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# Preliminary HEC-RAS Analysis

## Tentative Tract Map No. 38927

**JN: 10308**
**CLIENT: Raincross Development, LLC**
**DATE PREPARED**
**08/12/2024**
**DATE REVISED:**
**9/16/2025**

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# Section 1 - Introduction

## 1. Introduction

This report provides a for analysis of post development 100-year flooding limits for the natural drainage courses located within the project limits for a development known as Tentative Tract Map No. 38927 utilizing the Hydrologic Engineering Center's River Analysis System (HEC-RAS). Tentative Tract Map No. 38297 is located in the unincorporated area of Riverside County. The project is located on the north side of Lake Matthews, north of El Sobrante Road and East of McAllister Street. Figure 1.1 provides a location map for the project.

This report provides information on proposed storm flows rates, established bed and bank locations, existing culvert/storm drain facilities, proposed culvert/storm drain facilities, and any other necessary criteria for the analysis of the development to determine the extent of the post development 100-year flooding limits. The extents of the analysis will be utilized to determine the post-development impacts of Tentative Tract Map No. 38927 to prevent impedance of any run-on flows, protect downstream properties and/or facilities from potential flooding, and to identify the 100-year flooding limits to confirm the design of the proposed development does not create any adverse drainage impacts.

## 2. Land Use Plan

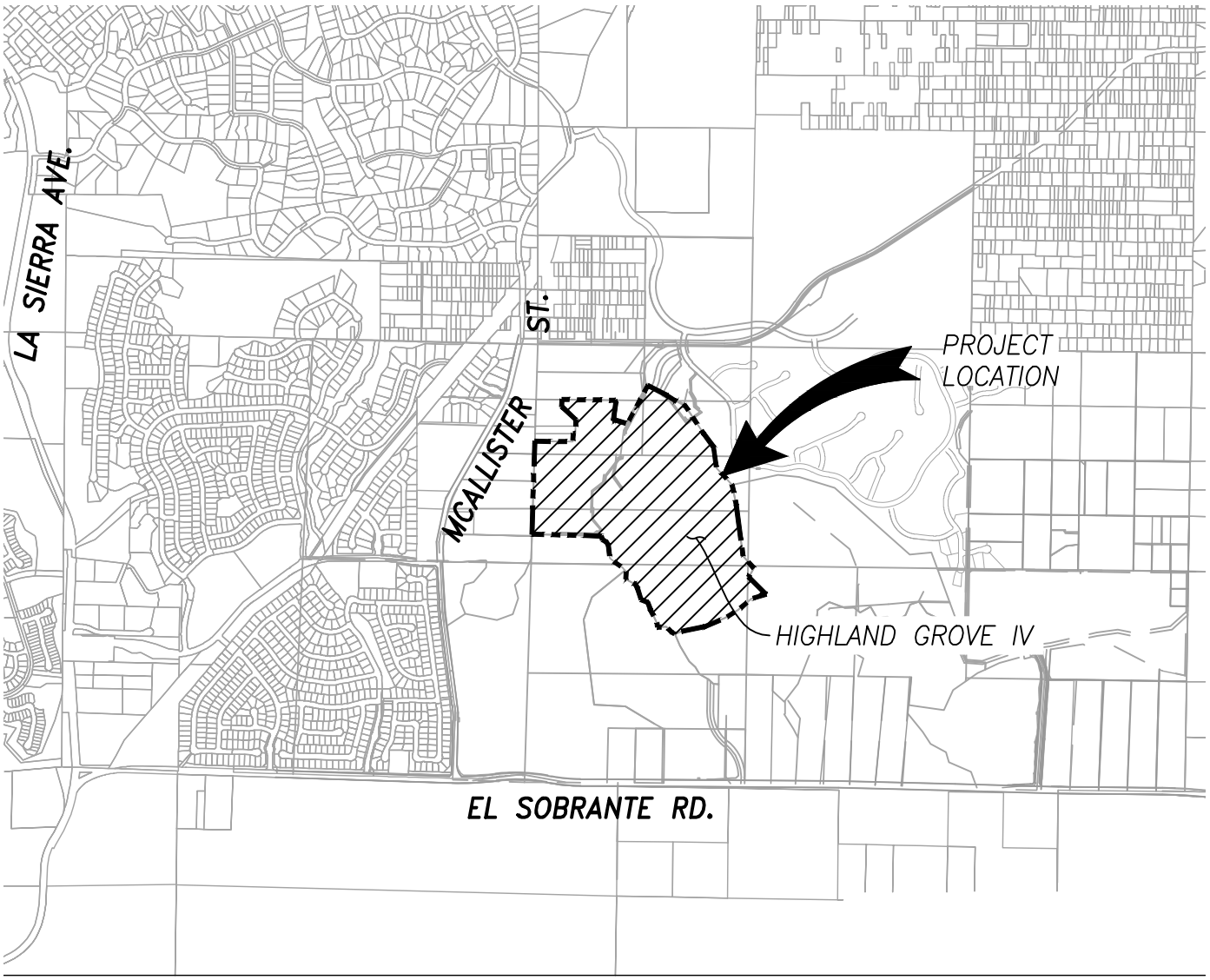
Tentative Tract Map No. 38927 encompasses a total of approximately 112.34 acres. Figure 1.2 provides the development plan for the project. The proposed project consists of the development of 206 detached single family dwelling units located within the unincorporated area of Riverside County known as the Lake Matthews Area. The Lake Mathew Area Plan was developed as part of the Riverside County General Plan 2025, prepared in 2003 as part of the General Plan Update. The project is located with the El Sobrante Policy Area of the Lake Matthews Area, which encourages the clustering of parcel sizes to a minimum of 10,000 square feet for the purposes of conserving open space and sensitive habitat while not exceeding the underlying housing densities identified by the general plan's designation of LDR-Low Density Residential (2 units/acre) and VLDR-Very Low Density Residentials (1 unit/acre). As part of the clustering efforts the project will be proposing a zone change to incorporate development standards that are consistent with the reduced lot sizes. It should be noted that although the project is clustering the units to a smaller overall parcel size, the total number of units is consistent with the existing land use designation.

## 3. Purpose of Study

The purpose of this study is to substantiate the hydrology and hydraulic design of the residential development known as Tentative Tract Map No. 38927 to determine the 100-year flooding limits of the existing drainage courses that bisect the project site. This study will analyze post-development storm water run-on and run-off values and propose storm water design recommendations to ensure the adequate size, volumes, and proper operation of drainage facilities for the proposed project while not adversely affecting the capacity of the existing drainage courses while maintaining the conveyance of 100-year storm flows without impeding on adjacent development or cause any downstream or upstream flooding impacts. Along with the standard analysis of a typical report, this report outlines the specific analysis and provides the back-up calculations necessary for

determining the 100-year flooding limits of the natural drainage courses within the development such that the anticipated storm drain flows are adequately contained without causing any adverse drainage impacts. Figure 1.3, aerial imagery of the project, shown below, identifies the existing drainage reach locations analyzed as part of post development analysis, Figure 1.4 also shown below identifies the proposed culvert locations associated with analysis of the post development condition.

4. Figure 1.1 Location Map - Tentative Tract No. 38927




LAKE MATHEWS

0 2000 6000

1000 4000 8000

SCALE: 1" = 2000'

PREPARATION DATE: JULY 2024

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# FIGURE 1.1
## VICINITY MAP

HIGHLAND GROVE IV
TTM 38927

U:\Projects\Pulte\10615 - HG4\water analysis\TTM 38927 VICINITY MAP FIGURE 1.1.dwg

5. Figure 1.2 Land Use Map - Tentative Tract No. 38927




0 600 1800

300 1200 2400

SCALE: 1" = 600'

PREPARATION DATE: JULY 2024

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# FIGURE 1.2
## LAND USE PLAN

HIGH GROVE IV
TTM 38927

U:\Projects\Pulte\10615 - HG4\water analysis\TTM 38927 LAND USE FIGURE 1.2.dwg

6. Figure 1.3 Aerial Imagery Map - Tentative Tract No. 38927




*Figure 1.3 - Aerial Image Map*

# Section 2 –Site Conditions

## 1. Existing Hydrologic Site Conditions

The existing site is an irregular shaped property consisting of rolling hills previously utilized for the cultivation of citrus fruit. The existing citrus trees have since been removed leaving the remanent of citrus furrows and overgrown earthen irrigation trenches. The project site is bisected by a ridgeline running from east to west close to the center of the property assemblage. The ridgeline can also be defined by an unpaved road seen within aerial imagery providing a means of maintenance access for an existing reservoir owned by Western Municipal Water District (WMWD) to the east of the Project site. From the ridge line the existing flows travel north and south into two natural drainage courses (Reach 1 and Reach 2) that bound the north and south edges of the project site. The northerly tributary (Reach 2) flows from east to west along the northerly project boundary, the southerly tributary (Reach 1) flows from east to west along the southerly project boundary and then bisects a small portion of the project site flowing from the south to the northeast corner of the site. The existing drainage courses have been deeply incised and defined throughout time, and in many locations exhibit exposed bedrock limiting the potential for future erosion. Each of these two natural drainage courses ultimately convey flows northwesterly to a point of confluence at the most northwest corner of the project site before being conveyed northerly beyond the project through a development to the north of the project site, known as Tramonte, and finally into the Harrison Dam facility. It should be noted that all run-on flows and flows tributary from Tentative Tract Map No. 38927 leave the project site at a single point of discharge.

The Harrison Dam was constructed based on the development of the upstream tributaries to protect the downstream properties located in the City of Riverside. The Dam was designed to detain the watershed of the proposed project, including the upstream properties. From the Harrison Dam facility existing storm flows are conveyed through the City of Riverside and ultimately into the Arlington Channel owned and maintained by RCFC. The Arlington Channel is part of a drainage system funded by Area Drainage Plan fees known at the Southwest Area Drainage Plan.

## 2. Proposed Hydrologic Site Conditions

The proposed project consists of 206 single family detached single family residences. The project site has been designed in such a manner to respect the existing ridgeline that bisects the project from east to west. The existing ridgeline, also being an unpaved road as seen within aerial imagery, provides a means of maintenance access for an existing reservoir owned by WMWD and was avoided from disturbance and the existing grade respected. The project is divided into two distinct drainage tributaries separated into a westerly and easterly drainage area. The portion of the project lying westerly of the existing tributary bisecting the project from the south to the north is conveyed into one extended detention basin on the west side of the project which is then conveyed northerly to a point of confluence at the northwest corner of the project boundary. The portion of the project lying westerly of the same bisecting tributary is conveyed into another extended detention basin located at near the northwest corner of the project which is then conveyed northerly to a point of confluence at the same northwest corner of the project boundary. This northwest location is the projects single point of flows leaving from the project site.

There are three culvert crossings being proposed as part of the project. One of these culvert crossings are located in the northerly existing drainage course (Reach 2) and two of the culvert crossings are located where the southerly existing drainage (Reach 1) bisects the westerly portion of the project site from south to north. These culvert crossing will allow the development to provide access and utilities over the existing drainage courses. The culverts have been designed in accordance with the California Department of Fish and Wildlife (CDFW) to have a minimum size of 72" for the purposes of providing a downstream and upstream connection for habitat and wildlife within the drainage corridor. This results in culverts larger than necessary to convey the actual flow experience by a 100-year storm event. The culverts also contain the necessary headwalls, cutoff walls, and rip-rap energy dissipaters to reduce the storm flow velocities to a non-erosive level protecting the downstream drainage courses. A depiction showing the location of the proposed culverts is located below within Figure 2.1.

## 3. Tributary Migration and 100 Year Flood Setback

An investigation of the soils composition for the project site was conducted by Leighton and Associations with regard to the potential lateral migration of the existing drainage courses to establish a flood limit setback for structures proposed as part of Tentative Tract Map No. 38927. Riverside County Flood Control suggests a minimum of a 50' setback flood setback without any supporting site-specific soils data or analytics performed to determine the actual erosion potential. Based on the findings that the existing drainage courses were deeply incised tributaries and within the limits of these tributaries was dense weathered bedrock it was determined the lateral migration of the tributaries would not occur. This was further substantiated by evidence of locations where bedrock was already exposed negating any long-term erosion concerns both vertically and laterally for the lifetime of the project. A letter prepared by Leighton and Associates, supplemental to their analysis conducted under their Geotechnical Due Diligence Evaluation of the Proposed Highland Grove 4 (Tentative Tract Map No. 38927) Residential Development Report dated November 17, 2023 is included within Appendix "C" of this report.

4. Figure 2.1 – Proposed Culvert Locations

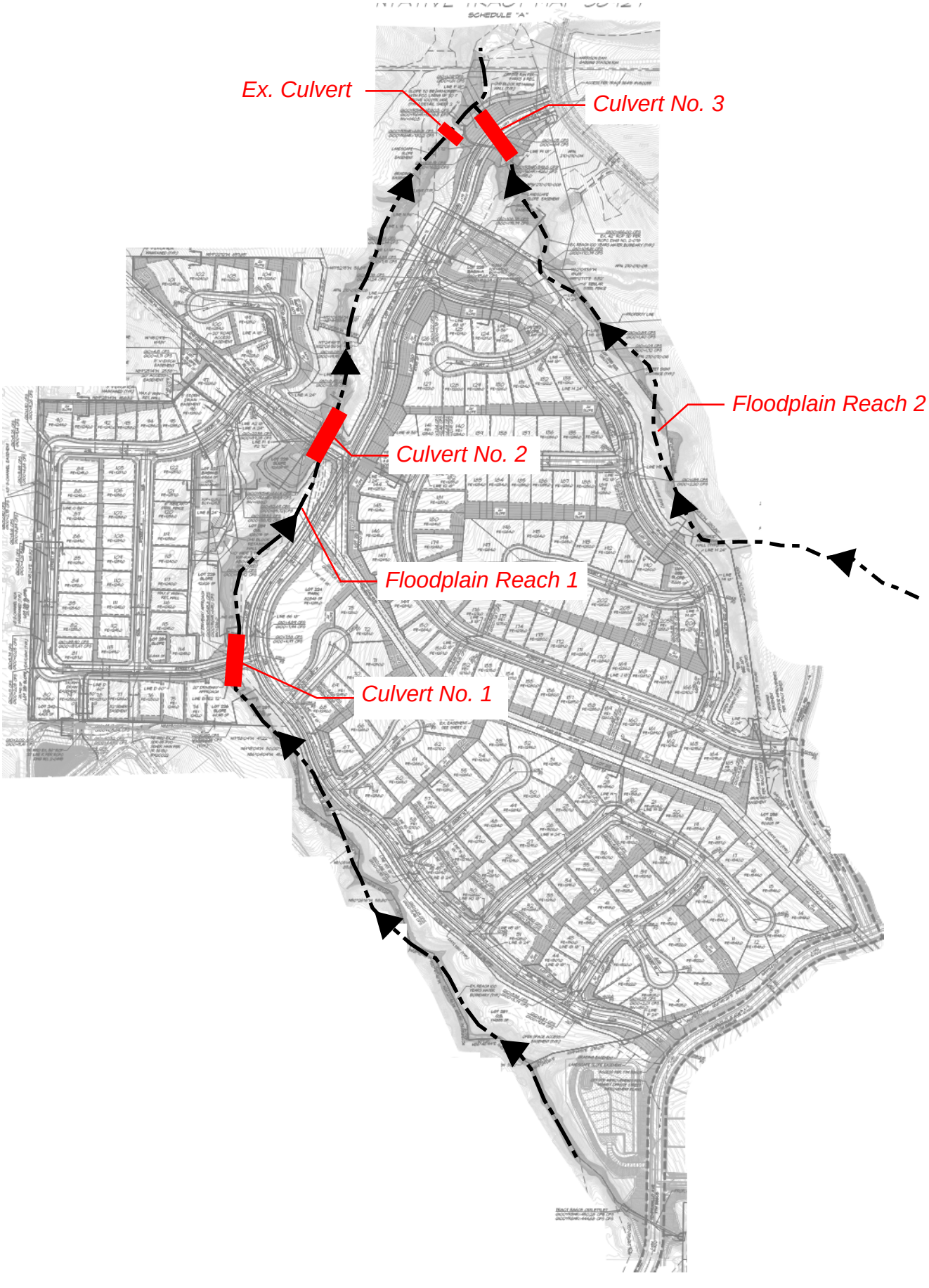



*Figure 2.1 - Proposed Culvert Locations*

## Section 3 – Analytical Approach

The site hydrology was performed utilizing Riverside County Flood Control and Water Conversation District Hydrology Manual, from which pertinent soil and rainfall information was obtained. The results of the hydrology analysis determined Synthetic Unit Method storm flow rates utilized for the purposes of determining the 100-year flooding limits within the existing drainage courses, Reach 1 and Reach 2.

Reach 1, located southerly of project boundary, was analyzed downstream of a proposed culvert west of Street "A", to be constructed as part of Tentative Tract Map 38605. Tentative Tract Map 38605 has undergone Hydrology review by the County of Riverside and has been conditionally approved. Reach 1 was then analyzed downstream of this location within the existing drainage course, flowing westerly along the southerly project boundary, to a proposed double barrel 72" culvert noted as Line "E1" and "E2" per Tentative Tract Map No. 38927. Reach 1 was then analyzed down stream of this location within the existing drainage course, flowing northerly, bisecting the project site to another proposed double barrel 72" culvert noted as Line "F1" and "F2" per Tentative Tract Map No. 38927. Reach 1 was then analyzed downstream of this location within the existing drainage course flowing northerly to a confluence point with Reach 2. Reach 1 was then analyzed down stream of this location terminating a location just prior to flows entering into an existing culvert south of Travertine Drive.

Reach 2, located northerly of the project boundary, was analyzed downstream of a proposed culvert southwest of Travertine Drive and north of the termination of Street "G", to be constructed as part of Tentative Tract Map 38605. Reach 2 was then analyzed downstream of this location within the existing drainage course, flowing westerly along the northerly project boundary to a proposed 72" culvert, noted as Line "I" as shown per Tentative Tract Map No. 38927. Reach 2 was then analyzed through the proposed 72" culvert and confluenced downstream with the flows from Reach 1. Reach 2 was terminated at this location.

## Section 4 – Method of Analysis

The dry streambed was analyzed using the US Army Corps of Engineers' HEC-RAS channel hydraulic modeler (version 6.4.1) in conjunction with AutoCAD Civil 3D. A centerline alignment for the reach was delineated in Autodesk Civil 3d and left bank and right bank alignments were established along with sample lines enabling export to HEC-RAS for further study. Once the surface, alignments, and sample lines were exported into HEC-RAS, the following flow regime and design parameters were utilized to model the reach effectively, see the below Table 4-1 for the pre-development modeling conditions and Table 4-2 for the post development modeling conditions:

**Table 4-1**
**Pre-Development Condition**

| Reach No. | Drainage Area | Flow Regime | Flow Raate CFS ( 100 Year – 6 Hour) | Mannings Coef. "n" (Bank) | Mannings Coef. "n" (Bed)[1] |
|---|---|---|---|---|---|
| 1 | Upstream of Boundary Outfall | Mixed | 1079.5 CFS | 0.07 | 0.10 |
| 1 | Upstream of Future Culvert No. 2 | Mixed | 632.5 CFS | 0.07 | 0.10 |
| 1 | Upstream of Future Culvert No. 1 | Mixed | 478.6 CFS | 0.07 | 0.10 |
| 2 | Upstream of Reach 1 | Mixed | 372.4 CFS | 0.07 | 0.10 |

Notes:

[1]Bed is defined by the limits of riparian habitat.

**Table 4-2**
**Post-Development Condition**

| Reach No. | Drainage Area | Flow Regime | Flow Raate CFS ( 100 Year – 6 Hour) | Mannings Coef. "n" (Bank) | Mannings Coef. "n" (Bed)[1] |
|---|---|---|---|---|---|
| 1 | Upstream of Boundary Outfall | Mixed | 1245.2 CFS | 0.07 | 0.07 |
| 1 | Upstream of Existing Culvert | Mixed | 807.4 CFS | 0.07 | 0.07 |
| 1 | Upstream of Future Culvert No. 2 | Mixed | 785.1 CFS | 0.07 | 0.07 |
| 1 | Upstream of Future Culvert No. 1 | Mixed | 757.7 CFS | 0.07 | 0.07 |
| 2 | Upstream of Reach 1 | Mixed | 444.6 CFS | 0.07 | 0.07 |

Notes:

[1]Bed is defined by the limits of riparian habitat.

The Mixed Flow regime was run with the above flow rates & Manning's Coefficients per values established with RCFC through HEC-RAS analyses for the preliminary design phase of the project. A mixed flow regime was used to demonstrate both the greatest depth of the stream to delineate the highest potential flood limits of the stream. These limits and their respective velocities and flow characteristics can be found in post development summary tables shown within Appendix "A" of this report. The location of the streambed reaches, cross section locations, and flooding limits can be found on the HEC-RAS work map shown within Appendix "B" of this report.

The n-values for the separation of the bed and bank locations were determined by using the extents of the riparian area established by the project biologist. A manning's value of 0.10 was utilized for the riparian areas within the river cross section and 0.07 for area outside of the bank locations. These "n" values represent a conservative assumption when analyzing the streambed for depth of flow to determine the greatest extents of the flooding limits.

The upstream and downstream boundary constraints for both the pre-development and post-development condition are shown for each of the corresponding drainage reaches within Table 4-3 and Table 4-4 shown below:

**Table 4-3**
**Pre Development - Upstream and Downstream Boundary Constraint**

| Reach No. | Location | Boundary Constraint |
|---|---|---|
| 1 | Upstream | Normal Depth HGL Based on Slope (2.17%) |
| 1 | Downstream | Existing Tract 36475 Culvert HGL Elevation (1128.0) |
| 2 | Upstream | Normal Depth HGL Based on Slope (2.86%) |
| 2 | Downstream | Reach 1 HGL Elevation (1145.97) |

**Table 4-4**
**Post Development - Upstream and Downstream Boundary Constraint**

| Reach No. | Location | Boundary Constraint |
|---|---|---|
| 1 | Upstream | Proposed Tract 38605 Culvert HGL Elevation (1290.00) |
| 1 | Downstream | Existing Tract 36475 Culvert HGL Elevation (1128.00) |
| 2 | Upstream | Proposed Tract 38605 Culvert HGL Elevation (1244.00) |
| 2 | Downstream | Reach 1 HGL Elevation (1145.30) |

Flow rates were established by utilizing the Synthetic Unit Hydrograph Method per the Riverside County Flood Control and Water Conversation District Hydrology Manual as shown with "Preliminary Hydrology Study, Tentative Tract Map No. 38927" prepared by Adkan Engineers, dated April 3, 2025.

## Section 5 – Conclusion

The hydrologic calculations provided within this report substantiate the preliminary hydrology and hydraulic design of the proposed project, Tentative Tract Map No. 38927, and indicate the following:

- The proposed storm drain culvert facilities crossing the natural drainage course demonstrate the ability to convey the Rational Hydrology Method 100 year storm event as required by the Riverside County Flood Control Hydrology Manual.

- The 100-year water surface in the post construction condition is constrained within the natural drainage course and is not adversely affected by the proposed development. Furthermore, the natural drainage course in the post development condition does not impeded the existing run-on flows, create any downstream flooding impacts, or create any adverse drainage impacts for future residents within the proposed development of Tentative Tract Map No. 38927.

Therefore, it is our conclusion this project **does not** negatively impact the local community or watershed goals of the Santa Ana River and does not adversely affect downstream facilities while maintaining the adequate conveyance of storm flows for on-site facilities to the criteria for the protection of storm flow as determined by the Riverside County Flood Control Hydrology Manual.

# Appendix A – Reach 1 - Pre Development and Post Development 100-Year 6-Hr HEC-RAS Analysis

# PRE DEVELOPMENT

HEC-RAS Plan: EX REACH 1 River: EX REACH 1 Reach: EX REACH 1 Profile: 100YR

| Reach | River Sta | Profile | Q Total | Min Ch El | W.S. Elev | Crit W.S. | E.G. Elev | E.G. Slope | Vel Chnl | Flow Area | Top Width | Froude # Chl |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | (cfs) | (ft) | (ft) | (ft) | (ft) | (ft/ft) | (ft/s) | (sq ft) | (ft) | |
| EX REACH 1 | 5001.26 | 100YR | 478.60 | 1280.95 | 1286.99 | 1285.00 | 1287.34 | 0.020178 | 4.72 | 101.41 | 26.99 | 0.43 |
| EX REACH 1 | 4900 | 100YR | 478.60 | 1278.96 | 1284.21 | | 1284.70 | 0.034457 | 5.61 | 85.31 | 26.85 | 0.55 |
| EX REACH 1 | 4700 | 100YR | 478.60 | 1274.88 | 1280.07 | | 1280.32 | 0.014740 | 4.00 | 119.62 | 33.99 | 0.38 |
| EX REACH 1 | 4500 | 100YR | 478.60 | 1269.99 | 1275.02 | | 1275.59 | 0.043038 | 6.04 | 79.17 | 26.42 | 0.62 |
| EX REACH 1 | 4300 | 100YR | 478.60 | 1260.90 | 1266.39 | | 1267.03 | 0.042568 | 6.41 | 74.66 | 21.18 | 0.60 |
| EX REACH 1 | 4100 | 100YR | 478.60 | 1256.00 | 1260.66 | | 1260.99 | 0.021926 | 4.65 | 102.87 | 30.90 | 0.45 |
| EX REACH 1 | 3900 | 100YR | 478.60 | 1251.95 | 1256.72 | | 1257.01 | 0.018013 | 4.32 | 110.69 | 32.10 | 0.41 |
| EX REACH 1 | 3700 | 100YR | 478.60 | 1245.78 | 1249.29 | | 1250.08 | 0.089766 | 7.15 | 66.92 | 31.95 | 0.87 |
| EX REACH 1 | 3500 | 100YR | 478.60 | 1237.00 | 1244.80 | | 1245.01 | 0.011190 | 3.68 | 130.16 | 32.54 | 0.32 |
| EX REACH 1 | 3300 | 100YR | 478.60 | 1233.95 | 1240.93 | | 1241.42 | 0.032629 | 5.61 | 85.28 | 24.14 | 0.53 |
| EX REACH 1 | 3100 | 100YR | 478.60 | 1231.00 | 1236.96 | | 1237.16 | 0.014509 | 3.56 | 134.47 | 46.27 | 0.37 |
| EX REACH 1 | 2900 | 100YR | 478.60 | 1225.00 | 1229.59 | 1229.59 | 1230.64 | 0.122802 | 8.25 | 58.02 | 27.52 | 1.00 |
| EX REACH 1 | 2700 | 100YR | 478.60 | 1216.96 | 1223.71 | 1221.09 | 1223.87 | 0.009066 | 3.20 | 149.80 | 41.81 | 0.30 |
| EX REACH 1 | 2543.26 | 100YR | 478.60 | 1213.88 | 1220.78 | | 1221.00 | 0.013393 | 3.82 | 125.39 | 35.12 | 0.36 |
| EX REACH 1 | 2438.15 | 100YR | 478.60 | 1212.00 | 1218.98 | | 1219.18 | 0.011599 | 3.60 | 133.02 | 36.42 | 0.33 |
| EX REACH 1 | 2400 | 100YR | 478.60 | 1212.00 | 1218.43 | 1216.20 | 1218.67 | 0.015478 | 3.92 | 122.22 | 37.20 | 0.38 |
| EX REACH 1 | 2200 | 100YR | 478.60 | 1208.96 | 1211.70 | 1211.50 | 1212.39 | 0.091909 | 6.65 | 71.92 | 39.30 | 0.87 |
| EX REACH 1 | 2000 | 100YR | 478.60 | 1205.26 | 1209.76 | | 1209.82 | 0.004419 | 1.96 | 243.66 | 85.07 | 0.20 |
| EX REACH 1 | 1800 | 100YR | 478.60 | 1200.79 | 1209.78 | | 1209.78 | 0.000038 | 0.33 | 1455.55 | 209.57 | 0.02 |
| EX REACH 1 | 1636.82 | 100YR | 478.60 | 1199.00 | 1209.77 | 1200.25 | 1209.77 | 0.000036 | 0.35 | 1350.26 | 167.07 | 0.02 |
| EX REACH 1 | 1636.8 | | Culvert | | | | | | | | | |
| EX REACH 1 | 1542.86 | 100YR | 632.50 | 1183.35 | 1186.17 | | 1186.42 | 0.028176 | 4.02 | 157.18 | 76.12 | 0.49 |
| EX REACH 1 | 1400 | 100YR | 632.50 | 1176.00 | 1180.78 | | 1181.31 | 0.046480 | 5.84 | 108.22 | 42.21 | 0.64 |
| EX REACH 1 | 1200 | 100YR | 632.50 | 1167.95 | 1172.61 | | 1173.01 | 0.036974 | 5.10 | 123.95 | 48.42 | 0.56 |
| EX REACH 1 | 1000 | 100YR | 632.50 | 1158.95 | 1163.83 | | 1164.53 | 0.048910 | 6.67 | 94.79 | 29.89 | 0.66 |
| EX REACH 1 | 800 | 100YR | 632.50 | 1153.95 | 1160.35 | | 1160.57 | 0.010074 | 3.76 | 168.14 | 39.09 | 0.32 |
| EX REACH 1 | 600 | 100YR | 632.50 | 1149.98 | 1160.05 | | 1160.09 | 0.000895 | 1.52 | 416.55 | 61.00 | 0.10 |
| EX REACH 1 | 426.55 | 100YR | 632.50 | 1143.00 | 1159.96 | 1148.22 | 1159.98 | 0.000441 | 1.08 | 586.77 | 79.25 | 0.07 |
| EX REACH 1 | 426.5 | | Culvert | | | | | | | | | |
| EX REACH 1 | 358.29 | 100YR | 632.50 | 1140.29 | 1147.01 | | 1147.29 | 0.014439 | 4.20 | 150.63 | 38.87 | 0.38 |
| EX REACH 1 | 300 | 100YR | 1079.50 | 1139.88 | 1145.97 | | 1146.24 | 0.020566 | 4.19 | 257.83 | 92.21 | 0.44 |
| EX REACH 1 | 200 | 100YR | 1079.50 | 1137.71 | 1140.97 | 1140.97 | 1142.12 | 0.112412 | 8.63 | 125.09 | 54.11 | 1.00 |
| EX REACH 1 | 100 | 100YR | 1079.50 | 1129.97 | 1135.80 | 1133.97 | 1136.42 | 0.030045 | 6.34 | 170.27 | 38.38 | 0.53 |
| EX REACH 1 | 0 | 100YR | 1079.50 | 1127.00 | 1129.90 | 1129.90 | 1131.10 | 0.115743 | 8.77 | 123.15 | 51.96 | 1.00 |

HEC-RAS Plan: EX REACH 1 River: EX REACH 1 Reach: EX REACH 1 Profile: 100YR

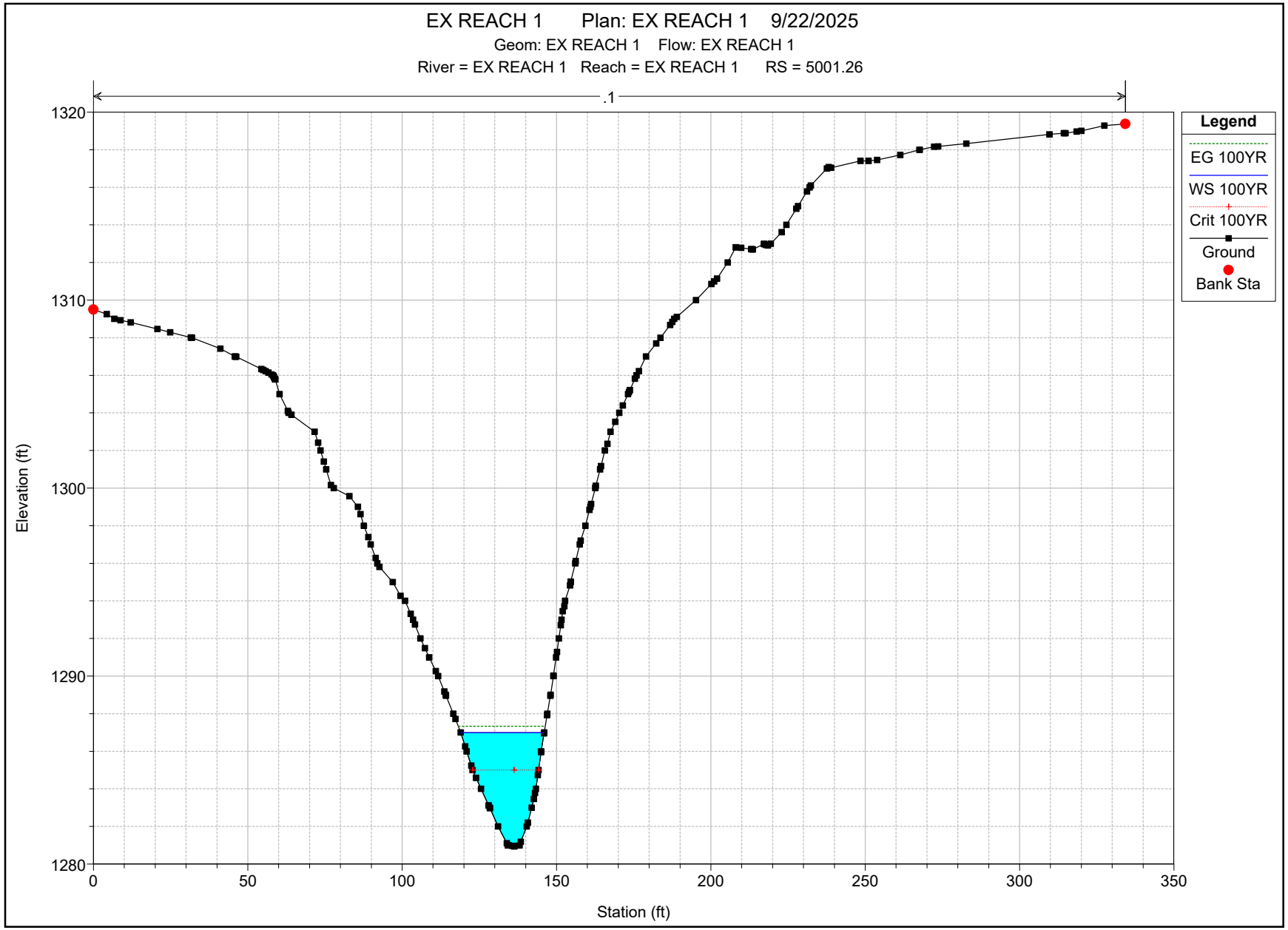
| Reach | River Sta | Profile | E.G. Elev | W.S. Elev | Vel Head | Frctn Loss | C & E Loss | Q Left | Q Channel | Q Right | Top Width |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | (ft) | (ft) | (ft) | (ft) | (ft) | (cfs) | (cfs) | (cfs) | (ft) |
| EX REACH 1 | 5001.26 | 100YR | 1287.34 | 1286.99 | 0.35 | 2.62 | 0.01 | | 478.60 | | 26.99 |
| EX REACH 1 | 4900 | 100YR | 1284.70 | 1284.21 | 0.49 | 4.31 | 0.07 | | 478.60 | | 26.85 |
| EX REACH 1 | 4700 | 100YR | 1280.32 | 1280.07 | 0.25 | 4.69 | 0.03 | | 478.60 | | 33.99 |
| EX REACH 1 | 4500 | 100YR | 1275.59 | 1275.02 | 0.57 | 8.56 | 0.01 | | 478.60 | | 26.42 |
| EX REACH 1 | 4300 | 100YR | 1267.03 | 1266.39 | 0.64 | 5.95 | 0.09 | | 478.60 | | 21.18 |
| EX REACH 1 | 4100 | 100YR | 1260.99 | 1260.66 | 0.34 | 3.97 | 0.01 | | 478.60 | | 30.90 |
| EX REACH 1 | 3900 | 100YR | 1257.01 | 1256.72 | 0.29 | 6.87 | 0.05 | | 478.60 | | 32.10 |
| EX REACH 1 | 3700 | 100YR | 1250.08 | 1249.29 | 0.79 | 4.89 | 0.18 | | 478.60 | | 31.95 |
| EX REACH 1 | 3500 | 100YR | 1245.01 | 1244.80 | 0.21 | 3.56 | 0.03 | | 478.60 | | 32.54 |
| EX REACH 1 | 3300 | 100YR | 1241.42 | 1240.93 | 0.49 | 4.18 | 0.09 | | 478.60 | | 24.14 |
| EX REACH 1 | 3100 | 100YR | 1237.16 | 1236.96 | 0.20 | 6.43 | 0.09 | | 478.60 | | 46.27 |
| EX REACH 1 | 2900 | 100YR | 1230.64 | 1229.59 | 1.06 | 4.48 | 0.27 | | 478.60 | | 27.52 |
| EX REACH 1 | 2700 | 100YR | 1223.87 | 1223.71 | 0.16 | 2.86 | 0.01 | | 478.60 | | 41.81 |
| EX REACH 1 | 2543.26 | 100YR | 1221.00 | 1220.78 | 0.23 | 1.81 | 0.01 | | 478.60 | | 35.12 |
| EX REACH 1 | 2438.15 | 100YR | 1219.18 | 1218.98 | 0.20 | 0.51 | 0.00 | | 478.60 | | 36.42 |
| EX REACH 1 | 2400 | 100YR | 1218.67 | 1218.43 | 0.24 | 6.22 | 0.04 | | 478.60 | | 37.20 |
| EX REACH 1 | 2200 | 100YR | 1212.39 | 1211.70 | 0.69 | 2.38 | 0.19 | | 478.60 | | 39.30 |
| EX REACH 1 | 2000 | 100YR | 1209.82 | 1209.76 | 0.06 | 0.03 | 0.02 | | 478.60 | | 85.07 |
| EX REACH 1 | 1800 | 100YR | 1209.78 | 1209.78 | 0.00 | 0.01 | 0.00 | | 478.60 | | 209.57 |
| EX REACH 1 | 1636.82 | 100YR | 1209.77 | 1209.77 | 0.00 | | | | 478.60 | | 167.07 |
| EX REACH 1 | 1636.8 | | Culvert | | | | | | | | |
| EX REACH 1 | 1542.86 | 100YR | 1186.42 | 1186.17 | 0.25 | 5.09 | 0.03 | | 632.50 | | 76.12 |
| EX REACH 1 | 1400 | 100YR | 1181.31 | 1180.78 | 0.53 | 8.26 | 0.04 | | 632.50 | | 42.21 |
| EX REACH 1 | 1200 | 100YR | 1173.01 | 1172.61 | 0.40 | 8.46 | 0.03 | | 632.50 | | 48.42 |
| EX REACH 1 | 1000 | 100YR | 1164.53 | 1163.83 | 0.69 | 3.81 | 0.14 | | 632.50 | | 29.89 |
| EX REACH 1 | 800 | 100YR | 1160.57 | 1160.35 | 0.22 | 0.42 | 0.06 | | 632.50 | | 39.09 |
| EX REACH 1 | 600 | 100YR | 1160.09 | 1160.05 | 0.04 | 0.11 | 0.01 | | 632.50 | | 61.00 |
| EX REACH 1 | 426.55 | 100YR | 1159.98 | 1159.96 | 0.02 | | | | 632.50 | | 79.25 |
| EX REACH 1 | 426.5 | | Culvert | | | | | | | | |
| EX REACH 1 | 358.29 | 100YR | 1147.29 | 1147.01 | 0.27 | 1.04 | 0.00 | | 632.50 | | 38.87 |
| EX REACH 1 | 300 | 100YR | 1146.24 | 1145.97 | 0.27 | 4.04 | 0.09 | | 1079.50 | | 92.21 |
| EX REACH 1 | 200 | 100YR | 1142.12 | 1140.97 | 1.16 | 5.22 | 0.16 | | 1079.50 | | 54.11 |
| EX REACH 1 | 100 | 100YR | 1136.42 | 1135.80 | 0.62 | 5.27 | 0.06 | | 1079.50 | | 38.38 |
| EX REACH 1 | 0 | 100YR | 1131.10 | 1129.90 | 1.19 | | | | 1079.50 | | 51.96 |

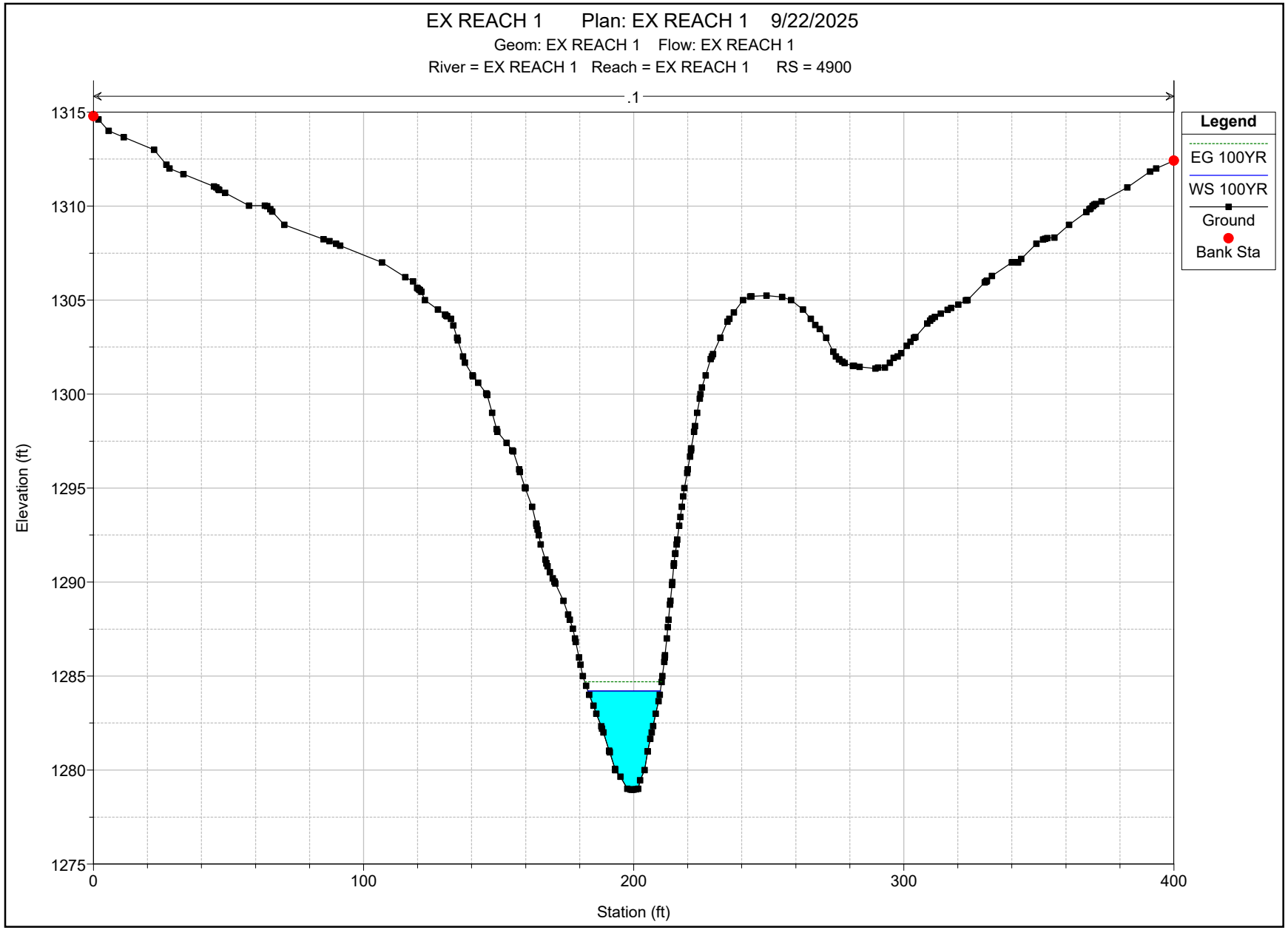
Plan: EX REACH 1  EX REACH 1  EX REACH 1  RS: 1636.8  Culv Group:  Culvert #1  Profile: 100YR

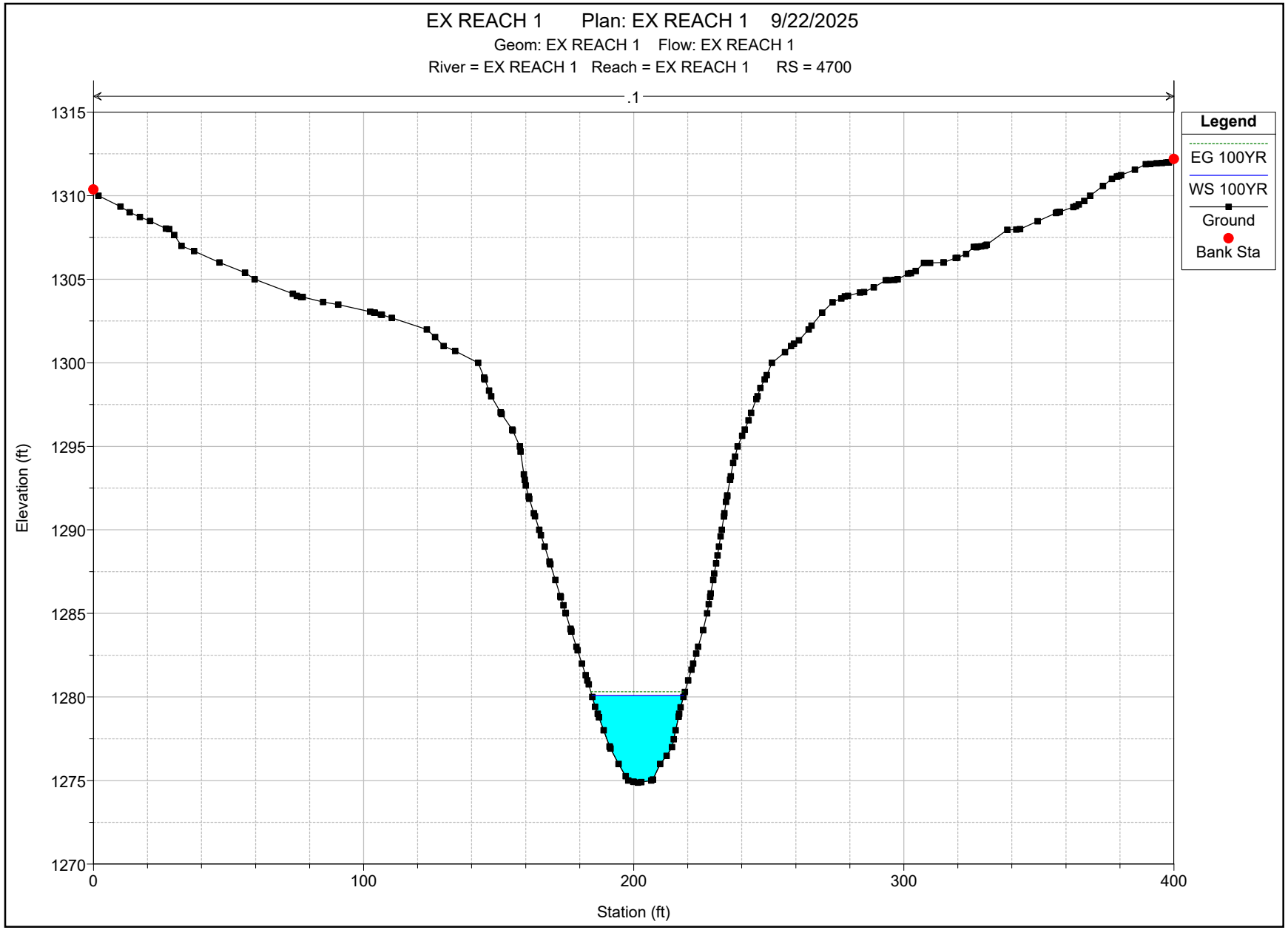
| | | | |
|---|---|---|---|
| Q Culv Group (cfs) | 270.99 | Culv Full Len (ft) | |
| # Barrels | 1 | Culv Vel US (ft/s) | 13.80 |
| Q Barrel (cfs) | 270.99 | Culv Vel DS (ft/s) | 28.15 |
| E.G. US. (ft) | 1209.77 | Culv Inv El Up (ft) | 1199.27 |
| W.S. US. (ft) | 1209.77 | Culv Inv El Dn (ft) | 1183.49 |
| E.G. DS (ft) | 1186.42 | Culv Frctn Ls (ft) | 11.42 |
| W.S. DS (ft) | 1186.17 | Culv Exit Loss (ft) | 11.85 |
| Delta EG (ft) | 23.35 | Culv Entr Loss (ft) | 0.09 |
| Delta WS (ft) | 23.60 | Q Weir (cfs) | 207.61 |
| E.G. IC (ft) | 1209.77 | Weir Sta Lft (ft) | 108.46 |
| E.G. OC (ft) | 1207.16 | Weir Sta Rgt (ft) | 275.51 |
| Culvert Control | Inlet | Weir Submerg | 0.00 |
| Culv WS Inlet (ft) | 1204.27 | Weir Max Depth (ft) | 0.77 |
| Culv WS Outlet (ft) | 1185.95 | Weir Avg Depth (ft) | 0.61 |
| Culv Nml Depth (ft) | 2.39 | Weir Flow Area (sq ft) | 101.83 |
| Culv Crt Depth (ft) | 4.54 | Min El Weir Flow (ft) | 1209.01 |

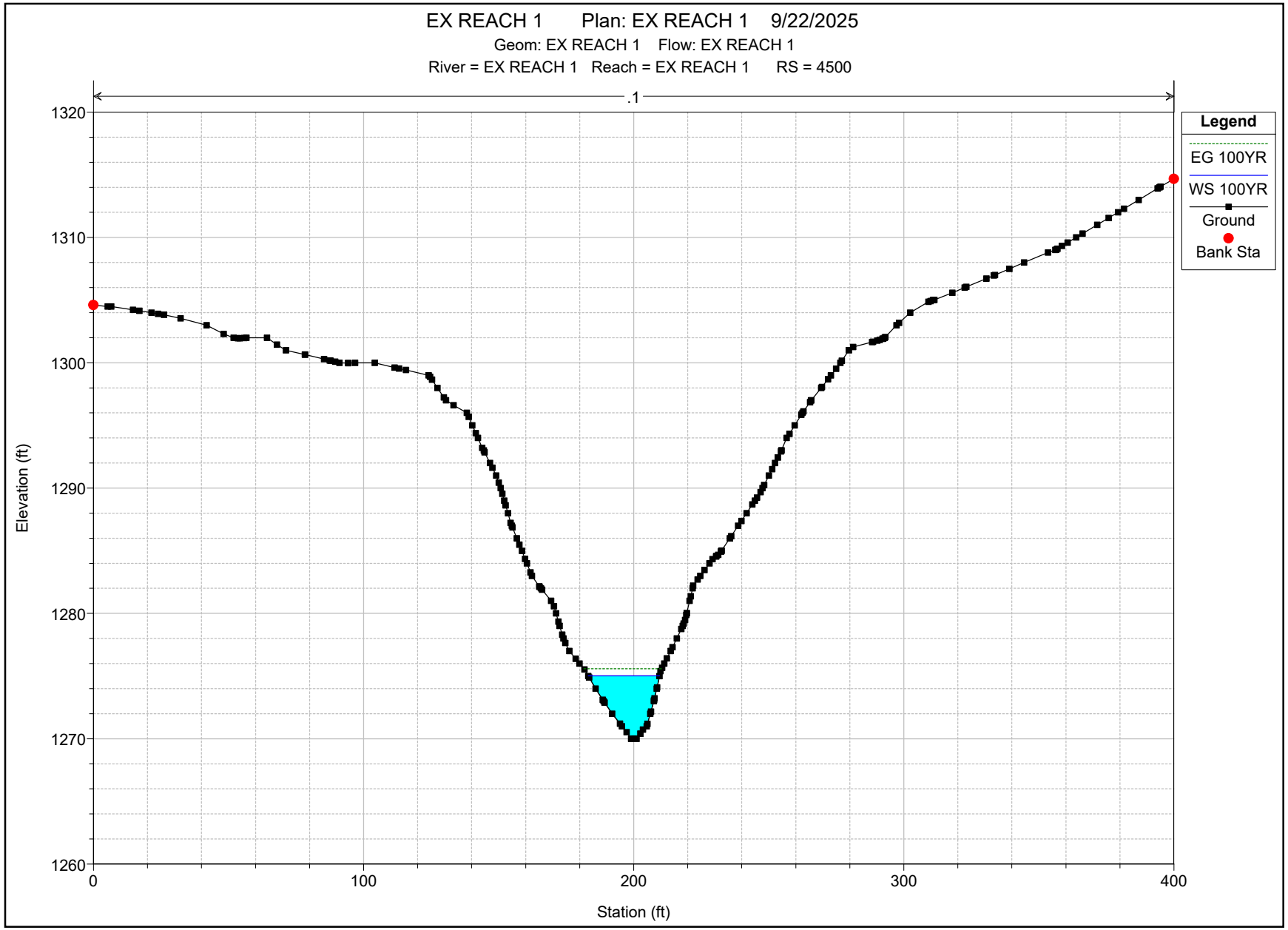
Plan: EX REACH 1  EX REACH 1  EX REACH 1  RS: 426.5  Culv Group:  Culvert #2  Profile: 100YR

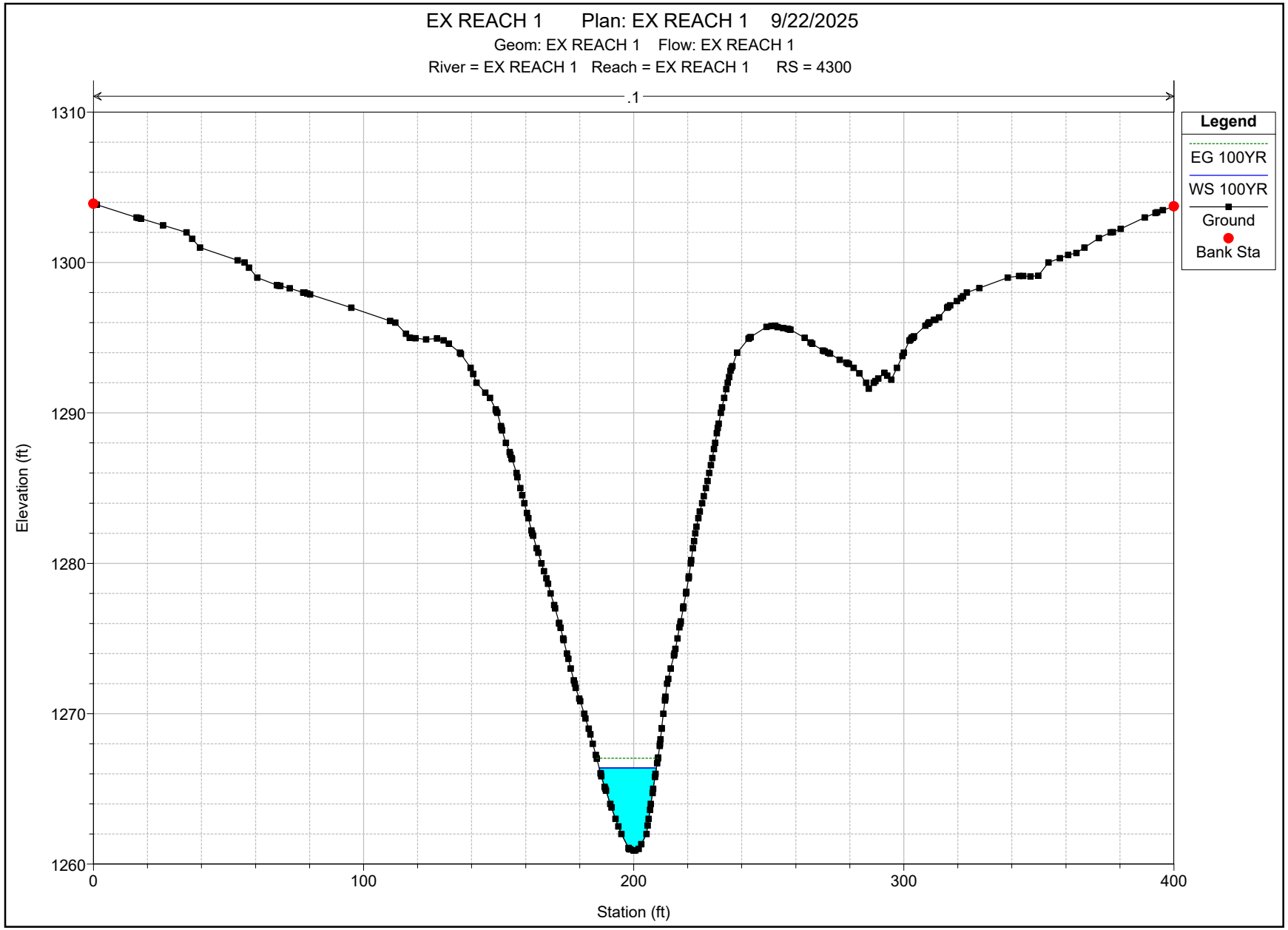
| | | | |
|---|---|---|---|
| Q Culv Group (cfs) | 440.15 | Culv Full Len (ft) | 68.00 |
| # Barrels | 1 | Culv Vel US (ft/s) | 22.42 |
| Q Barrel (cfs) | 440.15 | Culv Vel DS (ft/s) | 22.42 |
| E.G. US. (ft) | 1159.98 | Culv Inv El Up (ft) | 1143.00 |
| W.S. US. (ft) | 1159.96 | Culv Inv El Dn (ft) | 1140.31 |
| E.G. DS (ft) | 1147.29 | Culv Frctn Ls (ft) | 6.63 |
| W.S. DS (ft) | 1147.01 | Culv Exit Loss (ft) | 5.83 |
| Delta EG (ft) | 12.69 | Culv Entr Loss (ft) | 0.23 |
| Delta WS (ft) | 12.95 | Q Weir (cfs) | 192.35 |
| E.G. IC (ft) | 1160.21 | Weir Sta Lft (ft) | 171.99 |
| E.G. OC (ft) | 1159.98 | Weir Sta Rgt (ft) | 261.96 |
| Culvert Control | Outlet | Weir Submerg | 0.00 |
| Culv WS Inlet (ft) | 1148.00 | Weir Max Depth (ft) | 1.31 |
| Culv WS Outlet (ft) | 1145.31 | Weir Avg Depth (ft) | 0.94 |
| Culv Nml Depth (ft) | 5.00 | Weir Flow Area (sq ft) | 74.75 |
| Culv Crt Depth (ft) | 5.00 | Min El Weir Flow (ft) | 1158.68 |

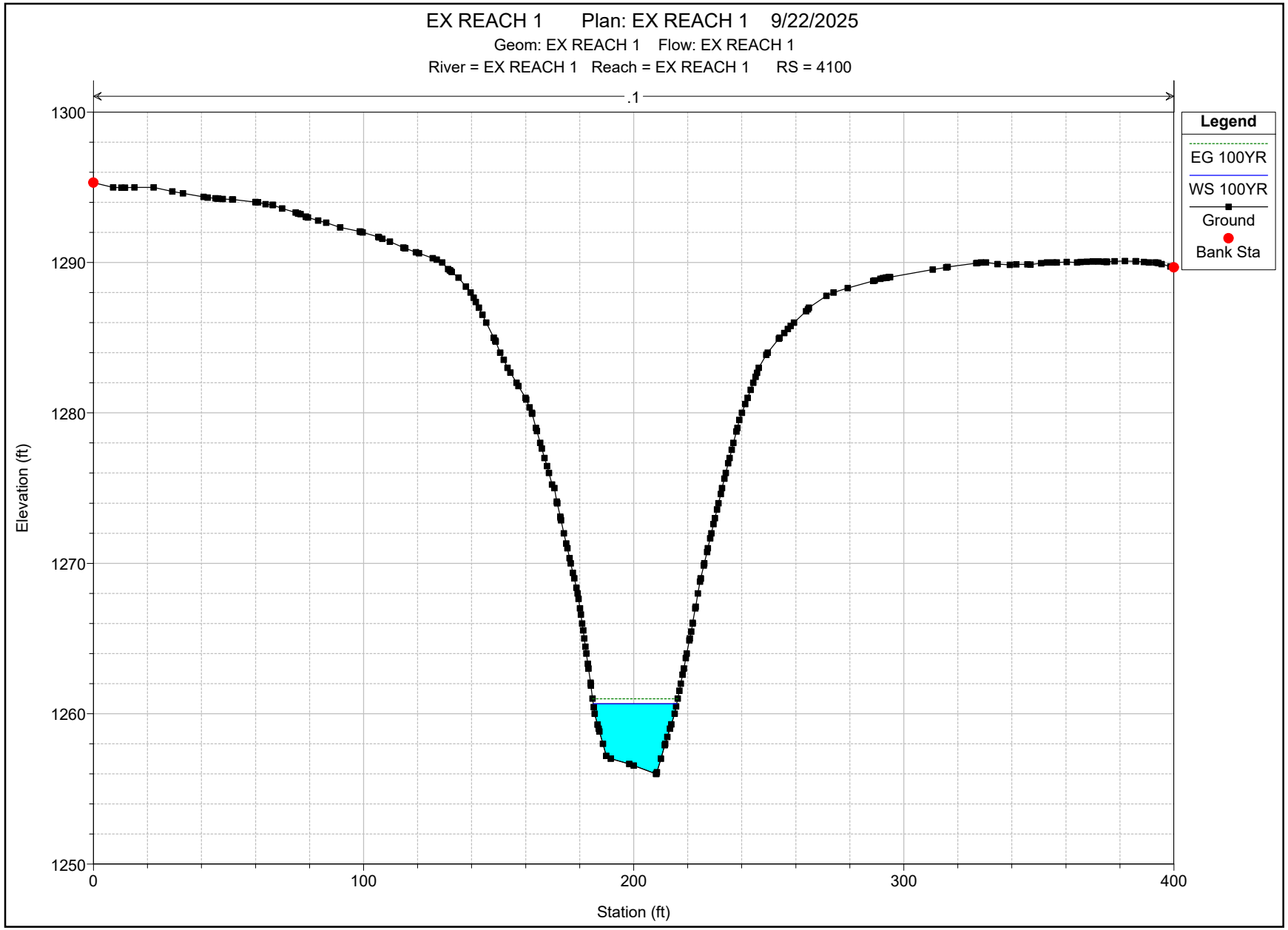

EX REACH 1 Plan: EX REACH 1 9/22/2025
Geom: EX REACH 1 Flow: EX REACH 1
River = EX REACH 1 Reach = EX REACH 1 RS = 5001.26
.1
Legend
EG 100YR
WS 100YR
Crit 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
1320
1310
1300
1290
1280
0
50
100
150
200
250
300
350

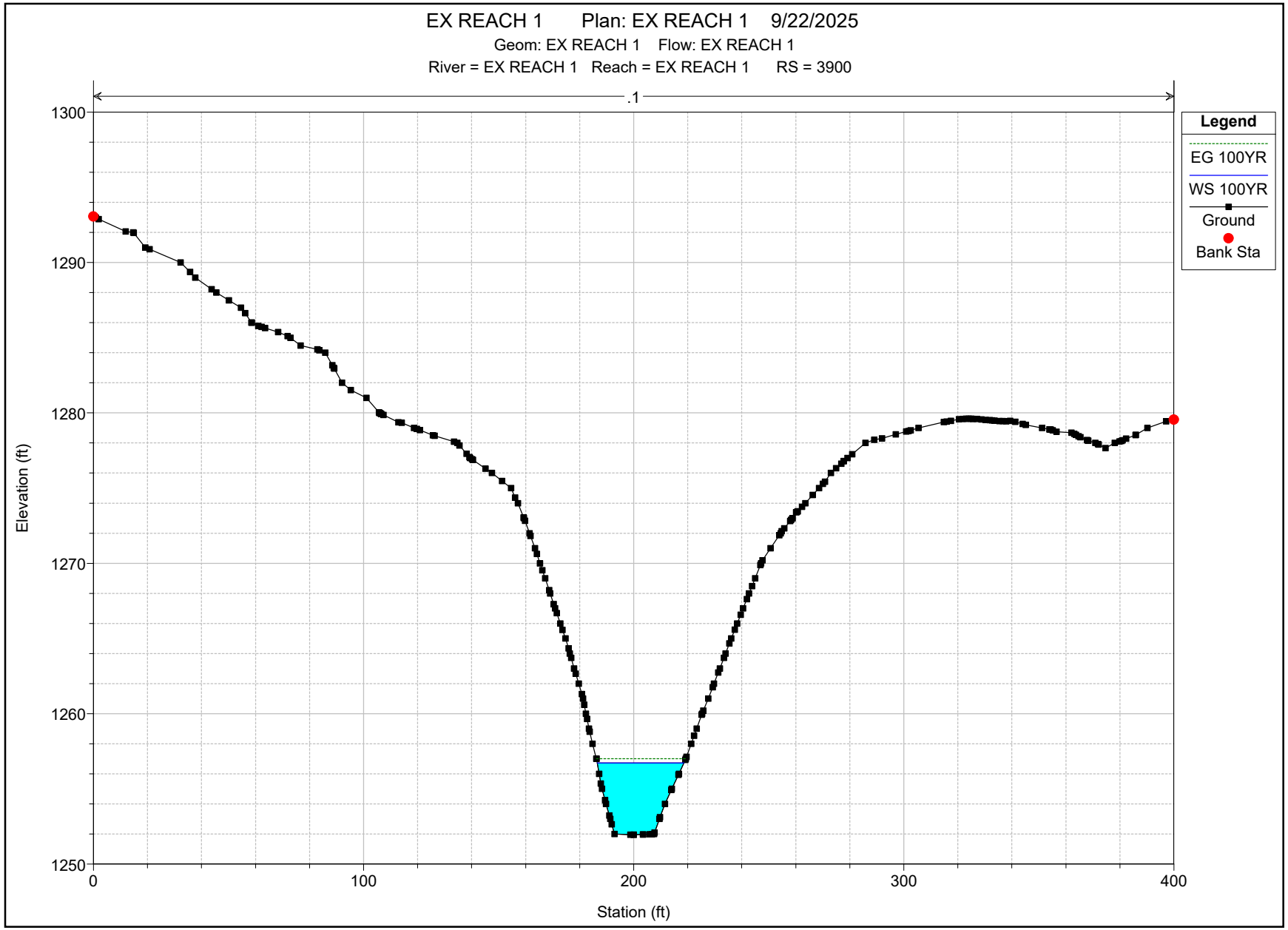

EX REACH 1 Plan: EX REACH 1 9/22/2025
Geom: EX REACH 1 Flow: EX REACH 1
River = EX REACH 1 Reach = EX REACH 1 RS = 4900
.1
Legend
EG 100YR
WS 100YR
Ground
Bank Sta
Elevation (ft)
1315
1310
1305
1300
1295
1290
1285
1280
1275
0
100
200
300
400
Station (ft)

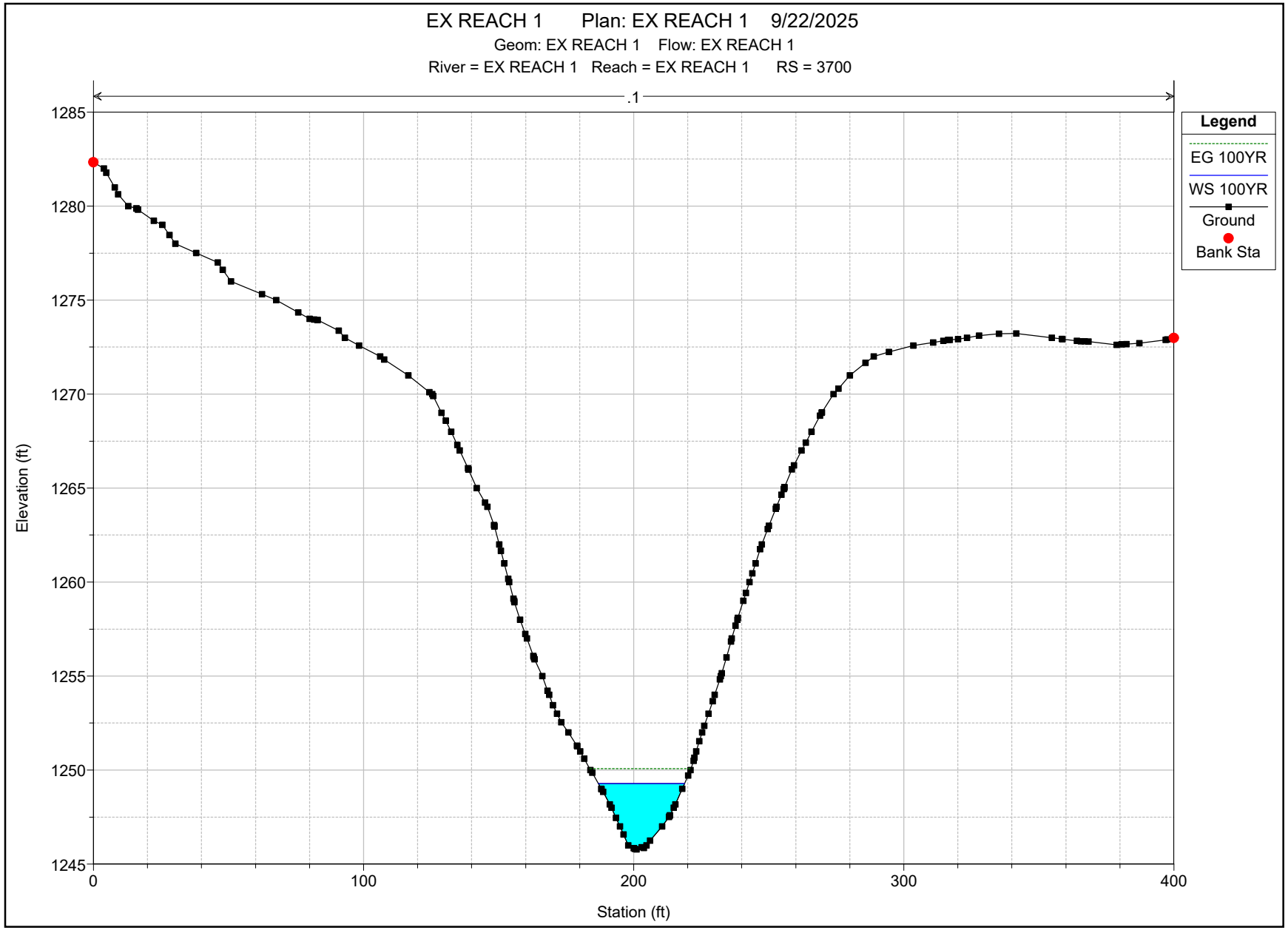

EX REACH 1 Plan: EX REACH 1 9/22/2025
Geom: EX REACH 1 Flow: EX REACH 1
River = EX REACH 1 Reach = EX REACH 1 RS = 4700
.1
Legend
EG 100YR
WS 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
1315
1310
1305
1300
1295
1290
1285
1280
1275
1270
0
100
200
300
400

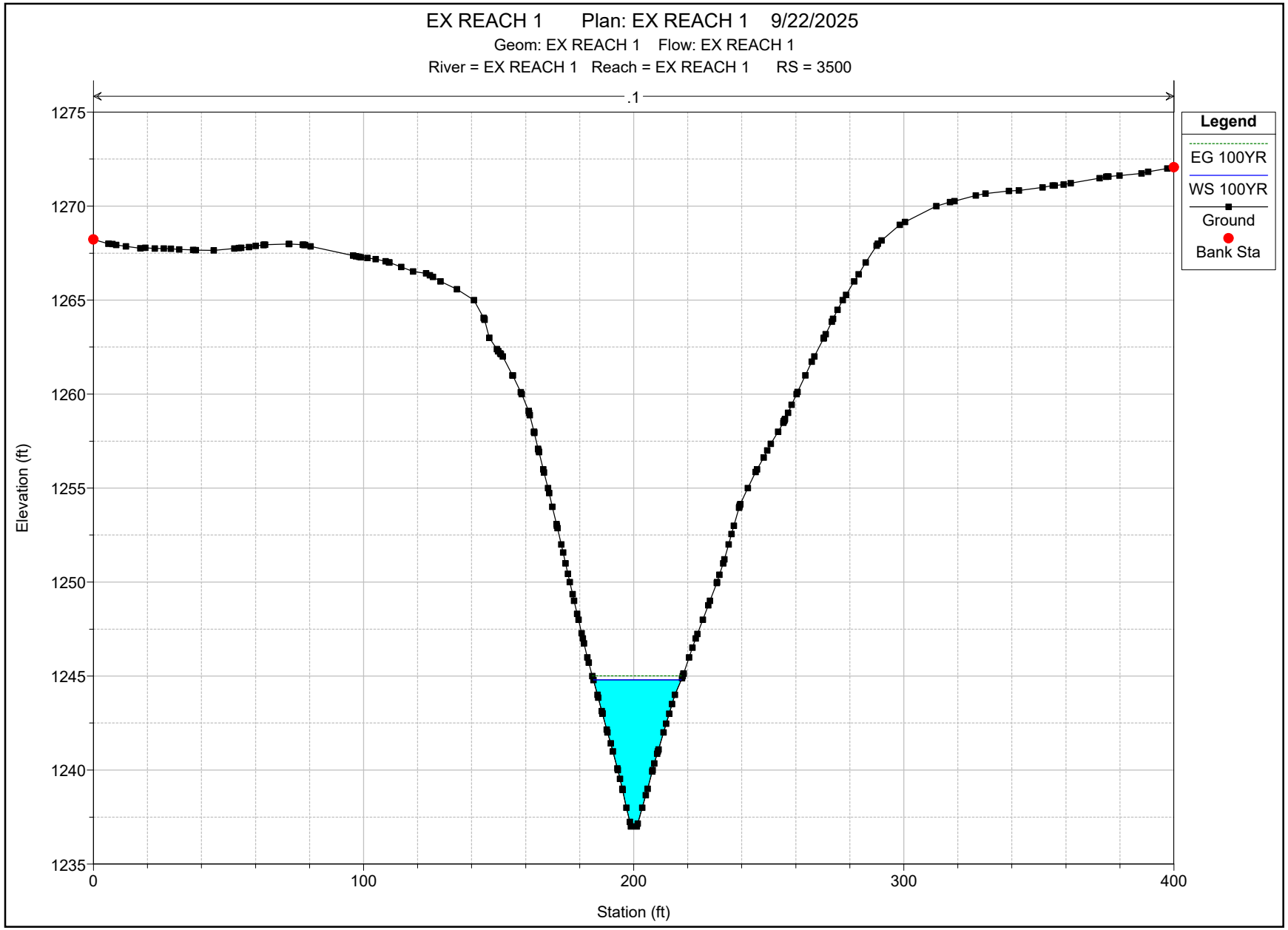

EX REACH 1 Plan: EX REACH 1 9/22/2025
Geom: EX REACH 1 Flow: EX REACH 1
River = EX REACH 1 Reach = EX REACH 1 RS = 4500
.1
Legend
EG 100YR
WS 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
1320
1310
1300
1290
1280
1270
1260
0
100
200
300
400

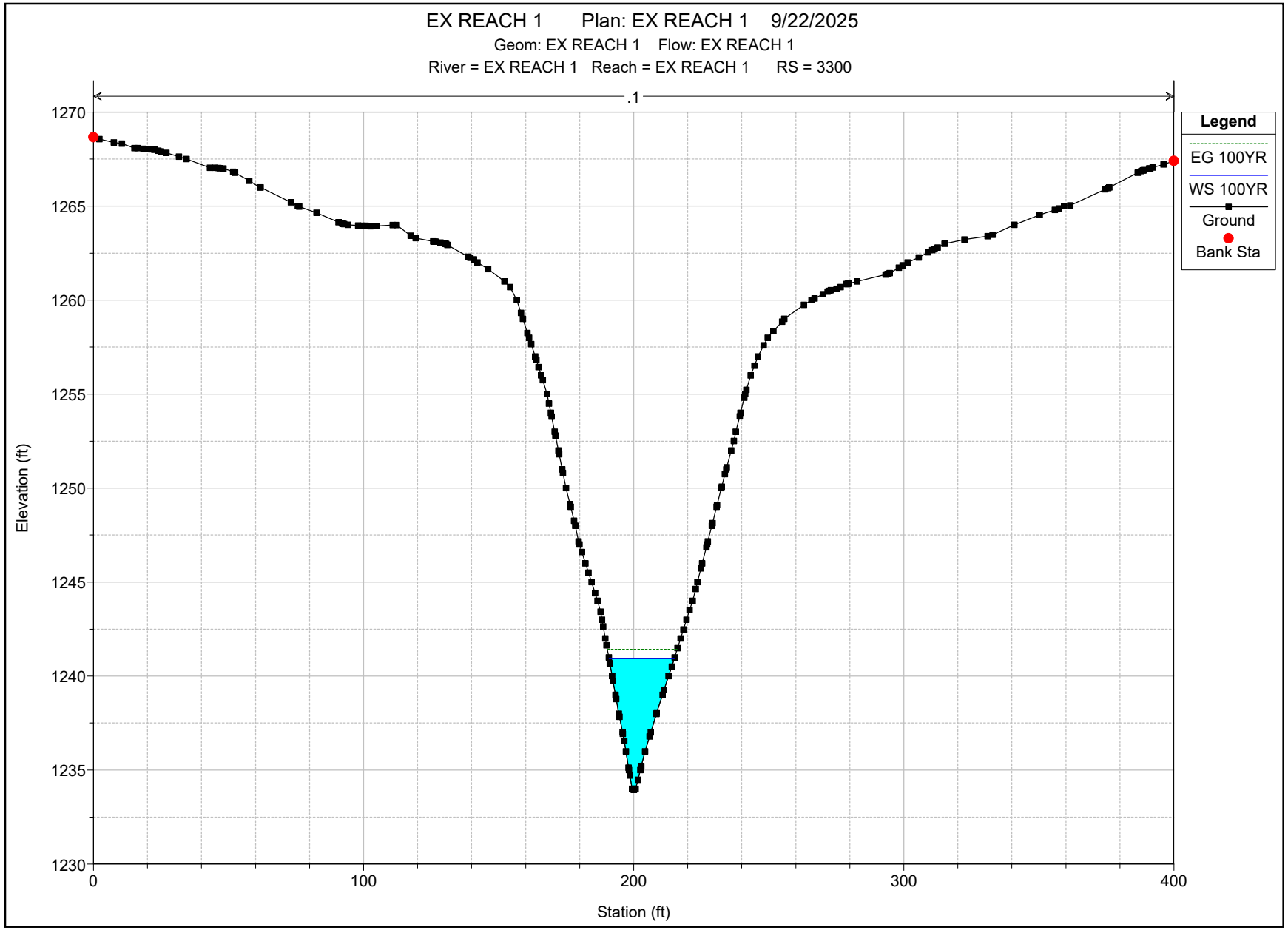

EX REACH 1 Plan: EX REACH 1 9/22/2025
Geom: EX REACH 1 Flow: EX REACH 1
River = EX REACH 1 Reach = EX REACH 1 RS = 4300
.1
Legend
EG 100YR
WS 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
1310
1300
1290
1280
1270
1260
0
100
200
300
400

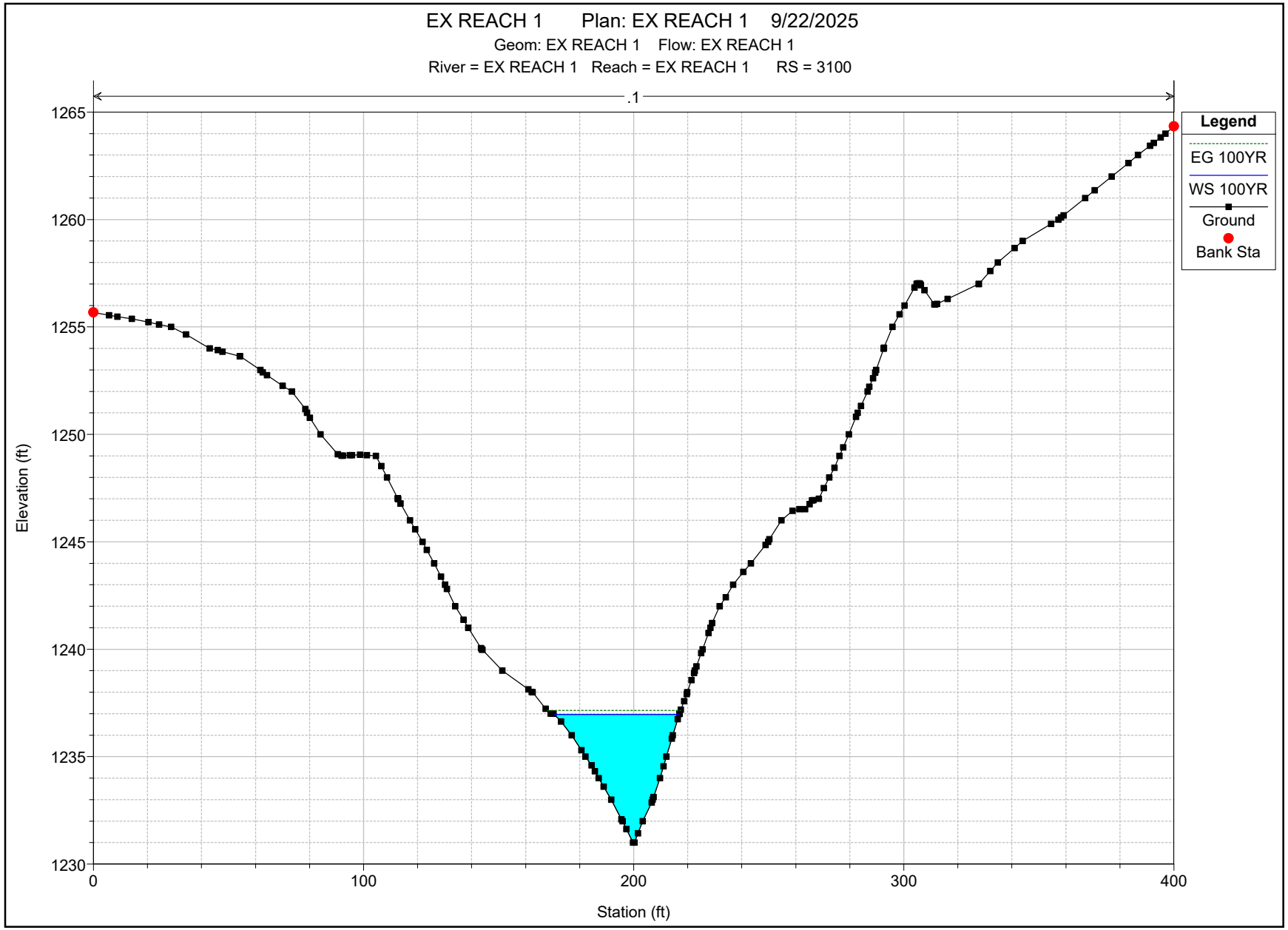

EX REACH 1 Plan: EX REACH 1 9/22/2025
Geom: EX REACH 1 Flow: EX REACH 1
River = EX REACH 1 Reach = EX REACH 1 RS = 4100
.1
Legend
EG 100YR
WS 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
1300
1290
1280
1270
1260
1250
0
100
200
300
400

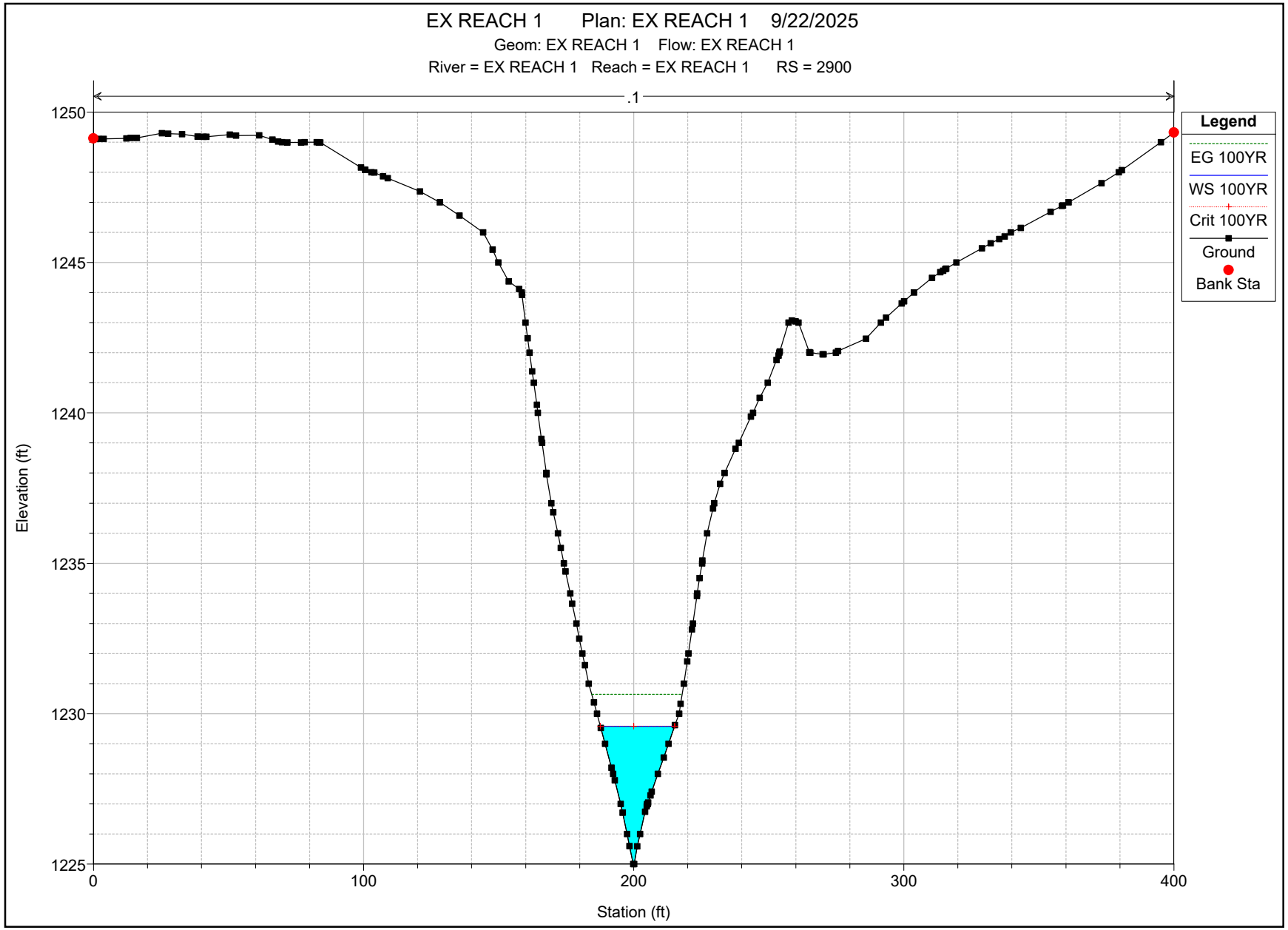

EX REACH 1 Plan: EX REACH 1 9/22/2025
Geom: EX REACH 1 Flow: EX REACH 1
River = EX REACH 1 Reach = EX REACH 1 RS = 3900
.1
Legend
EG 100YR
WS 100YR
Ground
Bank Sta
Elevation (ft)
1300
1290
1280
1270
1260
1250
0
100
200
300
400
Station (ft)

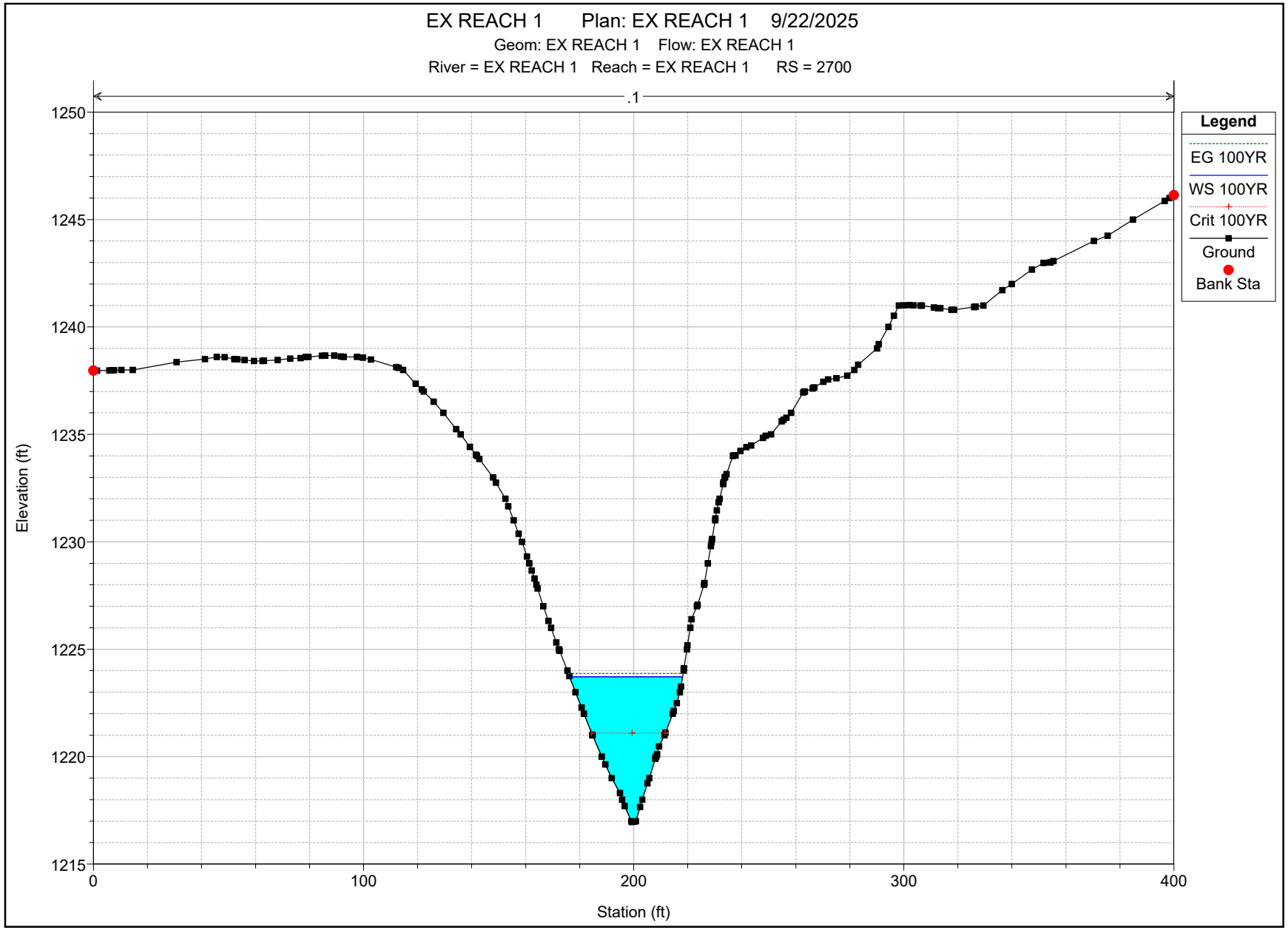

EX REACH 1 Plan: EX REACH 1 9/22/2025
Geom: EX REACH 1 Flow: EX REACH 1
River = EX REACH 1 Reach = EX REACH 1 RS = 3700
.1
Legend
EG 100YR
WS 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
1285
1280
1275
1270
1265
1260
1255
1250
1245
0
100
200
300
400

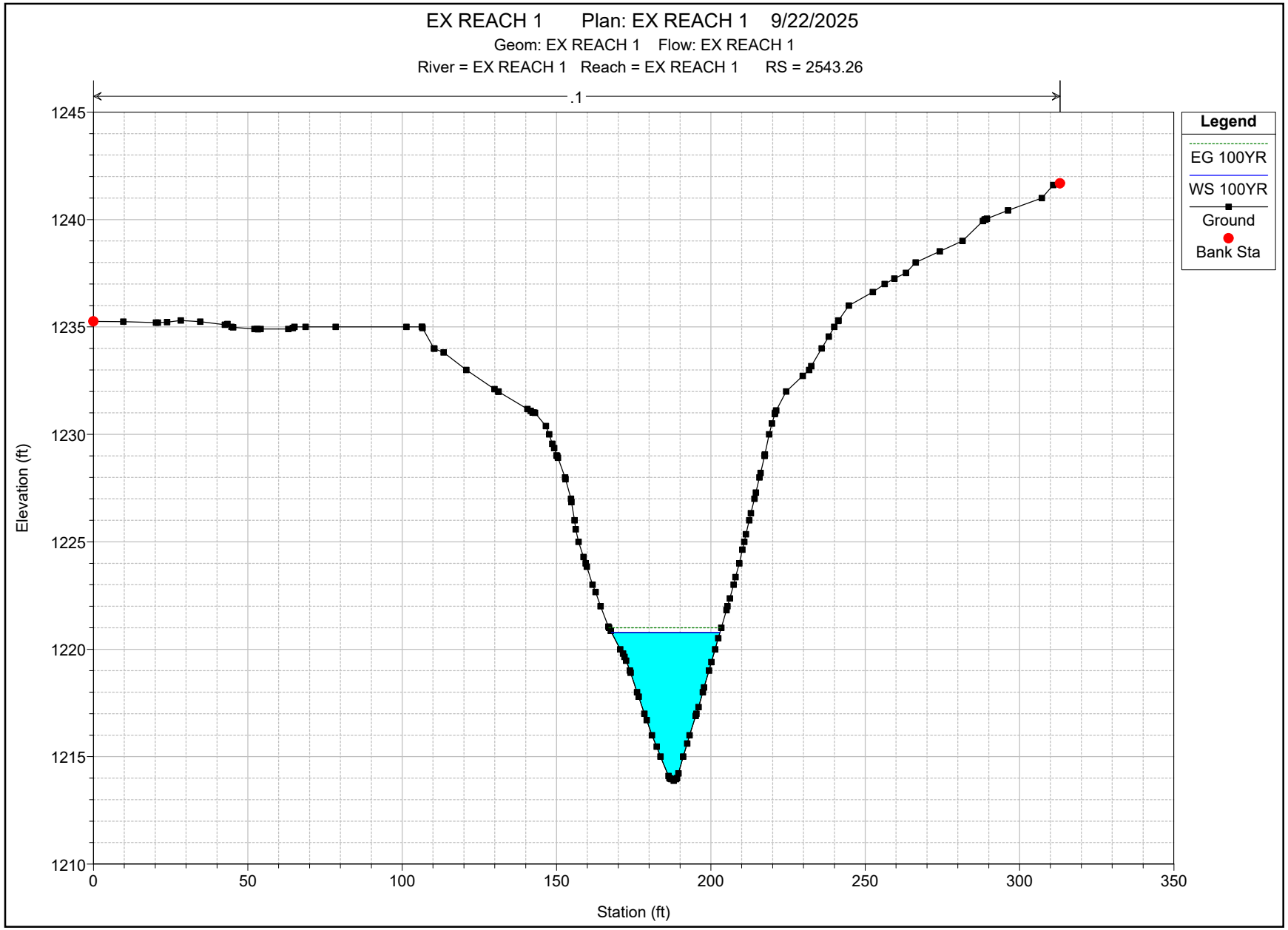

EX REACH 1 Plan: EX REACH 1 9/22/2025
Geom: EX REACH 1 Flow: EX REACH 1
River = EX REACH 1 Reach = EX REACH 1 RS = 3500
.1
Legend
EG 100YR
WS 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
1275
1270
1265
1260
1255
1250
1245
1240
1235
0
100
200
300
400

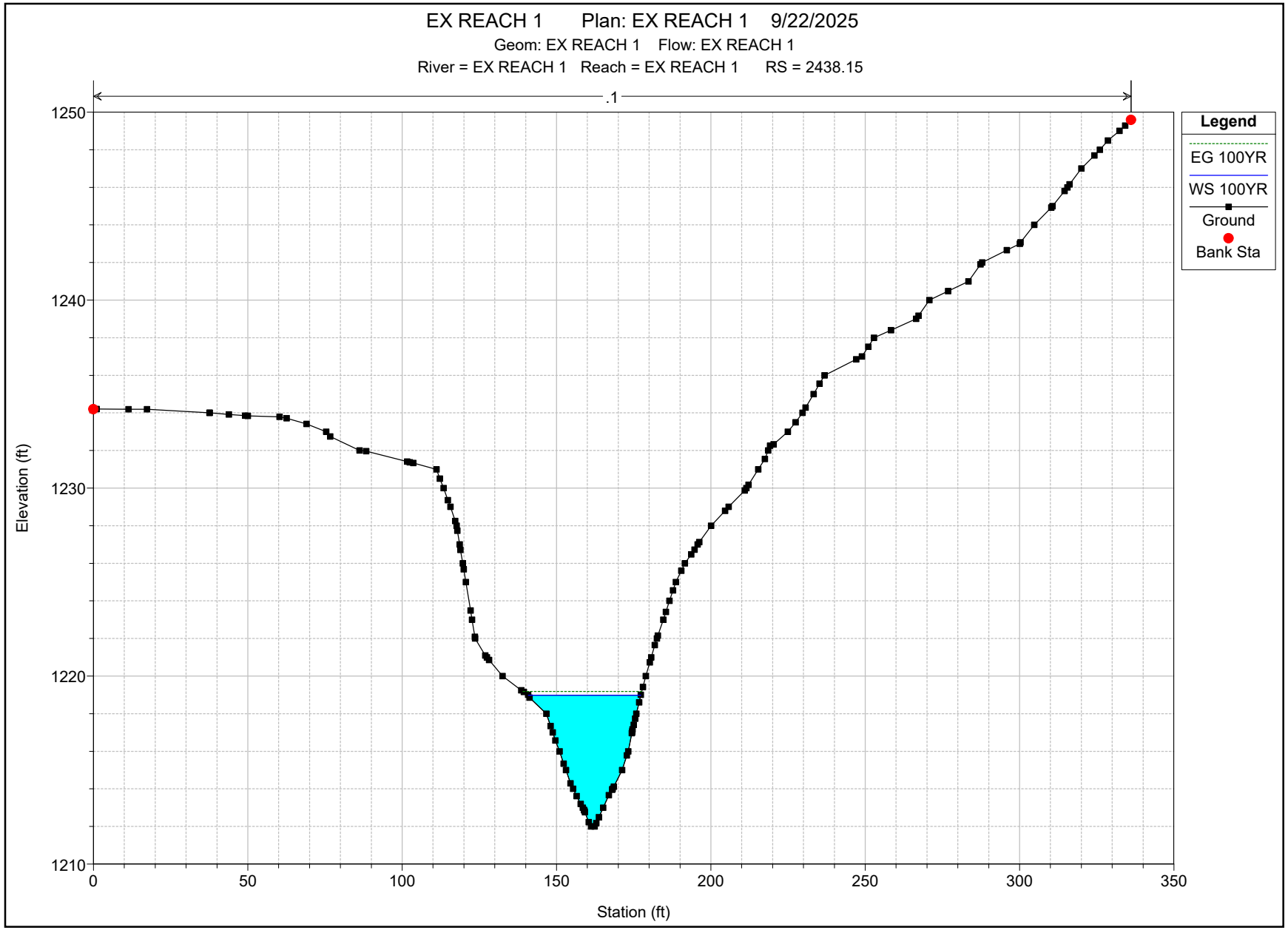

EX REACH 1 Plan: EX REACH 1 9/22/2025
Geom: EX REACH 1 Flow: EX REACH 1
River = EX REACH 1 Reach = EX REACH 1 RS = 3300
.1
Legend
EG 100YR
WS 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
1270
1265
1260
1255
1250
1245
1240
1235
1230
0
100
200
300
400

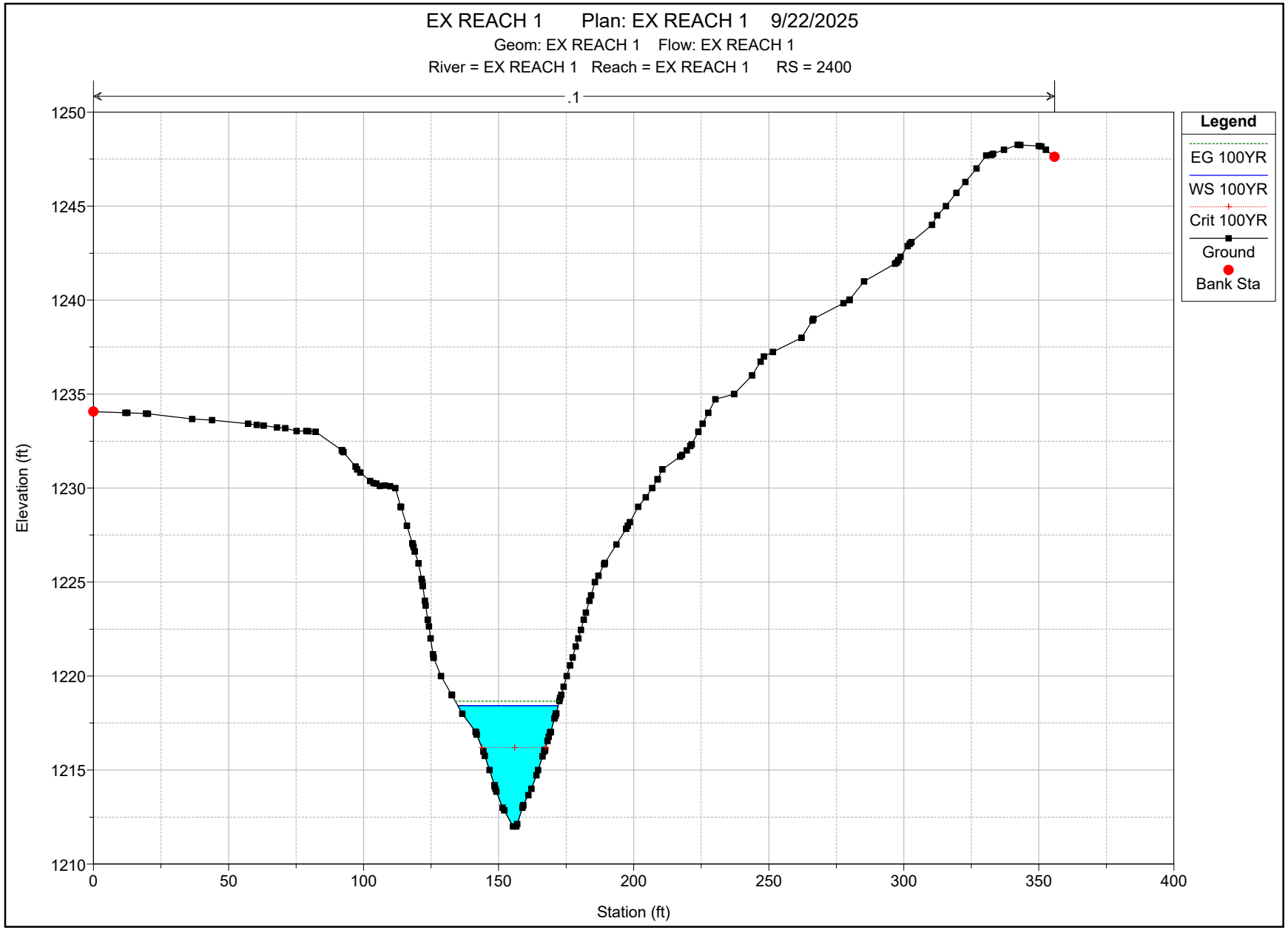

EX REACH 1 Plan: EX REACH 1 9/22/2025
Geom: EX REACH 1 Flow: EX REACH 1
River = EX REACH 1 Reach = EX REACH 1 RS = 3100
.1
Legend
EG 100YR
WS 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
1265
1260
1255
1250
1245
1240
1235
1230
0
100
200
300
400

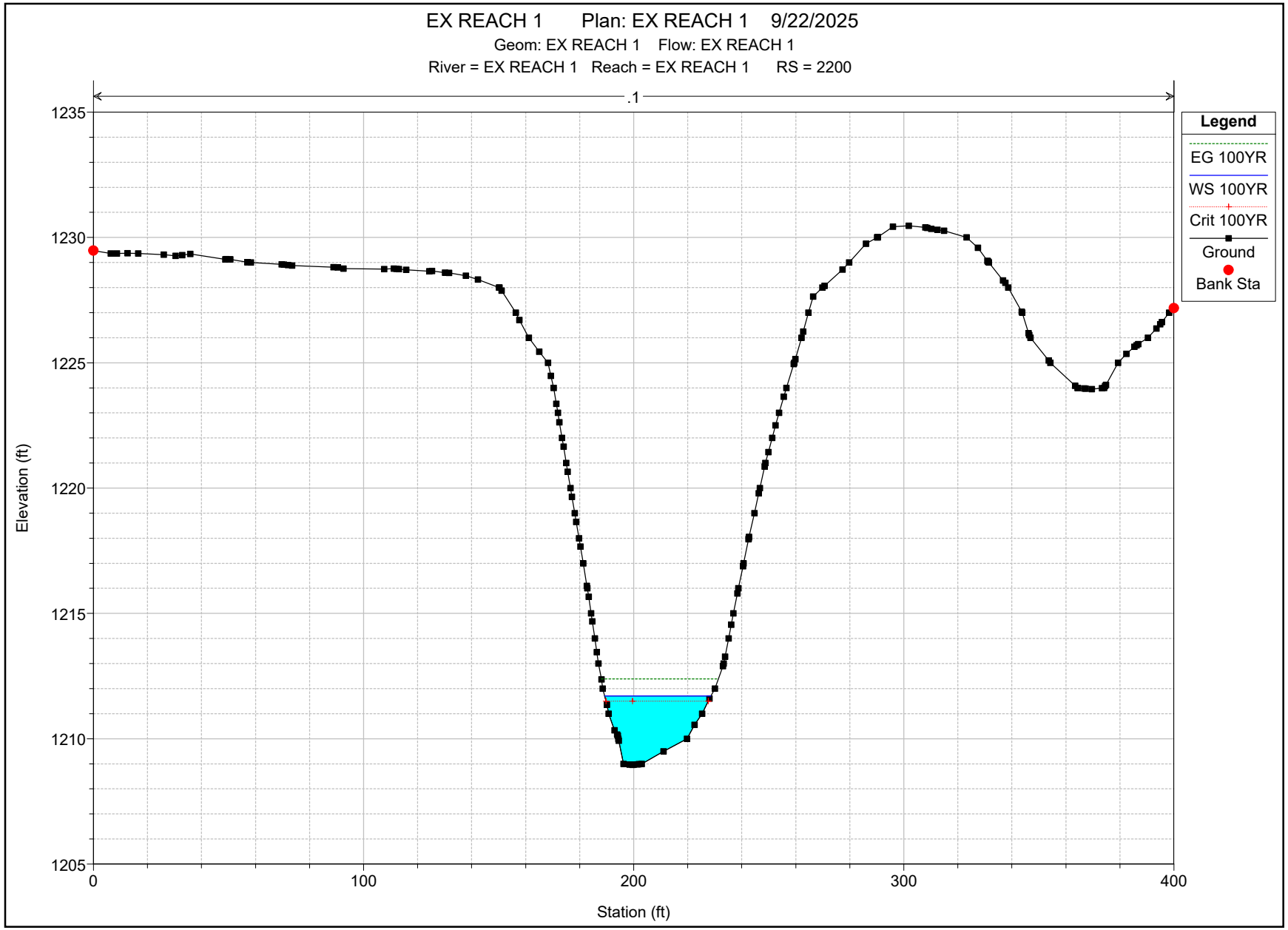

EX REACH 1 Plan: EX REACH 1 9/22/2025
Geom: EX REACH 1 Flow: EX REACH 1
River = EX REACH 1 Reach = EX REACH 1 RS = 2900
.1
Legend
EG 100YR
WS 100YR
Crit 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
1250
1245
1240
1235
1230
1225
0
100
200
300
400

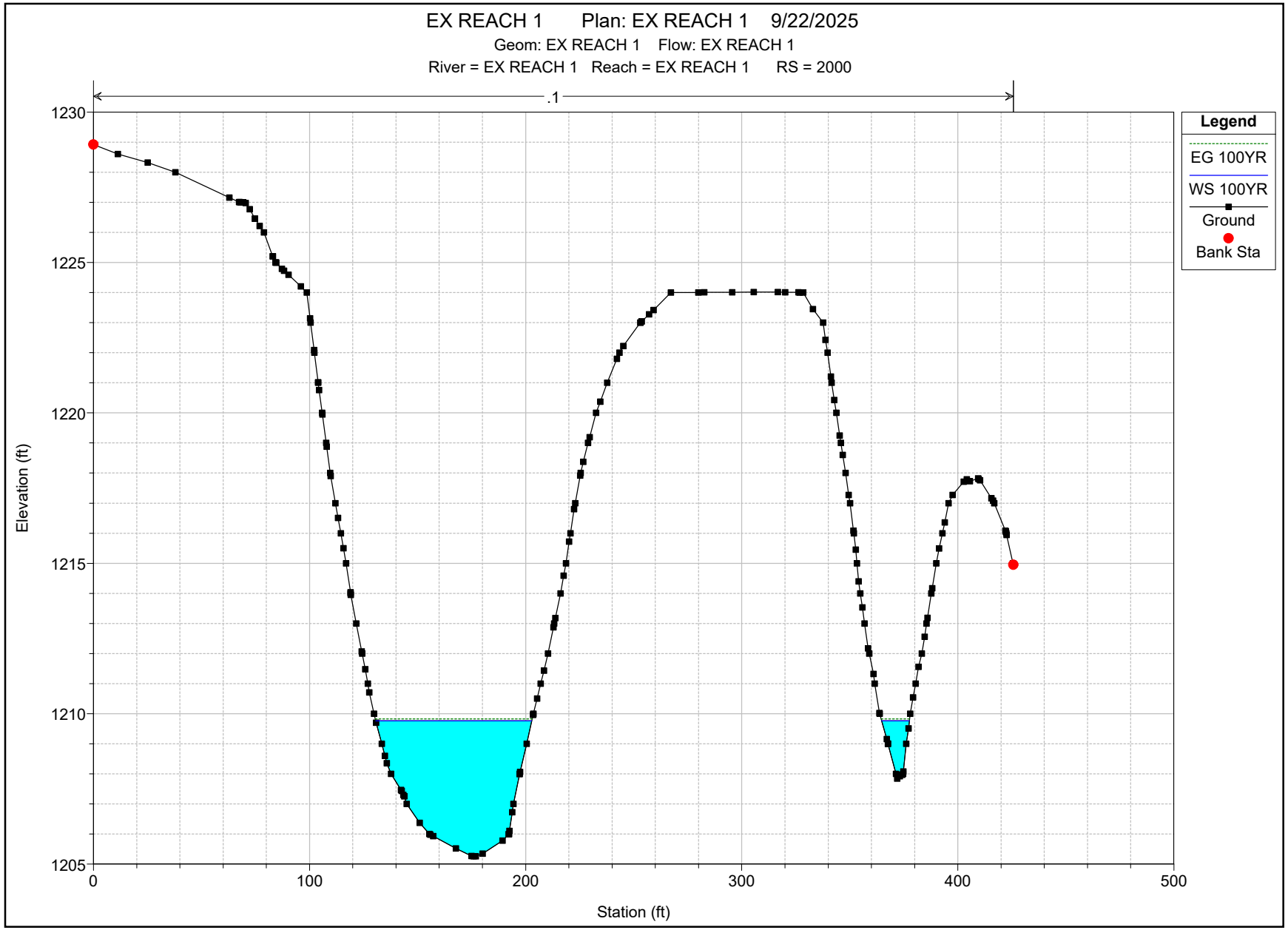

EX REACH 1 Plan: EX REACH 1 9/22/2025
Geom: EX REACH 1 Flow: EX REACH 1
River = EX REACH 1 Reach = EX REACH 1 RS = 2700
.1
Legend
EG 100YR
WS 100YR
Crit 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
1250
1245
1240
1235
1230
1225
1220
1215
0
100
200
300
400

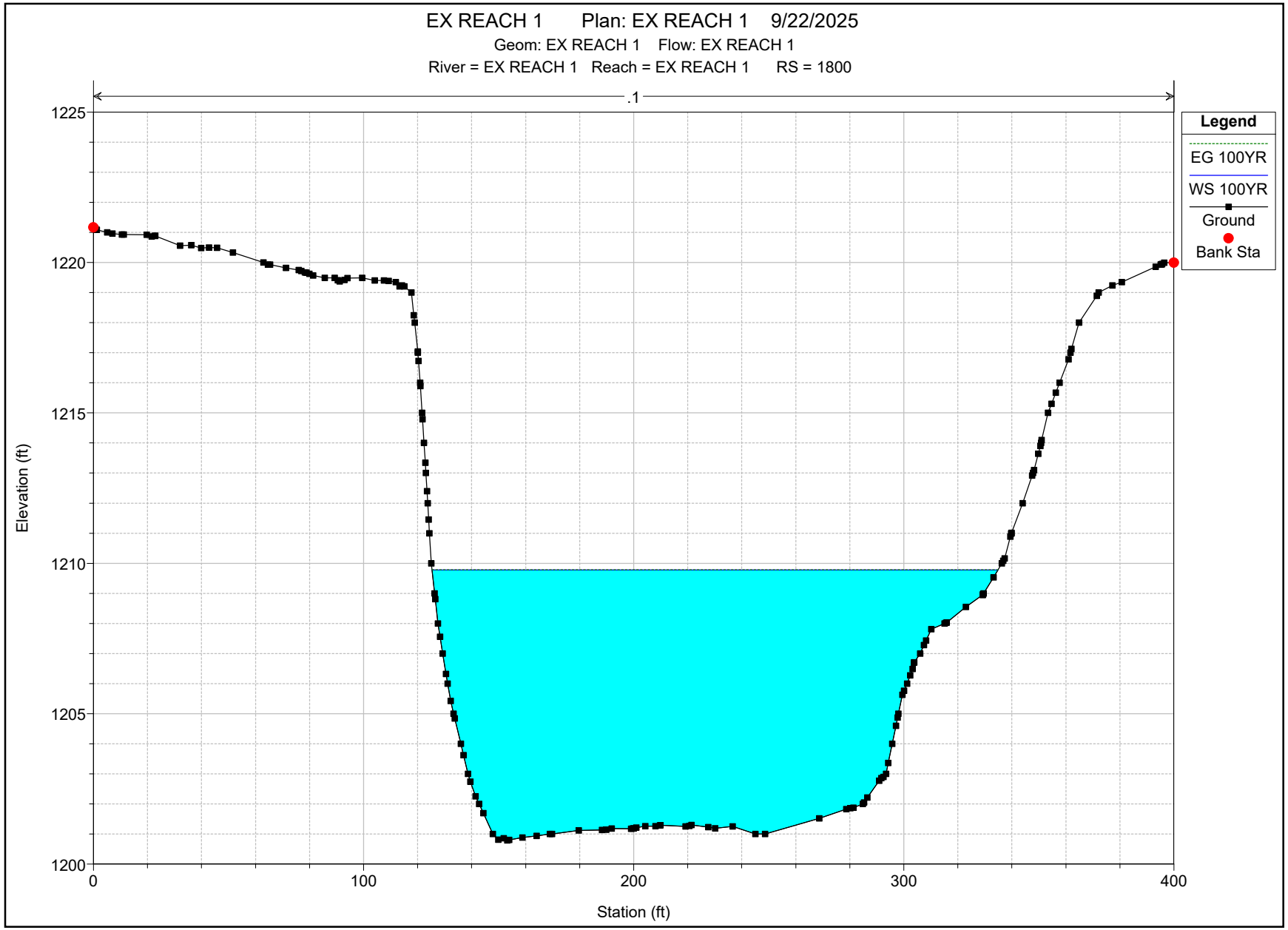

EX REACH 1 Plan: EX REACH 1 9/22/2025
Geom: EX REACH 1 Flow: EX REACH 1
River = EX REACH 1 Reach = EX REACH 1 RS = 2543.26
.1
Legend
EG 100YR
WS 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
1245
1240
1235
1230
1225
1220
1215
1210
0
50
100
150
200
250
300
350

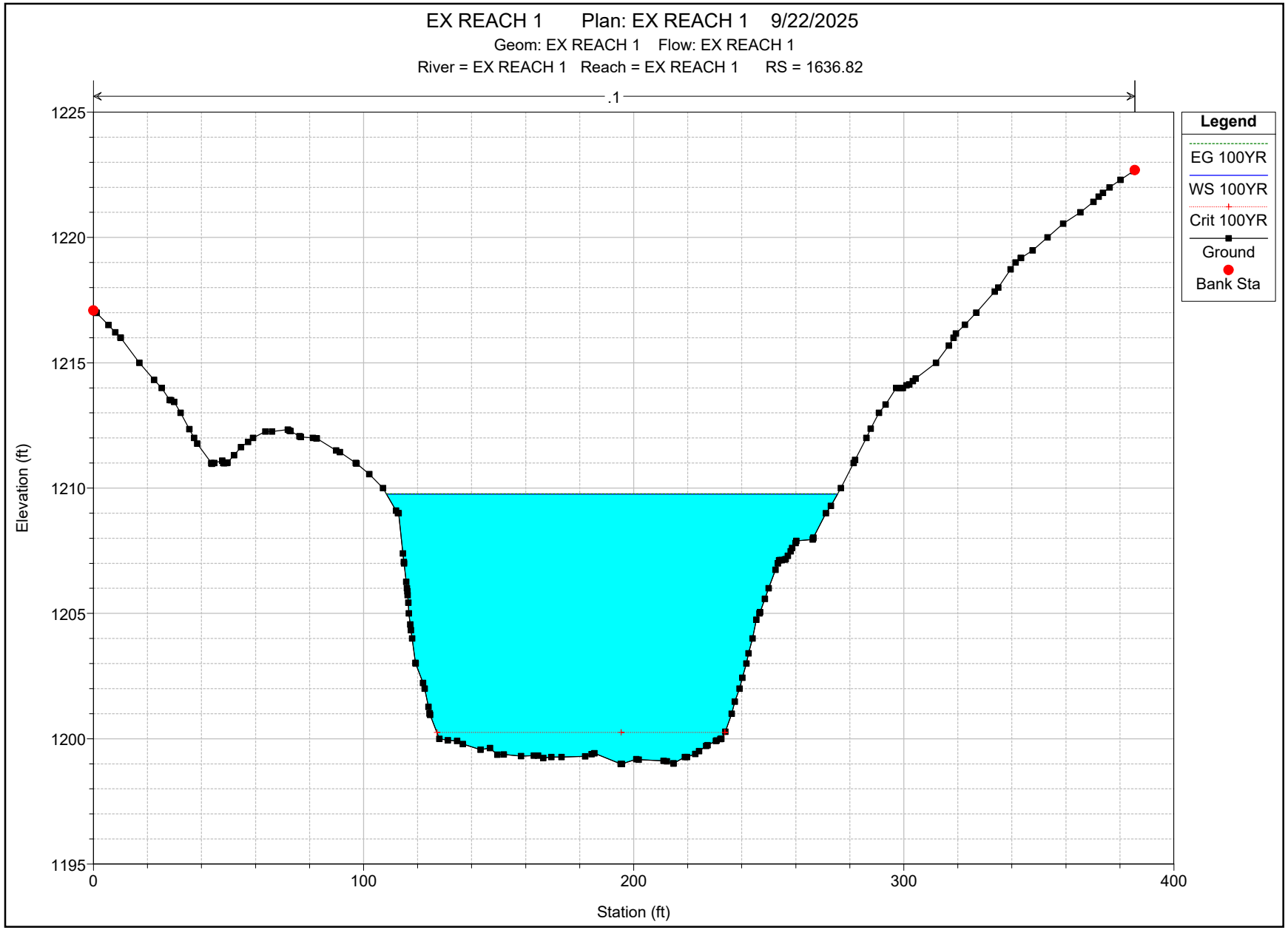

EX REACH 1 Plan: EX REACH 1 9/22/2025
Geom: EX REACH 1 Flow: EX REACH 1
River = EX REACH 1 Reach = EX REACH 1 RS = 2438.15
.1
Legend
EG 100YR
WS 100YR
Ground
Bank Sta
Elevation (ft)
1250
1240
1230
1220
1210
0
50
100
150
200
250
300
350
Station (ft)

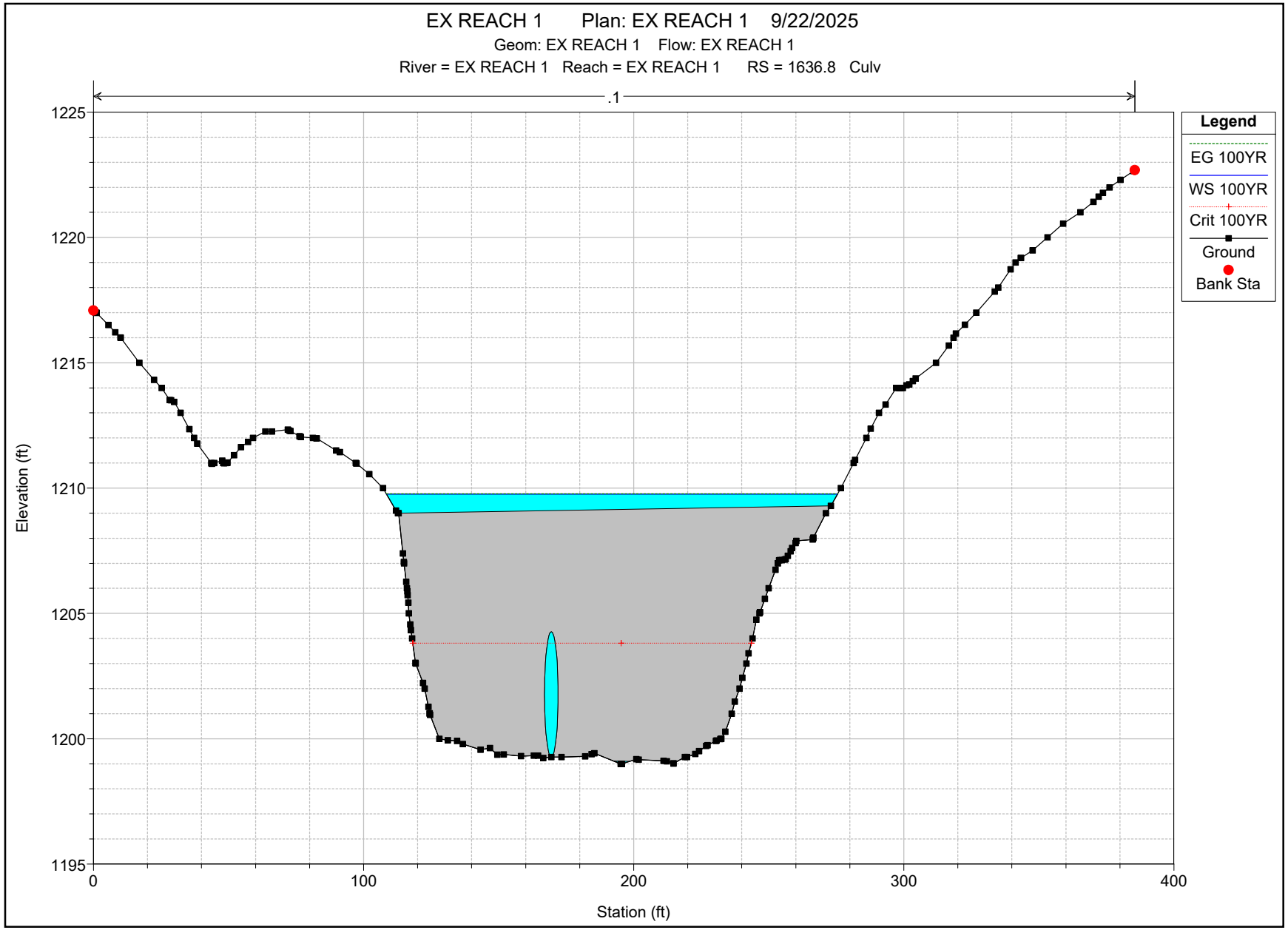

EX REACH 1 Plan: EX REACH 1 9/22/2025
Geom: EX REACH 1 Flow: EX REACH 1
River = EX REACH 1 Reach = EX REACH 1 RS = 2400
.1
Legend
EG 100YR
WS 100YR
Crit 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
1250
1245
1240
1235
1230
1225
1220
1215
1210
0
50
100
150
200
250
300
350
400

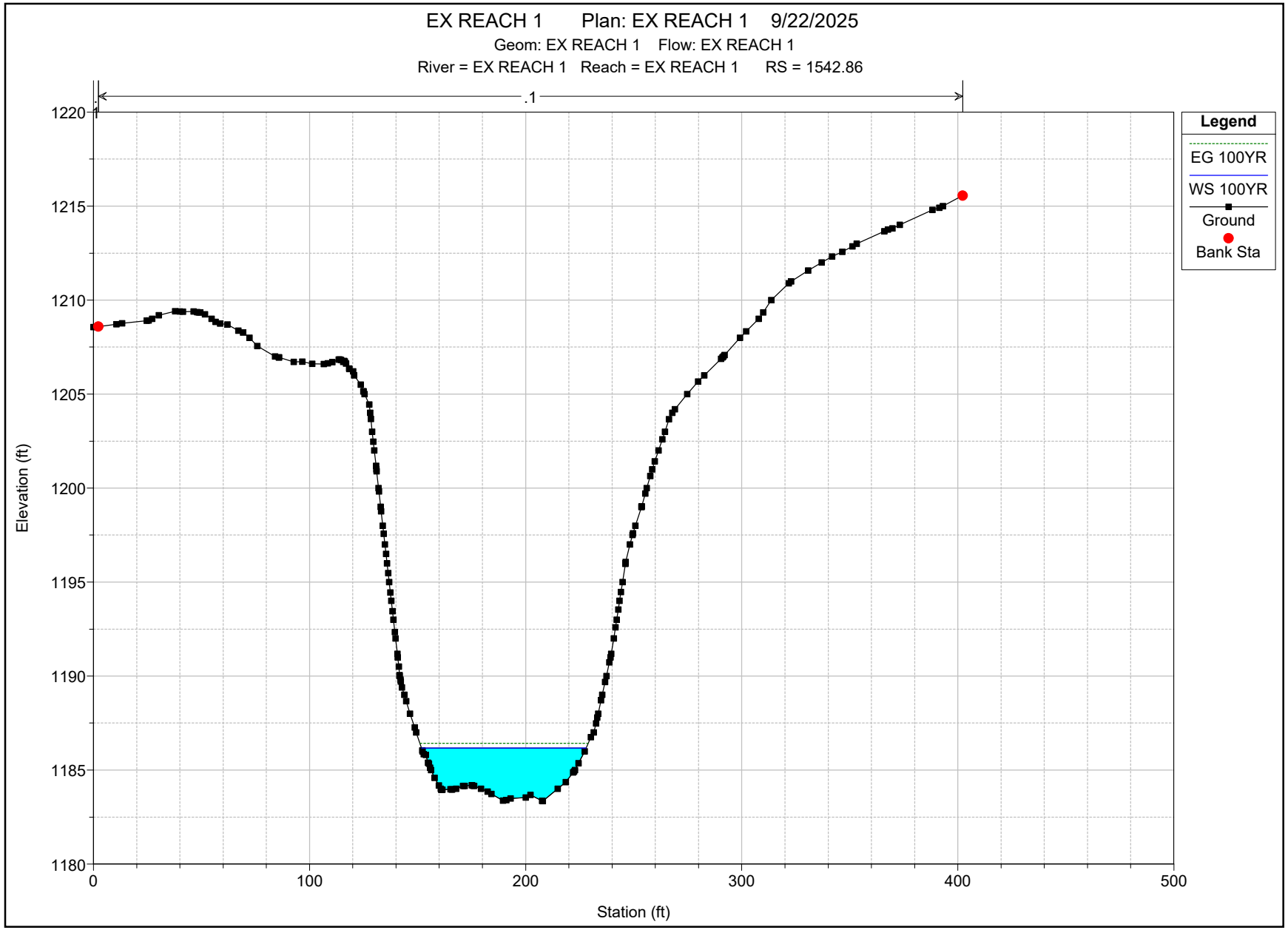

EX REACH 1 Plan: EX REACH 1 9/22/2025
Geom: EX REACH 1 Flow: EX REACH 1
River = EX REACH 1 Reach = EX REACH 1 RS = 2200
.1
Legend
EG 100YR
WS 100YR
Crit 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
1235
1230
1225
1220
1215
1210
1205
0
100
200
300
400

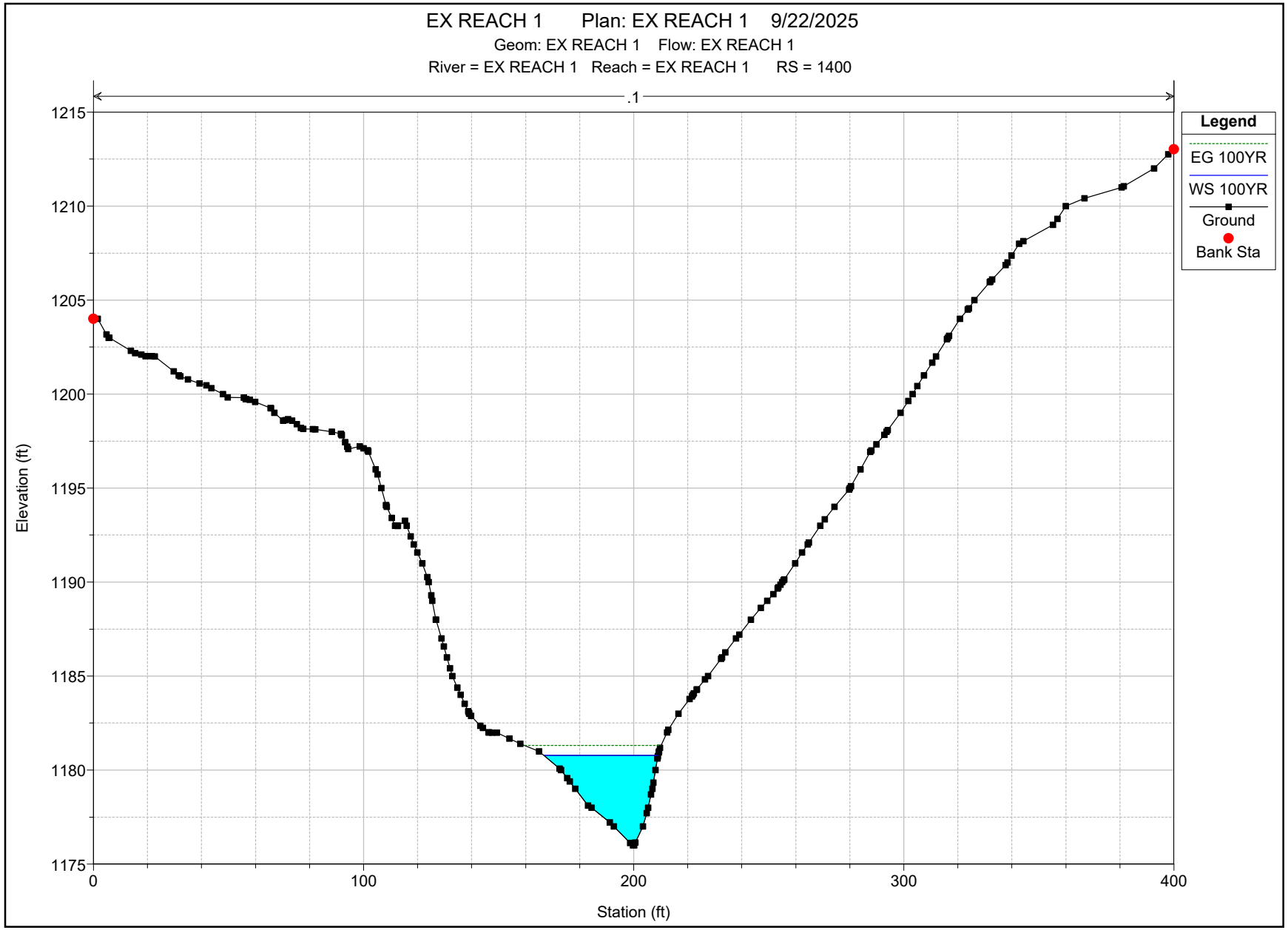

EX REACH 1 Plan: EX REACH 1 9/22/2025
Geom: EX REACH 1 Flow: EX REACH 1
River = EX REACH 1 Reach = EX REACH 1 RS = 2000
.1
Legend
EG 100YR
WS 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
1230
1225
1220
1215
1210
1205
0
100
200
300
400
500

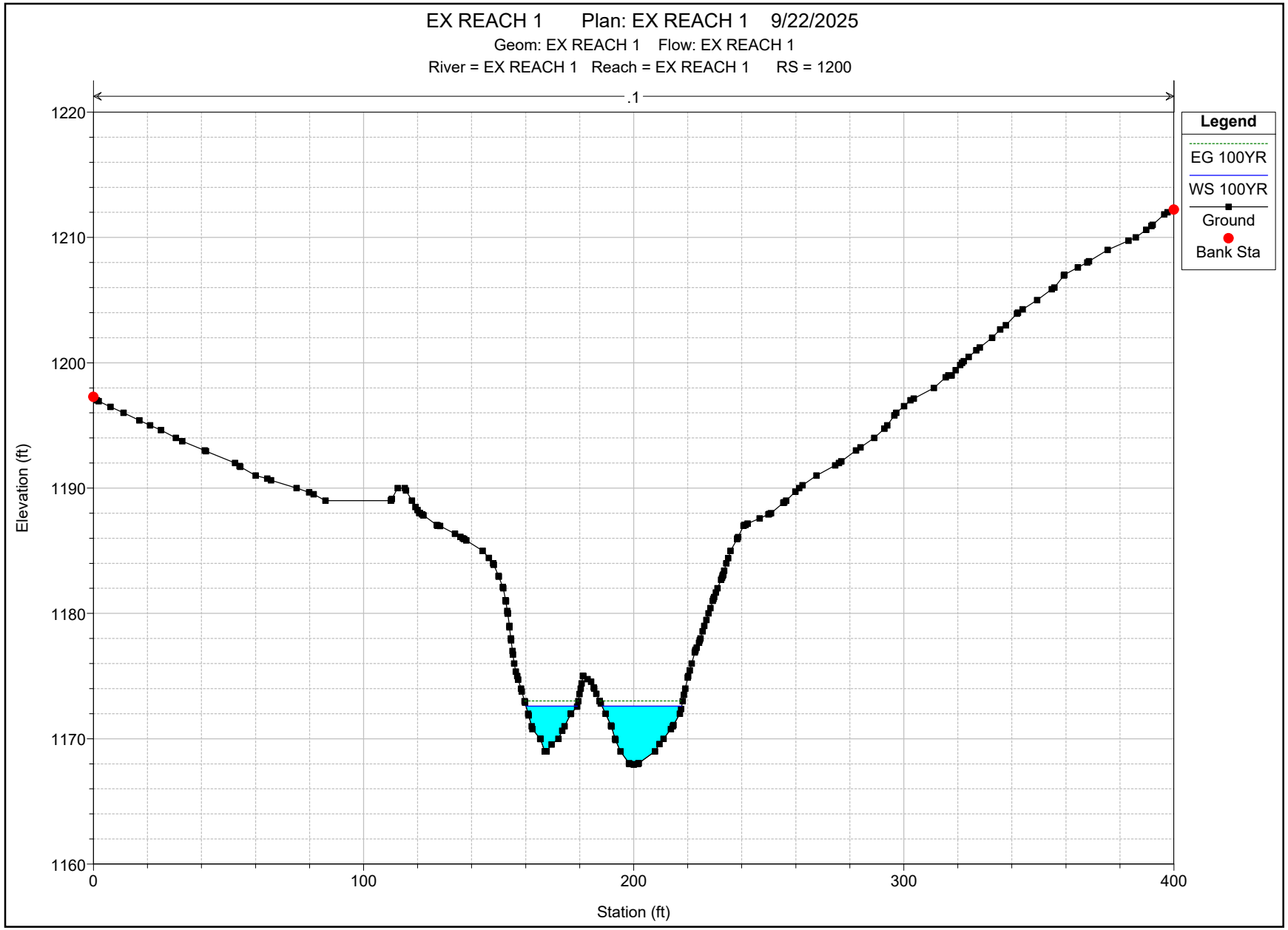

EX REACH 1 Plan: EX REACH 1 9/22/2025
Geom: EX REACH 1 Flow: EX REACH 1
River = EX REACH 1 Reach = EX REACH 1 RS = 1800
.1
Legend
EG 100YR
WS 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
1225
1220
1215
1210
1205
1200
0
100
200
300
400

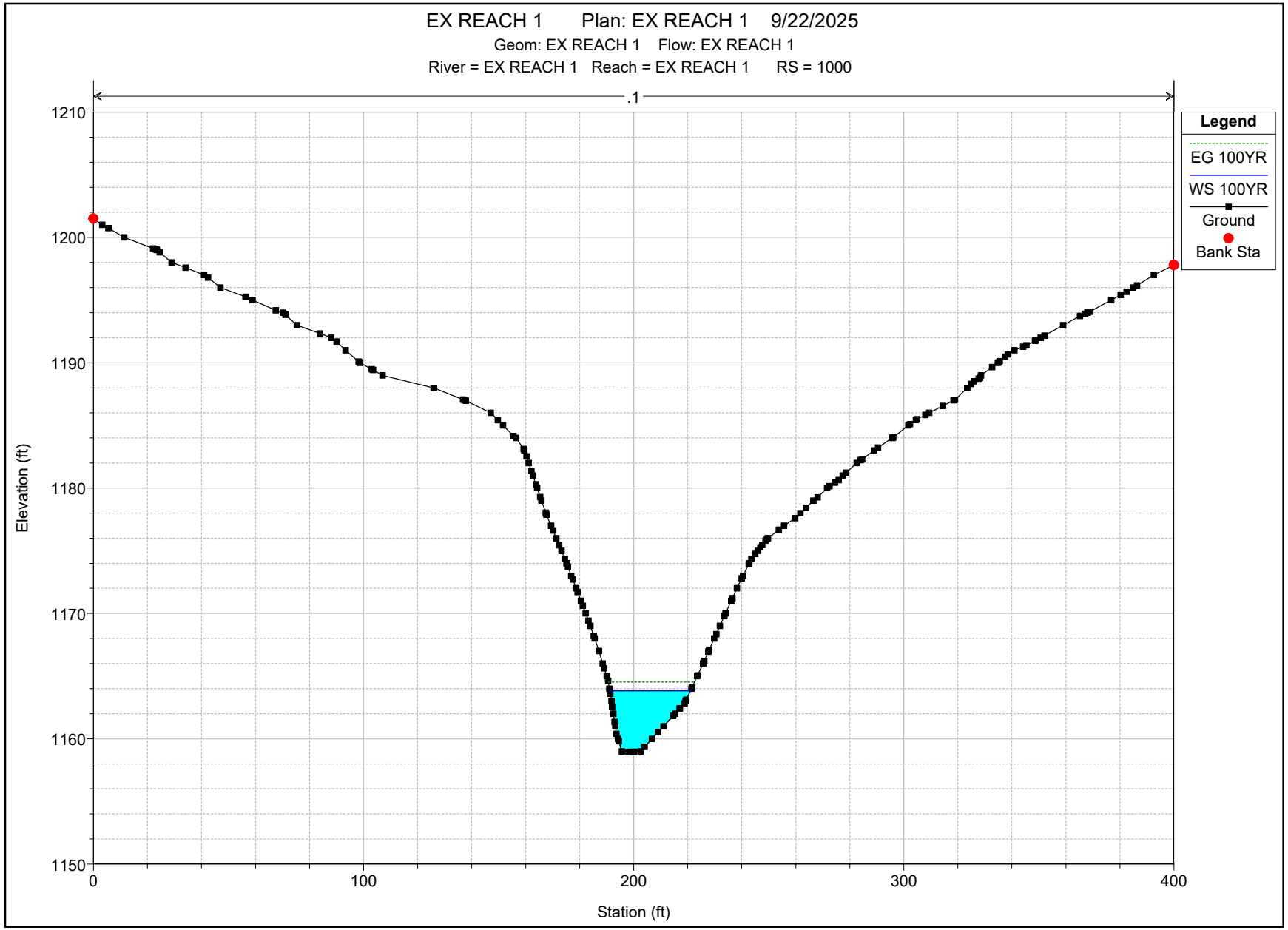

EX REACH 1 Plan: EX REACH 1 9/22/2025
Geom: EX REACH 1 Flow: EX REACH 1
River = EX REACH 1 Reach = EX REACH 1 RS = 1636.82
.1
Legend
EG 100YR
WS 100YR
Crit 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
1225
1220
1215
1210
1205
1200
1195
0
100
200
300
400

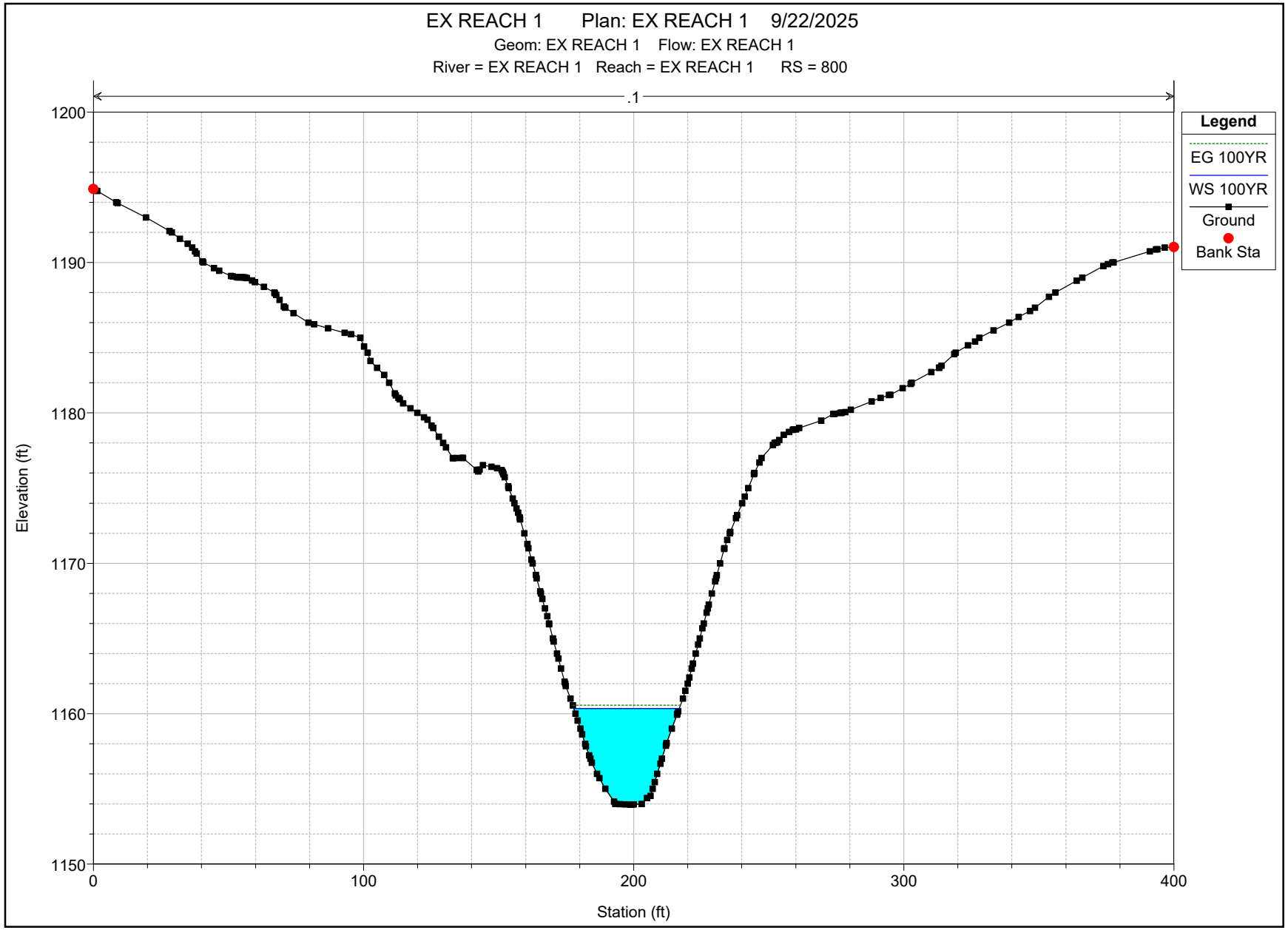

EX REACH 1 Plan: EX REACH 1 9/22/2025
Geom: EX REACH 1 Flow: EX REACH 1
River = EX REACH 1 Reach = EX REACH 1 RS = 1636.8 Culv
.1
Legend
EG 100YR
WS 100YR
Crit 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
1225
1220
1215
1210
1205
1200
1195
0
100
200
300
400

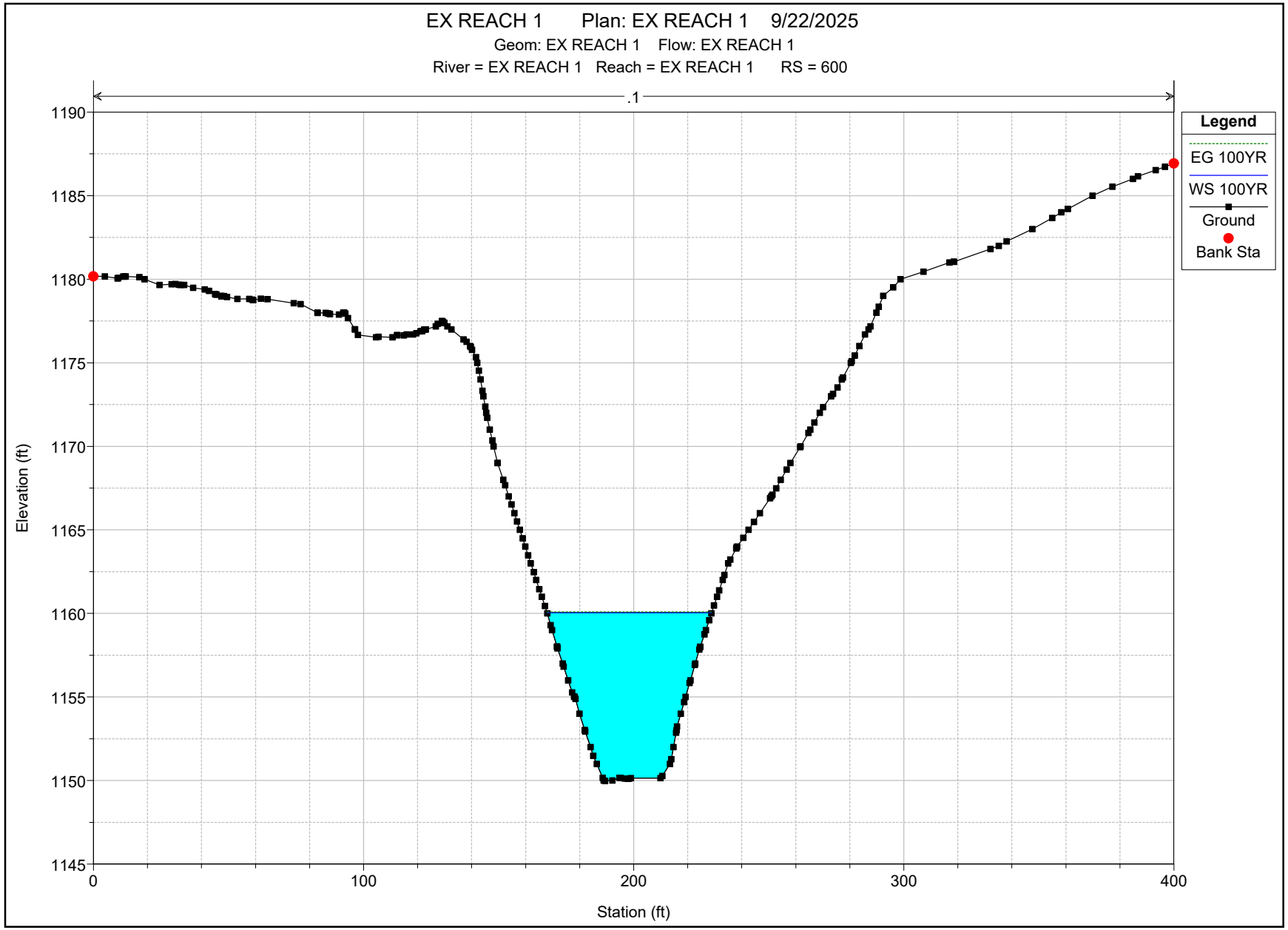

EX REACH 1 Plan: EX REACH 1 9/22/2025
Geom: EX REACH 1 Flow: EX REACH 1
River = EX REACH 1 Reach = EX REACH 1 RS = 1542.86
.1
Legend
EG 100YR
WS 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
1220
1215
1210
1205
1200
1195
1190
1185
1180
0
100
200
300
400
500

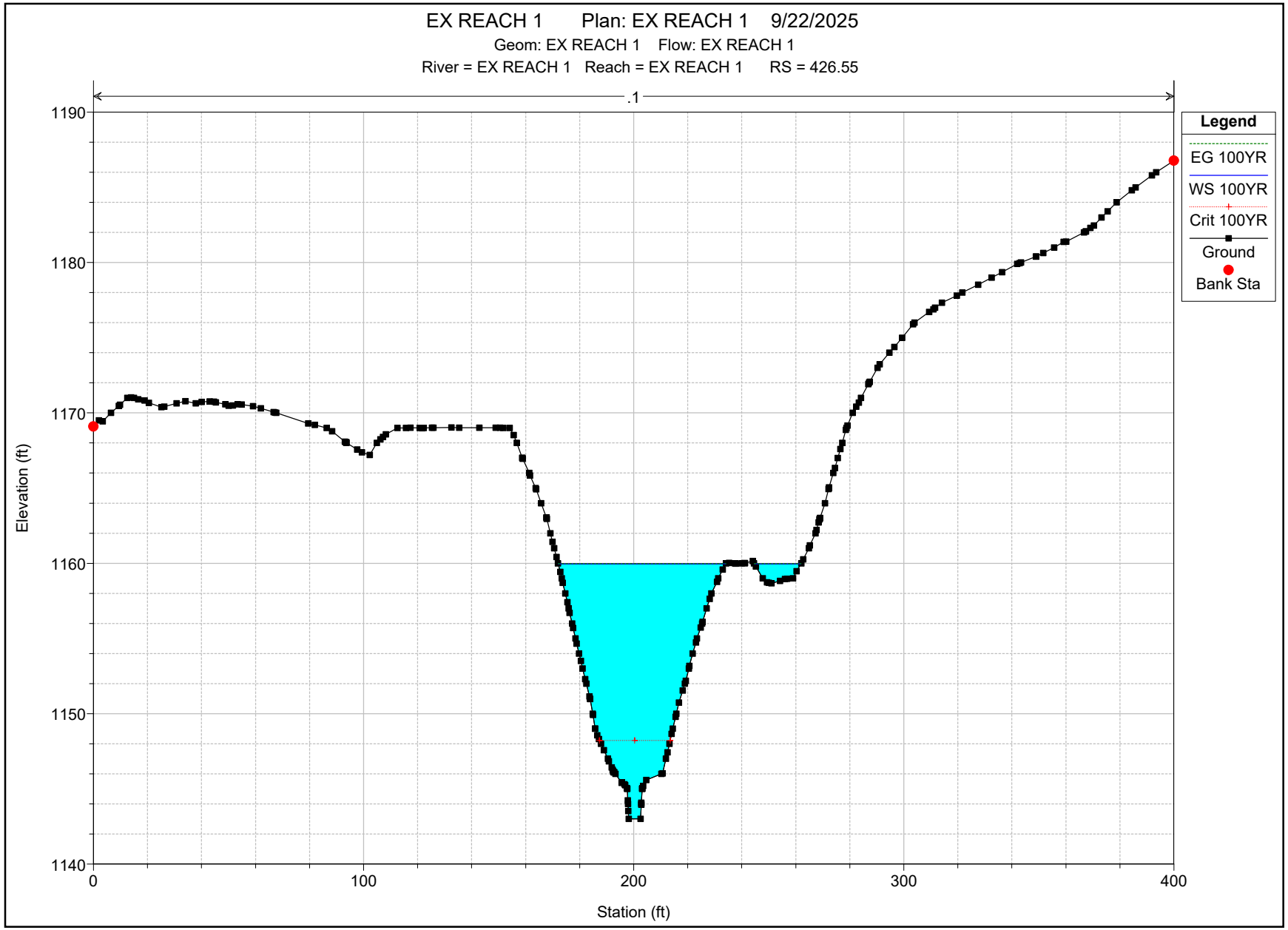

EX REACH 1 Plan: EX REACH 1 9/22/2025
Geom: EX REACH 1 Flow: EX REACH 1
River = EX REACH 1 Reach = EX REACH 1 RS = 1400
.1
Legend
EG 100YR
WS 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
1215
1210
1205
1200
1195
1190
1185
1180
1175
0
100
200
300
400

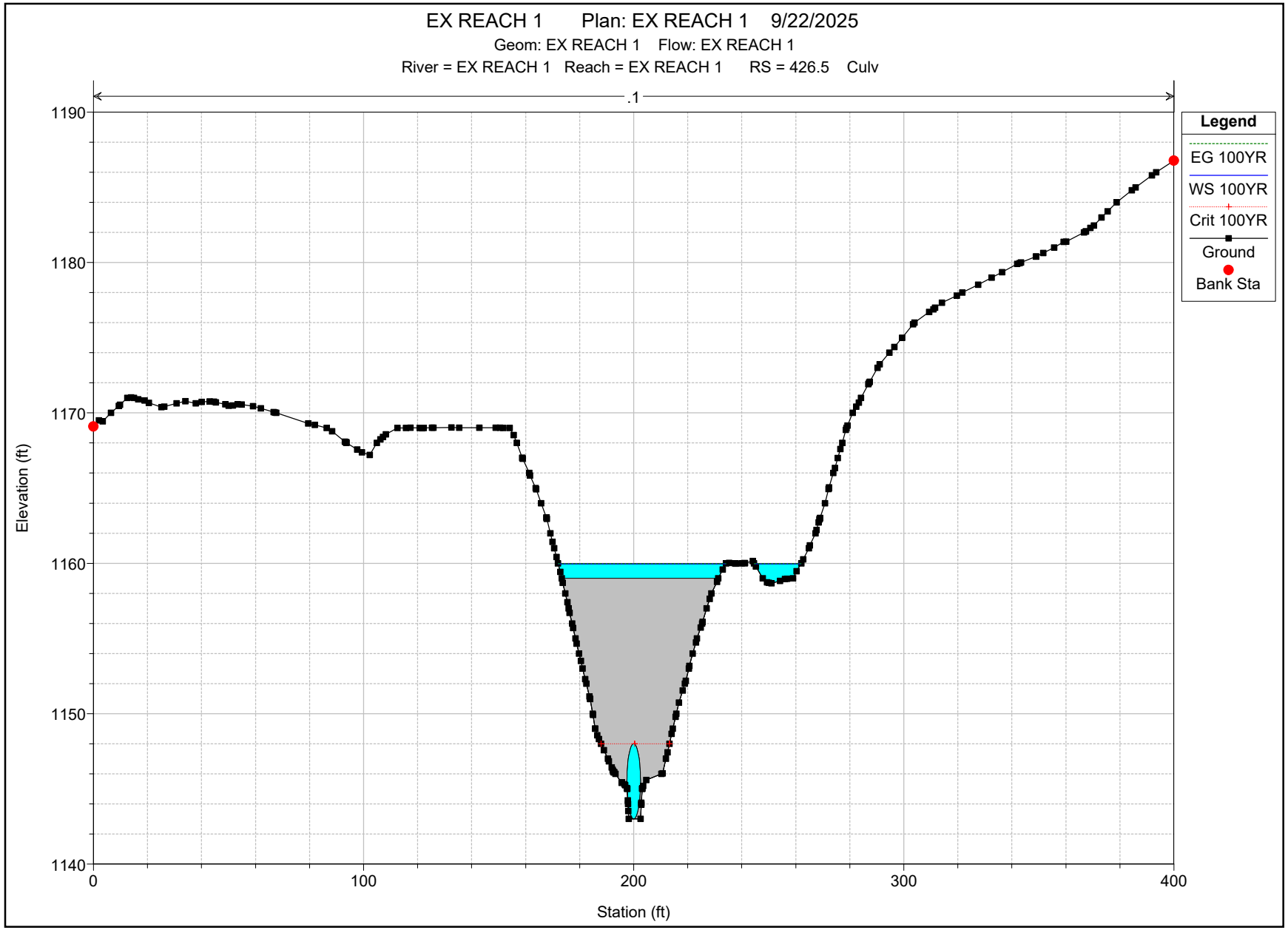

EX REACH 1 Plan: EX REACH 1 9/22/2025
Geom: EX REACH 1 Flow: EX REACH 1
River = EX REACH 1 Reach = EX REACH 1 RS = 1200
.1
Legend
EG 100YR
WS 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
1220
1210
1200
1190
1180
1170
1160
0
100
200
300
400

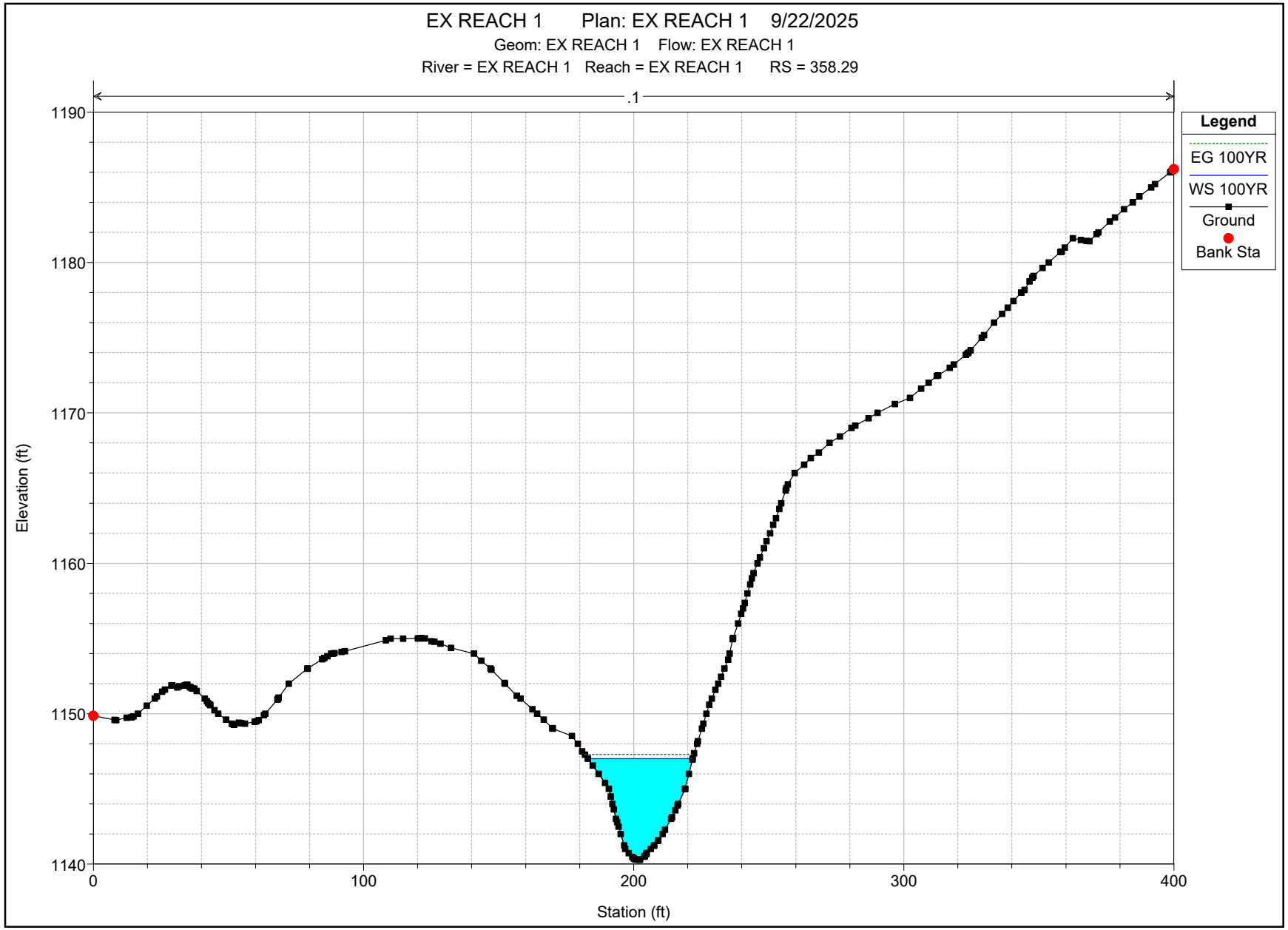

EX REACH 1 Plan: EX REACH 1 9/22/2025
Geom: EX REACH 1 Flow: EX REACH 1
River = EX REACH 1 Reach = EX REACH 1 RS = 1000
.1
Legend
EG 100YR
WS 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
1210
1200
1190
1180
1170
1160
1150
0
100
200
300
400

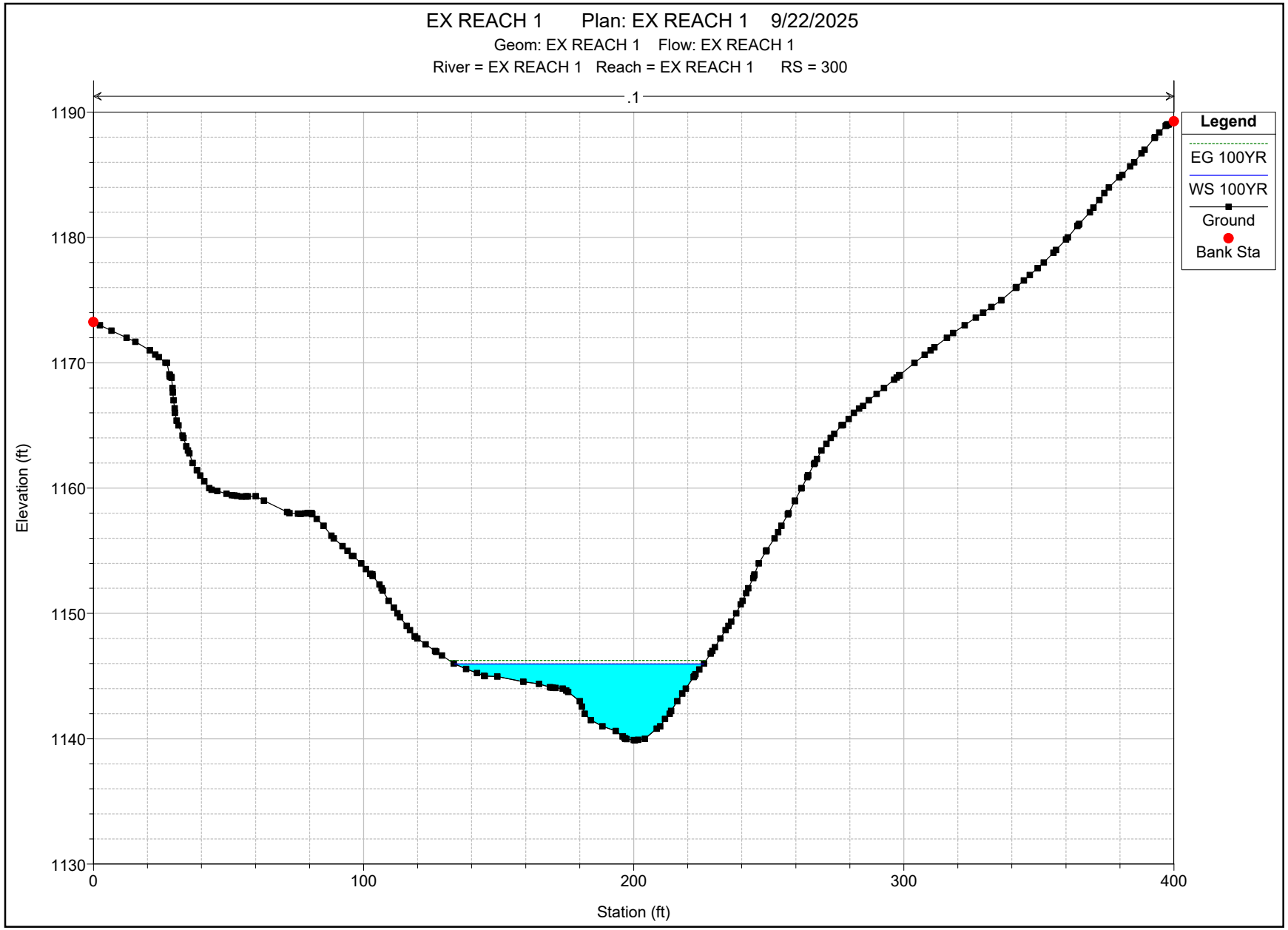

EX REACH 1 Plan: EX REACH 1 9/22/2025
Geom: EX REACH 1 Flow: EX REACH 1
River = EX REACH 1 Reach = EX REACH 1 RS = 800
.1
Legend
EG 100YR
WS 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
1200
1190
1180
1170
1160
1150
0
100
200
300
400

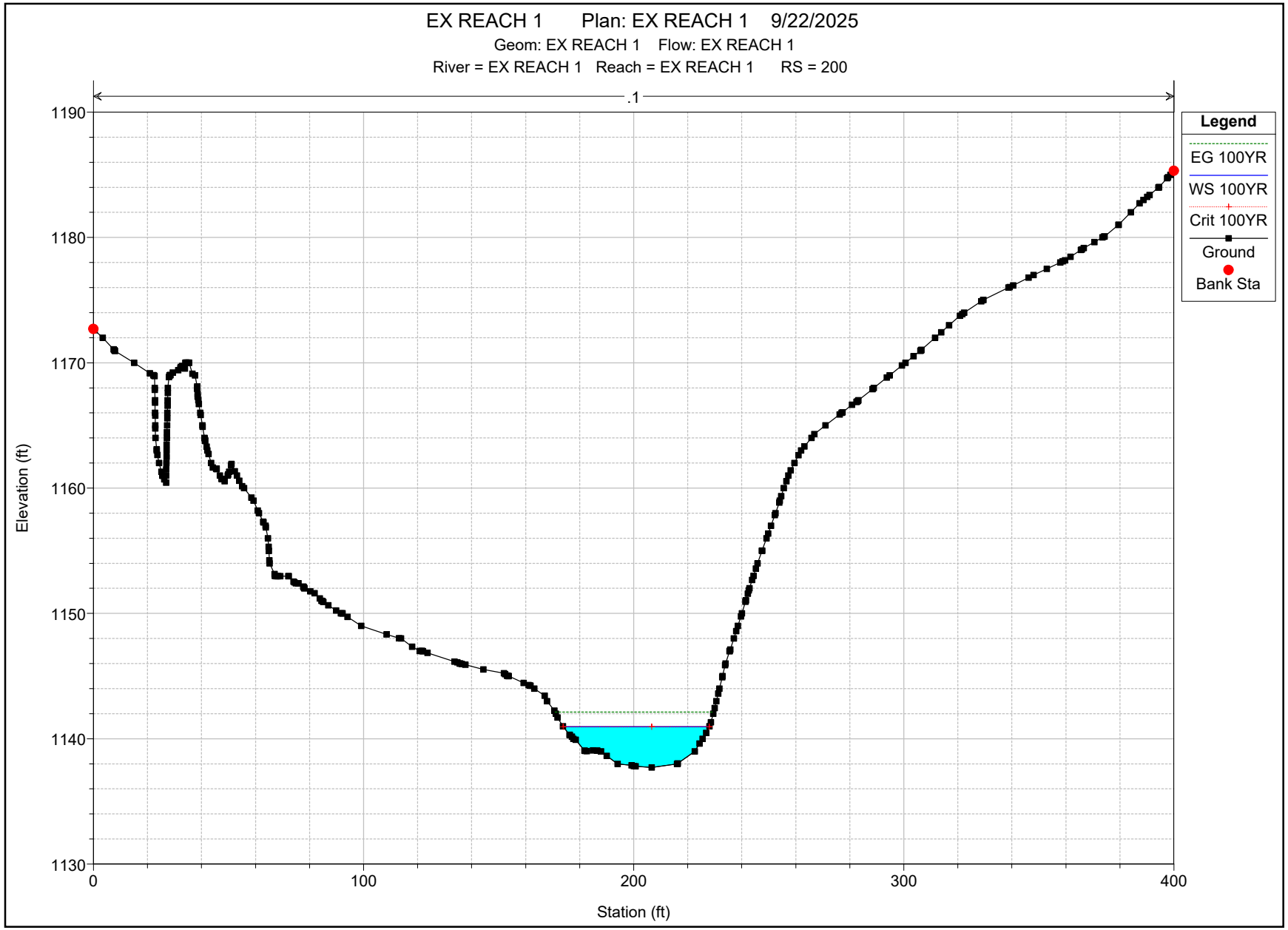

EX REACH 1 Plan: EX REACH 1 9/22/2025
Geom: EX REACH 1 Flow: EX REACH 1
River = EX REACH 1 Reach = EX REACH 1 RS = 600
.1
Legend
EG 100YR
WS 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
1190
1185
1180
1175
1170
1165
1160
1155
1150
1145
0
100
200
300
400

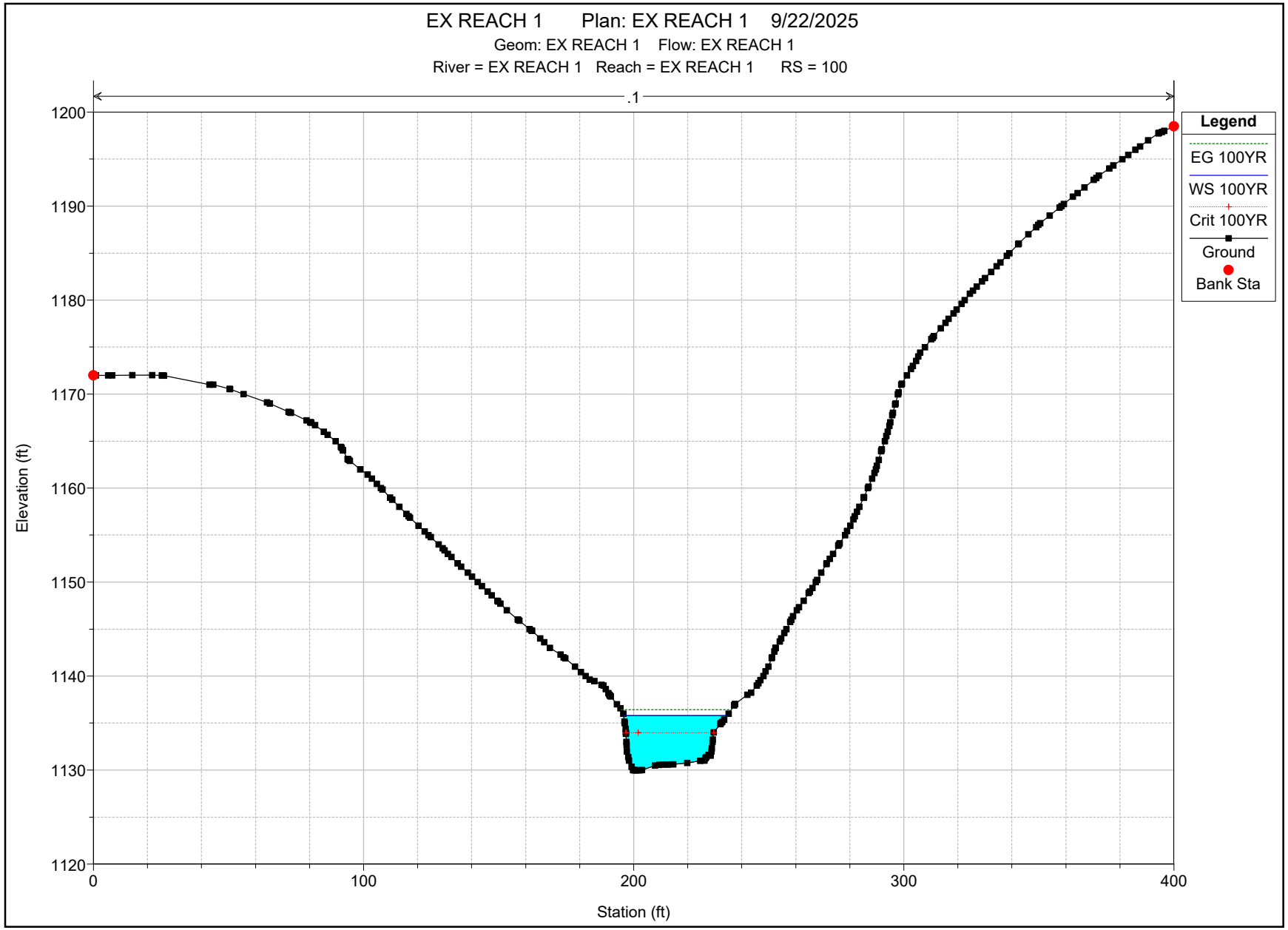

EX REACH 1 Plan: EX REACH 1 9/22/2025
Geom: EX REACH 1 Flow: EX REACH 1
River = EX REACH 1 Reach = EX REACH 1 RS = 426.55
.1
Legend
EG 100YR
WS 100YR
Crit 100YR
Ground
Bank Sta
Elevation (ft)
1190
1180
1170
1160
1150
1140
0
100
200
300
400
Station (ft)

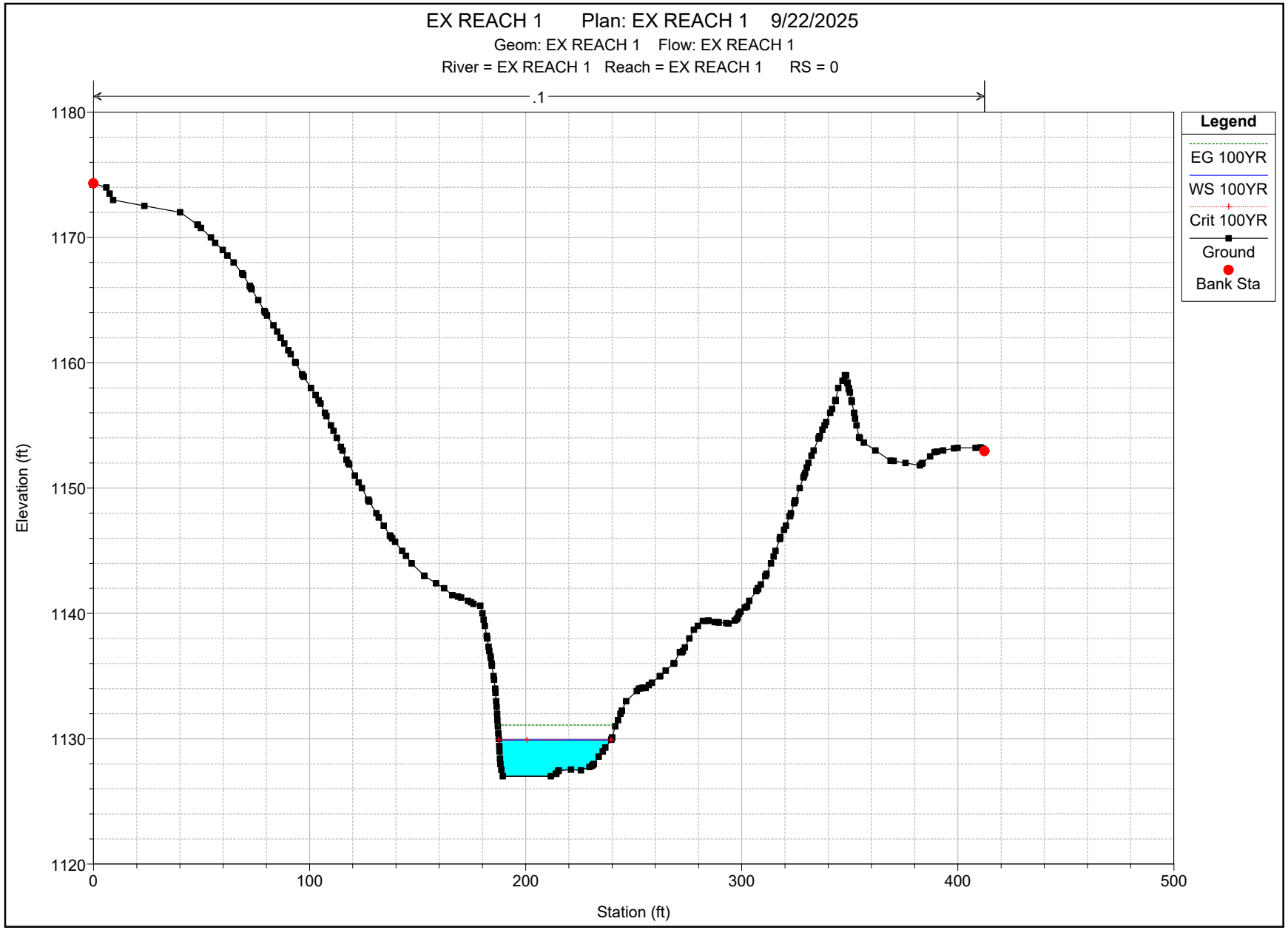

EX REACH 1 Plan: EX REACH 1 9/22/2025
Geom: EX REACH 1 Flow: EX REACH 1
River = EX REACH 1 Reach = EX REACH 1 RS = 426.5 Culv
.1
Legend
EG 100YR
WS 100YR
Crit 100YR
Ground
Bank Sta
Elevation (ft)
1190
1180
1170
1160
1150
1140
0
100
200
300
400
Station (ft)


EX REACH 1 Plan: EX REACH 1 9/22/2025
Geom: EX REACH 1 Flow: EX REACH 1
River = EX REACH 1 Reach = EX REACH 1 RS = 358.29
.1
Legend
EG 100YR
WS 100YR
Ground
Bank Sta
Elevation (ft)
1190
1180
1170
1160
1150
1140
0
100
200
300
400
Station (ft)


EX REACH 1 Plan: EX REACH 1 9/22/2025
Geom: EX REACH 1 Flow: EX REACH 1
River = EX REACH 1 Reach = EX REACH 1 RS = 300
.1
Legend
EG 100YR
WS 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
1190
1180
1170
1160
1150
1140
1130
0
100
200
300
400


EX REACH 1 Plan: EX REACH 1 9/22/2025
Geom: EX REACH 1 Flow: EX REACH 1
River = EX REACH 1 Reach = EX REACH 1 RS = 200
.1
Legend
EG 100YR
WS 100YR
Crit 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
1190
1180
1170
1160
1150
1140
1130
0
100
200
300
400


EX REACH 1 Plan: EX REACH 1 9/22/2025
Geom: EX REACH 1 Flow: EX REACH 1
River = EX REACH 1 Reach = EX REACH 1 RS = 100
.1
Legend
EG 100YR
WS 100YR
Crit 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
1200
1190
1180
1170
1160
1150
1140
1130
1120
0
100
200
300
400


EX REACH 1 Plan: EX REACH 1 9/22/2025
Geom: EX REACH 1 Flow: EX REACH 1
River = EX REACH 1 Reach = EX REACH 1 RS = 0
.1
Legend
EG 100YR
WS 100YR
Crit 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
1180
1170
1160
1150
1140
1130
1120
0
100
200
300
400
500

# POST DEVELOPMENT

HEC-RAS Plan: Prop R1 River: PROP REACH 1 Reach: PROP REACH 1 Profile: 100YR6HR

| Reach | River Sta | Profile | Q Total | Min Ch El | W.S. Elev | Crit W.S. | E.G. Elev | E.G. Slope | Vel Chnl | Flow Area | Top Width | Froude # Chl |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | (cfs) | (ft) | (ft) | (ft) | (ft) | (ft/ft) | (ft/s) | (sq ft) | (ft) | |
| PROP REACH 1 | 5001.26 | 100YR6HR | 757.70 | 1280.95 | 1288.29 | | 1288.75 | 0.021481 | 5.42 | 139.87 | 31.51 | 0.45 |
| PROP REACH 1 | 4900 | 100YR6HR | 757.70 | 1278.96 | 1285.42 | | 1286.04 | 0.033817 | 6.36 | 119.22 | 30.20 | 0.56 |
| PROP REACH 1 | 4700 | 100YR6HR | 757.70 | 1274.52 | 1281.28 | | 1281.61 | 0.015151 | 4.60 | 164.82 | 38.45 | 0.39 |
| PROP REACH 1 | 4500 | 100YR6HR | 757.70 | 1270.00 | 1276.33 | | 1276.98 | 0.038904 | 6.47 | 117.18 | 32.69 | 0.60 |
| PROP REACH 1 | 4300 | 100YR6HR | 757.70 | 1260.90 | 1267.56 | | 1268.43 | 0.046929 | 7.51 | 100.88 | 23.90 | 0.64 |
| PROP REACH 1 | 4100 | 100YR6HR | 757.70 | 1256.00 | 1261.92 | | 1262.35 | 0.020540 | 5.27 | 143.81 | 33.25 | 0.45 |
| PROP REACH 1 | 3900 | 100YR6HR | 757.70 | 1251.95 | 1257.69 | | 1258.12 | 0.021815 | 5.27 | 143.76 | 35.50 | 0.46 |
| PROP REACH 1 | 3700 | 100YR6HR | 757.70 | 1245.77 | 1250.40 | | 1251.18 | 0.062686 | 7.10 | 106.73 | 39.22 | 0.76 |
| PROP REACH 1 | 3500 | 100YR6HR | 757.70 | 1237.00 | 1246.28 | | 1246.55 | 0.011343 | 4.14 | 183.09 | 38.78 | 0.34 |
| PROP REACH 1 | 3300 | 100YR6HR | 757.70 | 1233.95 | 1242.17 | | 1242.83 | 0.035273 | 6.48 | 116.97 | 28.28 | 0.56 |
| PROP REACH 1 | 3100 | 100YR6HR | 757.70 | 1231.00 | 1238.08 | | 1238.32 | 0.014948 | 3.93 | 192.66 | 58.52 | 0.38 |
| PROP REACH 1 | 2900 | 100YR6HR | 757.70 | 1225.00 | 1230.39 | 1230.39 | 1231.70 | 0.118036 | 9.19 | 82.41 | 32.22 | 1.01 |
| PROP REACH 1 | 2700 | 100YR6HR | 757.70 | 1217.96 | 1229.07 | | 1229.12 | 0.001222 | 1.74 | 435.44 | 66.57 | 0.12 |
| PROP REACH 1 | 2543.26 | 100YR6HR | 757.70 | 1217.70 | 1228.74 | 1220.49 | 1228.82 | 0.003288 | 2.20 | 344.38 | 63.22 | 0.17 |
| PROP REACH 1 | 2543.2 | | Culvert | | | | | | | | | |
| PROP REACH 1 | 2438.15 | 100YR6HR | 785.10 | 1216.00 | 1220.96 | | 1221.73 | 0.042872 | 7.07 | 111.10 | 22.89 | 0.57 |
| PROP REACH 1 | 2400 | 100YR6HR | 785.10 | 1215.05 | 1218.60 | | 1219.53 | 0.080060 | 7.75 | 101.32 | 38.28 | 0.84 |
| PROP REACH 1 | 2250 | 100YR6HR | 785.10 | 1208.99 | 1214.00 | | 1214.32 | 0.018335 | 4.53 | 173.36 | 49.32 | 0.43 |
| PROP REACH 1 | 2050 | 100YR6HR | 785.10 | 1206.90 | 1211.27 | 1209.32 | 1211.44 | 0.011266 | 3.30 | 237.58 | 77.41 | 0.33 |
| PROP REACH 1 | 1850 | 100YR6HR | 785.10 | 1202.82 | 1205.18 | 1205.18 | 1205.98 | 0.132214 | 7.18 | 109.31 | 69.57 | 1.01 |
| PROP REACH 1 | 1678.26 | 100YR6HR | 807.40 | 1185.01 | 1197.08 | 1188.31 | 1197.13 | 0.002365 | 1.86 | 435.06 | 89.86 | 0.15 |
| PROP REACH 1 | 1530 | | Culvert | | | | | | | | | |
| PROP REACH 1 | 1529.89 | 100YR6HR | 807.40 | 1184.50 | 1188.29 | | 1189.28 | 0.067145 | 7.98 | 101.22 | 27.02 | 0.73 |
| PROP REACH 1 | 1400 | 100YR6HR | 807.40 | 1176.00 | 1181.36 | | 1181.91 | 0.047035 | 5.98 | 135.04 | 51.57 | 0.65 |
| PROP REACH 1 | 1200 | 100YR6HR | 807.40 | 1167.95 | 1173.05 | | 1173.52 | 0.037423 | 5.52 | 146.36 | 50.90 | 0.57 |
| PROP REACH 1 | 1000 | 100YR6HR | 807.40 | 1159.00 | 1164.47 | | 1165.23 | 0.045809 | 7.01 | 115.15 | 31.75 | 0.65 |
| PROP REACH 1 | 800 | 100YR6HR | 807.40 | 1153.95 | 1161.30 | | 1161.54 | 0.009291 | 3.90 | 207.08 | 42.75 | 0.31 |
| PROP REACH 1 | 600 | 100YR6HR | 807.40 | 1149.97 | 1160.98 | | 1161.02 | 0.001026 | 1.70 | 474.53 | 64.78 | 0.11 |
| PROP REACH 1 | 500 | 100YR6HR | 807.40 | 1146.00 | 1160.98 | | 1161.01 | 0.000025 | 1.22 | 661.44 | 76.48 | 0.07 |
| PROP REACH 1 | 426.54 | 100YR6HR | 807.40 | 1144.00 | 1160.98 | 1148.90 | 1161.00 | 0.000031 | 1.20 | 674.24 | 94.24 | 0.08 |
| PROP REACH 1 | 426.5 | | Culvert | | | | | | | | | |
| PROP REACH 1 | 358.29 | 100YR6HR | 807.40 | 1140.48 | 1146.47 | | 1147.26 | 0.044580 | 7.17 | 112.57 | 28.36 | 0.63 |
| PROP REACH 1 | 300 | 100YR6HR | 1245.20 | 1140.00 | 1145.50 | | 1145.84 | 0.015533 | 4.65 | 267.90 | 62.37 | 0.40 |
| PROP REACH 1 | 200 | 100YR6HR | 1245.20 | 1137.71 | 1141.21 | 1141.21 | 1142.47 | 0.109588 | 8.98 | 138.60 | 55.28 | 1.00 |
| PROP REACH 1 | 100 | 100YR6HR | 1245.20 | 1129.97 | 1136.21 | 1134.32 | 1136.90 | 0.031263 | 6.69 | 186.13 | 39.86 | 0.55 |
| PROP REACH 1 | 0 | 100YR6HR | 1245.20 | 1127.00 | 1130.14 | 1130.14 | 1131.45 | 0.113574 | 9.17 | 135.78 | 52.59 | 1.01 |

HEC-RAS Plan: Prop R1 River: PROP REACH 1 Reach: PROP REACH 1 Profile: 100YR6HR

| Reach | River Sta | Profile | E.G. Elev | W.S. Elev | Vel Head | Frctn Loss | C & E Loss | Q Left | Q Channel | Q Right | Top Width |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | (ft) | (ft) | (ft) | (ft) | (ft) | (cfs) | (cfs) | (cfs) | (ft) |
| PROP REACH 1 | 5001.26 | 100YR6HR | 1288.75 | 1288.29 | 0.46 | 2.69 | 0.02 | | 757.70 | | 31.51 |
| PROP REACH 1 | 4900 | 100YR6HR | 1286.04 | 1285.42 | 0.63 | 4.35 | 0.09 | | 757.70 | | 30.20 |
| PROP REACH 1 | 4700 | 100YR6HR | 1281.61 | 1281.28 | 0.33 | 4.60 | 0.03 | | 757.70 | | 38.45 |
| PROP REACH 1 | 4500 | 100YR6HR | 1276.98 | 1276.33 | 0.65 | 8.53 | 0.02 | | 757.70 | | 32.69 |
| PROP REACH 1 | 4300 | 100YR6HR | 1268.43 | 1267.56 | 0.88 | 5.95 | 0.13 | | 757.70 | | 23.90 |
| PROP REACH 1 | 4100 | 100YR6HR | 1262.35 | 1261.92 | 0.43 | 4.23 | 0.00 | | 757.70 | | 33.25 |
| PROP REACH 1 | 3900 | 100YR6HR | 1258.12 | 1257.69 | 0.43 | 6.90 | 0.04 | | 757.70 | | 35.50 |
| PROP REACH 1 | 3700 | 100YR6HR | 1251.18 | 1250.40 | 0.78 | 4.47 | 0.16 | | 757.70 | | 39.22 |
| PROP REACH 1 | 3500 | 100YR6HR | 1246.55 | 1246.28 | 0.27 | 3.70 | 0.04 | | 757.70 | | 38.78 |
| PROP REACH 1 | 3300 | 100YR6HR | 1242.83 | 1242.17 | 0.65 | 4.39 | 0.12 | | 757.70 | | 28.28 |
| PROP REACH 1 | 3100 | 100YR6HR | 1238.32 | 1238.08 | 0.24 | 6.50 | 0.11 | | 757.70 | | 58.52 |
| PROP REACH 1 | 2900 | 100YR6HR | 1231.70 | 1230.39 | 1.31 | 0.81 | 0.38 | | 757.70 | | 32.22 |
| PROP REACH 1 | 2700 | 100YR6HR | 1229.12 | 1229.07 | 0.05 | 0.30 | 0.00 | | 757.70 | | 66.57 |
| PROP REACH 1 | 2543.26 | 100YR6HR | 1228.82 | 1228.74 | 0.08 | | | | 757.70 | | 63.22 |
| PROP REACH 1 | 2543.2 | | Culvert | | | | | | | | |
| PROP REACH 1 | 2438.15 | 100YR6HR | 1221.73 | 1220.96 | 0.78 | 2.18 | 0.02 | | 785.10 | | 22.89 |
| PROP REACH 1 | 2400 | 100YR6HR | 1219.53 | 1218.60 | 0.93 | 5.03 | 0.18 | | 785.10 | | 38.28 |
| PROP REACH 1 | 2250 | 100YR6HR | 1214.32 | 1214.00 | 0.32 | 2.83 | 0.04 | | 785.10 | | 49.32 |
| PROP REACH 1 | 2050 | 100YR6HR | 1211.44 | 1211.27 | 0.17 | 5.40 | 0.06 | | 785.10 | | 77.41 |
| PROP REACH 1 | 1850 | 100YR6HR | 1205.98 | 1205.18 | 0.80 | 1.24 | 0.22 | | 785.10 | | 69.57 |
| PROP REACH 1 | 1678.26 | 100YR6HR | 1197.13 | 1197.08 | 0.05 | | | | 807.40 | | 89.86 |
| PROP REACH 1 | 1530 | | Culvert | | | | | | | | |
| PROP REACH 1 | 1529.89 | 100YR6HR | 1189.28 | 1188.29 | 0.99 | 7.24 | 0.13 | | 807.40 | | 27.02 |
| PROP REACH 1 | 1400 | 100YR6HR | 1181.91 | 1181.36 | 0.56 | 8.36 | 0.02 | | 807.40 | | 51.57 |
| PROP REACH 1 | 1200 | 100YR6HR | 1173.52 | 1173.05 | 0.47 | 8.26 | 0.03 | | 807.40 | | 50.90 |
| PROP REACH 1 | 1000 | 100YR6HR | 1165.23 | 1164.47 | 0.76 | 3.53 | 0.16 | | 807.40 | | 31.75 |
| PROP REACH 1 | 800 | 100YR6HR | 1161.54 | 1161.30 | 0.24 | 0.46 | 0.06 | | 807.40 | | 42.75 |
| PROP REACH 1 | 600 | 100YR6HR | 1161.02 | 1160.98 | 0.04 | 0.01 | 0.01 | | 807.40 | | 64.78 |
| PROP REACH 1 | 500 | 100YR6HR | 1161.01 | 1160.98 | 0.02 | 0.00 | 0.00 | | 807.40 | | 76.48 |
| PROP REACH 1 | 426.54 | 100YR6HR | 1161.00 | 1160.98 | 0.02 | | | | 807.40 | | 94.24 |
| PROP REACH 1 | 426.5 | | Culvert | | | | | | | | |
| PROP REACH 1 | 358.29 | 100YR6HR | 1147.26 | 1146.47 | 0.80 | 1.29 | 0.14 | | 807.40 | | 28.36 |
| PROP REACH 1 | 300 | 100YR6HR | 1145.84 | 1145.50 | 0.34 | 3.28 | 0.09 | | 1245.20 | | 62.37 |
| PROP REACH 1 | 200 | 100YR6HR | 1142.47 | 1141.21 | 1.25 | 5.31 | 0.17 | | 1245.20 | | 55.28 |
| PROP REACH 1 | 100 | 100YR6HR | 1136.90 | 1136.21 | 0.70 | 5.38 | 0.06 | | 1245.20 | | 39.86 |
| PROP REACH 1 | 0 | 100YR6HR | 1131.45 | 1130.14 | 1.31 | | | | 1245.20 | | 52.59 |

Plan: Prop R1  PROP REACH 1  PROP REACH 1  RS: 2543.2  Culv Group:  Culvert #1  Profile: 100YR6HR

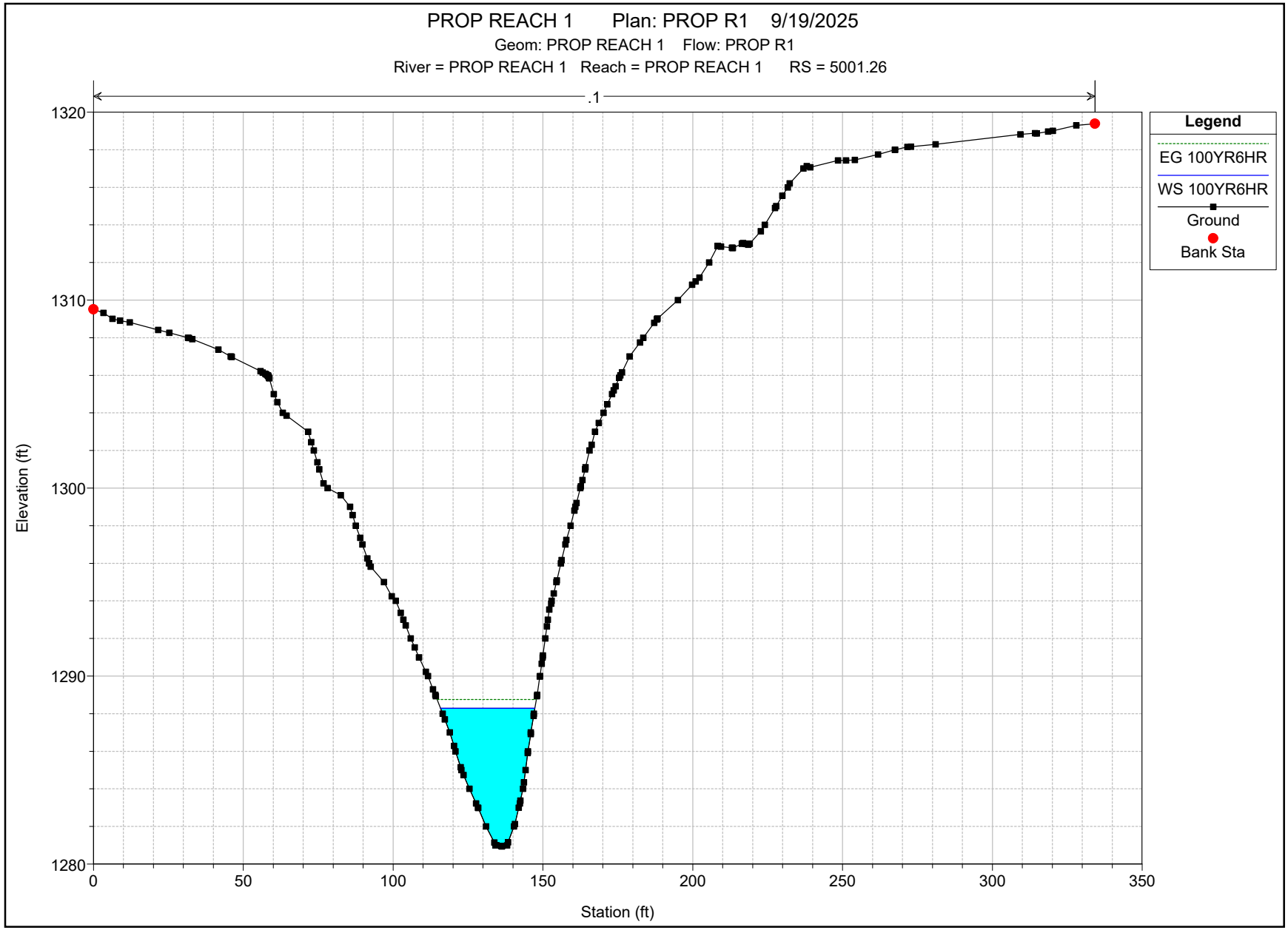
| | | | |
|---|---|---|---|
| Q Culv Group (cfs) | 757.70 | Culv Full Len (ft) | |
| # Barrels | 2 | Culv Vel US (ft/s) | 13.40 |
| Q Barrel (cfs) | 378.85 | Culv Vel DS (ft/s) | 21.69 |
| E.G. US. (ft) | 1228.82 | Culv Inv El Up (ft) | 1217.70 |
| W.S. US. (ft) | 1228.74 | Culv Inv El Dn (ft) | 1216.00 |
| E.G. DS (ft) | 1221.73 | Culv Frctn Ls (ft) | 1.86 |
| W.S. DS (ft) | 1220.96 | Culv Exit Loss (ft) | 5.14 |
| Delta EG (ft) | 7.09 | Culv Entr Loss (ft) | 0.08 |
| Delta WS (ft) | 7.79 | Q Weir (cfs) | |
| E.G. IC (ft) | 1228.82 | Weir Sta Lft (ft) | |
| E.G. OC (ft) | 1226.29 | Weir Sta Rgt (ft) | |
| Culvert Control | Inlet | Weir Submerg | |
| Culv WS Inlet (ft) | 1223.70 | Weir Max Depth (ft) | |
| Culv WS Outlet (ft) | 1219.56 | Weir Avg Depth (ft) | |
| Culv Nml Depth (ft) | 3.70 | Weir Flow Area (sq ft) | |
| Culv Crt Depth (ft) | 5.23 | Min El Weir Flow (ft) | 1231.01 |

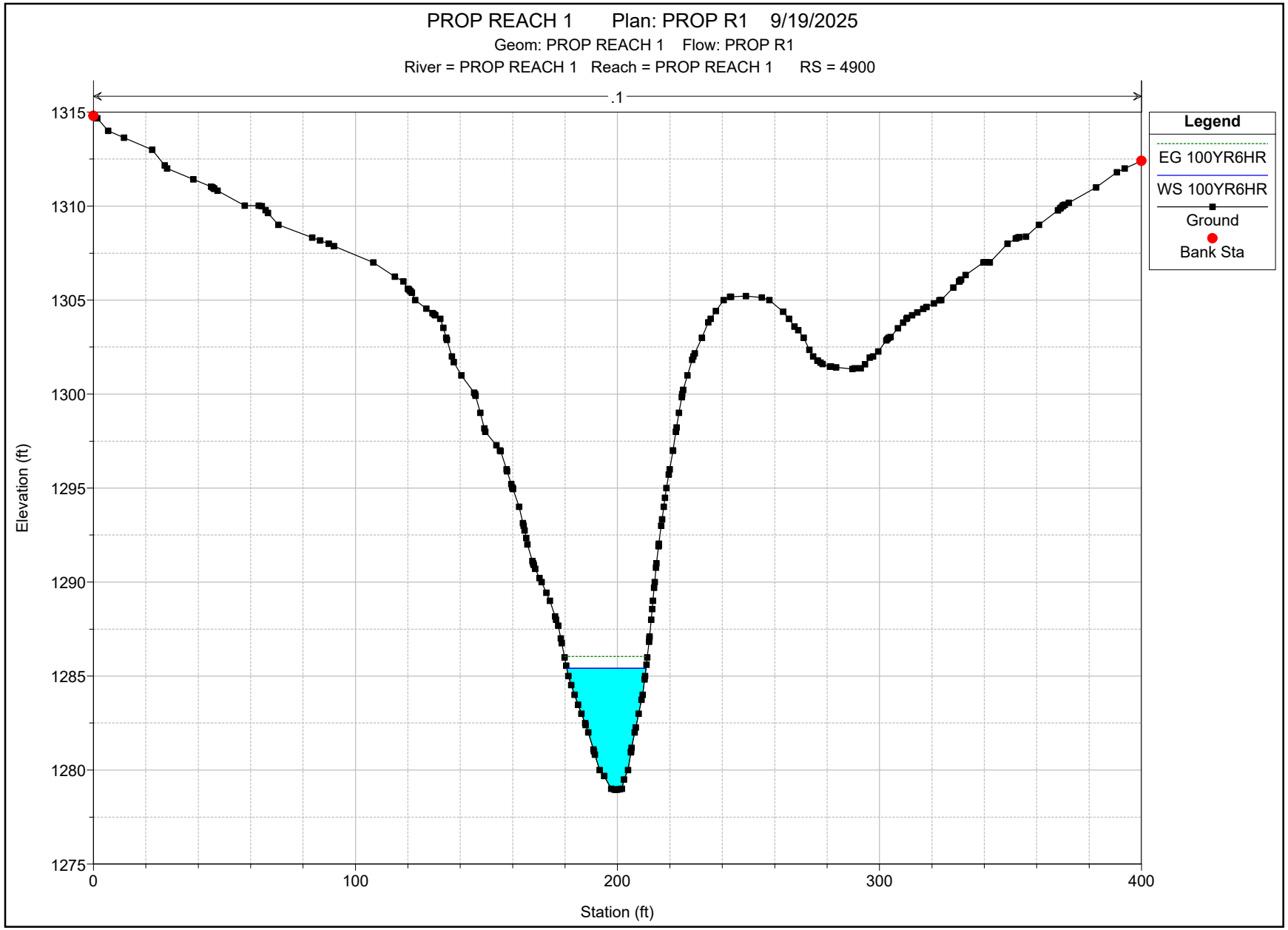
Plan: Prop R1  PROP REACH 1  PROP REACH 1  RS: 1530  Culv Group:  Culvert #2  Profile: 100YR6HR

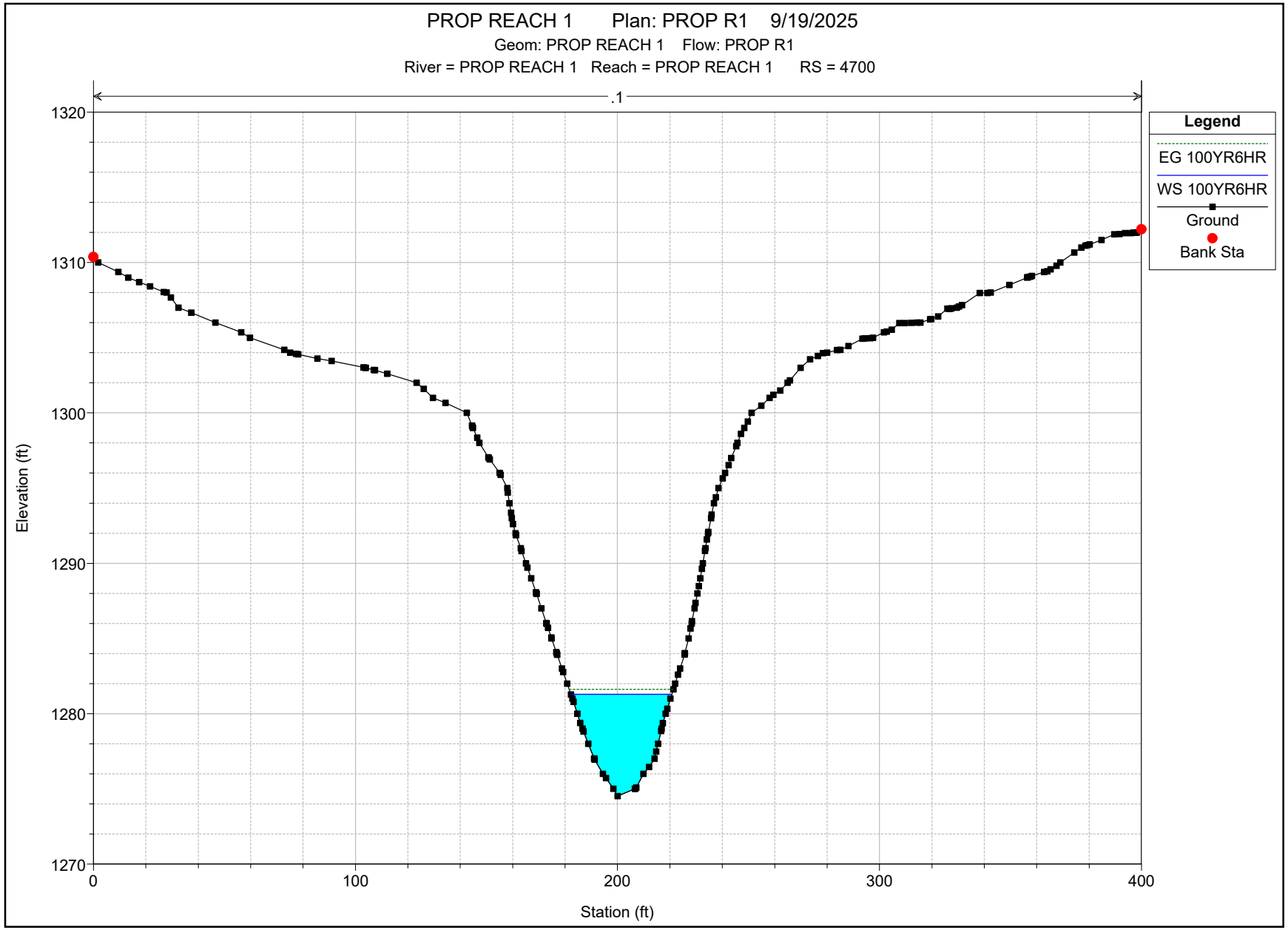
| | | | |
|---|---|---|---|
| Q Culv Group (cfs) | 807.40 | Culv Full Len (ft) | |
| # Barrels | 2 | Culv Vel US (ft/s) | 14.28 |
| Q Barrel (cfs) | 403.70 | Culv Vel DS (ft/s) | 19.66 |
| E.G. US. (ft) | 1197.13 | Culv Inv El Up (ft) | 1185.01 |
| W.S. US. (ft) | 1197.08 | Culv Inv El Dn (ft) | 1184.50 |
| E.G. DS (ft) | 1189.28 | Culv Frctn Ls (ft) | 2.44 |
| W.S. DS (ft) | 1188.29 | Culv Exit Loss (ft) | 5.31 |
| Delta EG (ft) | 7.85 | Culv Entr Loss (ft) | 0.10 |
| Delta WS (ft) | 8.79 | Q Weir (cfs) | |
| E.G. IC (ft) | 1197.13 | Weir Sta Lft (ft) | |
| E.G. OC (ft) | 1194.79 | Weir Sta Rgt (ft) | |
| Culvert Control | Inlet | Weir Submerg | |
| Culv WS Inlet (ft) | 1191.01 | Weir Max Depth (ft) | |
| Culv WS Outlet (ft) | 1188.59 | Weir Avg Depth (ft) | |
| Culv Nml Depth (ft) | 6.00 | Weir Flow Area (sq ft) | |
| Culv Crt Depth (ft) | 5.35 | Min El Weir Flow (ft) | 1208.80 |

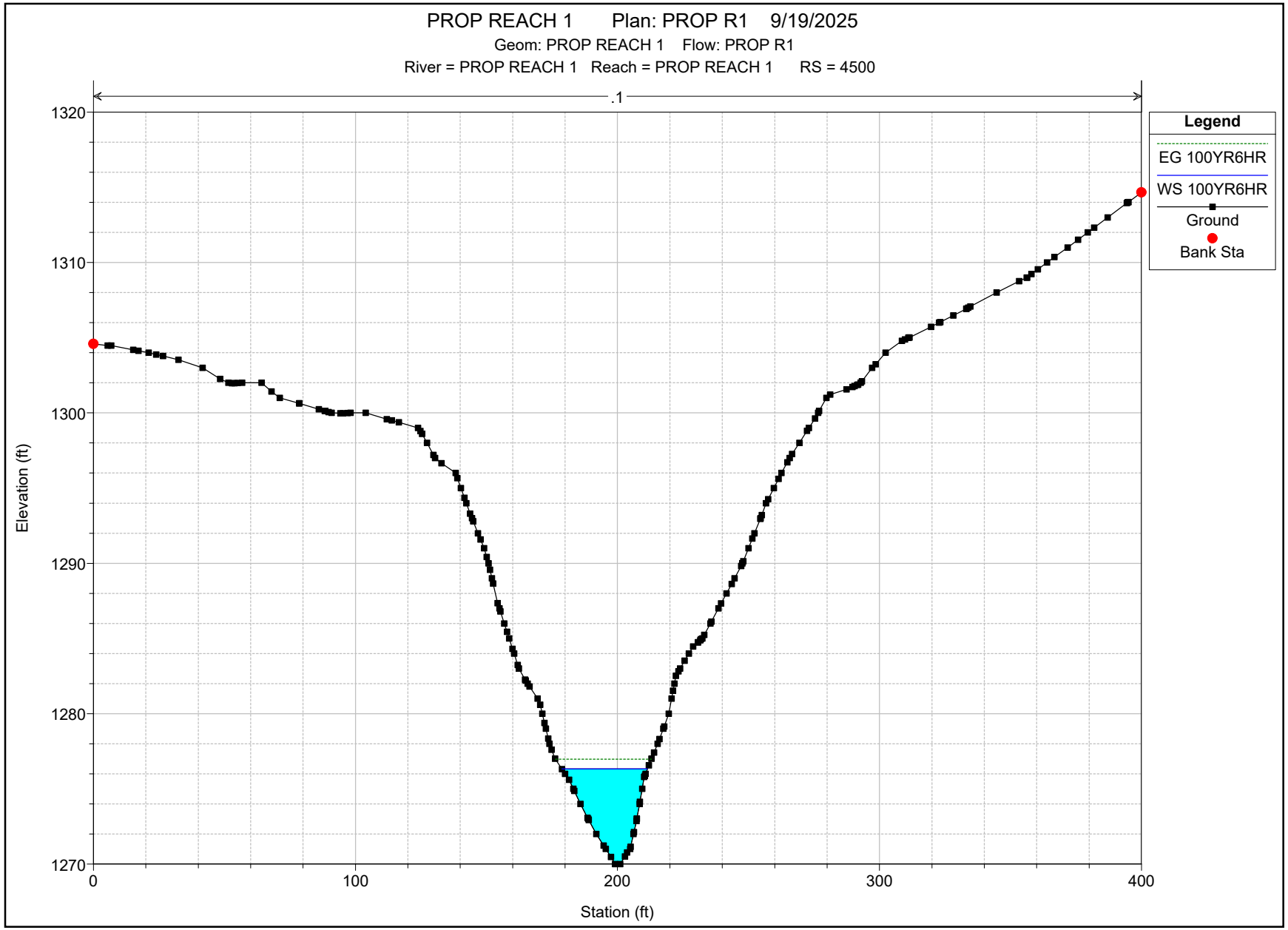
Plan: Prop R1  PROP REACH 1  PROP REACH 1  RS: 426.5  Culv Group:  Ex Culvert  Profile: 100YR6HR

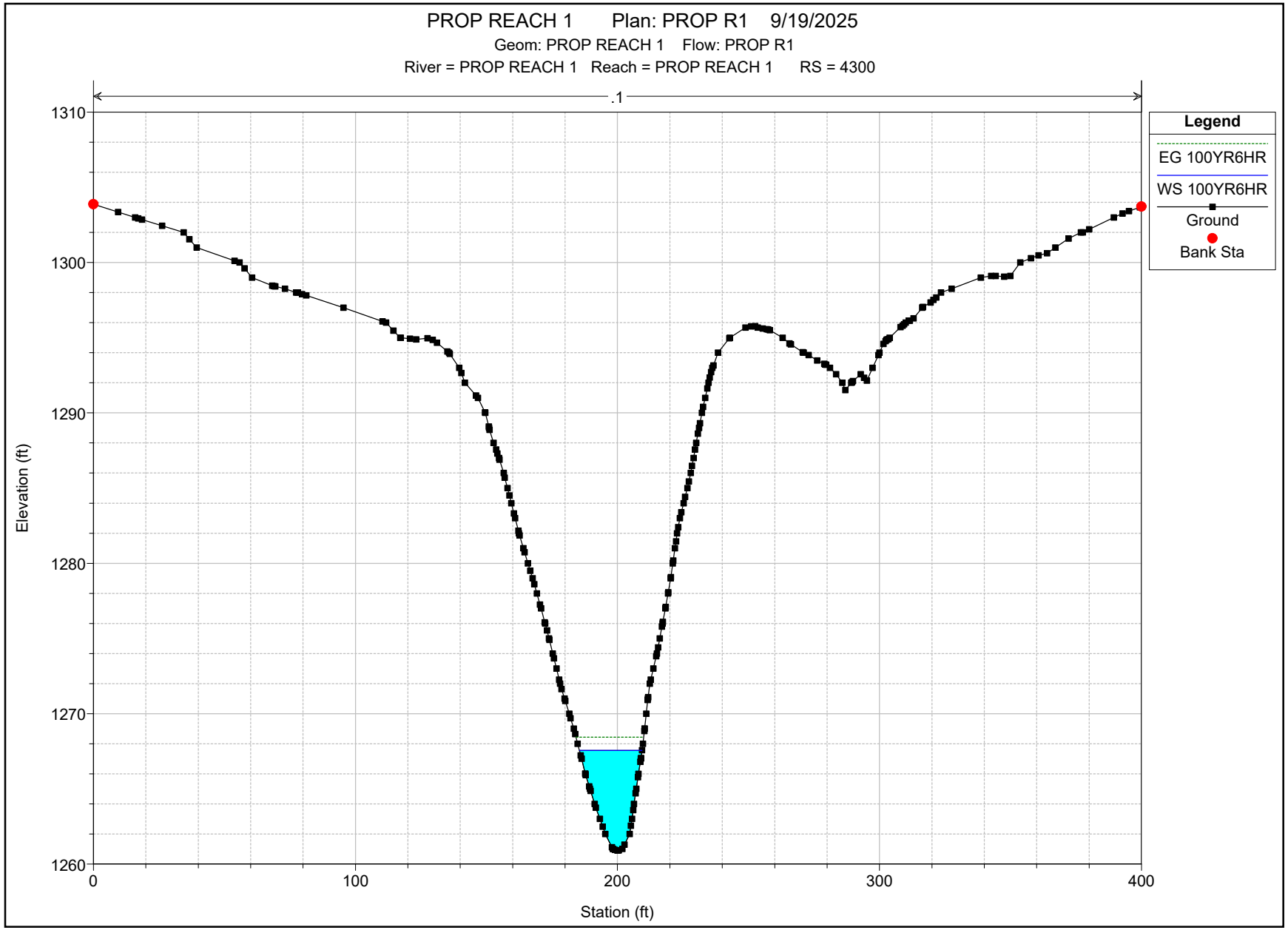
| | | | |
|---|---|---|---|
| Q Culv Group (cfs) | 445.15 | Culv Full Len (ft) | 68.00 |
| # Barrels | 1 | Culv Vel US (ft/s) | 22.67 |
| Q Barrel (cfs) | 445.15 | Culv Vel DS (ft/s) | 22.67 |
| E.G. US. (ft) | 1161.00 | Culv Inv El Up (ft) | 1144.00 |
| W.S. US. (ft) | 1160.98 | Culv Inv El Dn (ft) | 1141.00 |
| E.G. DS (ft) | 1147.26 | Culv Frctn Ls (ft) | 6.78 |
| W.S. DS (ft) | 1146.47 | Culv Exit Loss (ft) | 6.72 |
| Delta EG (ft) | 13.74 | Culv Entr Loss (ft) | 0.24 |
| Delta WS (ft) | 14.52 | Q Weir (cfs) | 362.25 |
| E.G. IC (ft) | 1161.23 | Weir Sta Lft (ft) | 170.47 |
| E.G. OC (ft) | 1161.00 | Weir Sta Rgt (ft) | 264.95 |
| Culvert Control | Outlet | Weir Submerg | 0.00 |
| Culv WS Inlet (ft) | 1149.00 | Weir Max Depth (ft) | 3.46 |
| Culv WS Outlet (ft) | 1146.00 | Weir Avg Depth (ft) | 1.25 |
| Culv Nml Depth (ft) | 5.00 | Weir Flow Area (sq ft) | 118.31 |
| Culv Crt Depth (ft) | 5.00 | Min El Weir Flow (ft) | 1157.60 |

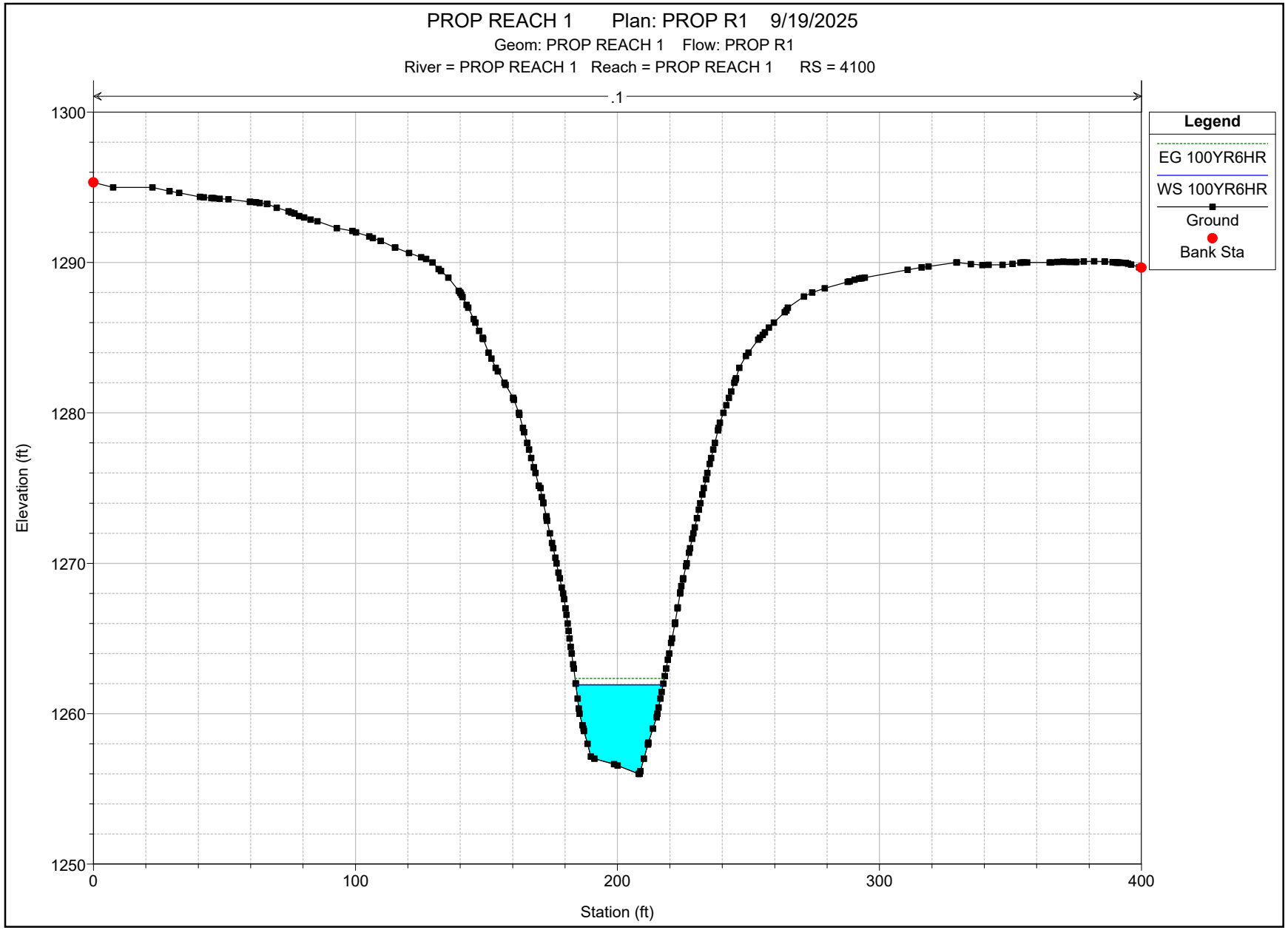

PROP REACH 1 Plan: PROP R1 9/19/2025
Geom: PROP REACH 1 Flow: PROP R1
River = PROP REACH 1 Reach = PROP REACH 1 RS = 5001.26
.1
Legend
EG 100YR6HR
WS 100YR6HR
Ground
Bank Sta
Elevation (ft)
Station (ft)
1320
1310
1300
1290
1280
0
50
100
150
200
250
300
350

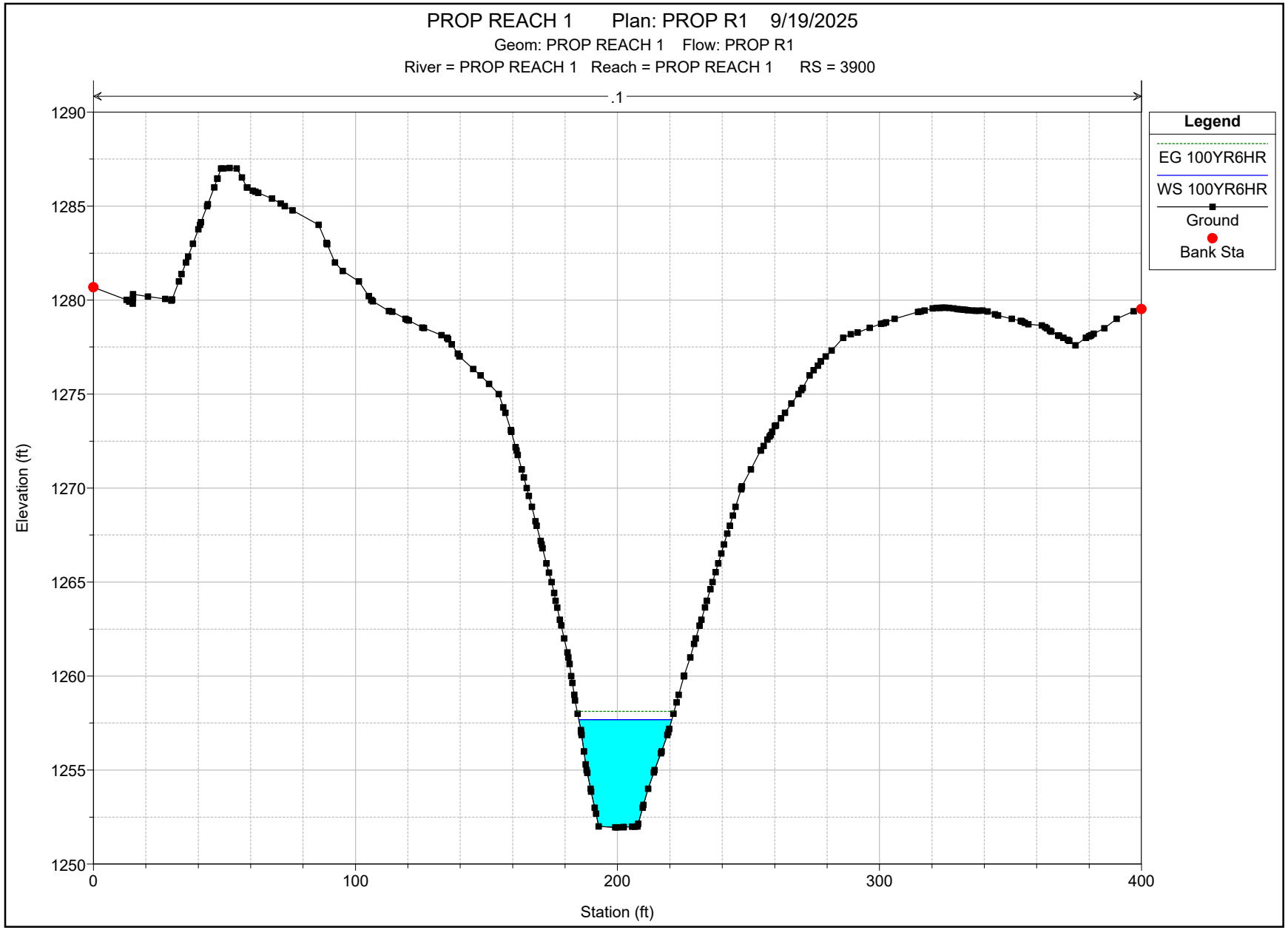

PROP REACH 1 Plan: PROP R1 9/19/2025
Geom: PROP REACH 1 Flow: PROP R1
River = PROP REACH 1 Reach = PROP REACH 1 RS = 4900
.1
Legend
EG 100YR6HR
WS 100YR6HR
Ground
Bank Sta
Elevation (ft)
Station (ft)
1315
1310
1305
1300
1295
1290
1285
1280
1275
0
100
200
300
400

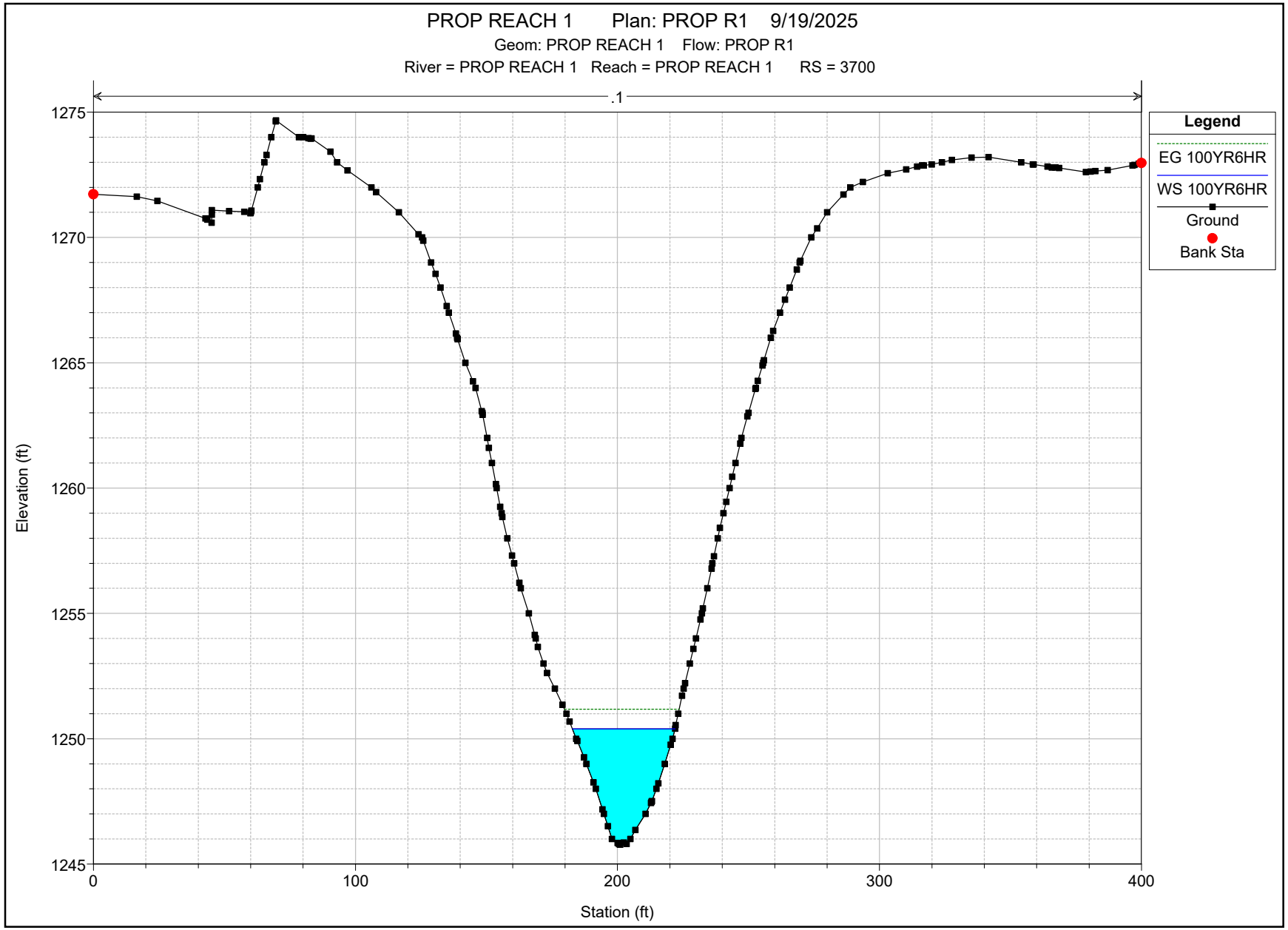

PROP REACH 1 Plan: PROP R1 9/19/2025
Geom: PROP REACH 1 Flow: PROP R1
River = PROP REACH 1 Reach = PROP REACH 1 RS = 4700
.1
Legend
EG 100YR6HR
WS 100YR6HR
Ground
Bank Sta
Elevation (ft)
Station (ft)
1320
1310
1300
1290
1280
1270
0
100
200
300
400

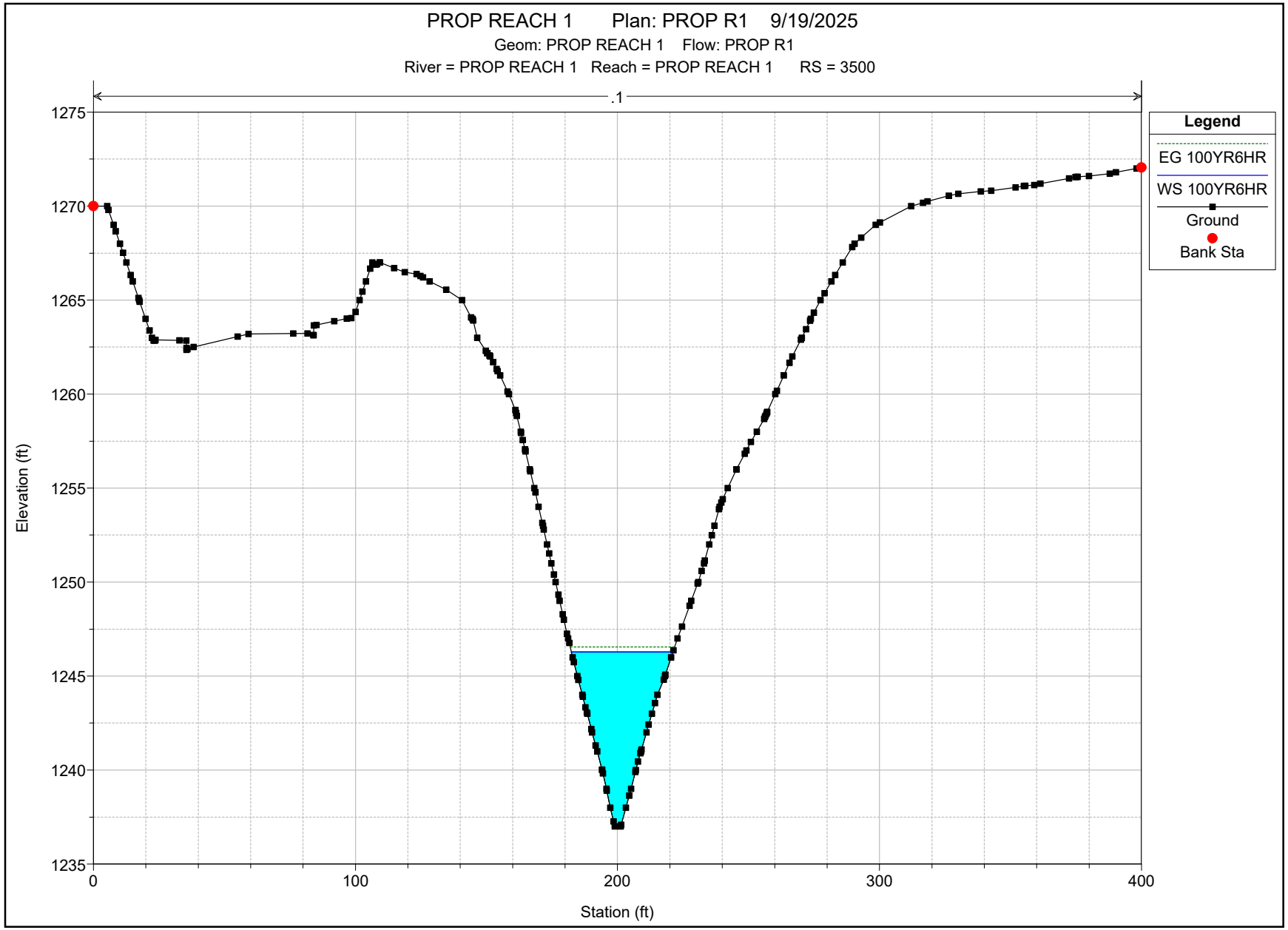

PROP REACH 1 Plan: PROP R1 9/19/2025
Geom: PROP REACH 1 Flow: PROP R1
River = PROP REACH 1 Reach = PROP REACH 1 RS = 4500
.1
Legend
EG 100YR6HR
WS 100YR6HR
Ground
Bank Sta
Elevation (ft)
Station (ft)
1320
1310
1300
1290
1280
1270
0
100
200
300
400

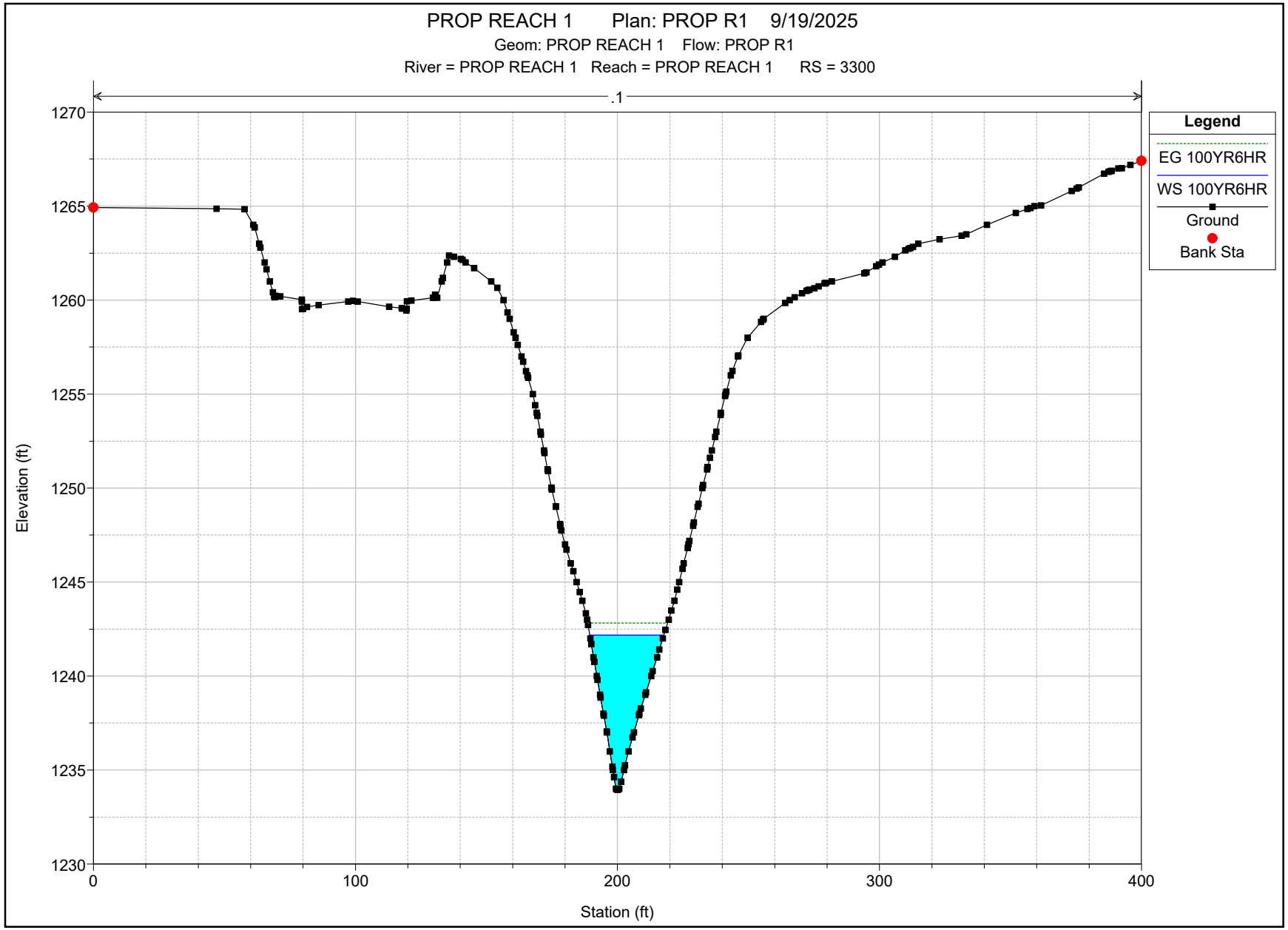

PROP REACH 1 Plan: PROP R1 9/19/2025
Geom: PROP REACH 1 Flow: PROP R1
River = PROP REACH 1 Reach = PROP REACH 1 RS = 4300
.1
Legend
EG 100YR6HR
WS 100YR6HR
Ground
Bank Sta
Elevation (ft)
Station (ft)
1310
1300
1290
1280
1270
1260
0
100
200
300
400

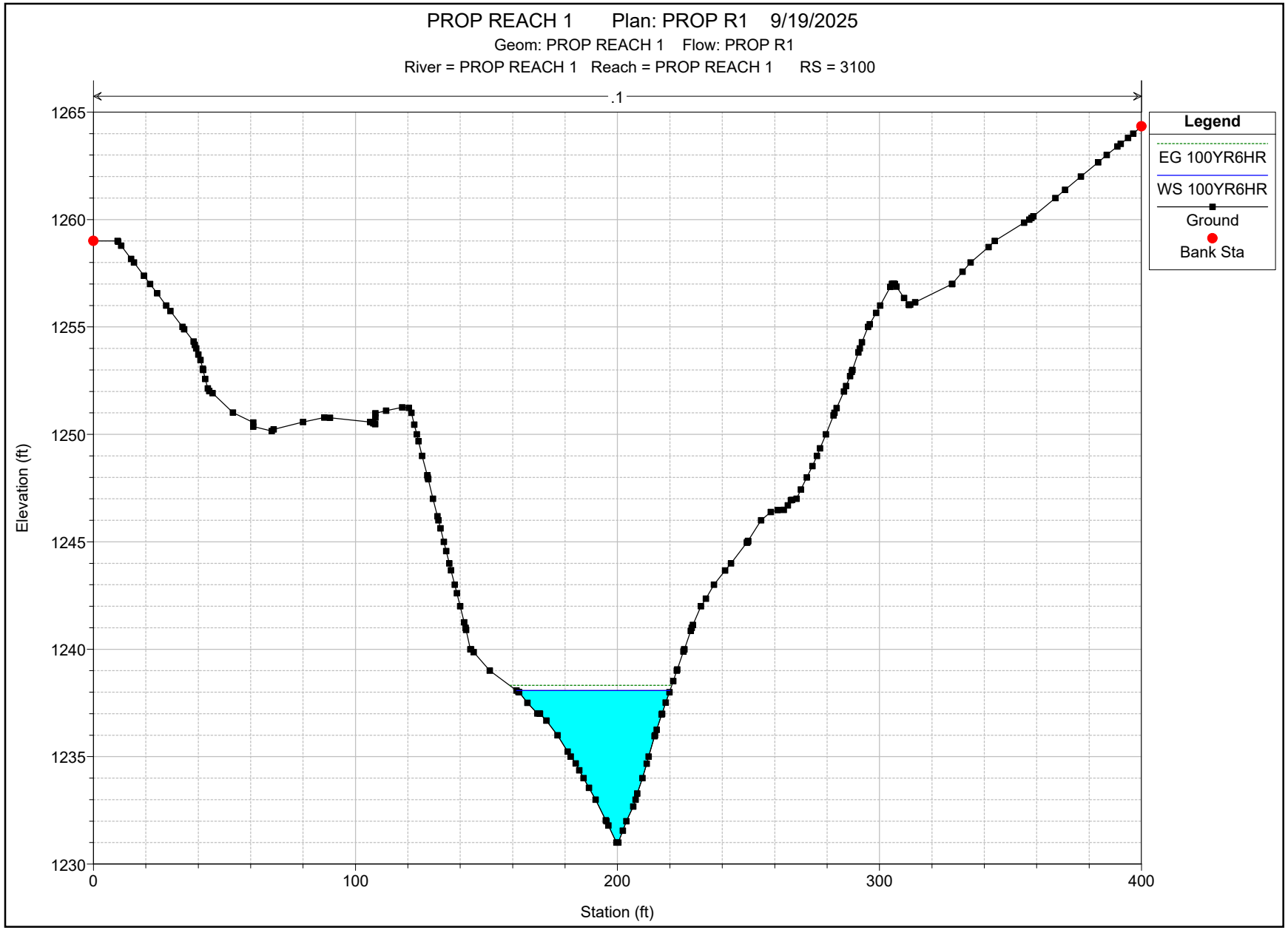

PROP REACH 1 Plan: PROP R1 9/19/2025
Geom: PROP REACH 1 Flow: PROP R1
River = PROP REACH 1 Reach = PROP REACH 1 RS = 4100
.1
Legend
EG 100YR6HR
WS 100YR6HR
Ground
Bank Sta
Elevation (ft)
Station (ft)
1300
1290
1280
1270
1260
1250
0
100
200
300
400

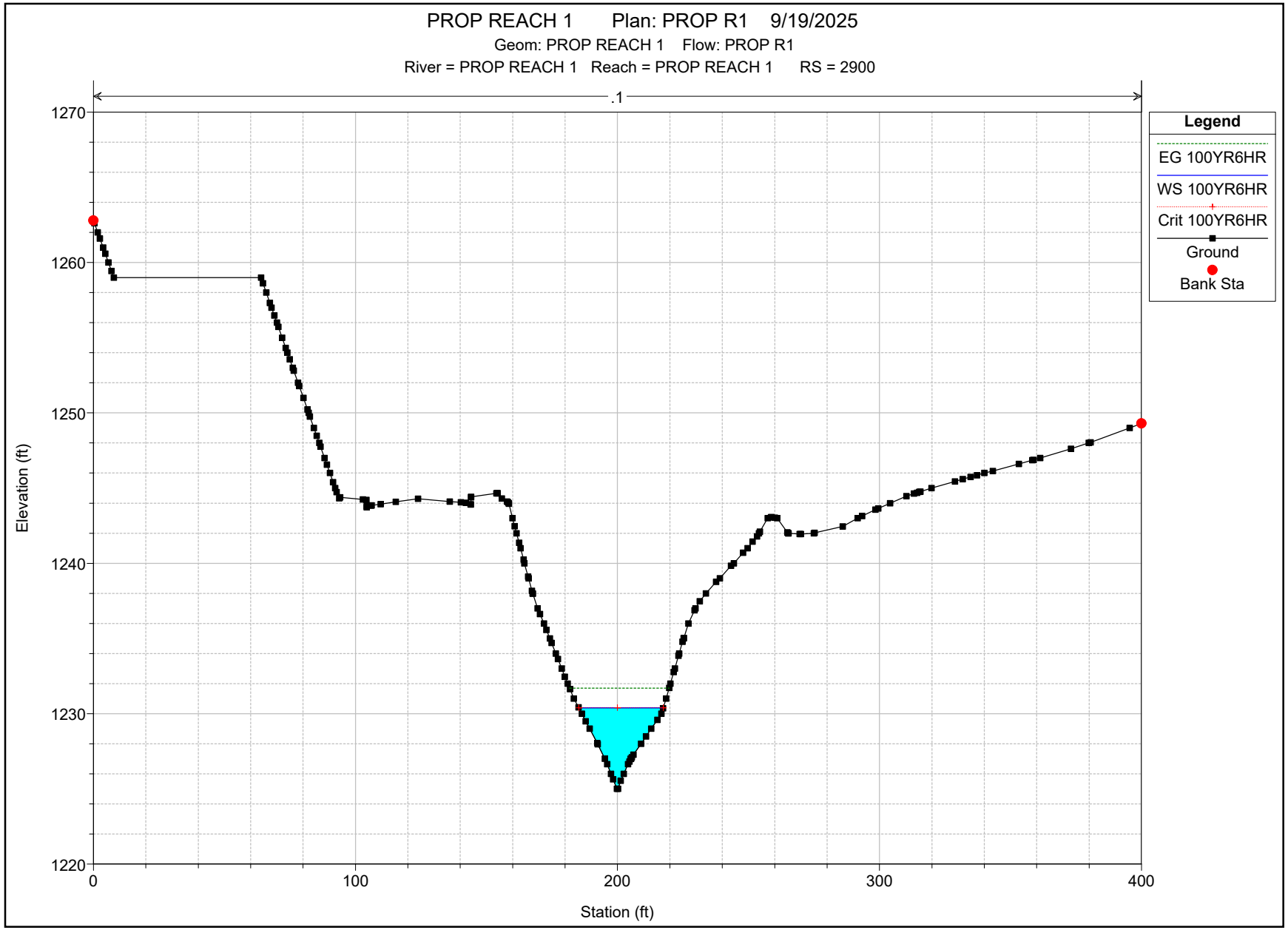

PROP REACH 1 Plan: PROP R1 9/19/2025
Geom: PROP REACH 1 Flow: PROP R1
River = PROP REACH 1 Reach = PROP REACH 1 RS = 3900
.1
Legend
EG 100YR6HR
WS 100YR6HR
Ground
Bank Sta
Elevation (ft)
Station (ft)
1290
1285
1280
1275
1270
1265
1260
1255
1250
0
100
200
300
400

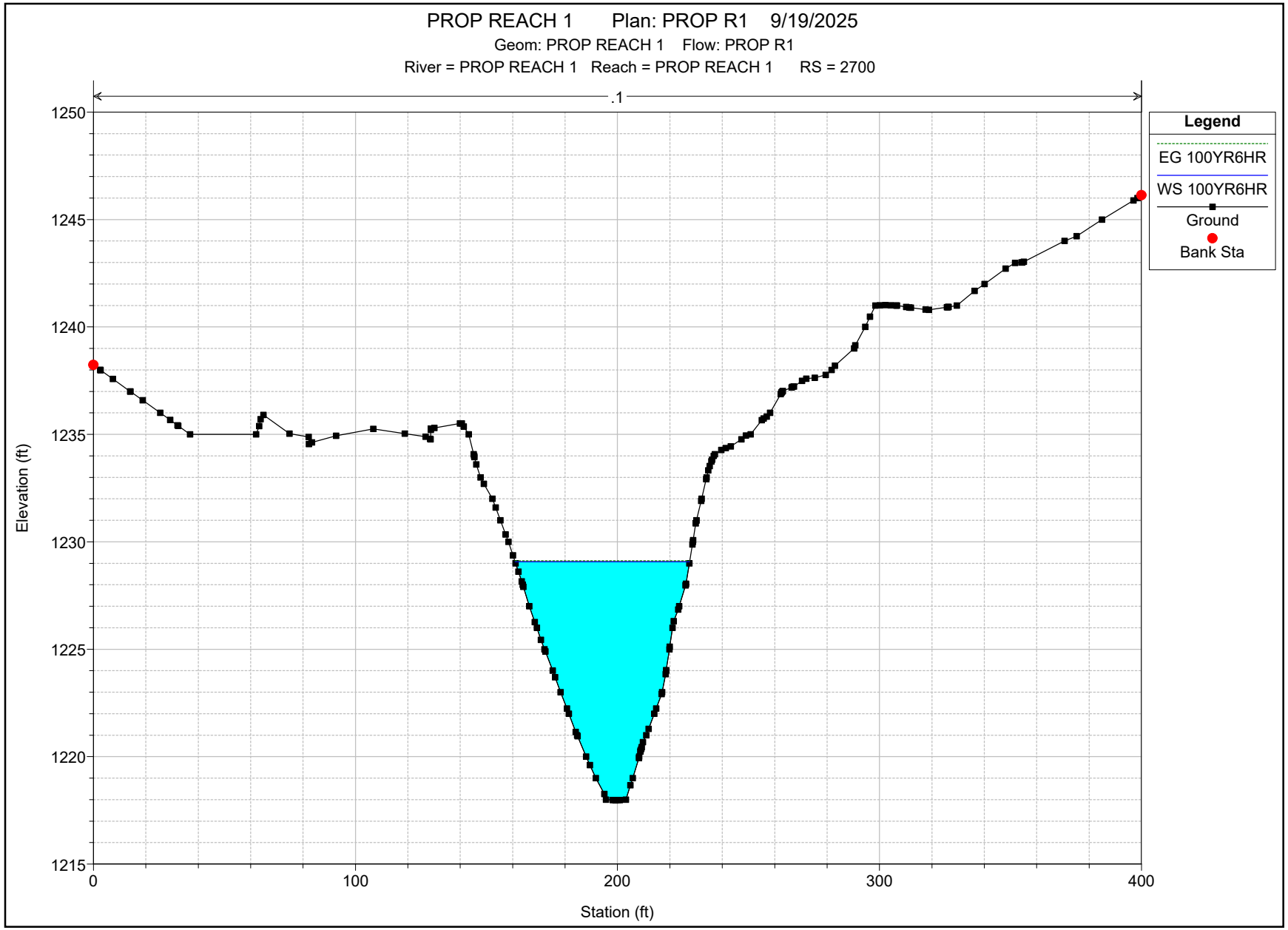

PROP REACH 1 Plan: PROP R1 9/19/2025
Geom: PROP REACH 1 Flow: PROP R1
River = PROP REACH 1 Reach = PROP REACH 1 RS = 3700
.1
Legend
EG 100YR6HR
WS 100YR6HR
Ground
Bank Sta
Elevation (ft)
Station (ft)
1275
1270
1265
1260
1255
1250
1245
0
100
200
300
400

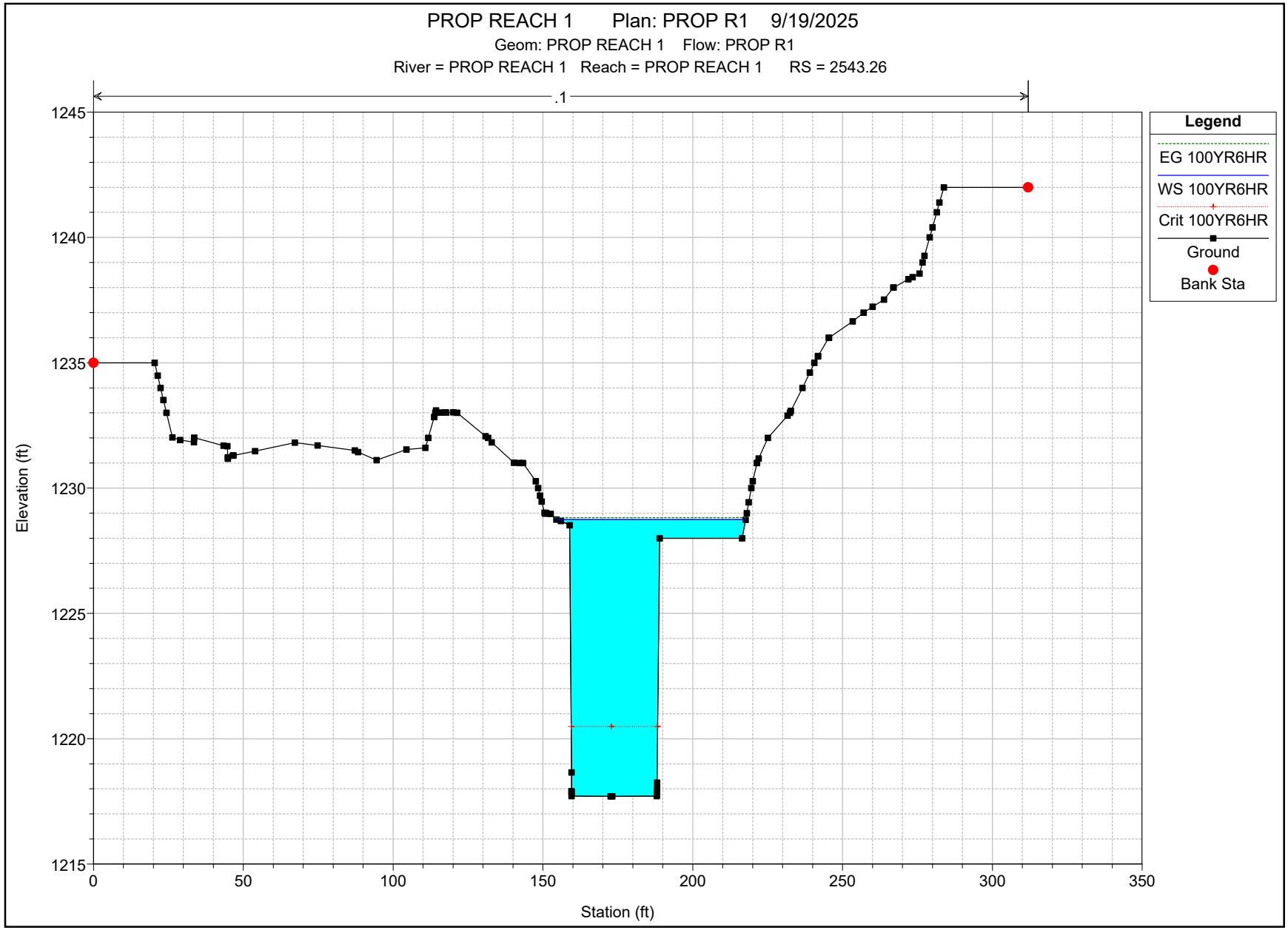

PROP REACH 1 Plan: PROP R1 9/19/2025
Geom: PROP REACH 1 Flow: PROP R1
River = PROP REACH 1 Reach = PROP REACH 1 RS = 3500
.1
Legend
EG 100YR6HR
WS 100YR6HR
Ground
Bank Sta
Elevation (ft)
Station (ft)
1275
1270
1265
1260
1255
1250
1245
1240
1235
0
100
200
300
400

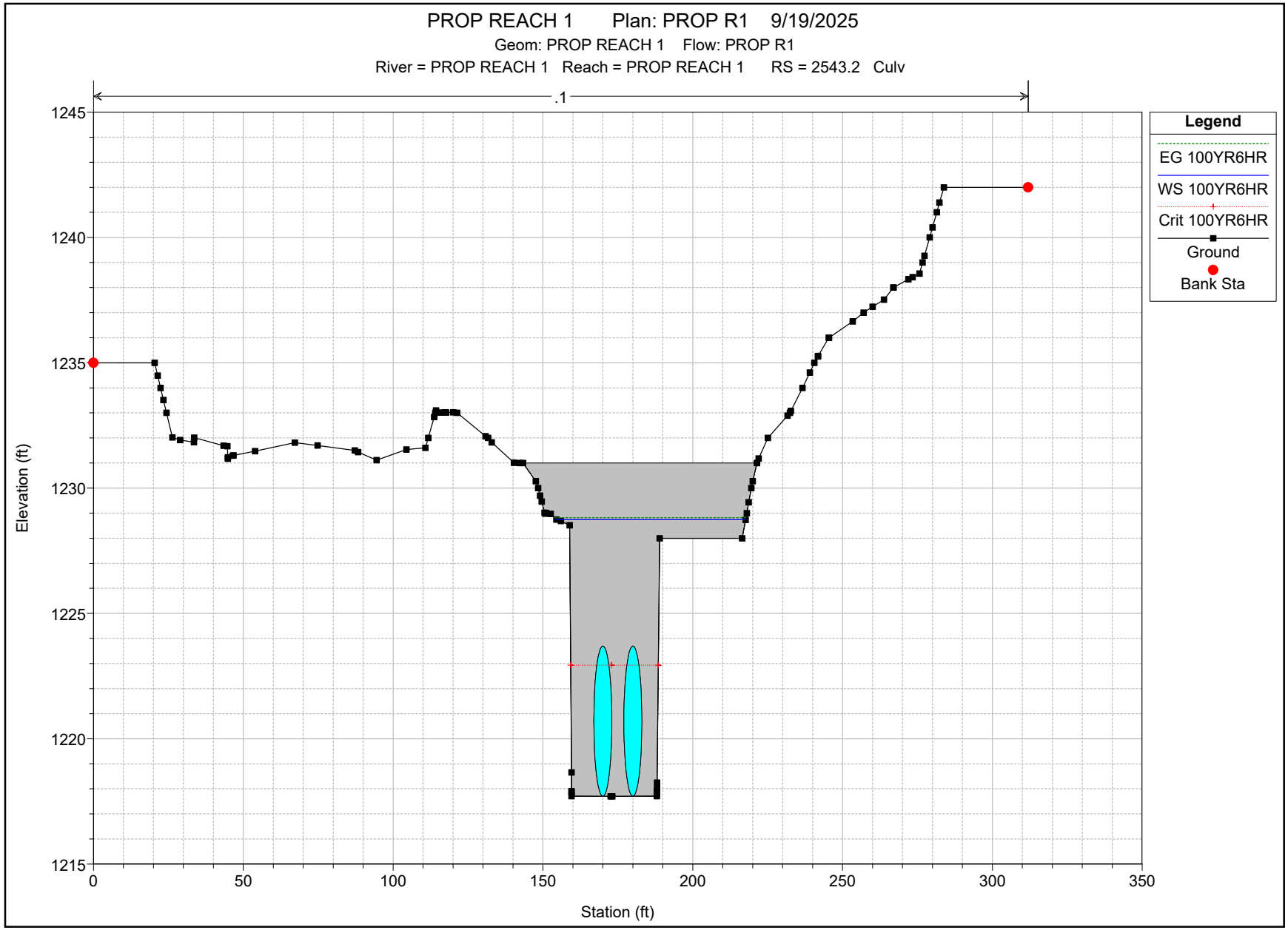

PROP REACH 1 Plan: PROP R1 9/19/2025
Geom: PROP REACH 1 Flow: PROP R1
River = PROP REACH 1 Reach = PROP REACH 1 RS = 3300
.1
Legend
EG 100YR6HR
WS 100YR6HR
Ground
Bank Sta
Elevation (ft)
Station (ft)
1270
1265
1260
1255
1250
1245
1240
1235
1230
0
100
200
300
400

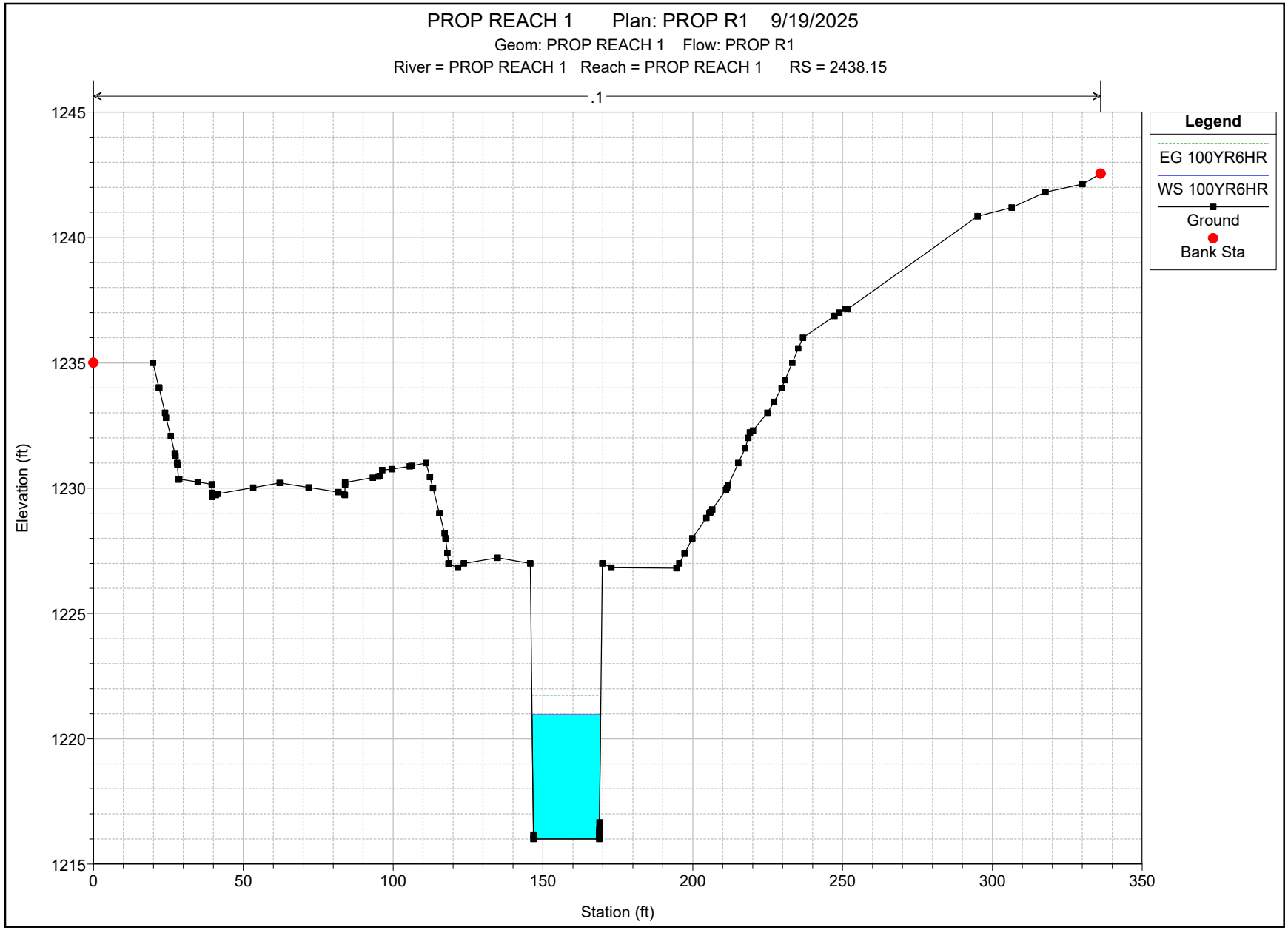

PROP REACH 1 Plan: PROP R1 9/19/2025
Geom: PROP REACH 1 Flow: PROP R1
River = PROP REACH 1 Reach = PROP REACH 1 RS = 3100
.1
Legend
EG 100YR6HR
WS 100YR6HR
Ground
Bank Sta
Elevation (ft)
Station (ft)
1265
1260
1255
1250
1245
1240
1235
1230
0
100
200
300
400

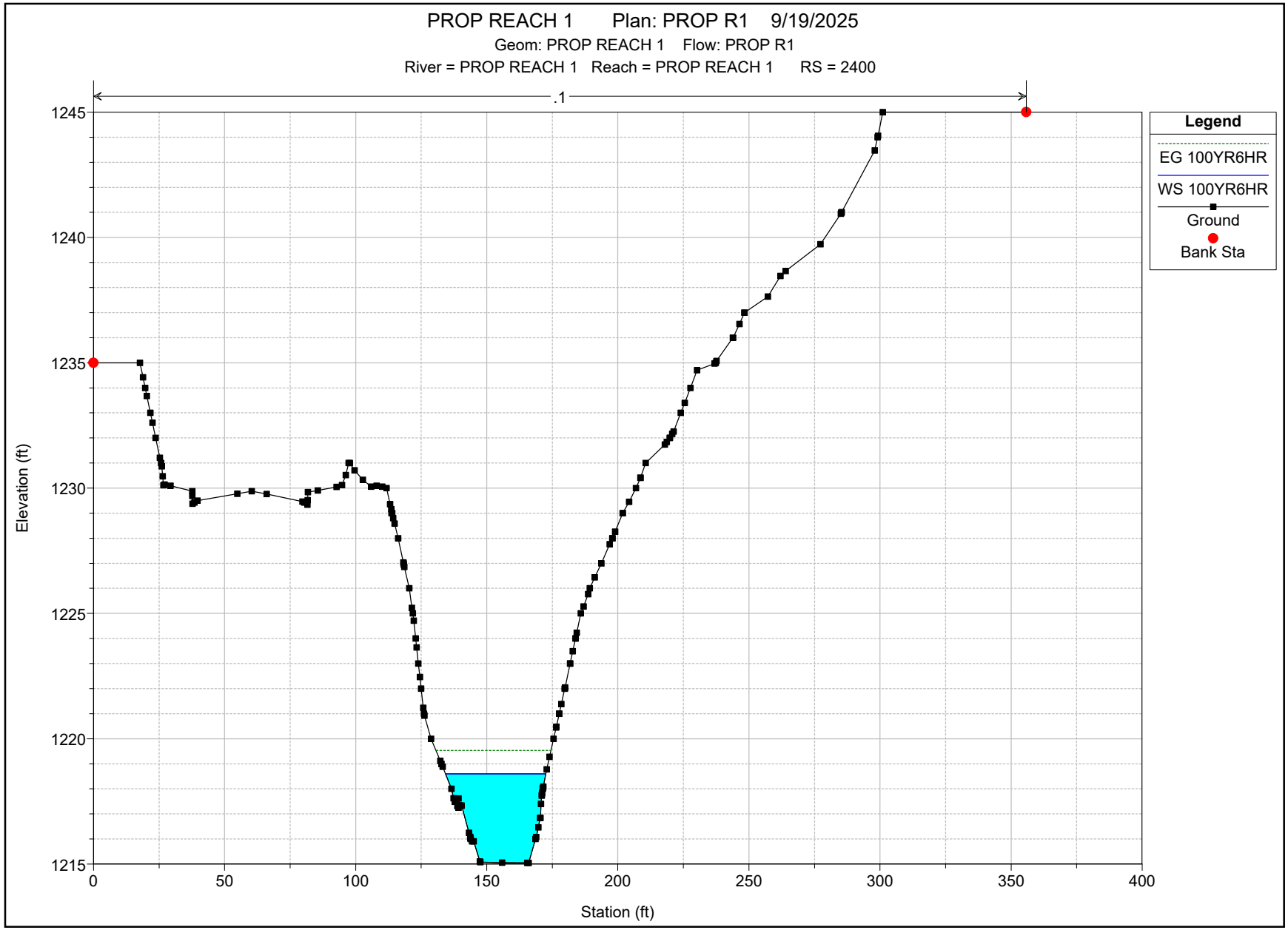

PROP REACH 1 Plan: PROP R1 9/19/2025
Geom: PROP REACH 1 Flow: PROP R1
River = PROP REACH 1 Reach = PROP REACH 1 RS = 2900
.1
Legend
EG 100YR6HR
WS 100YR6HR
Crit 100YR6HR
Ground
Bank Sta
Elevation (ft)
Station (ft)
1270
1260
1250
1240
1230
1220
0
100
200
300
400

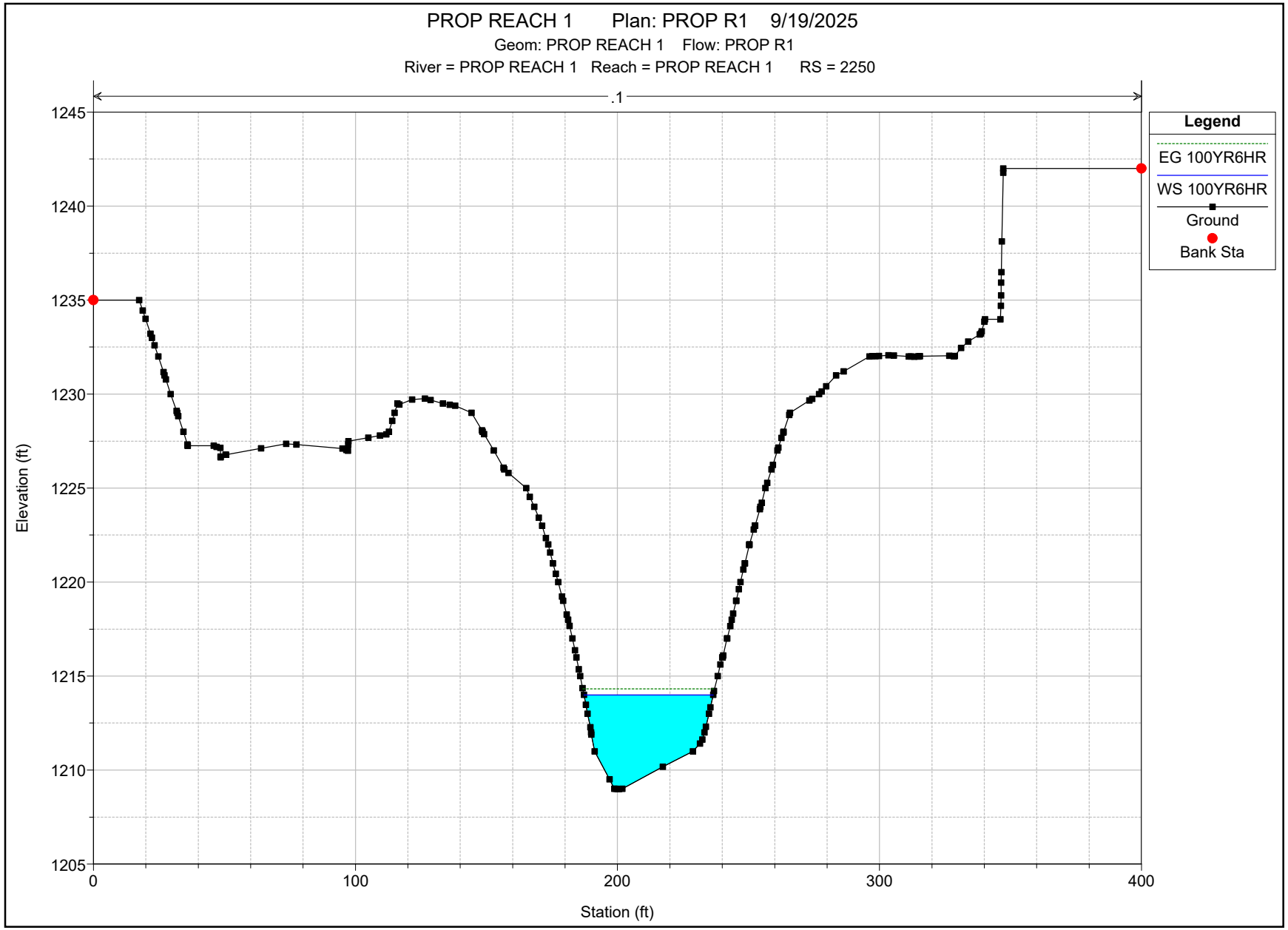

PROP REACH 1 Plan: PROP R1 9/19/2025
Geom: PROP REACH 1 Flow: PROP R1
River = PROP REACH 1 Reach = PROP REACH 1 RS = 2700
.1
Legend
EG 100YR6HR
WS 100YR6HR
Ground
Bank Sta
Elevation (ft)
Station (ft)
1250
1245
1240
1235
1230
1225
1220
1215
0
100
200
300
400

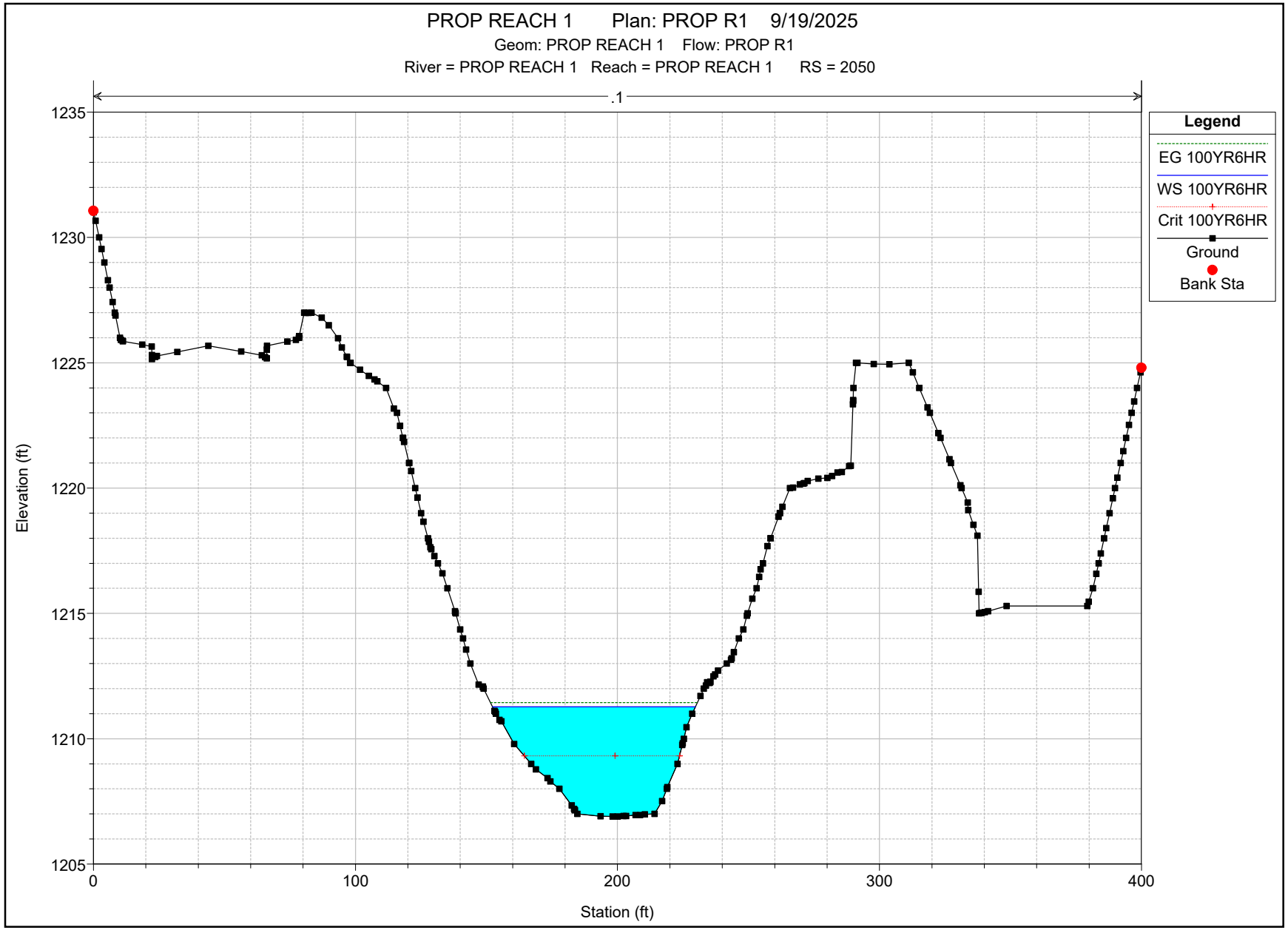

PROP REACH 1 Plan: PROP R1 9/19/2025
Geom: PROP REACH 1 Flow: PROP R1
River = PROP REACH 1 Reach = PROP REACH 1 RS = 2543.26
.1
Legend
EG 100YR6HR
WS 100YR6HR
Crit 100YR6HR
Ground
Bank Sta
Elevation (ft)
Station (ft)
1245
1240
1235
1230
1225
1220
1215
0
50
100
150
200
250
300
350

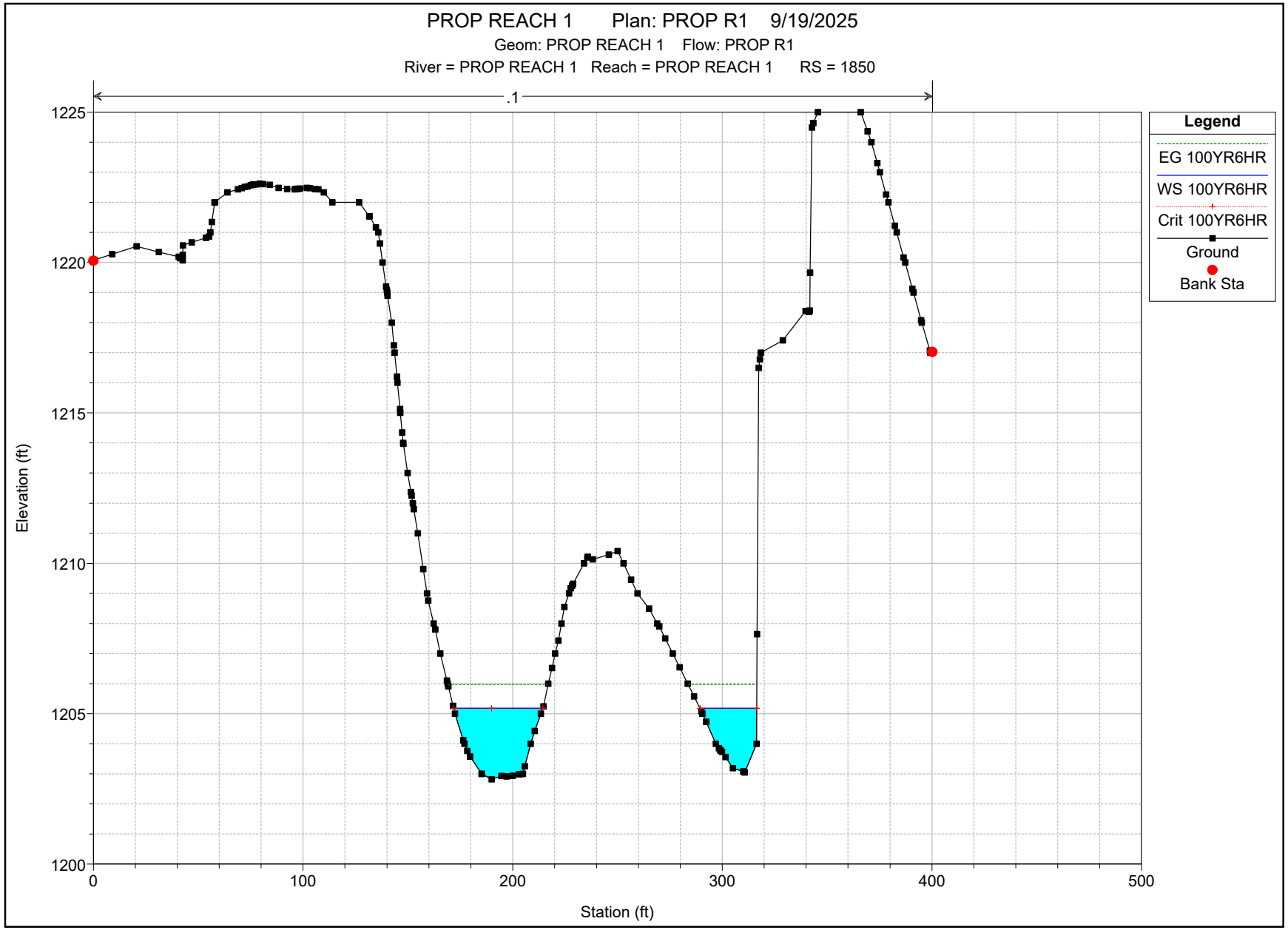

PROP REACH 1 Plan: PROP R1 9/19/2025
Geom: PROP REACH 1 Flow: PROP R1
River = PROP REACH 1 Reach = PROP REACH 1 RS = 2543.2 Culv
.1
Legend
EG 100YR6HR
WS 100YR6HR
Crit 100YR6HR
Ground
Bank Sta
Elevation (ft)
Station (ft)
1245
1240
1235
1230
1225
1220
1215
0
50
100
150
200
250
300
350

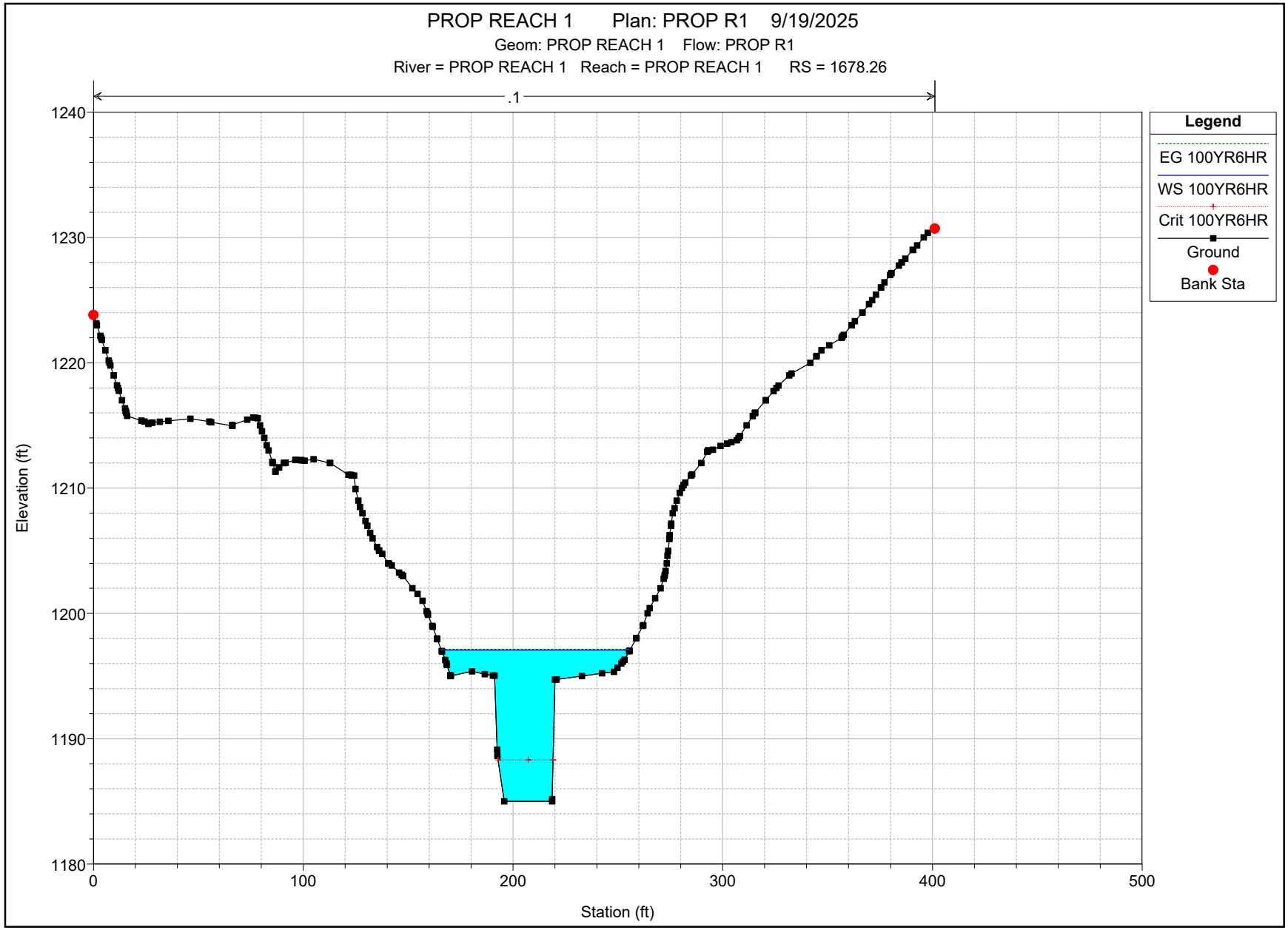

PROP REACH 1 Plan: PROP R1 9/19/2025
Geom: PROP REACH 1 Flow: PROP R1
River = PROP REACH 1 Reach = PROP REACH 1 RS = 2438.15
.1
Legend
EG 100YR6HR
WS 100YR6HR
Ground
Bank Sta
Elevation (ft)
Station (ft)
1245
1240
1235
1230
1225
1220
1215
0
50
100
150
200
250
300
350

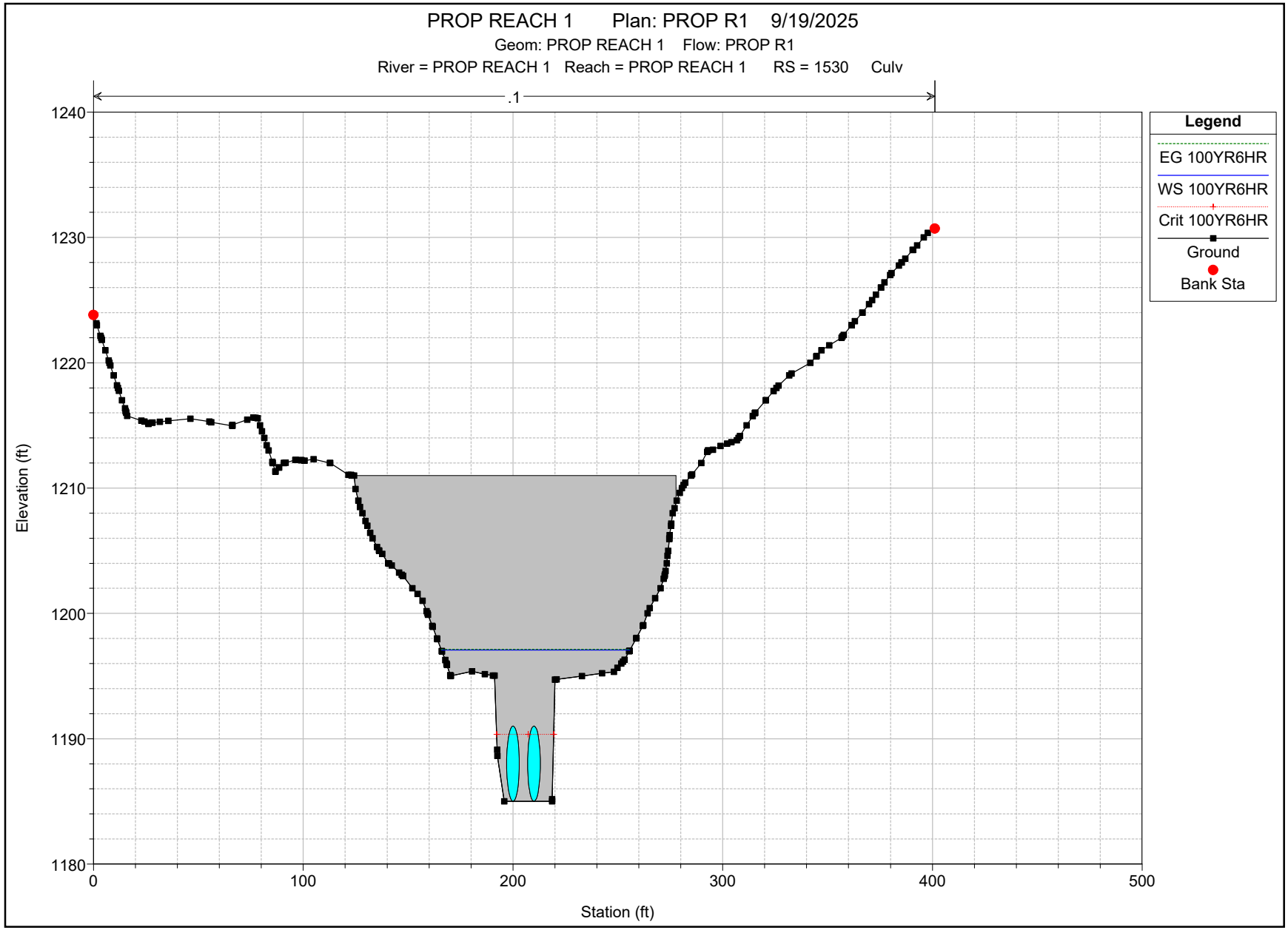

PROP REACH 1 Plan: PROP R1 9/19/2025
Geom: PROP REACH 1 Flow: PROP R1
River = PROP REACH 1 Reach = PROP REACH 1 RS = 2400
.1
Legend
EG 100YR6HR
WS 100YR6HR
Ground
Bank Sta
Elevation (ft)
Station (ft)
1245
1240
1235
1230
1225
1220
1215
0
50
100
150
200
250
300
350
400

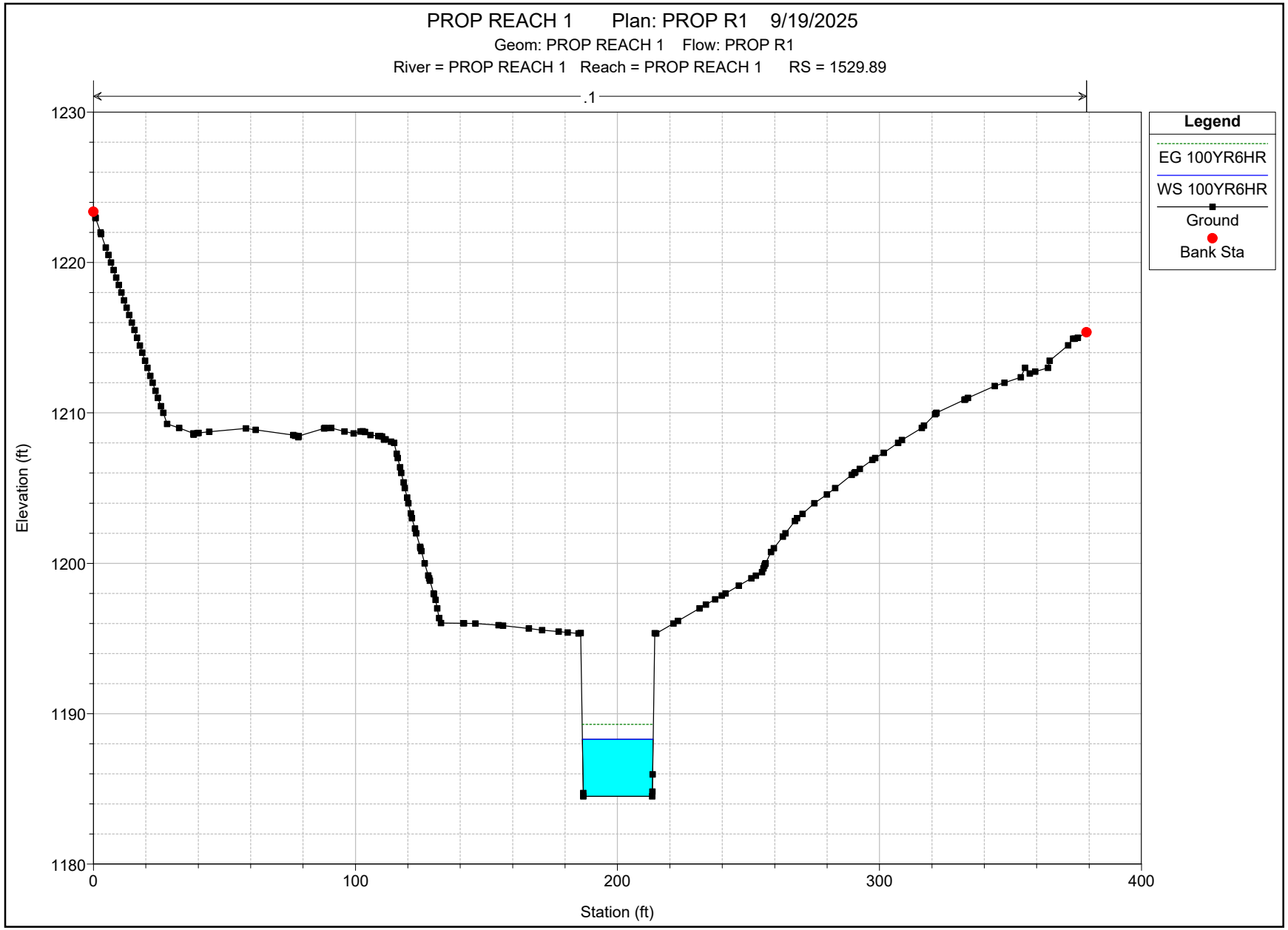

PROP REACH 1 Plan: PROP R1 9/19/2025
Geom: PROP REACH 1 Flow: PROP R1
River = PROP REACH 1 Reach = PROP REACH 1 RS = 2250
.1
Legend
EG 100YR6HR
WS 100YR6HR
Ground
Bank Sta
Elevation (ft)
Station (ft)
1245
1240
1235
1230
1225
1220
1215
1210
1205
0
100
200
300
400

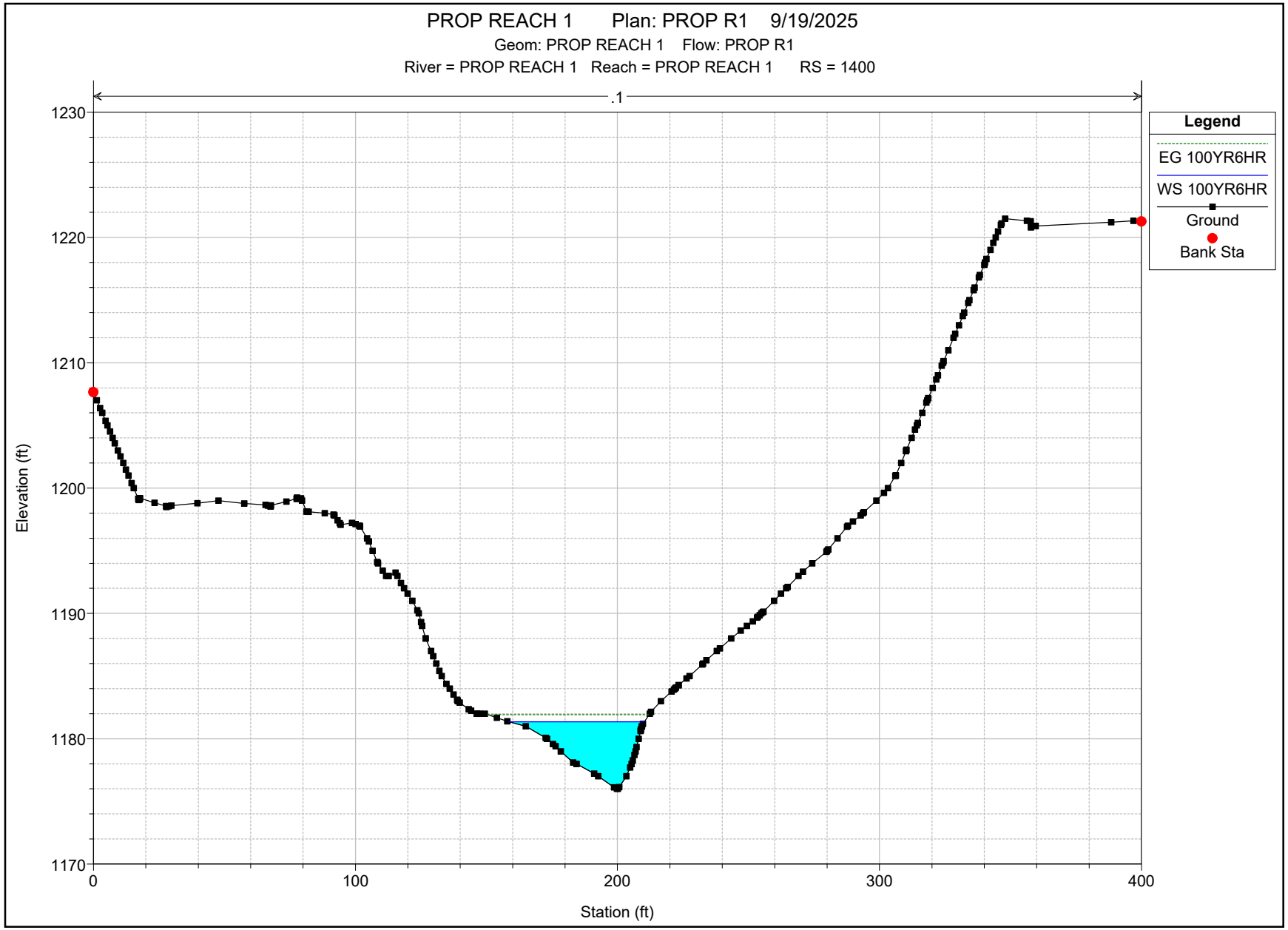

PROP REACH 1 Plan: PROP R1 9/19/2025
Geom: PROP REACH 1 Flow: PROP R1
River = PROP REACH 1 Reach = PROP REACH 1 RS = 2050
.1
Legend
EG 100YR6HR
WS 100YR6HR
Crit 100YR6HR
Ground
Bank Sta
Elevation (ft)
Station (ft)
1235
1230
1225
1220
1215
1210
1205
0
100
200
300
400

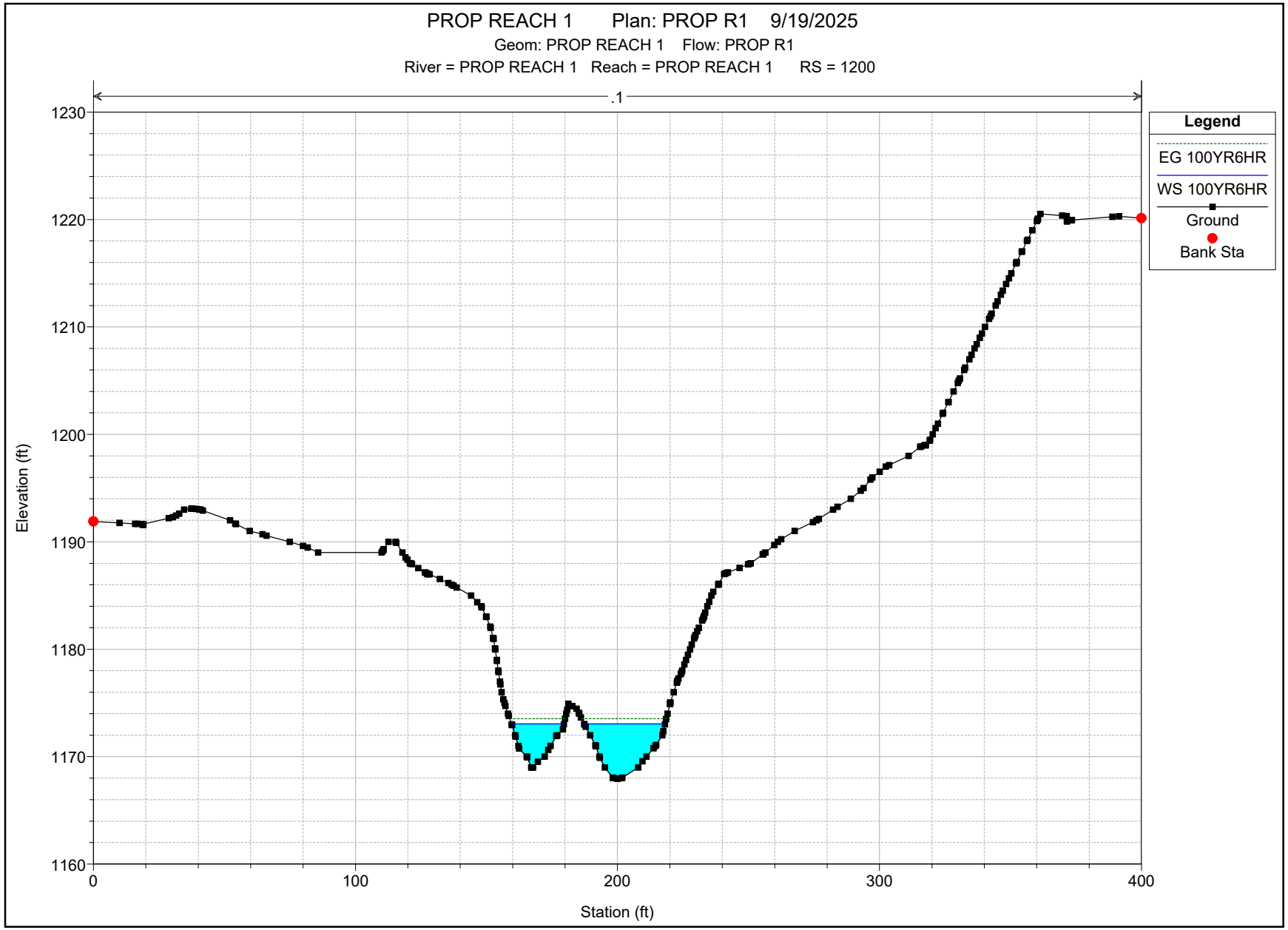

PROP REACH 1 Plan: PROP R1 9/19/2025
Geom: PROP REACH 1 Flow: PROP R1
River = PROP REACH 1 Reach = PROP REACH 1 RS = 1850
.1
Legend
EG 100YR6HR
WS 100YR6HR
Crit 100YR6HR
Ground
Bank Sta
Elevation (ft)
Station (ft)
1225
1220
1215
1210
1205
1200
0
100
200
300
400
500

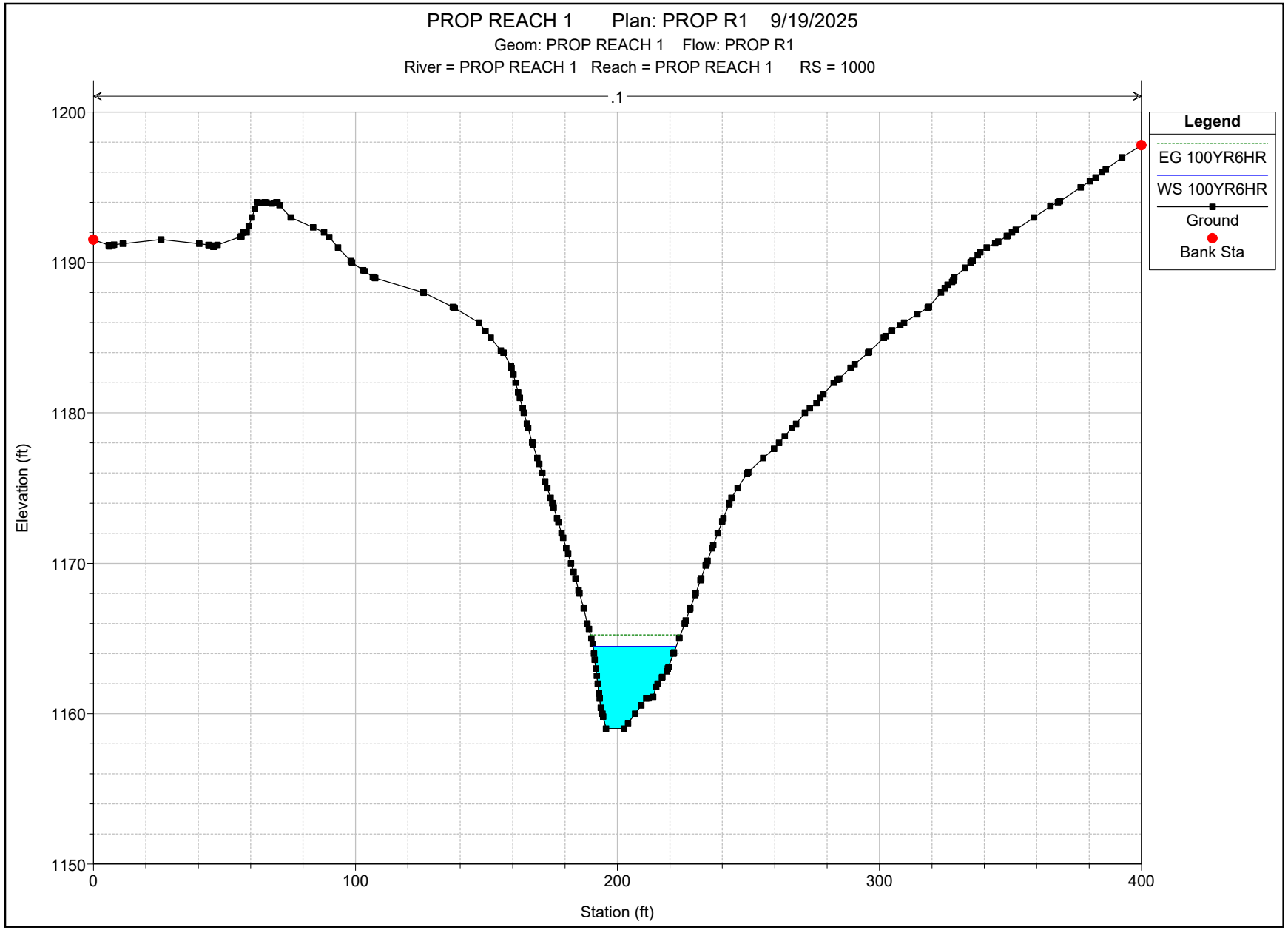

PROP REACH 1 Plan: PROP R1 9/19/2025
Geom: PROP REACH 1 Flow: PROP R1
River = PROP REACH 1 Reach = PROP REACH 1 RS = 1678.26
.1
Legend
EG 100YR6HR
WS 100YR6HR
Crit 100YR6HR
Ground
Bank Sta
Elevation (ft)
Station (ft)
1240
1230
1220
1210
1200
1190
1180
0
100
200
300
400
500

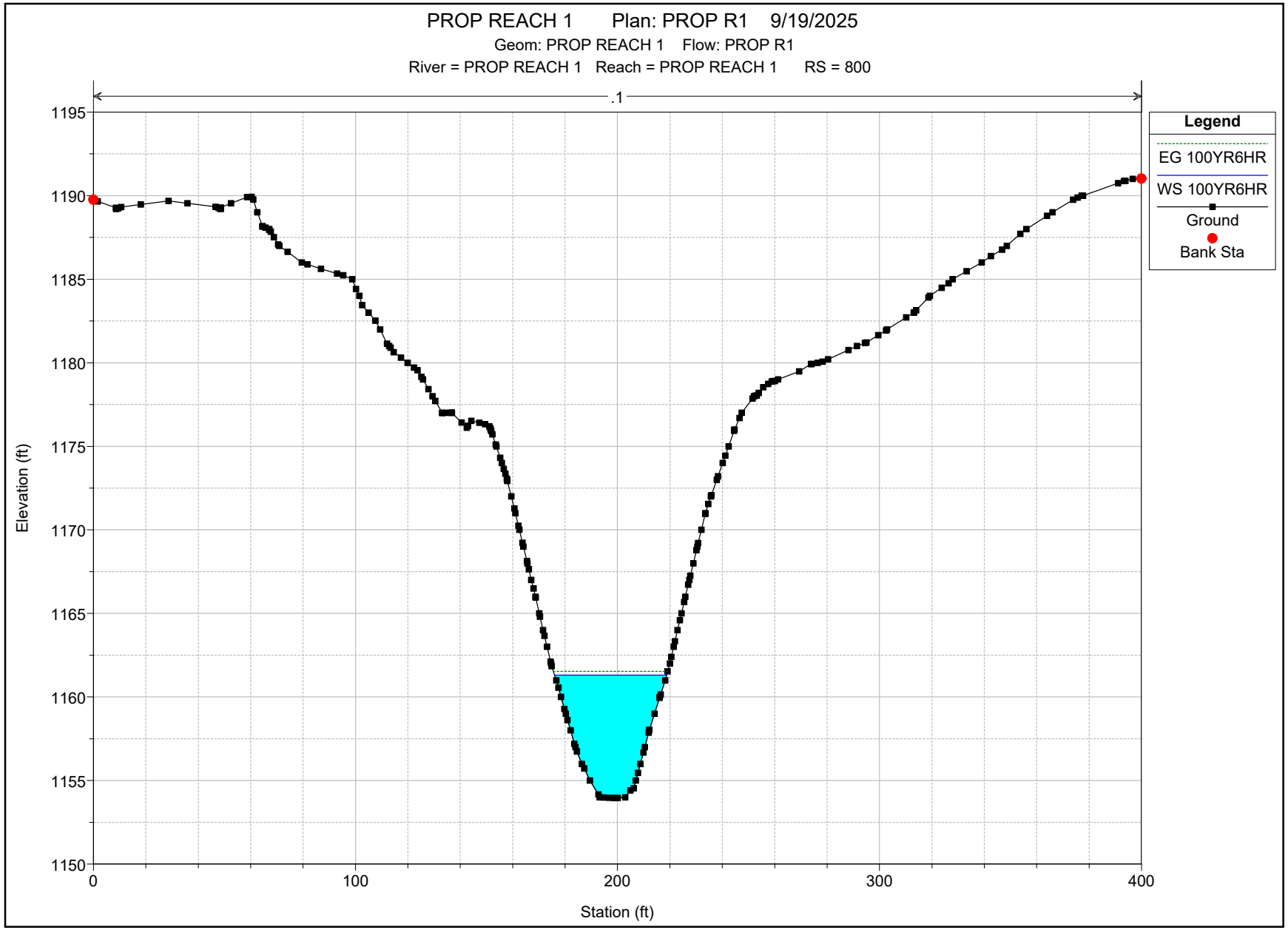

PROP REACH 1 Plan: PROP R1 9/19/2025
Geom: PROP REACH 1 Flow: PROP R1
River = PROP REACH 1 Reach = PROP REACH 1 RS = 1530 Culv
.1
Legend
EG 100YR6HR
WS 100YR6HR
Crit 100YR6HR
Ground
Bank Sta
Elevation (ft)
Station (ft)
1240
1230
1220
1210
1200
1190
1180
0
100
200
300
400
500

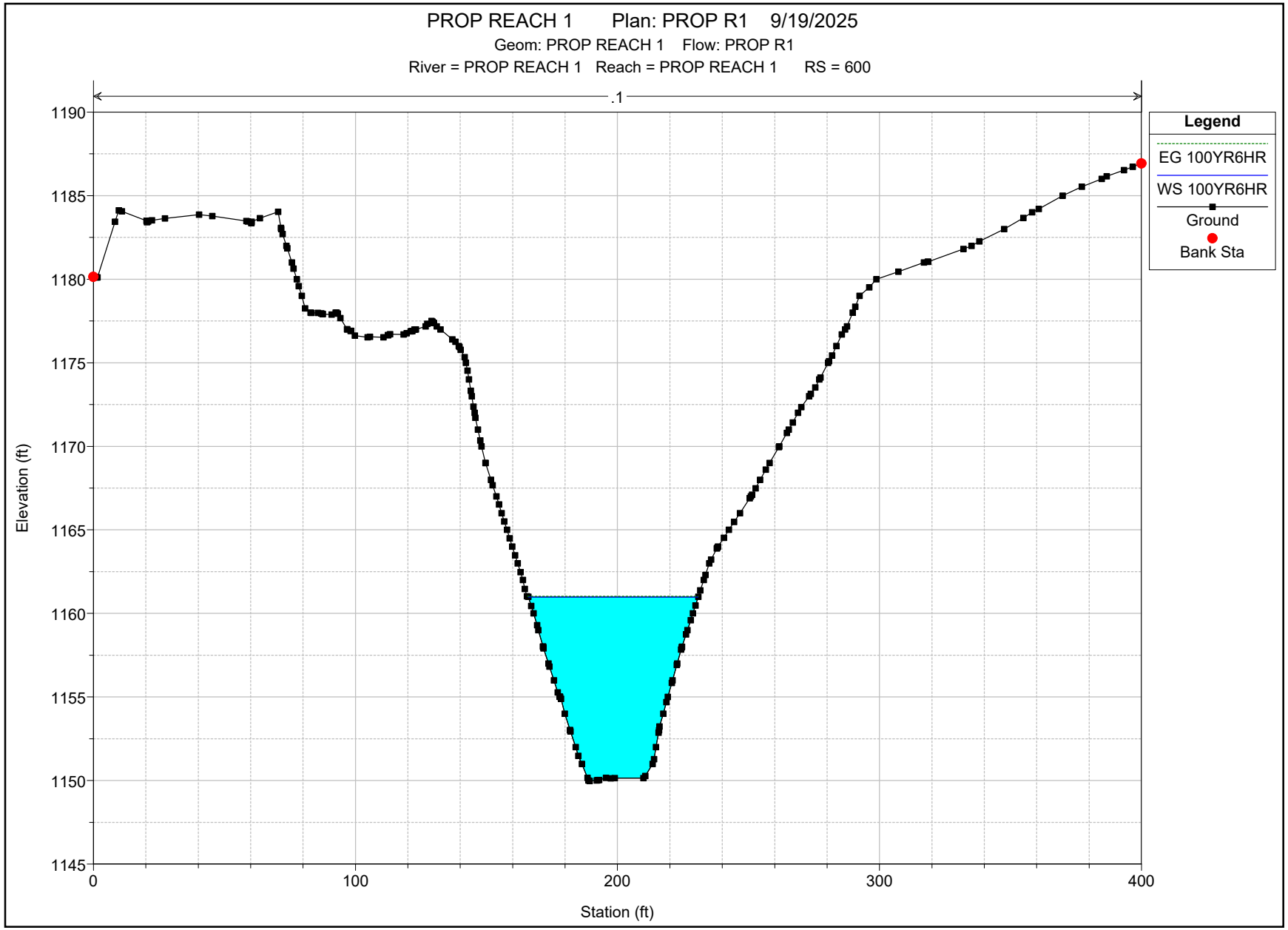

PROP REACH 1 Plan: PROP R1 9/19/2025
Geom: PROP REACH 1 Flow: PROP R1
River = PROP REACH 1 Reach = PROP REACH 1 RS = 1529.89
.1
Legend
EG 100YR6HR
WS 100YR6HR
Ground
Bank Sta
Elevation (ft)
1230
1220
1210
1200
1190
1180
0
100
200
300
400
Station (ft)

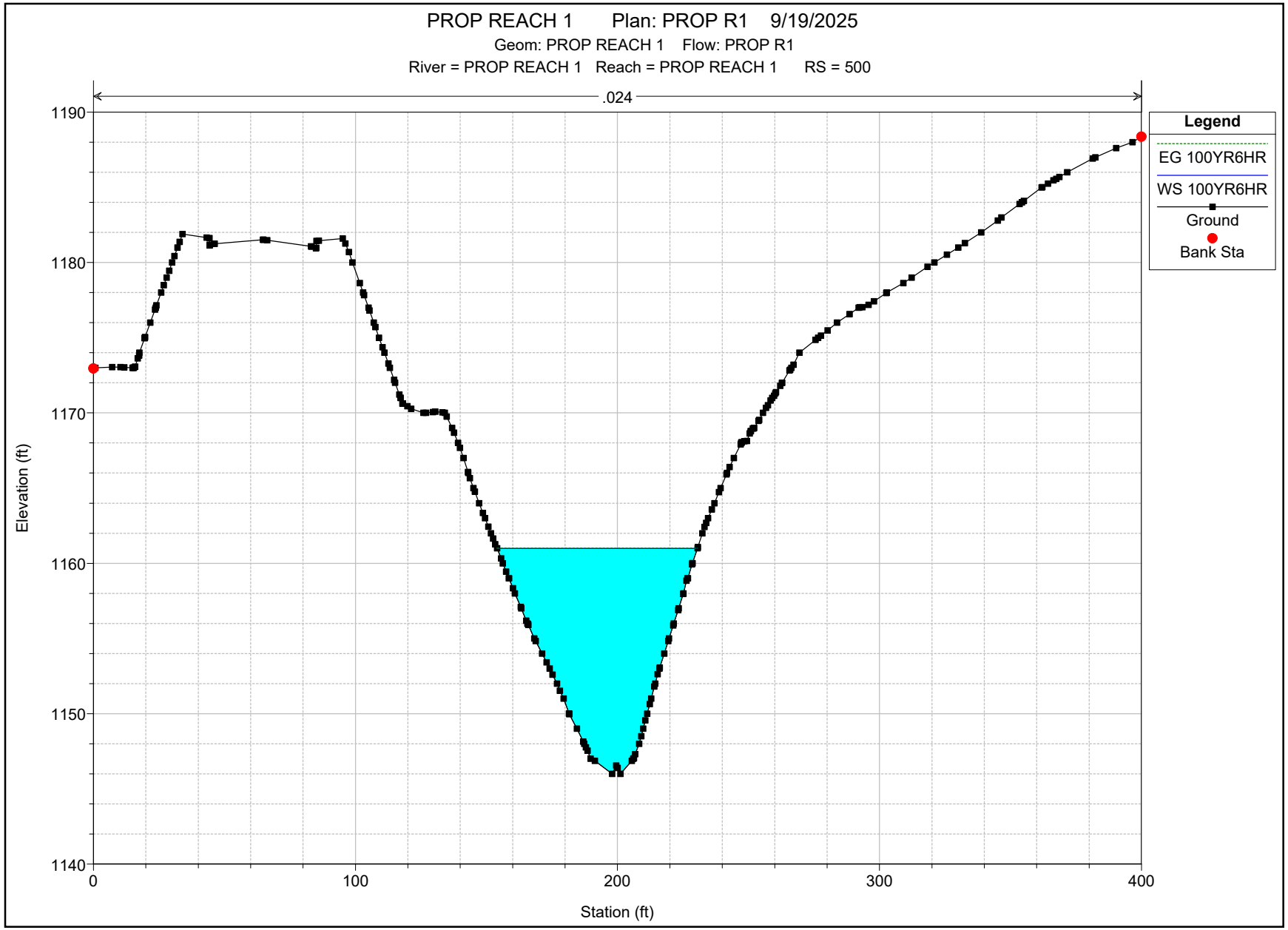

PROP REACH 1 Plan: PROP R1 9/19/2025
Geom: PROP REACH 1 Flow: PROP R1
River = PROP REACH 1 Reach = PROP REACH 1 RS = 1400
.1
Legend
EG 100YR6HR
WS 100YR6HR
Ground
Bank Sta
Elevation (ft)
Station (ft)
1230
1220
1210
1200
1190
1180
1170
0
100
200
300
400

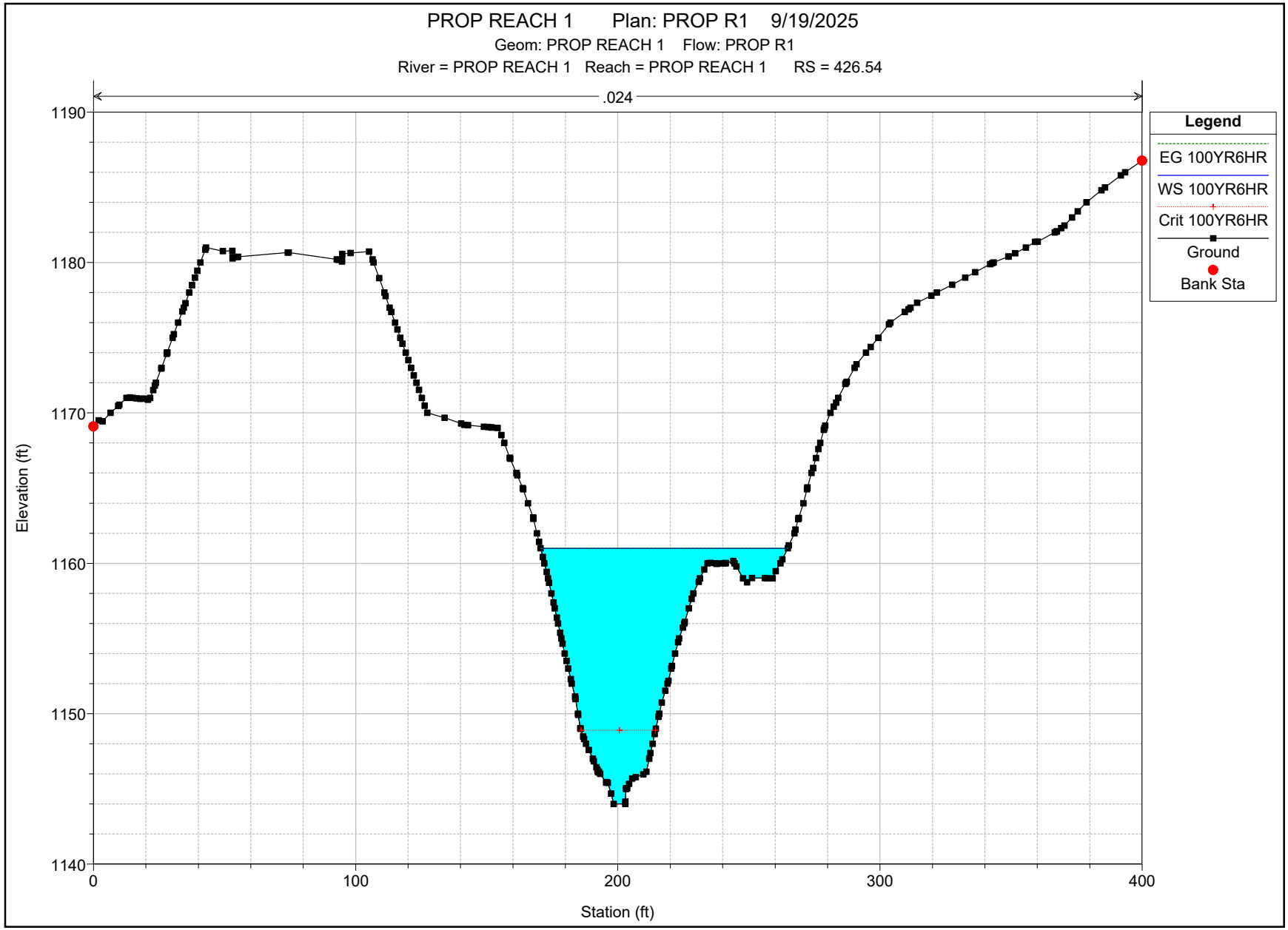

PROP REACH 1 Plan: PROP R1 9/19/2025
Geom: PROP REACH 1 Flow: PROP R1
River = PROP REACH 1 Reach = PROP REACH 1 RS = 1200
.1
Legend
EG 100YR6HR
WS 100YR6HR
Ground
Bank Sta
Elevation (ft)
Station (ft)
1230
1220
1210
1200
1190
1180
1170
1160
0
100
200
300
400

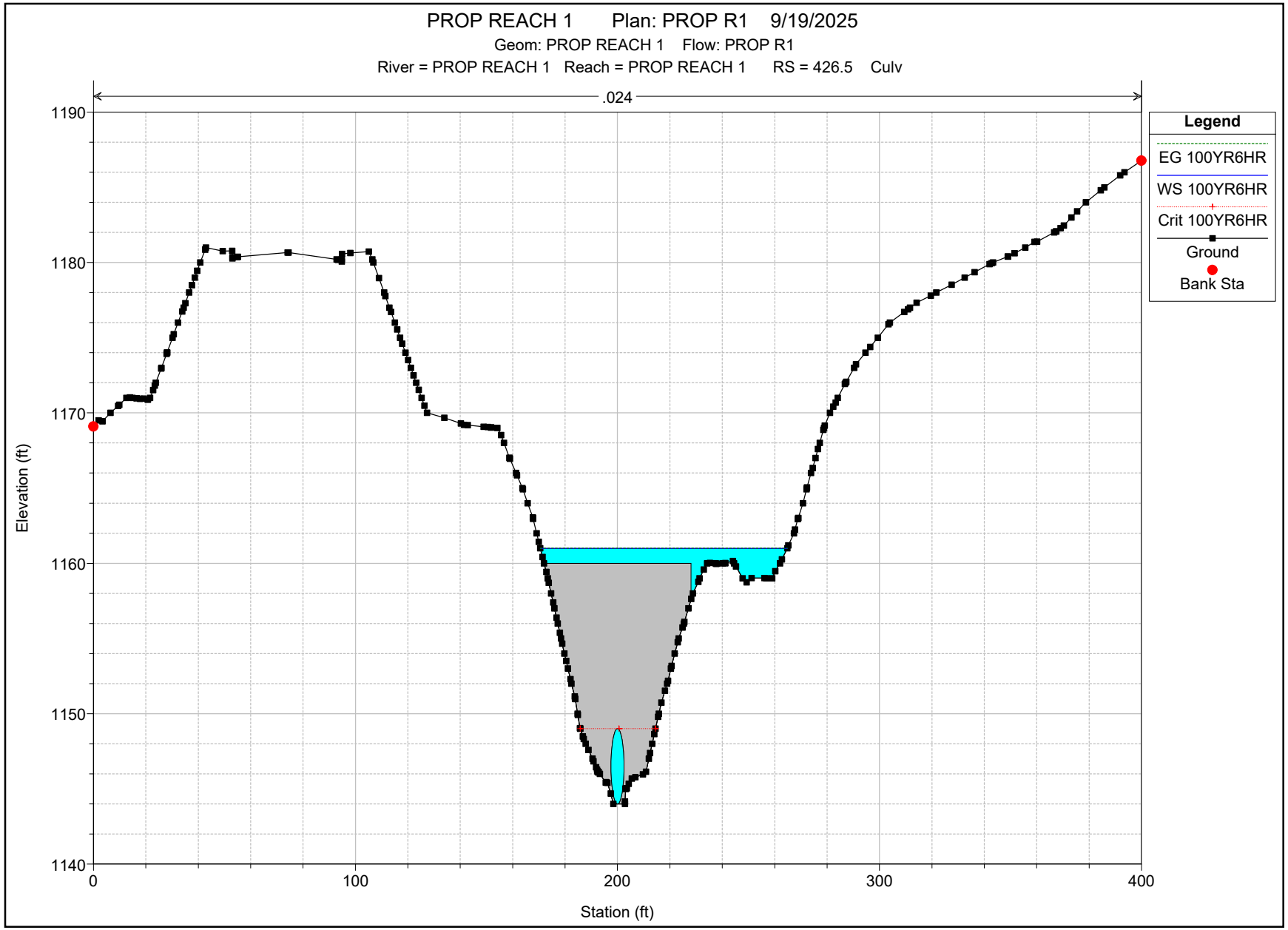

PROP REACH 1 Plan: PROP R1 9/19/2025
Geom: PROP REACH 1 Flow: PROP R1
River = PROP REACH 1 Reach = PROP REACH 1 RS = 1000
.1
Legend
EG 100YR6HR
WS 100YR6HR
Ground
Bank Sta
Elevation (ft)
Station (ft)
1200
1190
1180
1170
1160
1150
0
100
200
300
400

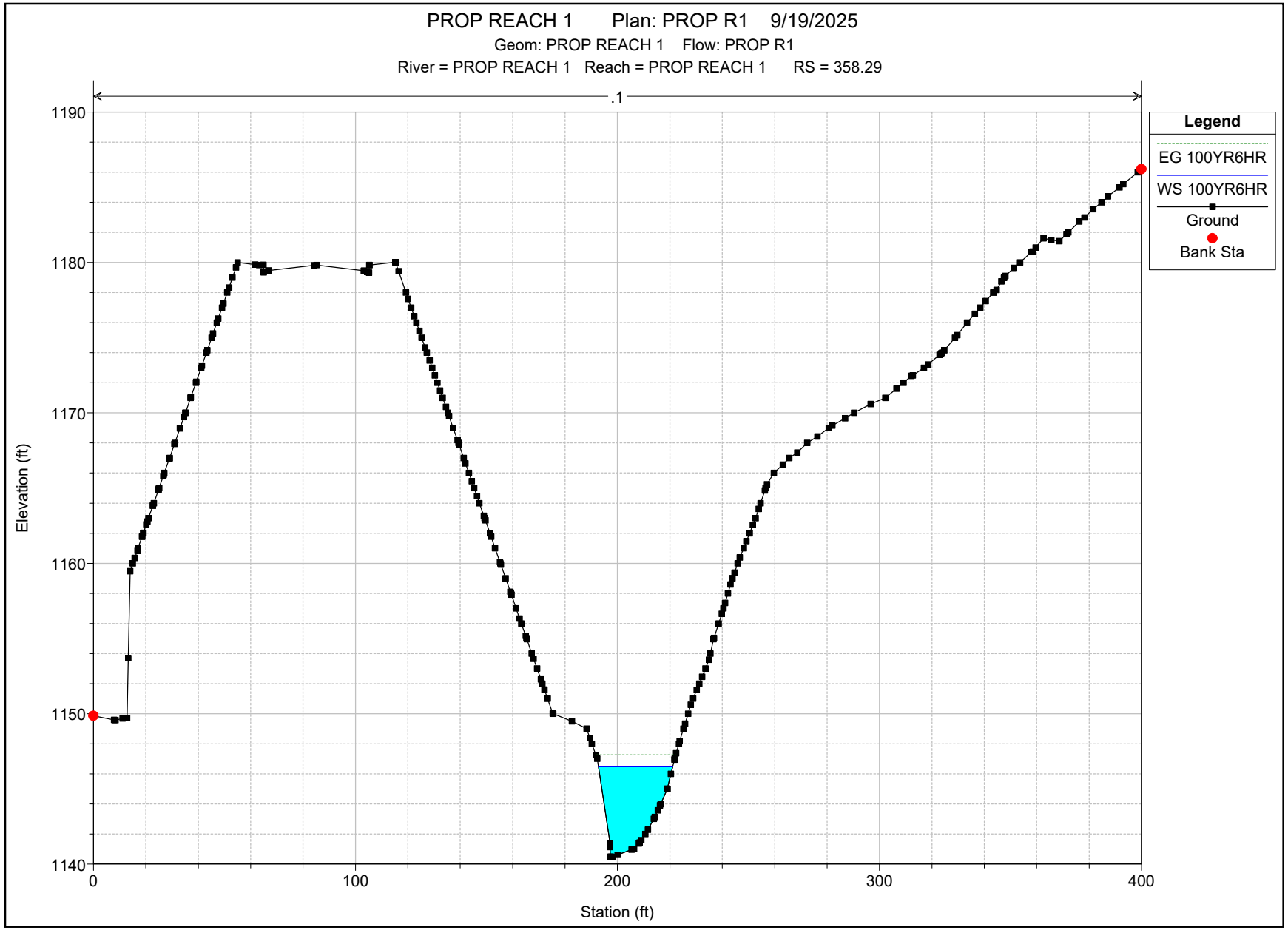

PROP REACH 1 Plan: PROP R1 9/19/2025
Geom: PROP REACH 1 Flow: PROP R1
River = PROP REACH 1 Reach = PROP REACH 1 RS = 800
.1
Legend
EG 100YR6HR
WS 100YR6HR
Ground
Bank Sta
Elevation (ft)
Station (ft)
1195
1190
1185
1180
1175
1170
1165
1160
1155
1150
0
100
200
300
400

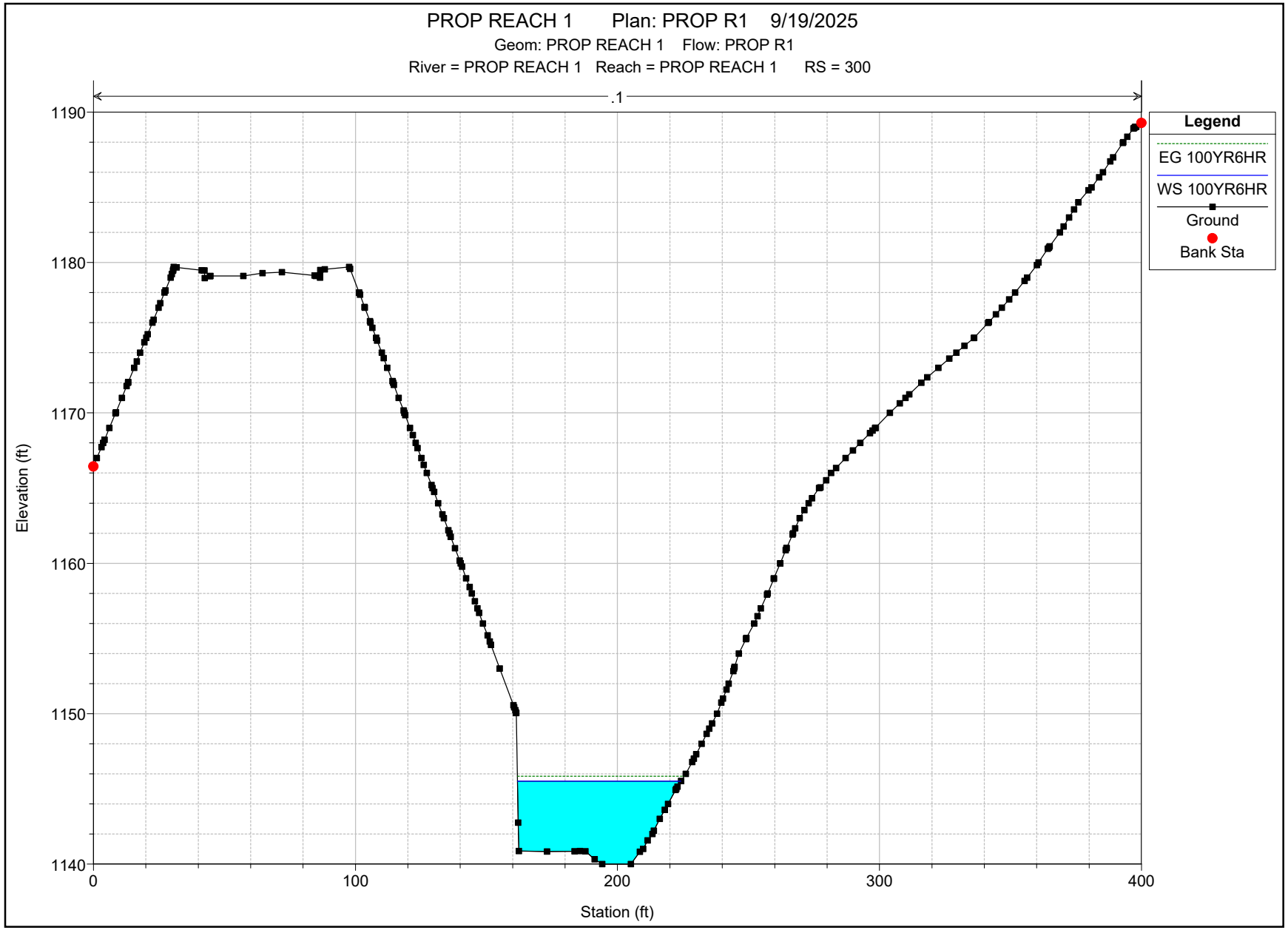

PROP REACH 1 Plan: PROP R1 9/19/2025
Geom: PROP REACH 1 Flow: PROP R1
River = PROP REACH 1 Reach = PROP REACH 1 RS = 600
.1
Legend
EG 100YR6HR
WS 100YR6HR
Ground
Bank Sta
Elevation (ft)
Station (ft)
1190
1185
1180
1175
1170
1165
1160
1155
1150
1145
0
100
200
300
400

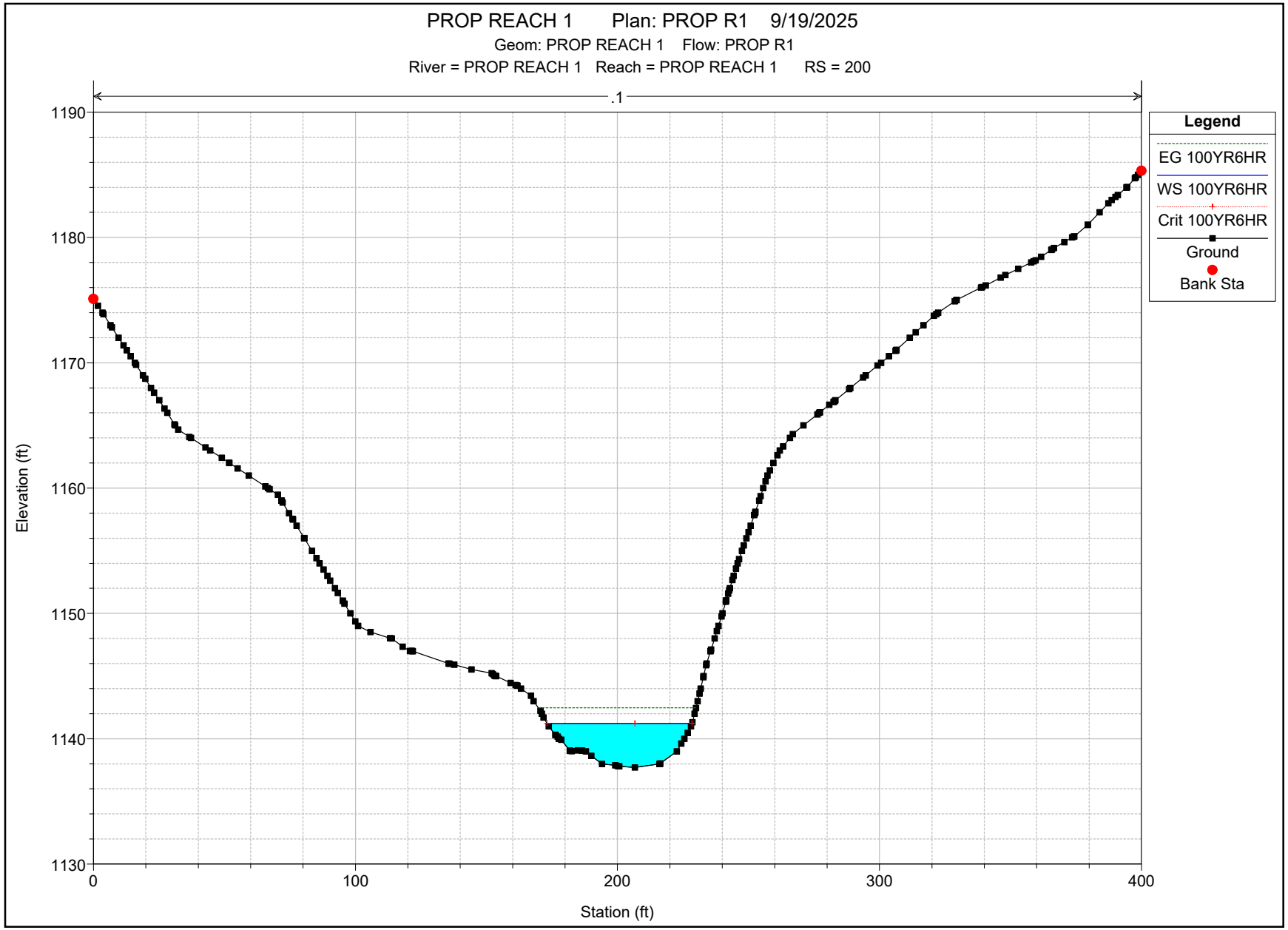

PROP REACH 1 Plan: PROP R1 9/19/2025
Geom: PROP REACH 1 Flow: PROP R1
River = PROP REACH 1 Reach = PROP REACH 1 RS = 500
.024
Legend
EG 100YR6HR
WS 100YR6HR
Ground
Bank Sta
Elevation (ft)
Station (ft)
1190
1180
1170
1160
1150
1140
0
100
200
300
400

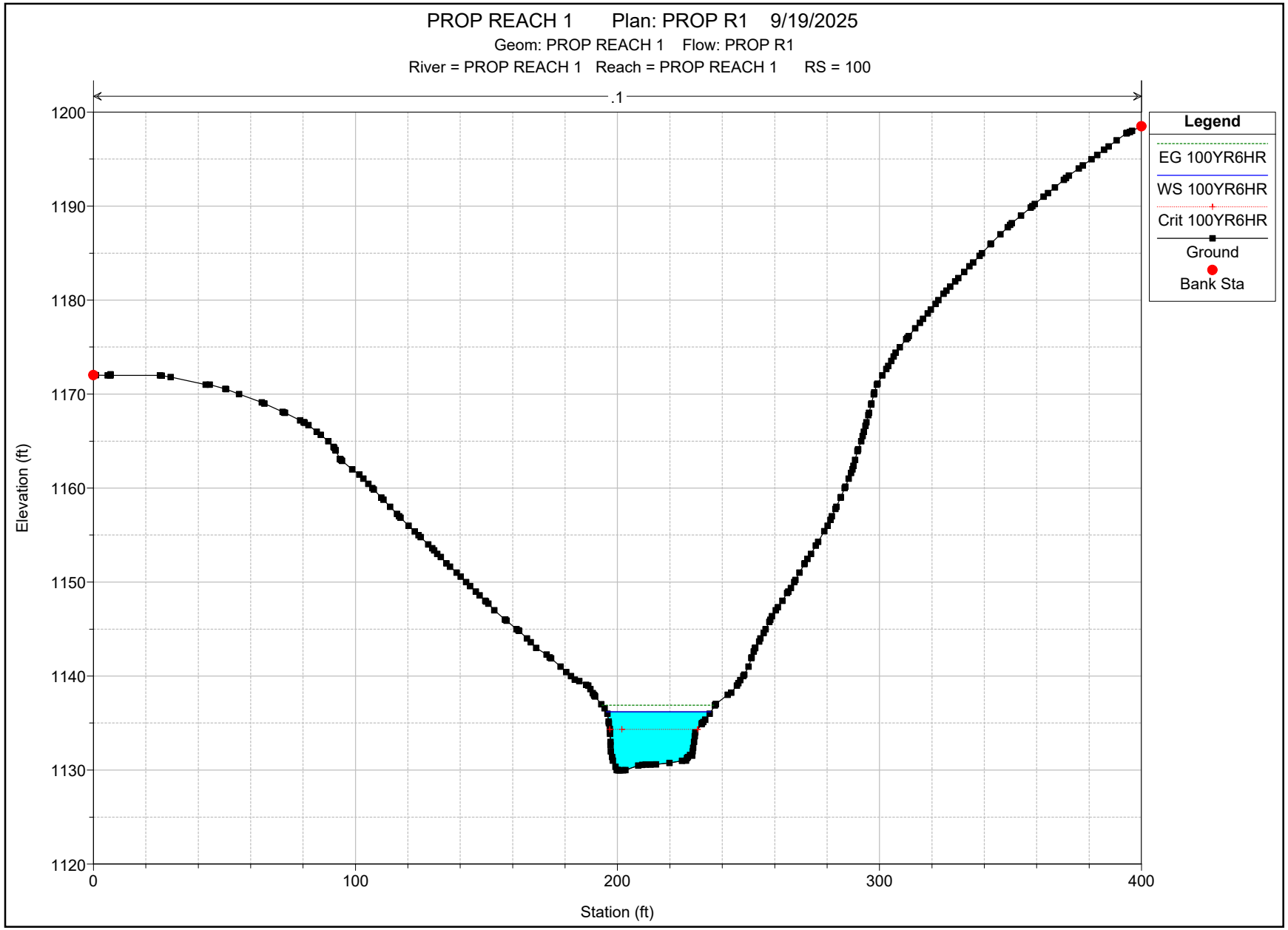

PROP REACH 1 Plan: PROP R1 9/19/2025
Geom: PROP REACH 1 Flow: PROP R1
River = PROP REACH 1 Reach = PROP REACH 1 RS = 426.54
.024
Legend
EG 100YR6HR
WS 100YR6HR
Crit 100YR6HR
Ground
Bank Sta
Elevation (ft)
Station (ft)
1190
1180
1170
1160
1150
1140
0
100
200
300
400

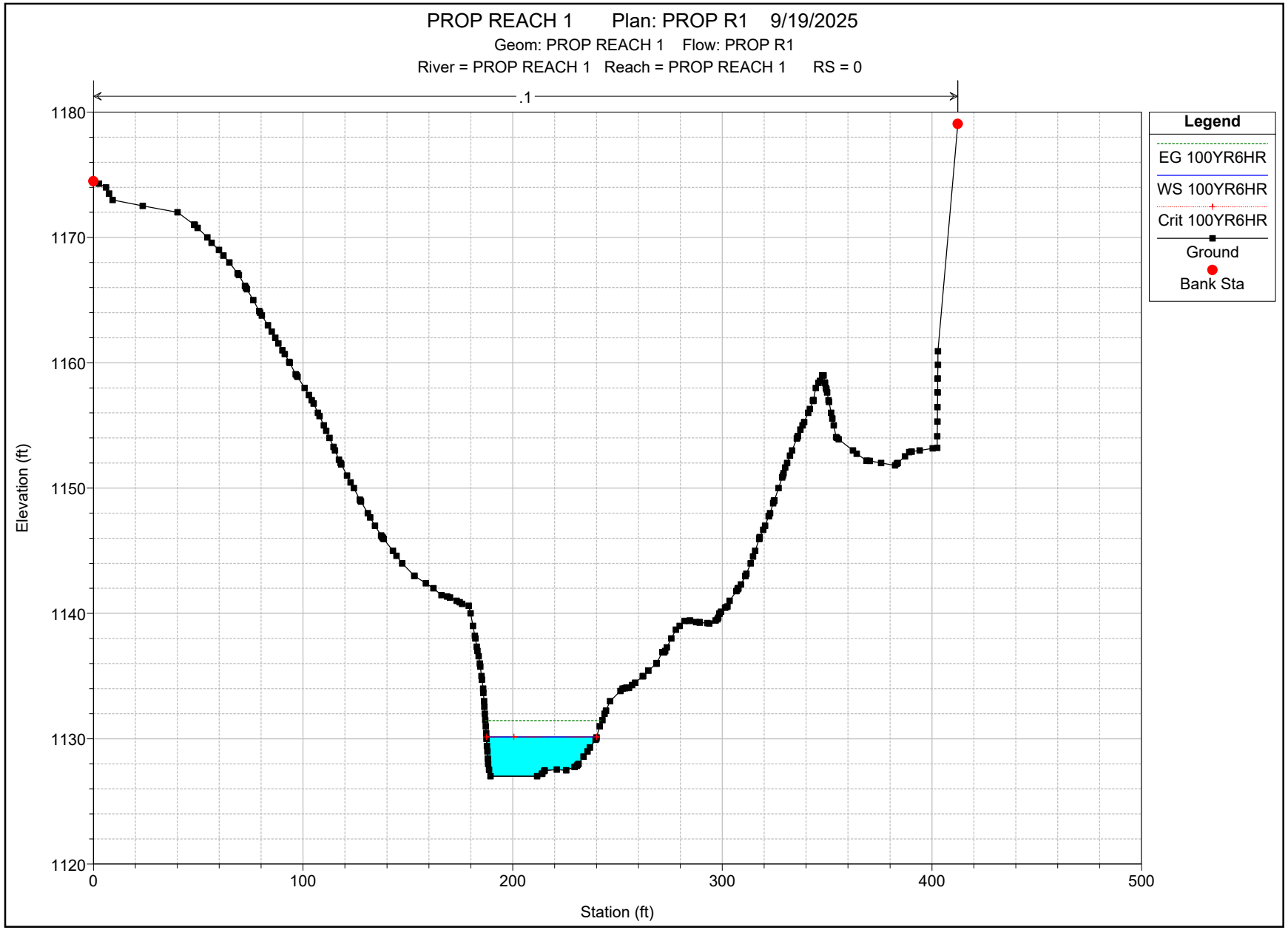

PROP REACH 1 Plan: PROP R1 9/19/2025
Geom: PROP REACH 1 Flow: PROP R1
River = PROP REACH 1 Reach = PROP REACH 1 RS = 426.5 Culv
.024
Legend
EG 100YR6HR
WS 100YR6HR
Crit 100YR6HR
Ground
Bank Sta
Elevation (ft)
Station (ft)
1190
1180
1170
1160
1150
1140
0
100
200
300
400


PROP REACH 1 Plan: PROP R1 9/19/2025
Geom: PROP REACH 1 Flow: PROP R1
River = PROP REACH 1 Reach = PROP REACH 1 RS = 358.29
.1
Legend
EG 100YR6HR
WS 100YR6HR
Ground
Bank Sta
Elevation (ft)
Station (ft)
1190
1180
1170
1160
1150
1140
0
100
200
300
400


PROP REACH 1 Plan: PROP R1 9/19/2025
Geom: PROP REACH 1 Flow: PROP R1
River = PROP REACH 1 Reach = PROP REACH 1 RS = 300
.1
Legend
EG 100YR6HR
WS 100YR6HR
Ground
Bank Sta
Elevation (ft)
Station (ft)
1190
1180
1170
1160
1150
1140
0
100
200
300
400


PROP REACH 1 Plan: PROP R1 9/19/2025
Geom: PROP REACH 1 Flow: PROP R1
River = PROP REACH 1 Reach = PROP REACH 1 RS = 200
.1
Legend
EG 100YR6HR
WS 100YR6HR
Crit 100YR6HR
Ground
Bank Sta
Elevation (ft)
Station (ft)
1190
1180
1170
1160
1150
1140
1130
0
100
200
300
400


PROP REACH 1 Plan: PROP R1 9/19/2025
Geom: PROP REACH 1 Flow: PROP R1
River = PROP REACH 1 Reach = PROP REACH 1 RS = 100
.1
Legend
EG 100YR6HR
WS 100YR6HR
Crit 100YR6HR
Ground
Bank Sta
Elevation (ft)
Station (ft)
1200
1190
1180
1170
1160
1150
1140
1130
1120
0
100
200
300
400


PROP REACH 1 Plan: PROP R1 9/19/2025
Geom: PROP REACH 1 Flow: PROP R1
River = PROP REACH 1 Reach = PROP REACH 1 RS = 0
.1
Legend
EG 100YR6HR
WS 100YR6HR
Crit 100YR6HR
Ground
Bank Sta
Elevation (ft)
Station (ft)
1180
1170
1160
1150
1140
1130
1120
0
100
200
300
400
500

# Appendix B – Reach 2 - Pre Development and Post Development 100-Year 6-Hr HEC-RAS Analysis

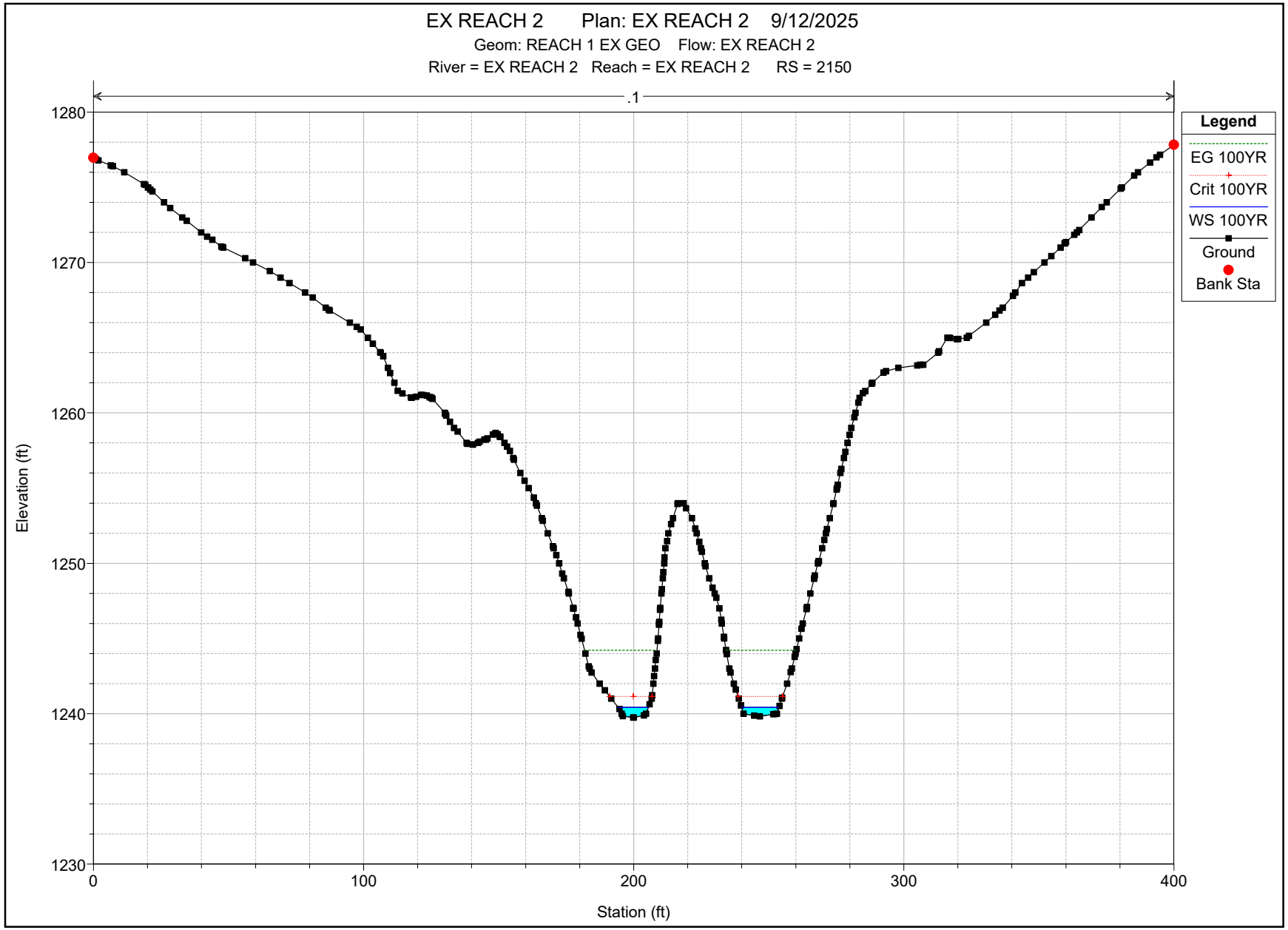
# PRE DEVELOPMENT

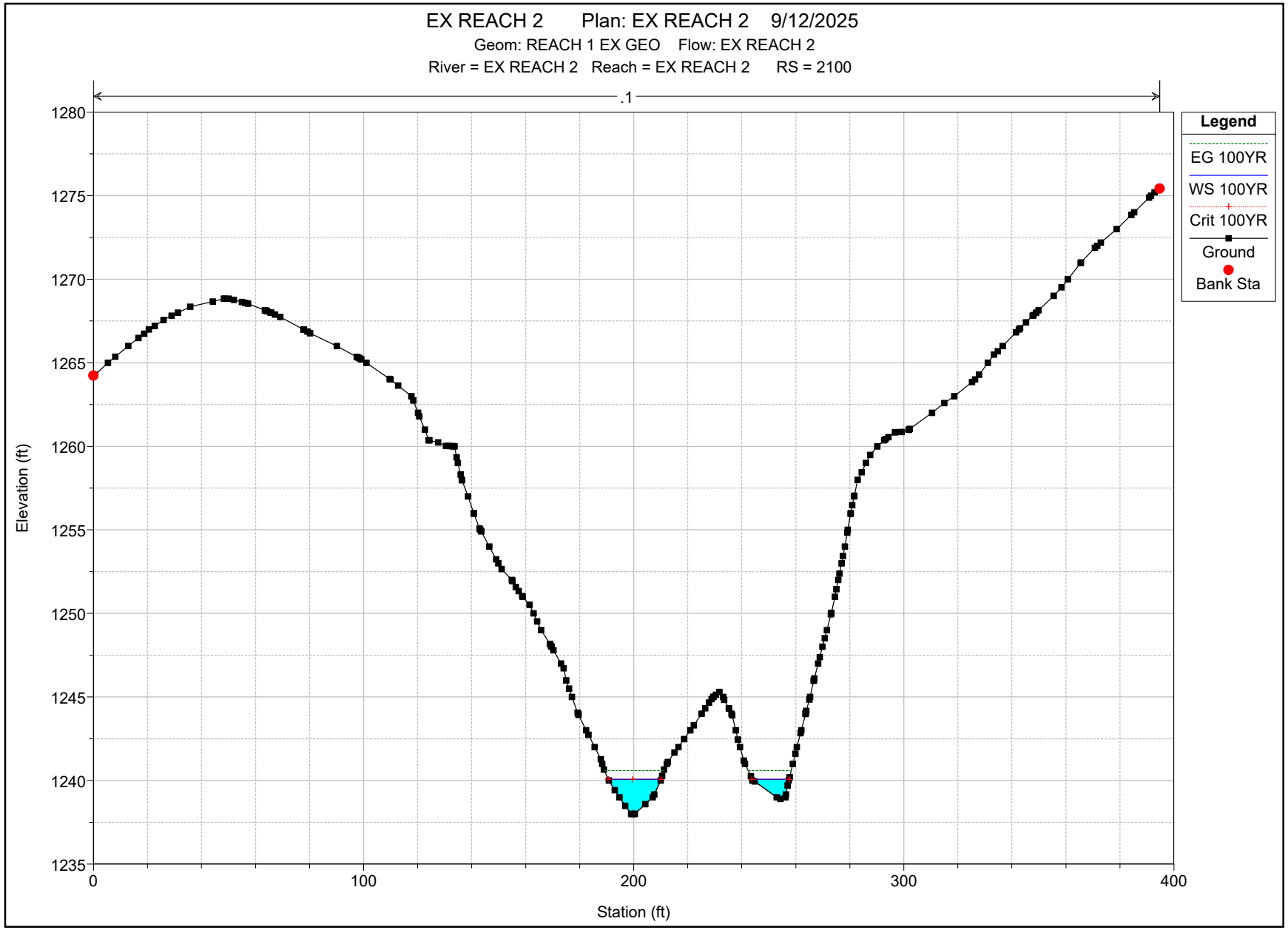
HEC-RAS Plan: EX REACH 2 River: EX REACH 2 Reach: EX REACH 2 Profile: 100YR

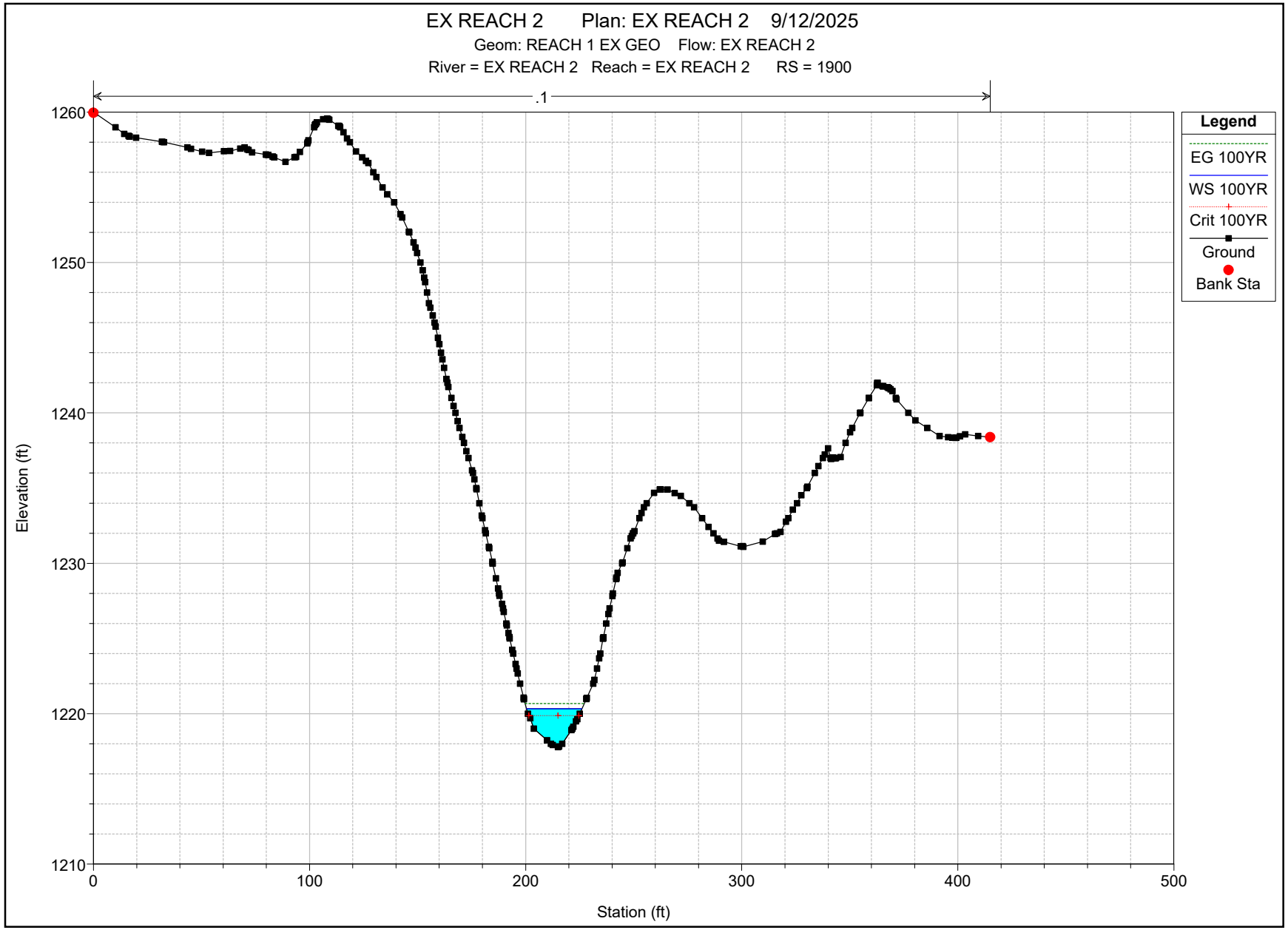
| Reach | River Sta | Profile | Q Total | Min Ch El | W.S. Elev | Crit W.S. | E.G. Elev | E.G. Slope | Vel Chnl | Flow Area | Top Width | Froude # Chl |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | (cfs) | (ft) | (ft) | (ft) | (ft) | (ft/ft) | (ft/s) | (sq ft) | (ft) | |
| EX REACH 2 | 2150 | 100YR | 194.73 | 1239.74 | 1240.42 | 1241.15 | 1244.21 | 2.861404 | 15.62 | 12.47 | 25.02 | 3.90 |
| EX REACH 2 | 2100 | 100YR | 194.73 | 1237.99 | 1240.08 | 1240.08 | 1240.60 | 0.156584 | 5.79 | 33.62 | 33.42 | 1.02 |
| EX REACH 2 | 1900 | 100YR | 194.73 | 1217.78 | 1220.32 | 1219.88 | 1220.68 | 0.056846 | 4.76 | 40.89 | 25.60 | 0.66 |
| EX REACH 2 | 1700 | 100YR | 194.73 | 1208.83 | 1211.71 | | 1211.99 | 0.034142 | 4.22 | 46.09 | 22.98 | 0.53 |
| EX REACH 2 | 1500 | 100YR | 194.73 | 1201.83 | 1205.61 | | 1205.87 | 0.027597 | 4.05 | 48.08 | 21.35 | 0.48 |
| EX REACH 2 | 1300 | 100YR | 194.73 | 1191.69 | 1194.49 | 1194.49 | 1195.33 | 0.135247 | 7.35 | 26.48 | 15.76 | 1.00 |
| EX REACH 2 | 1100 | 100YR | 194.73 | 1181.89 | 1184.84 | 1183.84 | 1185.00 | 0.020897 | 3.22 | 60.47 | 32.19 | 0.41 |
| EX REACH 2 | 900 | 100YR | 194.73 | 1175.96 | 1177.78 | | 1178.13 | 0.066115 | 4.72 | 41.27 | 29.56 | 0.70 |
| EX REACH 2 | 700 | 100YR | 194.73 | 1170.70 | 1173.74 | | 1173.85 | 0.010219 | 2.54 | 76.54 | 33.63 | 0.30 |
| EX REACH 2 | 500 | 100YR | 372.40 | 1162.47 | 1165.65 | 1165.65 | 1166.40 | 0.131611 | 6.95 | 53.57 | 35.83 | 1.00 |
| EX REACH 2 | 300 | 100YR | 372.40 | 1151.97 | 1157.04 | 1154.91 | 1157.22 | 0.012422 | 3.39 | 109.99 | 35.81 | 0.34 |
| EX REACH 2 | 200 | 100YR | 372.40 | 1149.12 | 1156.80 | | 1156.83 | 0.001548 | 1.40 | 266.80 | 69.63 | 0.13 |
| EX REACH 2 | 100 | 100YR | 372.40 | 1153.29 | 1155.86 | 1155.86 | 1156.28 | 0.167484 | 5.18 | 71.88 | 89.83 | 1.02 |
| EX REACH 2 | 0 | 100YR | 372.40 | 1139.98 | 1145.97 | 1141.67 | 1145.98 | 0.000387 | 0.66 | 567.01 | 166.63 | 0.06 |

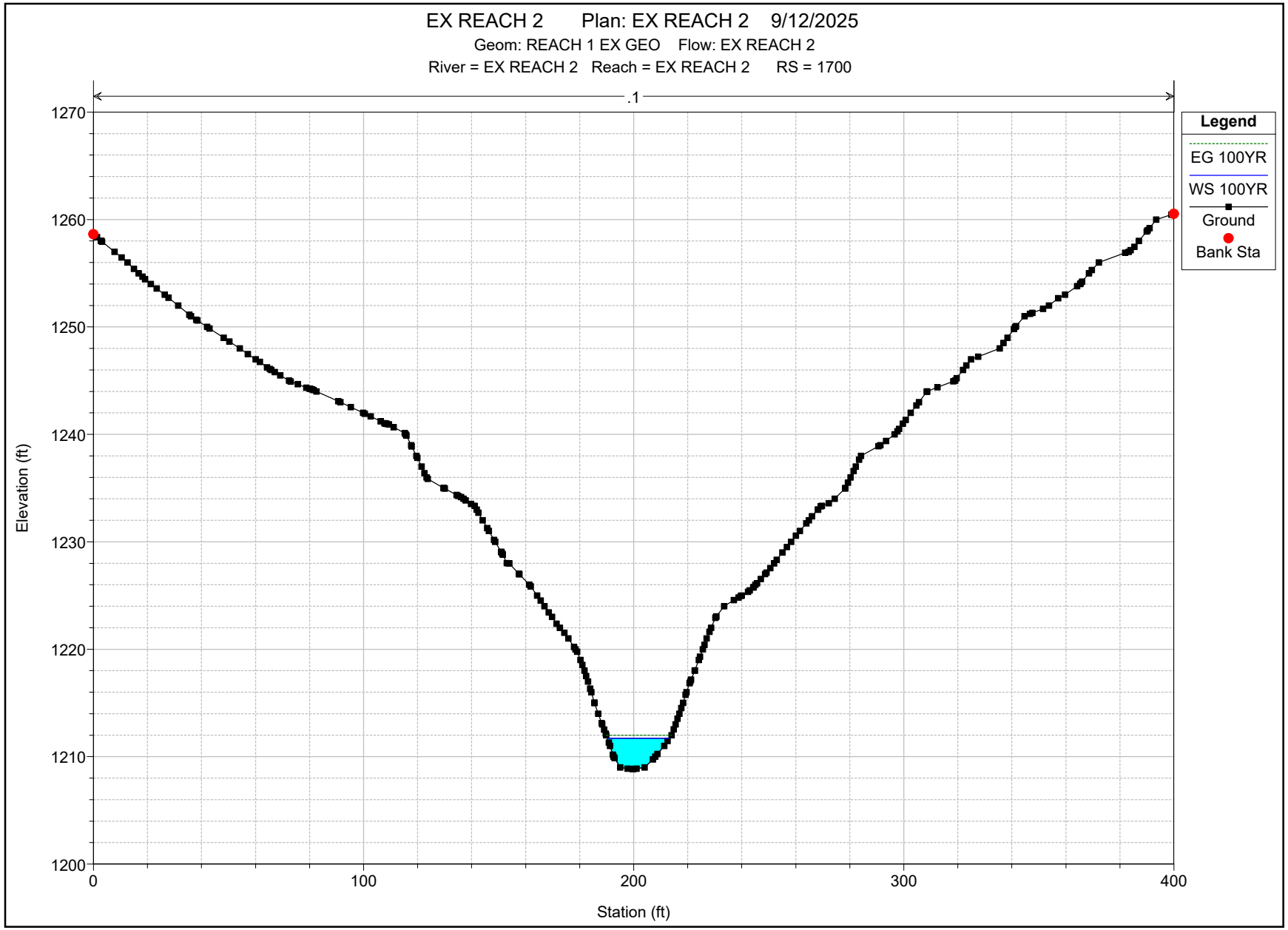
HEC-RAS Plan: EX REACH 2 River: EX REACH 2 Reach: EX REACH 2 Profile: 100YR

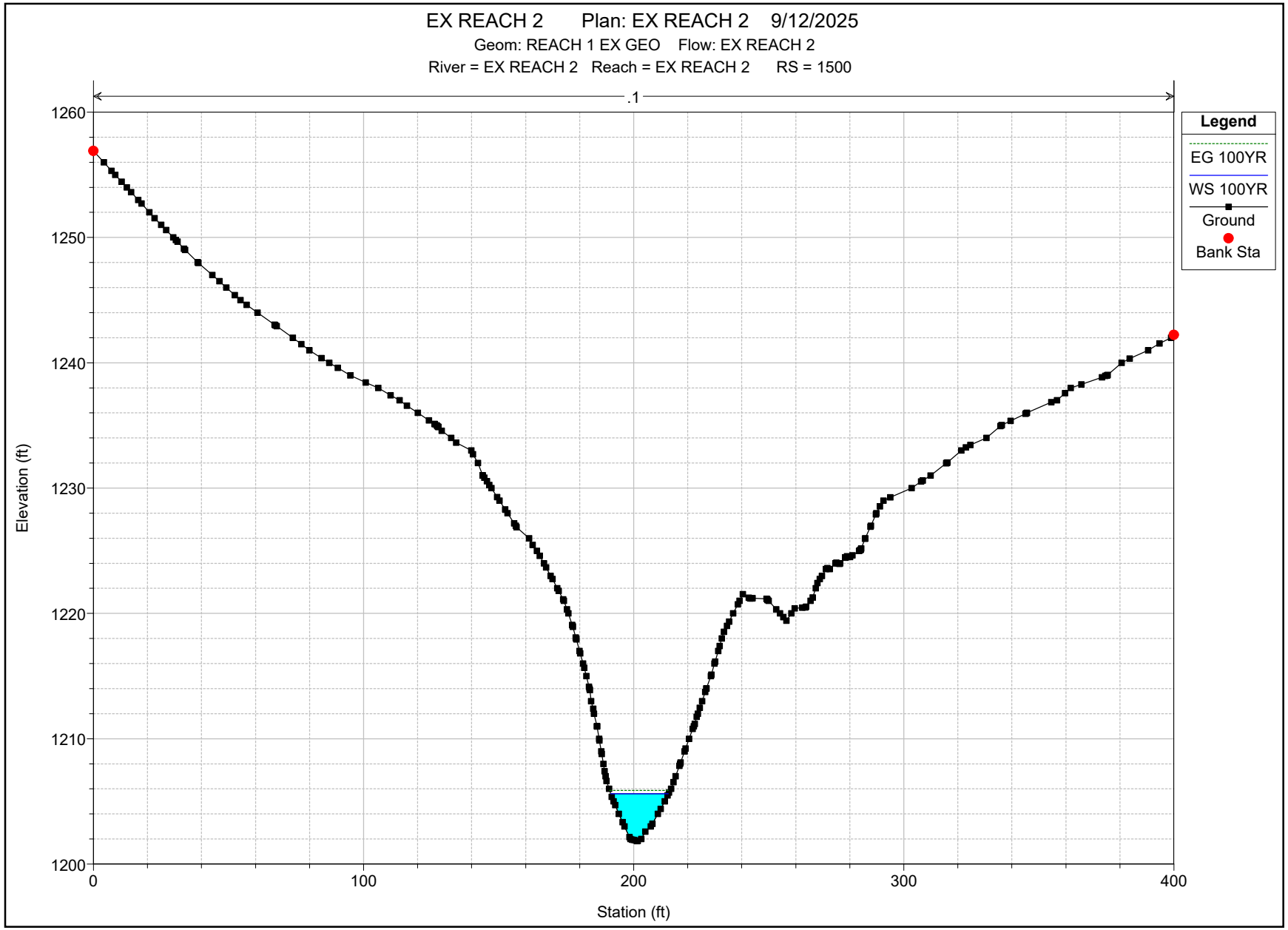
| Reach | River Sta | Profile | E.G. Elev | W.S. Elev | Vel Head | Frctn Loss | C & E Loss | Q Left | Q Channel | Q Right | Top Width |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | (ft) | (ft) | (ft) | (ft) | (ft) | (cfs) | (cfs) | (cfs) | (ft) |
| EX REACH 2 | 2150 | 100YR | 1244.21 | 1240.42 | 3.79 | | | | 194.73 | | 25.02 |
| EX REACH 2 | 2100 | 100YR | 1240.60 | 1240.08 | 0.52 | 17.71 | 0.05 | | 194.73 | | 33.42 |
| EX REACH 2 | 1900 | 100YR | 1220.68 | 1220.32 | 0.35 | 8.67 | 0.02 | | 194.73 | | 25.60 |
| EX REACH 2 | 1700 | 100YR | 1211.99 | 1211.71 | 0.28 | 6.12 | 0.01 | | 194.73 | | 22.98 |
| EX REACH 2 | 1500 | 100YR | 1205.87 | 1205.61 | 0.25 | 10.48 | 0.06 | | 194.73 | | 21.35 |
| EX REACH 2 | 1300 | 100YR | 1195.33 | 1194.49 | 0.84 | 8.61 | 0.20 | | 194.73 | | 15.76 |
| EX REACH 2 | 1100 | 100YR | 1185.00 | 1184.84 | 0.16 | 6.85 | 0.02 | | 194.73 | | 32.19 |
| EX REACH 2 | 900 | 100YR | 1178.13 | 1177.78 | 0.35 | 4.21 | 0.07 | | 194.73 | | 29.56 |
| EX REACH 2 | 700 | 100YR | 1173.85 | 1173.74 | 0.10 | 7.38 | 0.07 | | 194.73 | | 33.63 |
| EX REACH 2 | 500 | 100YR | 1166.40 | 1165.65 | 0.75 | 5.82 | 0.17 | | 372.40 | | 35.83 |
| EX REACH 2 | 300 | 100YR | 1157.22 | 1157.04 | 0.18 | 0.34 | 0.04 | | 372.40 | | 35.81 |
| EX REACH 2 | 200 | 100YR | 1156.83 | 1156.80 | 0.03 | 0.52 | 0.04 | | 372.40 | | 69.63 |
| EX REACH 2 | 100 | 100YR | 1156.28 | 1155.86 | 0.42 | 0.14 | 0.12 | | 372.40 | | 89.83 |
| EX REACH 2 | 0 | 100YR | 1145.98 | 1145.97 | 0.01 | | | | 372.40 | | 166.63 |

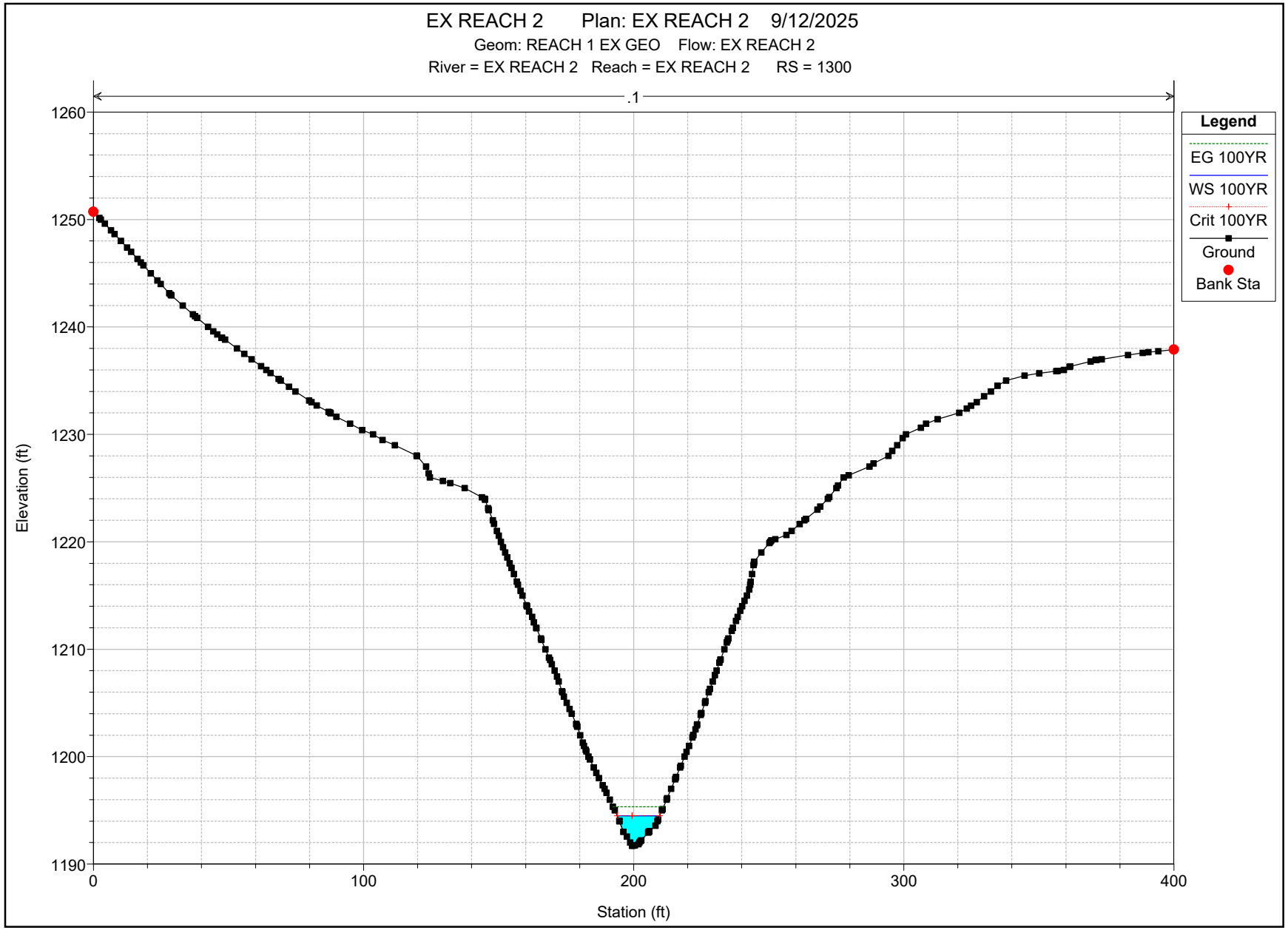

EX REACH 2 Plan: EX REACH 2 9/12/2025
Geom: REACH 1 EX GEO Flow: EX REACH 2
River = EX REACH 2 Reach = EX REACH 2 RS = 2150
.1
Legend
EG 100YR
Crit 100YR
WS 100YR
Ground
Bank Sta
Elevation (ft)
1280
1270
1260
1250
1240
1230
0
100
200
300
400
Station (ft)

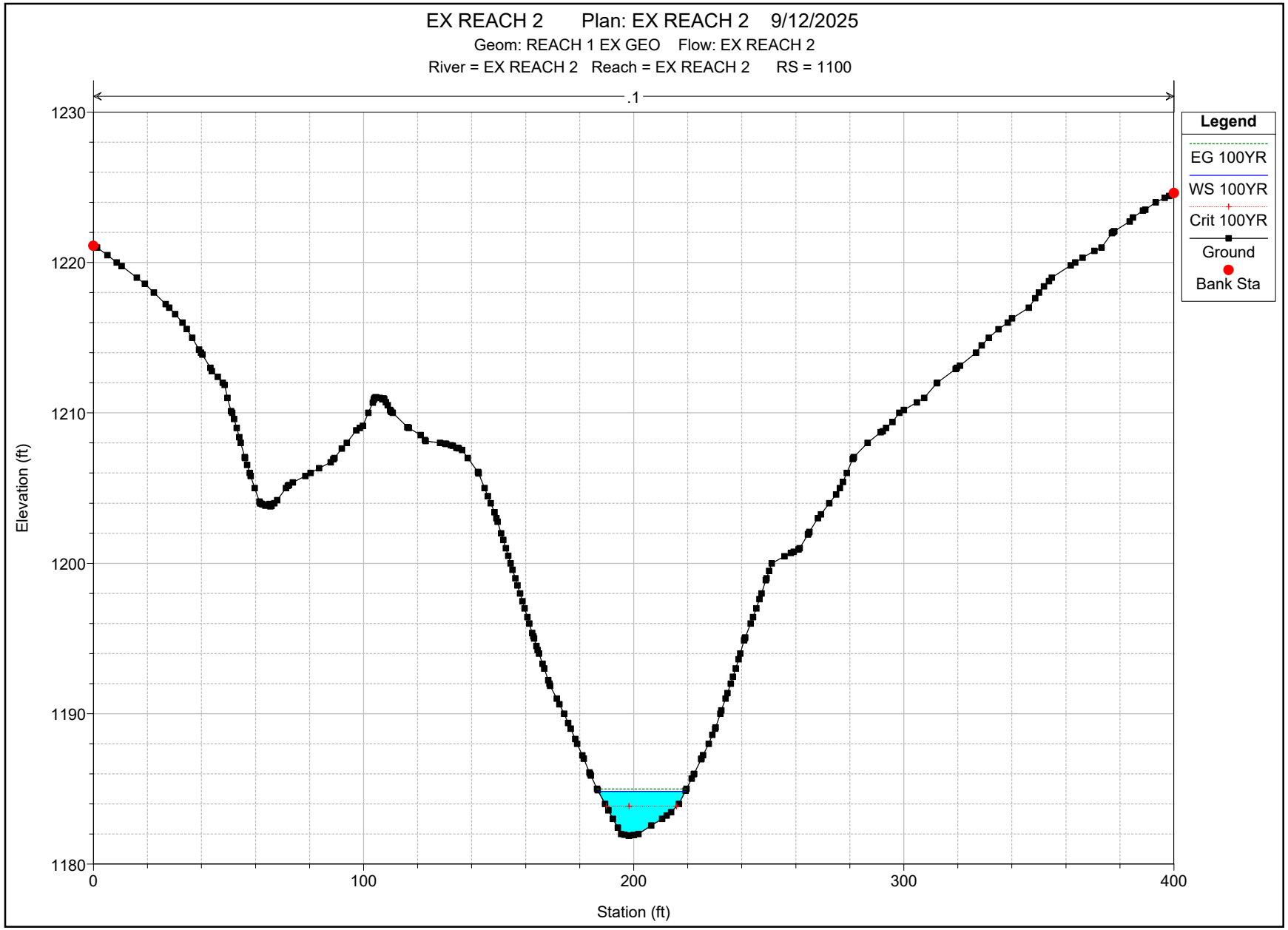

EX REACH 2 Plan: EX REACH 2 9/12/2025
Geom: REACH 1 EX GEO Flow: EX REACH 2
River = EX REACH 2 Reach = EX REACH 2 RS = 2100
.1
Legend
EG 100YR
WS 100YR
Crit 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
1280
1275
1270
1265
1260
1255
1250
1245
1240
1235
0
100
200
300
400

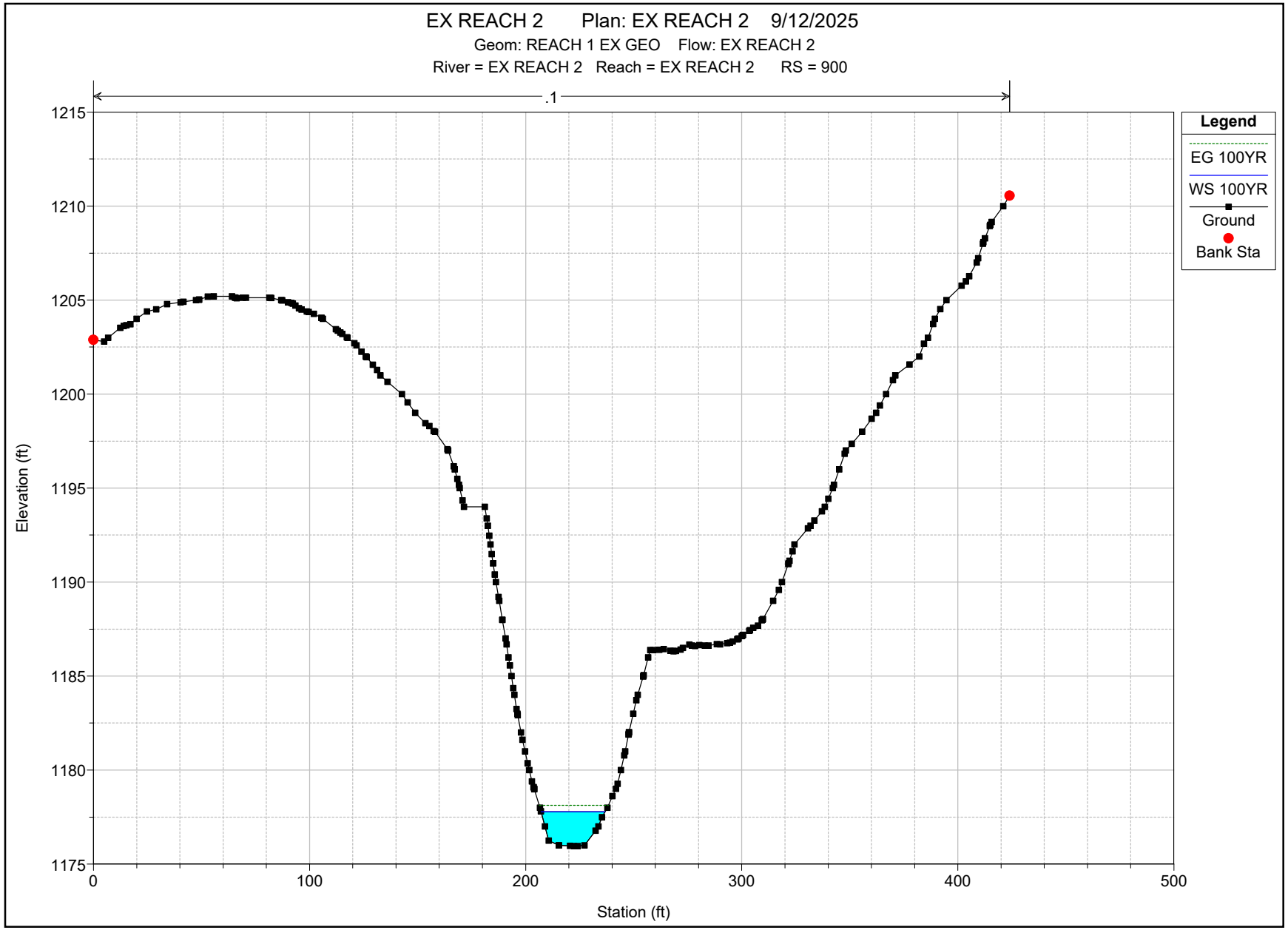

EX REACH 2 Plan: EX REACH 2 9/12/2025
Geom: REACH 1 EX GEO Flow: EX REACH 2
River = EX REACH 2 Reach = EX REACH 2 RS = 1900
.1
Legend
EG 100YR
WS 100YR
Crit 100YR
Ground
Bank Sta
Elevation (ft)
1260
1250
1240
1230
1220
1210
0
100
200
300
400
500
Station (ft)

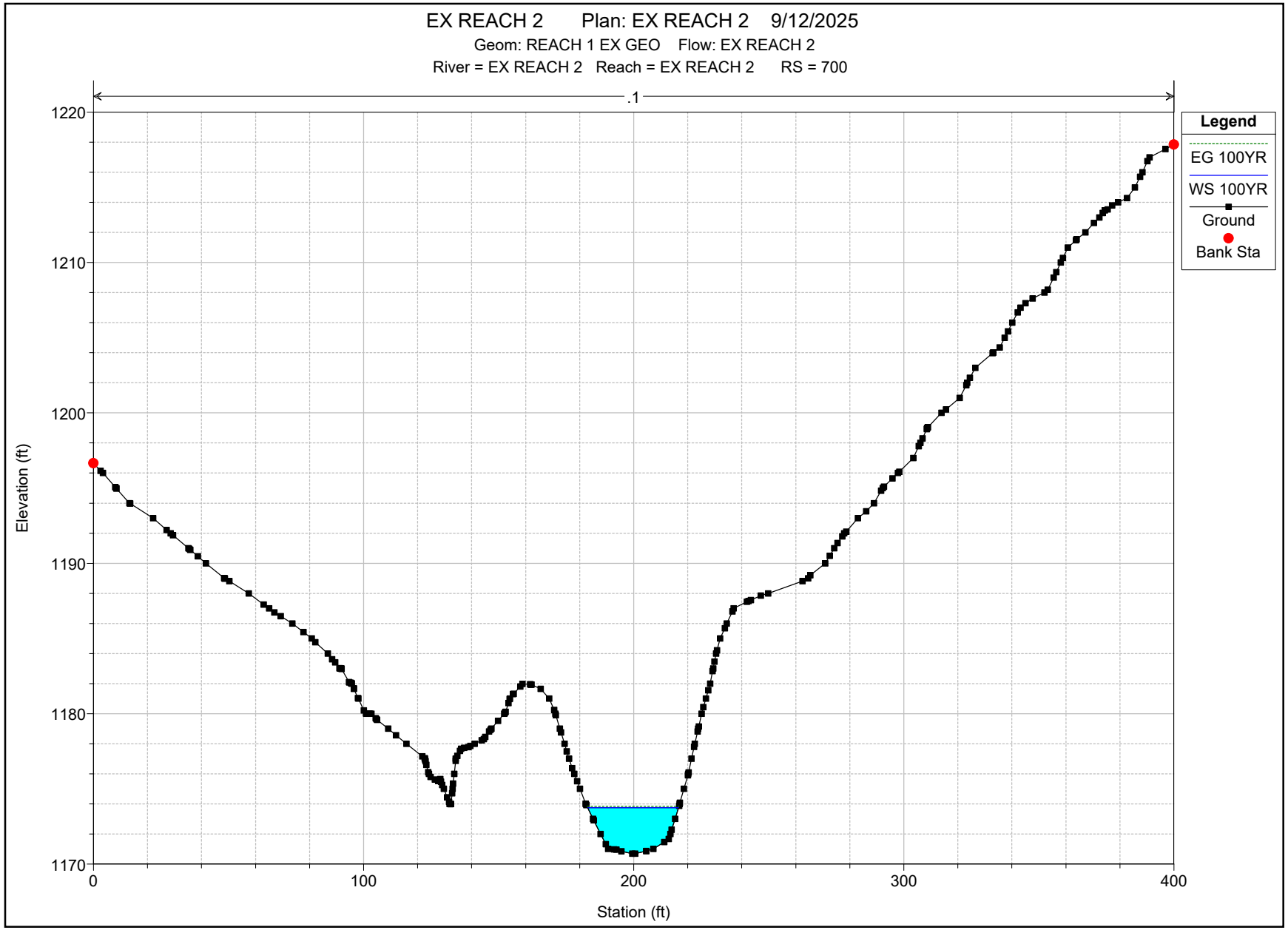

EX REACH 2 Plan: EX REACH 2 9/12/2025
Geom: REACH 1 EX GEO Flow: EX REACH 2
River = EX REACH 2 Reach = EX REACH 2 RS = 1700
.1
Legend
EG 100YR
WS 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
1270
1260
1250
1240
1230
1220
1210
1200
0
100
200
300
400

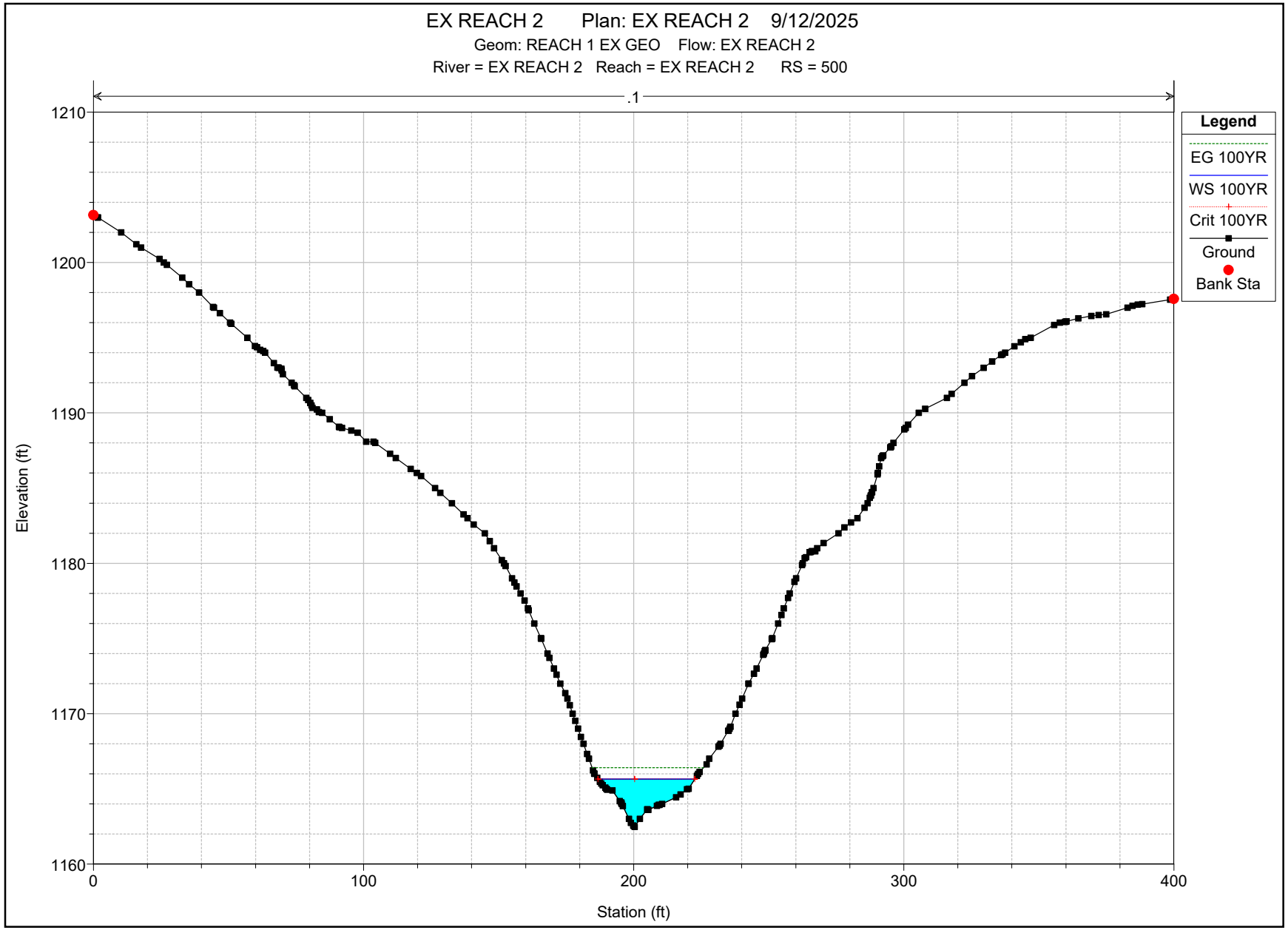

EX REACH 2 Plan: EX REACH 2 9/12/2025
Geom: REACH 1 EX GEO Flow: EX REACH 2
River = EX REACH 2 Reach = EX REACH 2 RS = 1500
.1
Legend
EG 100YR
WS 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
1260
1250
1240
1230
1220
1210
1200
0
100
200
300
400

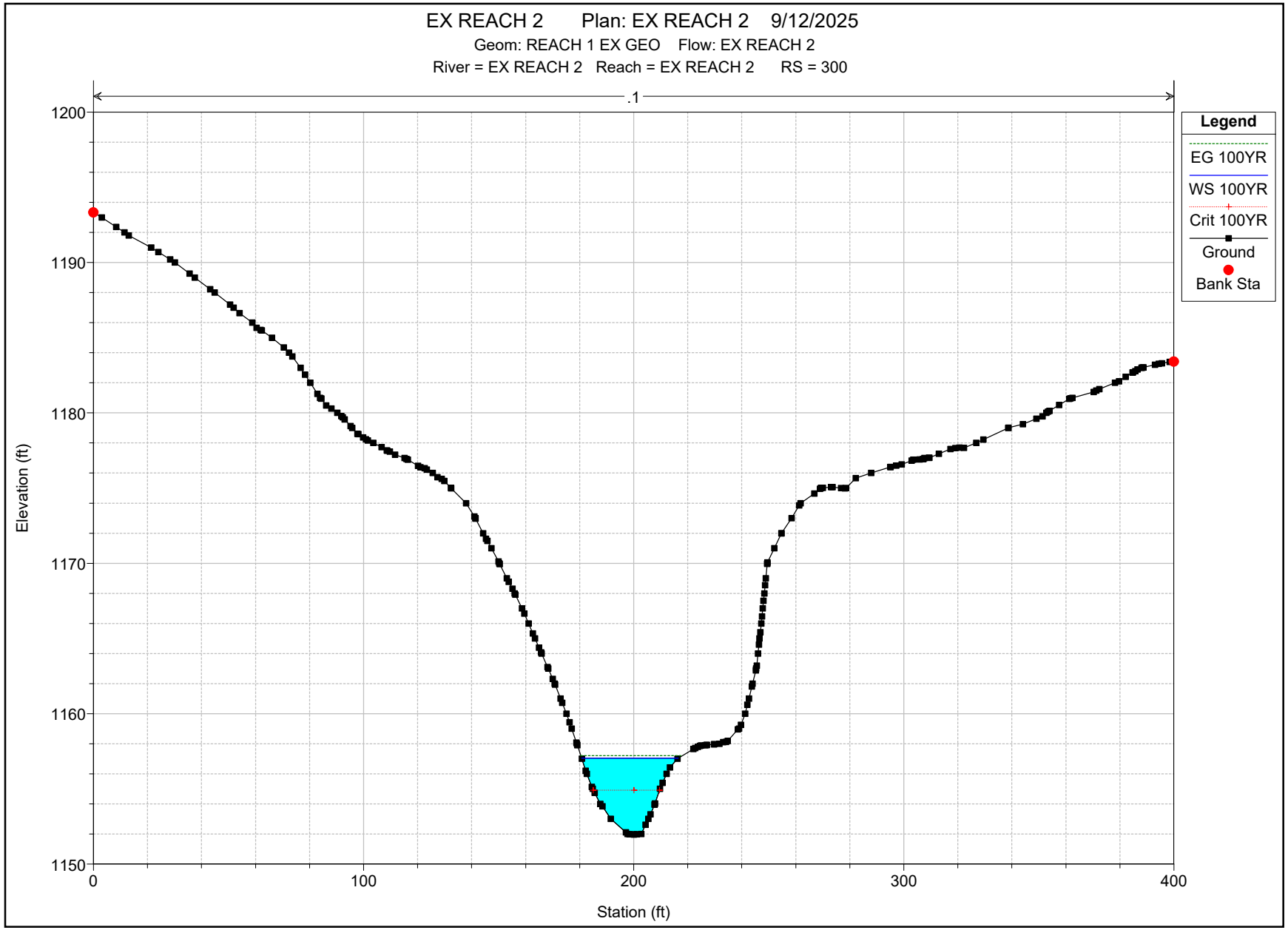

EX REACH 2 Plan: EX REACH 2 9/12/2025
Geom: REACH 1 EX GEO Flow: EX REACH 2
River = EX REACH 2 Reach = EX REACH 2 RS = 1300
.1
Legend
EG 100YR
WS 100YR
Crit 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
1260
1250
1240
1230
1220
1210
1200
1190
0
100
200
300
400

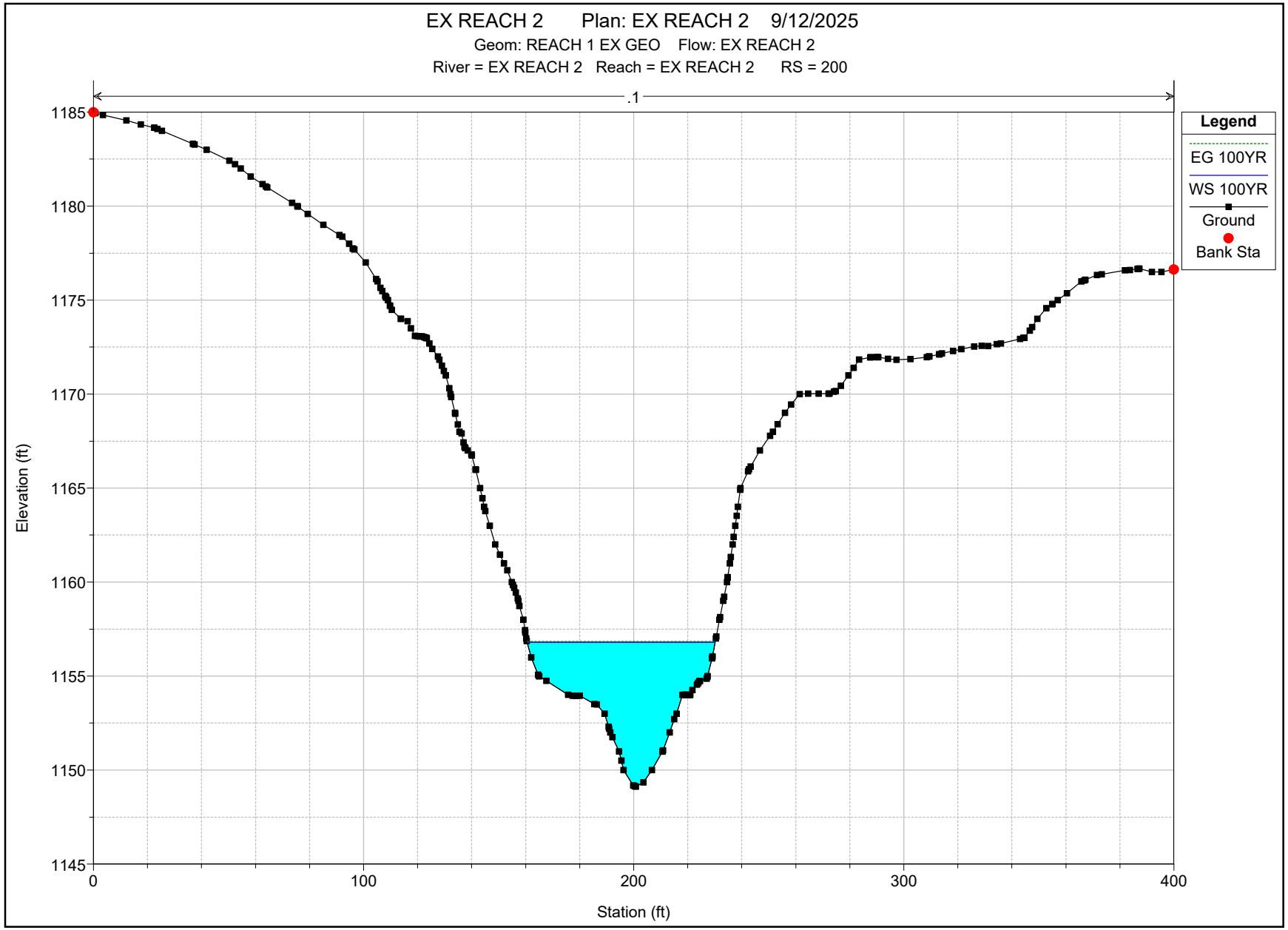

EX REACH 2 Plan: EX REACH 2 9/12/2025
Geom: REACH 1 EX GEO Flow: EX REACH 2
River = EX REACH 2 Reach = EX REACH 2 RS = 1100
.1
Legend
EG 100YR
WS 100YR
Crit 100YR
Ground
Bank Sta
Elevation (ft)
1230
1220
1210
1200
1190
1180
0
100
200
300
400
Station (ft)

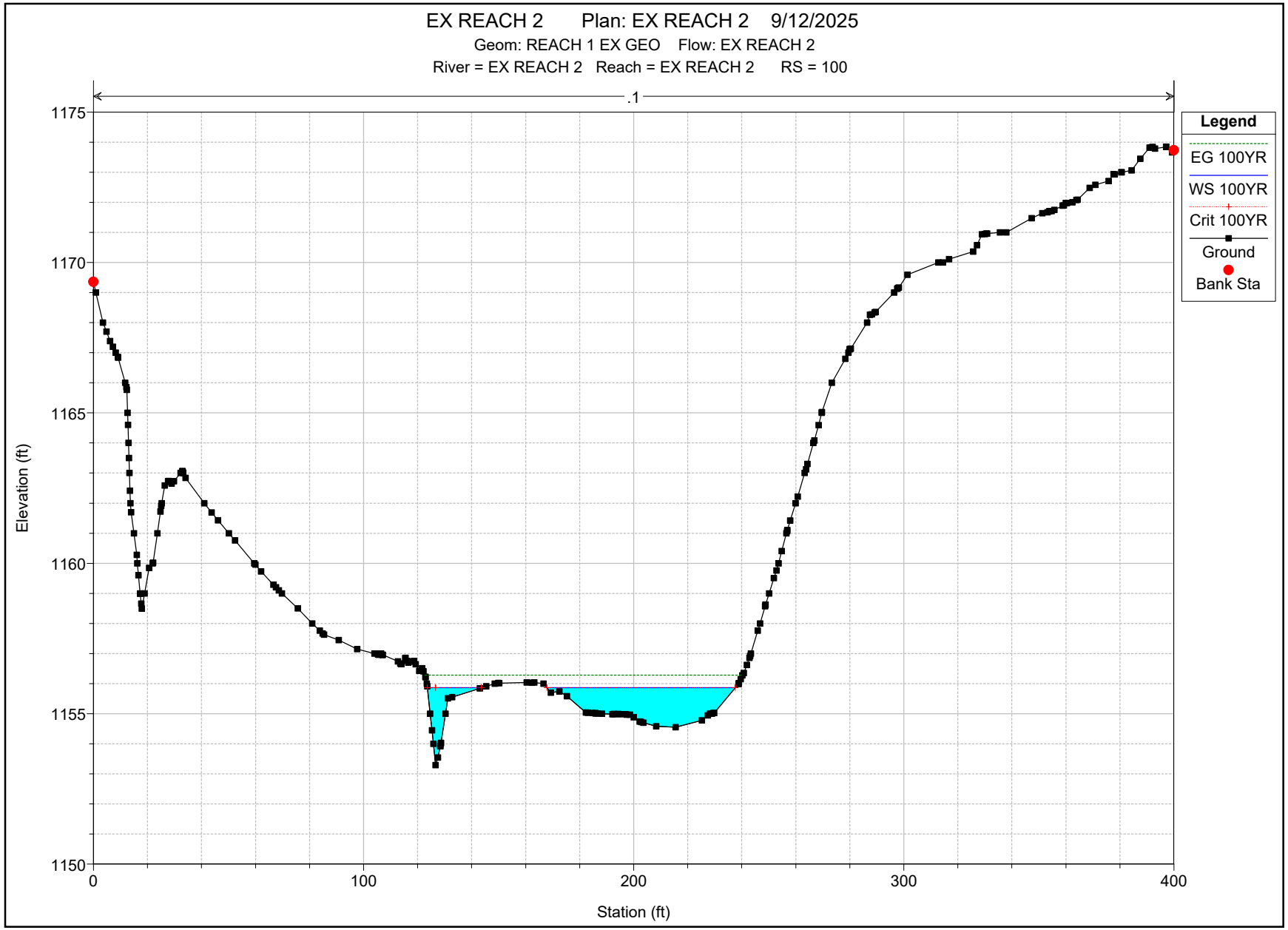

EX REACH 2 Plan: EX REACH 2 9/12/2025
Geom: REACH 1 EX GEO Flow: EX REACH 2
River = EX REACH 2 Reach = EX REACH 2 RS = 900
.1
Legend
EG 100YR
WS 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
1215
1210
1205
1200
1195
1190
1185
1180
1175
0
100
200
300
400
500

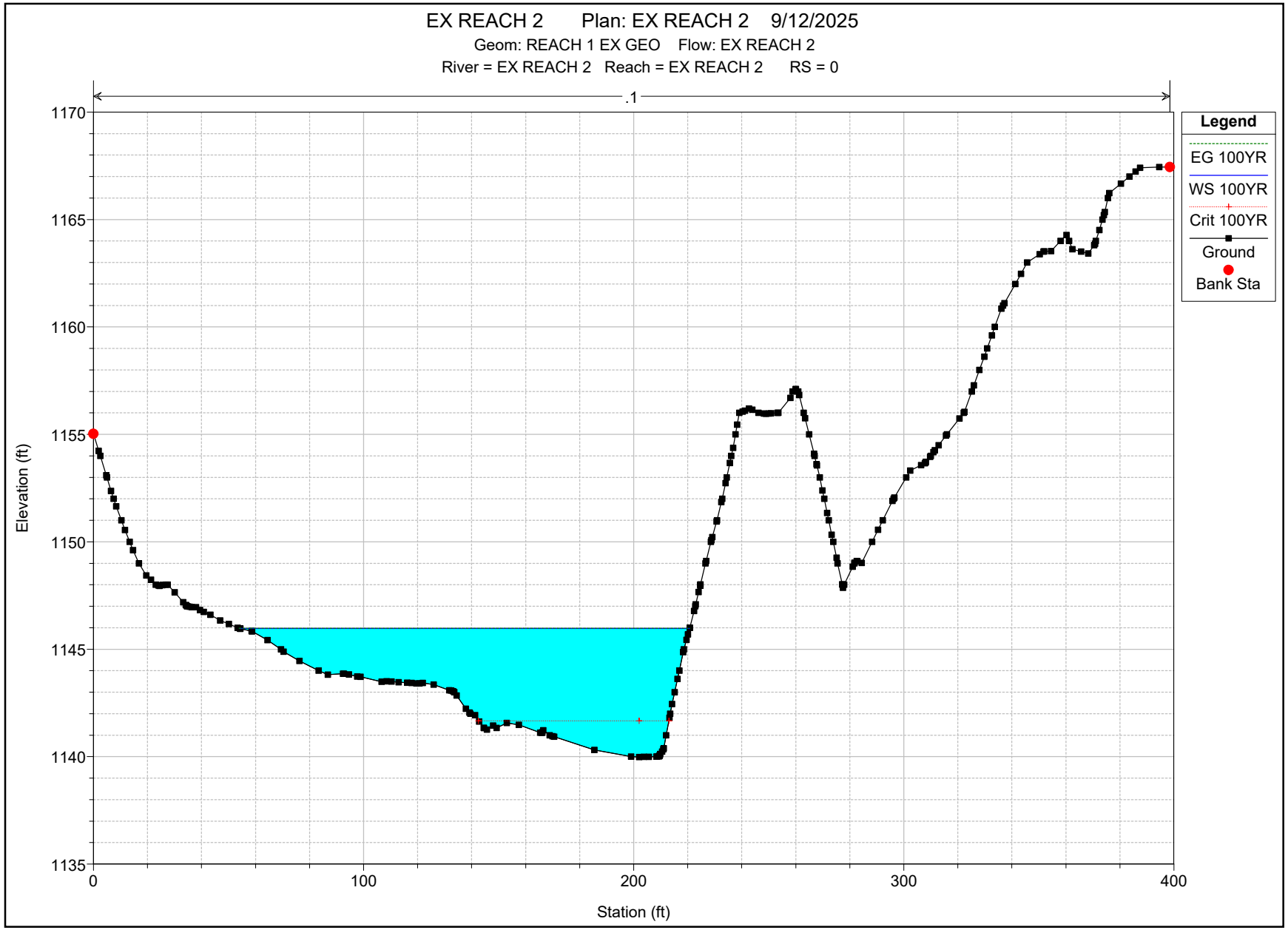

EX REACH 2 Plan: EX REACH 2 9/12/2025
Geom: REACH 1 EX GEO Flow: EX REACH 2
River = EX REACH 2 Reach = EX REACH 2 RS = 700
.1
Legend
EG 100YR
WS 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
1220
1210
1200
1190
1180
1170
0
100
200
300
400


EX REACH 2 Plan: EX REACH 2 9/12/2025
Geom: REACH 1 EX GEO Flow: EX REACH 2
River = EX REACH 2 Reach = EX REACH 2 RS = 500
.1
Legend
EG 100YR
WS 100YR
Crit 100YR
Ground
Bank Sta
Elevation (ft)
1210
1200
1190
1180
1170
1160
0
100
200
300
400
Station (ft)


EX REACH 2 Plan: EX REACH 2 9/12/2025
Geom: REACH 1 EX GEO Flow: EX REACH 2
River = EX REACH 2 Reach = EX REACH 2 RS = 300
.1
Legend
EG 100YR
WS 100YR
Crit 100YR
Ground
Bank Sta
Elevation (ft)
1200
1190
1180
1170
1160
1150
0
100
200
300
400
Station (ft)


EX REACH 2 Plan: EX REACH 2 9/12/2025
Geom: REACH 1 EX GEO Flow: EX REACH 2
River = EX REACH 2 Reach = EX REACH 2 RS = 200
.1
Legend
EG 100YR
WS 100YR
Ground
Bank Sta
Elevation (ft)
1185
1180
1175
1170
1165
1160
1155
1150
1145
0
100
200
300
400
Station (ft)


EX REACH 2 Plan: EX REACH 2 9/12/2025
Geom: REACH 1 EX GEO Flow: EX REACH 2
River = EX REACH 2 Reach = EX REACH 2 RS = 100
.1
Legend
EG 100YR
WS 100YR
Crit 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
1175
1170
1165
1160
1155
1150
0
100
200
300
400


EX REACH 2 Plan: EX REACH 2 9/12/2025
Geom: REACH 1 EX GEO Flow: EX REACH 2
River = EX REACH 2 Reach = EX REACH 2 RS = 0
.1
Legend
EG 100YR
WS 100YR
Crit 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
1170
1165
1160
1155
1150
1145
1140
1135
0
100
200
300
400

# POST DEVELOPMENT

HEC-RAS Plan: PROP R2 River: PROP REACH 2 Reach: PROP REACH 2 Profile: 100YR6HR

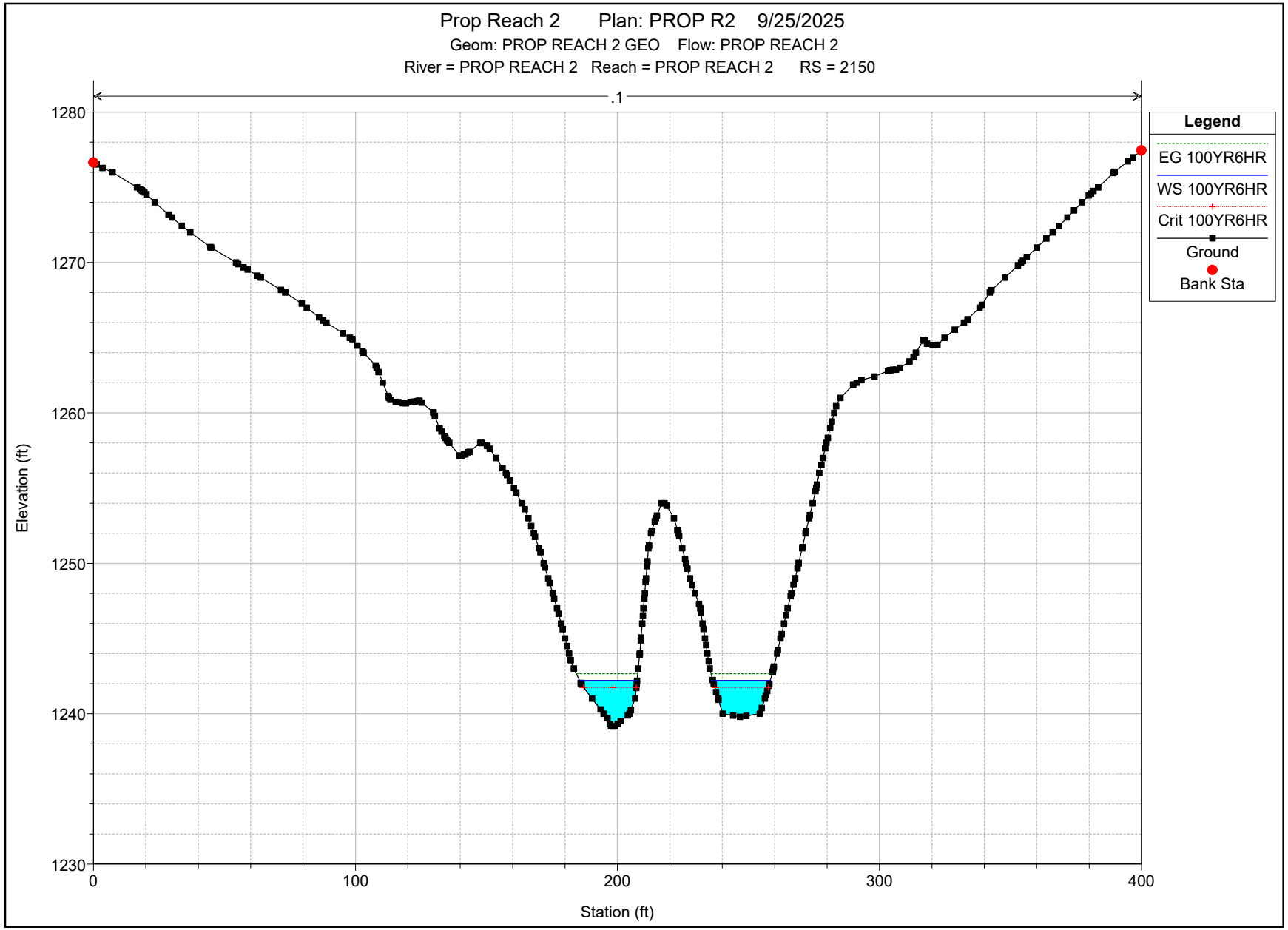
| Reach | River Sta | Profile | Q Total | Min Ch El | W.S. Elev | Crit W.S. | E.G. Elev | E.G. Slope | Vel Chnl | Flow Area | Top Width | Froude # Chl |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | (cfs) | (ft) | (ft) | (ft) | (ft) | (ft/ft) | (ft/s) | (sq ft) | (ft) | |
| PROP REACH 2 | 2150 | 100YR6HR | 446.00 | 1239.14 | 1242.20 | 1241.73 | 1242.66 | 0.061712 | 5.42 | 82.36 | 43.80 | 0.70 |
| PROP REACH 2 | 1950 | 100YR6HR | 446.00 | 1220.98 | 1224.58 | 1224.58 | 1225.69 | 0.122676 | 8.45 | 52.76 | 24.19 | 1.01 |
| PROP REACH 2 | 1750 | 100YR6HR | 446.00 | 1209.80 | 1213.95 | 1212.52 | 1214.20 | 0.023350 | 3.99 | 111.81 | 46.85 | 0.46 |
| PROP REACH 2 | 1500 | 100YR6HR | 446.00 | 1201.82 | 1206.90 | | 1207.34 | 0.032462 | 5.37 | 83.04 | 26.99 | 0.54 |
| PROP REACH 2 | 1300 | 100YR6HR | 446.00 | 1191.55 | 1196.02 | 1195.74 | 1197.03 | 0.092838 | 8.09 | 55.14 | 20.97 | 0.88 |
| PROP REACH 2 | 1100 | 100YR6HR | 446.00 | 1181.88 | 1185.72 | | 1186.10 | 0.034955 | 4.92 | 90.73 | 37.51 | 0.56 |
| PROP REACH 2 | 900 | 100YR6HR | 446.00 | 1175.96 | 1179.40 | | 1179.72 | 0.029094 | 4.54 | 98.20 | 39.90 | 0.51 |
| PROP REACH 2 | 700 | 100YR6HR | 446.00 | 1170.66 | 1174.68 | | 1174.92 | 0.019940 | 3.95 | 113.01 | 41.69 | 0.42 |
| PROP REACH 2 | 500 | 100YR6HR | 446.00 | 1162.44 | 1165.84 | 1165.84 | 1166.67 | 0.127436 | 7.29 | 61.19 | 37.17 | 1.00 |
| PROP REACH 2 | 300 | 100YR6HR | 446.00 | 1151.97 | 1162.79 | 1155.25 | 1162.80 | 0.000390 | 0.95 | 469.82 | 76.39 | 0.07 |
| PROP REACH 2 | 188.63 | 100YR6HR | 446.00 | 1148.67 | 1162.76 | 1153.34 | 1162.77 | 0.000250 | 0.78 | 570.16 | 83.29 | 0.05 |
| PROP REACH 2 | 185 | | Culvert | | | | | | | | | |
| PROP REACH 2 | 19.27 | 100YR6HR | 446.00 | 1140.00 | 1140.72 | 1142.15 | 1157.19 | 13.809630 | 32.55 | 13.70 | 29.59 | 8.43 |
| PROP REACH 2 | 0 | 100YR6HR | 446.00 | 1140.00 | 1145.26 | 1141.49 | 1145.27 | 0.000715 | 0.83 | 534.74 | 174.05 | 0.08 |

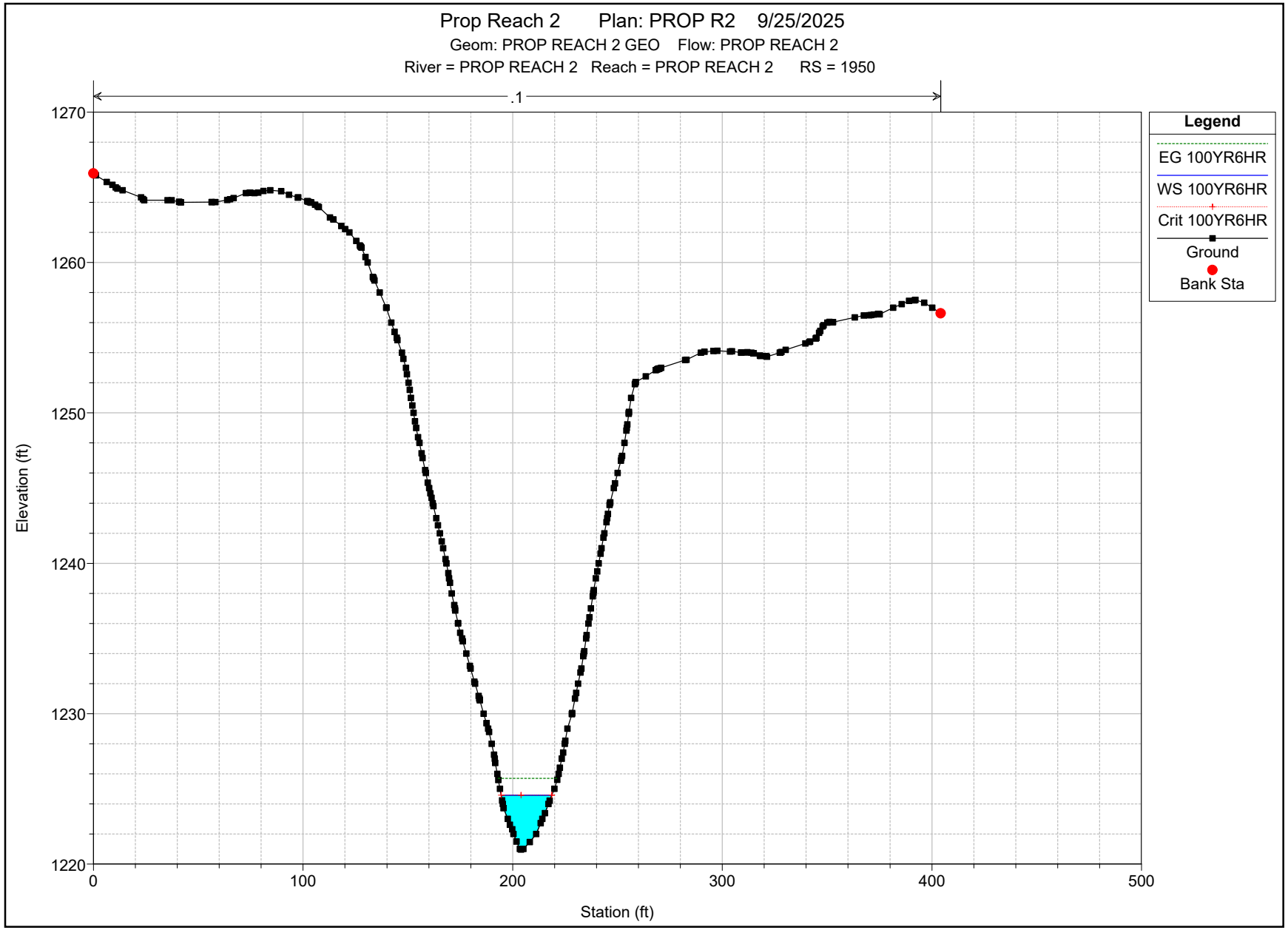
HEC-RAS Plan: PROP R2 River: PROP REACH 2 Reach: PROP REACH 2 Profile: 100YR6HR

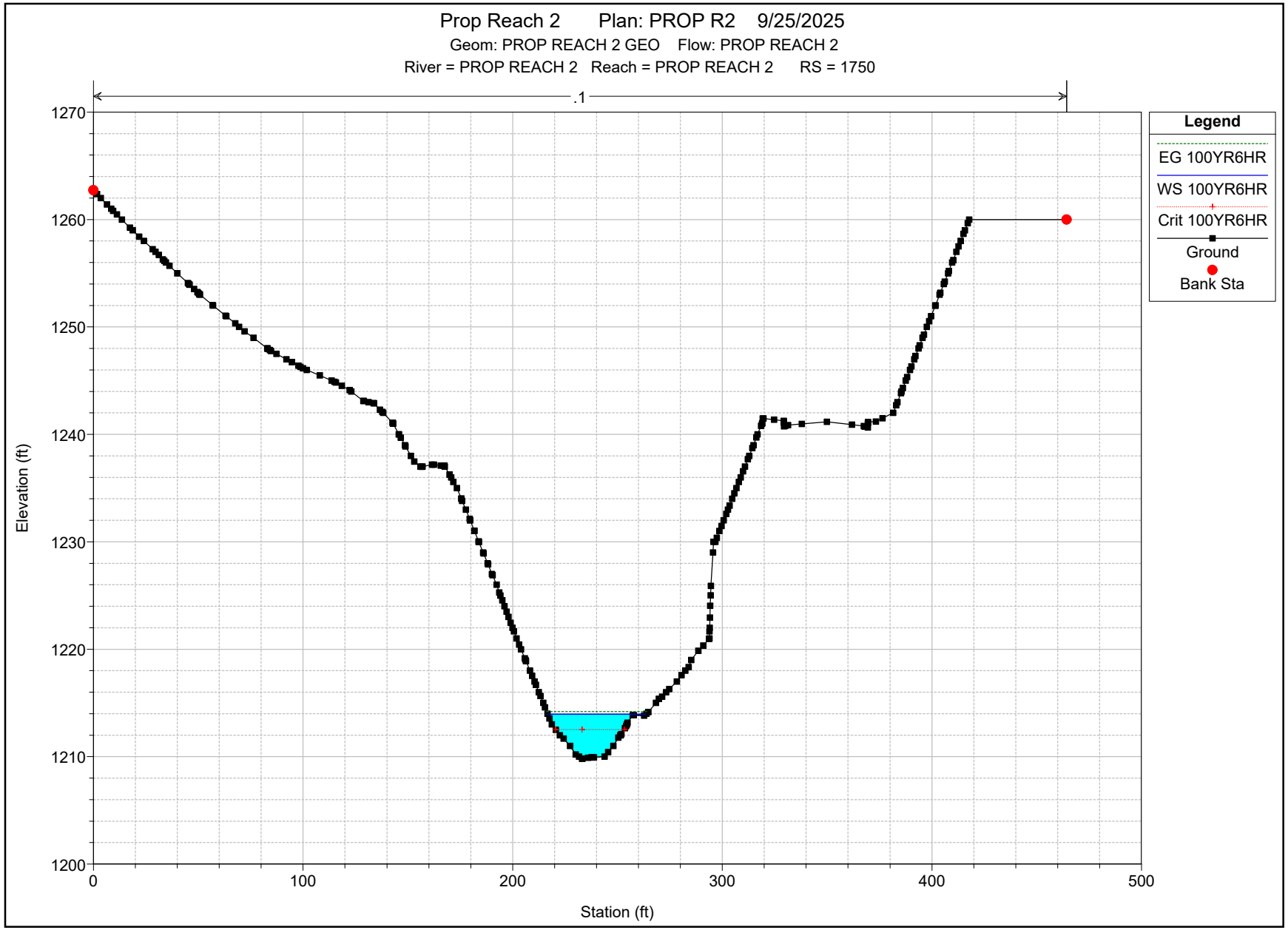
| Reach | River Sta | Profile | E.G. Elev | W.S. Elev | Vel Head | Frctn Loss | C & E Loss | Q Left | Q Channel | Q Right | Top Width |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | (ft) | (ft) | (ft) | (ft) | (ft) | (cfs) | (cfs) | (cfs) | (ft) |
| PROP REACH 2 | 2150 | 100YR6HR | 1242.66 | 1242.20 | 0.46 | 16.90 | 0.07 | | 446.00 | | 43.80 |
| PROP REACH 2 | 1950 | 100YR6HR | 1225.69 | 1224.58 | 1.11 | 9.06 | 0.26 | | 446.00 | | 24.19 |
| PROP REACH 2 | 1750 | 100YR6HR | 1214.20 | 1213.95 | 0.25 | 6.84 | 0.02 | | 446.00 | | 46.85 |
| PROP REACH 2 | 1500 | 100YR6HR | 1207.34 | 1206.90 | 0.45 | 10.26 | 0.06 | | 446.00 | | 26.99 |
| PROP REACH 2 | 1300 | 100YR6HR | 1197.03 | 1196.02 | 1.02 | 10.74 | 0.19 | | 446.00 | | 20.97 |
| PROP REACH 2 | 1100 | 100YR6HR | 1186.10 | 1185.72 | 0.38 | 6.36 | 0.02 | | 446.00 | | 37.51 |
| PROP REACH 2 | 900 | 100YR6HR | 1179.72 | 1179.40 | 0.32 | 4.77 | 0.02 | | 446.00 | | 39.90 |
| PROP REACH 2 | 700 | 100YR6HR | 1174.92 | 1174.68 | 0.24 | 8.19 | 0.06 | | 446.00 | | 41.69 |
| PROP REACH 2 | 500 | 100YR6HR | 1166.67 | 1165.84 | 0.83 | 0.28 | 0.24 | | 446.00 | | 37.17 |
| PROP REACH 2 | 300 | 100YR6HR | 1162.80 | 1162.79 | 0.01 | 0.03 | 0.00 | | 446.00 | | 76.39 |
| PROP REACH 2 | 188.63 | 100YR6HR | 1162.77 | 1162.76 | 0.01 | | | | 446.00 | | 83.29 |
| PROP REACH 2 | 185 | | Culvert | | | | | | | | |
| PROP REACH 2 | 19.27 | 100YR6HR | 1157.19 | 1140.72 | 16.47 | | | | 446.00 | | 29.59 |
| PROP REACH 2 | 0 | 100YR6HR | 1145.27 | 1145.26 | 0.01 | | | | 446.00 | | 174.05 |

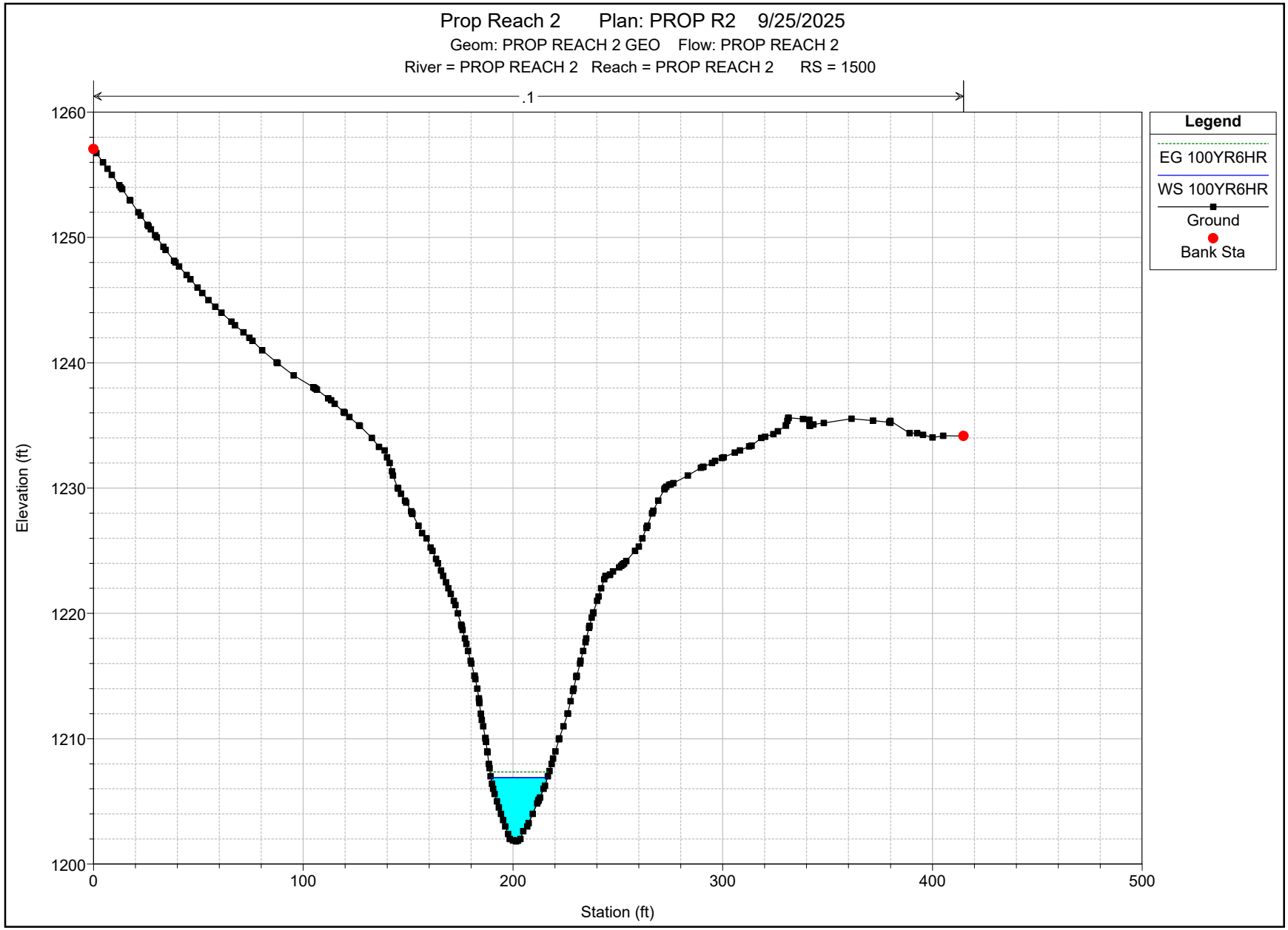
Plan: PROP R2  PROP REACH 2  PROP REACH 2  RS: 185  Culv Group:  Culvert #3  Profile: 100YR6HR

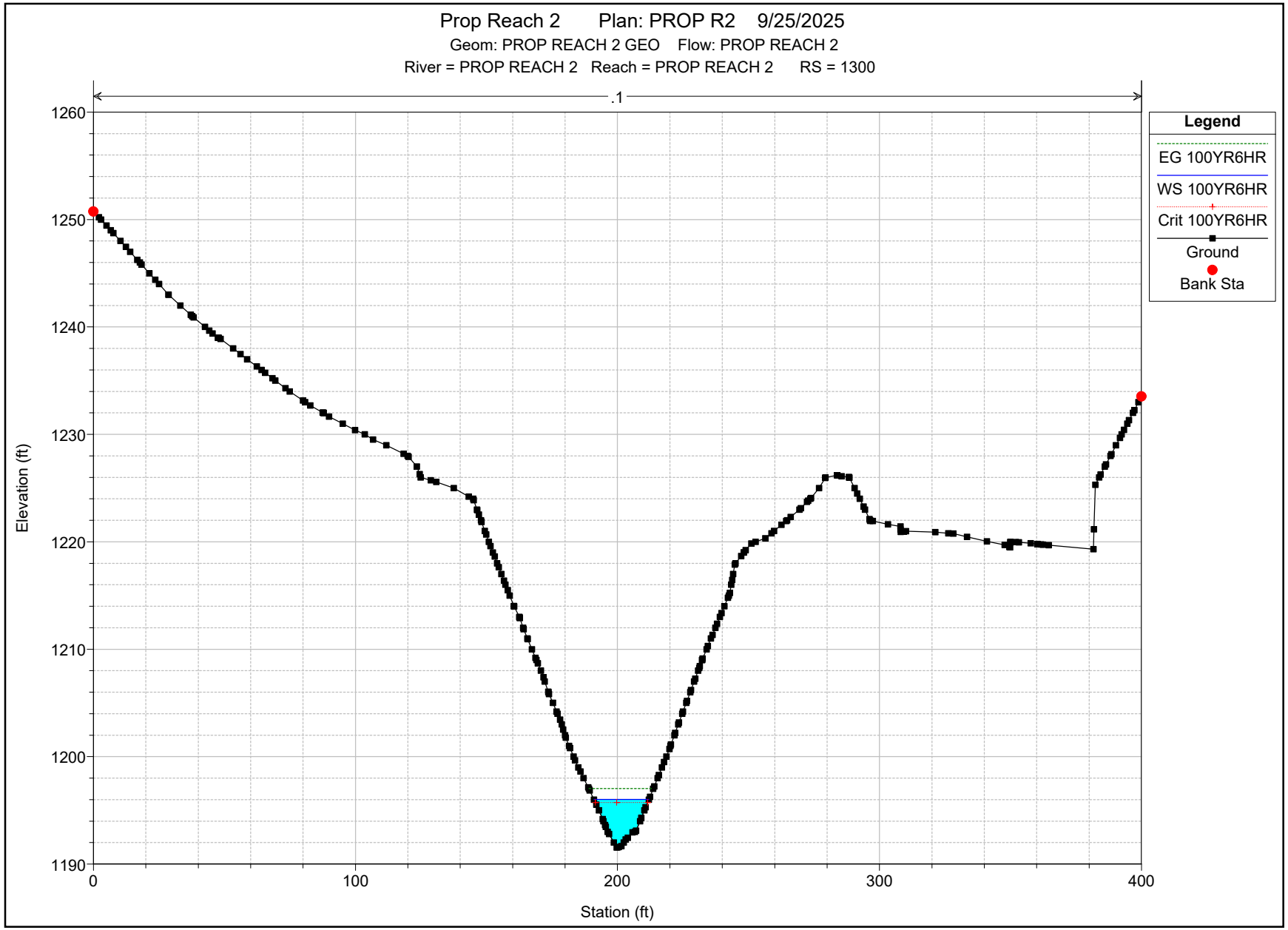
| | | | |
|---|---|---|---|
| Q Culv Group (cfs) | 446.00 | Culv Full Len (ft) | |
| # Barrels | 1 | Culv Vel US (ft/s) | 15.77 |
| Q Barrel (cfs) | 446.00 | Culv Vel DS (ft/s) | 29.84 |
| E.G. US. (ft) | 1162.77 | Culv Inv El Up (ft) | 1149.00 |
| W.S. US. (ft) | 1162.76 | Culv Inv El Dn (ft) | 1140.30 |
| E.G. DS (ft) | 1145.33 | Culv Frctn Ls (ft) | 5.38 |
| W.S. DS (ft) | 1145.23 | Culv Exit Loss (ft) | 11.94 |
| Delta EG (ft) | 17.44 | Culv Entr Loss (ft) | 0.12 |
| Delta WS (ft) | 17.53 | Q Weir (cfs) | |
| E.G. IC (ft) | 1162.77 | Weir Sta Lft (ft) | |
| E.G. OC (ft) | 1158.82 | Weir Sta Rgt (ft) | |
| Culvert Control | Inlet | Weir Submerg | |
| Culv WS Inlet (ft) | 1155.00 | Weir Max Depth (ft) | |
| Culv WS Outlet (ft) | 1143.44 | Weir Avg Depth (ft) | |
| Culv Nml Depth (ft) | 2.87 | Weir Flow Area (sq ft) | |
| Culv Crt Depth (ft) | 5.52 | Min El Weir Flow (ft) | 1175.21 |

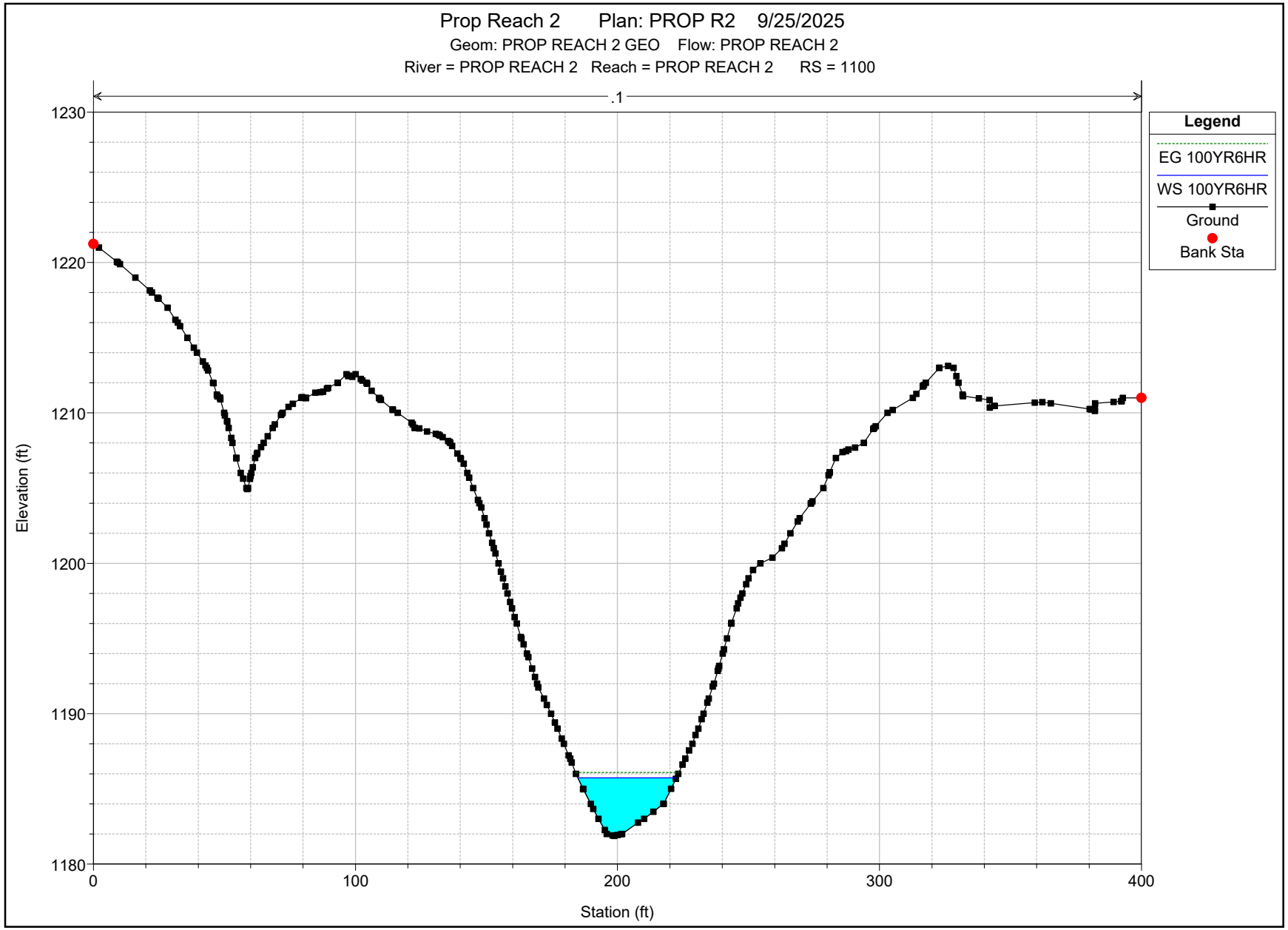

Prop Reach 2 Plan: PROP R2 9/25/2025
Geom: PROP REACH 2 GEO Flow: PROP REACH 2
River = PROP REACH 2 Reach = PROP REACH 2 RS = 2150
.1
Legend
EG 100YR6HR
WS 100YR6HR
Crit 100YR6HR
Ground
Bank Sta
Elevation (ft)
1280
1270
1260
1250
1240
1230
0
100
200
300
400
Station (ft)

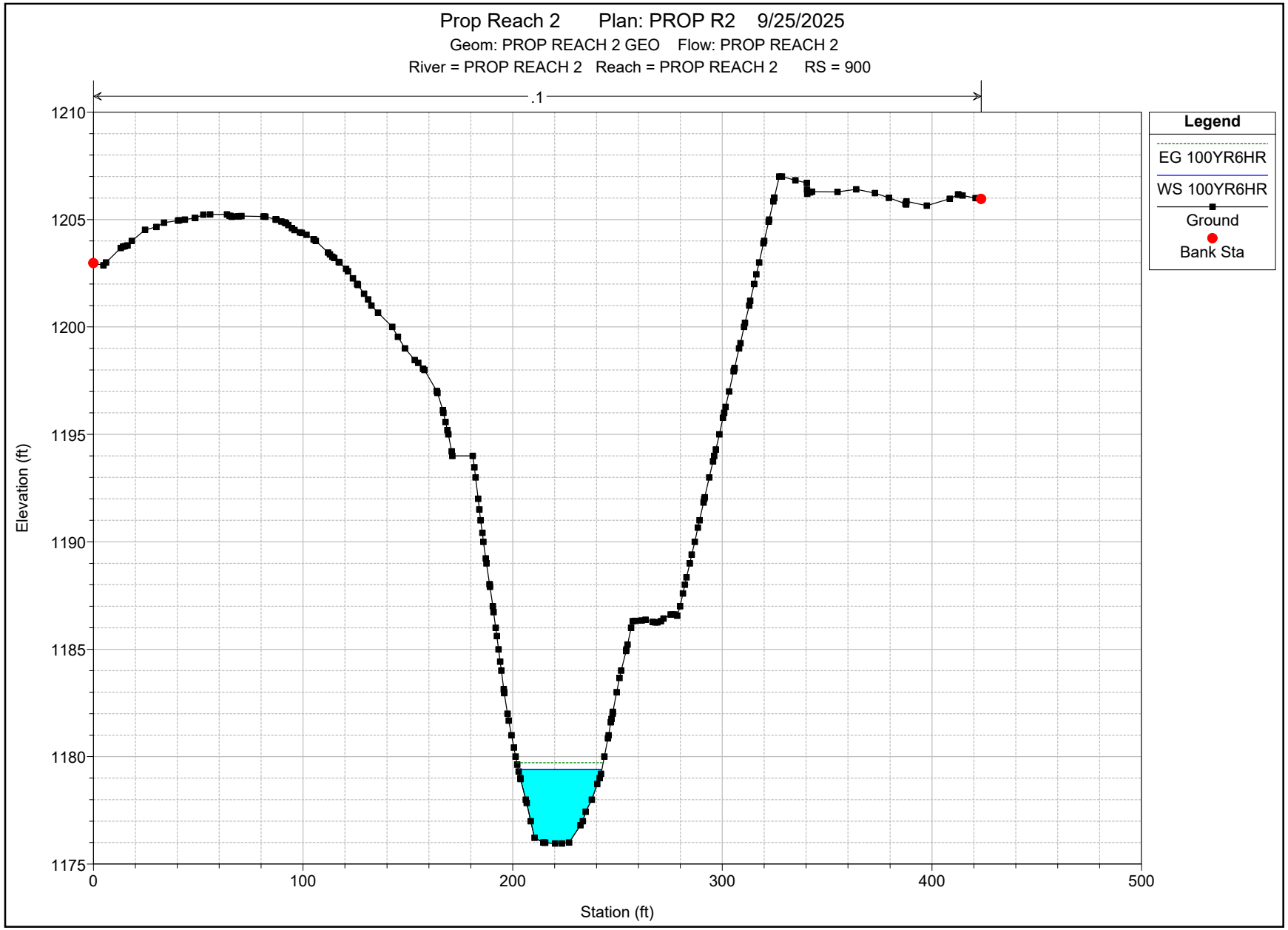

Prop Reach 2 Plan: PROP R2 9/25/2025
Geom: PROP REACH 2 GEO Flow: PROP REACH 2
River = PROP REACH 2 Reach = PROP REACH 2 RS = 1950
.1
Legend
EG 100YR6HR
WS 100YR6HR
Crit 100YR6HR
Ground
Bank Sta
Elevation (ft)
Station (ft)
1270
1260
1250
1240
1230
1220
0
100
200
300
400
500

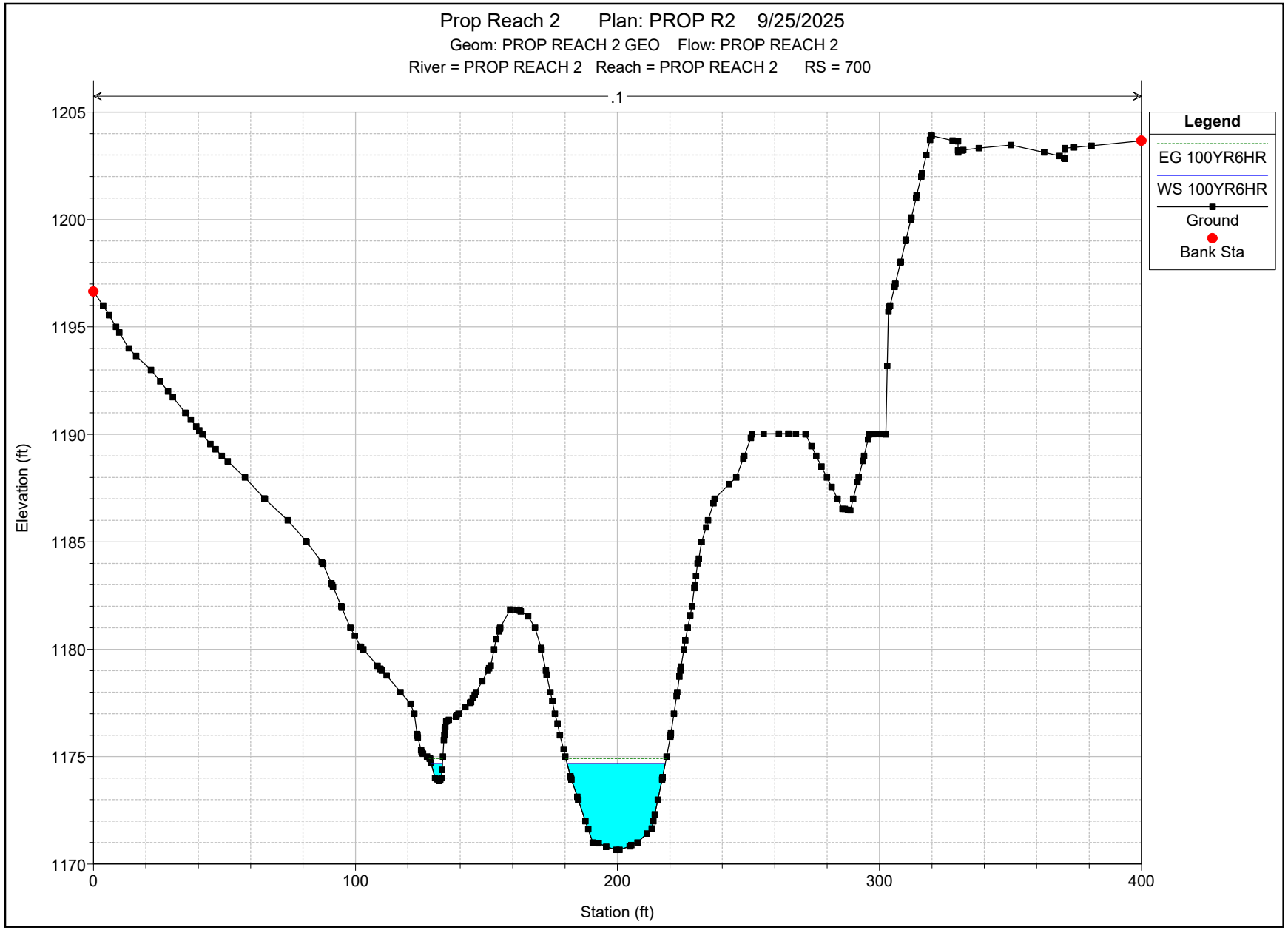

Prop Reach 2 Plan: PROP R2 9/25/2025
Geom: PROP REACH 2 GEO Flow: PROP REACH 2
River = PROP REACH 2 Reach = PROP REACH 2 RS = 1750
.1
Legend
EG 100YR6HR
WS 100YR6HR
Crit 100YR6HR
Ground
Bank Sta
Elevation (ft)
Station (ft)
1270
1260
1250
1240
1230
1220
1210
1200
0
100
200
300
400
500

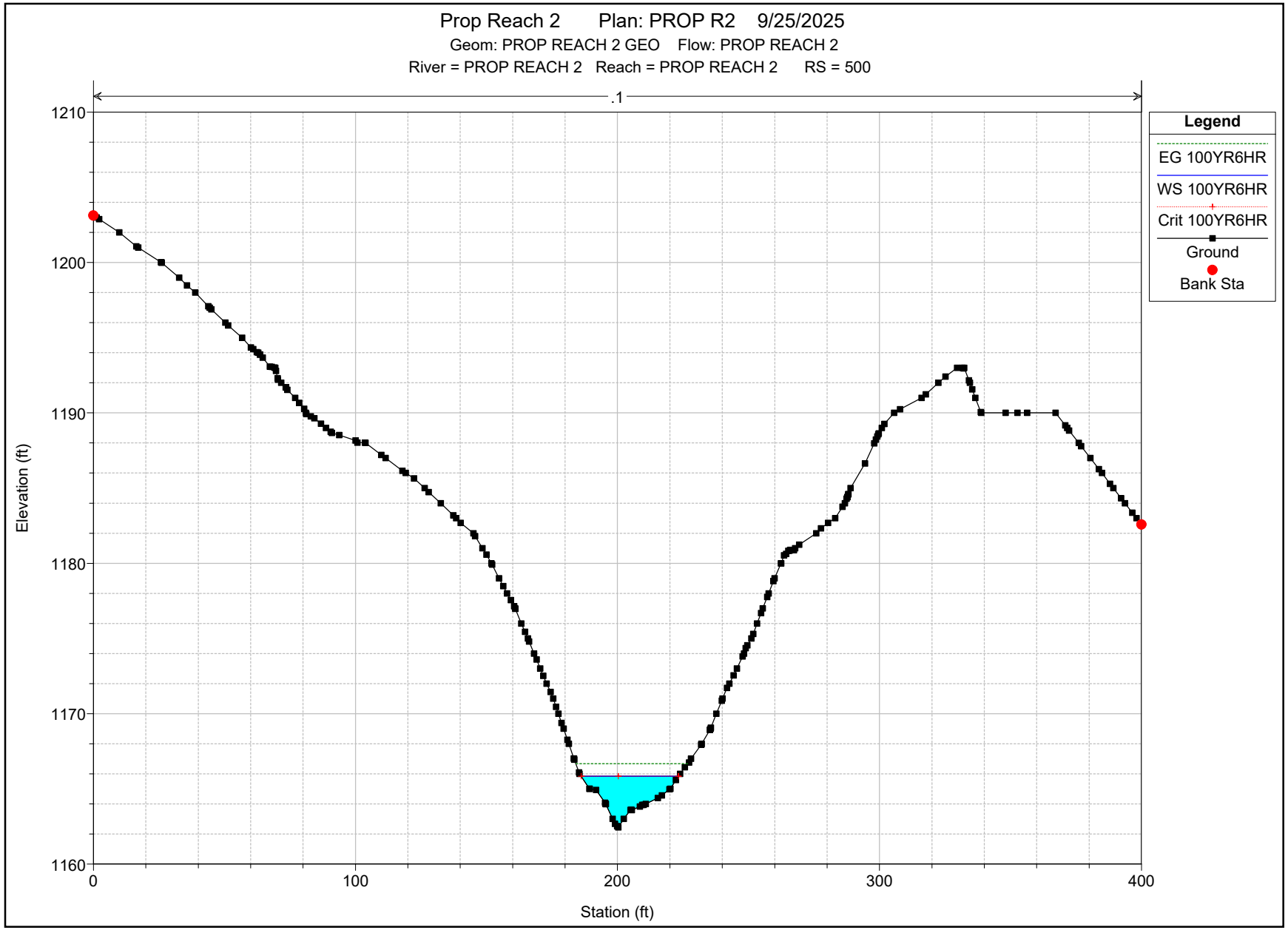

Prop Reach 2 Plan: PROP R2 9/25/2025
Geom: PROP REACH 2 GEO Flow: PROP REACH 2
River = PROP REACH 2 Reach = PROP REACH 2 RS = 1500
.1
Legend
EG 100YR6HR
WS 100YR6HR
Ground
Bank Sta
Elevation (ft)
Station (ft)
1260
1250
1240
1230
1220
1210
1200
0
100
200
300
400
500

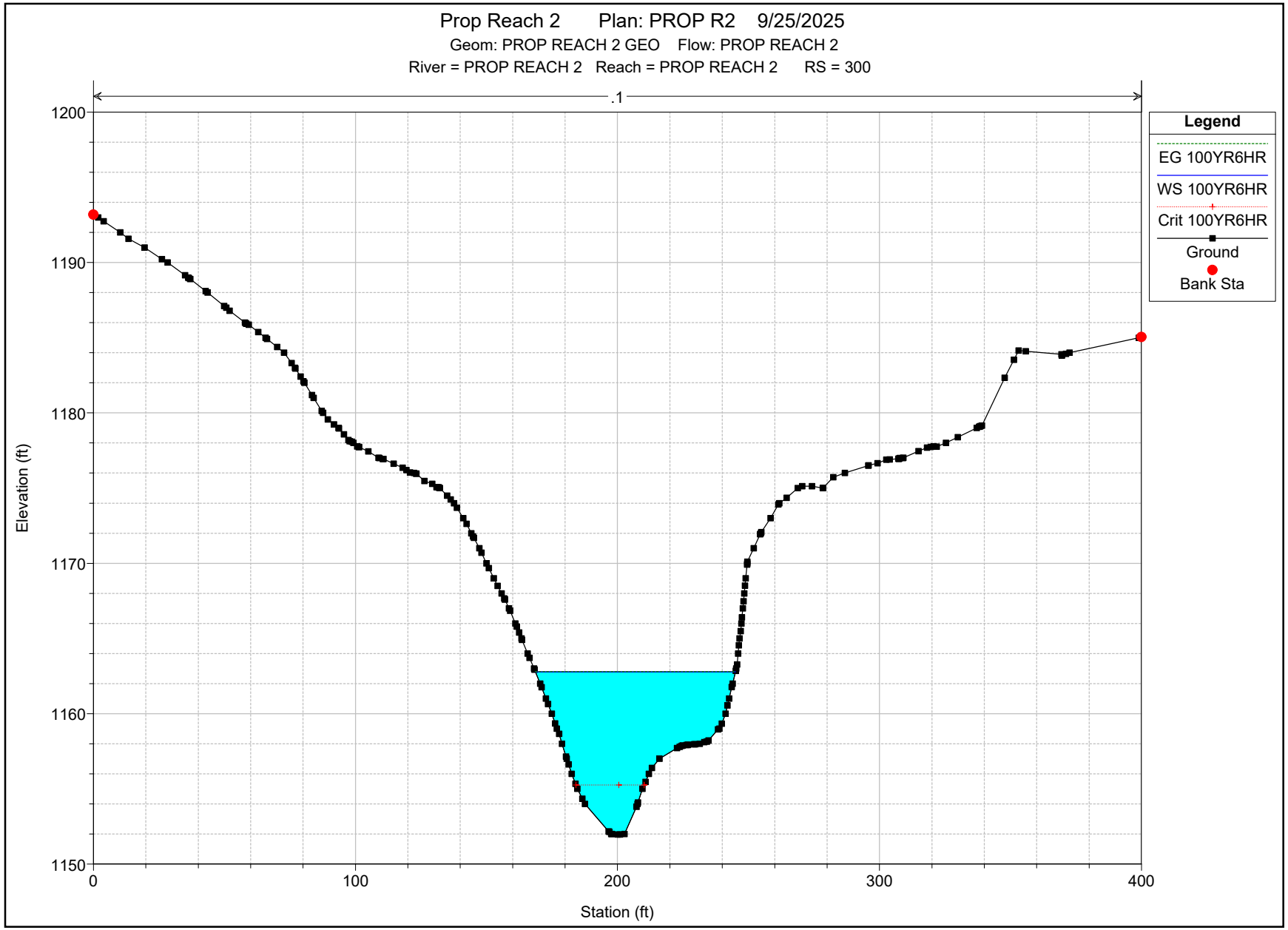

Prop Reach 2 Plan: PROP R2 9/25/2025
Geom: PROP REACH 2 GEO Flow: PROP REACH 2
River = PROP REACH 2 Reach = PROP REACH 2 RS = 1300
.1
Legend
EG 100YR6HR
WS 100YR6HR
Crit 100YR6HR
Ground
Bank Sta
Elevation (ft)
1260
1250
1240
1230
1220
1210
1200
1190
0
100
200
300
400
Station (ft)

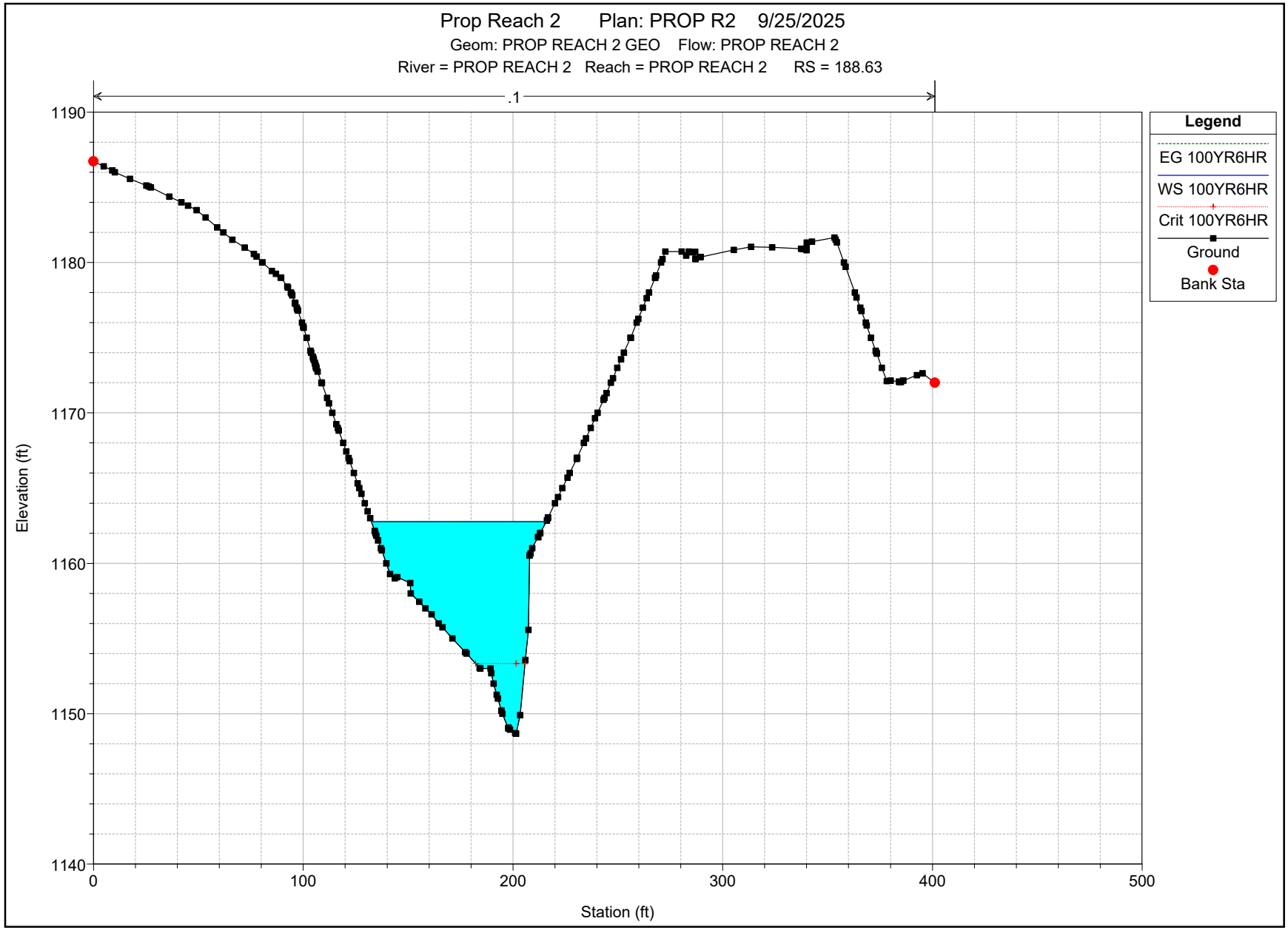

Prop Reach 2 Plan: PROP R2 9/25/2025
Geom: PROP REACH 2 GEO Flow: PROP REACH 2
River = PROP REACH 2 Reach = PROP REACH 2 RS = 1100
.1
Legend
EG 100YR6HR
WS 100YR6HR
Ground
Bank Sta
Elevation (ft)
1230
1220
1210
1200
1190
1180
0
100
200
300
400
Station (ft)

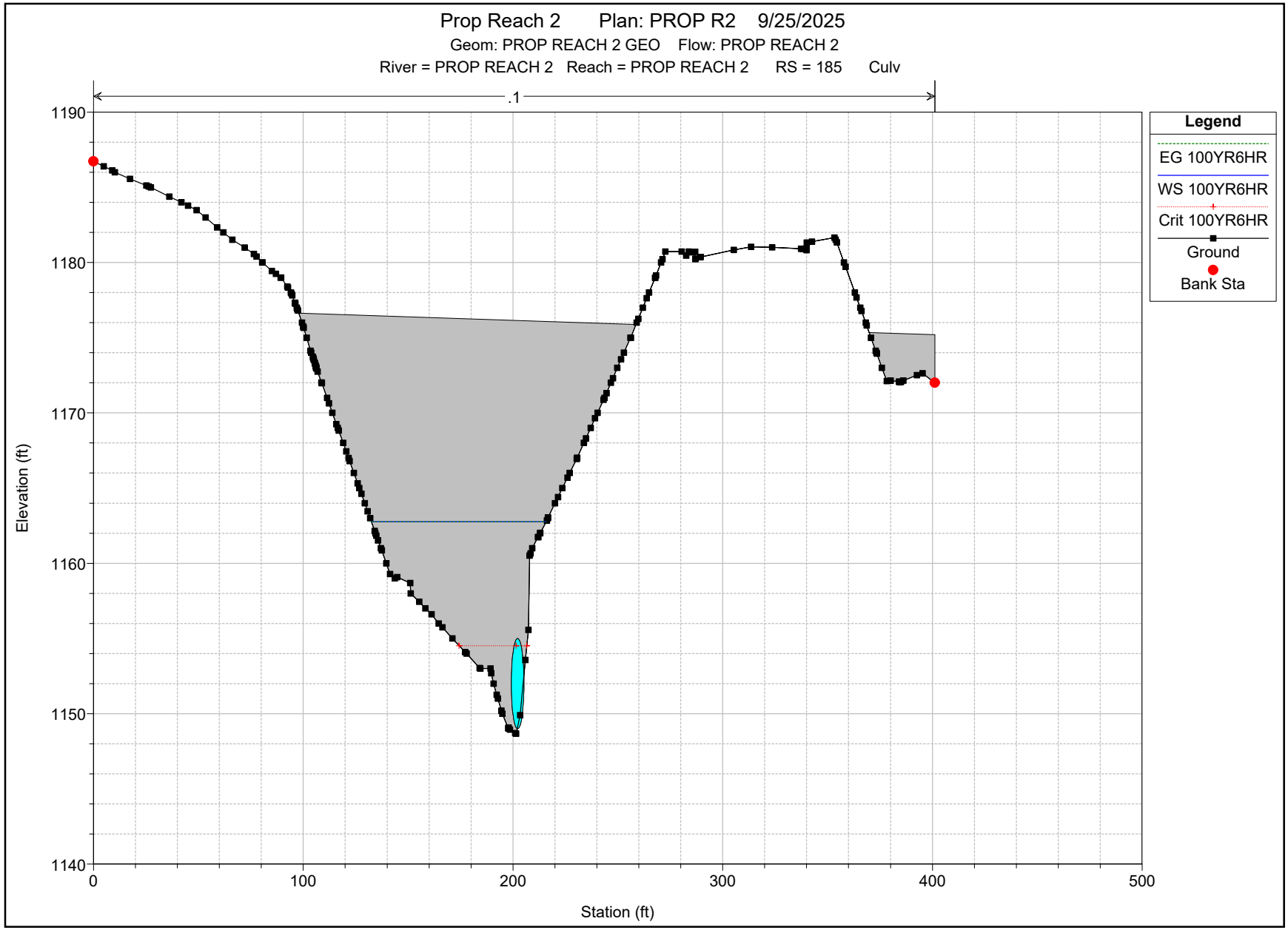

Prop Reach 2 Plan: PROP R2 9/25/2025
Geom: PROP REACH 2 GEO Flow: PROP REACH 2
River = PROP REACH 2 Reach = PROP REACH 2 RS = 900
.1
Legend
EG 100YR6HR
WS 100YR6HR
Ground
Bank Sta
Elevation (ft)
Station (ft)
1210
1205
1200
1195
1190
1185
1180
1175
0
100
200
300
400
500

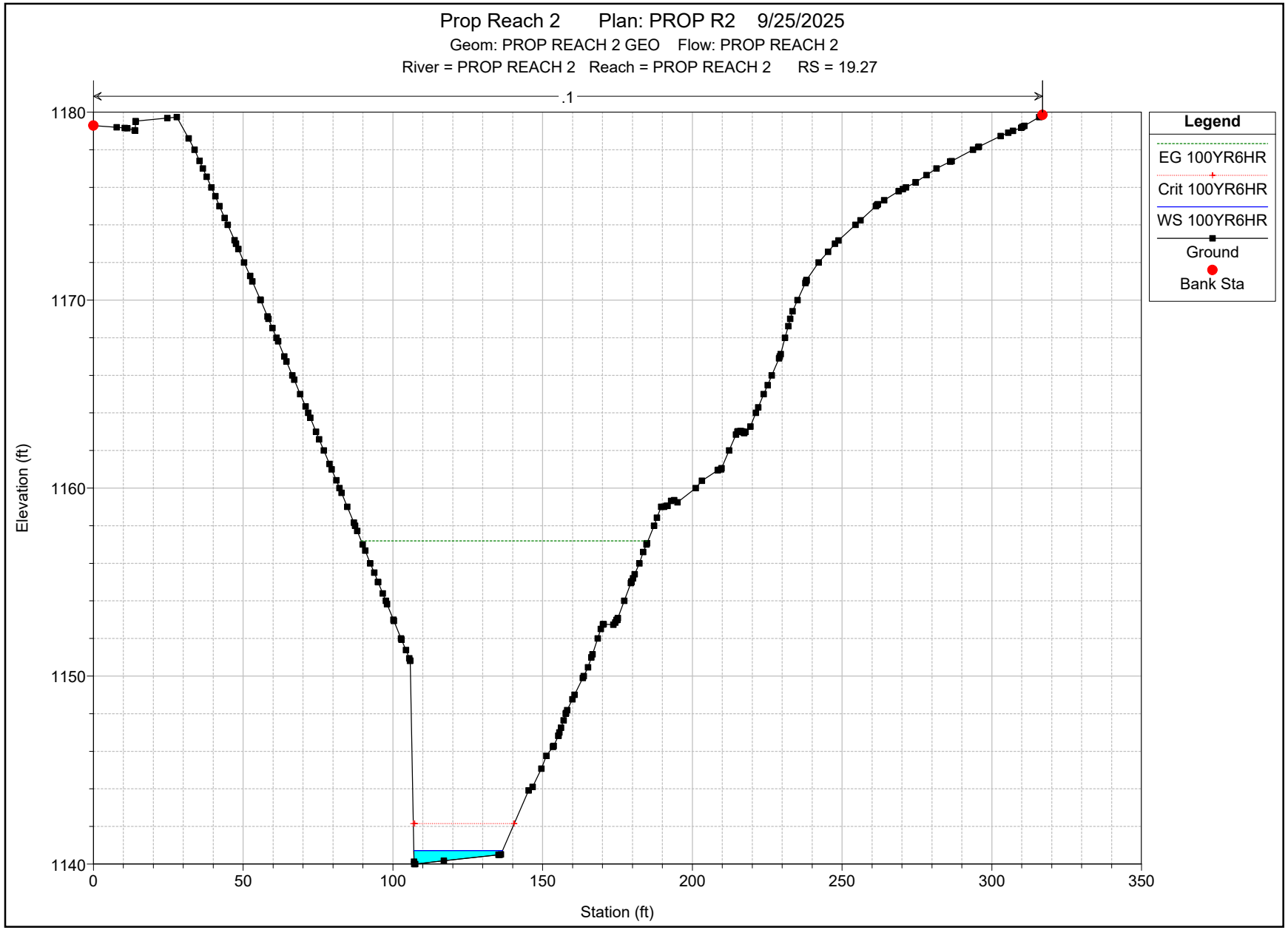

Prop Reach 2 Plan: PROP R2 9/25/2025
Geom: PROP REACH 2 GEO Flow: PROP REACH 2
River = PROP REACH 2 Reach = PROP REACH 2 RS = 700
.1
Legend
EG 100YR6HR
WS 100YR6HR
Ground
Bank Sta
Elevation (ft)
Station (ft)
1205
1200
1195
1190
1185
1180
1175
1170
0
100
200
300
400

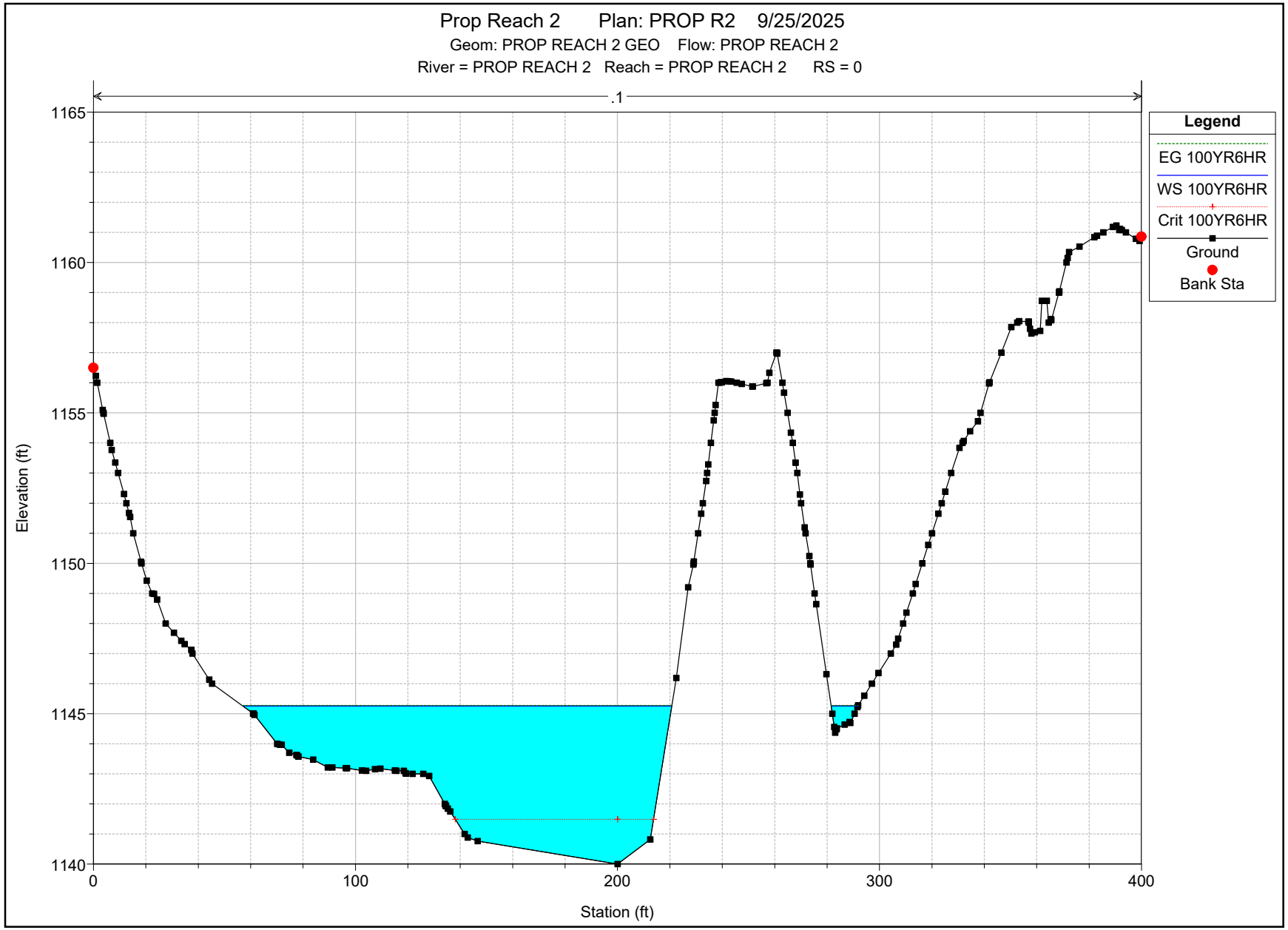

Prop Reach 2 Plan: PROP R2 9/25/2025
Geom: PROP REACH 2 GEO Flow: PROP REACH 2
River = PROP REACH 2 Reach = PROP REACH 2 RS = 500
.1
Legend
EG 100YR6HR
WS 100YR6HR
Crit 100YR6HR
Ground
Bank Sta
Elevation (ft)
Station (ft)
1210
1200
1190
1180
1170
1160
0
100
200
300
400


Prop Reach 2 Plan: PROP R2 9/25/2025
Geom: PROP REACH 2 GEO Flow: PROP REACH 2
River = PROP REACH 2 Reach = PROP REACH 2 RS = 300
.1
Legend
EG 100YR6HR
WS 100YR6HR
Crit 100YR6HR
Ground
Bank Sta
Elevation (ft)
Station (ft)
1200
1190
1180
1170
1160
1150
0
100
200
300
400


Prop Reach 2 Plan: PROP R2 9/25/2025
Geom: PROP REACH 2 GEO Flow: PROP REACH 2
River = PROP REACH 2 Reach = PROP REACH 2 RS = 188.63
.1
Legend
EG 100YR6HR
WS 100YR6HR
Crit 100YR6HR
Ground
Bank Sta
Elevation (ft)
1190
1180
1170
1160
1150
1140
0
100
200
300
400
500
Station (ft)

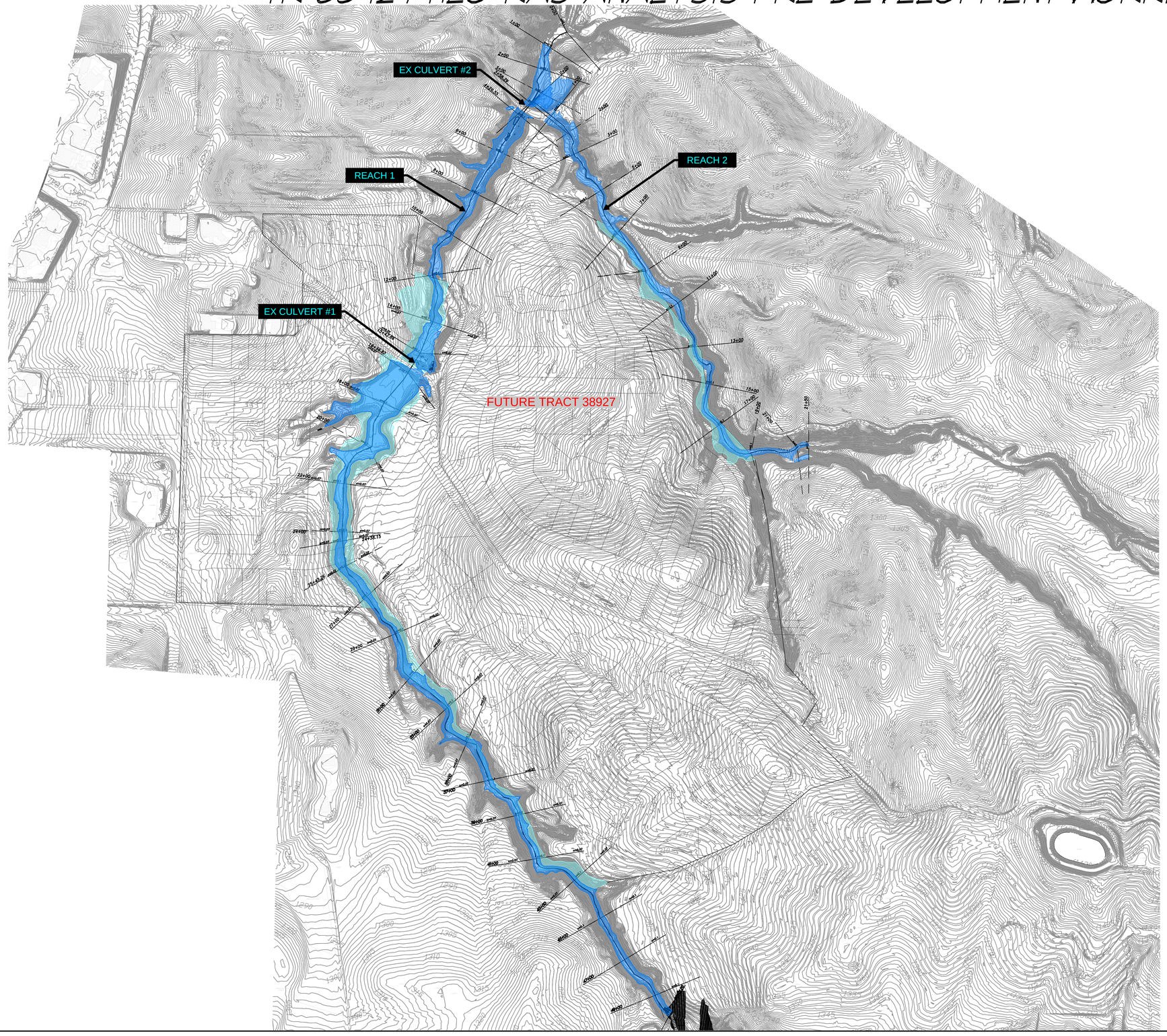

Prop Reach 2 Plan: PROP R2 9/25/2025
Geom: PROP REACH 2 GEO Flow: PROP REACH 2
River = PROP REACH 2 Reach = PROP REACH 2 RS = 185 Culv
.1
Legend
EG 100YR6HR
WS 100YR6HR
Crit 100YR6HR
Ground
Bank Sta
Elevation (ft)
1190
1180
1170
1160
1150
1140
0
100
200
300
400
500
Station (ft)


Prop Reach 2 Plan: PROP R2 9/25/2025
Geom: PROP REACH 2 GEO Flow: PROP REACH 2
River = PROP REACH 2 Reach = PROP REACH 2 RS = 19.27
.1
Legend
EG 100YR6HR
Crit 100YR6HR
WS 100YR6HR
Ground
Bank Sta
Elevation (ft)
1180
1170
1160
1150
1140
0
50
100
150
200
250
300
350
Station (ft)


Prop Reach 2 Plan: PROP R2 9/25/2025
Geom: PROP REACH 2 GEO Flow: PROP REACH 2
River = PROP REACH 2 Reach = PROP REACH 2 RS = 0
.1
Legend
EG 100YR6HR
WS 100YR6HR
Crit 100YR6HR
Ground
Bank Sta
Elevation (ft)
1165
1160
1155
1150
1145
1140
0
100
200
300
400
Station (ft)

# Appendix C – Pre Development and Post Development HEC-RAS Workplan

# TR 38927 HEC-RAS ANALYSIS PRE-DEVELOPMENT WORKMAP




## DESIGN CONDITION

$Q_{100}$ = 1079.5 CFS

## LEGEND

INUNDATION BOUNDARY PRE-DEVELOPMENT 100 YEARS WITH MANNING'S N=0.1 FOR RIPARIAN AREAS AND N=0.07 FOR UNTOUCHED EXISTING AREAS.

RIPARIAN LIMITS

EX. REACH SAMPLE LINE

EX. REACH

## EX CULVERT #1

EX. 60" CMP PIPE @STA. 16+36.8
STA. 16+35.8 CULVERT LENGTH: 93 FT
DISTANCE FROM PRIOR X-SECTION: 0.02'
**ENTRANCE LOSS: 0.03**

UPSTREAM:
STA. 16+36.8
ELEV. 1199 (EX) @ INLET
DOWNSTREAM:
STA: 15+42.86
ELEV. 1183.38 (EX) @ OUTLET

CULVERT:
MANNING N: 0.025 (CMP)
BARREL: US CENTER: 182.02
DS CENTER: 191.11

UPSTREAM SLOPE: 1.2%
DOWNSTREAM SLOPE: 7.6%

## EX CULVERT #2

EX. 60" CMP PIPE @STA. 3+58.29
STA. 3+58.29 CULVERT LENGTH: 68 FT
DISTANCE FROM PRIOR X-SECTION: 0.04'
**ENTRANCE LOSS: 0.03**

UPSTREAM:
STA. 4+26.55
ELEV. 1143 (EX) @ INLET
DOWNSTREAM:
STA: 3+58.29
ELEV. 1140.31 (EX) @ OUTLET

CULVERT:
MANNING N: 0.025 (CMP)
BARREL: US CENTER: 200
DS CENTER: 200

UPSTREAM SLOPE: 5.8%
DOWNSTREAM SLOPE: 1.3%

0 100 200 400 600 800
SCALE: 1" = 200'

PREPARED DATE: DECEMBER 2024

PLANS PREPARED BY:
adkan ENGINEERS
Civil Engineering · Surveying · Planning
6879 Airport Drive, Riverside, CA 92504
Tel:(951) 688-0241 · Fax:(951) 688-0599

# TR 38927 HEC-RAS ANALYSIS POST-DEVELOPMENT WORKMAP




## LEGEND

- INUNDATION BOUNDARY PRO-DEVELOPMENT 100 YEARS WITH MANNING'S N=0.1 FOR RIPARIAN AREAS AND N=0.07 FOR UNTOUCHED EXISTING AREAS.
- RIPARIAN LIMITS
- TRACT BOUNDARY
- PROP. REACH SAMPLE LINE
- EX. REACH
- PROP. CULVERT
- PROP. V-DITCH
- INEFFECTIVE AREAS

0 200 600
100 400 800
SCALE: 1" = 200'

## DESIGN CONDITION

$Q_{100}$ = **1245.2**

## CULVERT #1

PROP. 2x72" PIPE CULVERT @STA. 24+52.64
STA. 24+52.64 CULVERT LENGTH: 80 FT (PROP.)
DISTANCE FROM PRIOR X-SECTION: 0.1'
**CONTRACTION RATIO: 1:1**
**ENTRANCE LOSS: 0.03**
**(HEADWALL)**

UPSTREAM:
STA. 25+35.7
ELEV. 1217.7 (PROPOSED) @ INLET
DOWNSTREAM:
STA: 24+52.64
ELEV. 1216.0 (PROPOSED) @ OUTLET
**EXPANSION RATIO: 1:1.5**

CULVERT:
MANNING N: 0.013 (CONCRETE)
BARREL: US CENTER: 168
DS CENTER: 158

UPSTREAM SLOPE: 0.50%
DOWNSTREAM SLOPE: 0.50%

## CULVERT #2

PROP. 2x72" PIPE CULVERT @STA. 15+29.89
STA. 15+29.89 CULVERT LENGTH: 125 FT (PROP.)
DISTANCE FROM PRIOR X-SECTION: 0.1'
**CONTRACTION RATIO: 1:1**
**ENTRANCE LOSS: 0.03**
**(STRAIGHT HEADWALL)**

UPSTREAM:
STA. 16+78.26
ELEV. 1185.01 (PROPOSED) @ INLET
DOWNSTREAM:
STA: 15+29.89
ELEV. 1184.50 (PROPOSED) @ OUTLET
**EXPANSION RATIO: 1:1.5**

CULVERT:
MANNING N: 0.013 (CONCRETE)
BARREL: US CENTER: 207
DS CENTER: 200

UPSTREAM SLOPE: 0.50%
DOWNSTREAM SLOPE: 0.50%

## EX CULVERT

EX. 60" CMP PIPE @STA. 3+58.29
STA. 3+58.29 CULVERT LENGTH: 68 FT
DISTANCE FROM PRIOR X-SECTION: 0.04'
**ENTRANCE LOSS: 0.03**

UPSTREAM:
STA. 4+26.55
ELEV. 1143 (EX) @ INLET
DOWNSTREAM:
STA: 3+58.29
ELEV. 1140.31 (EX) @ OUTLET

CULVERT:
MANNING N: 0.025 (CMP)
BARREL: US CENTER: 200
DS CENTER: 200

UPSTREAM SLOPE: 5.8%
DOWNSTREAM SLOPE: 1.3%

## CULVERT #3

PROP. 1x72" PIPE CULVERT @STA. 0+19.27
STA. 0+19.27 CULVERT LENGTH: 169 FT (PROP.)
DISTANCE FROM PRIOR X-SECTION: 0.07'
**CONTRACTION RATIO: 1:1**
**ENTRANCE LOSS: 0.03**
**(STRAIGHT HEADWALL)**

UPSTREAM:
STA. 1+88.63
ELEV. 1149.0 (PROPOSED) @ INLET
DOWNSTREAM:
STA: 10+19.27
ELEV. 1140.3 (PROPOSED) @ OUTLET
**EXPANSION RATIO: 1:1.5**

CULVERT:
MANNING N: 0.013 (CONCRETE)
BARREL: US CENTER: 202.21
DS CENTER: 121.23

UPSTREAM SLOPE: 2.3%
DOWNSTREAM SLOPE: 1.5%

PREPARED DATE: JULY 2024

PLANS PREPARED BY:
adkan ENGINEERS
Civil Engineering · Surveying · Planning
6879 Airport Drive, Riverside, CA 92504
Tel:(951) 688-0241 · Fax:(951) 688-0599

# Appendix D – Soils Memorandum on Tributary Migration

July 29, 2024

Project No. 41.19909

Pulte Home Company, LLC
27401 Los Altos, Suite 400
Mission Viejo, California 92503

Attention: Mr. Patric Lynam

**Subject: Lateral Migration of On-site Tributaries**
**Highland Grove 4, Tract 38927**
**Lake Matthews Area**
**County of Riverside, California**

*References: Geotechnical Due Diligence Evaluation, Proposed Highland Grove IV Residential Development, Lake Matthews Area, Riverside County, California, by Leighton and Associates, Inc., PN. 41.19909, dated November 17, 2023.*

*Highland Grove 4 Site Plans, by Adkan Engineers, (undated).*

In accordance with a request by Mitch Adkison with Adkan Engineers, this letter is to provide our opinion regarding the possible migration of the tributary drainages on-site. It is our understanding that The County of Riverside Flood Control (RCFC) agency has reviewed the submittal of Highland Grove IV and they conveyed a concern for lateral migration of the existing flow line for the two main tributaries that bisect the site. Based on our above geotechnical report and understanding of the site geology, these tributaries are incised into granitic bedrock, and generally exhibit minimum flow. As such, it is our opinion that lateral migration of the flow lines for these tributaries should not be a design concern during the life time of this project.

The opportunity to be of service is sincerely appreciated. If you should have any questions, please do not hesitate to call our office.

Respectfully submitted,
LEIGHTON AND ASSOCIATES, INC.






Brent Adam, CEG
Senior Project Geologist
Ext 8923, badam@leightongroup.com

Distribution: (1) Addressee (PDF via email)