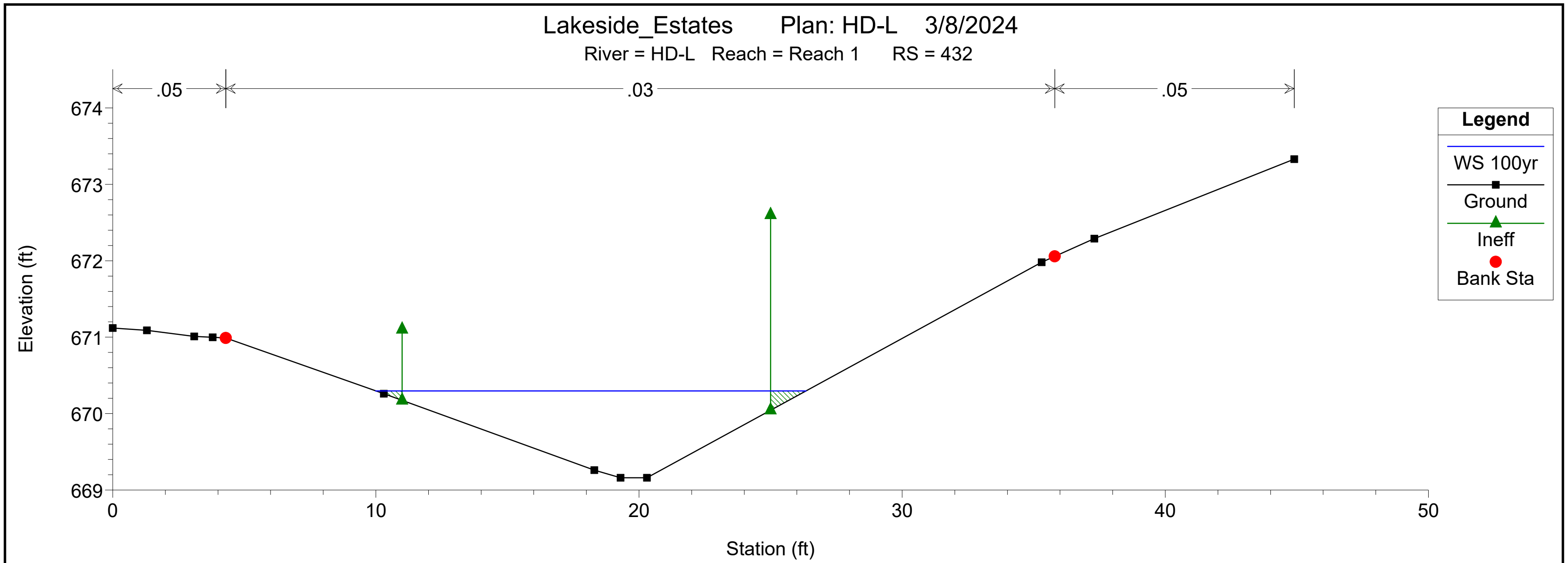

Lakeside_Estates Plan: HD-L 3/8/2024
River = HD-L Reach = Reach 1 RS = 647
.05
.03
.05
Elevation (ft)
686.5
686.0
685.5
685.0
684.5
684.0
683.5
683.0
682.5
682.0
0
10
20
30
40
Station (ft)
Legend
WS 100yr
Ground
Bank Sta

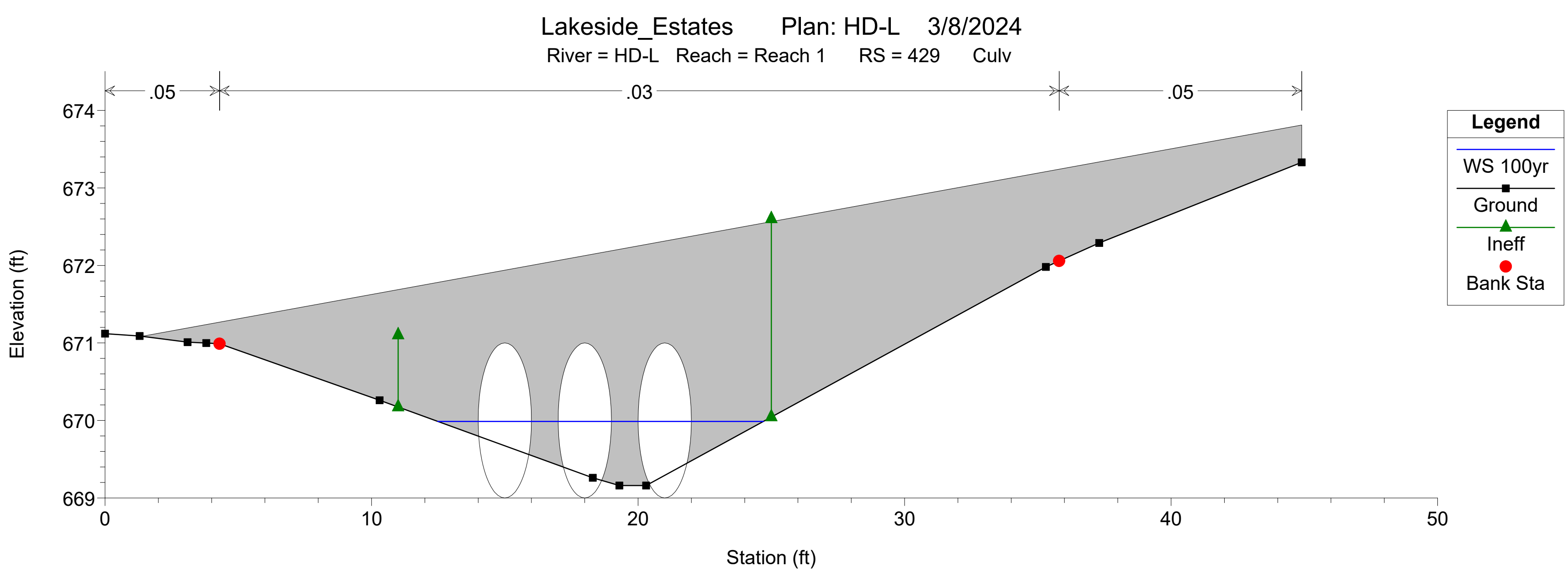

Lakeside_Estates Plan: HD-L 3/8/2024
River = HD-L Reach = Reach 1 RS = 601
.05
.03
.05
Elevation (ft)
683.0
682.5
682.0
681.5
681.0
680.5
680.0
679.5
679.0
0
10
20
30
40
Station (ft)
Legend
WS 100yr
Ground
Bank Sta

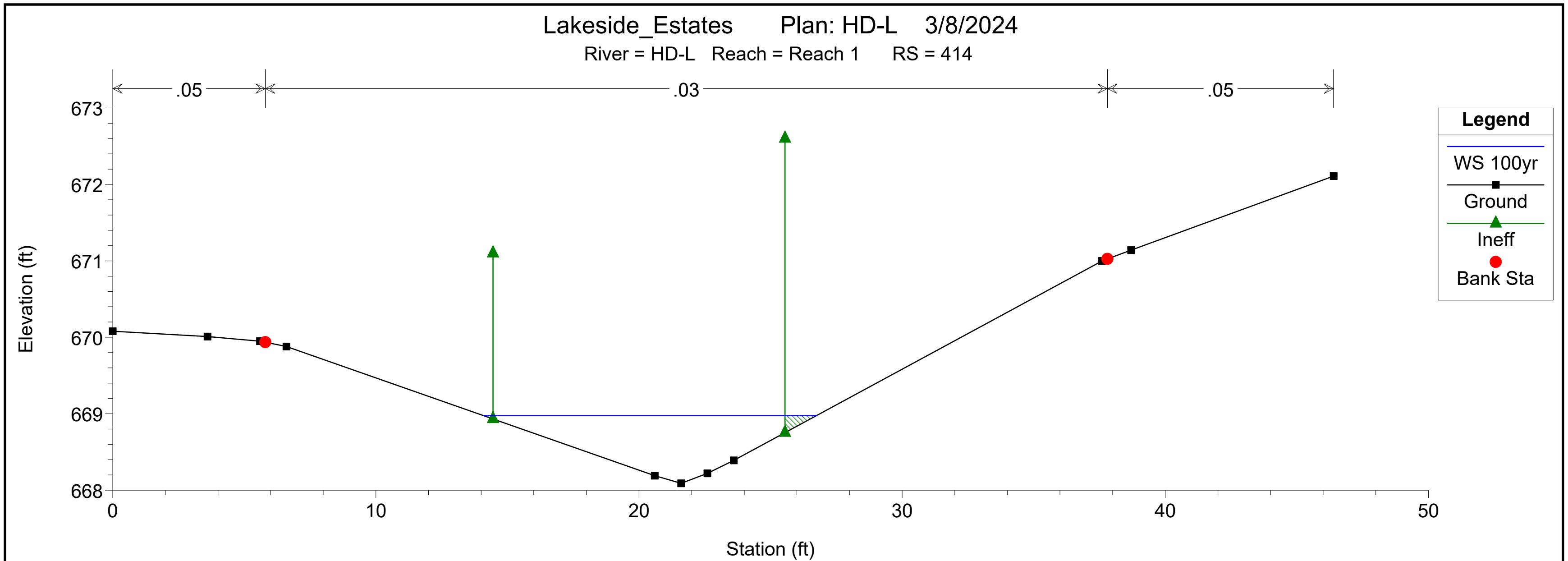

Lakeside_Estates Plan: HD-L 3/8/2024
River = HD-L Reach = Reach 1 RS = 556
.05
.03
.05
Elevation (ft)
680.5
680.0
679.5
679.0
678.5
678.0
677.5
677.0
676.5
0
10
20
30
40
Station (ft)
Legend
WS 100yr
Ground
Bank Sta

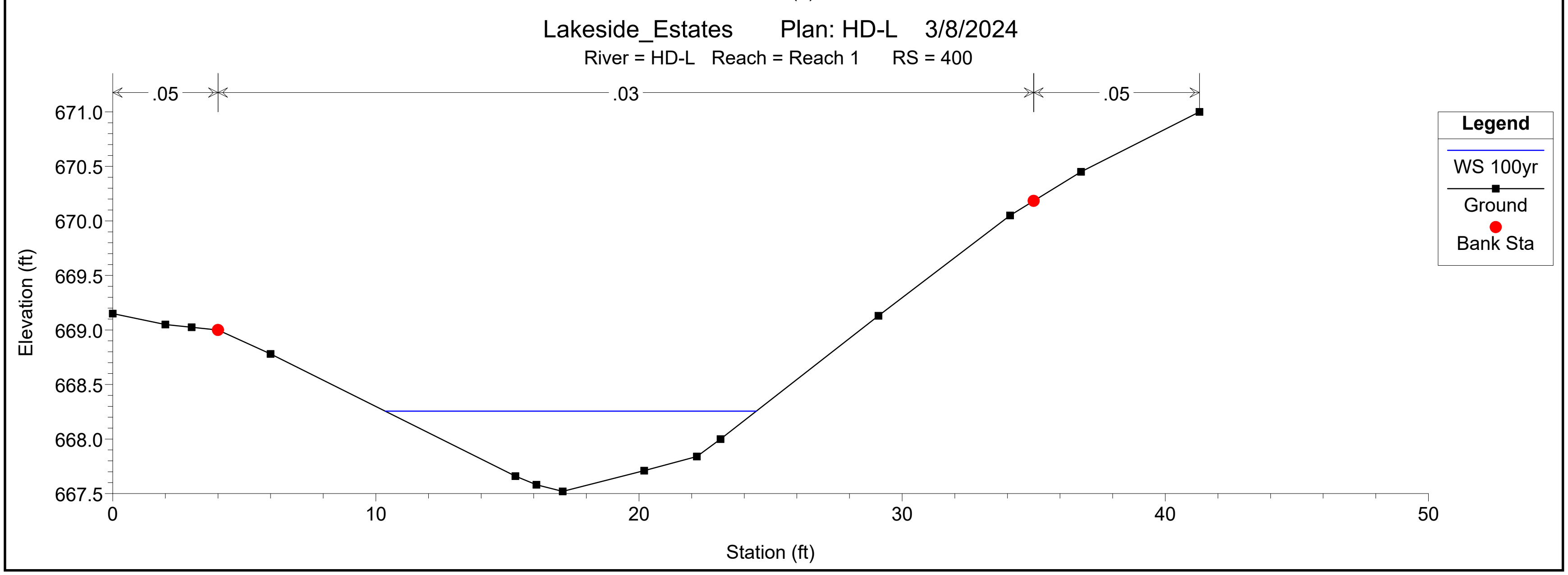

Lakeside_Estates Plan: HD-L 3/8/2024
River = HD-L Reach = Reach 1 RS = 505
.05
.03
.05
677.0
676.5
676.0
675.5
675.0
674.5
674.0
673.5
Elevation (ft)
0
10
20
30
40
Station (ft)
Legend
WS 100yr
Ground
Bank Sta

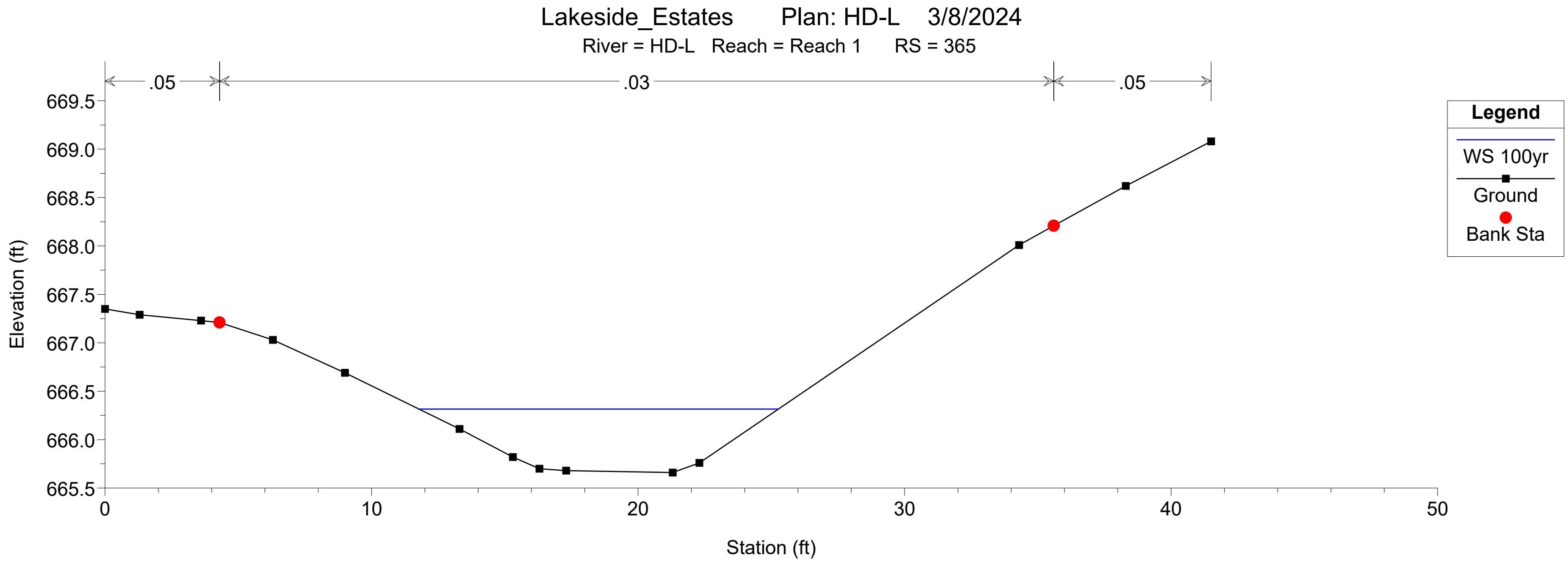

Lakeside_Estates Plan: HD-L 3/8/2024
River = HD-L Reach = Reach 1 RS = 453
.05
.03
.05
675
674
673
672
671
670
Elevation (ft)
0
10
20
30
40
50
Station (ft)
Legend
WS 100yr
Ground
Bank Sta

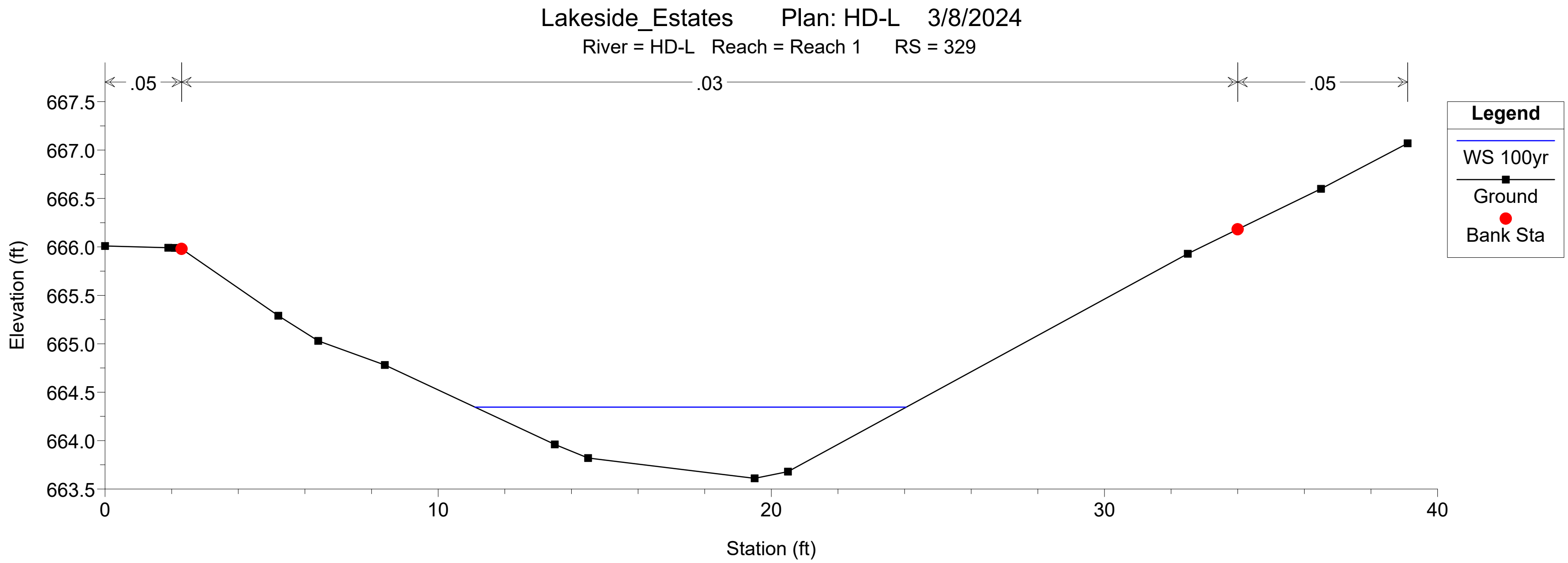

Lakeside_Estates Plan: HD-L 3/8/2024
River = HD-L Reach = Reach 1 RS = 432
.05
.03
.05
Elevation (ft)
Station (ft)
674
673
672
671
670
669
0
10
20
30
40
50
Legend
WS 100yr
Ground
Ineff
Bank Sta

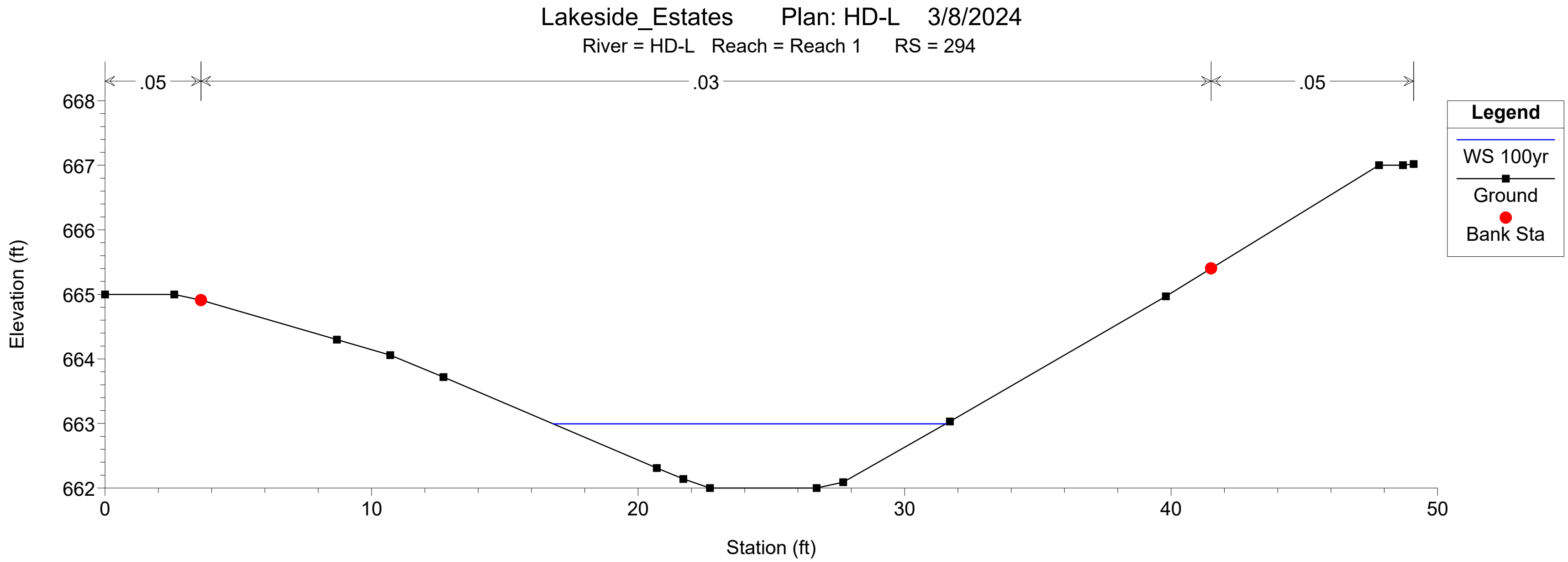

Lakeside_Estates Plan: HD-L 3/8/2024
River = HD-L Reach = Reach 1 RS = 429 Culv
.05
.03
.05
Elevation (ft)
Station (ft)
674
673
672
671
670
669
0
10
20
30
40
50
Legend
WS 100yr
Ground
Ineff
Bank Sta


Lakeside_Estates Plan: HD-L 3/8/2024
River = HD-L Reach = Reach 1 RS = 414
.05
.03
.05
673
672
671
670
669
668
Elevation (ft)
0
10
20
30
40
50
Station (ft)
Legend
WS 100yr
Ground
Ineff
Bank Sta

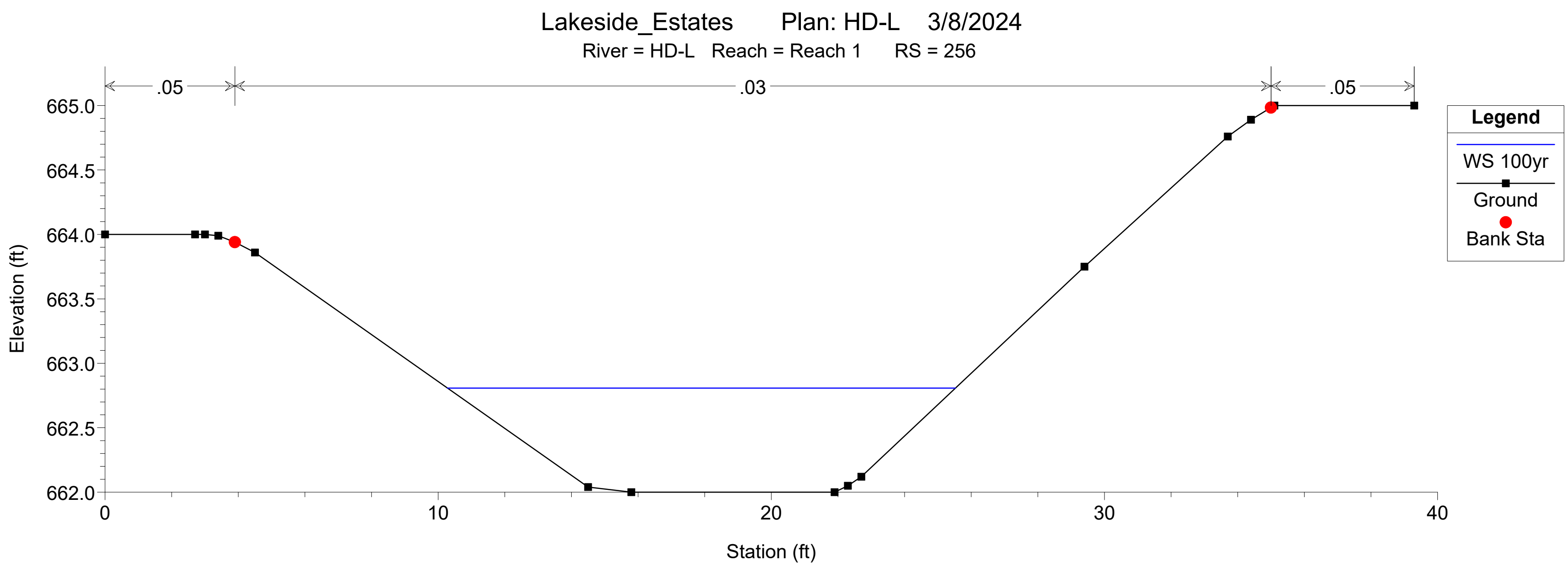

Lakeside_Estates Plan: HD-L 3/8/2024
River = HD-L Reach = Reach 1 RS = 400
.05
.03
.05
671.0
670.5
670.0
669.5
669.0
668.5
668.0
667.5
Elevation (ft)
0
10
20
30
40
50
Station (ft)
Legend
WS 100yr
Ground
Bank Sta


Lakeside_Estates Plan: HD-L 3/8/2024
River = HD-L Reach = Reach 1 RS = 365
.05
.03
.05
Elevation (ft)
Station (ft)
Legend
WS 100yr
Ground
Bank Sta

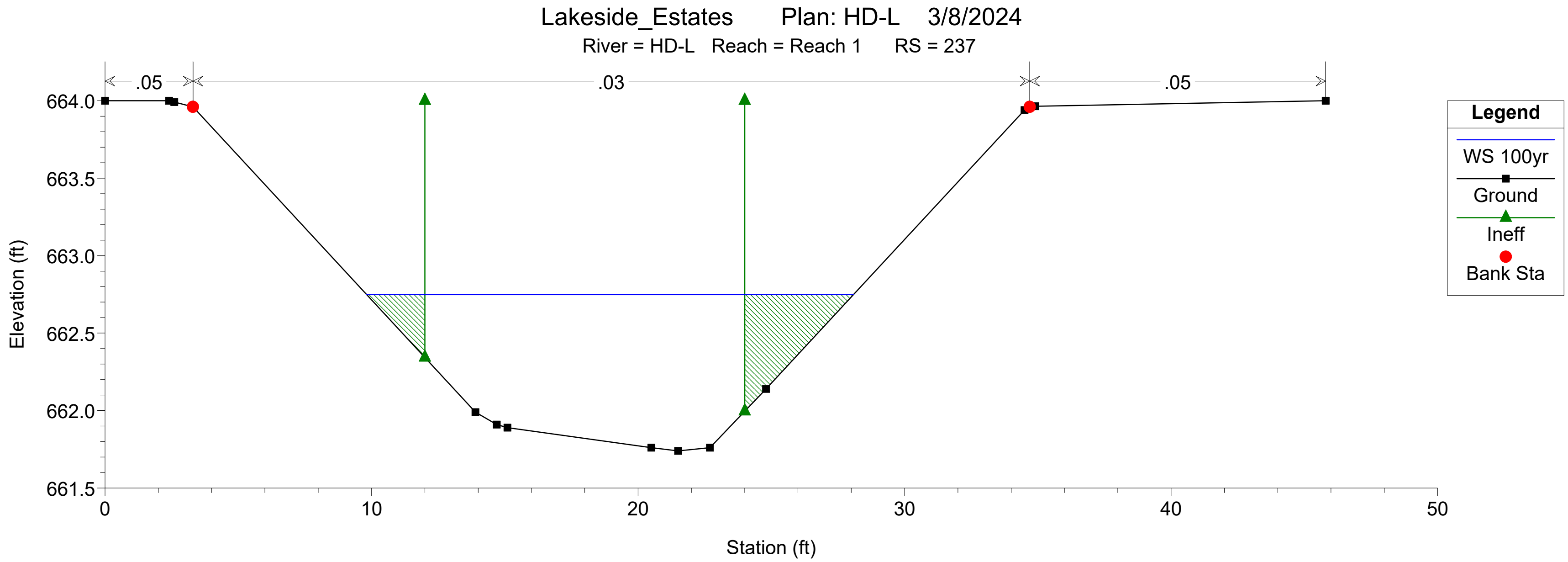

Lakeside_Estates Plan: HD-L 3/8/2024
River = HD-L Reach = Reach 1 RS = 329
.05
.03
.05
Elevation (ft)
Station (ft)
Legend
WS 100yr
Ground
Bank Sta



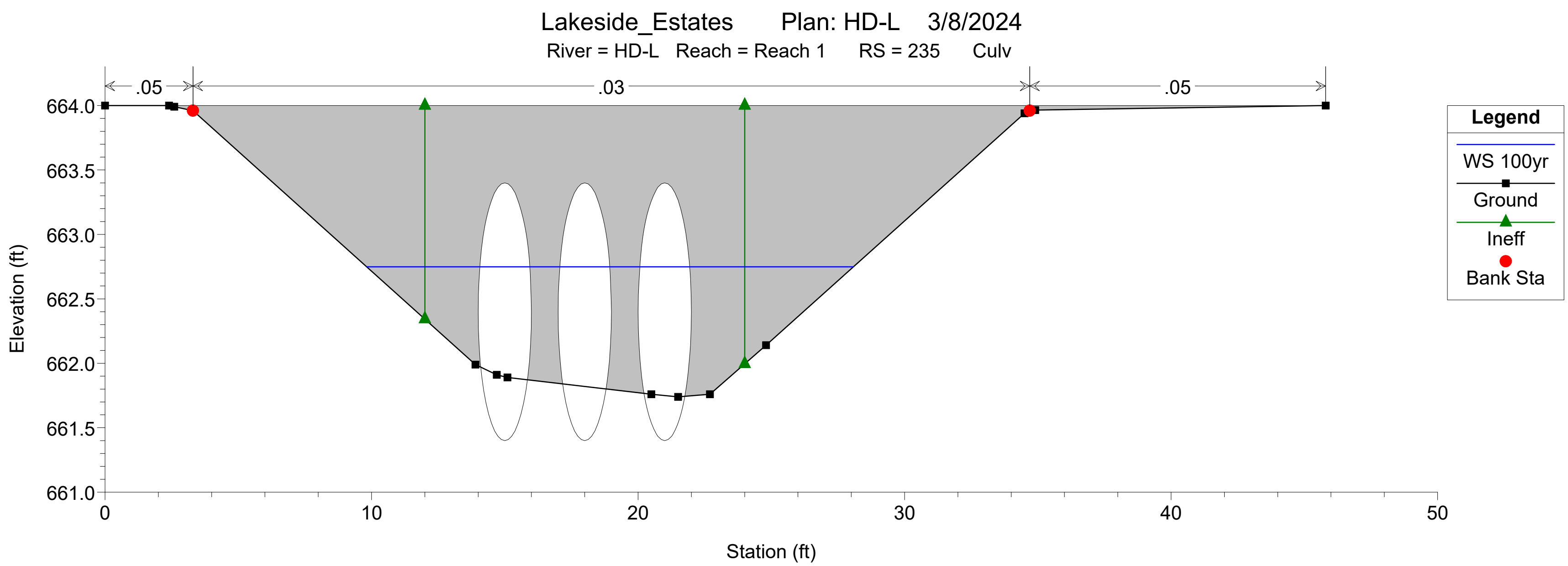
Lakeside_Estates Plan: HD-L 3/8/2024
River = HD-L Reach = Reach 1 RS = 294
.05
.03
.05
Legend
WS 100yr
Ground
Bank Sta
Elevation (ft)
668
667
666
665
664
663
662
0
10
20
30
40
50
Station (ft)



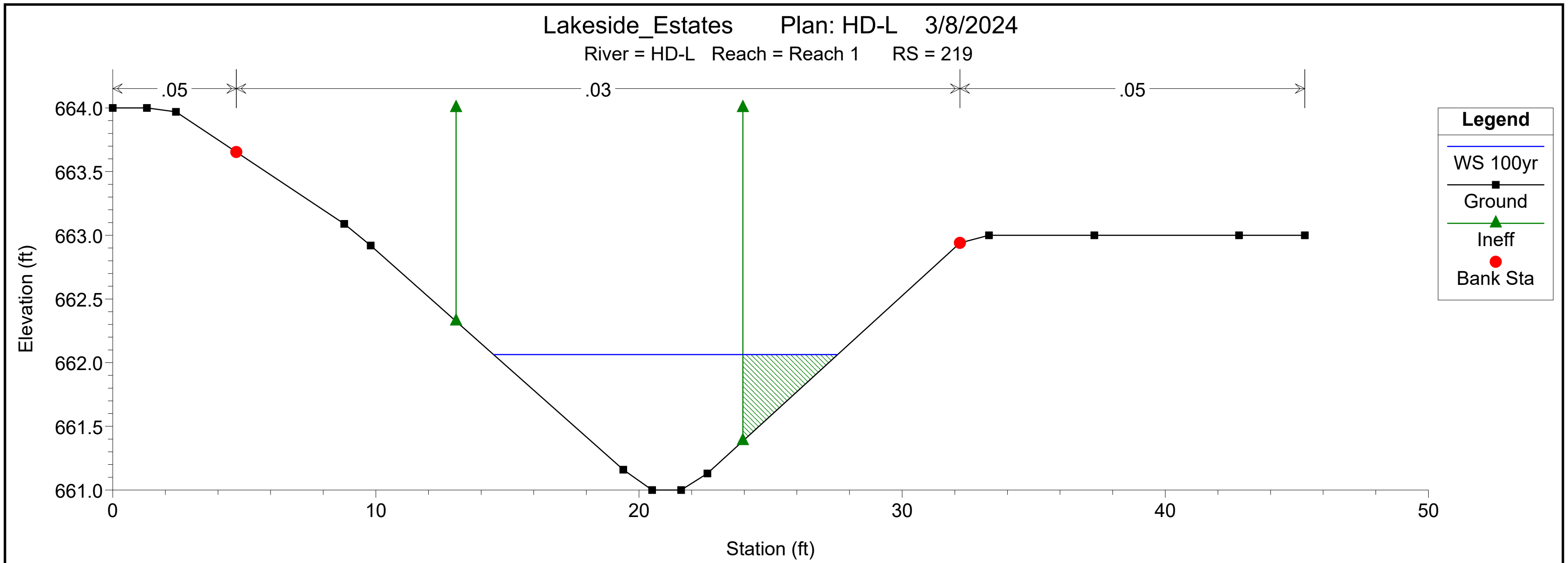
Lakeside_Estates Plan: HD-L 3/8/2024
River = HD-L Reach = Reach 1 RS = 256
.05
.03
.05
Legend
WS 100yr
Ground
Bank Sta
Elevation (ft)
665.0
664.5
664.0
663.5
663.0
662.5
662.0
0
10
20
30
40
Station (ft)

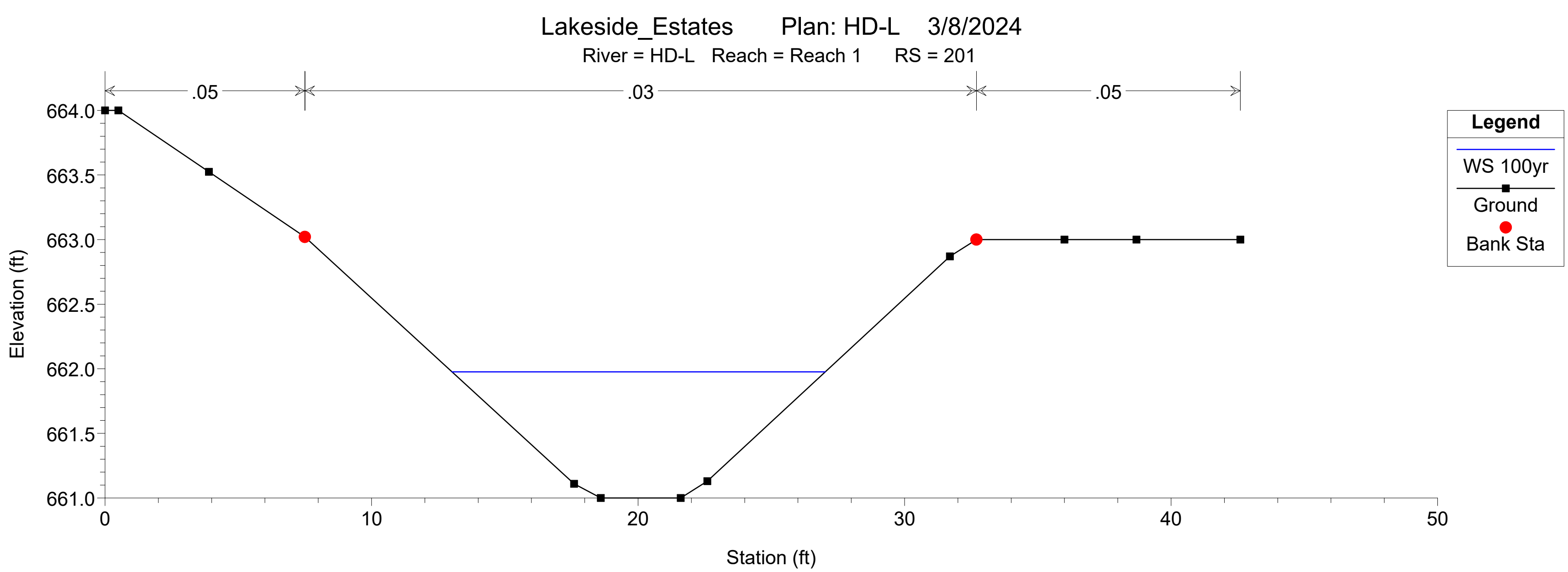


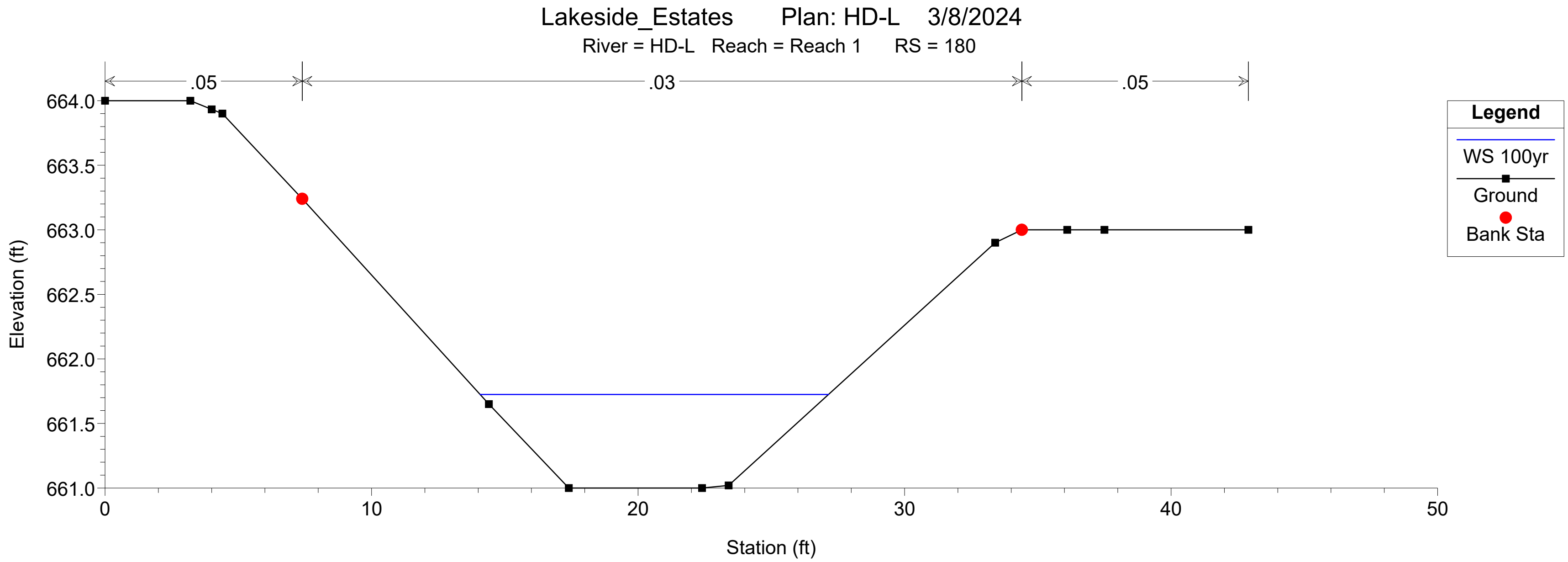
Lakeside_Estates Plan: HD-L 3/8/2024
River = HD-L Reach = Reach 1 RS = 237
.05
.03
.05
Elevation (ft)
Station (ft)
Legend
WS 100yr
Ground
Ineff
Bank Sta



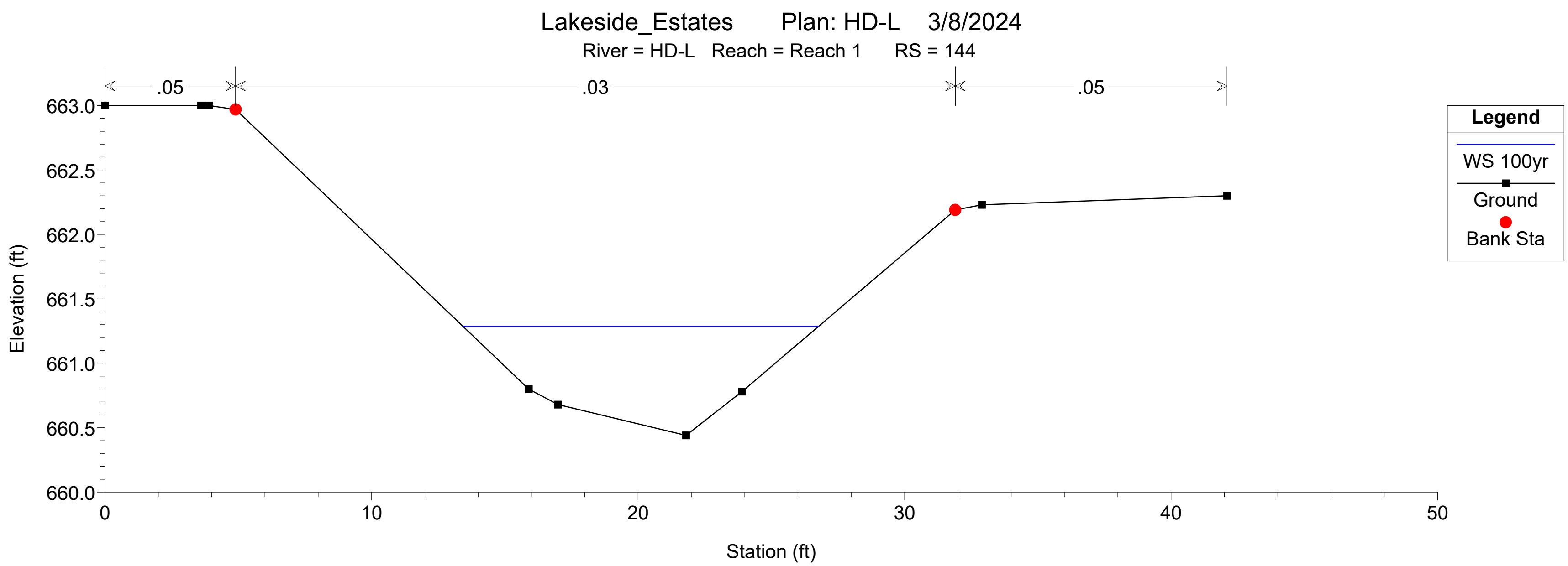
Lakeside_Estates Plan: HD-L 3/8/2024
River = HD-L Reach = Reach 1 RS = 235 Culv
.05
.03
.05
Elevation (ft)
Station (ft)
Legend
WS 100yr
Ground
Ineff
Bank Sta


Lakeside_Estates Plan: HD-L 3/8/2024
River = HD-L Reach = Reach 1 RS = 219
.05
.03
.05
Elevation (ft)
664.0
663.5
663.0
662.5
662.0
661.5
661.0
0
10
20
30
40
50
Station (ft)
Legend
WS 100yr
Ground
Ineff
Bank Sta

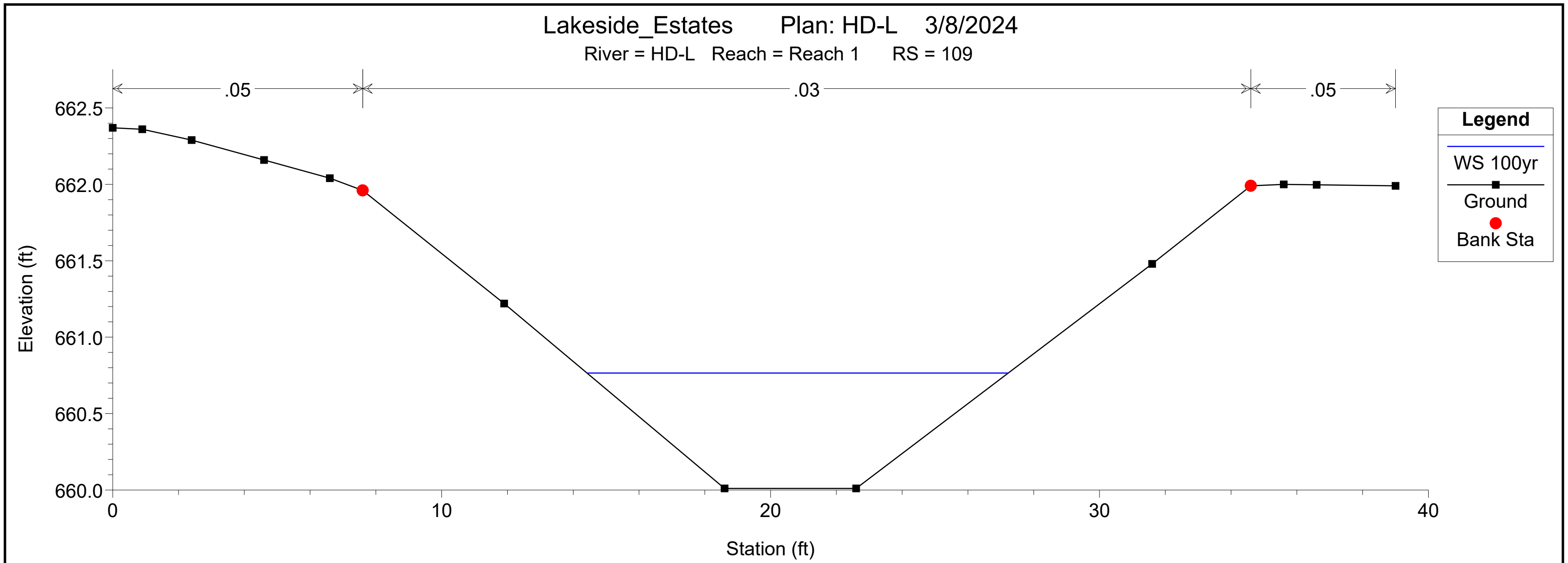

Lakeside_Estates Plan: HD-L 3/8/2024
River = HD-L Reach = Reach 1 RS = 201
.05
.03
.05
Elevation (ft)
664.0
663.5
663.0
662.5
662.0
661.5
661.0
0
10
20
30
40
50
Station (ft)
Legend
WS 100yr
Ground
Bank Sta

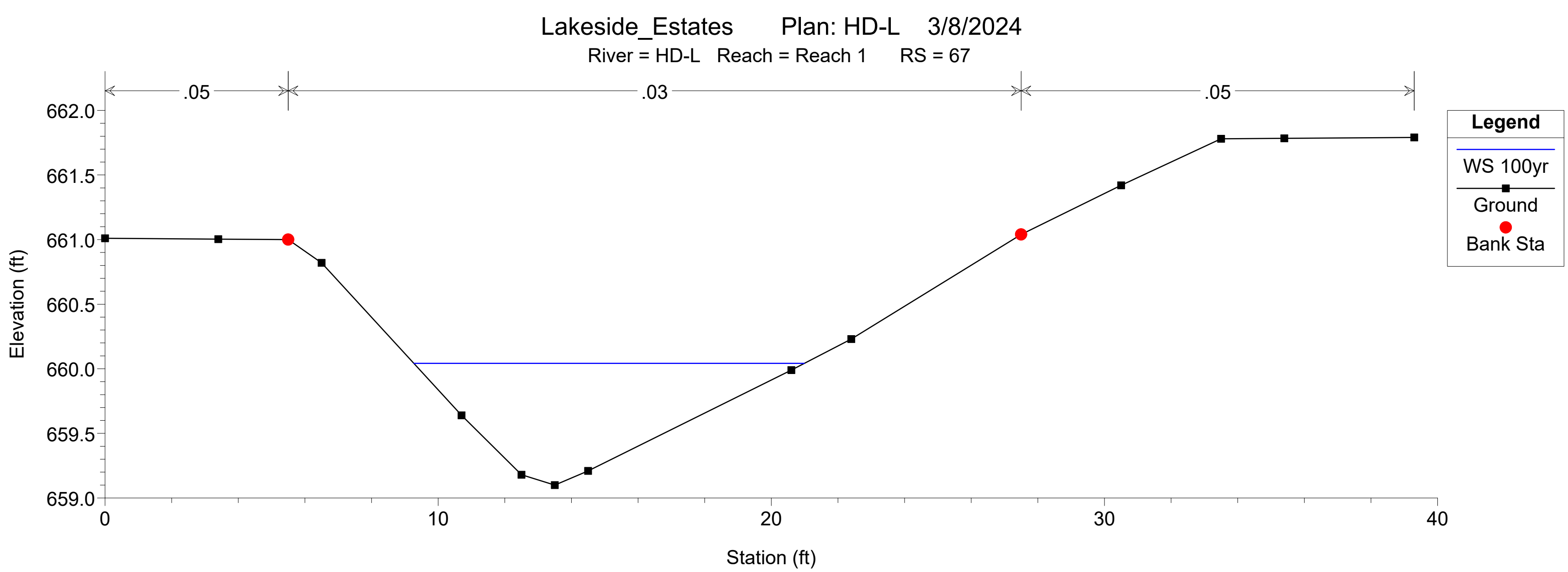


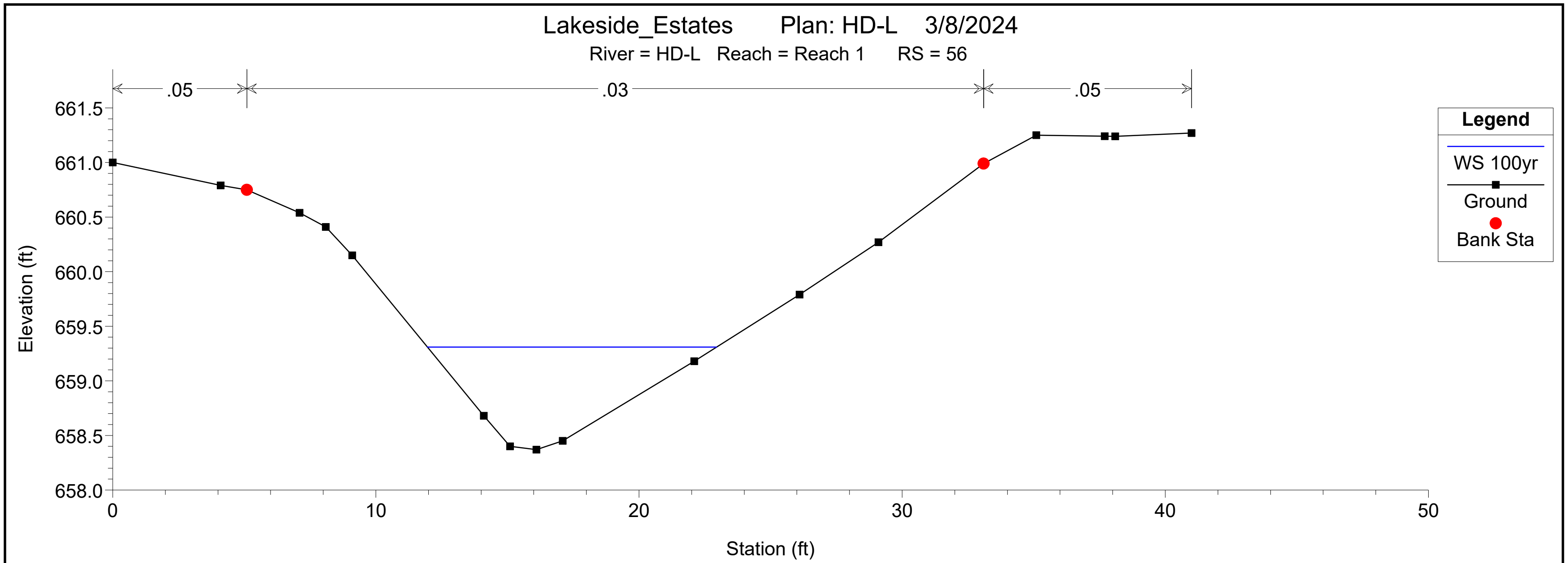
Lakeside_Estates Plan: HD-L 3/8/2024
River = HD-L Reach = Reach 1 RS = 180
.05
.03
.05
664.0
663.5
663.0
662.5
662.0
661.5
661.0
Elevation (ft)
0
10
20
30
40
50
Station (ft)
Legend
WS 100yr
Ground
Bank Sta

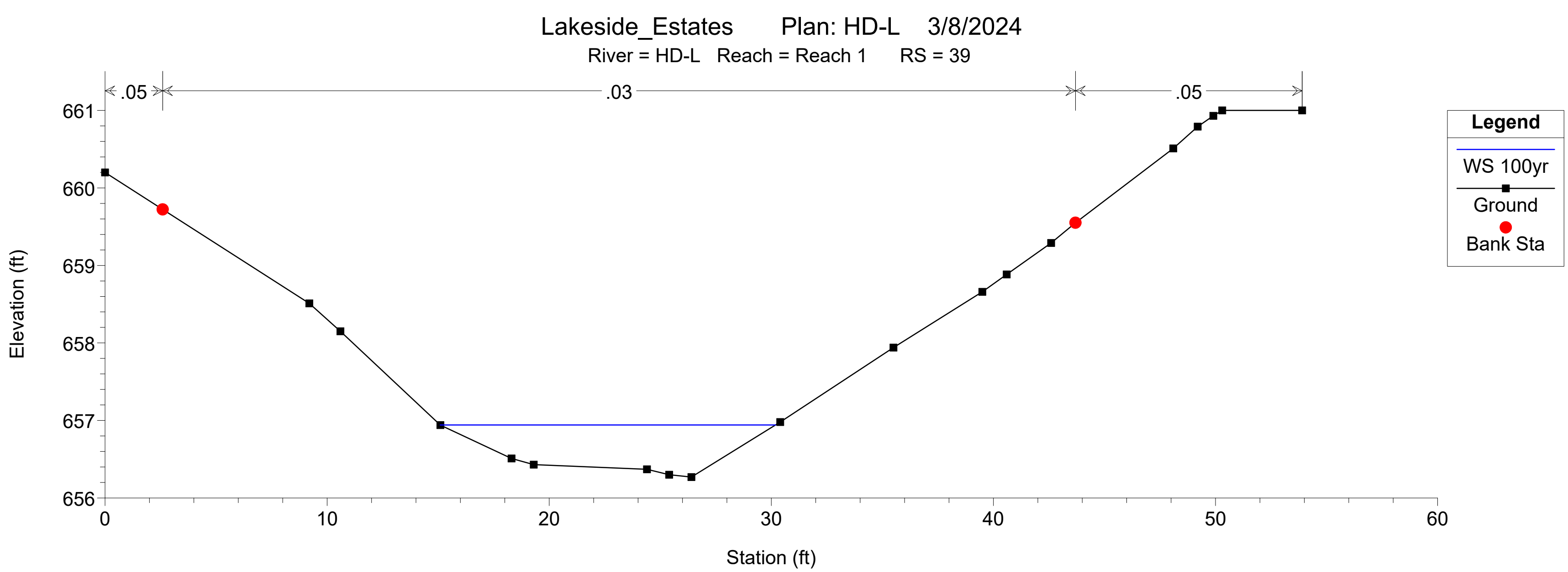


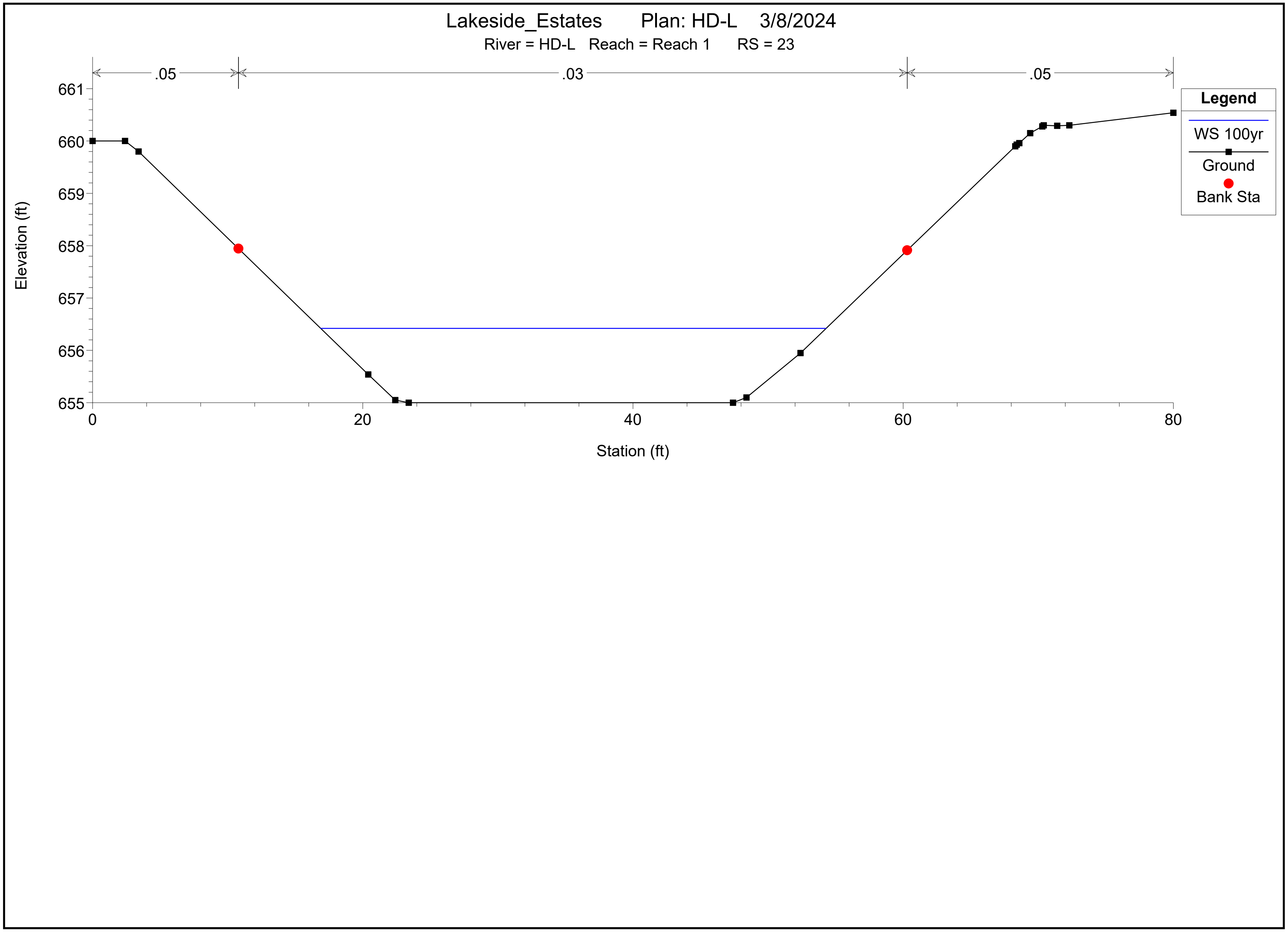
Lakeside_Estates Plan: HD-L 3/8/2024
River = HD-L Reach = Reach 1 RS = 144
.05
.03
.05
663.0
662.5
662.0
661.5
661.0
660.5
660.0
Elevation (ft)
0
10
20
30
40
50
Station (ft)
Legend
WS 100yr
Ground
Bank Sta


Lakeside_Estates Plan: HD-L 3/8/2024
River = HD-L Reach = Reach 1 RS = 109
.05
.03
.05
Elevation (ft)
662.5
662.0
661.5
661.0
660.5
660.0
0
10
20
30
40
Station (ft)
Legend
WS 100yr
Ground
Bank Sta


Lakeside_Estates Plan: HD-L 3/8/2024
River = HD-L Reach = Reach 1 RS = 67
.05
.03
.05
Elevation (ft)
662.0
661.5
661.0
660.5
660.0
659.5
659.0
0
10
20
30
40
Station (ft)
Legend
WS 100yr
Ground
Bank Sta

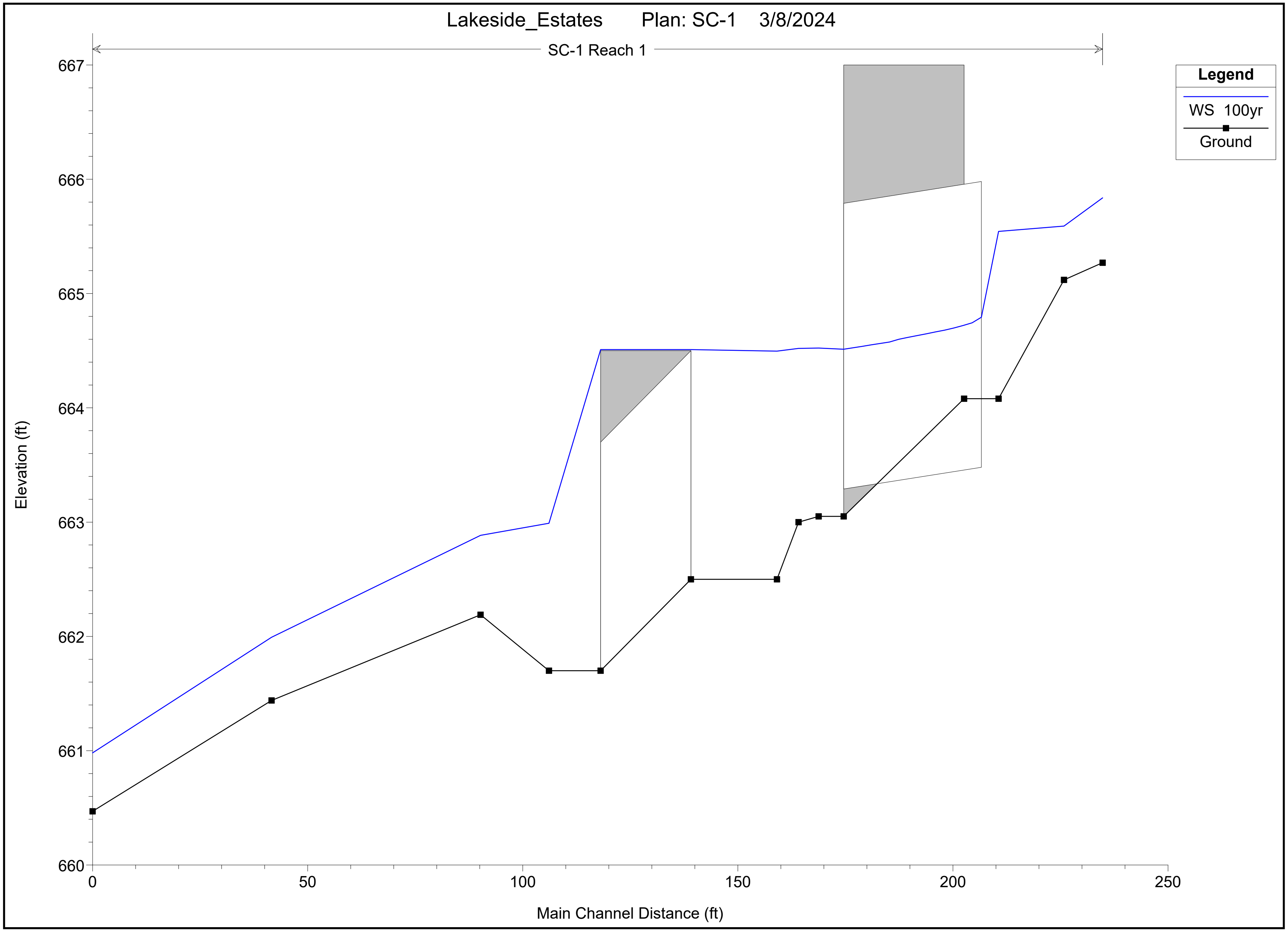

Lakeside_Estates Plan: HD-L 3/8/2024
River = HD-L Reach = Reach 1 RS = 56
.05
.03
.05
Elevation (ft)
661.5
661.0
660.5
660.0
659.5
659.0
658.5
658.0
0
10
20
30
40
50
Station (ft)
Legend
WS 100yr
Ground
Bank Sta


Lakeside_Estates Plan: HD-L 3/8/2024
River = HD-L Reach = Reach 1 RS = 39
.05
.03
.05
Elevation (ft)
661
660
659
658
657
656
0
10
20
30
40
50
60
Station (ft)
Legend
WS 100yr
Ground
Bank Sta

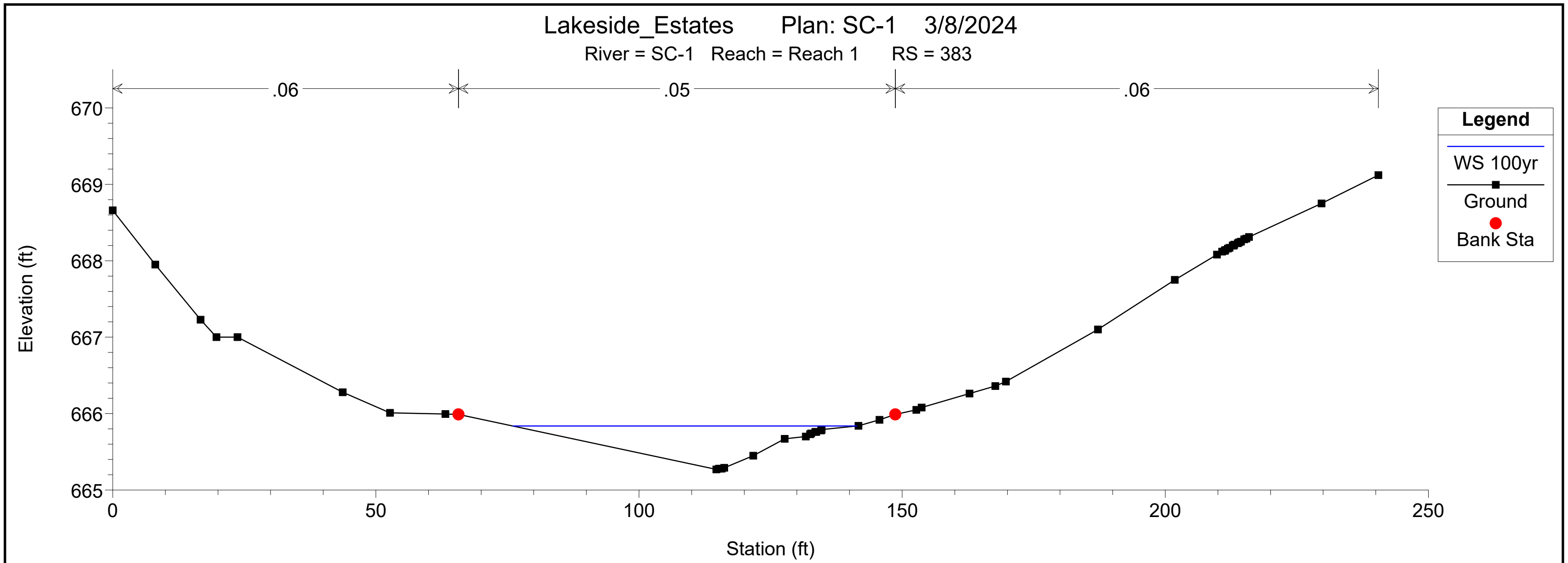


Lakeside_Estates Plan: HD-L 3/8/2024
River = HD-L Reach = Reach 1 RS = 23
.05
.03
.05
Legend
WS 100yr
Ground
Bank Sta
Elevation (ft)
661
660
659
658
657
656
655
0
20
40
60
80
Station (ft)

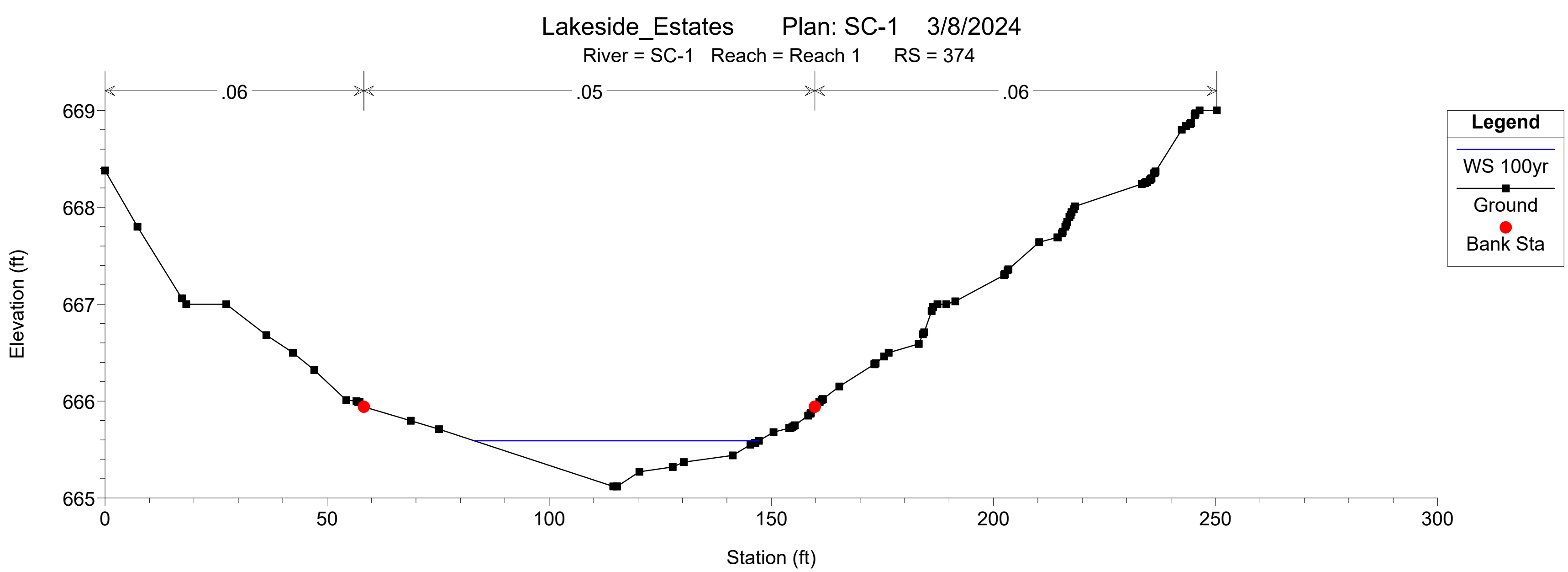
SC-1



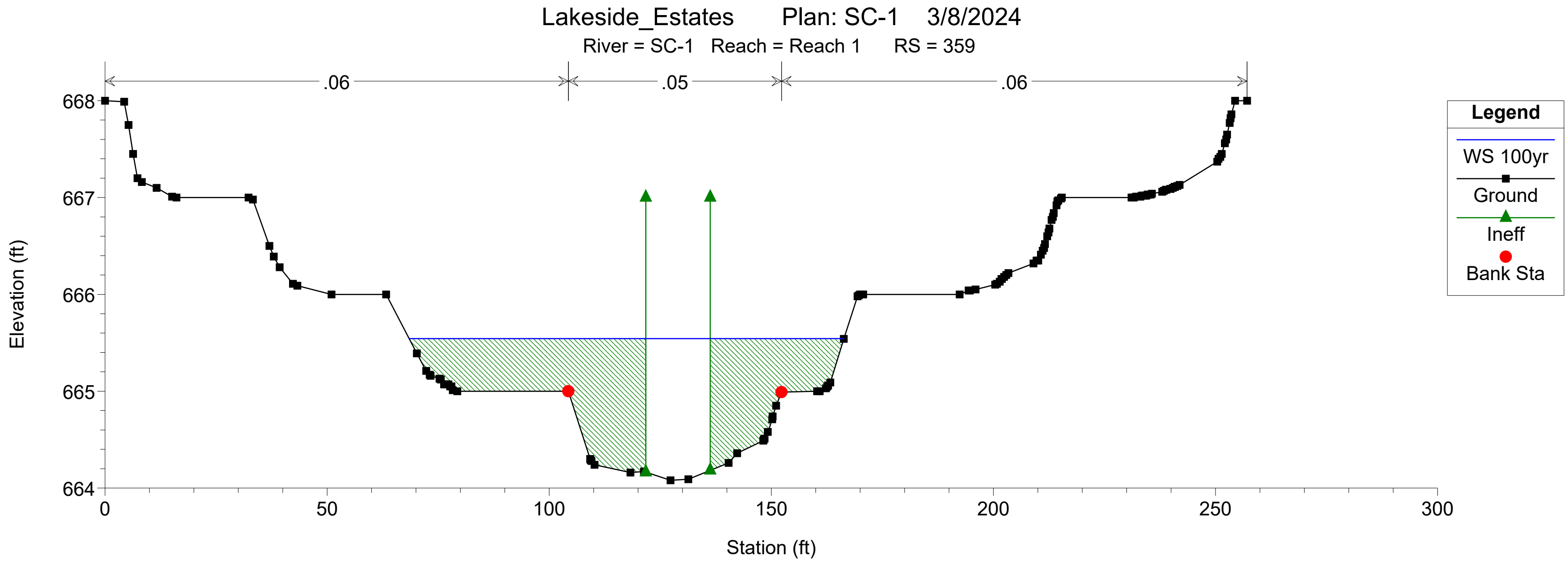
Lakeside_Estates Plan: SC-1 3/8/2024
SC-1 Reach 1
Legend
WS 100yr
Ground
Elevation (ft)
Main Channel Distance (ft)
667
666
665
664
663
662
661
660
0
50
100
150
200
250

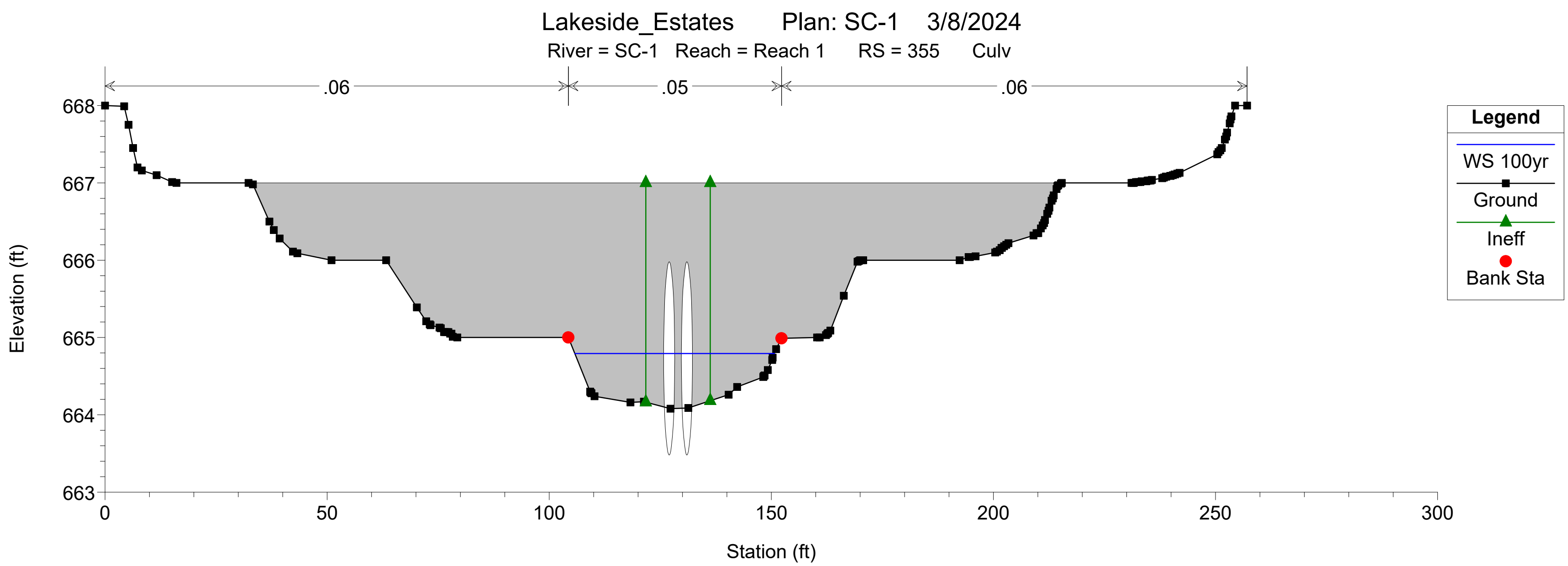


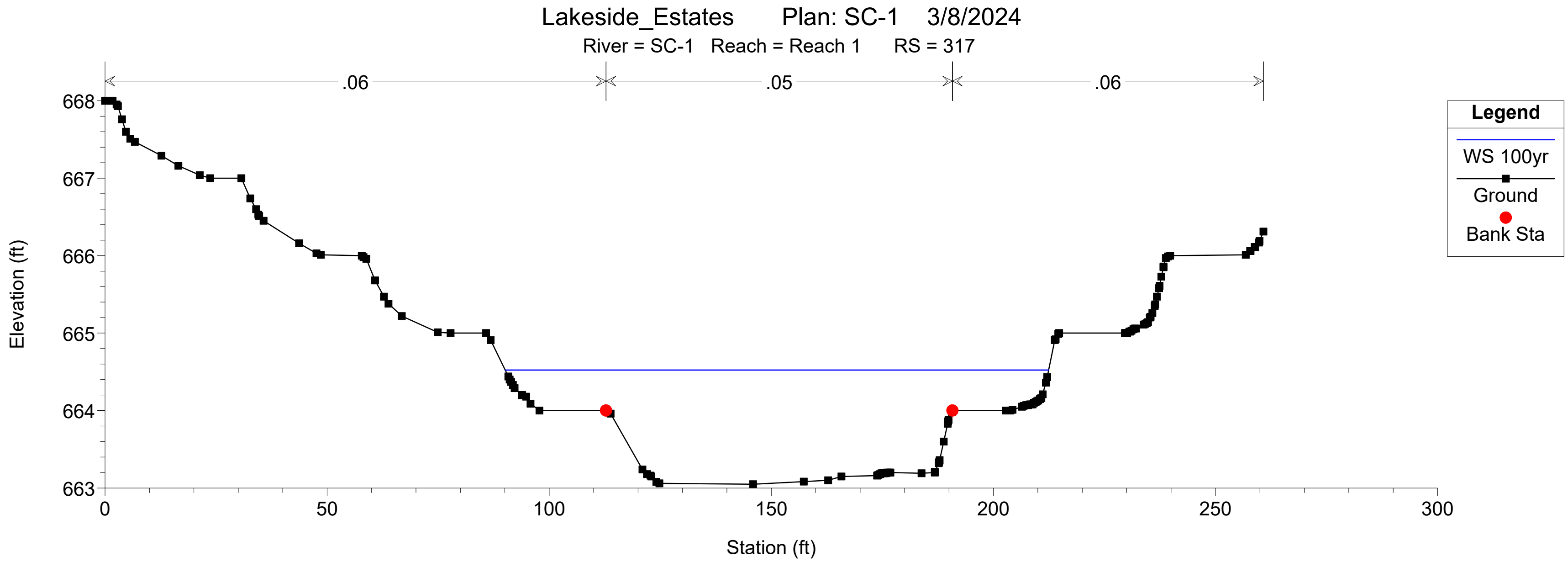
Lakeside_Estates Plan: SC-1 3/8/2024
River = SC-1 Reach = Reach 1 RS = 383
.06
.05
.06
Legend
WS 100yr
Ground
Bank Sta
Elevation (ft)
665
666
667
668
669
670
Station (ft)
0
50
100
150
200
250

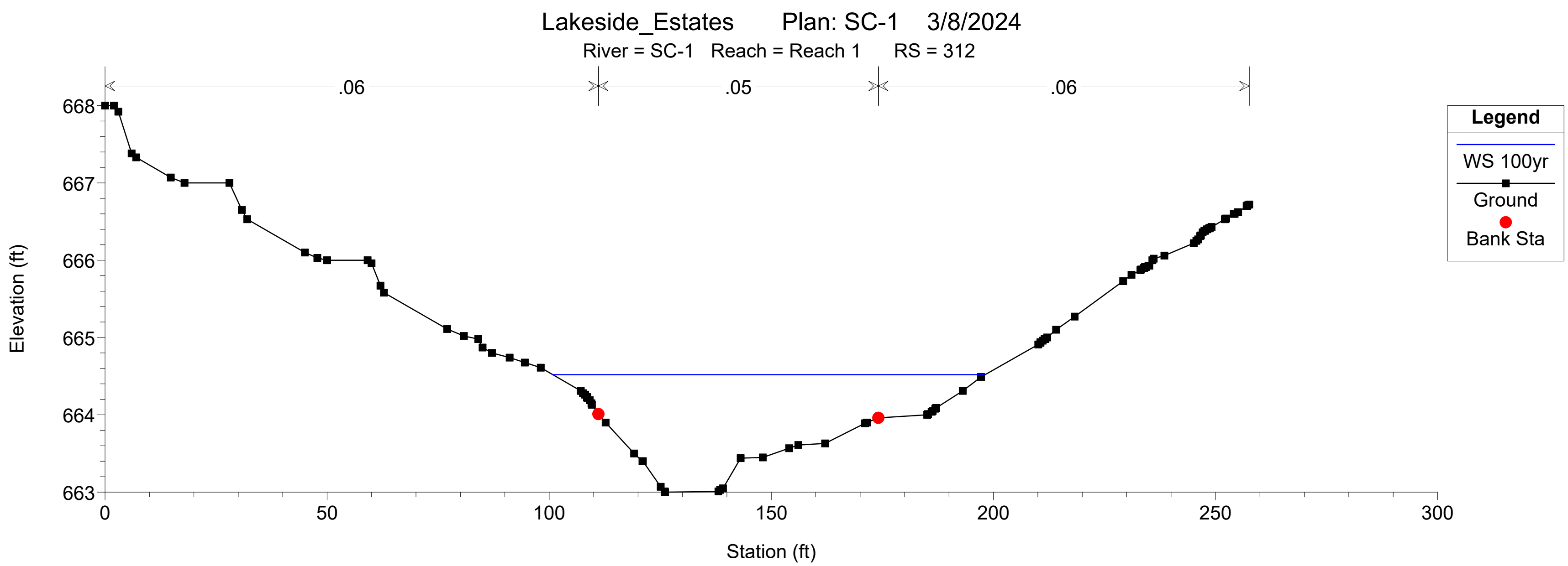


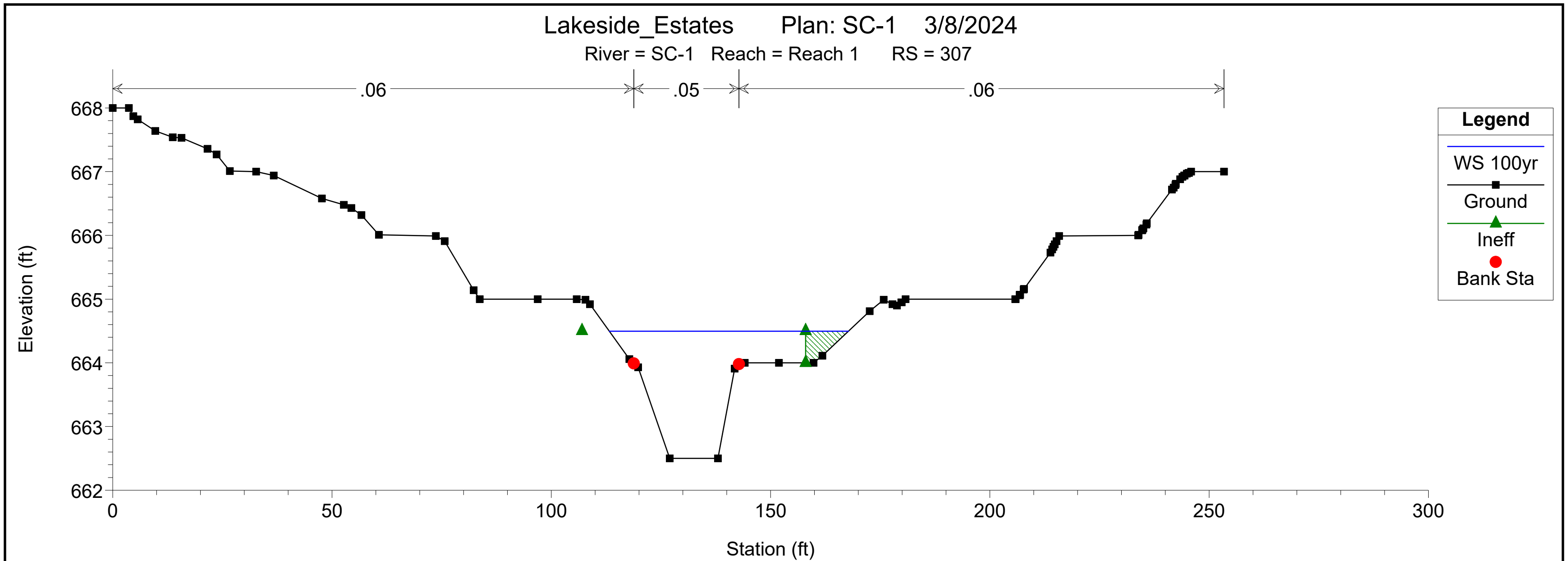
Lakeside_Estates Plan: SC-1 3/8/2024
River = SC-1 Reach = Reach 1 RS = 374
.06
.05
.06
Legend
WS 100yr
Ground
Bank Sta
Elevation (ft)
665
666
667
668
669
Station (ft)
0
50
100
150
200
250
300


Lakeside_Estates Plan: SC-1 3/8/2024
River = SC-1 Reach = Reach 1 RS = 359
.06
.05
.06
Elevation (ft)
Station (ft)
Legend
WS 100yr
Ground
Ineff
Bank Sta

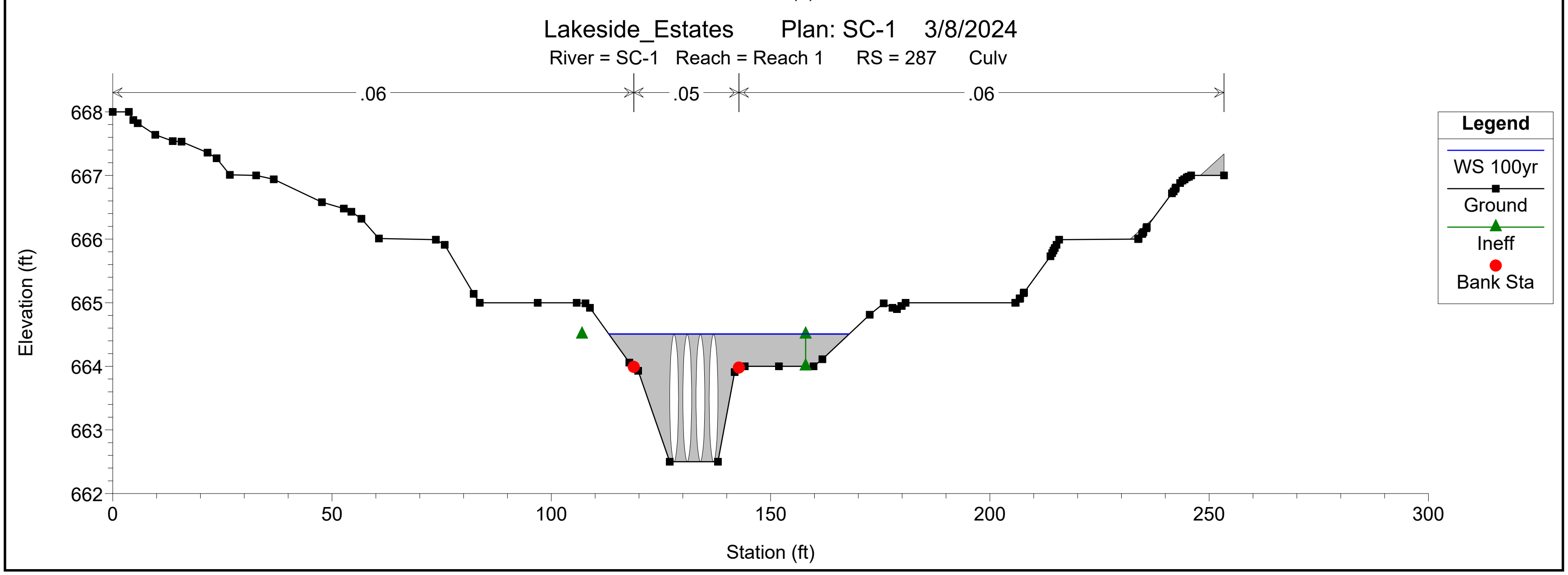

Lakeside_Estates Plan: SC-1 3/8/2024
River = SC-1 Reach = Reach 1 RS = 355 Culv
.06
.05
.06
Elevation (ft)
Station (ft)
Legend
WS 100yr
Ground
Ineff
Bank Sta


Lakeside_Estates Plan: SC-1 3/8/2024
River = SC-1 Reach = Reach 1 RS = 317
.06
.05
.06
Elevation (ft)
668
667
666
665
664
663
0
50
100
150
200
250
300
Station (ft)
Legend
WS 100yr
Ground
Bank Sta

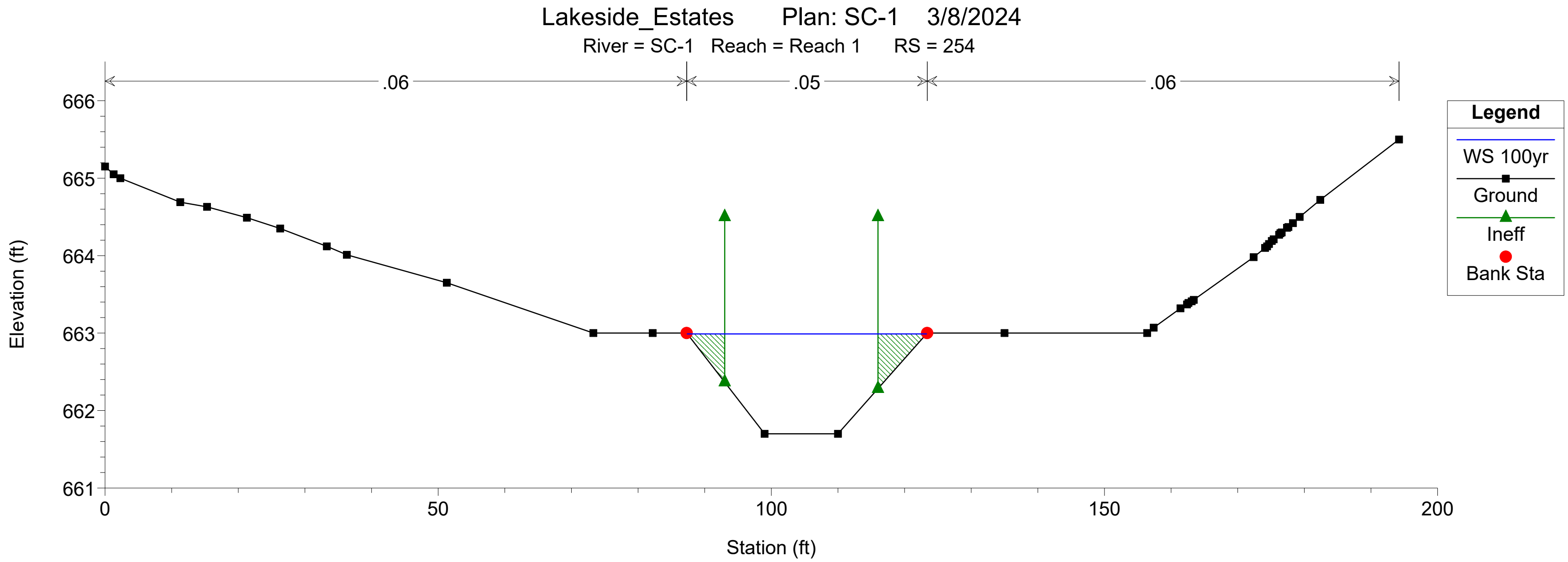

Lakeside_Estates Plan: SC-1 3/8/2024
River = SC-1 Reach = Reach 1 RS = 312
.06
.05
.06
Elevation (ft)
668
667
666
665
664
663
0
50
100
150
200
250
300
Station (ft)
Legend
WS 100yr
Ground
Bank Sta



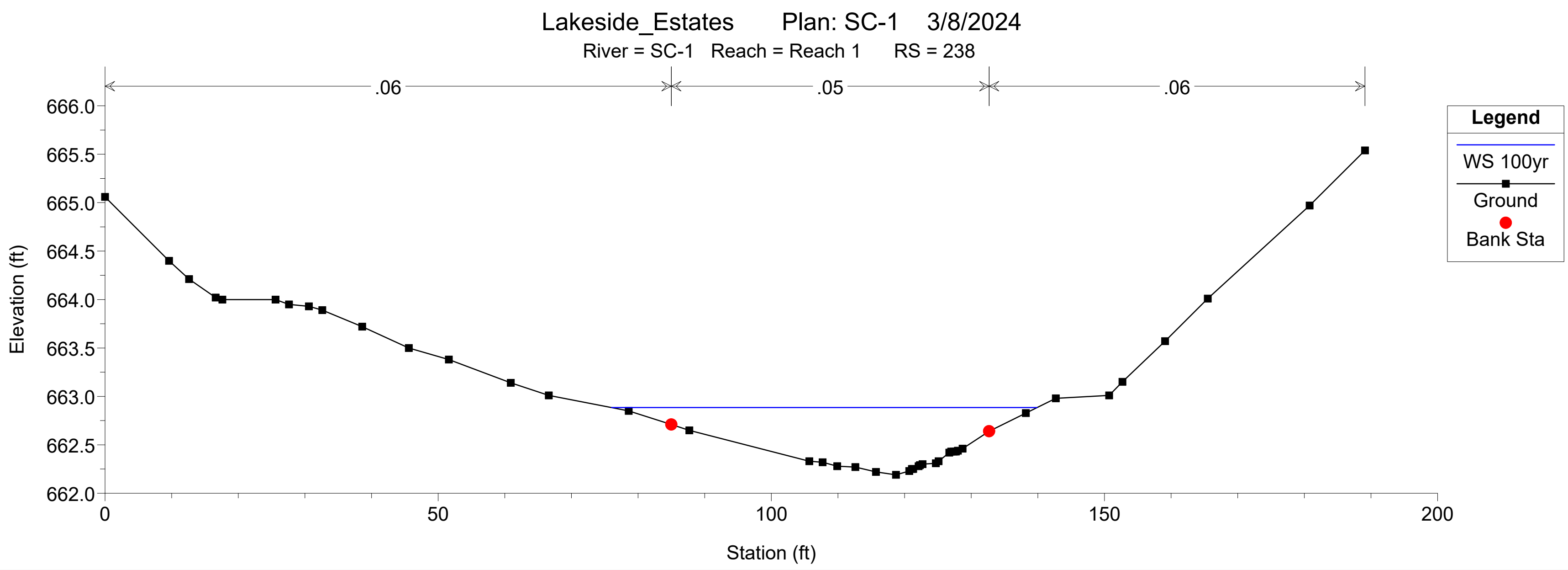
Lakeside_Estates Plan: SC-1 3/8/2024
River = SC-1 Reach = Reach 1 RS = 307
.06
.05
.06
Elevation (ft)
668
667
666
665
664
663
662
0
50
100
150
200
250
300
Station (ft)
Legend
WS 100yr
Ground
Ineff
Bank Sta



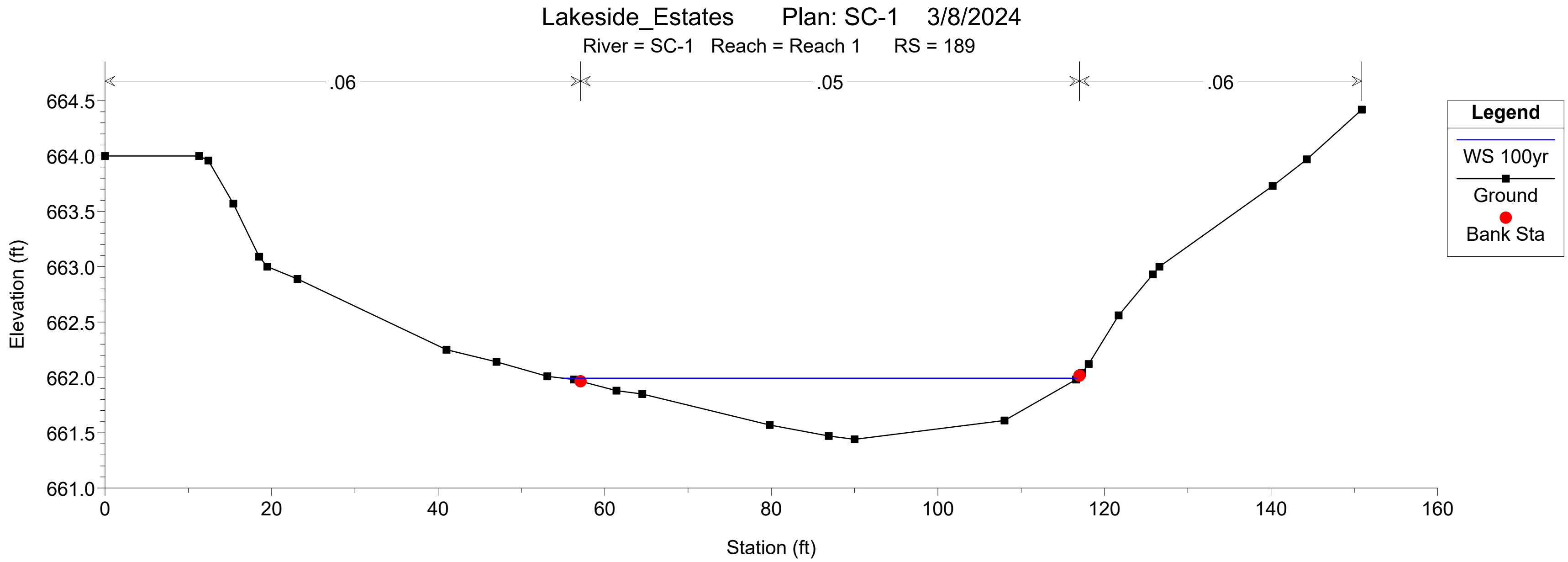
Lakeside_Estates Plan: SC-1 3/8/2024
River = SC-1 Reach = Reach 1 RS = 287 Culv
.06
.05
.06
Elevation (ft)
668
667
666
665
664
663
662
0
50
100
150
200
250
300
Station (ft)
Legend
WS 100yr
Ground
Ineff
Bank Sta

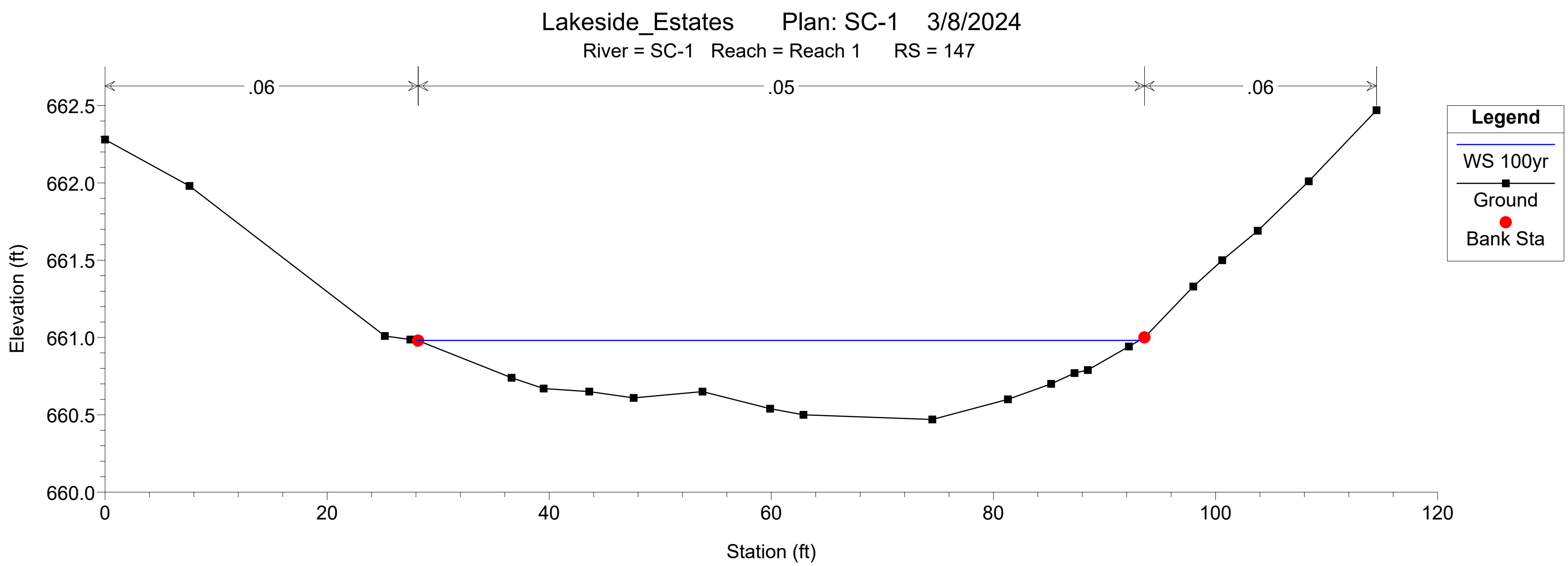


Lakeside_Estates Plan: SC-1 3/8/2024
River = SC-1 Reach = Reach 1 RS = 254
.06
.05
.06
Legend
WS 100yr
Ground
Ineff
Bank Sta
Elevation (ft)
666
665
664
663
662
661
0
50
100
150
200
Station (ft)

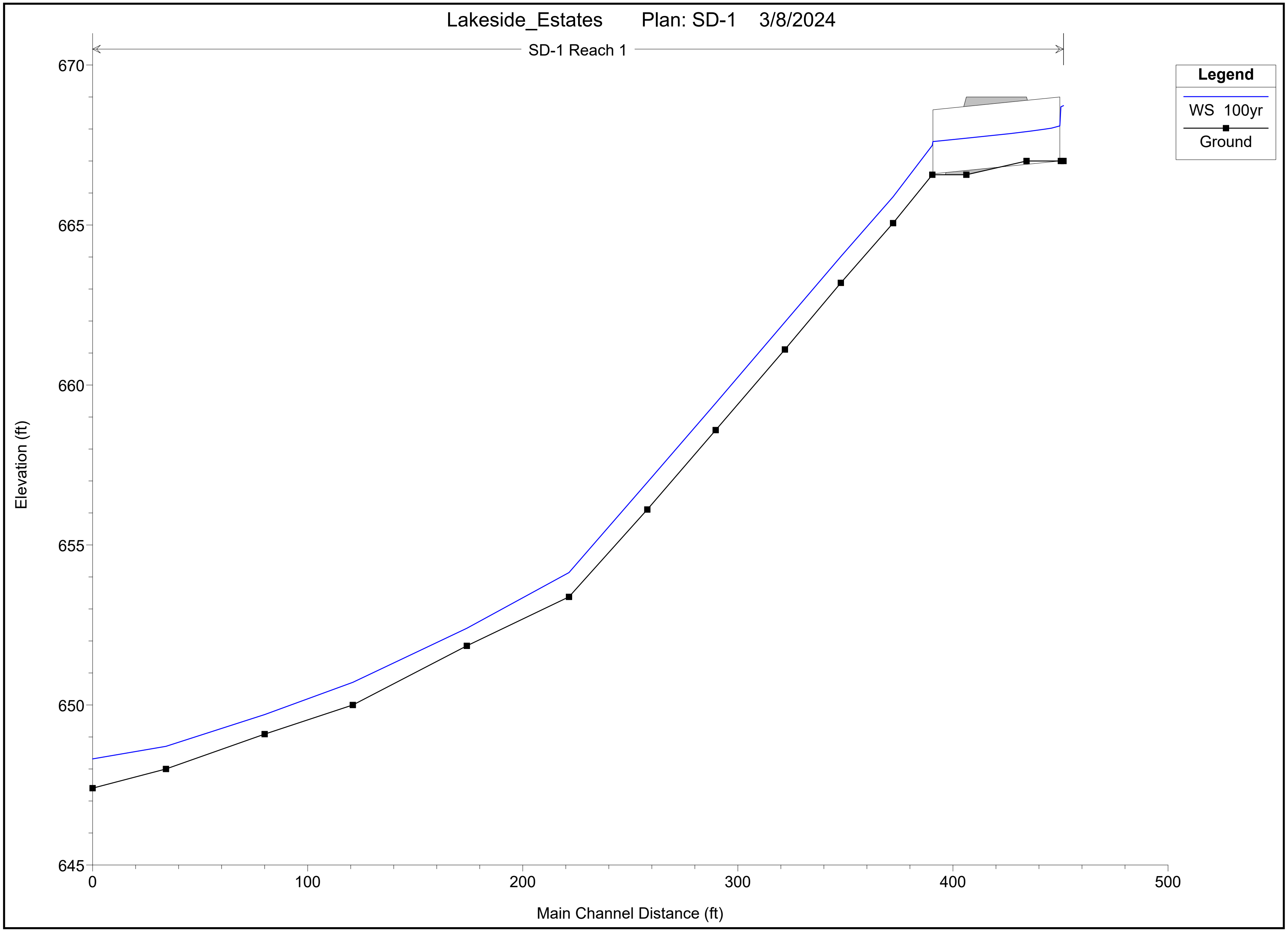


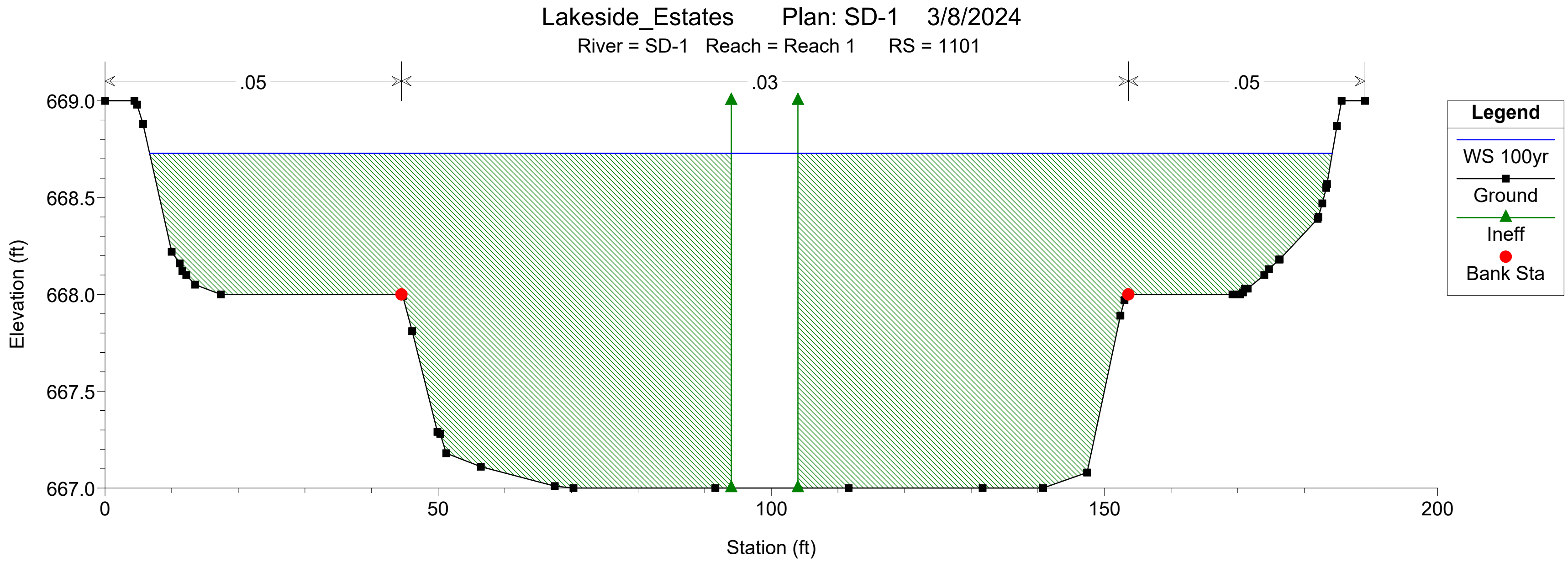
Lakeside_Estates Plan: SC-1 3/8/2024
River = SC-1 Reach = Reach 1 RS = 238
.06
.05
.06
Legend
WS 100yr
Ground
Bank Sta
Elevation (ft)
666.0
665.5
665.0
664.5
664.0
663.5
663.0
662.5
662.0
0
50
100
150
200
Station (ft)

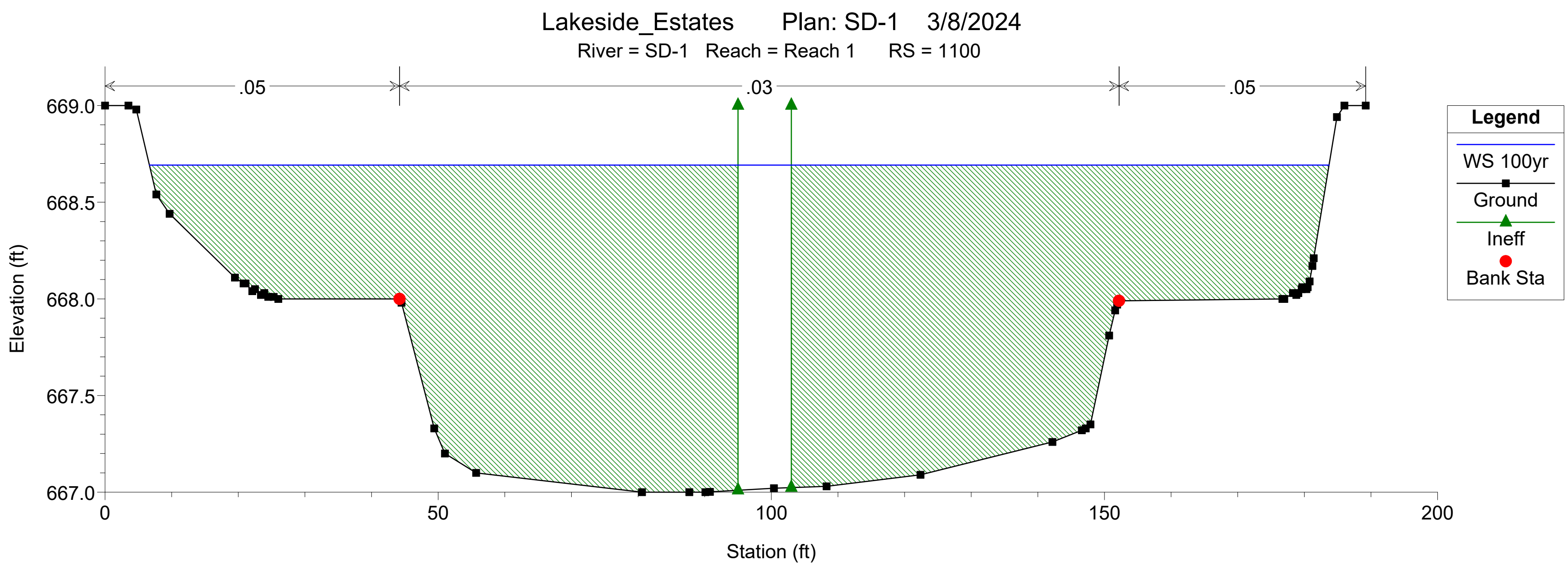

Lakeside_Estates Plan: SC-1 3/8/2024
River = SC-1 Reach = Reach 1 RS = 189
.06
.05
.06
Elevation (ft)
664.5
664.0
663.5
663.0
662.5
662.0
661.5
661.0
0
20
40
60
80
100
120
140
160
Station (ft)
Legend
WS 100yr
Ground
Bank Sta

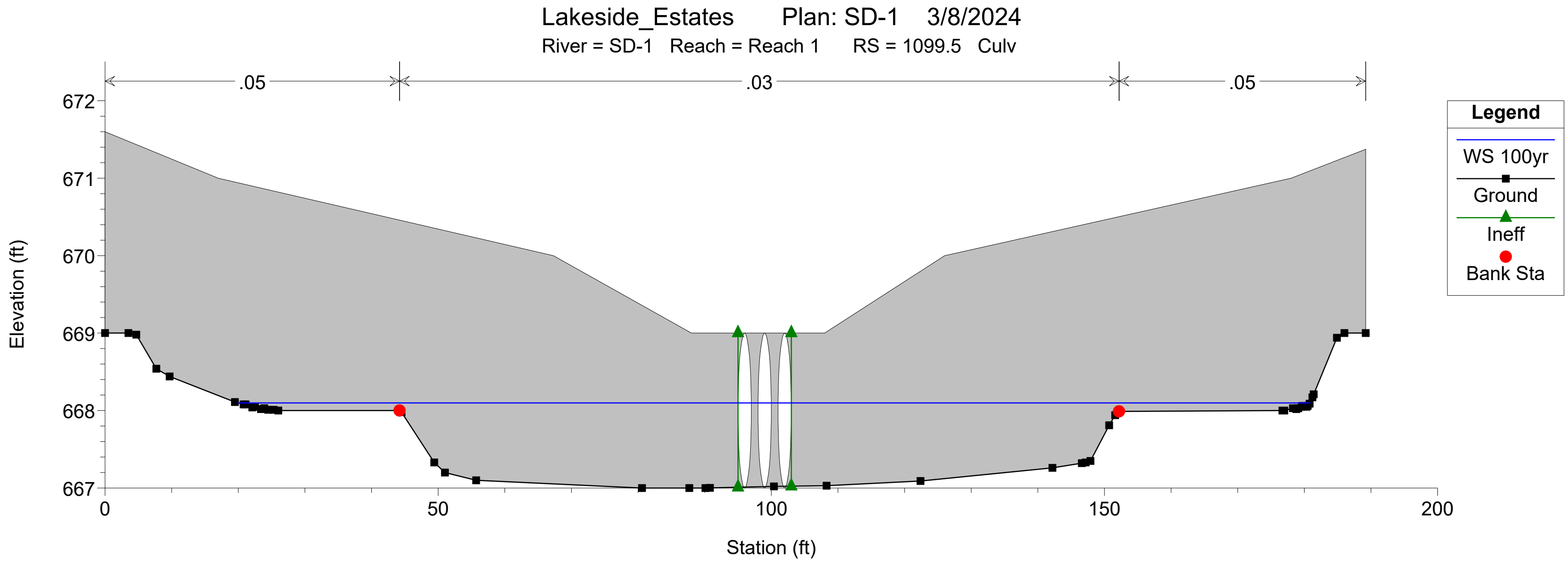

Lakeside_Estates Plan: SC-1 3/8/2024
River = SC-1 Reach = Reach 1 RS = 147
.06
.05
.06
Elevation (ft)
662.5
662.0
661.5
661.0
660.5
660.0
0
20
40
60
80
100
120
Station (ft)
Legend
WS 100yr
Ground
Bank Sta

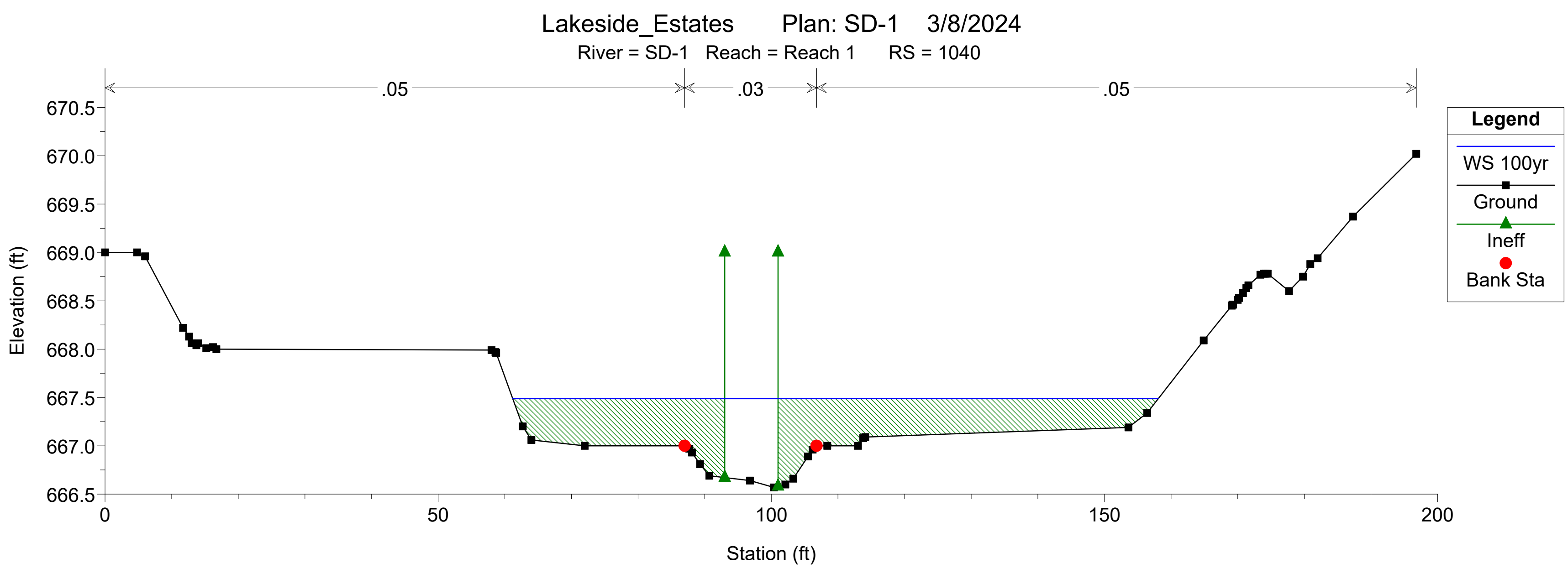
SD-1

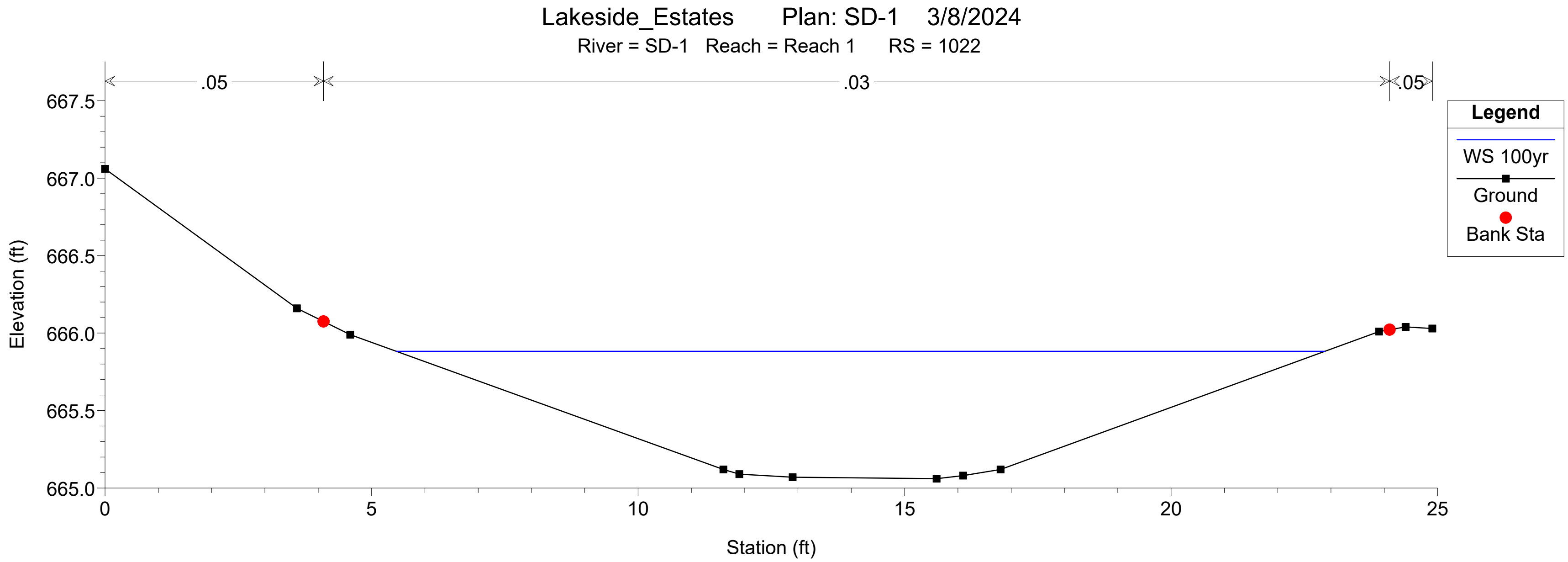

Lakeside_Estates Plan: SD-1 3/8/2024
SD-1 Reach 1
Legend
WS 100yr
Ground
Elevation (ft)
670
665
660
655
650
645
0
100
200
300
400
500
Main Channel Distance (ft)

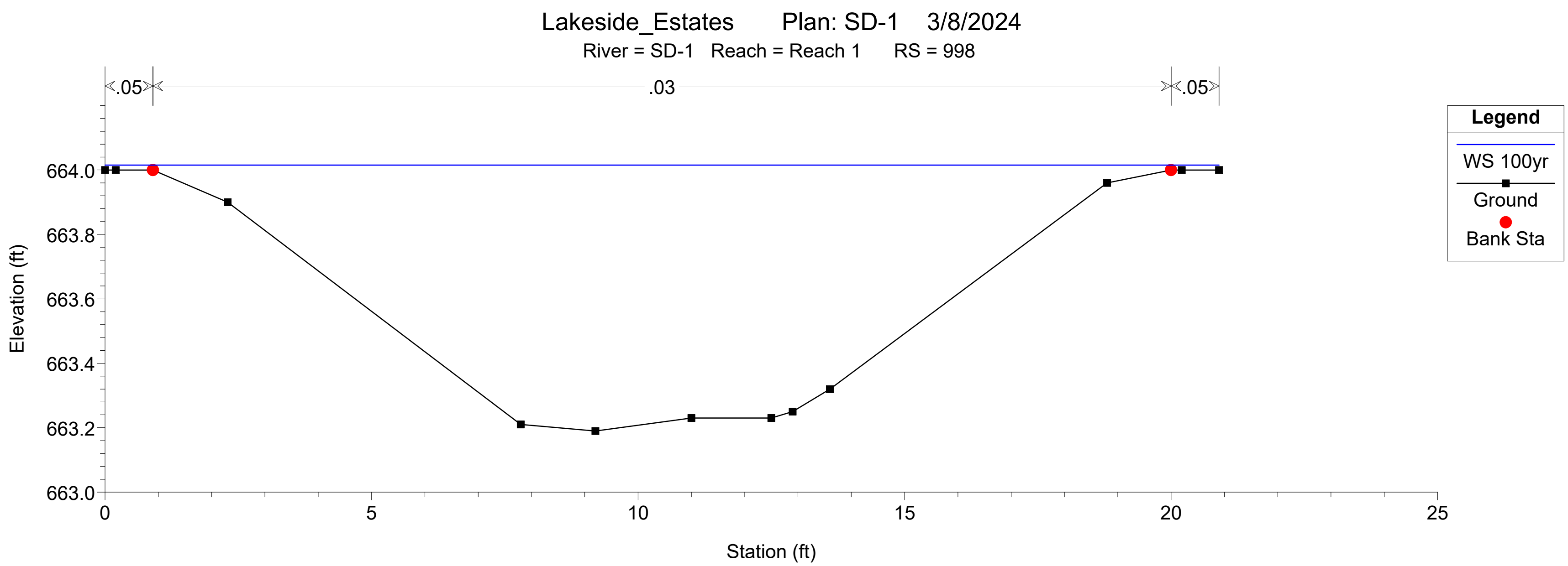

Lakeside_Estates Plan: SD-1 3/8/2024
River = SD-1 Reach = Reach 1 RS = 1101
.05
.03
.05
669.0
668.5
668.0
667.5
667.0
Elevation (ft)
0
50
100
150
200
Station (ft)
Legend
WS 100yr
Ground
Ineff
Bank Sta

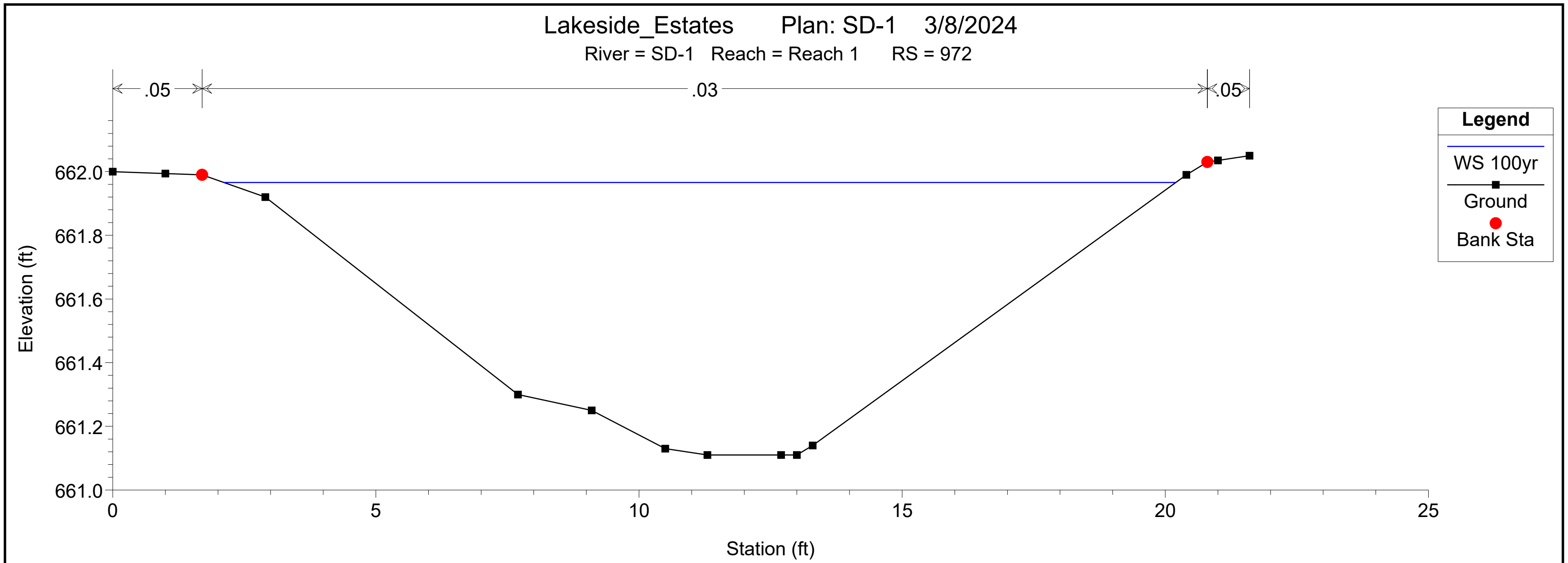

Lakeside_Estates Plan: SD-1 3/8/2024
River = SD-1 Reach = Reach 1 RS = 1100
.05
.03
.05
669.0
668.5
668.0
667.5
667.0
Elevation (ft)
0
50
100
150
200
Station (ft)
Legend
WS 100yr
Ground
Ineff
Bank Sta


Lakeside_Estates Plan: SD-1 3/8/2024
River = SD-1 Reach = Reach 1 RS = 1099.5 Culv
.05
.03
.05
Elevation (ft)
672
671
670
669
668
667
0
50
100
150
200
Station (ft)
Legend
WS 100yr
Ground
Ineff
Bank Sta

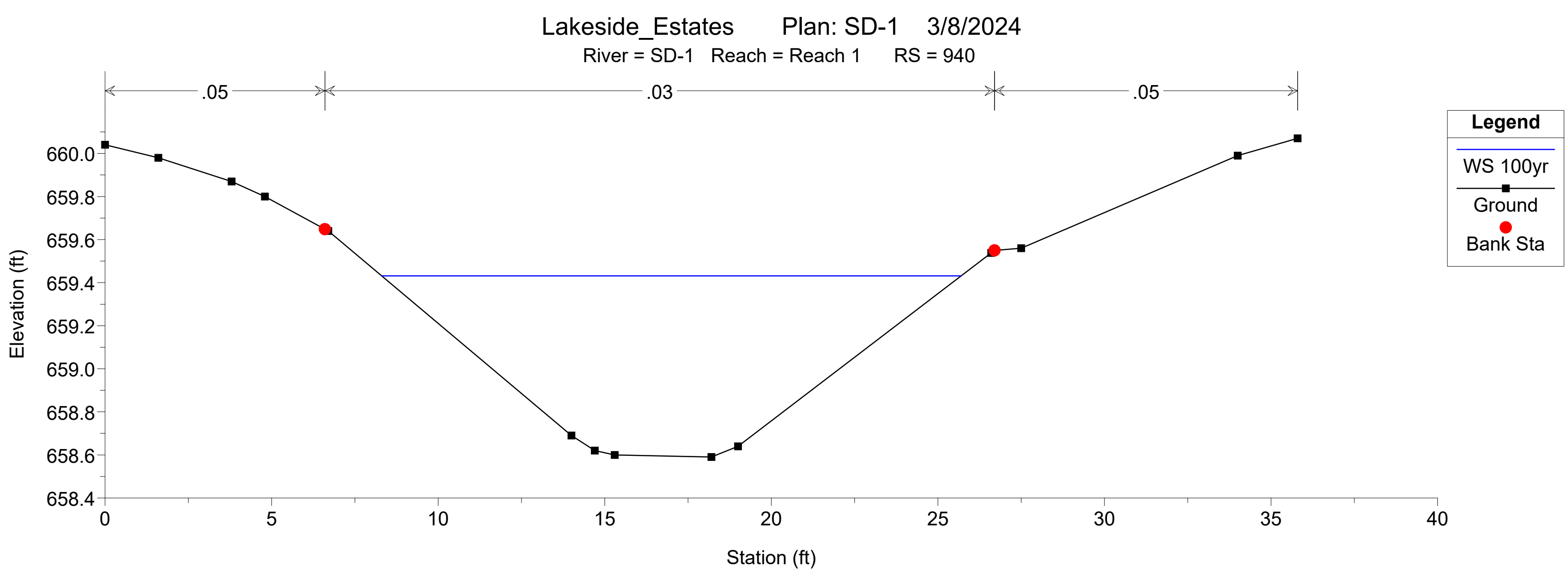

Lakeside_Estates Plan: SD-1 3/8/2024
River = SD-1 Reach = Reach 1 RS = 1040
.05
.03
.05
Elevation (ft)
670.5
670.0
669.5
669.0
668.5
668.0
667.5
667.0
666.5
0
50
100
150
200
Station (ft)
Legend
WS 100yr
Ground
Ineff
Bank Sta


Lakeside_Estates Plan: SD-1 3/8/2024
River = SD-1 Reach = Reach 1 RS = 1022
.05
.03
.05
Legend
WS 100yr
Ground
Bank Sta
Elevation (ft)
667.5
667.0
666.5
666.0
665.5
665.0
0
5
10
15
20
25
Station (ft)

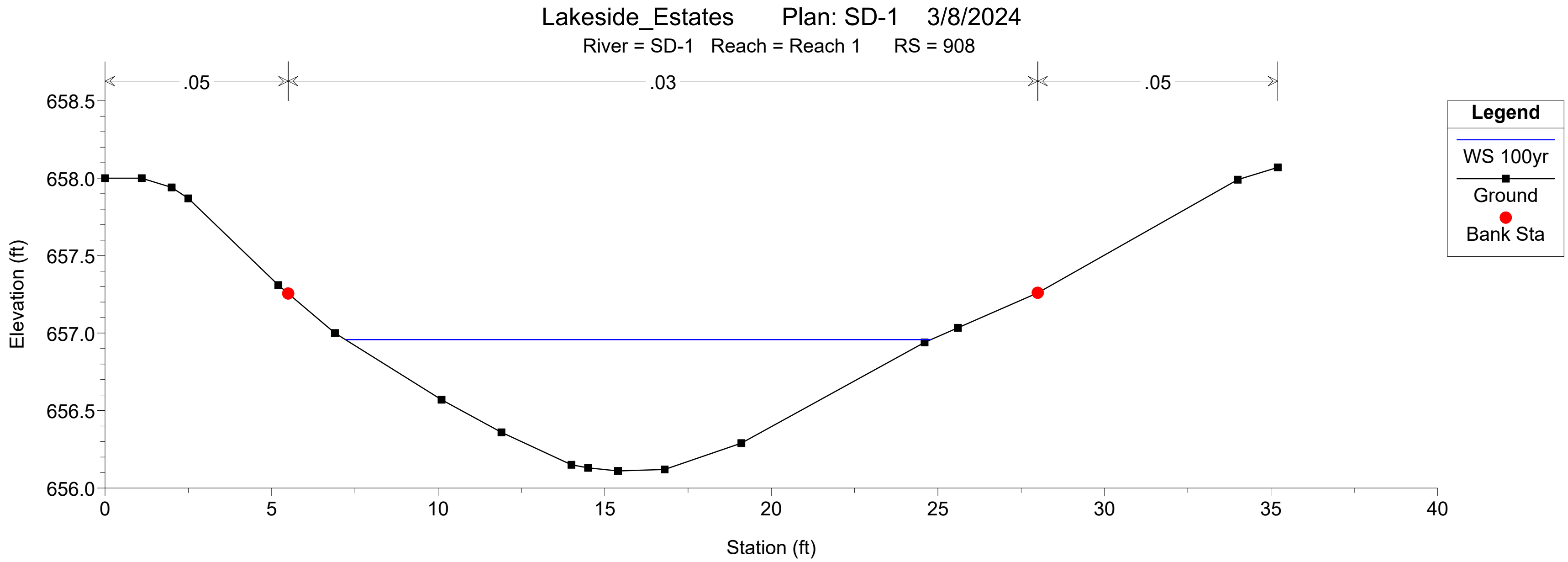

Lakeside_Estates Plan: SD-1 3/8/2024
River = SD-1 Reach = Reach 1 RS = 998
.05
.03
.05
Legend
WS 100yr
Ground
Bank Sta
Elevation (ft)
664.0
663.8
663.6
663.4
663.2
663.0
0
5
10
15
20
25
Station (ft)

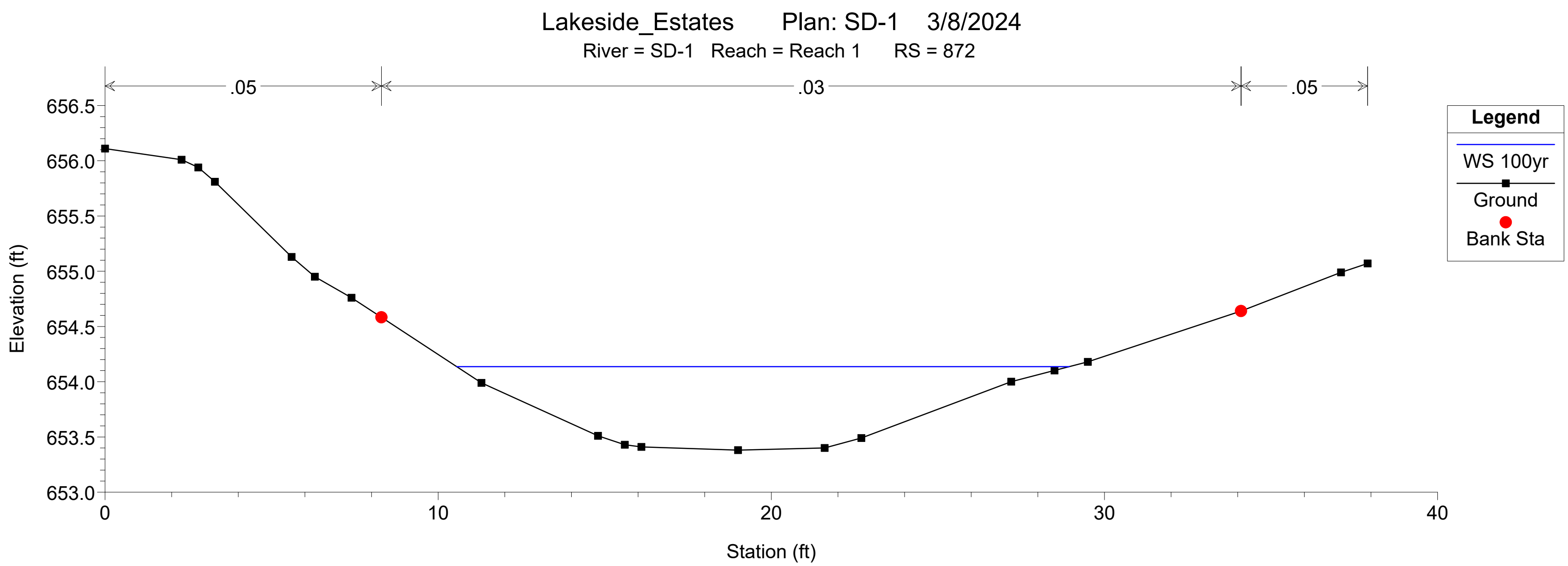


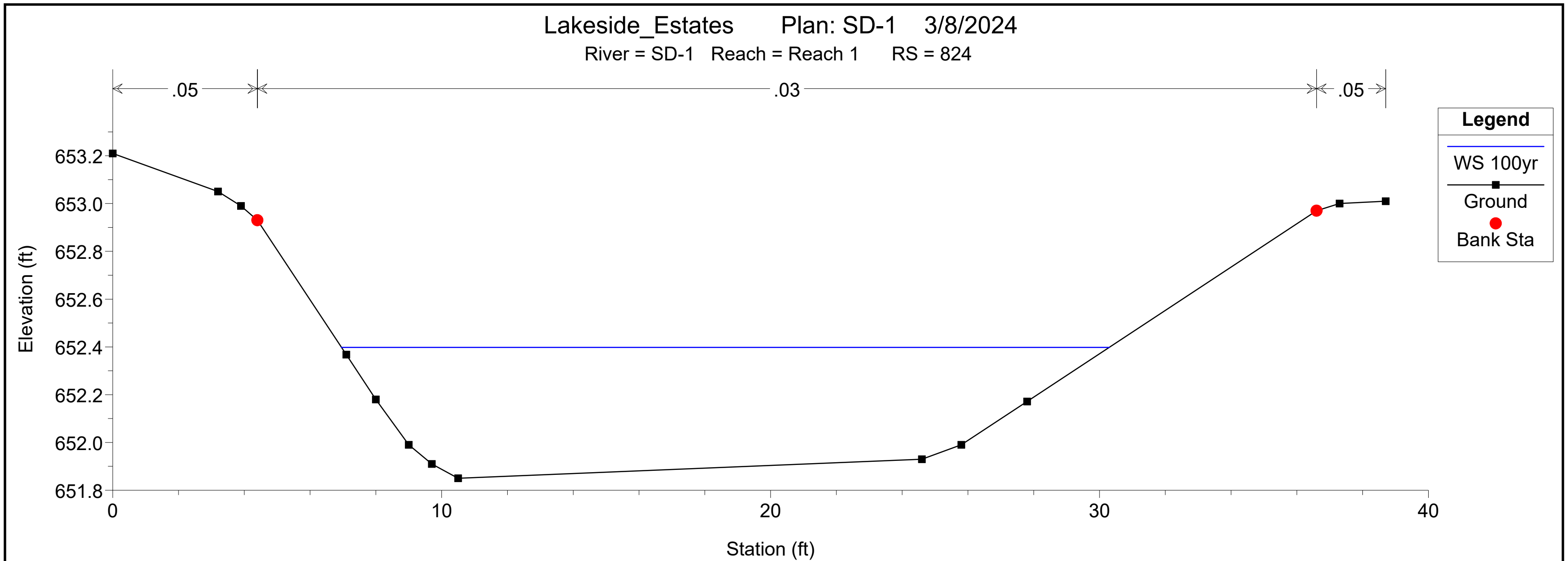
Lakeside_Estates Plan: SD-1 3/8/2024
River = SD-1 Reach = Reach 1 RS = 972
.05
.03
.05
Legend
WS 100yr
Ground
Bank Sta
Elevation (ft)
662.0
661.8
661.6
661.4
661.2
661.0
0
5
10
15
20
25
Station (ft)

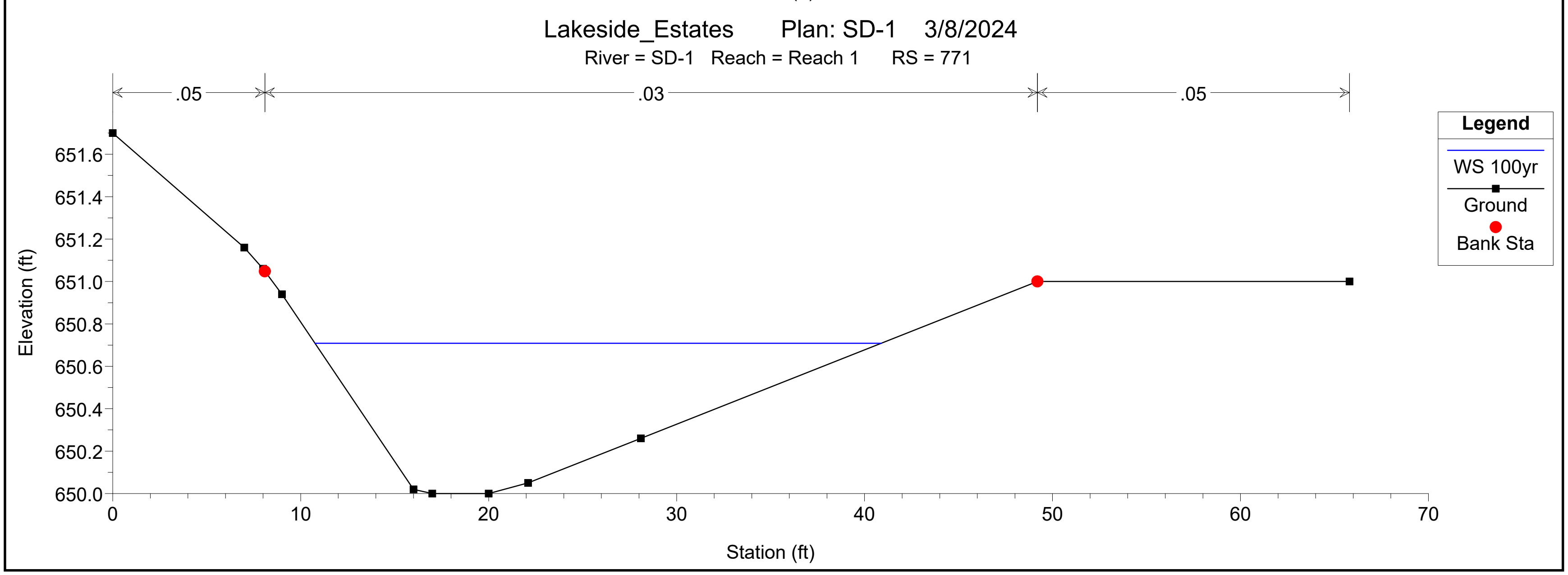


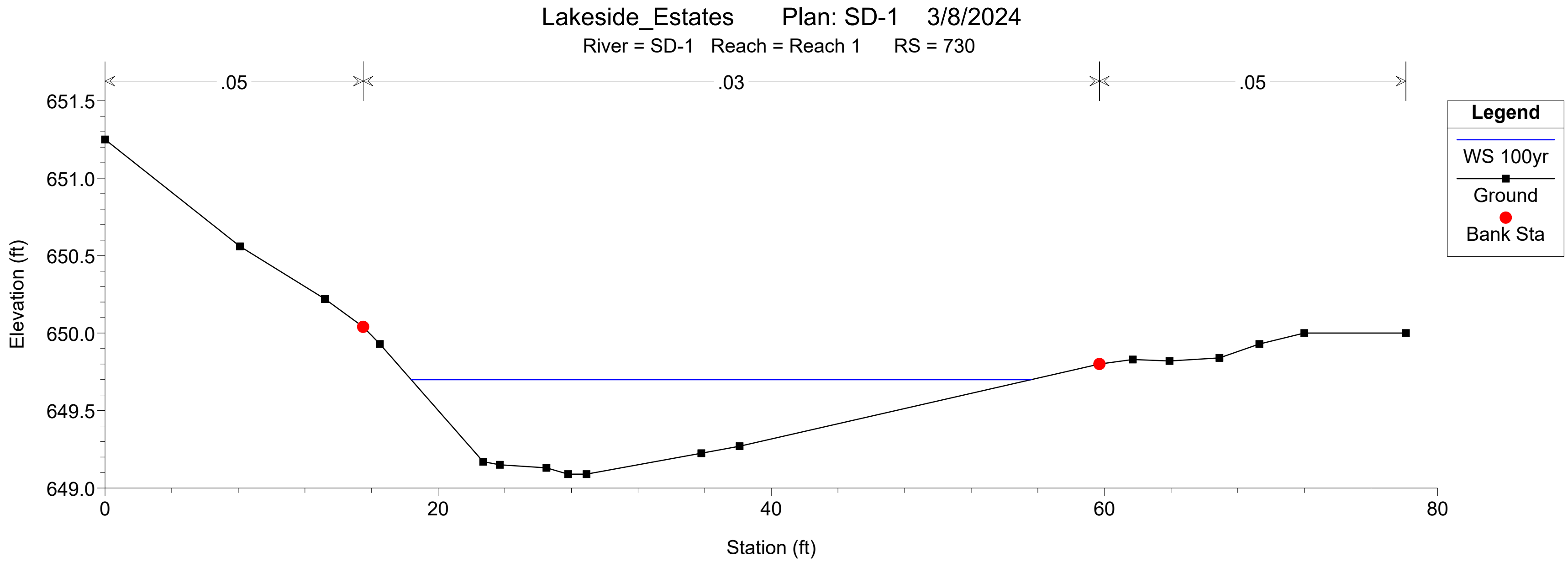
Lakeside_Estates Plan: SD-1 3/8/2024
River = SD-1 Reach = Reach 1 RS = 940
.05
.03
.05
Legend
WS 100yr
Ground
Bank Sta
Elevation (ft)
660.0
659.8
659.6
659.4
659.2
659.0
658.8
658.6
658.4
0
5
10
15
20
25
30
35
40
Station (ft)


Lakeside_Estates Plan: SD-1 3/8/2024
River = SD-1 Reach = Reach 1 RS = 908
.05
.03
.05
Legend
WS 100yr
Ground
Bank Sta
Elevation (ft)
658.5
658.0
657.5
657.0
656.5
656.0
0
5
10
15
20
25
30
35
40
Station (ft)

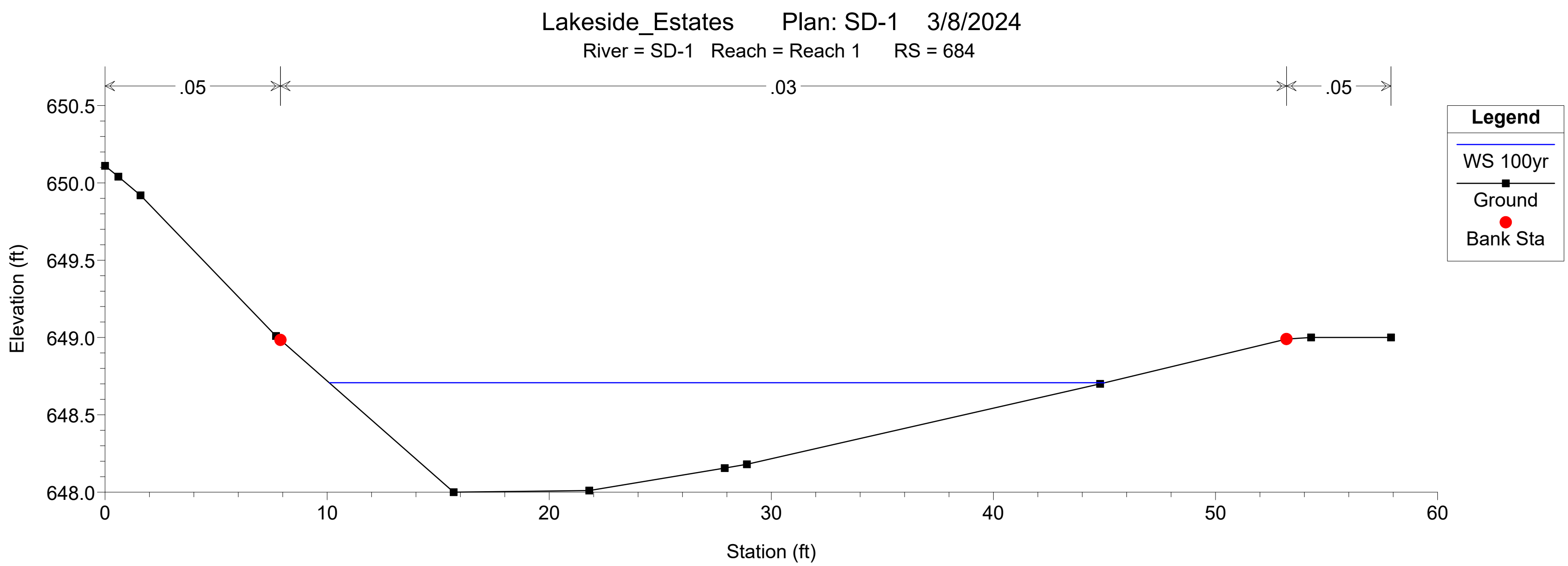

Lakeside_Estates Plan: SD-1 3/8/2024
River = SD-1 Reach = Reach 1 RS = 872
.05
.03
.05
Legend
WS 100yr
Ground
Bank Sta
Elevation (ft)
656.5
656.0
655.5
655.0
654.5
654.0
653.5
653.0
0
10
20
30
40
Station (ft)


Lakeside_Estates Plan: SD-1 3/8/2024
River = SD-1 Reach = Reach 1 RS = 824
.05
.03
.05
Legend
WS 100yr
Ground
Bank Sta
Elevation (ft)
653.2
653.0
652.8
652.6
652.4
652.2
652.0
651.8
0
10
20
30
40
Station (ft)

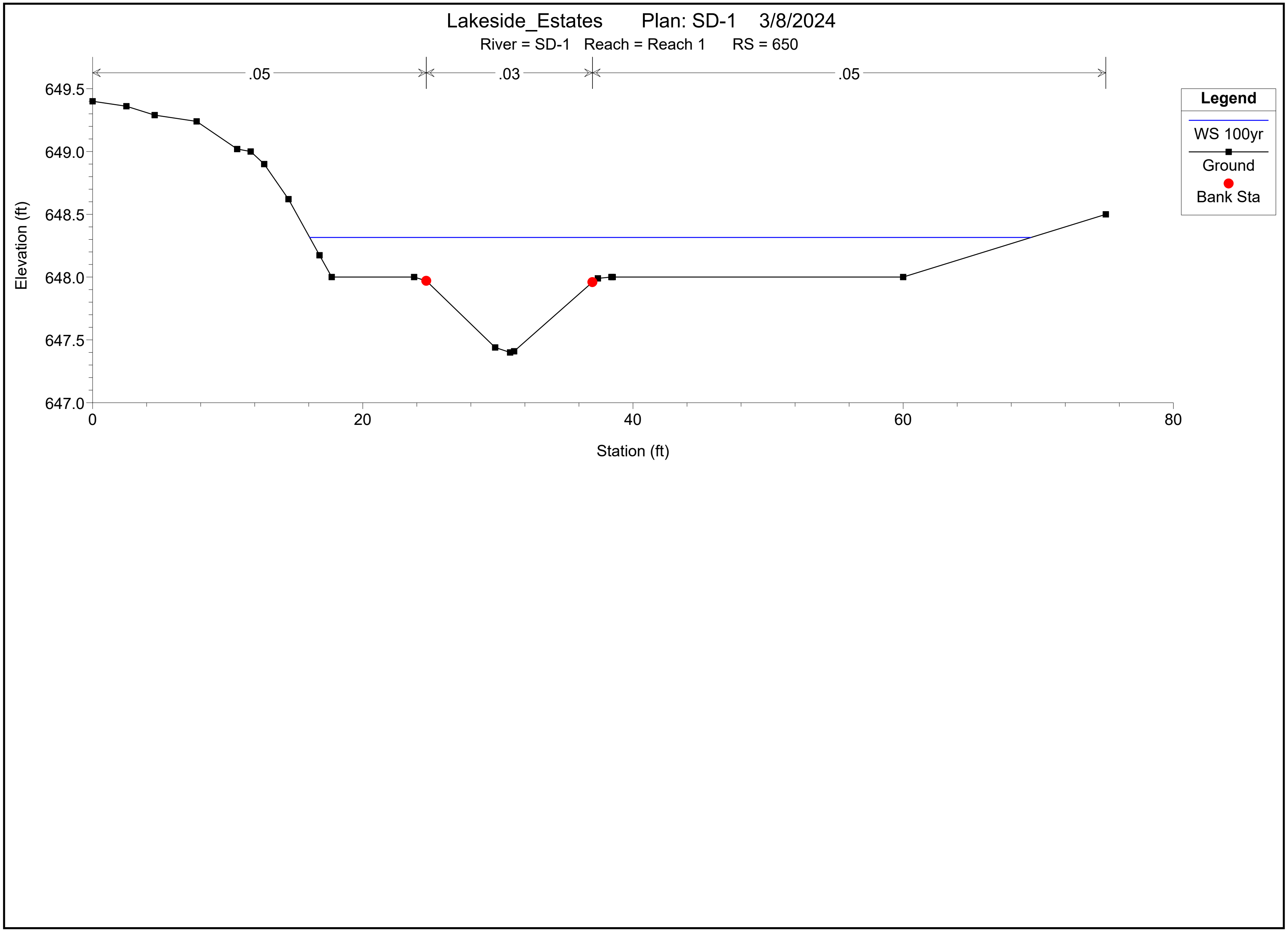

Lakeside_Estates Plan: SD-1 3/8/2024
River = SD-1 Reach = Reach 1 RS = 771
.05
.03
.05
Legend
WS 100yr
Ground
Bank Sta
Elevation (ft)
651.6
651.4
651.2
651.0
650.8
650.6
650.4
650.2
650.0
0
10
20
30
40
50
60
70
Station (ft)



Lakeside_Estates Plan: SD-1 3/8/2024
River = SD-1 Reach = Reach 1 RS = 730
.05
.03
.05
Legend
WS 100yr
Ground
Bank Sta
Elevation (ft)
651.5
651.0
650.5
650.0
649.5
649.0
0
20
40
60
80
Station (ft)

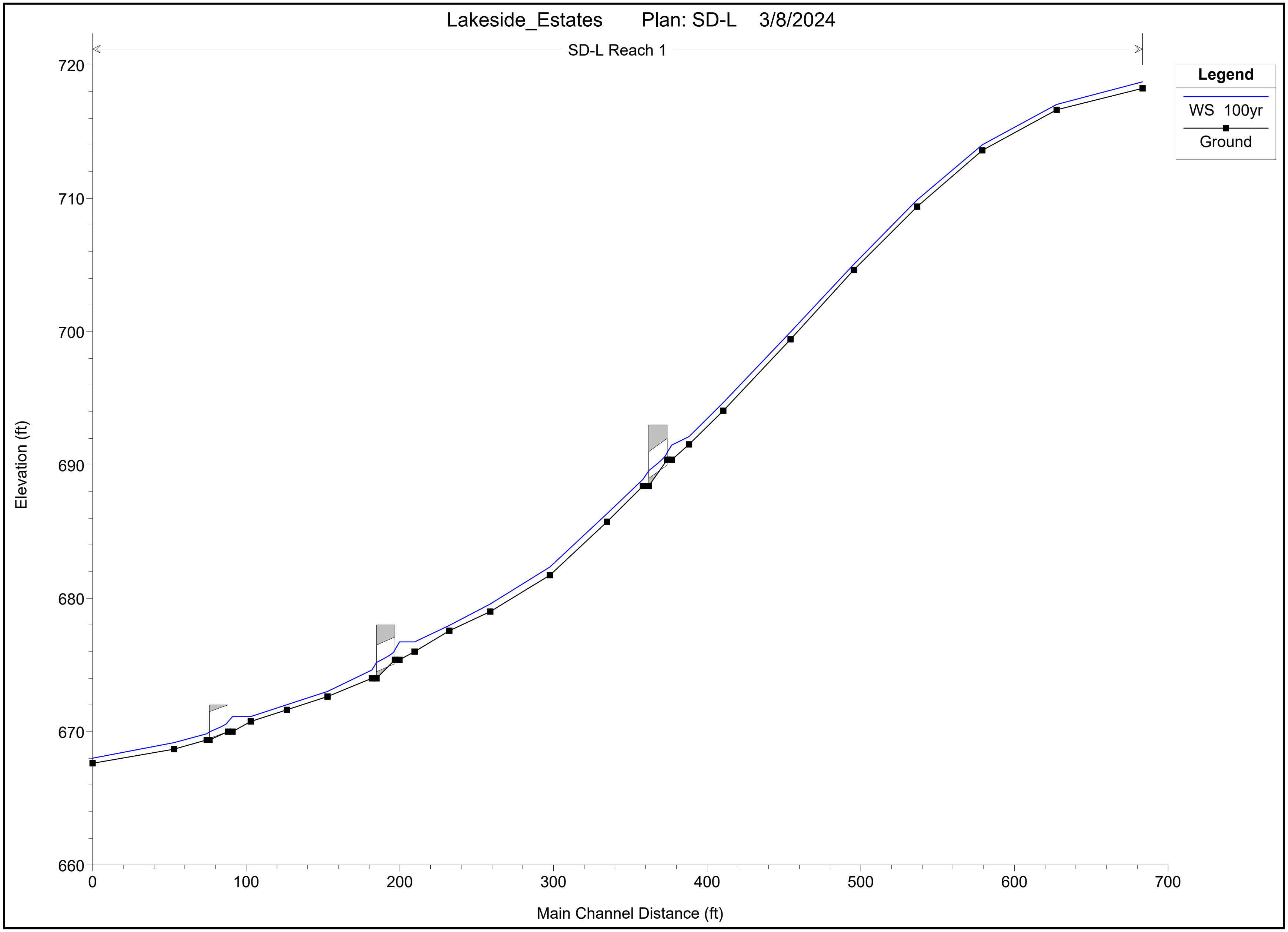


Lakeside_Estates Plan: SD-1 3/8/2024
River = SD-1 Reach = Reach 1 RS = 684
.05
.03
.05
Legend
WS 100yr
Ground
Bank Sta
Elevation (ft)
650.5
650.0
649.5
649.0
648.5
648.0
0
10
20
30
40
50
60
Station (ft)

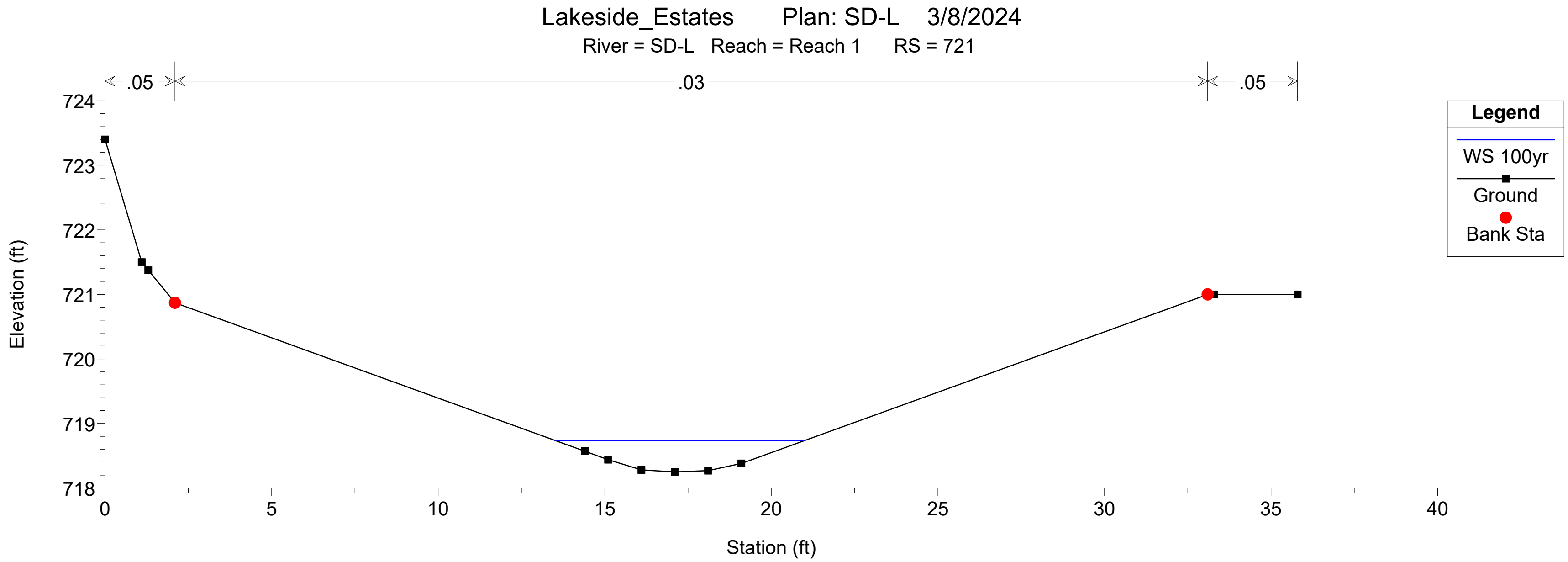


Lakeside_Estates Plan: SD-1 3/8/2024
River = SD-1 Reach = Reach 1 RS = 650
.05
.03
.05
Legend
WS 100yr
Ground
Bank Sta
Elevation (ft)
649.5
649.0
648.5
648.0
647.5
647.0
0
20
40
60
80
Station (ft)

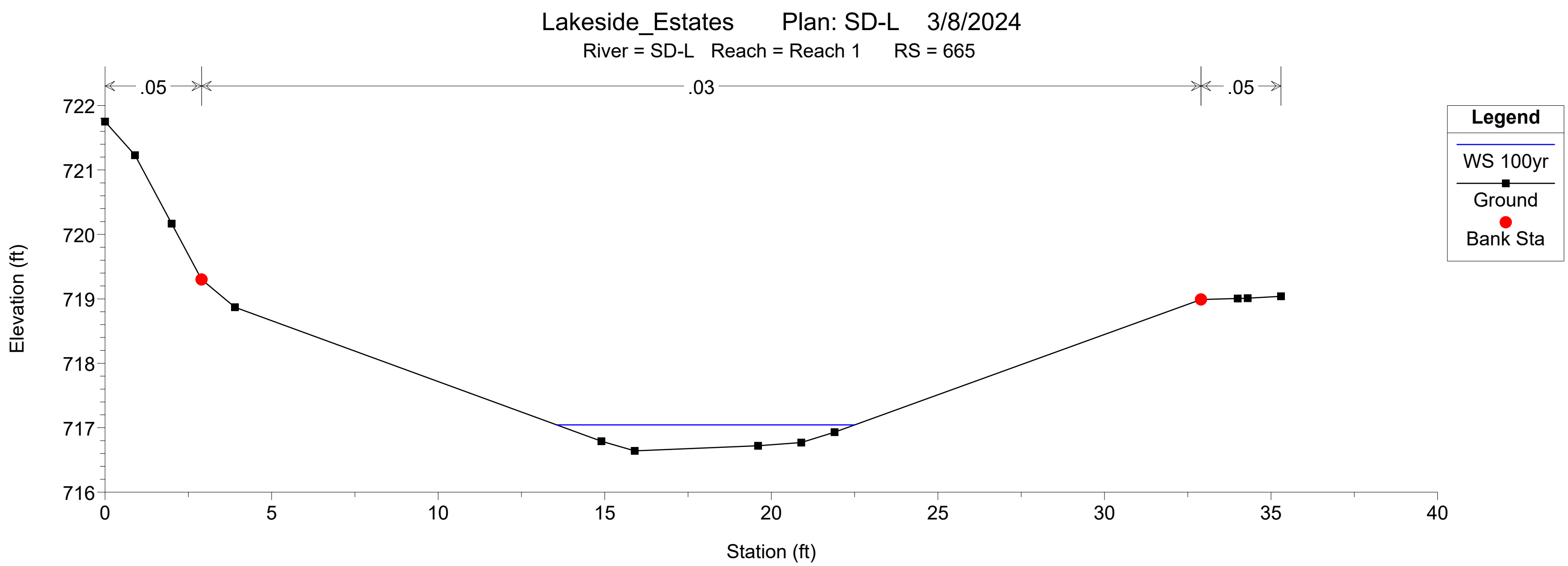
SD-L



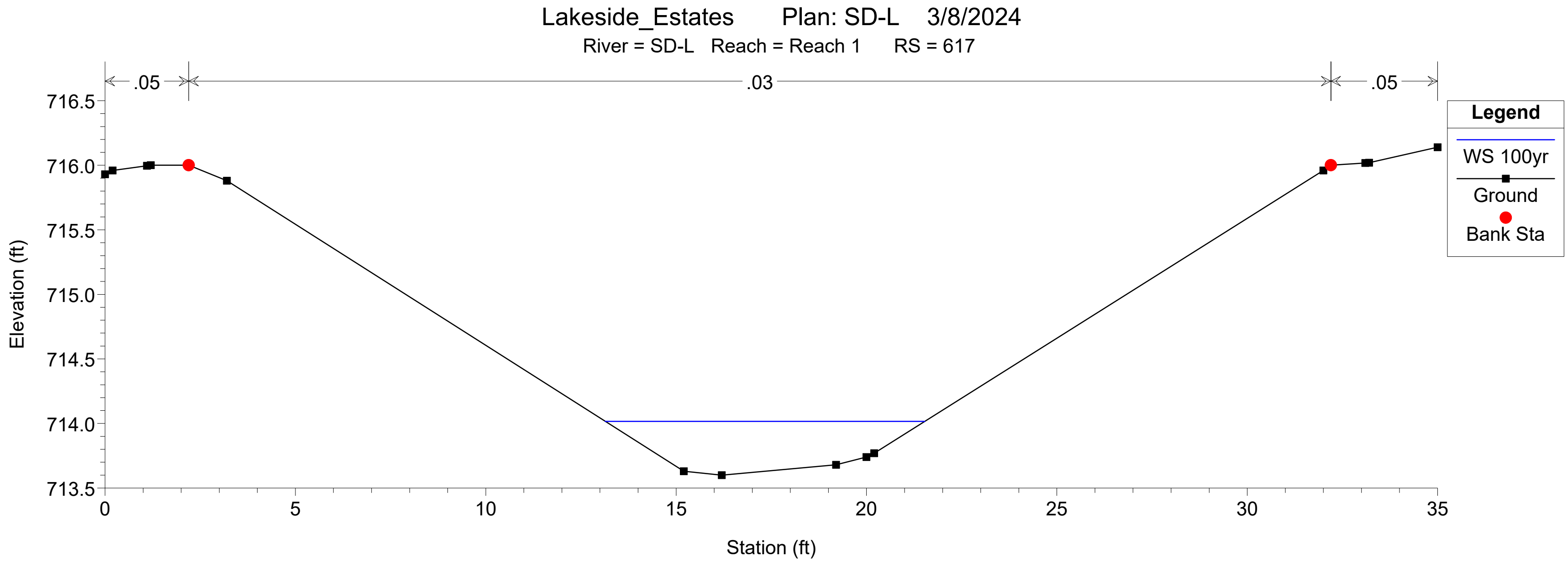
Lakeside_Estates Plan: SD-L 3/8/2024
SD-L Reach 1
Legend
WS 100yr
Ground
Elevation (ft)
660
670
680
690
700
710
720
0
100
200
300
400
500
600
700
Main Channel Distance (ft)

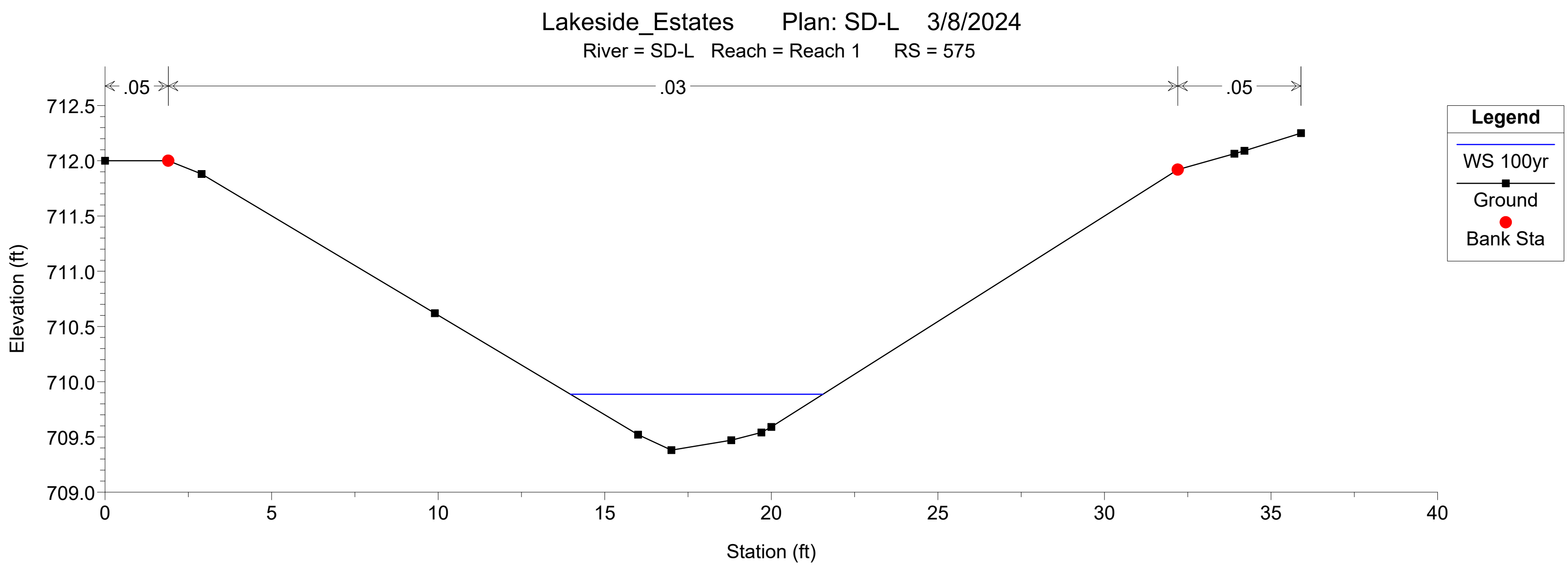


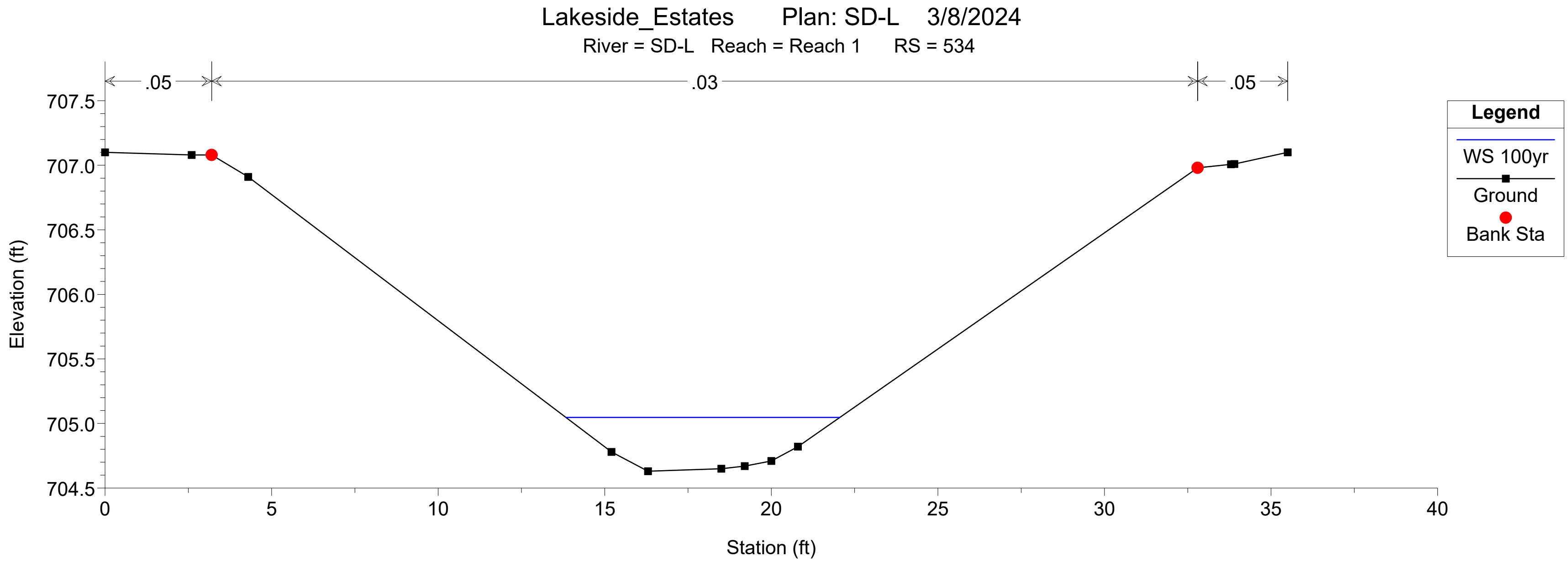
Lakeside_Estates Plan: SD-L 3/8/2024
River = SD-L Reach = Reach 1 RS = 721
.05
.03
.05
Legend
WS 100yr
Ground
Bank Sta
Elevation (ft)
Station (ft)
724
723
722
721
720
719
718
0
5
10
15
20
25
30
35
40

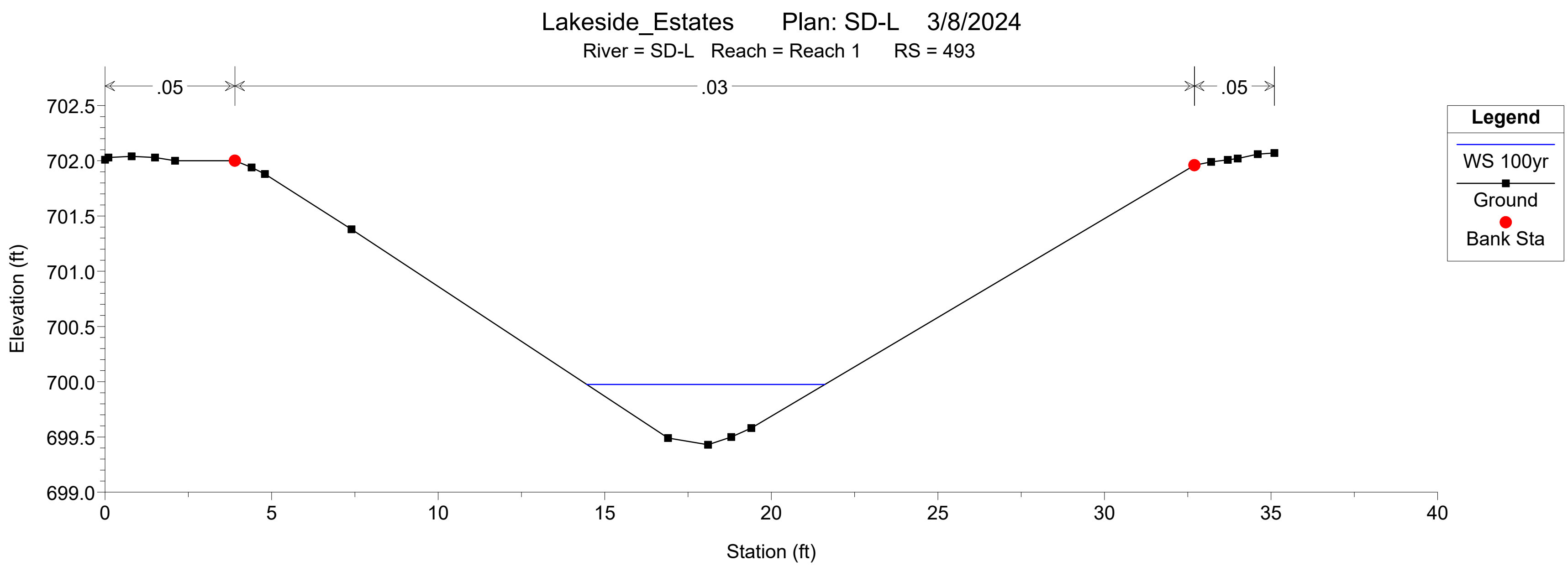


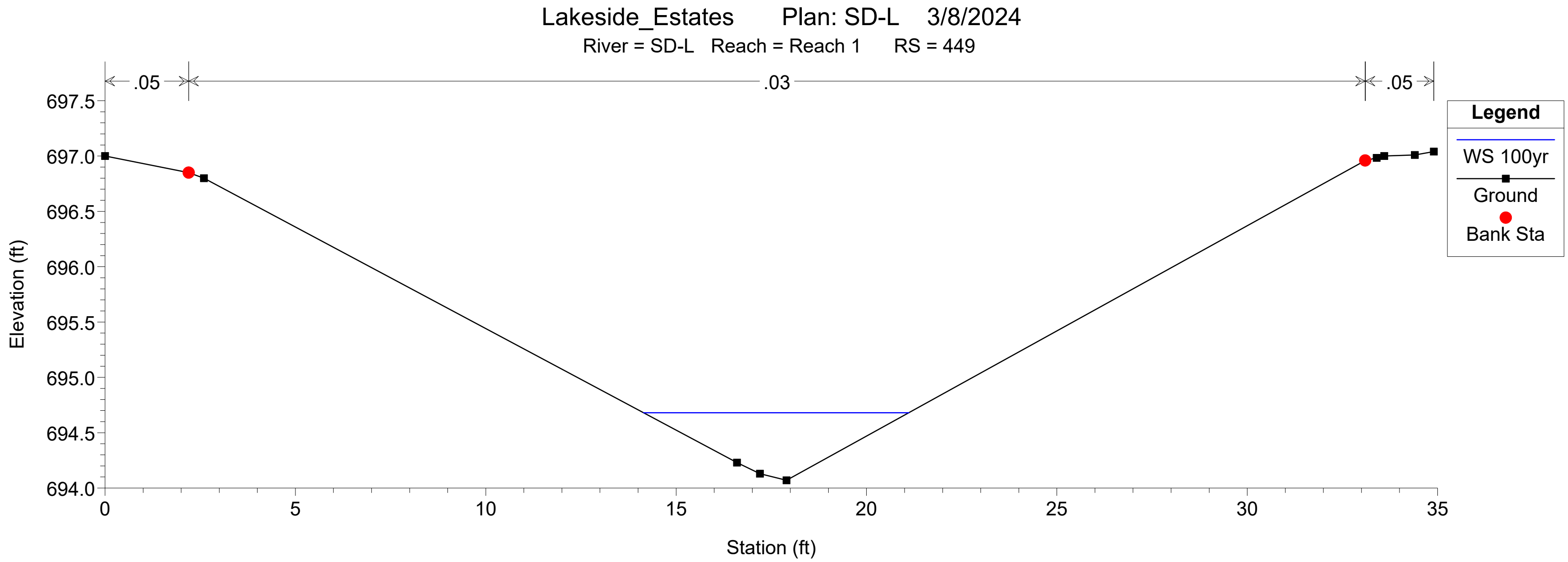
Lakeside_Estates Plan: SD-L 3/8/2024
River = SD-L Reach = Reach 1 RS = 665
.05
.03
.05
Legend
WS 100yr
Ground
Bank Sta
Elevation (ft)
Station (ft)
722
721
720
719
718
717
716
0
5
10
15
20
25
30
35
40

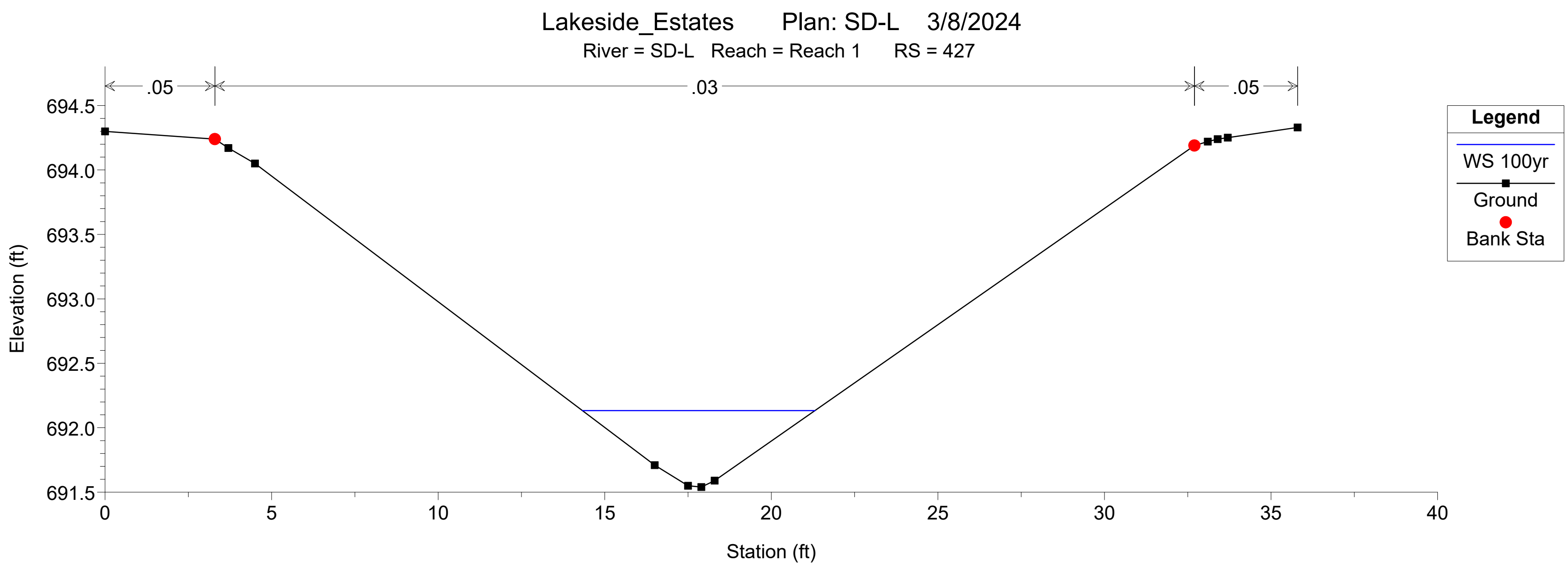

Lakeside_Estates Plan: SD-L 3/8/2024
River = SD-L Reach = Reach 1 RS = 617
.05
.03
.05
Legend
WS 100yr
Ground
Bank Sta
Elevation (ft)
716.5
716.0
715.5
715.0
714.5
714.0
713.5
0
5
10
15
20
25
30
35
Station (ft)

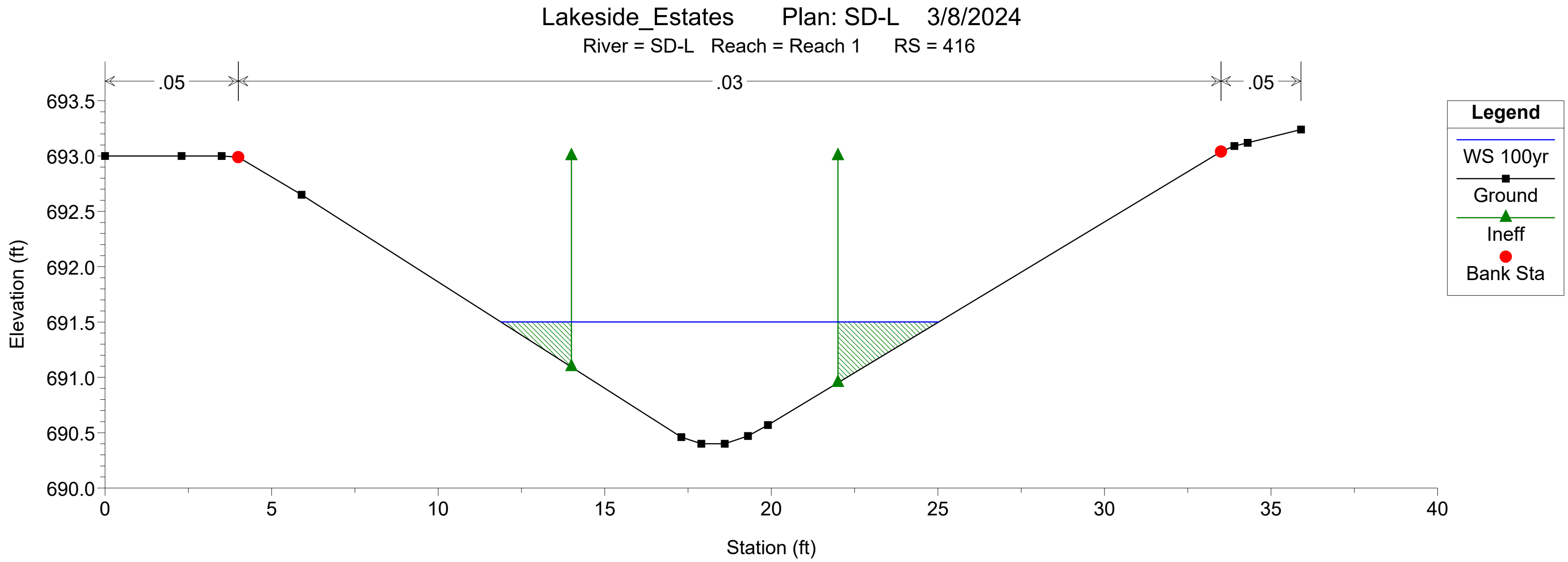

Lakeside_Estates Plan: SD-L 3/8/2024
River = SD-L Reach = Reach 1 RS = 575
.05
.03
.05
Legend
WS 100yr
Ground
Bank Sta
Elevation (ft)
712.5
712.0
711.5
711.0
710.5
710.0
709.5
709.0
0
5
10
15
20
25
30
35
40
Station (ft)

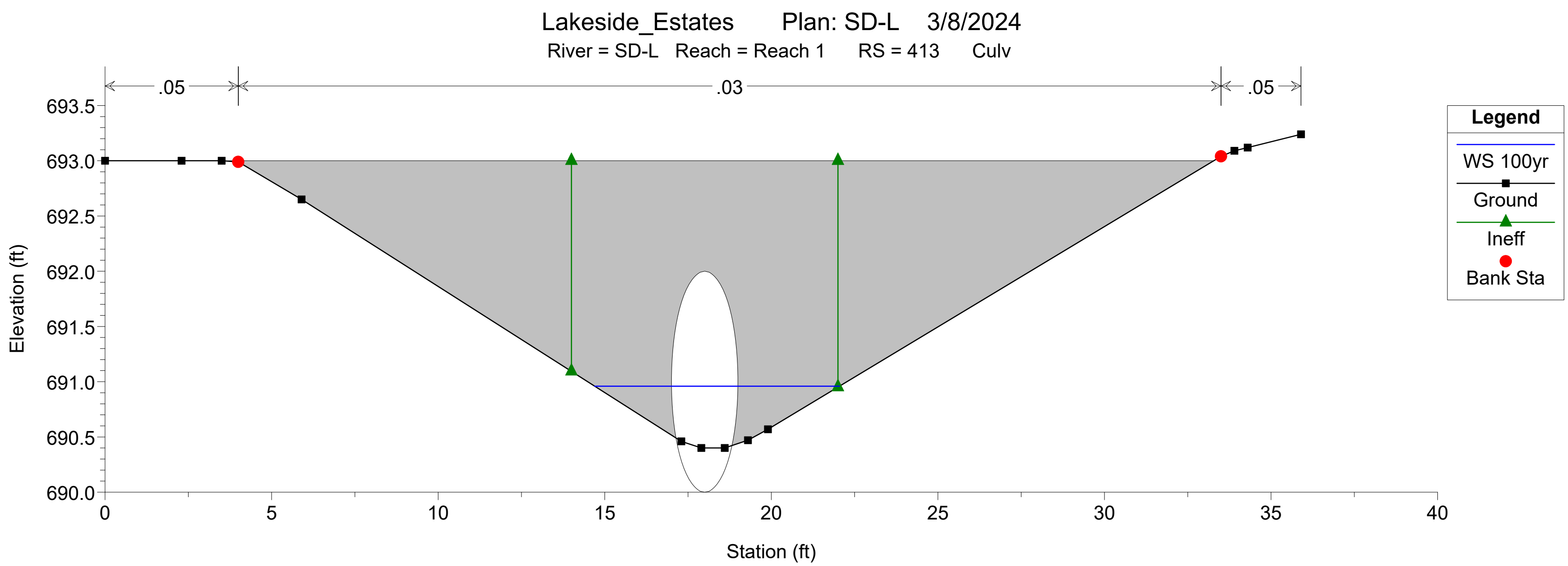

Lakeside_Estates Plan: SD-L 3/8/2024
River = SD-L Reach = Reach 1 RS = 534
.05
.03
.05
Legend
WS 100yr
Ground
Bank Sta
Elevation (ft)
707.5
707.0
706.5
706.0
705.5
705.0
704.5
0
5
10
15
20
25
30
35
40
Station (ft)

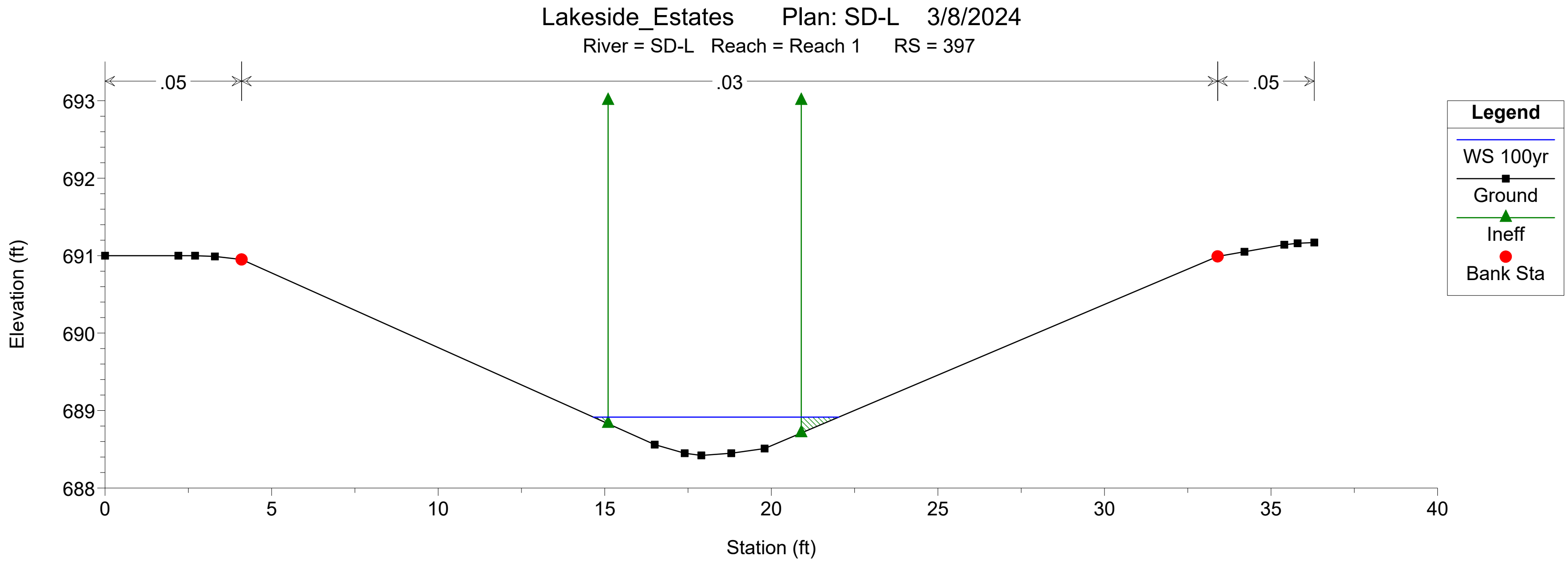

Lakeside_Estates Plan: SD-L 3/8/2024
River = SD-L Reach = Reach 1 RS = 493
.05
.03
.05
Legend
WS 100yr
Ground
Bank Sta
Elevation (ft)
702.5
702.0
701.5
701.0
700.5
700.0
699.5
699.0
0
5
10
15
20
25
30
35
40
Station (ft)

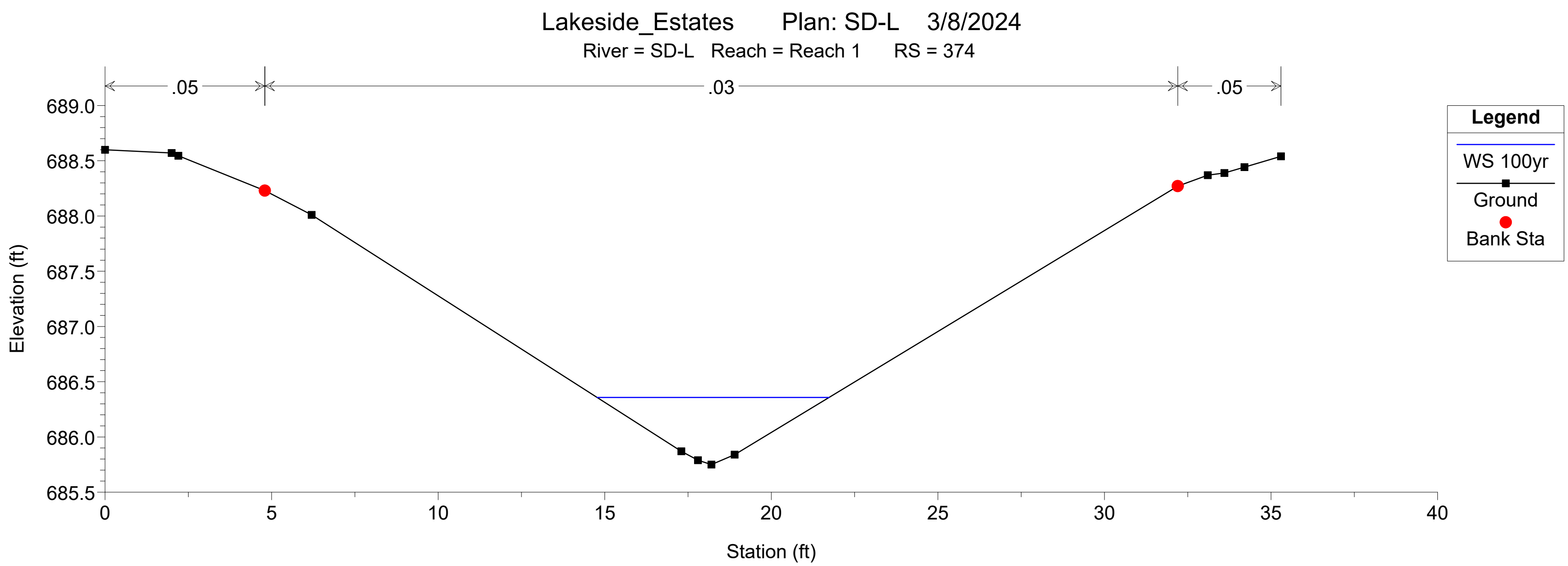

Lakeside_Estates Plan: SD-L 3/8/2024
River = SD-L Reach = Reach 1 RS = 449
.05
.03
.05
697.5
697.0
696.5
696.0
695.5
695.0
694.5
694.0
Elevation (ft)
0
5
10
15
20
25
30
35
Station (ft)
Legend
WS 100yr
Ground
Bank Sta

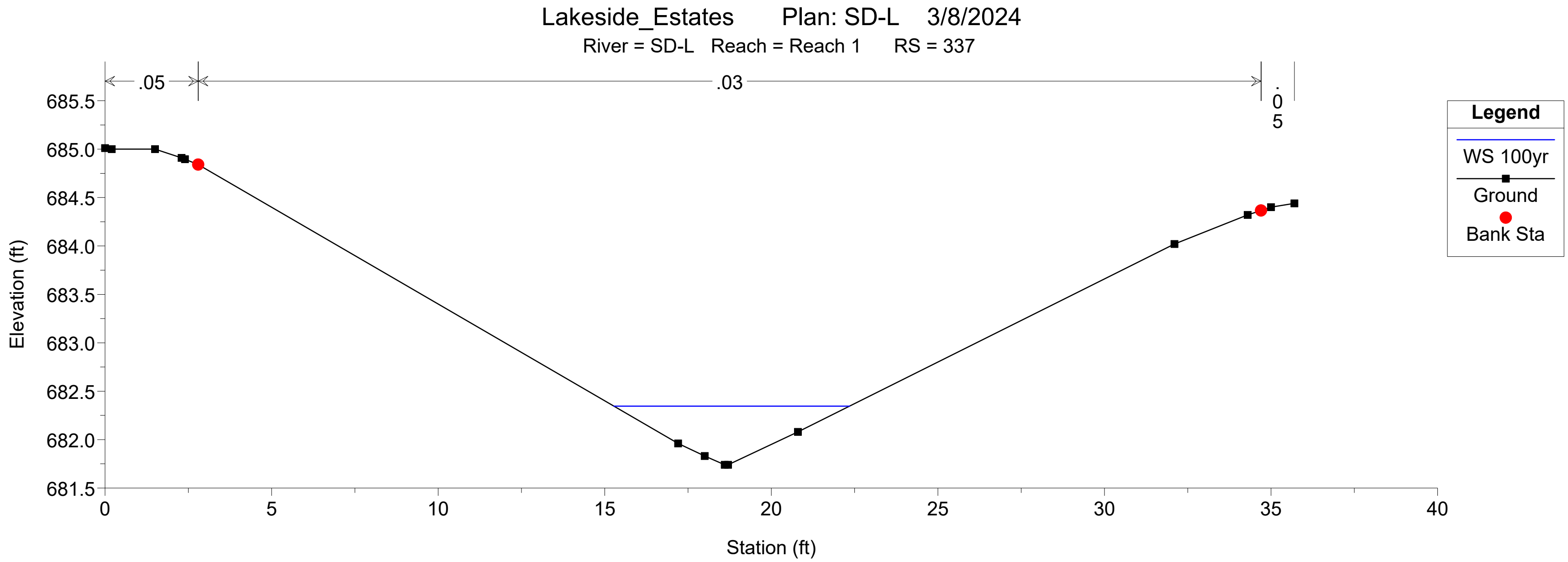

Lakeside_Estates Plan: SD-L 3/8/2024
River = SD-L Reach = Reach 1 RS = 427
.05
.03
.05
694.5
694.0
693.5
693.0
692.5
692.0
691.5
Elevation (ft)
0
5
10
15
20
25
30
35
40
Station (ft)
Legend
WS 100yr
Ground
Bank Sta


Lakeside_Estates Plan: SD-L 3/8/2024
River = SD-L Reach = Reach 1 RS = 416
.05
.03
.05
Elevation (ft)
693.5
693.0
692.5
692.0
691.5
691.0
690.5
690.0
0
5
10
15
20
25
30
35
40
Station (ft)
Legend
WS 100yr
Ground
Ineff
Bank Sta

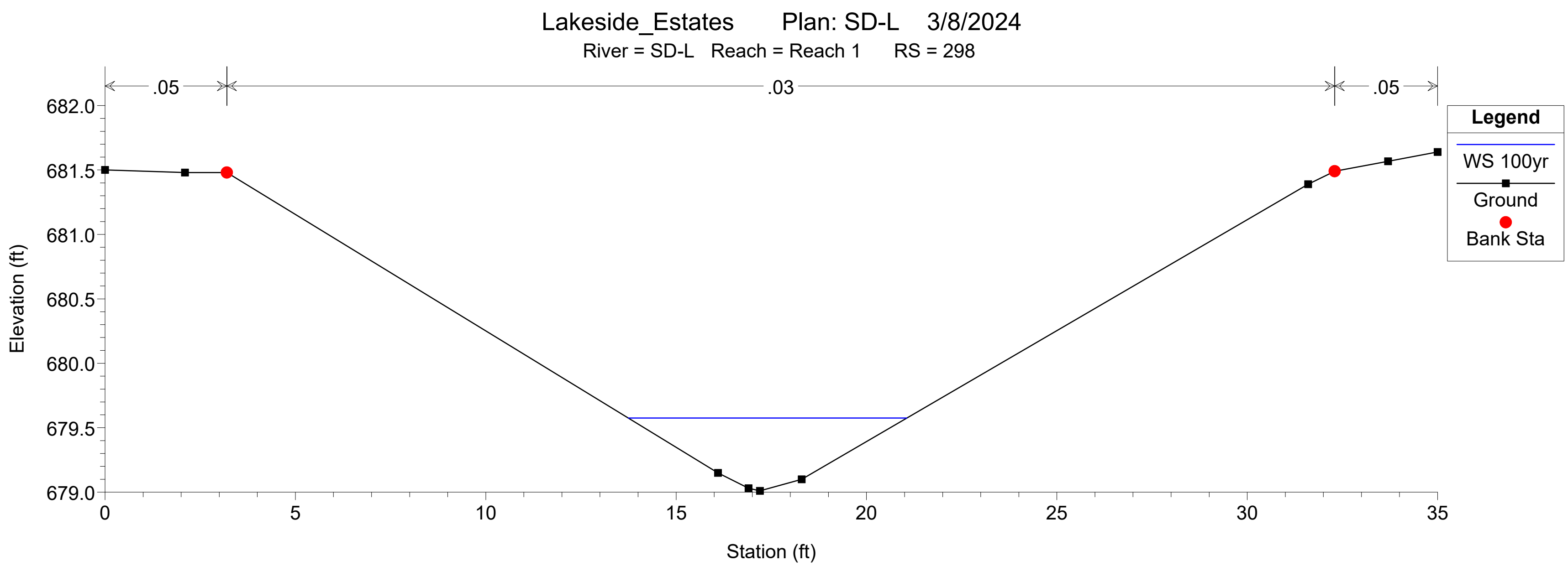

Lakeside_Estates Plan: SD-L 3/8/2024
River = SD-L Reach = Reach 1 RS = 413 Culv
.05
.03
.05
Elevation (ft)
693.5
693.0
692.5
692.0
691.5
691.0
690.5
690.0
0
5
10
15
20
25
30
35
40
Station (ft)
Legend
WS 100yr
Ground
Ineff
Bank Sta


Lakeside_Estates Plan: SD-L 3/8/2024
River = SD-L Reach = Reach 1 RS = 397
.05
.03
.05
Elevation (ft)
693
692
691
690
689
688
0
5
10
15
20
25
30
35
40
Station (ft)
Legend
WS 100yr
Ground
Ineff
Bank Sta

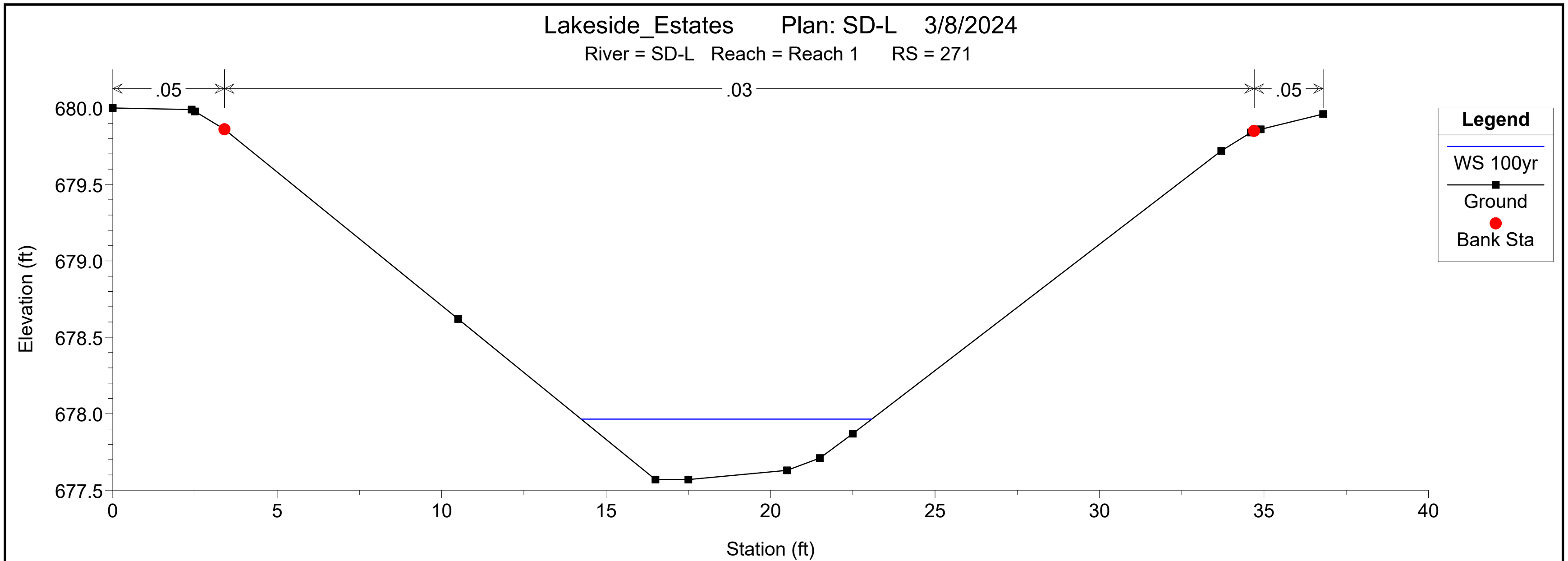

Lakeside_Estates Plan: SD-L 3/8/2024
River = SD-L Reach = Reach 1 RS = 374
.05
.03
.05
Elevation (ft)
689.0
688.5
688.0
687.5
687.0
686.5
686.0
685.5
0
5
10
15
20
25
30
35
40
Station (ft)
Legend
WS 100yr
Ground
Bank Sta

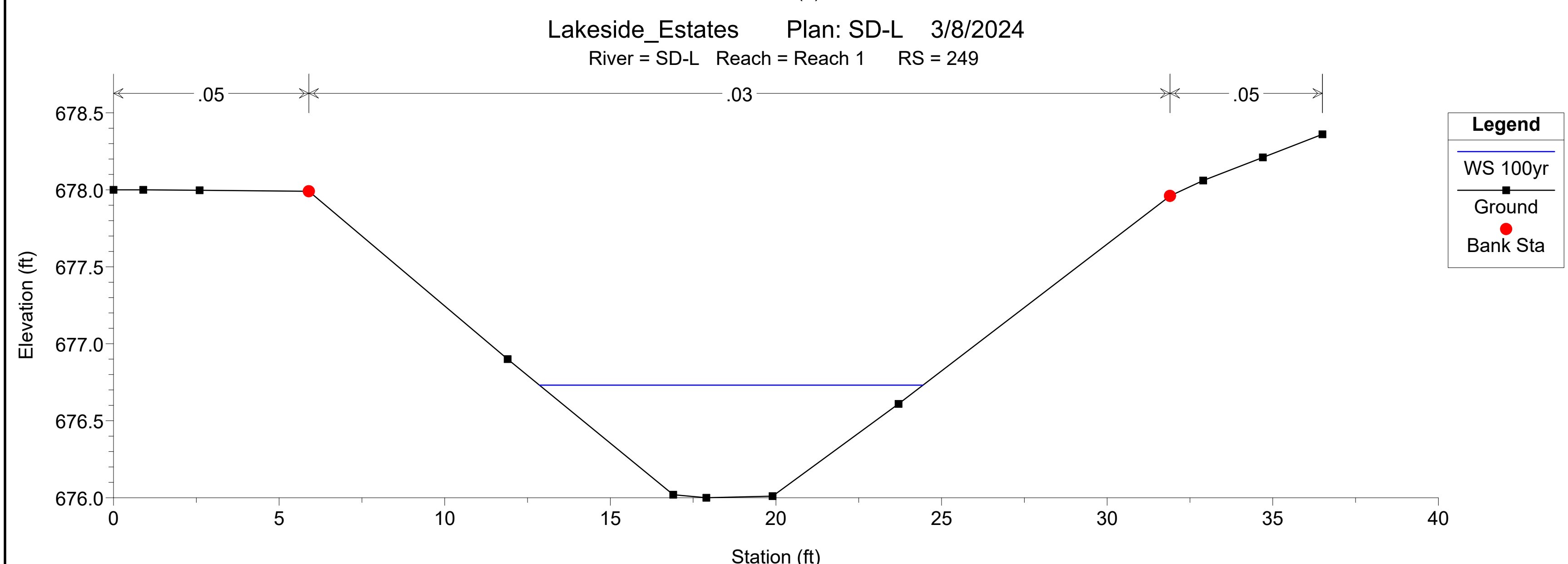


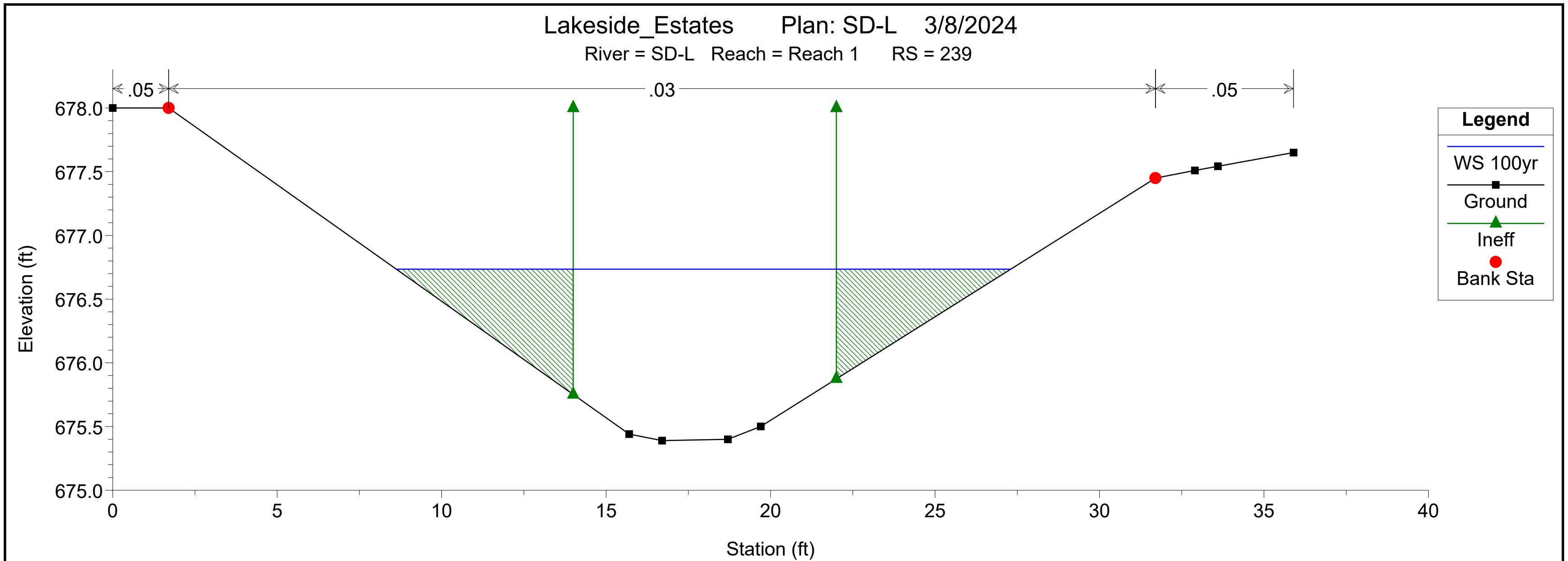
Lakeside_Estates Plan: SD-L 3/8/2024
River = SD-L Reach = Reach 1 RS = 337
.05
.03
.05
Elevation (ft)
685.5
685.0
684.5
684.0
683.5
683.0
682.5
682.0
681.5
0
5
10
15
20
25
30
35
40
Station (ft)
Legend
WS 100yr
Ground
Bank Sta

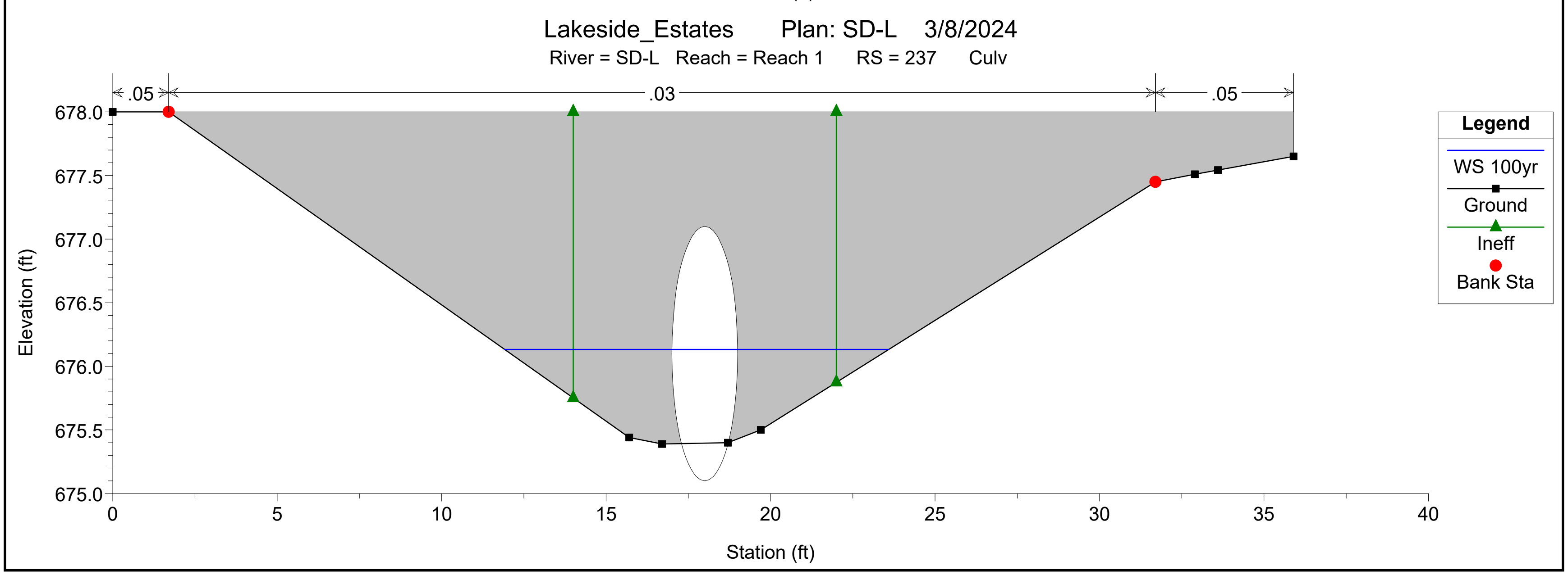


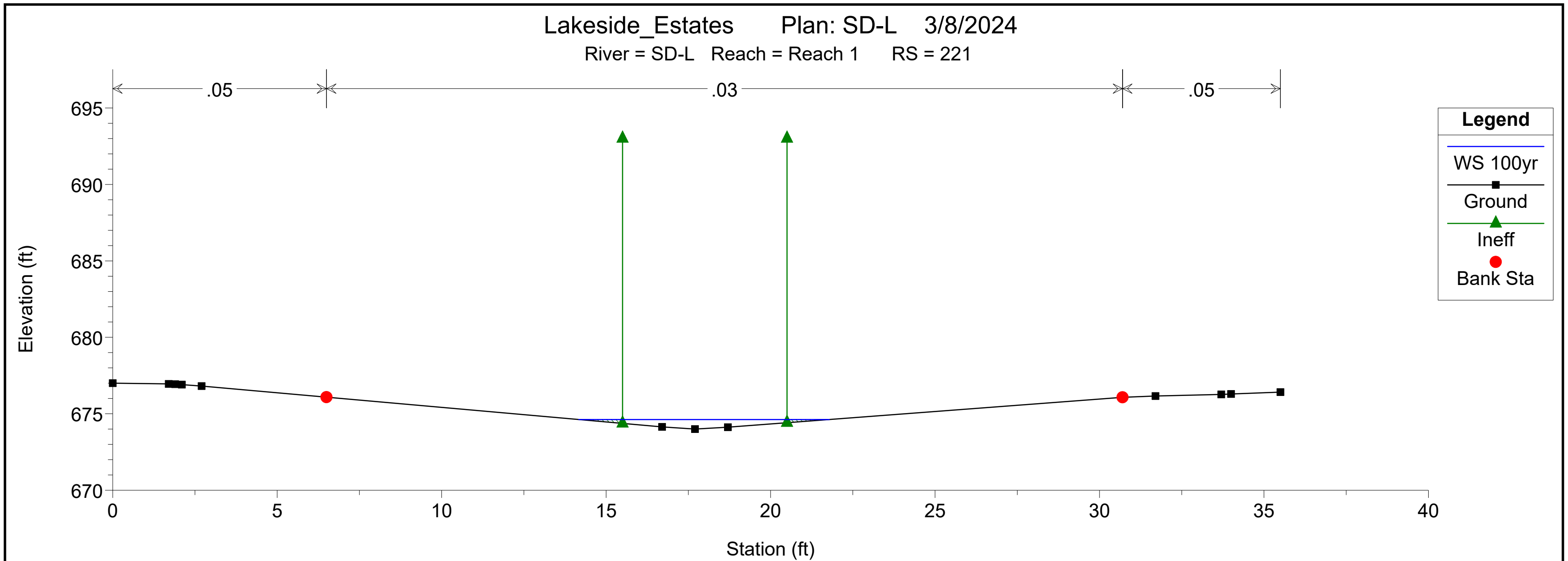
Lakeside_Estates Plan: SD-L 3/8/2024
River = SD-L Reach = Reach 1 RS = 298
.05
.03
.05
Elevation (ft)
682.0
681.5
681.0
680.5
680.0
679.5
679.0
0
5
10
15
20
25
30
35
Station (ft)
Legend
WS 100yr
Ground
Bank Sta

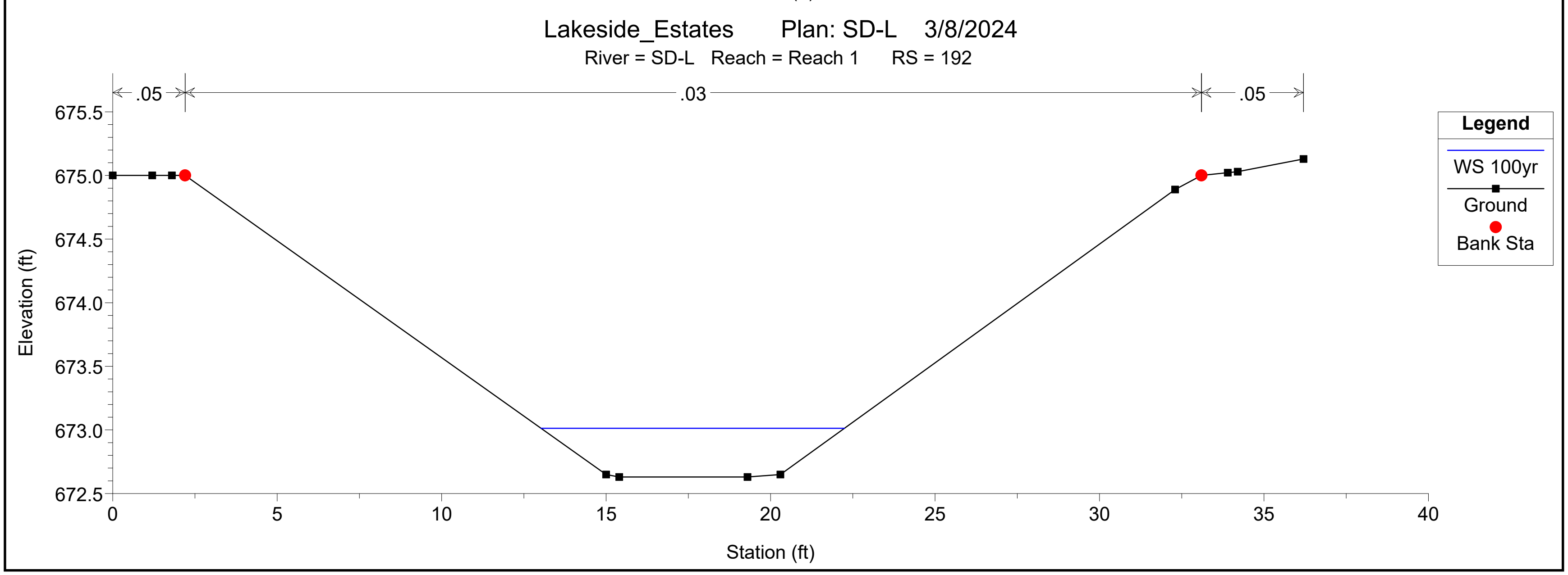

Lakeside_Estates Plan: SD-L 3/8/2024
River = SD-L Reach = Reach 1 RS = 271
.05
.03
.05
Elevation (ft)
680.0
679.5
679.0
678.5
678.0
677.5
0
5
10
15
20
25
30
35
40
Station (ft)
Legend
WS 100yr
Ground
Bank Sta

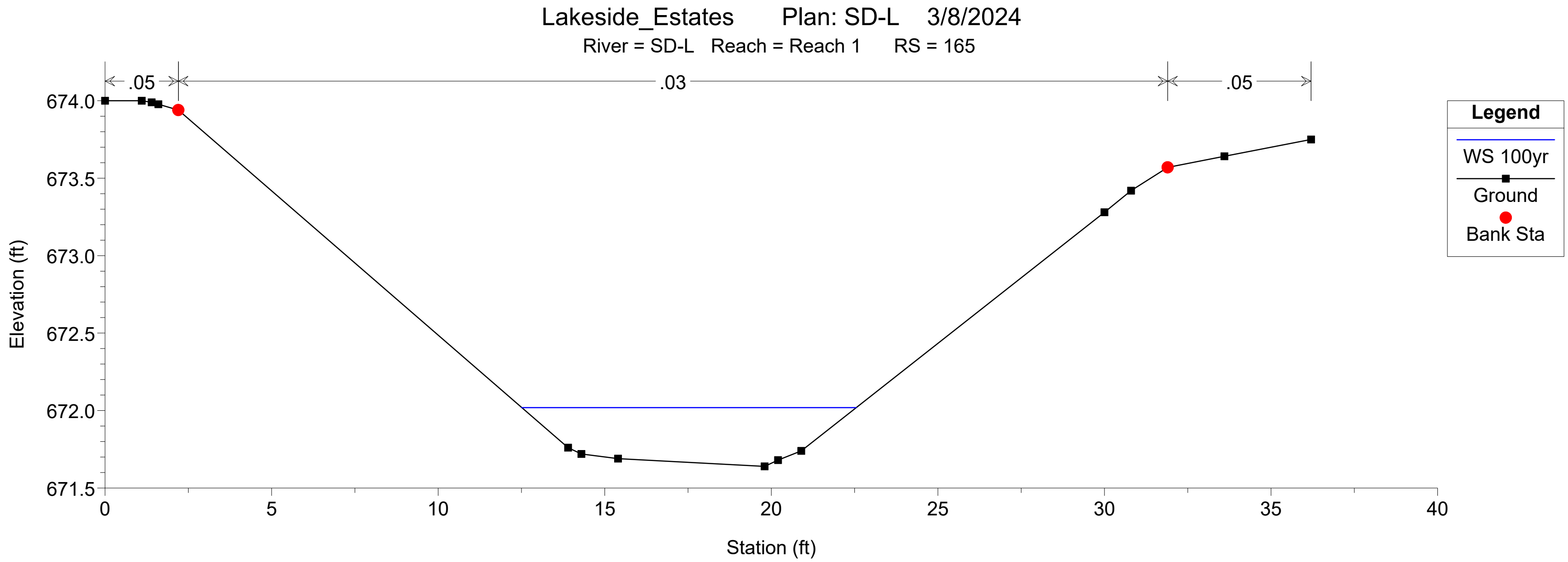

Lakeside_Estates Plan: SD-L 3/8/2024
River = SD-L Reach = Reach 1 RS = 249
.05
.03
.05
Elevation (ft)
678.5
678.0
677.5
677.0
676.5
676.0
0
5
10
15
20
25
30
35
40
Station (ft)
Legend
WS 100yr
Ground
Bank Sta


Lakeside_Estates Plan: SD-L 3/8/2024
River = SD-L Reach = Reach 1 RS = 239
.05
.03
.05
Elevation (ft)
Station (ft)
Legend
WS 100yr
Ground
Ineff
Bank Sta

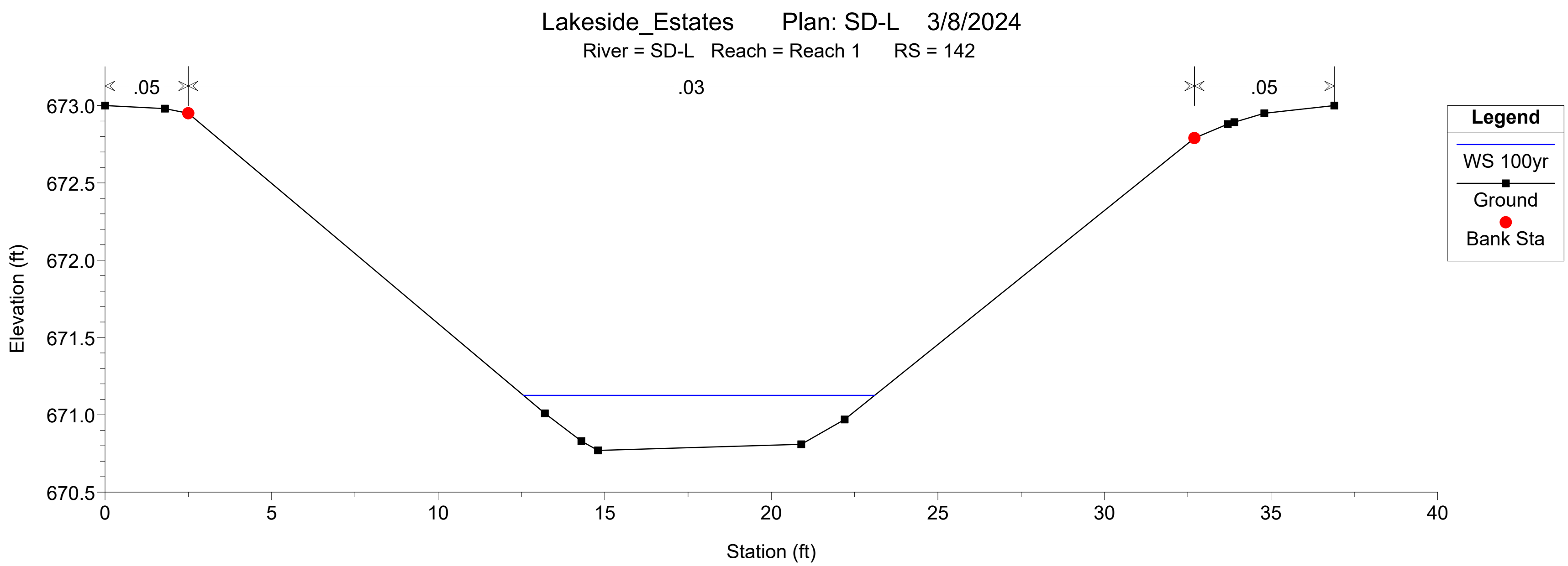

Lakeside_Estates Plan: SD-L 3/8/2024
River = SD-L Reach = Reach 1 RS = 237 Culv
.05
.03
.05
Elevation (ft)
Station (ft)
Legend
WS 100yr
Ground
Ineff
Bank Sta


Lakeside_Estates Plan: SD-L 3/8/2024
River = SD-L Reach = Reach 1 RS = 221
.05
.03
.05
Elevation (ft)
695
690
685
680
675
670
0
5
10
15
20
25
30
35
40
Station (ft)
Legend
WS 100yr
Ground
Ineff
Bank Sta

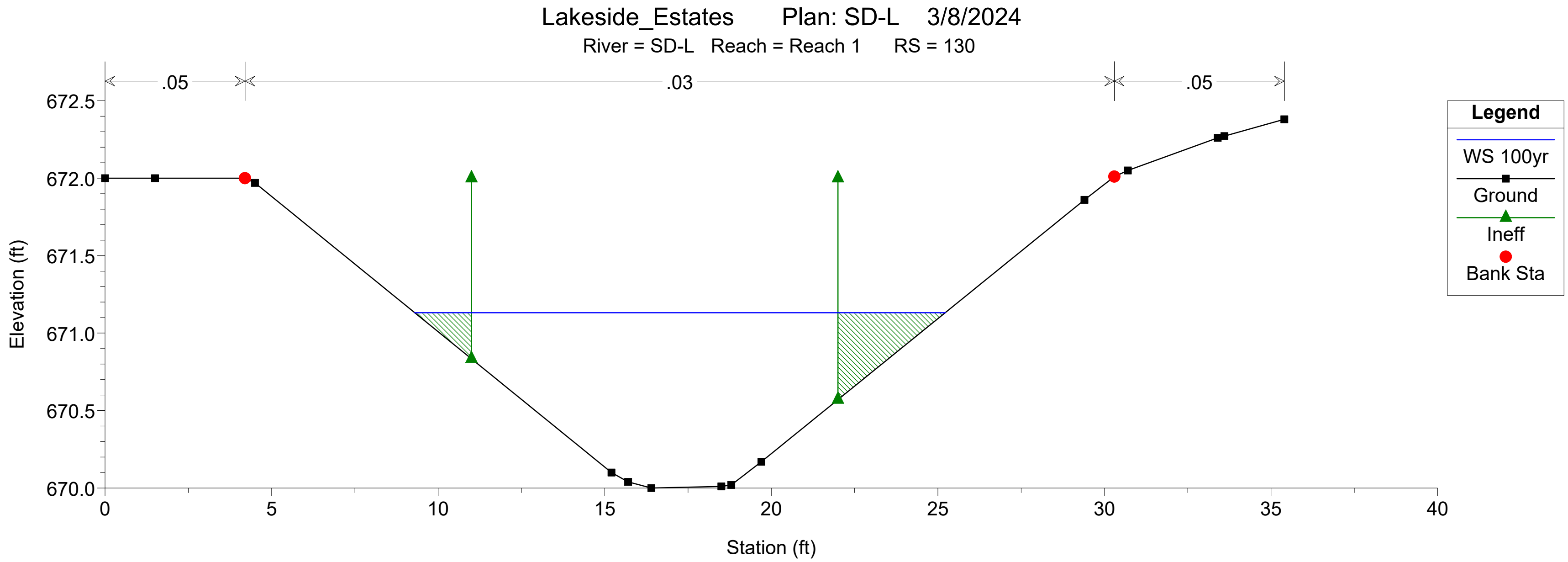

Lakeside_Estates Plan: SD-L 3/8/2024
River = SD-L Reach = Reach 1 RS = 192
.05
.03
.05
Elevation (ft)
675.5
675.0
674.5
674.0
673.5
673.0
672.5
0
5
10
15
20
25
30
35
40
Station (ft)
Legend
WS 100yr
Ground
Bank Sta



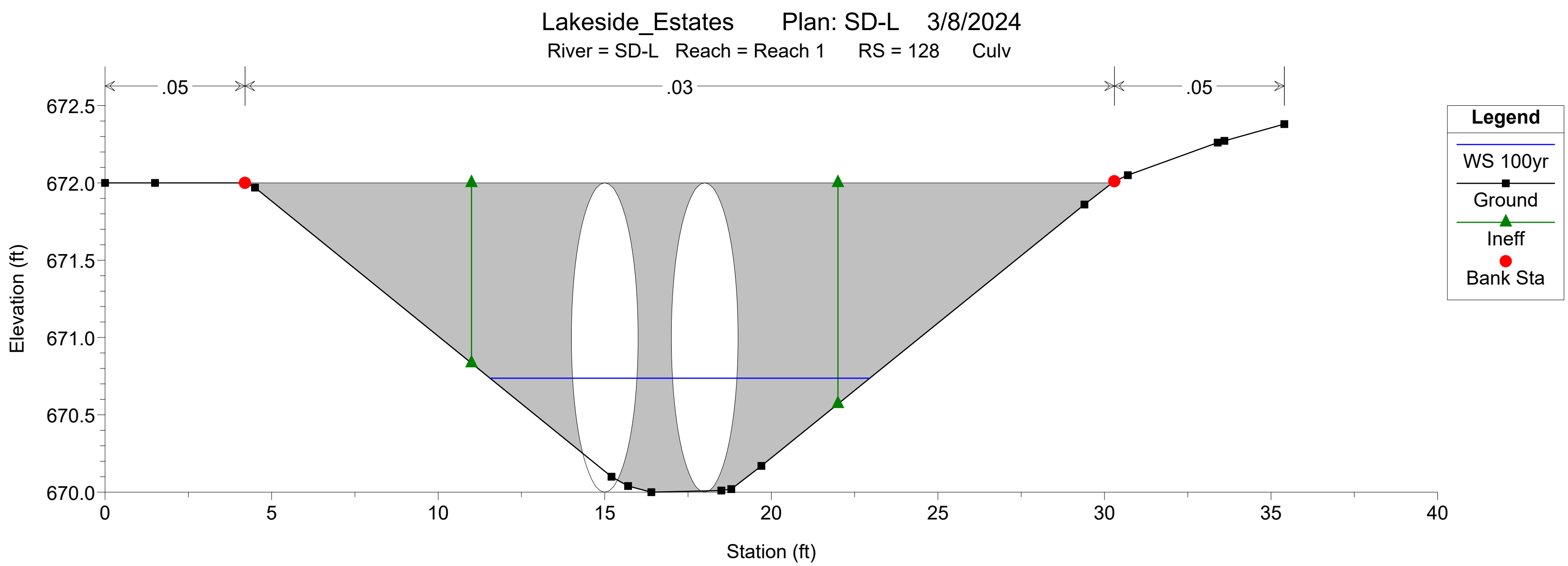
Lakeside_Estates Plan: SD-L 3/8/2024
River = SD-L Reach = Reach 1 RS = 165
.05
.03
.05
Legend
WS 100yr
Ground
Bank Sta
Elevation (ft)
674.0
673.5
673.0
672.5
672.0
671.5
0
5
10
15
20
25
30
35
40
Station (ft)



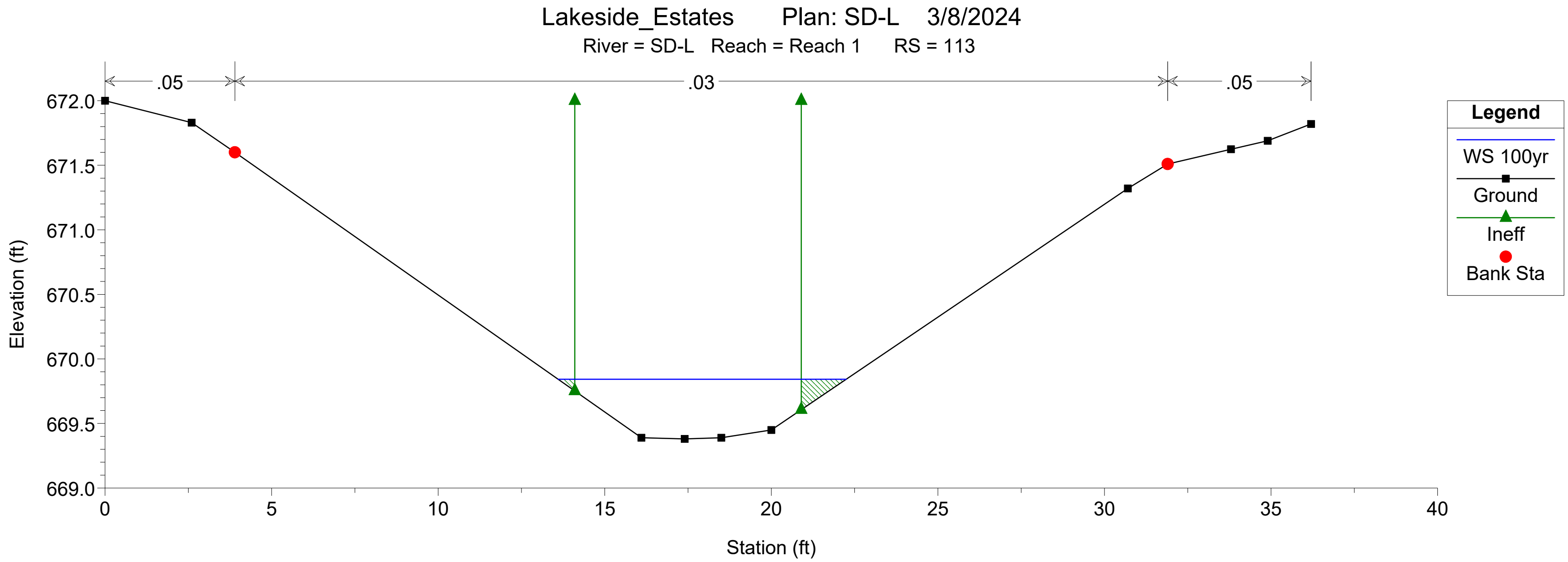
Lakeside_Estates Plan: SD-L 3/8/2024
River = SD-L Reach = Reach 1 RS = 142
.05
.03
.05
Legend
WS 100yr
Ground
Bank Sta
Elevation (ft)
673.0
672.5
672.0
671.5
671.0
670.5
0
5
10
15
20
25
30
35
40
Station (ft)

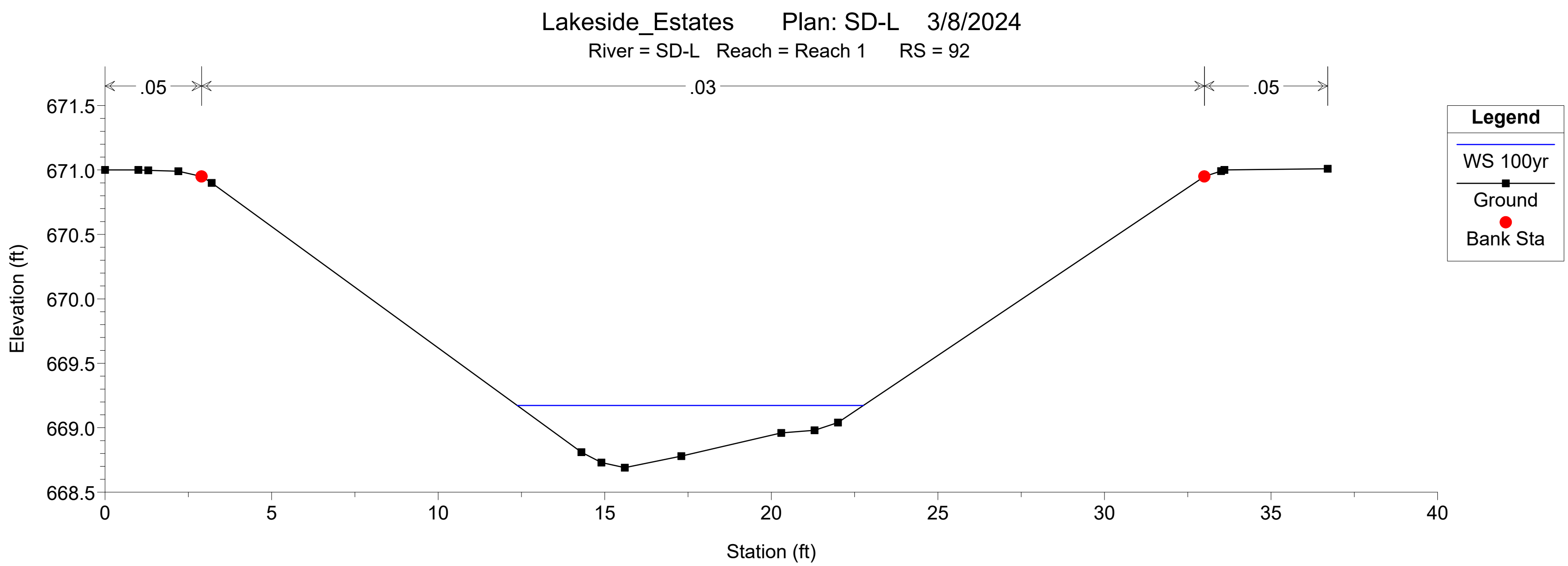


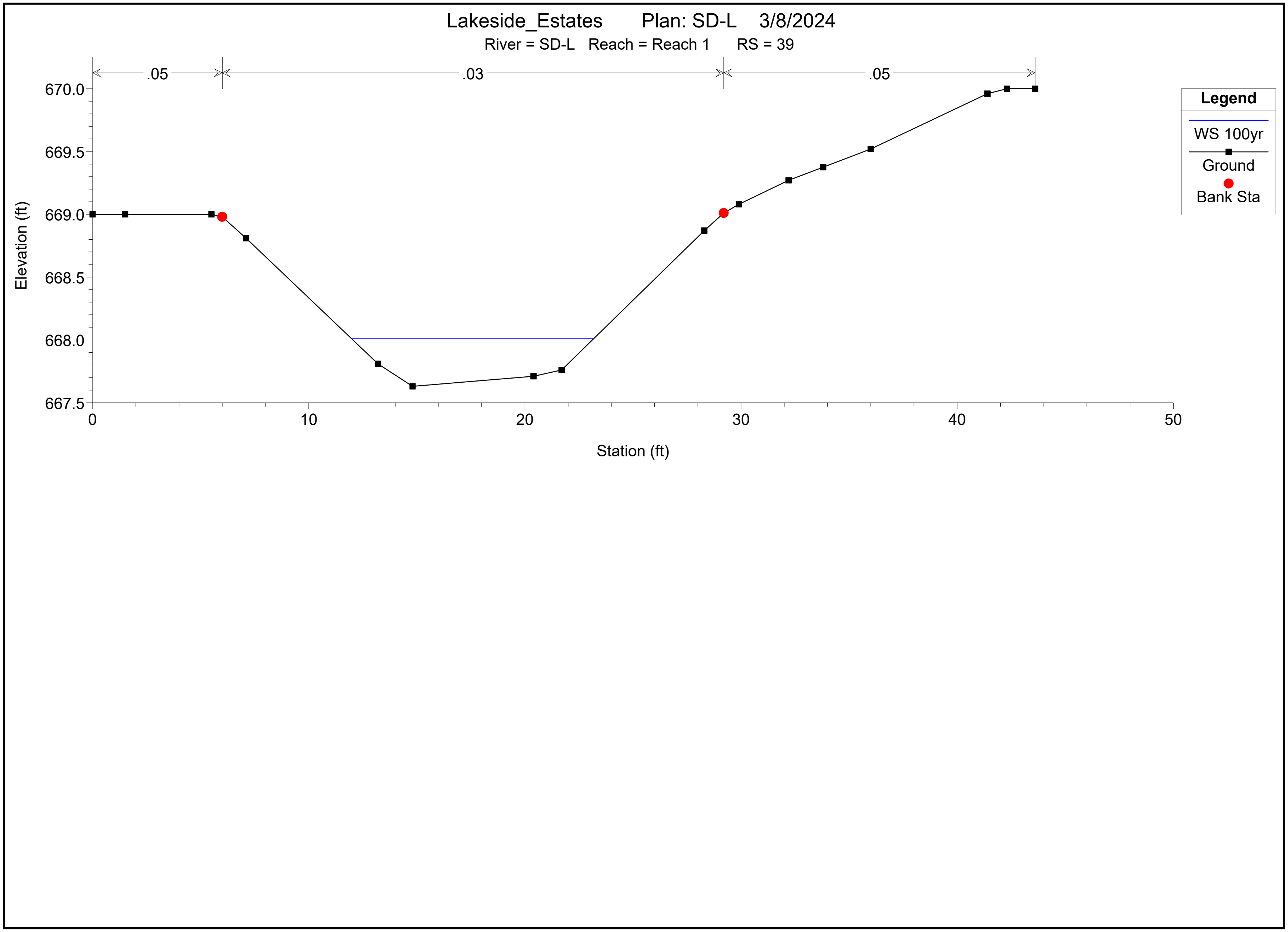
Lakeside_Estates Plan: SD-L 3/8/2024
River = SD-L Reach = Reach 1 RS = 130
.05
.03
.05
Legend
WS 100yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
672.5
672.0
671.5
671.0
670.5
670.0
0
5
10
15
20
25
30
35
40



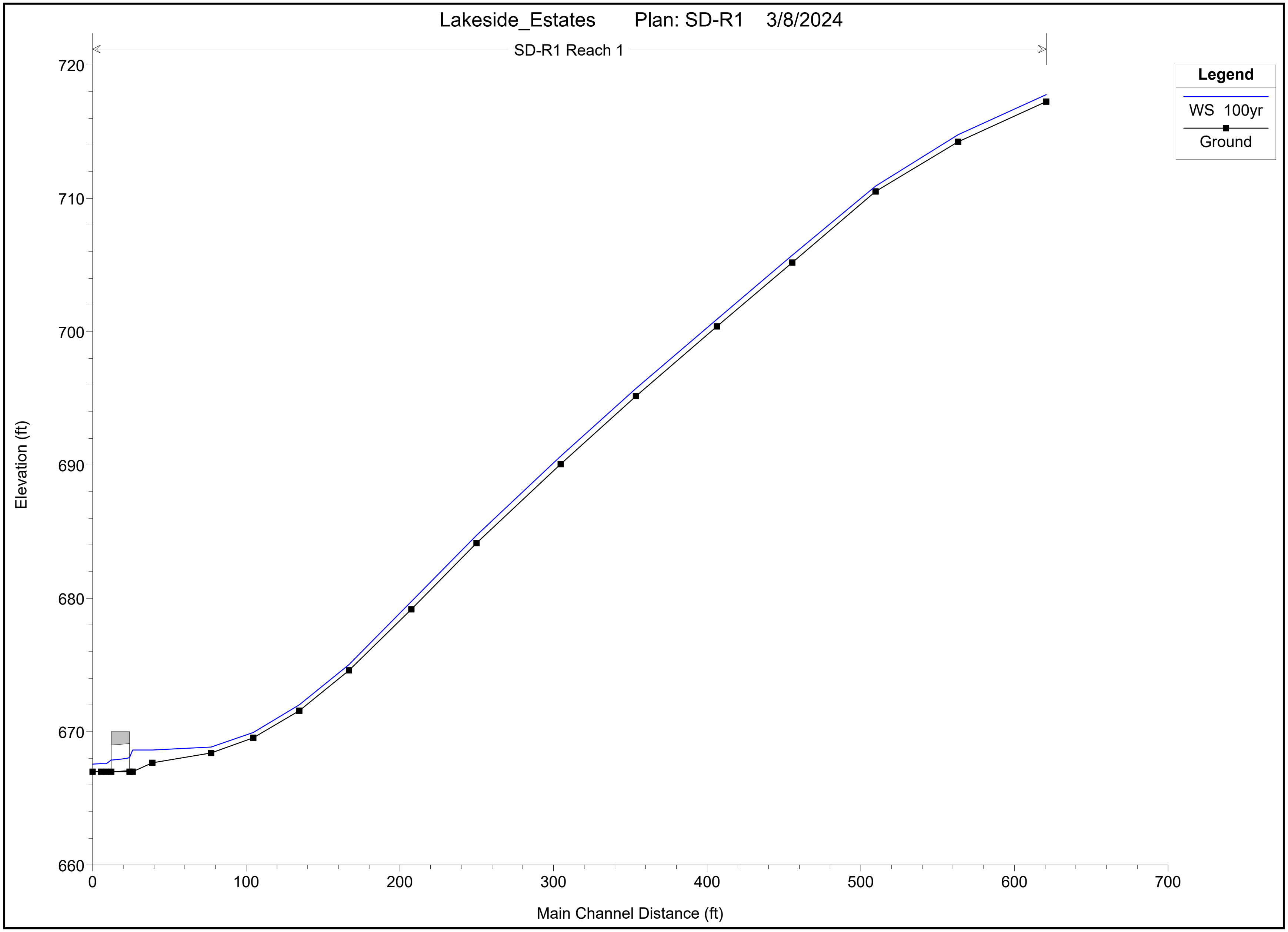
Lakeside_Estates Plan: SD-L 3/8/2024
River = SD-L Reach = Reach 1 RS = 128 Culv
.05
.03
.05
Legend
WS 100yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
672.5
672.0
671.5
671.0
670.5
670.0
0
5
10
15
20
25
30
35
40


Lakeside_Estates Plan: SD-L 3/8/2024
River = SD-L Reach = Reach 1 RS = 113
.05
.03
.05
Elevation (ft)
Station (ft)
Legend
WS 100yr
Ground
Ineff
Bank Sta

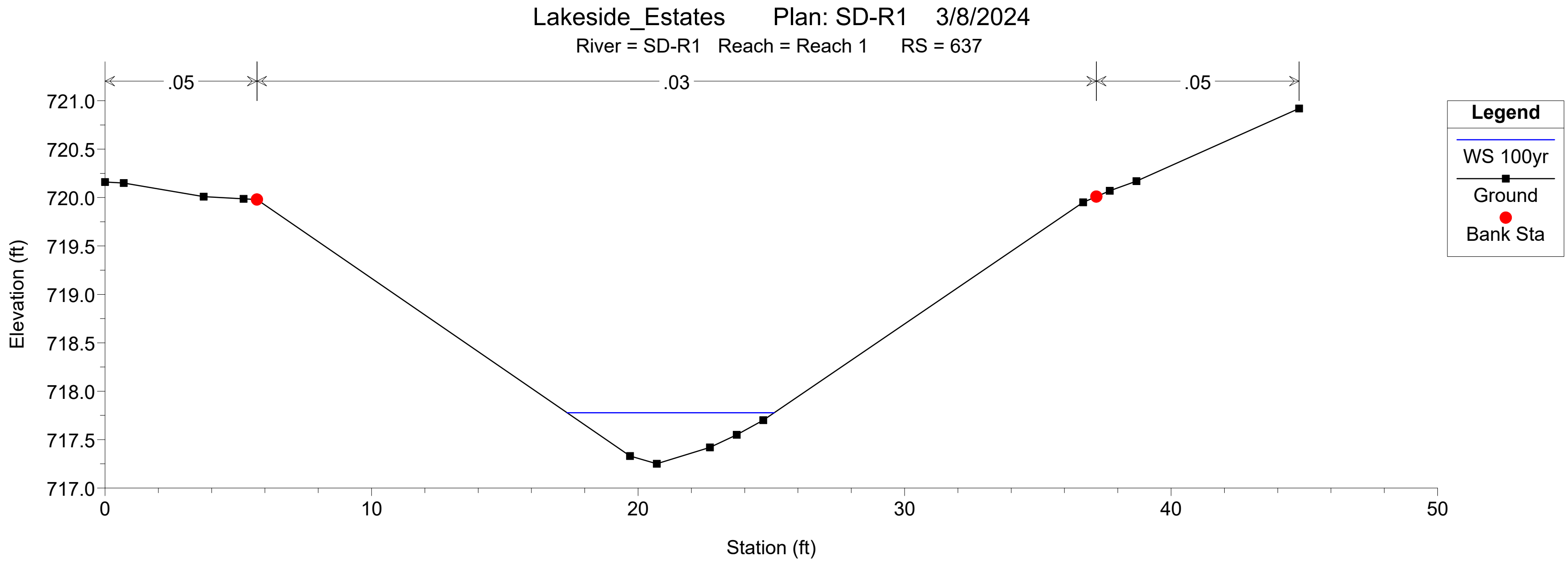

Lakeside_Estates Plan: SD-L 3/8/2024
River = SD-L Reach = Reach 1 RS = 92
.05
.03
.05
Elevation (ft)
Station (ft)
Legend
WS 100yr
Ground
Bank Sta

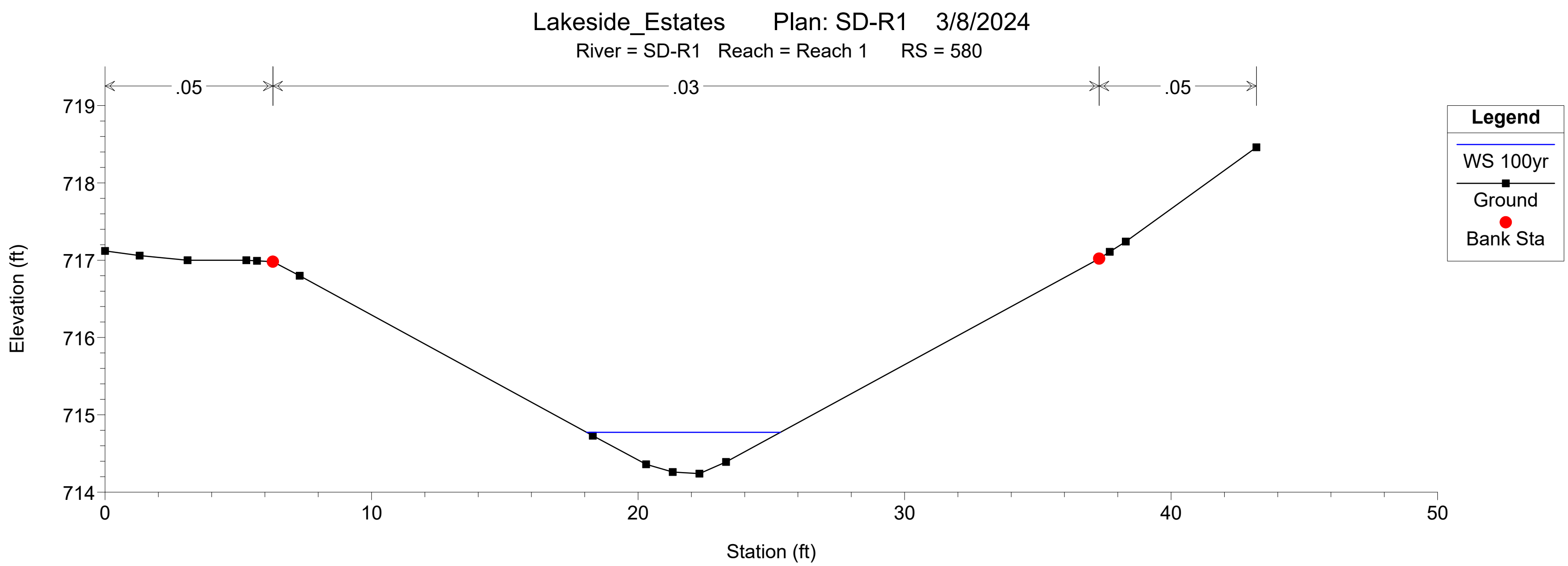

Lakeside_Estates Plan: SD-L 3/8/2024
River = SD-L Reach = Reach 1 RS = 39
.05
.03
.05
Elevation (ft)
670.0
669.5
669.0
668.5
668.0
667.5
Station (ft)
0
10
20
30
40
50
Legend
WS 100yr
Ground
Bank Sta

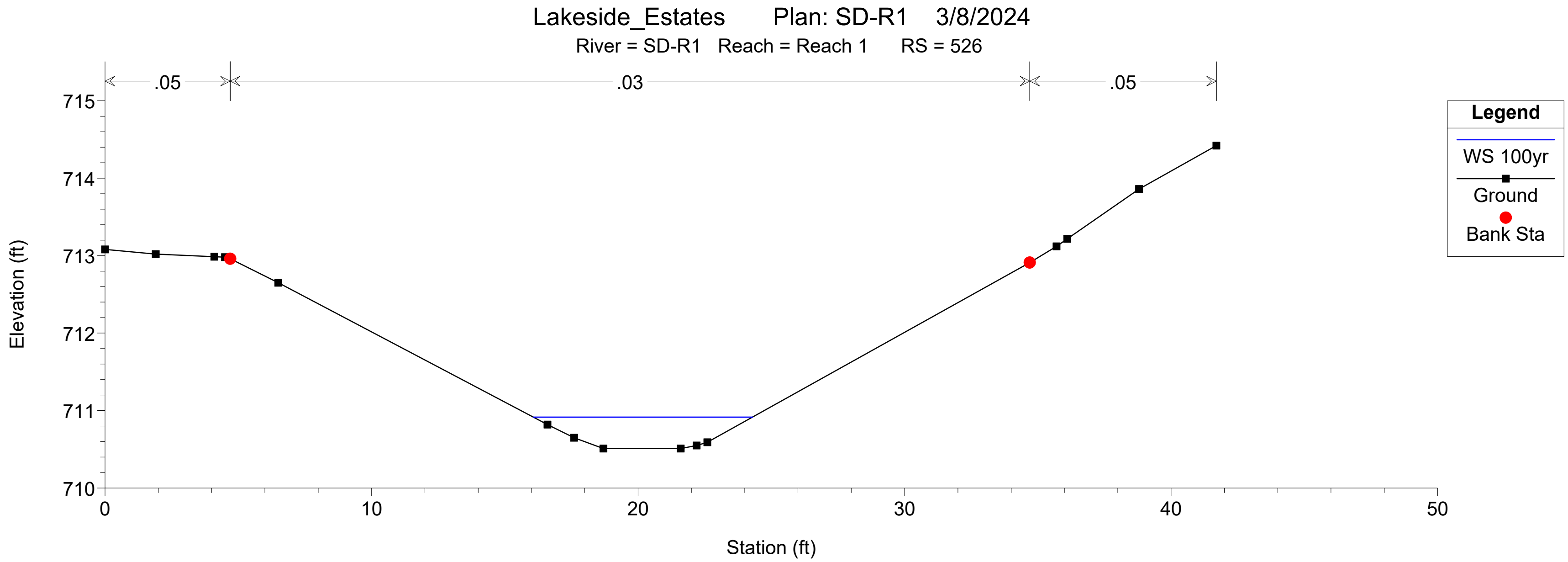
SD-R1

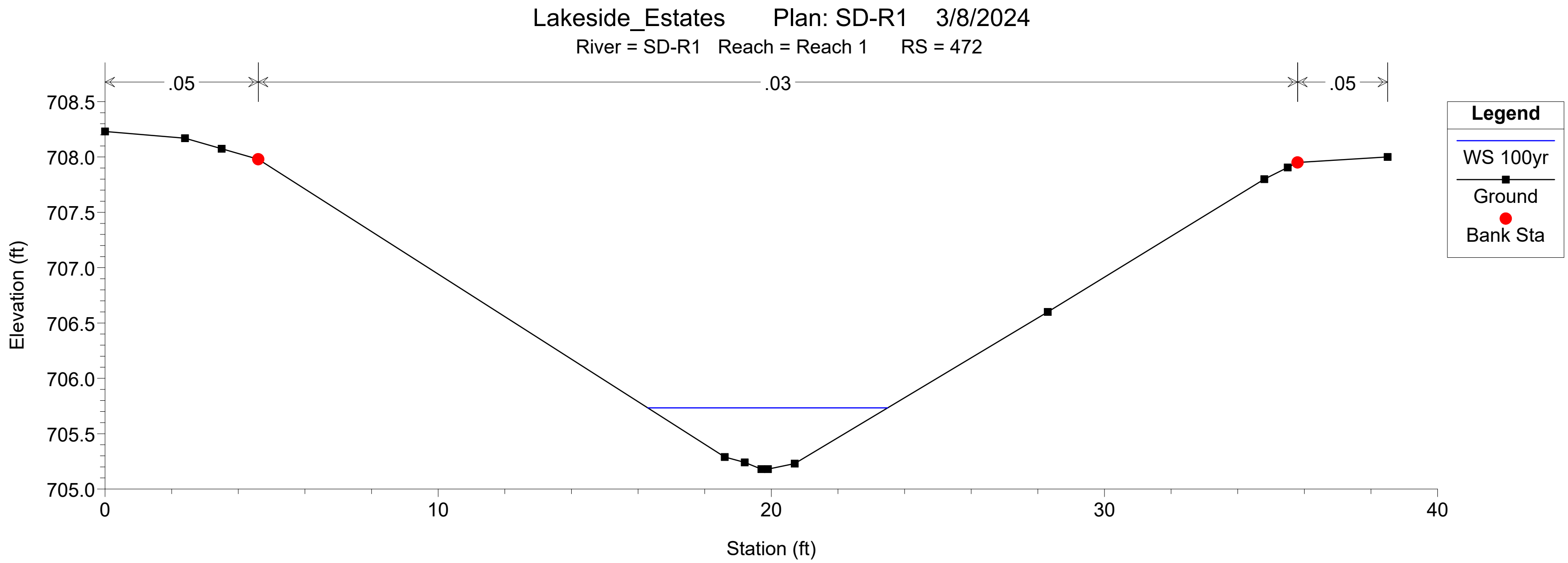


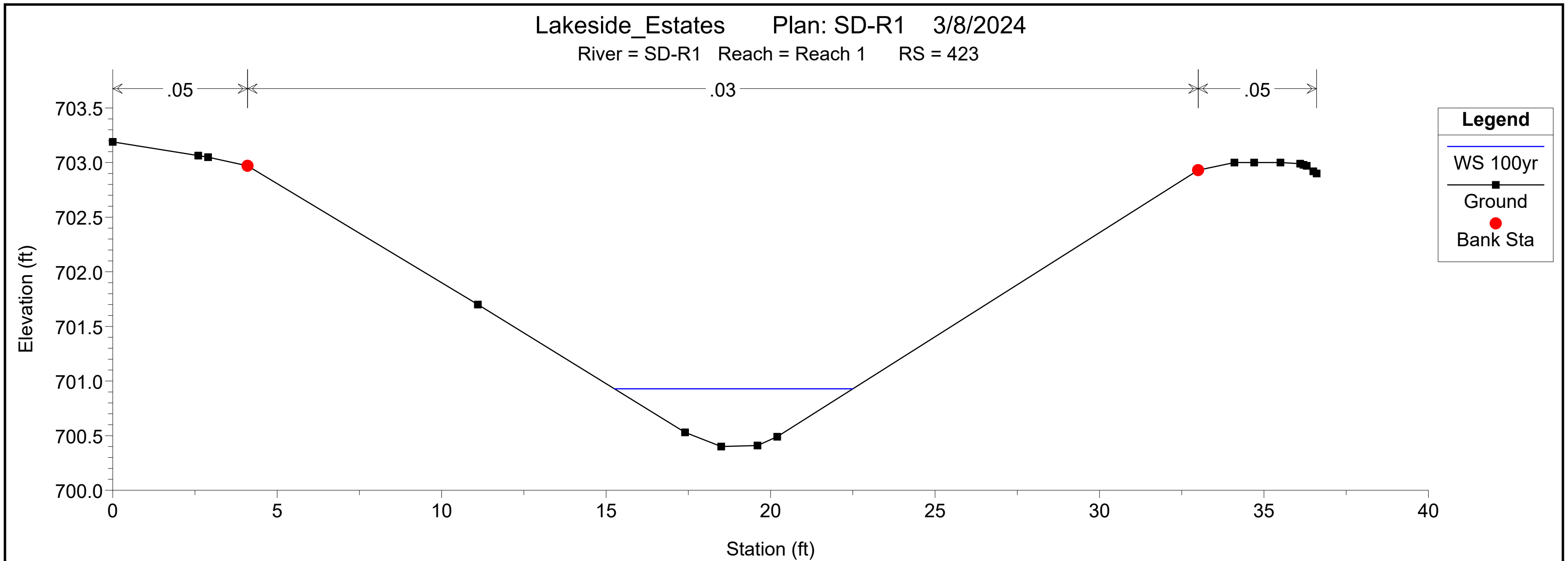
Lakeside_Estates Plan: SD-R1 3/8/2024
SD-R1 Reach 1
Legend
WS 100yr
Ground
Elevation (ft)
Main Channel Distance (ft)
720
710
700
690
680
670
660
0
100
200
300
400
500
600
700

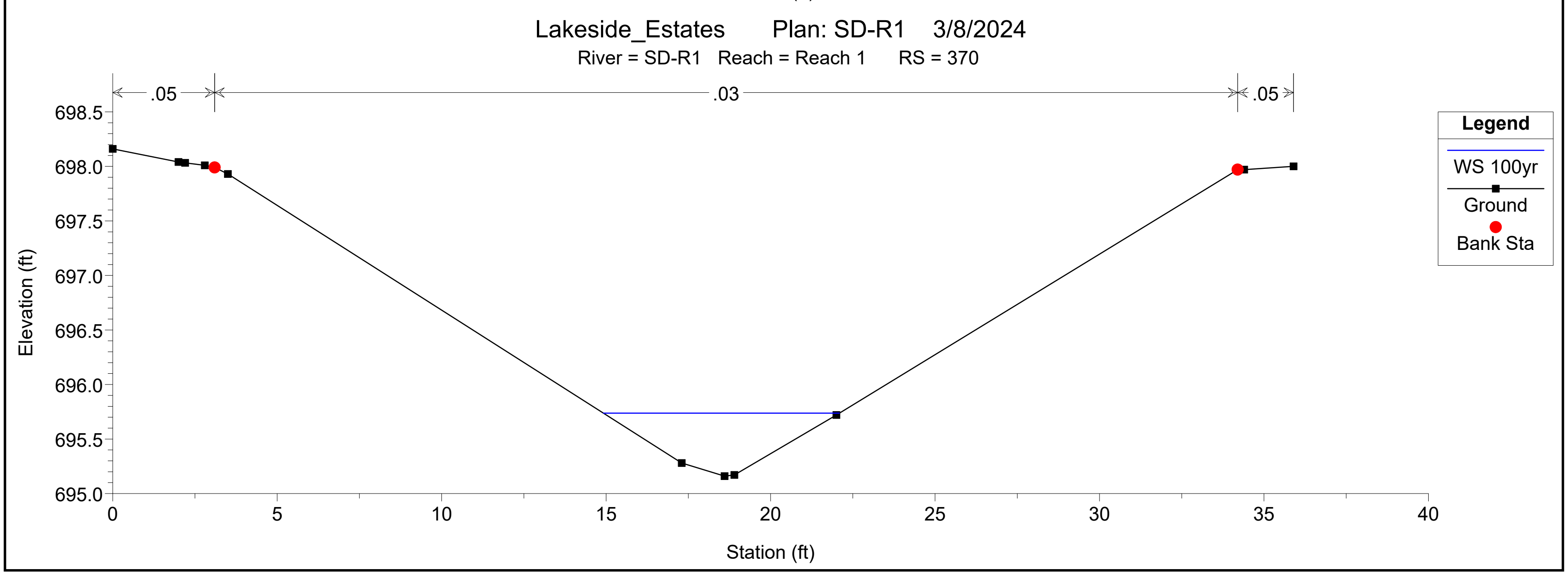

Lakeside_Estates Plan: SD-R1 3/8/2024
River = SD-R1 Reach = Reach 1 RS = 637
.05
.03
.05
Elevation (ft)
Station (ft)
Legend
WS 100yr
Ground
Bank Sta

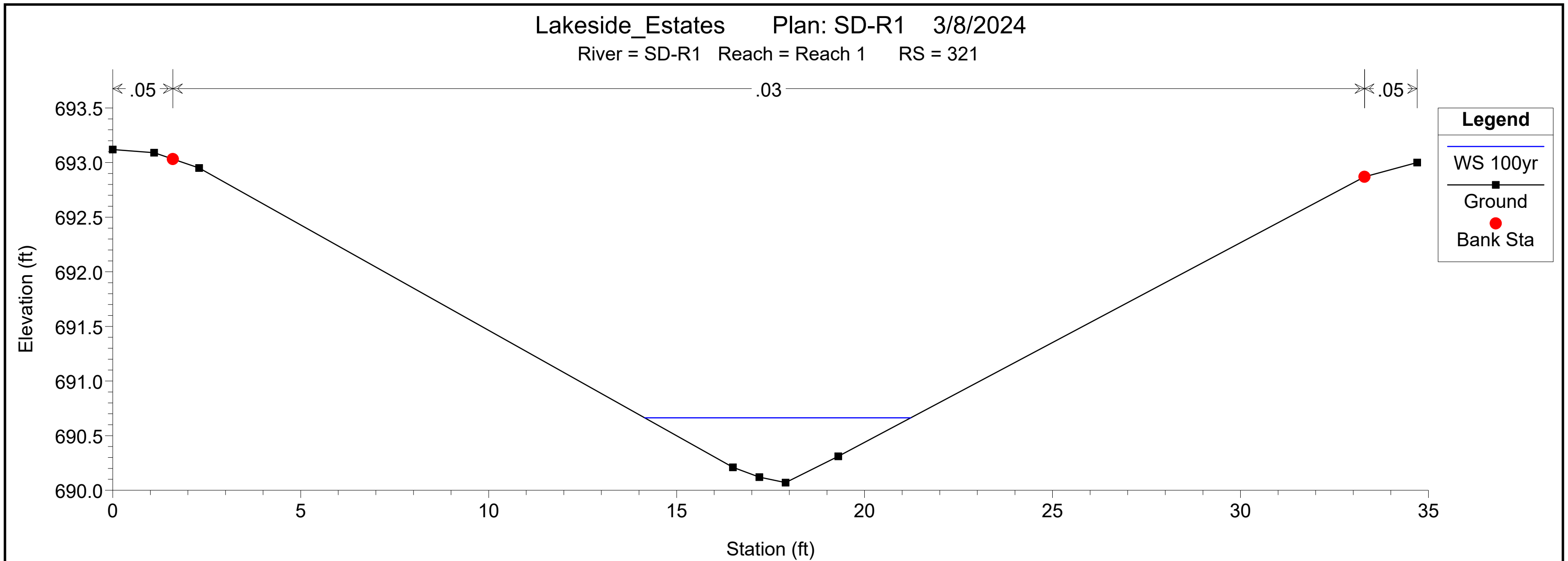

Lakeside_Estates Plan: SD-R1 3/8/2024
River = SD-R1 Reach = Reach 1 RS = 580
.05
.03
.05
Elevation (ft)
Station (ft)
Legend
WS 100yr
Ground
Bank Sta


Lakeside_Estates Plan: SD-R1 3/8/2024
River = SD-R1 Reach = Reach 1 RS = 526
.05
.03
.05
715
714
713
712
711
710
Elevation (ft)
0
10
20
30
40
50
Station (ft)
Legend
WS 100yr
Ground
Bank Sta

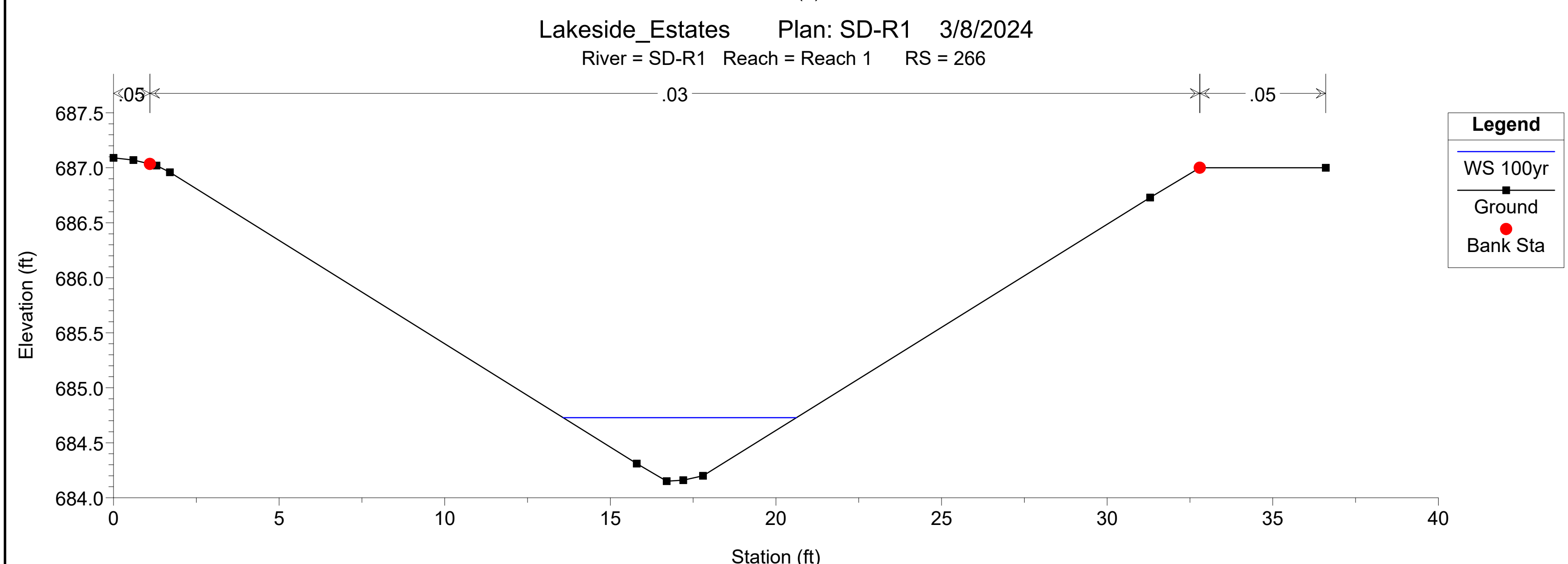

Lakeside_Estates Plan: SD-R1 3/8/2024
River = SD-R1 Reach = Reach 1 RS = 472
.05
.03
.05
708.5
708.0
707.5
707.0
706.5
706.0
705.5
705.0
Elevation (ft)
0
10
20
30
40
Station (ft)
Legend
WS 100yr
Ground
Bank Sta


Lakeside_Estates Plan: SD-R1 3/8/2024
River = SD-R1 Reach = Reach 1 RS = 423
.05
.03
.05
Legend
WS 100yr
Ground
Bank Sta
Elevation (ft)
703.5
703.0
702.5
702.0
701.5
701.0
700.5
700.0
0
5
10
15
20
25
30
35
40
Station (ft)

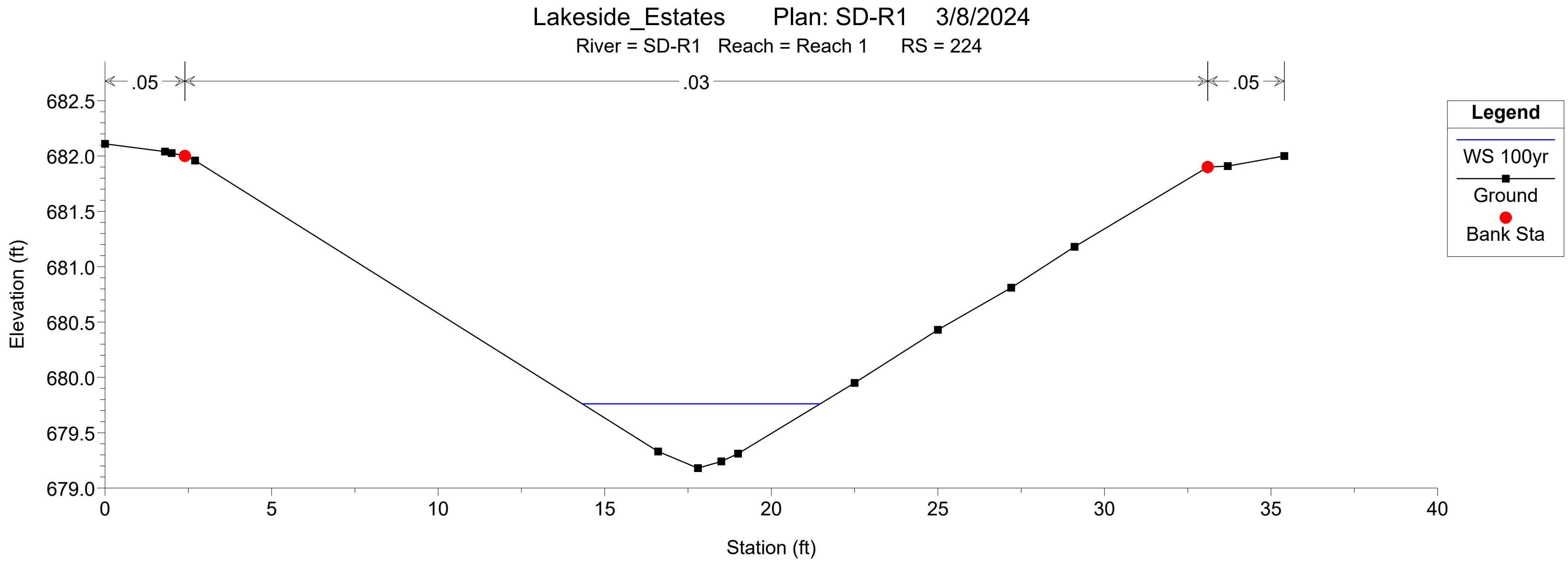

Lakeside_Estates Plan: SD-R1 3/8/2024
River = SD-R1 Reach = Reach 1 RS = 370
.05
.03
.05
Legend
WS 100yr
Ground
Bank Sta
Elevation (ft)
698.5
698.0
697.5
697.0
696.5
696.0
695.5
695.0
0
5
10
15
20
25
30
35
40
Station (ft)



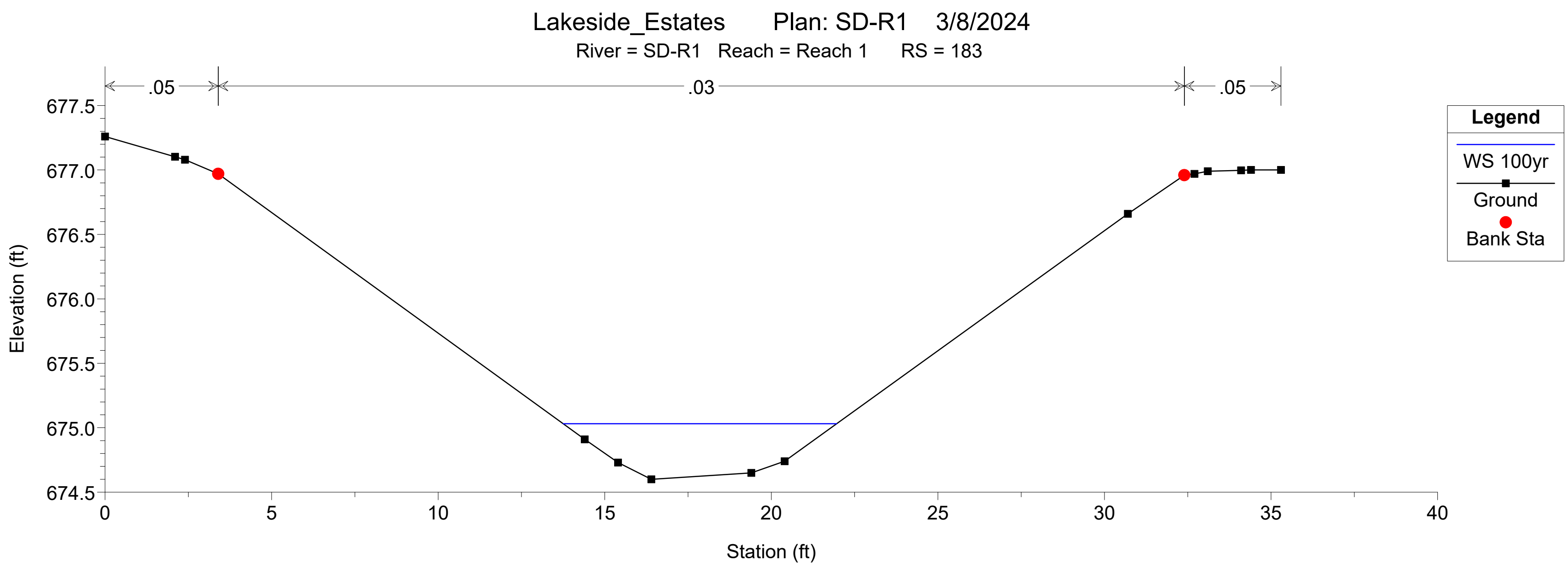
Lakeside_Estates Plan: SD-R1 3/8/2024
River = SD-R1 Reach = Reach 1 RS = 321
.05
.03
.05
Elevation (ft)
Station (ft)
Legend
WS 100yr
Ground
Bank Sta



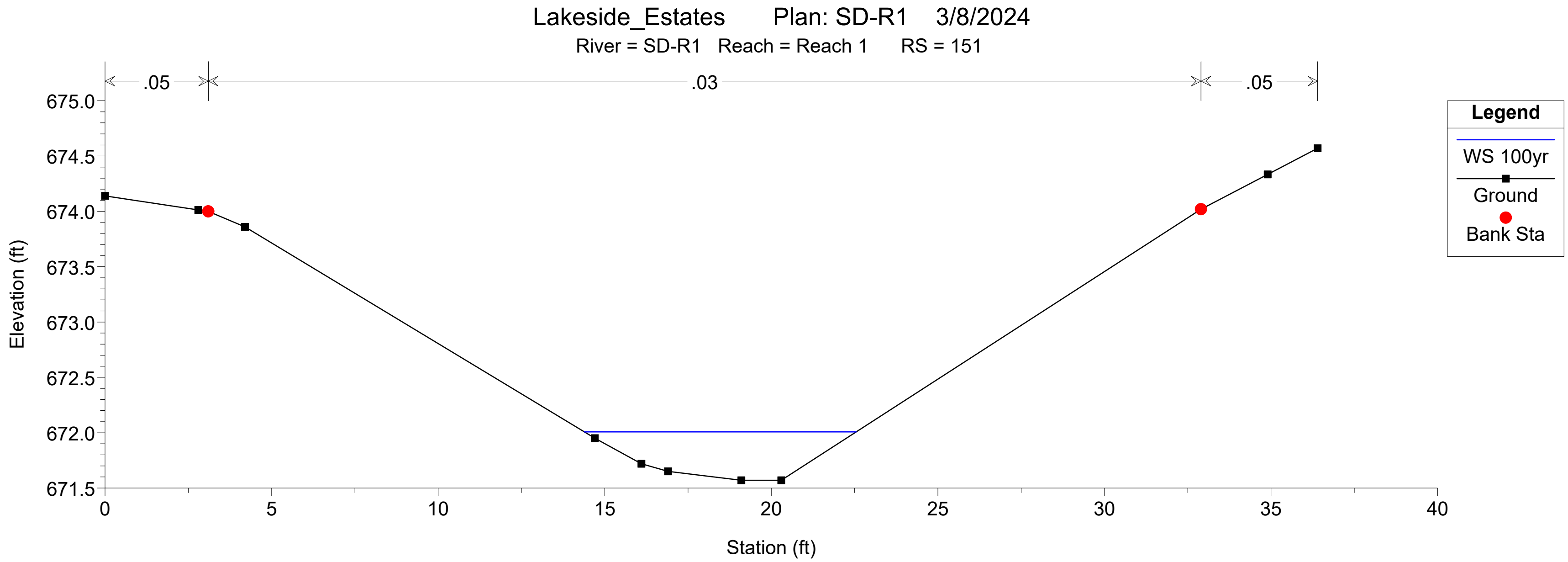
Lakeside_Estates Plan: SD-R1 3/8/2024
River = SD-R1 Reach = Reach 1 RS = 266
.05
.03
.05
Elevation (ft)
Station (ft)
Legend
WS 100yr
Ground
Bank Sta

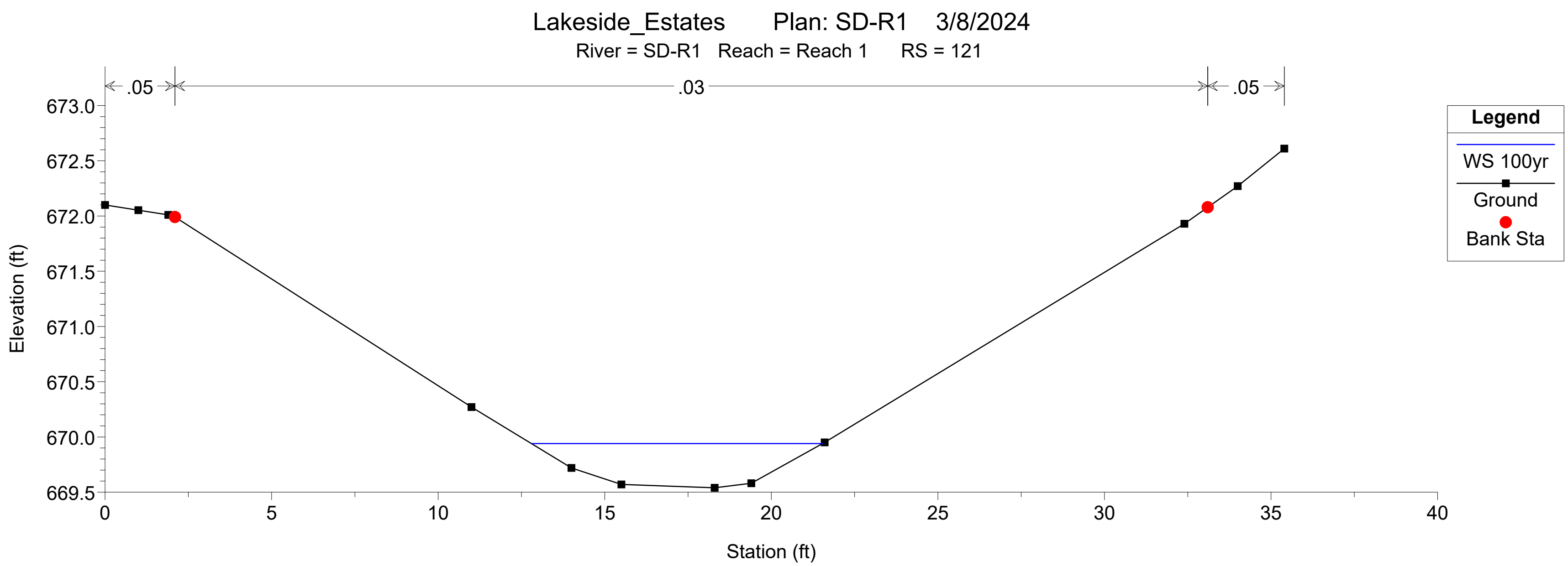


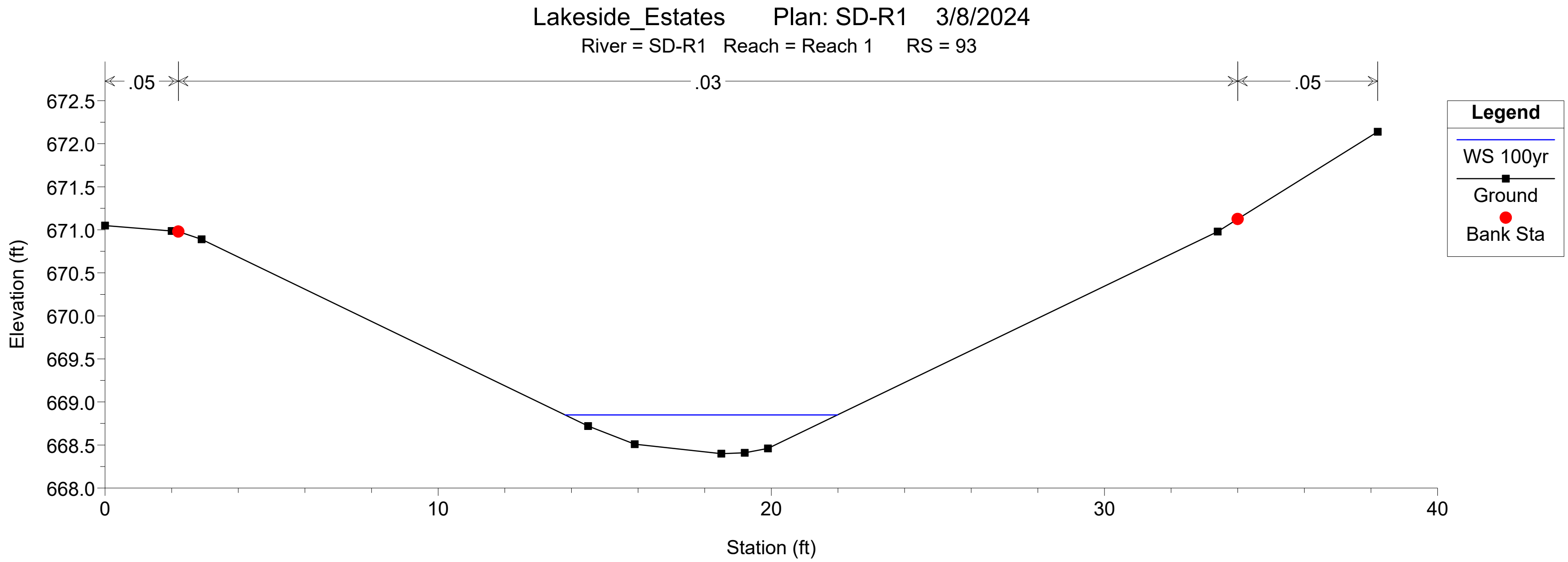
Lakeside_Estates Plan: SD-R1 3/8/2024
River = SD-R1 Reach = Reach 1 RS = 224
.05
.03
.05
682.5
682.0
681.5
681.0
680.5
680.0
679.5
679.0
Elevation (ft)
0
5
10
15
20
25
30
35
40
Station (ft)
Legend
WS 100yr
Ground
Bank Sta



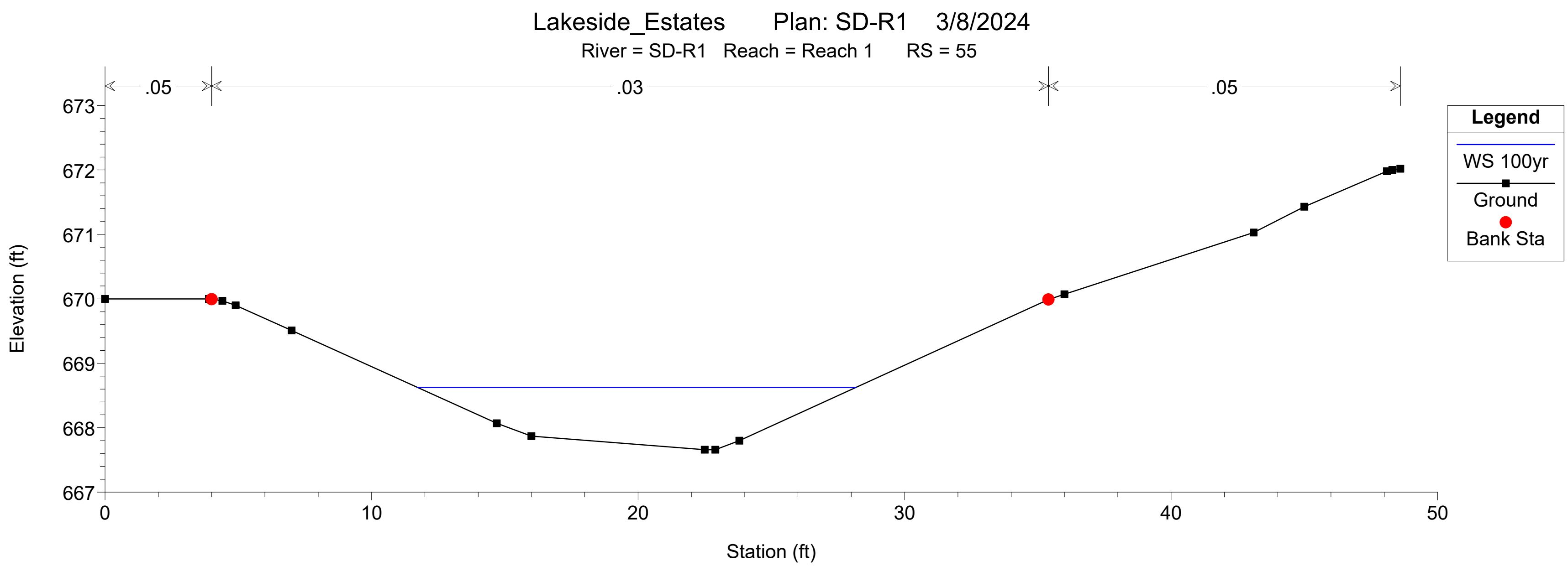
Lakeside_Estates Plan: SD-R1 3/8/2024
River = SD-R1 Reach = Reach 1 RS = 183
.05
.03
.05
677.5
677.0
676.5
676.0
675.5
675.0
674.5
Elevation (ft)
0
5
10
15
20
25
30
35
40
Station (ft)
Legend
WS 100yr
Ground
Bank Sta


Lakeside_Estates Plan: SD-R1 3/8/2024
River = SD-R1 Reach = Reach 1 RS = 151
.05
.03
.05
Elevation (ft)
675.0
674.5
674.0
673.5
673.0
672.5
672.0
671.5
0
5
10
15
20
25
30
35
40
Station (ft)
Legend
WS 100yr
Ground
Bank Sta

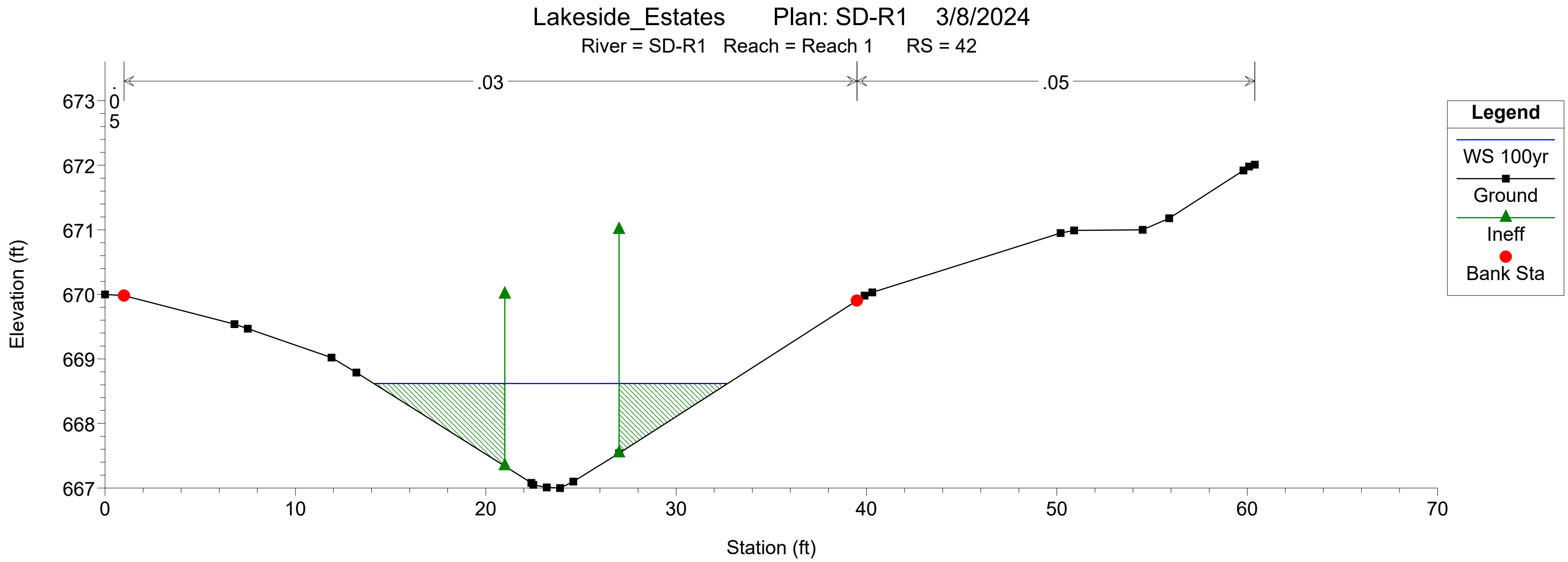

Lakeside_Estates Plan: SD-R1 3/8/2024
River = SD-R1 Reach = Reach 1 RS = 121
.05
.03
.05
Elevation (ft)
673.0
672.5
672.0
671.5
671.0
670.5
670.0
669.5
0
5
10
15
20
25
30
35
40
Station (ft)
Legend
WS 100yr
Ground
Bank Sta

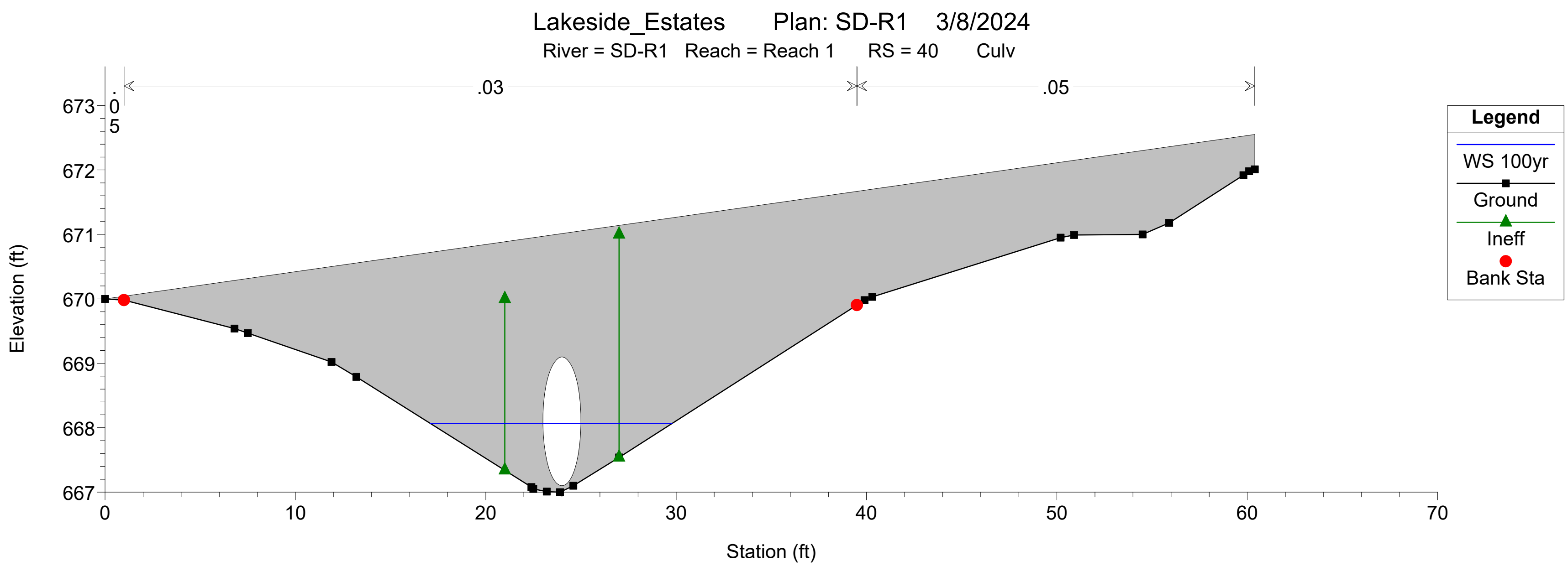


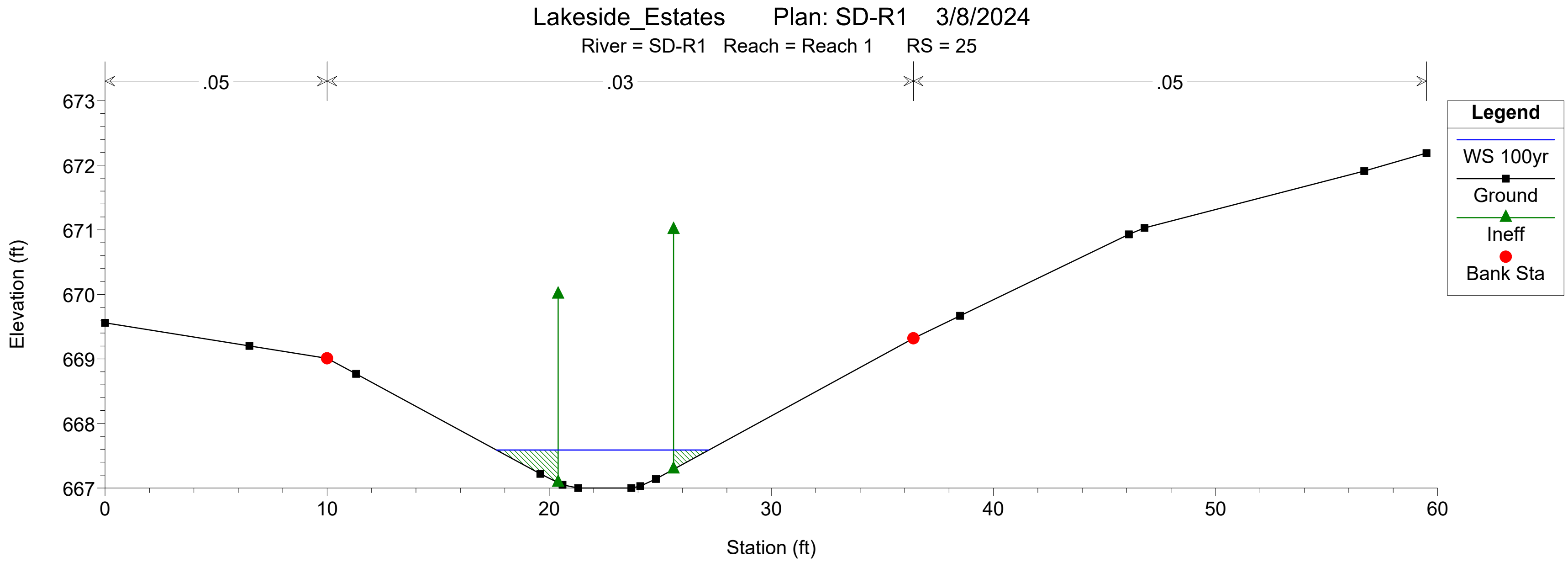
Lakeside_Estates Plan: SD-R1 3/8/2024
River = SD-R1 Reach = Reach 1 RS = 93
.05
.03
.05
Legend
WS 100yr
Ground
Bank Sta
Elevation (ft)
672.5
672.0
671.5
671.0
670.5
670.0
669.5
669.0
668.5
668.0
0
10
20
30
40
Station (ft)



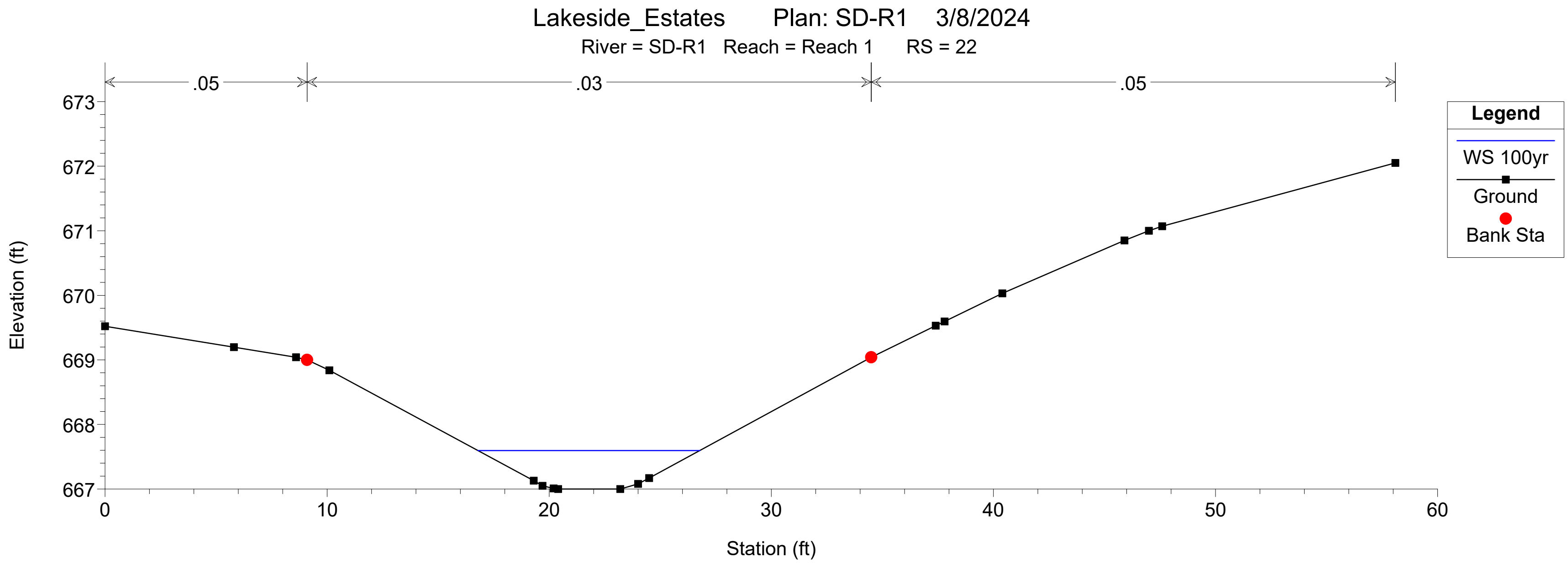
Lakeside_Estates Plan: SD-R1 3/8/2024
River = SD-R1 Reach = Reach 1 RS = 55
.05
.03
.05
Legend
WS 100yr
Ground
Bank Sta
Elevation (ft)
673
672
671
670
669
668
667
0
10
20
30
40
50
Station (ft)


Lakeside_Estates Plan: SD-R1 3/8/2024
River = SD-R1 Reach = Reach 1 RS = 42
.03
.05
Legend
WS 100yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
673
672
671
670
669
668
667
0
10
20
30
40
50
60
70

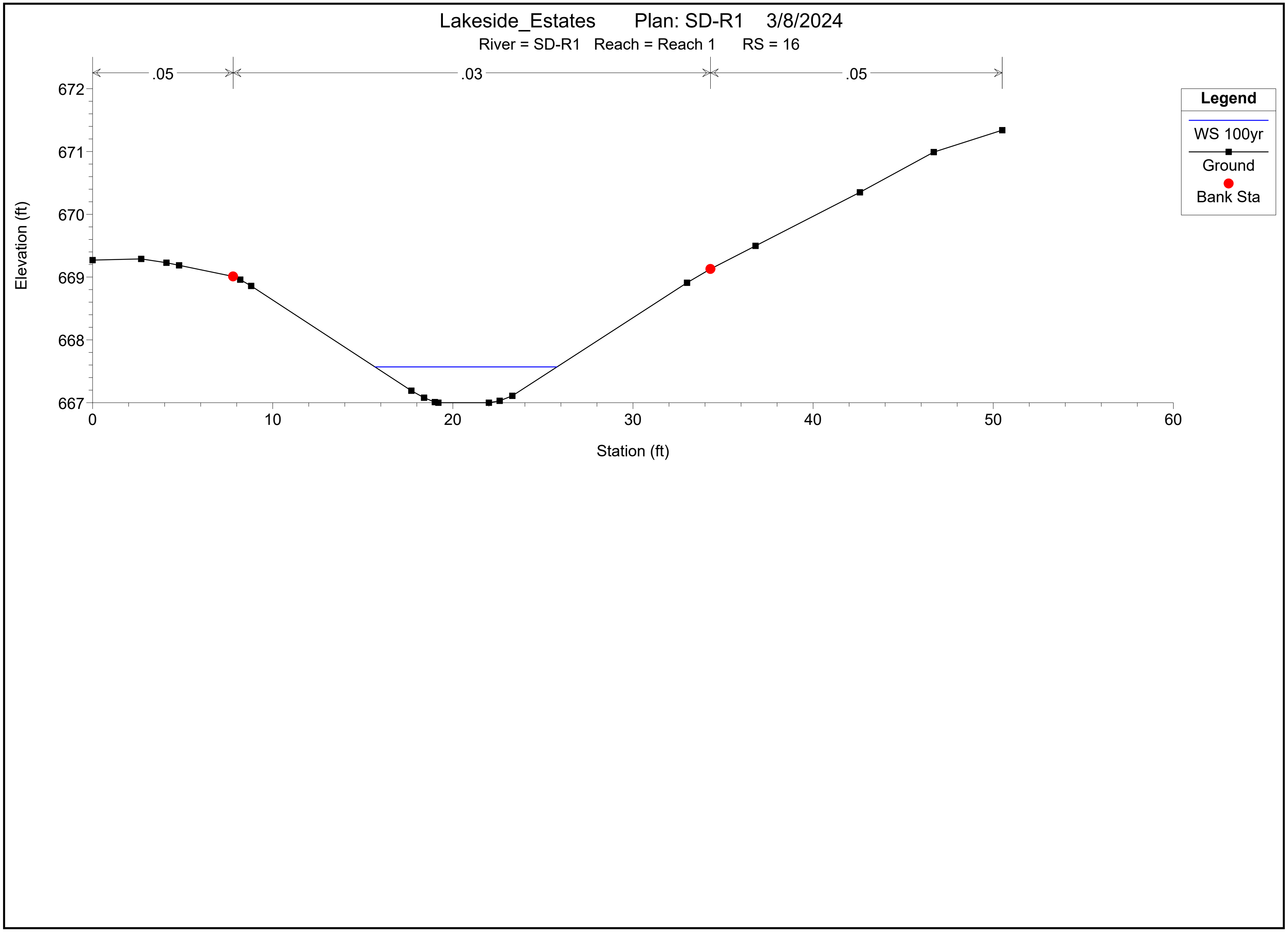

Lakeside_Estates Plan: SD-R1 3/8/2024
River = SD-R1 Reach = Reach 1 RS = 40 Culv
.03
.05
Legend
WS 100yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
673
672
671
670
669
668
667
0
10
20
30
40
50
60
70



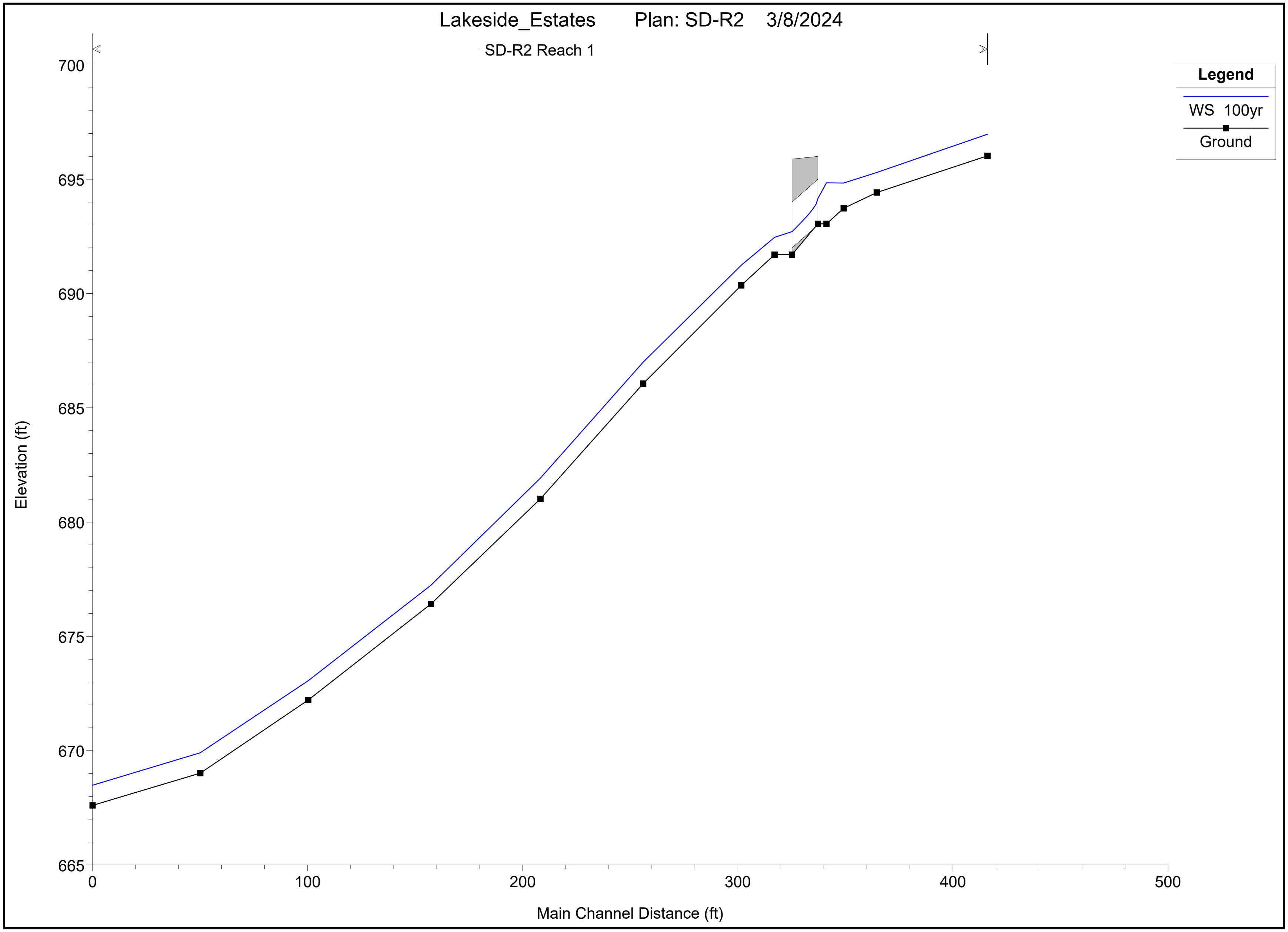
Lakeside_Estates Plan: SD-R1 3/8/2024
River = SD-R1 Reach = Reach 1 RS = 25
.05
.03
.05
Legend
WS 100yr
Ground
Ineff
Bank Sta
Elevation (ft)
673
672
671
670
669
668
667
0
10
20
30
40
50
60
Station (ft)

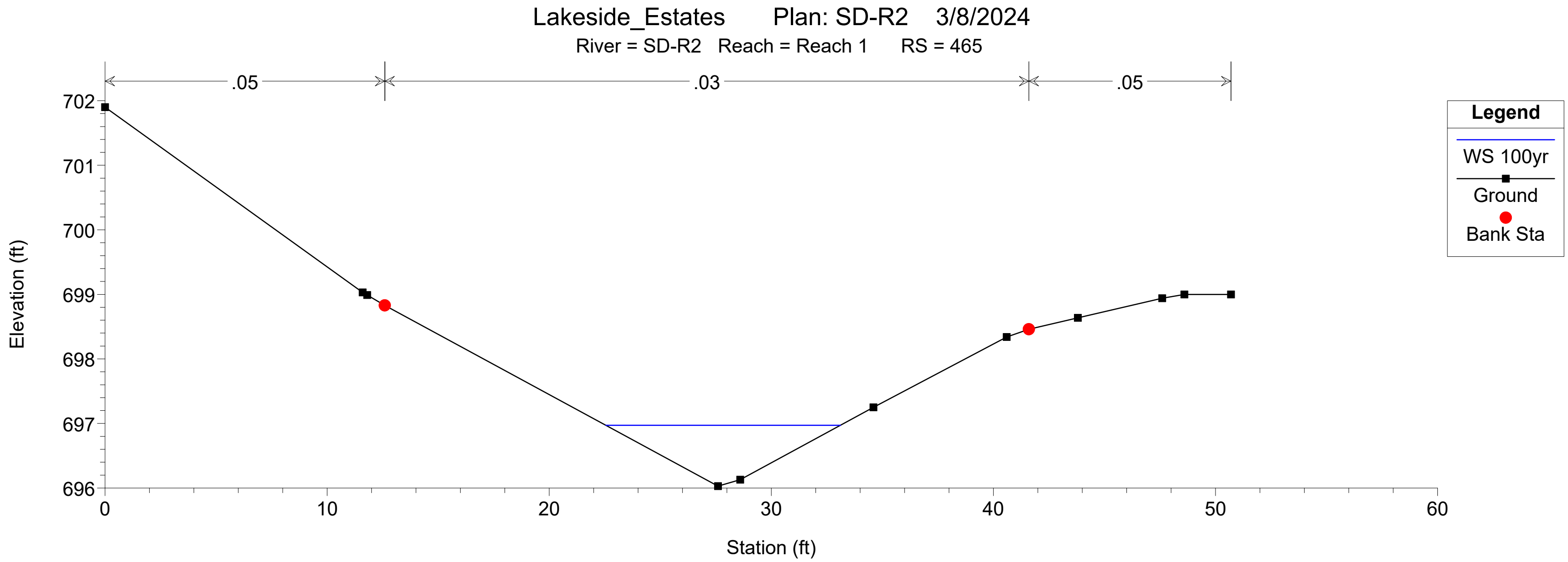


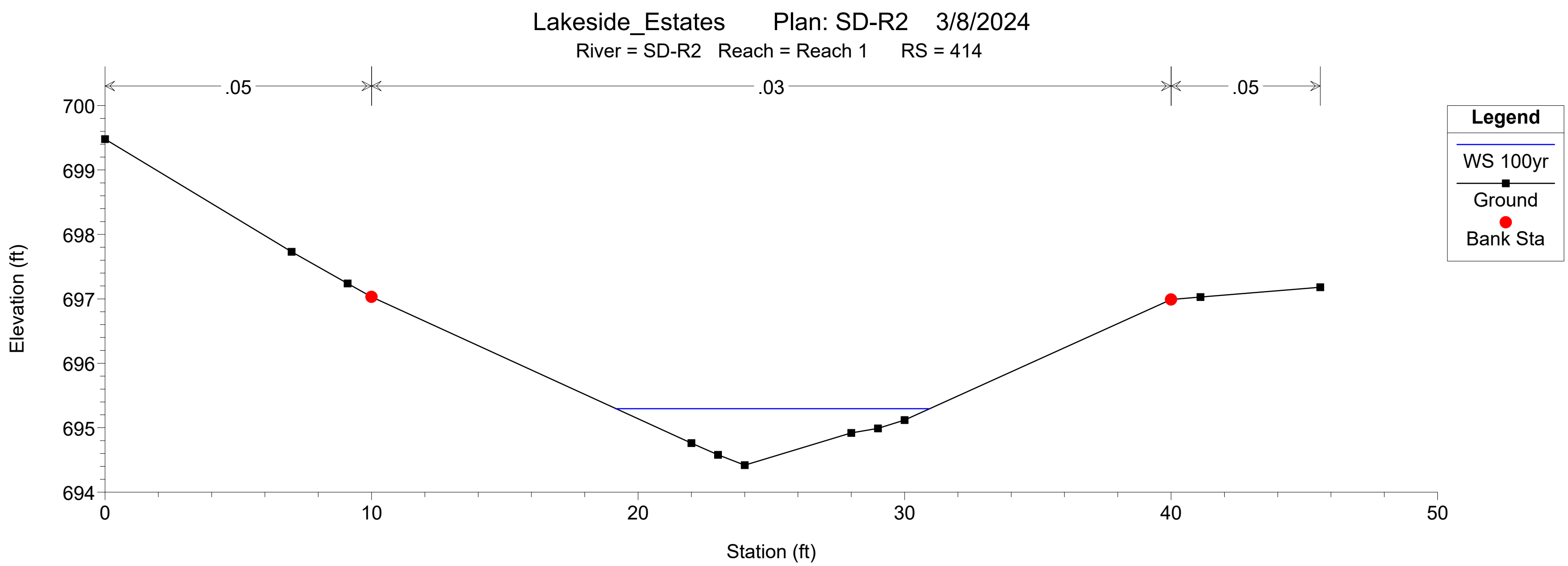
Lakeside_Estates Plan: SD-R1 3/8/2024
River = SD-R1 Reach = Reach 1 RS = 22
.05
.03
.05
Legend
WS 100yr
Ground
Bank Sta
Elevation (ft)
673
672
671
670
669
668
667
0
10
20
30
40
50
60
Station (ft)

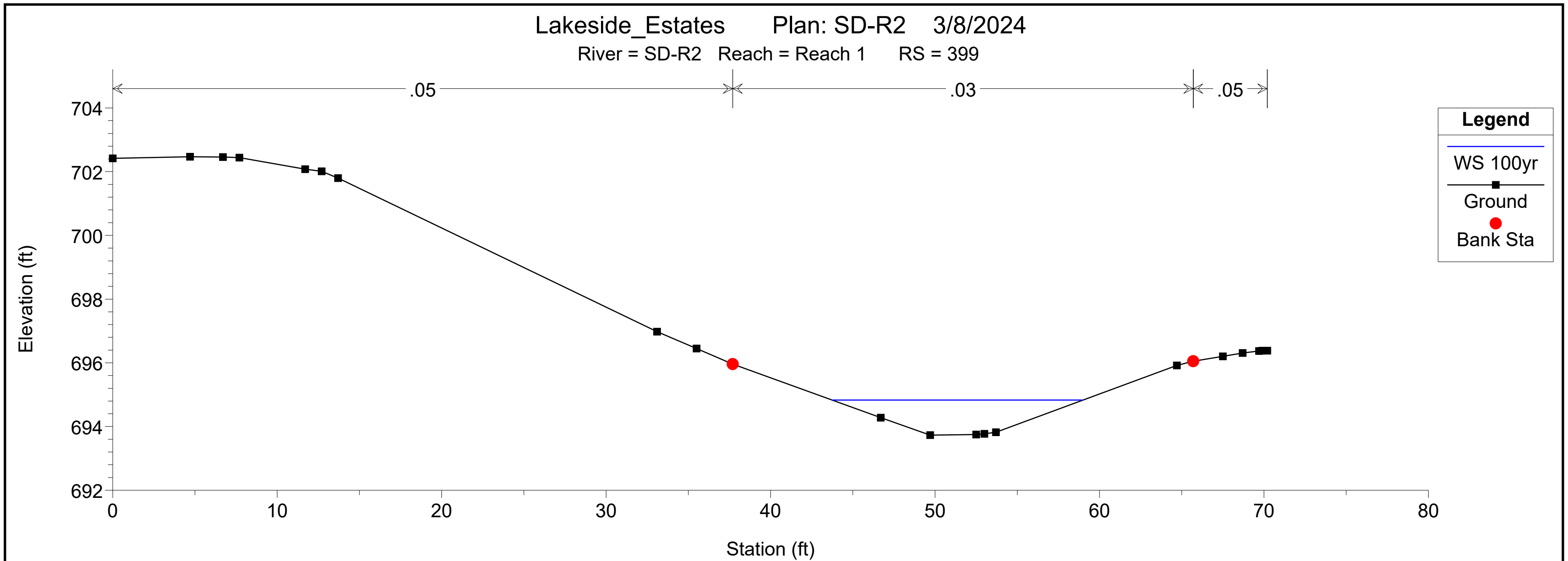

Lakeside_Estates Plan: SD-R1 3/8/2024
River = SD-R1 Reach = Reach 1 RS = 16
.05
.03
.05
Legend
WS 100yr
Ground
Bank Sta
Elevation (ft)
672
671
670
669
668
667
0
10
20
30
40
50
60
Station (ft)

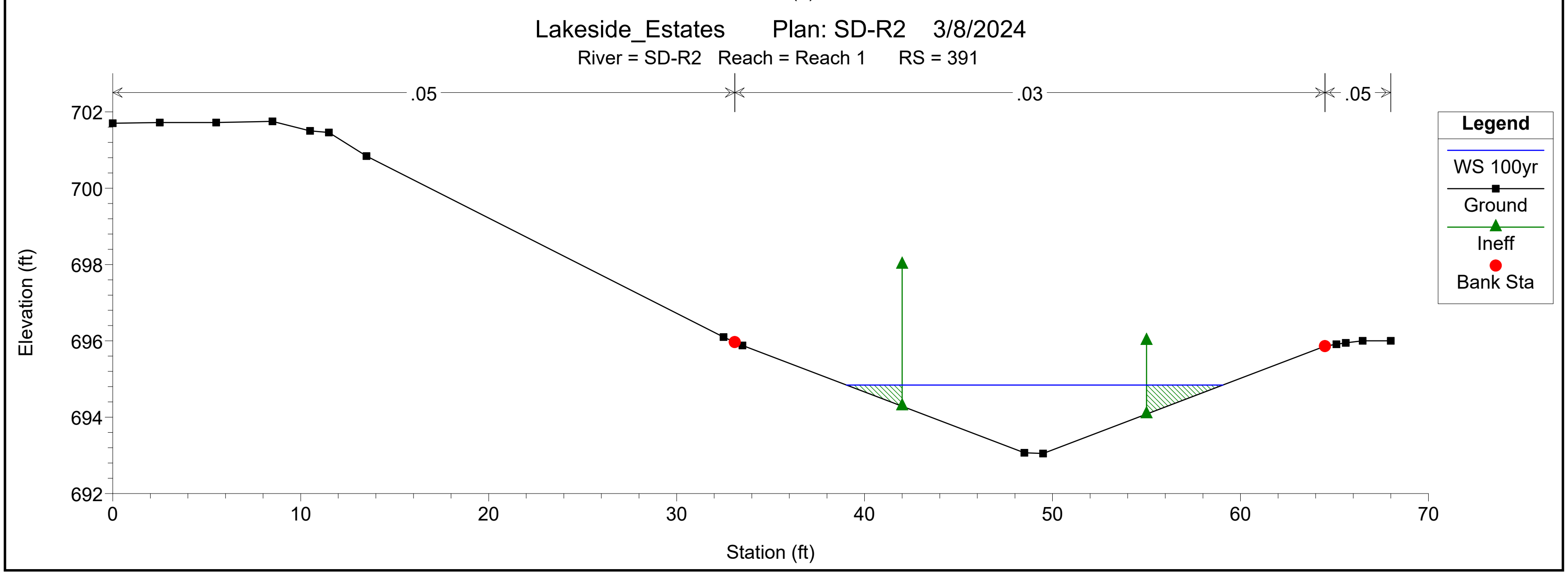
SD-R2

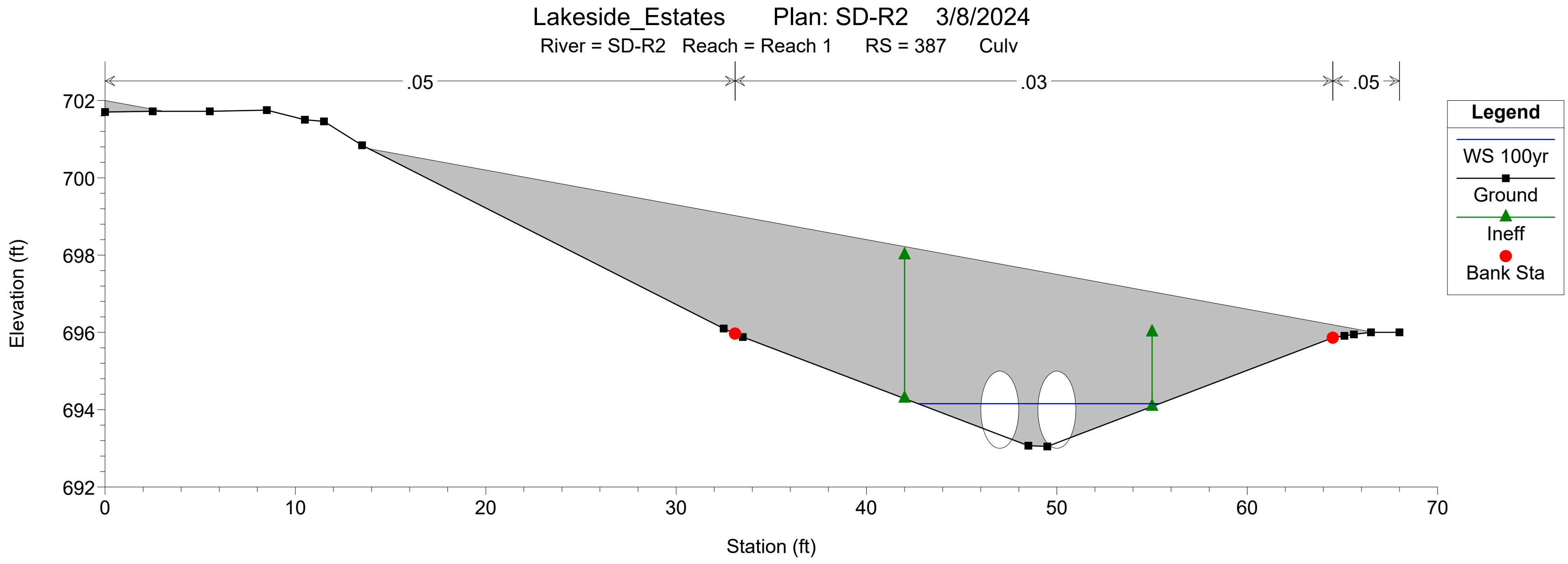

Lakeside_Estates Plan: SD-R2 3/8/2024
SD-R2 Reach 1
Legend
WS 100yr
Ground
Elevation (ft)
Main Channel Distance (ft)
700
695
690
685
680
675
670
665
0
100
200
300
400
500


Lakeside_Estates Plan: SD-R2 3/8/2024
River = SD-R2 Reach = Reach 1 RS = 465
.05
.03
.05
Legend
WS 100yr
Ground
Bank Sta
Elevation (ft)
Station (ft)
702
701
700
699
698
697
696
0
10
20
30
40
50
60

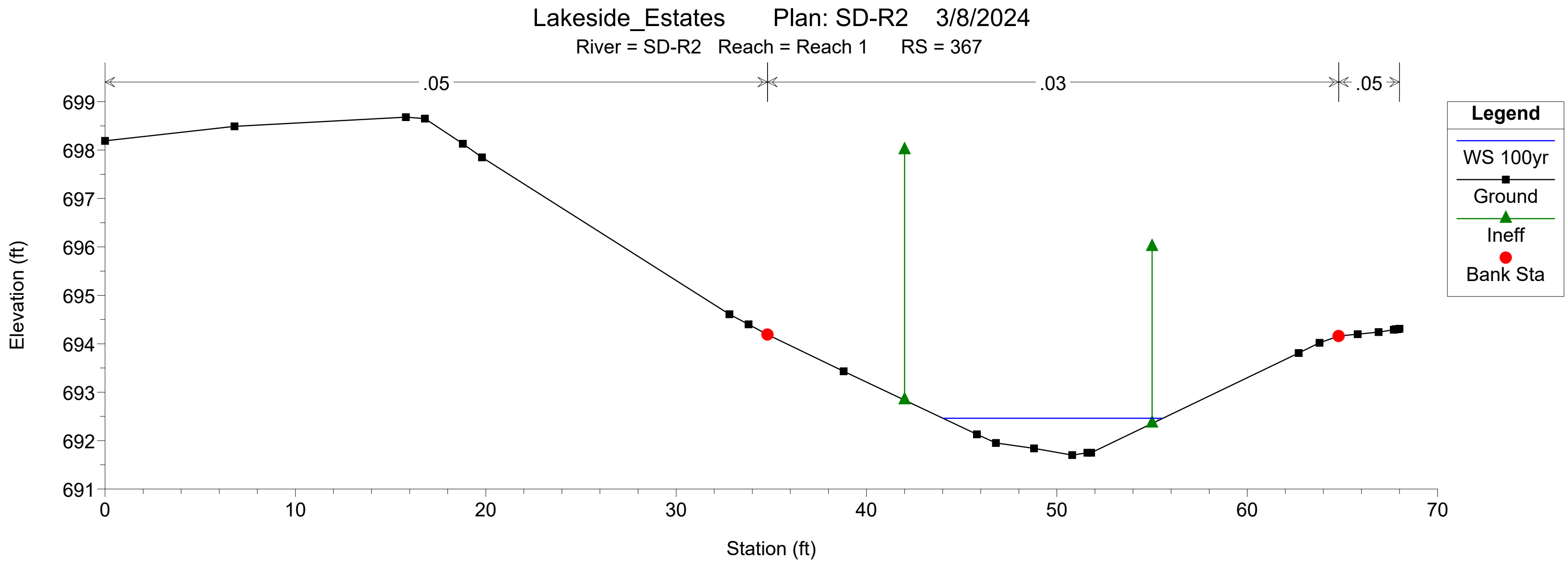

Lakeside_Estates Plan: SD-R2 3/8/2024
River = SD-R2 Reach = Reach 1 RS = 414
.05
.03
.05
Legend
WS 100yr
Ground
Bank Sta
Elevation (ft)
Station (ft)
700
699
698
697
696
695
694
0
10
20
30
40
50


Lakeside_Estates Plan: SD-R2 3/8/2024
River = SD-R2 Reach = Reach 1 RS = 399
.05
.03
.05
Elevation (ft)
704
702
700
698
696
694
692
0
10
20
30
40
50
60
70
80
Station (ft)
Legend
WS 100yr
Ground
Bank Sta

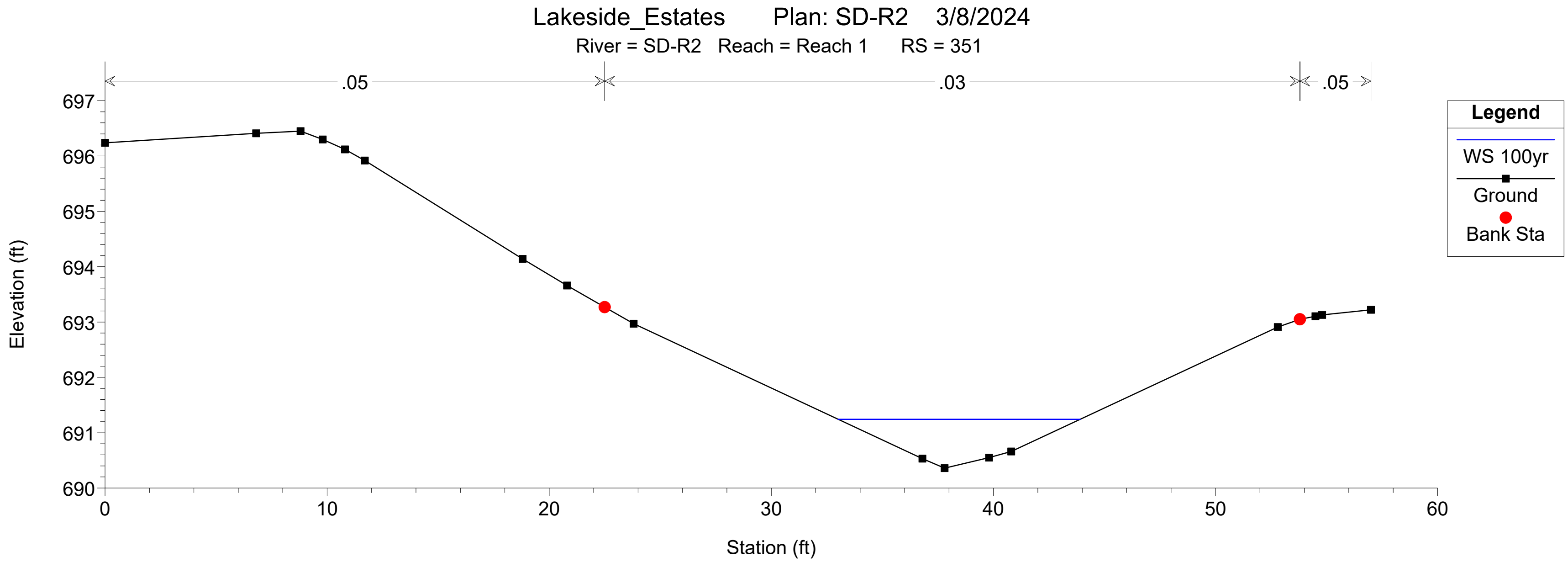

Lakeside_Estates Plan: SD-R2 3/8/2024
River = SD-R2 Reach = Reach 1 RS = 391
.05
.03
.05
Elevation (ft)
702
700
698
696
694
692
0
10
20
30
40
50
60
70
Station (ft)
Legend
WS 100yr
Ground
Ineff
Bank Sta



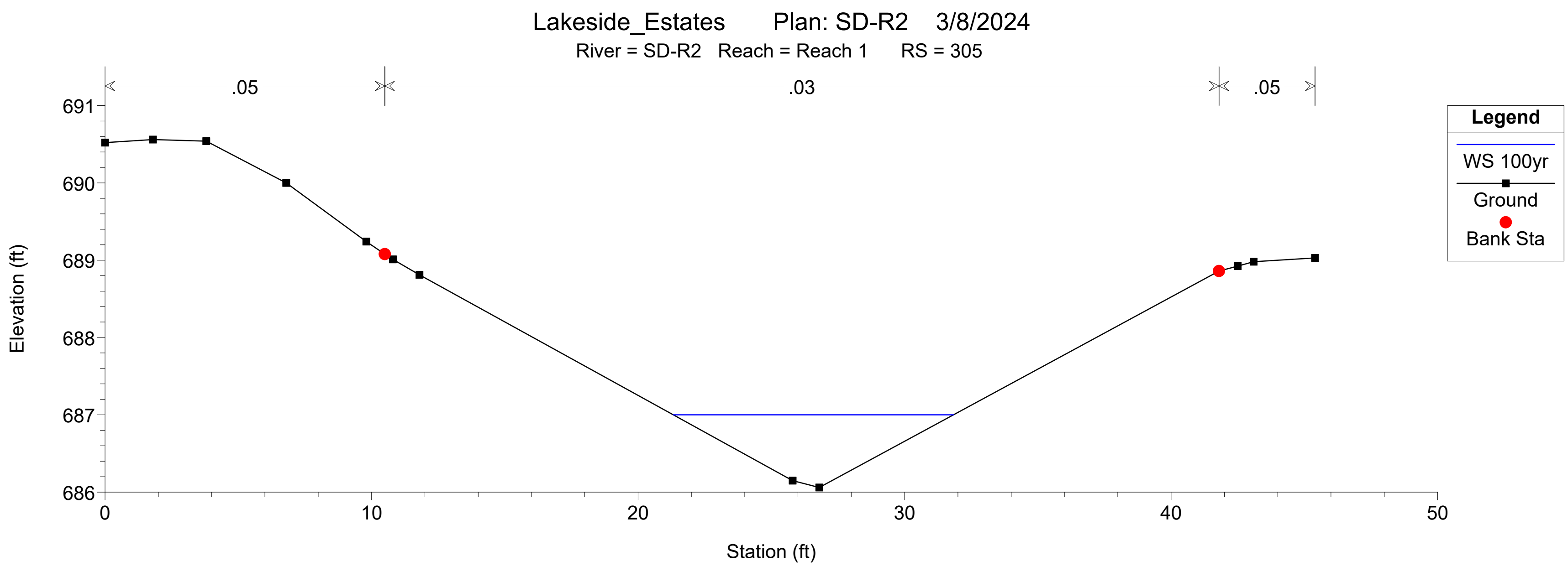
Lakeside_Estates Plan: SD-R2 3/8/2024
River = SD-R2 Reach = Reach 1 RS = 387 Culv
.05
.03
.05
Elevation (ft)
Station (ft)
Legend
WS 100yr
Ground
Ineff
Bank Sta



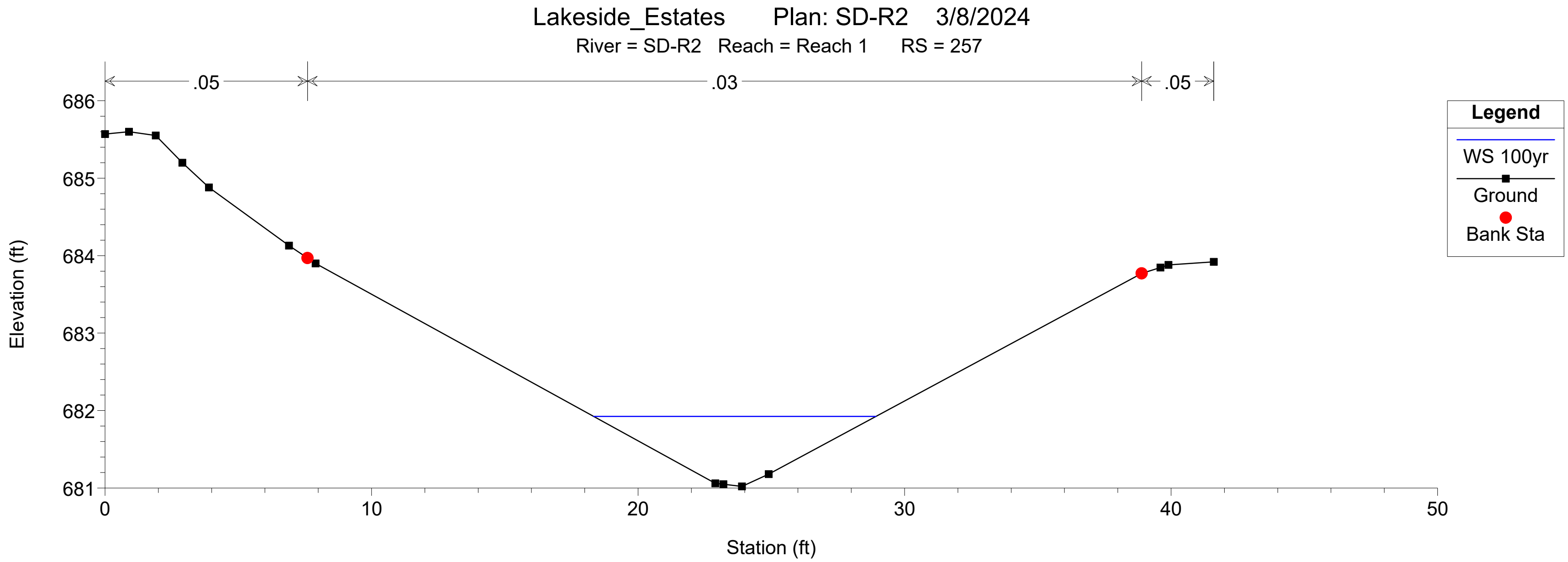
Lakeside_Estates Plan: SD-R2 3/8/2024
River = SD-R2 Reach = Reach 1 RS = 367
.05
.03
.05
Elevation (ft)
Station (ft)
Legend
WS 100yr
Ground
Ineff
Bank Sta

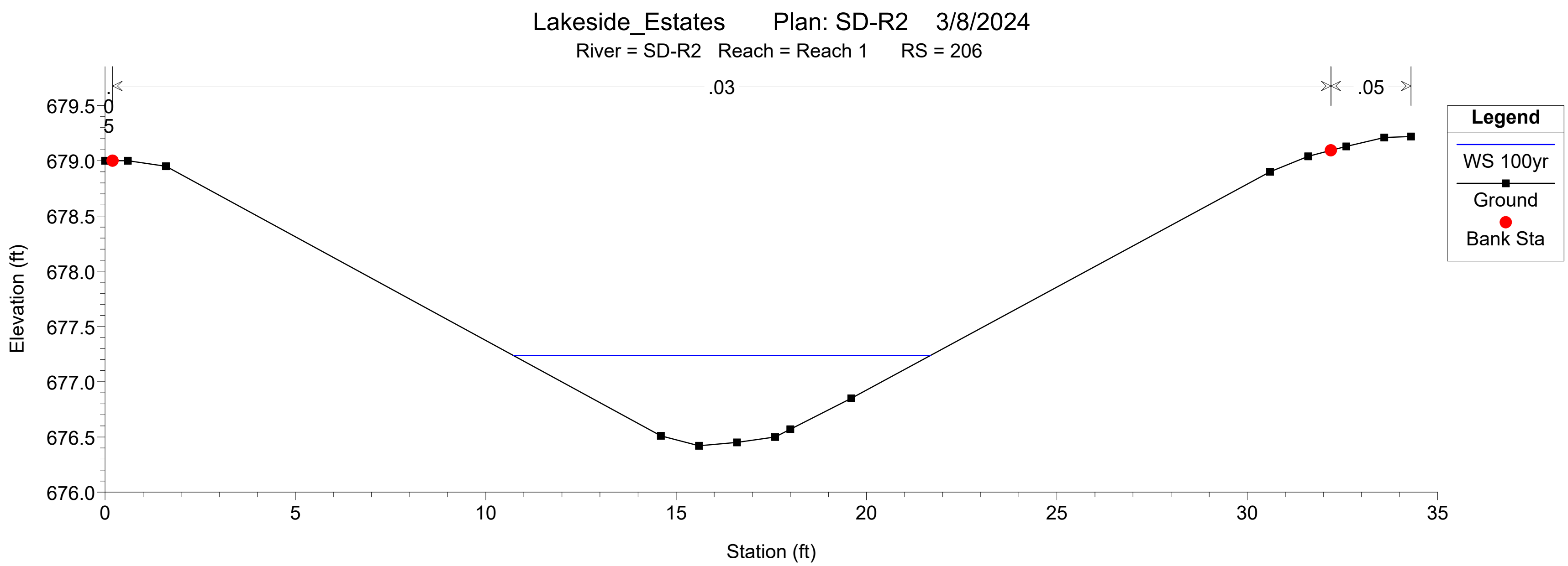


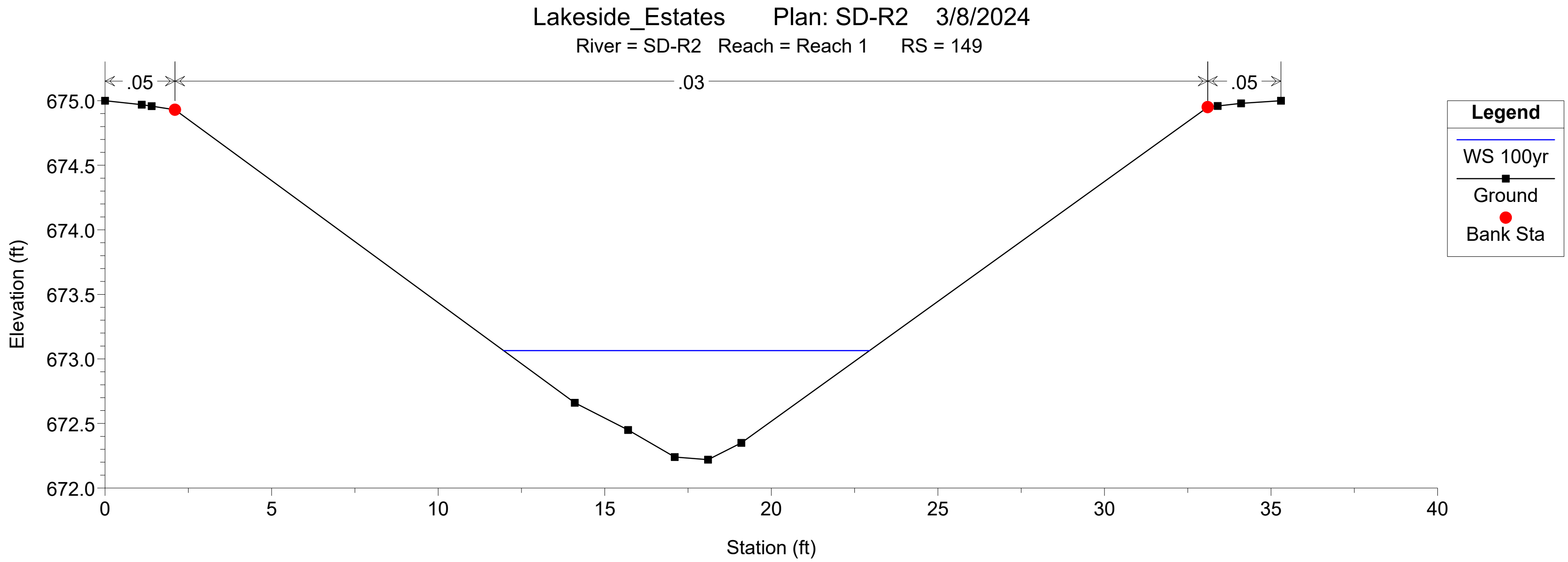
Lakeside_Estates Plan: SD-R2 3/8/2024
River = SD-R2 Reach = Reach 1 RS = 351
.05
.03
.05
Elevation (ft)
697
696
695
694
693
692
691
690
0
10
20
30
40
50
60
Station (ft)
Legend
WS 100yr
Ground
Bank Sta

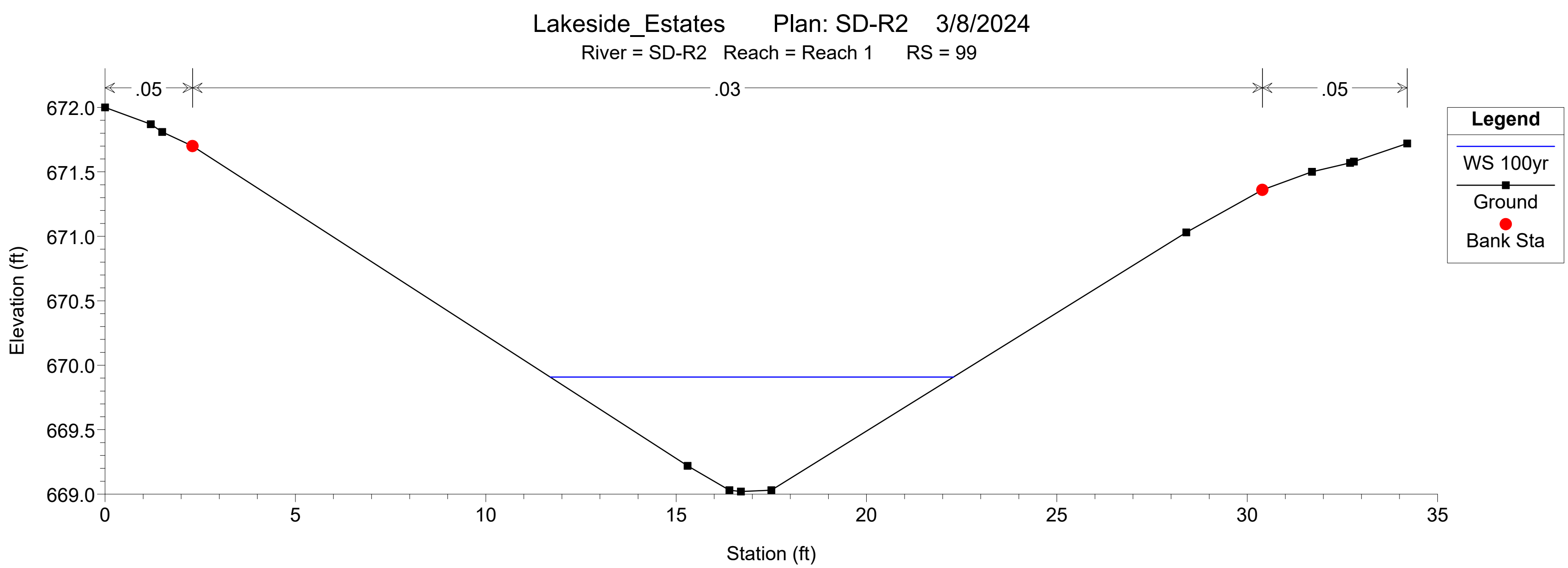


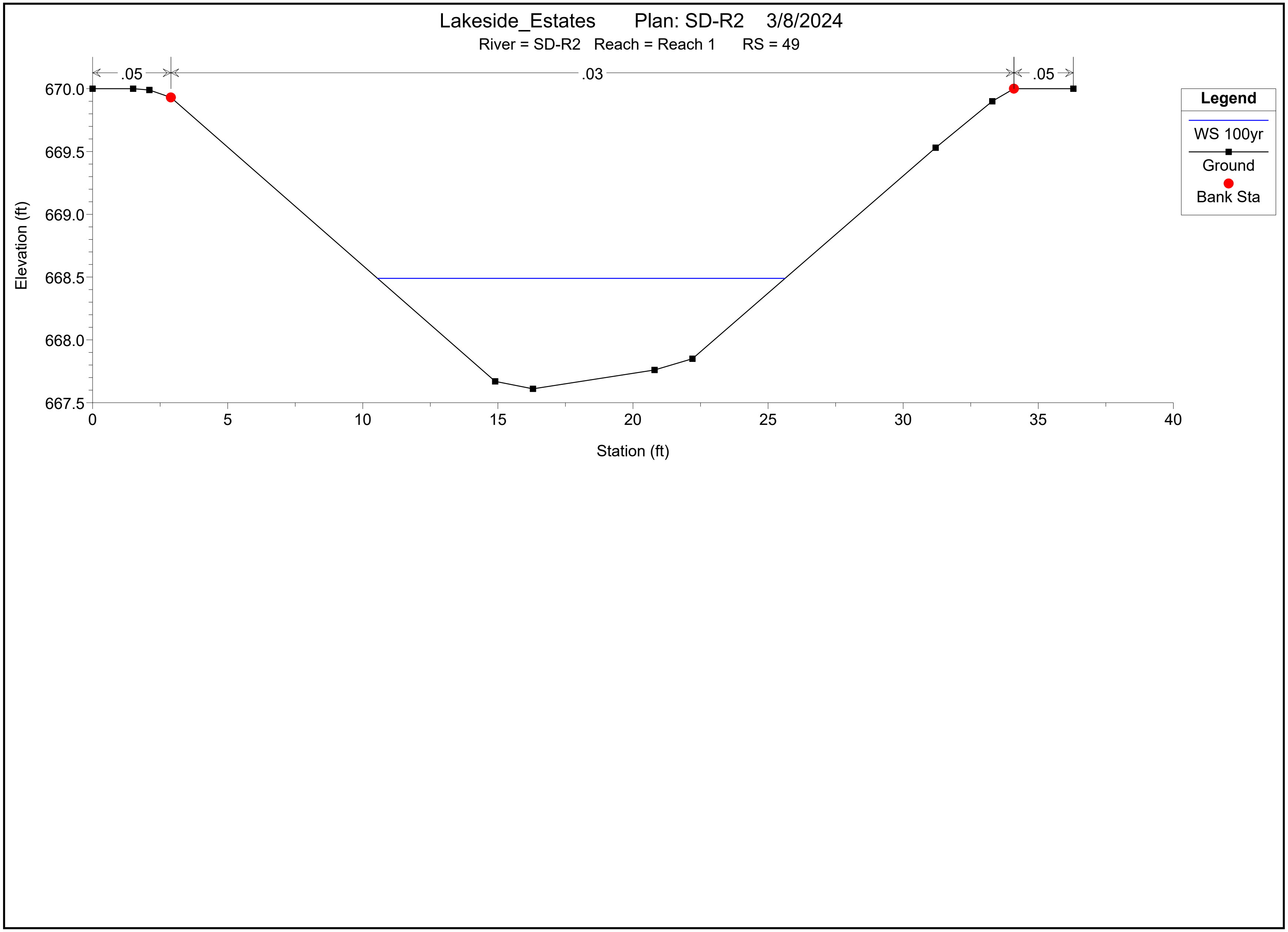
Lakeside_Estates Plan: SD-R2 3/8/2024
River = SD-R2 Reach = Reach 1 RS = 305
.05
.03
.05
Elevation (ft)
691
690
689
688
687
686
0
10
20
30
40
50
Station (ft)
Legend
WS 100yr
Ground
Bank Sta


Lakeside_Estates Plan: SD-R2 3/8/2024
River = SD-R2 Reach = Reach 1 RS = 257
.05
.03
.05
Legend
WS 100yr
Ground
Bank Sta
Elevation (ft)
686
685
684
683
682
681
0
10
20
30
40
50
Station (ft)


Lakeside_Estates Plan: SD-R2 3/8/2024
River = SD-R2 Reach = Reach 1 RS = 206
.03
.05
Legend
WS 100yr
Ground
Bank Sta
Elevation (ft)
679.5
679.0
678.5
678.0
677.5
677.0
676.5
676.0
0
5
10
15
20
25
30
35
Station (ft)


Lakeside_Estates Plan: SD-R2 3/8/2024
River = SD-R2 Reach = Reach 1 RS = 149
.05
.03
.05
Elevation (ft)
Station (ft)
Legend
WS 100yr
Ground
Bank Sta


Lakeside_Estates Plan: SD-R2 3/8/2024
River = SD-R2 Reach = Reach 1 RS = 99
.05
.03
.05
Elevation (ft)
Station (ft)
Legend
WS 100yr
Ground
Bank Sta



Lakeside_Estates Plan: SD-R2 3/8/2024
River = SD-R2 Reach = Reach 1 RS = 49
.05
.03
.05
Elevation (ft)
670.0
669.5
669.0
668.5
668.0
667.5
0
5
10
15
20
25
30
35
40
Station (ft)
Legend
WS 100yr
Ground
Bank Sta

Appendix D – Construction Plans

Appendix E – Electronic Data