

File 123239

July 18, 2024

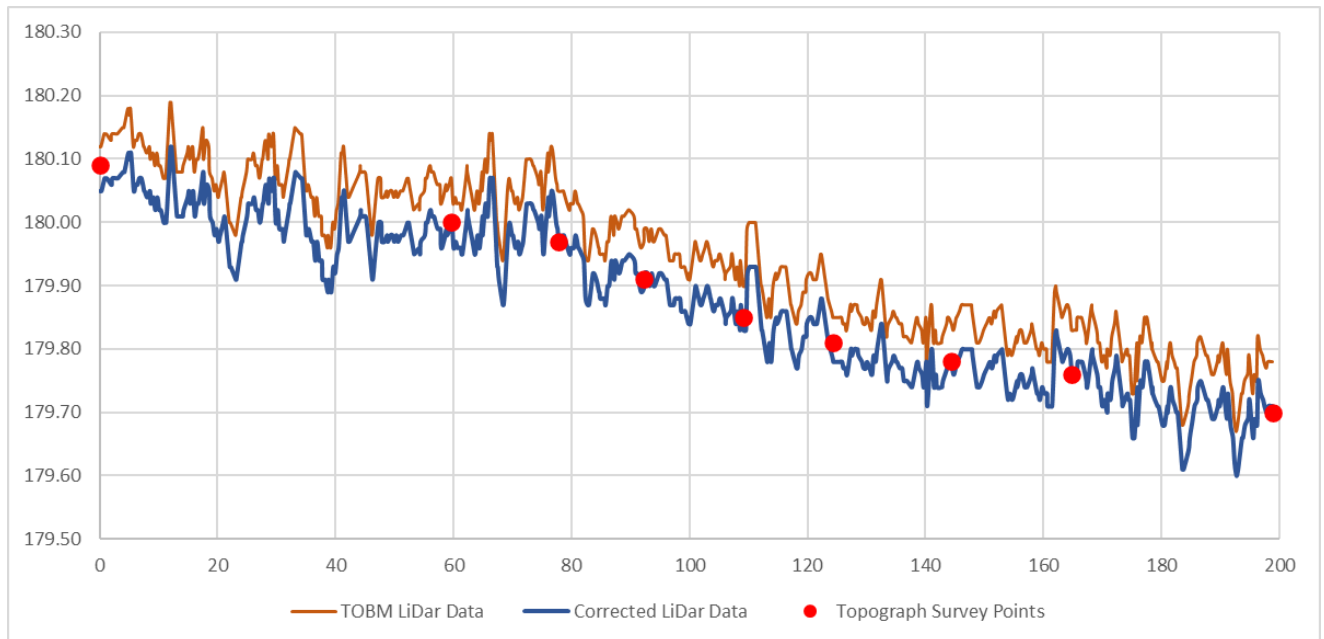
MacLean Plewes
Manager of Environmental Planning
Grey Sauble Conservation Authority
237897 Inglis Falls Road
Owen Sound, Ontario N4k 5N6
m.plewes@greysauble.on.ca

Re: Dagneau Property Flood Hazard Study, Town of The Blue Mountains
Flood Hazard Study

Dear Mac:

Tatham Engineering Limited has been retained by Bill and Janet Dagneau to prepare a flood hazard study for their property defined as East Part of Lot 156 Plan 529 in the Town of The Blue Mountains. The property is currently zoned as Open Space and Hazard due to a flood hazard associated with Watercourse 6 to the east of the subject property. This letter report has been prepared to delineate the flood hazard limits in the area and determine whether the lot can be developed without having negative impacts on flooding in the surrounding area in support of a zoning amendment application to the Town of The Blue Mountains.

To establish the flood hazard limits of Watercourse 6, an existing hydraulic model of Watercourse 6 downstream of Highway 26 was updated to include the subject property. The model was extended using a combination of elevation data from the Town of The Blue Mountains LiDAR data and topographic information collect by Van Harten Surveying Inc. on July 6, 2022, which was supplemented by topographic survey collected by Tatham Engineering in June 2024. The topographic survey data covers the subject property and a section of Highway 26 in front of the property. A datum comparison for the two elevation sources was prepared along Highway 26 as seen in Figure 1 provided overleaf. The additional survey completed by Tatham was tied into the original survey using a benchmark on a hydro pole at the front of the property. Based on the comparison the Town of The Blue Mountains LiDAR was adjusted by 0.07 m to match the topographic survey data. The location of the cross-section used for the datum comparison is illustrated on Figure 2 which has been attached for reference.

Figure 1: DEM Comparison Along South Line A

HYDROLOGIC MODEL

A hydrologic model of the study area was developed in Visual OTTHYMO as part of the Town of The Blue Mountains Drainage Master Plan (Tatham Engineering Limited, 2023). The existing condition model for Watercourse 6 predicted peak flow rates of 33.0 m³/s and 21.6 m³/s for the Regional and the 1:100-year return frequency design storm respectively. As the Regional Storm peak flow is larger, it was selected to be used as the Regulatory Peak flow in the hydraulic analysis described in the following sections.

EXISTING CONDITION HYDRAULIC ANALYSIS

The existing HEC-RAS model for Watercourse 6 was extended south of Highway 26 to cover the subject property using a combination of topographic survey data and Town of The Blue Mountains LIDAR (2020). The topographic survey data was used for the subject property while the LIDAR data was used all areas outside the subject property. A Manning's roughness coefficient of 0.080 was used for the overbanks representing mainly wooded areas. The main channel was assigned a Manning's roughness coefficient 0.035 to represent a clean straight channel with minimal vegetation.

During the Regulatory Storm, runoff from Watercourse 6 is expected to overtop the banks of Watercourse 6, spill around 209774 Highway 26 and through the subject property. The existing flood elevations across the subject property during the Regulatory Storm range from 179.94 m to 180.02 m. While Highway 26 is expected to overtop to the east of the subject property during the Regulatory storm, it is not expected to experience flooding immediately in front of the subject property and as such is expected to have safe



access/egress during the Regulatory Storm. The existing condition HEC-RAS model results are attached for reference.

PROPOSED CONDITION HYDRAULIC ANALYSIS

There is a high spot on the subject property that is above the existing flood hazard elevations that is suitable for development as illustrated in the Existing Condition Flood Hazard Plan (Drawing FM-1) attached for reference. However, fill will be required within the flood spill area to construct a driveway from Highway 26 to the high spot. The conceptual single-family dwelling, driveway and limits of grading are illustrated on the Proposed Condition Flood Hazard Plan (Drawing FM-2) and have been included to confirm the impact development would have on the flood elevations in the area and is attached for reference.

A proposed condition hydraulic model was prepared by updating the existing model to include the conceptual driveway and the grading changes required for house. These changes did not result in any changes to the Regulatory flood elevations in the area due to the relatively minor amount of fill required within the flood spill area. The results of the proposed condition hydraulic model are attached for reference.

CUT/FILL ANALYSIS

A cut/fill analysis was completed to quantify the volume of fill required within the flood spill area on the subject property. A stage-storage table was prepared to calculate the flood storage volume on the subject property under existing and proposed conditions and is summarized in Table 1 below.

Table 1: Regulatory Flood Spill Area Stage-Storage Table for Subject Property

ELEVATION	EXISTING CONDITIONS		PROPOSED CONDITIONS	
	SURFACE AREA (m ²)	VOLUME (m ³)	SURFACE AREA (m ²)	VOLUME (m ³)
178.80	798		645	
179.10	3,202	600	3,009	548
179.40	5,164	1,255	4,927	1,190
179.70	7,928	1,964	7,717	1,897
179.95	12,510	2,555	12,331	2,506
180.00	13,427	3,203	13,254	3,146
TOTAL	-	7,022	-	6,781



As shown in Table 1, the fill required for the conceptual dwelling and driveway would reduce the flood storage volume on the subject site by 232 m³ which is less than 1% of the floodplain between the Georgian Trail and Highway 26. This volume is negligible when compared to the total floodplain volume of Watercourse 6. In addition, the site is located at the downstream end of the watercourse with the ultimate control being the Highway 26 crossing. As such, the minor reduction in floodplain volume is expected to have negligible impacts on flooding in the area.

SUMMARY

The results of the existing and proposed condition hydraulic analysis described in the previous sections demonstrates that the subject site will have safe access/egress during the Regulatory storm. In addition, development of the site would require minimal fill within the flood spill area that does not impact the flood elevations in the area. As such, the subject property is suitable for development. It is noted that if the proposed development on the subject property is revised from the conceptual plans included in this report, the hydraulic analysis should be updated to confirm that development does not impact flood levels in the area.

We trust that the information provided above is sufficient to approve the rezoning of the subject property. If you have any questions, please do not hesitate to contact the undersigned.

Yours truly,

Tatham Engineering Limited



John Gore, B.Eng., P.Eng.
Engineer
JG: df



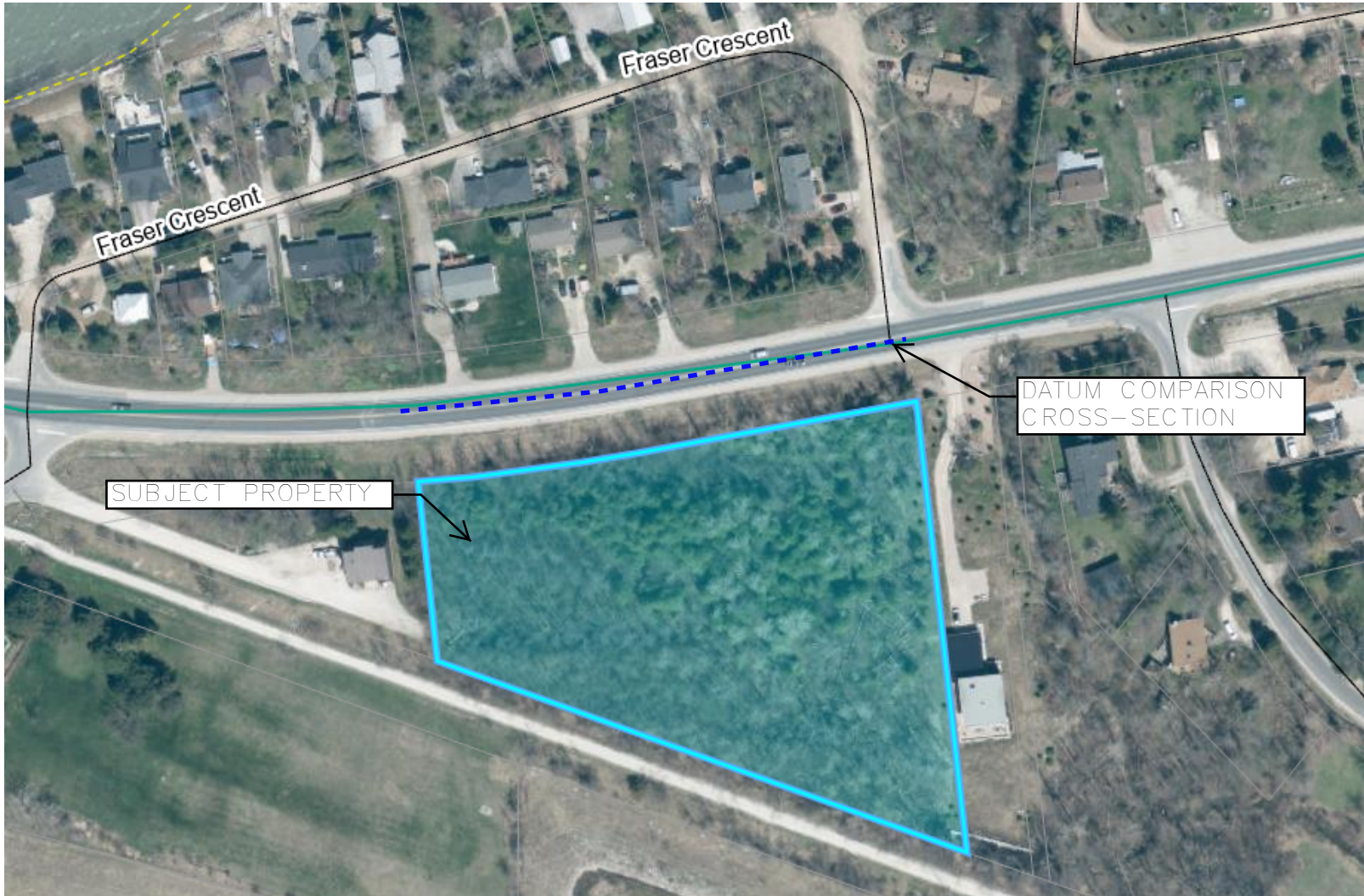
Dan Hurley, B.A.Sc. P.Eng., LEED AP
President

copy: Bill and Janet Dagneau

billdagneau@gmail.com



Figures



DAGNEAU PROPERTY FLOOD HAZARD STUDY
TOWN OF THE BLUE MOUNTAINS
SITE LOCATION PLAN

SCALE: NTS

DATE: FEB/24

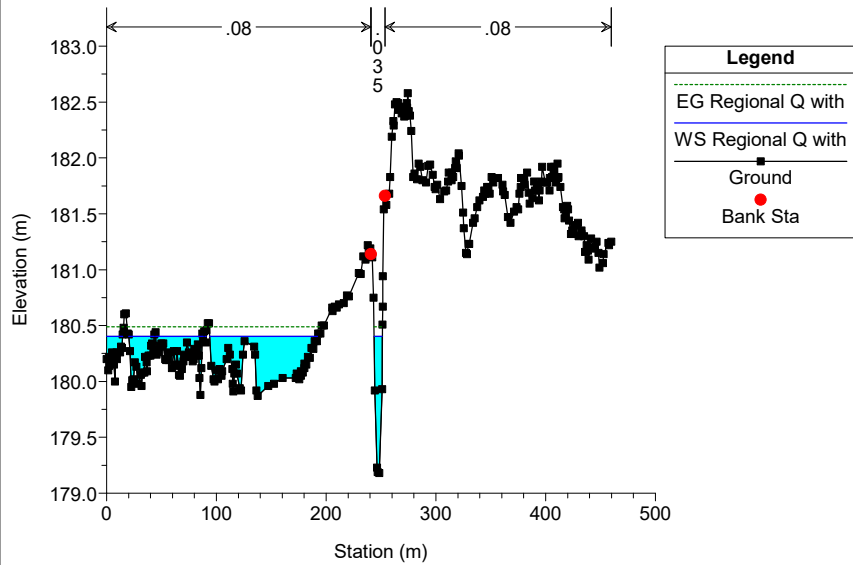
DRAWING No. FIG. 2

**Attachment A:
Existing Condition Hydraulic Model
Results**

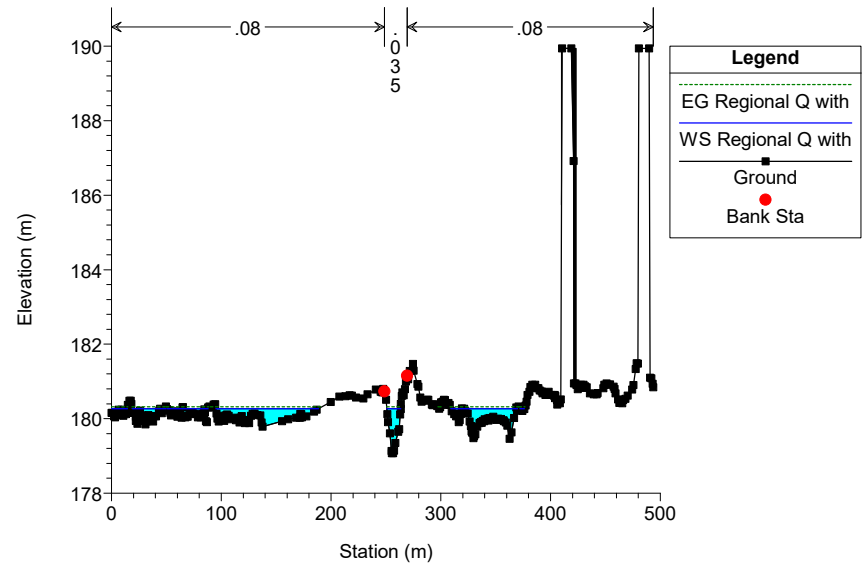
HEC-RAS Plan: Existing July 2024 River: 1 Reach: 1 Profile: Regional Q with

Reach	River Sta	Profile	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl
1	1227	Regional Q with	33.00	179.18	180.40		180.49	0.006684	2.01	53.19	187.34	0.69
1	1196	Regional Q with	33.00	179.07	180.27		180.32	0.004218	1.48	66.74	252.63	0.55
1	1172	Regional Q with	33.00	179.00	180.19		180.22	0.003649	1.32	82.99	336.41	0.51
1	1140	Regional Q with	33.00	179.01	180.13		180.15	0.001374	0.88	111.33	373.87	0.32
1	1120	Regional Q with	33.00	178.88	180.05		180.10	0.003207	1.34	73.94	340.02	0.49
1	1102	Regional Q with	33.00	178.75	180.04		180.06	0.001428	1.01	104.47	277.21	0.34
1	1081	Regional Q with	33.00	178.48	179.97		180.02	0.002166	1.38	81.49	291.86	0.45
1	1061	Regional Q with	33.00	178.40	179.97		179.98	0.000892	0.85	118.53	302.92	0.29
1	1044	Regional Q with	33.00	178.33	179.95		179.96	0.000857	0.88	117.54	348.27	0.29
1	1025	Regional Q with	33.00	178.19	179.94		179.95	0.000346	0.66	196.17	481.27	0.19
1	1008	Regional Q with	33.00	178.02	179.94		179.94	0.000382	0.62	153.80	330.96	0.19
1	993	Regional Q with	33.00	177.72	179.94		179.94	0.000119	0.52	252.06	424.01	0.12
1	978	Regional Q with	33.00	177.20	179.94	178.75	179.94	0.000036	0.31	418.14	535.64	0.07
1	964	Culvert										
1	945	Regional Q with	33.00	177.05	178.64	178.64	179.09	0.011630	3.00	11.01	99.97	0.99
1	933	Regional Q with	33.00	176.71	178.48		178.59	0.003477	1.92	42.54	78.06	0.54
1	918*	Regional Q with	33.00	176.66	178.29	178.29	178.49	0.006312	2.48	34.10	83.33	0.72
1	903*	Regional Q with	33.00	176.61	178.20		178.33	0.004469	2.13	48.28	125.60	0.61
1	887	Regional Q with	33.00	176.55	178.21		178.26	0.001992	1.51	72.56	148.19	0.42
1	876*	Regional Q with	33.00	176.50	178.21		178.24	0.000918	1.04	99.49	177.03	0.29
1	865	Regional Q with	33.00	176.45	178.22		178.23	0.000407	0.70	143.34	223.85	0.19
1	855*	Regional Q with	33.00	176.41	178.20		178.22	0.000629	0.89	111.58	201.03	0.24
1	844	Regional Q with	33.00	176.37	178.19		178.21	0.000685	0.94	102.26	199.28	0.25
1	821	Regional Q with	33.00	175.83	178.08		178.18	0.001853	1.59	42.69	92.30	0.41
1	805	Regional Q with	33.00	176.07	177.88	177.56	178.12	0.004170	2.28	22.43	46.64	0.61
1	783	Regional Q with	33.00	176.88	177.90	177.38	177.94	0.003895	1.29	43.75	69.34	0.52

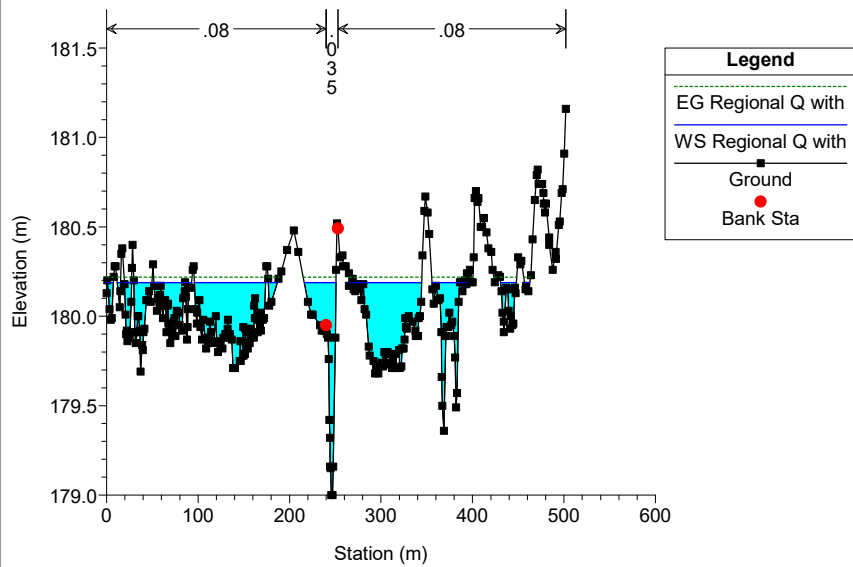
HEC-RAS Model Plan: Existing July 2024 7/10/2024



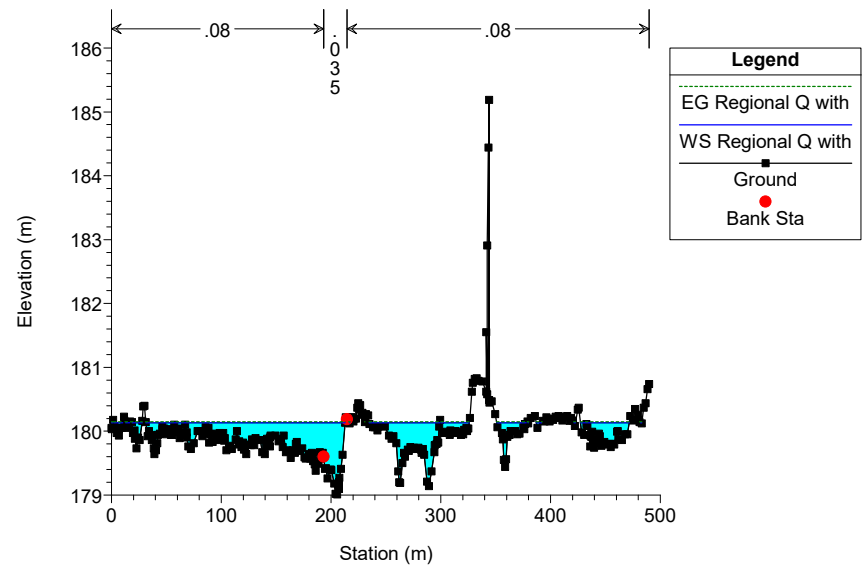
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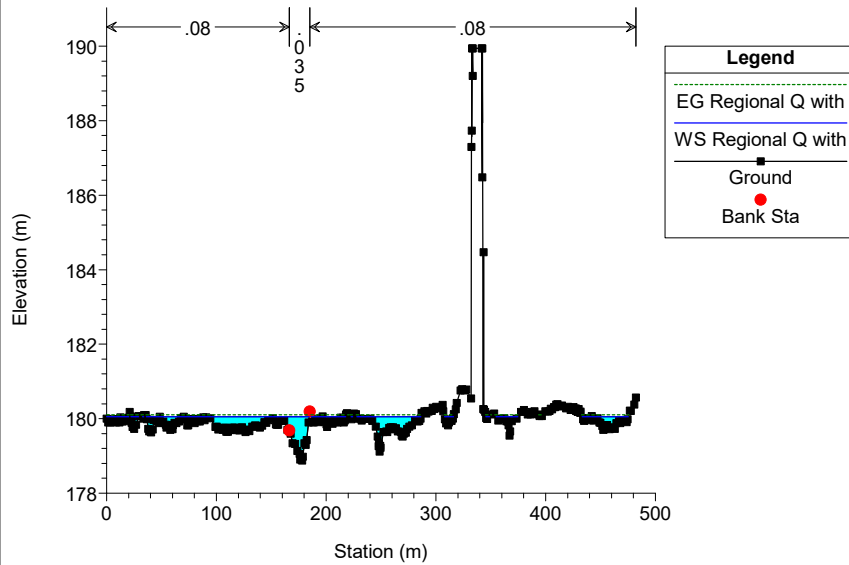
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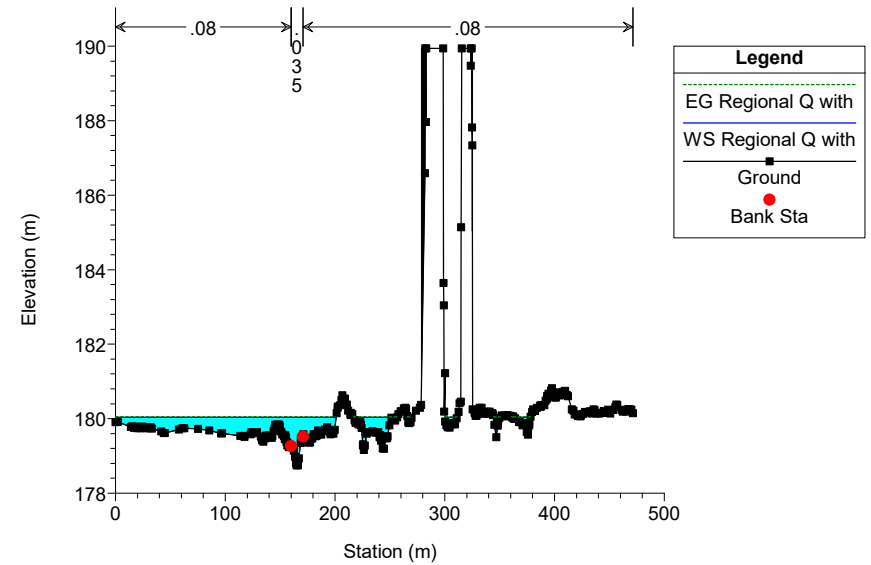
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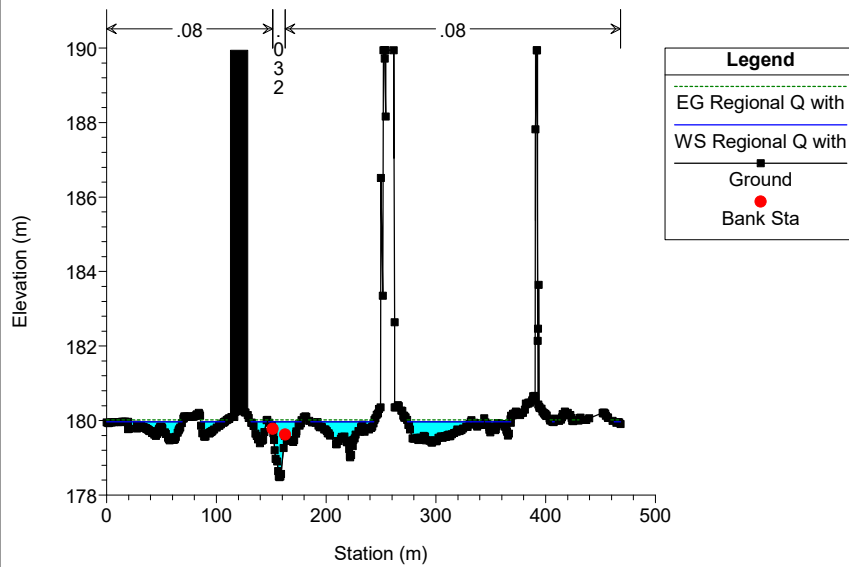
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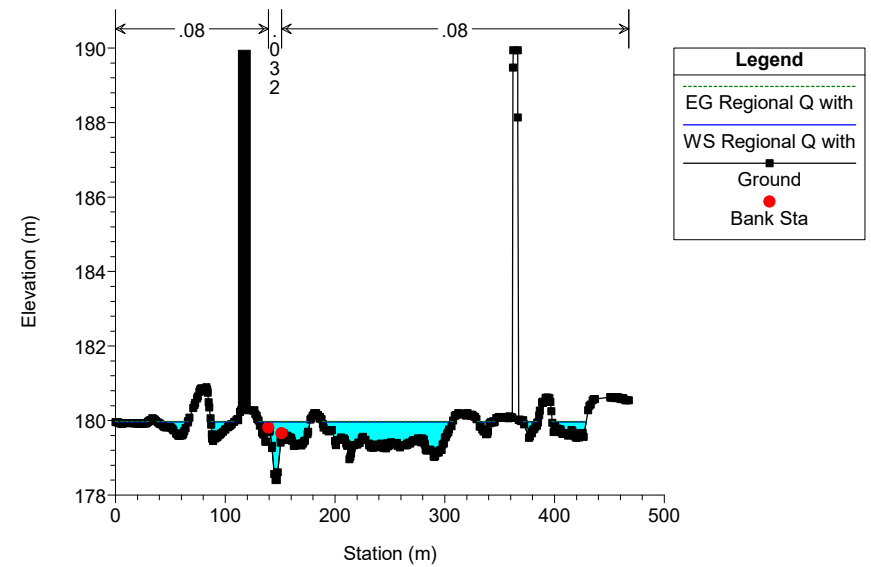
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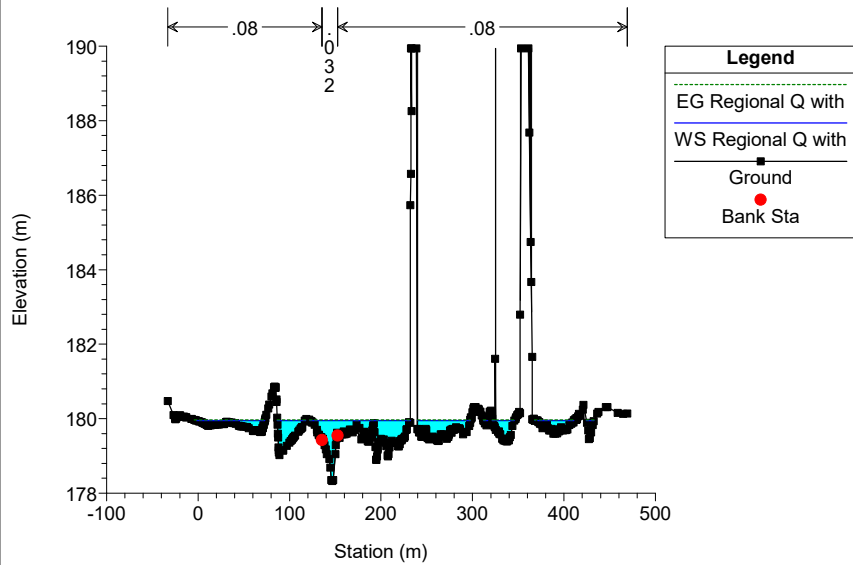
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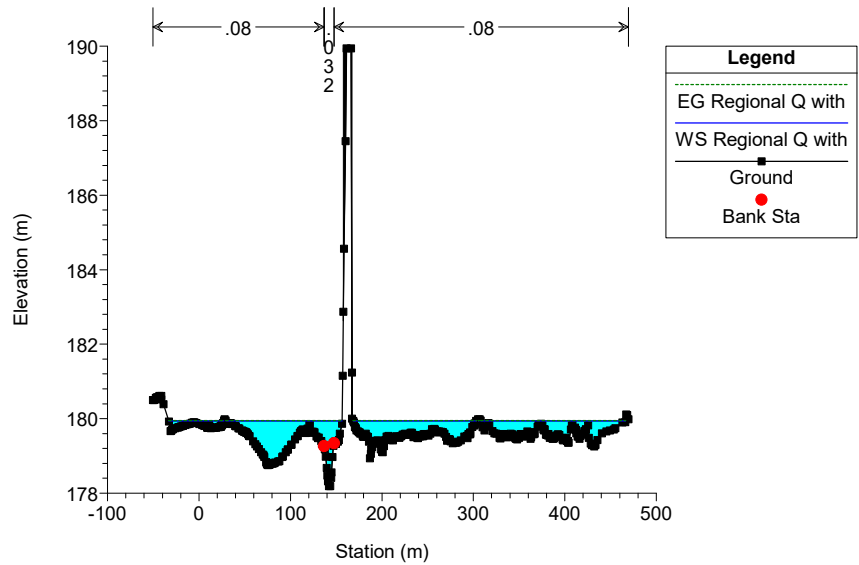
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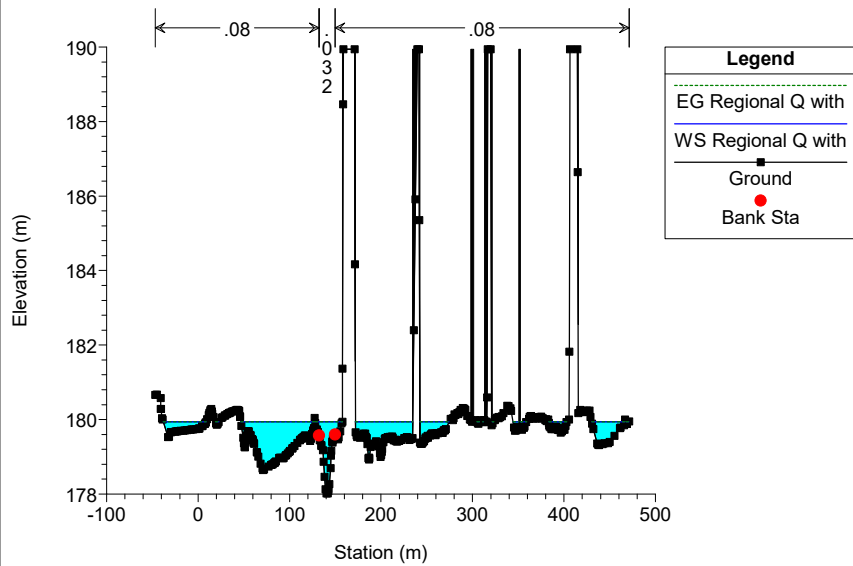
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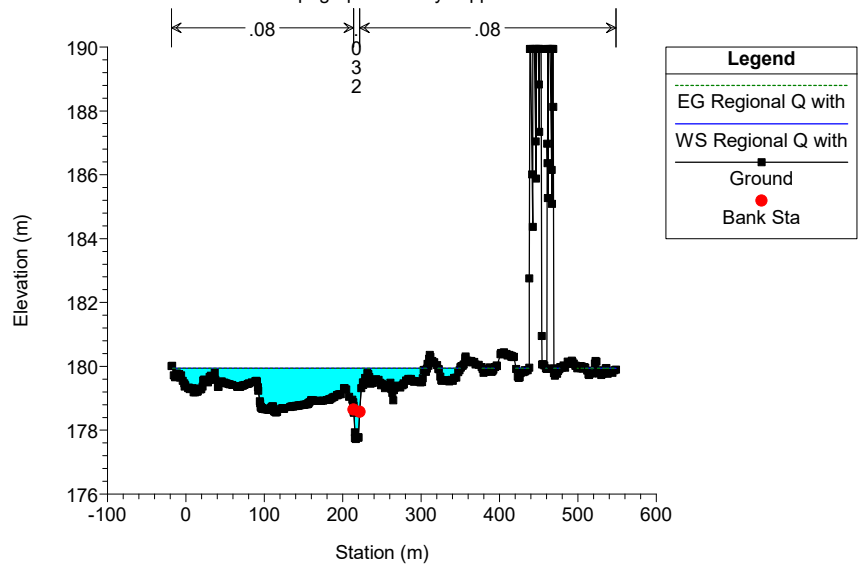
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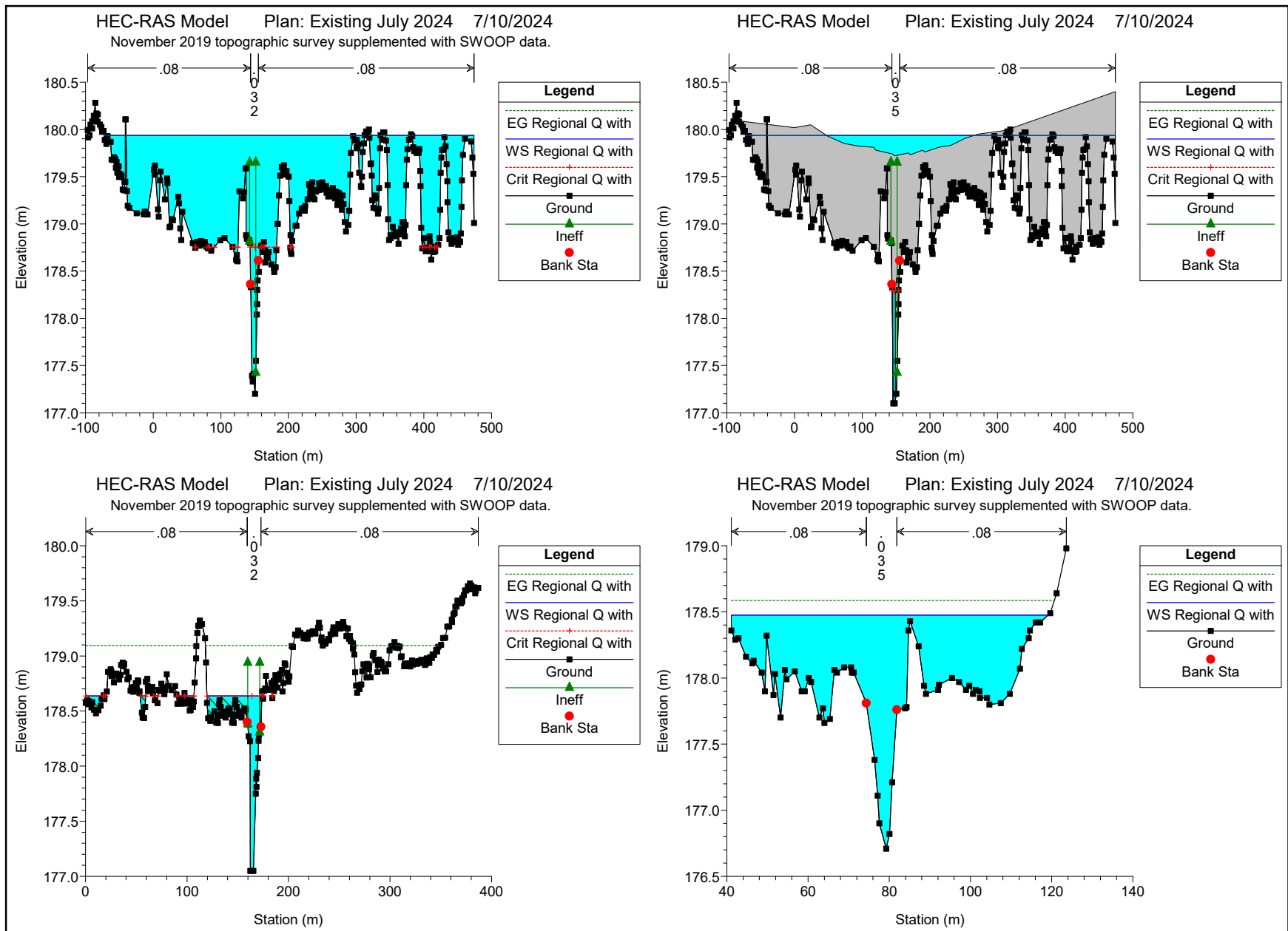


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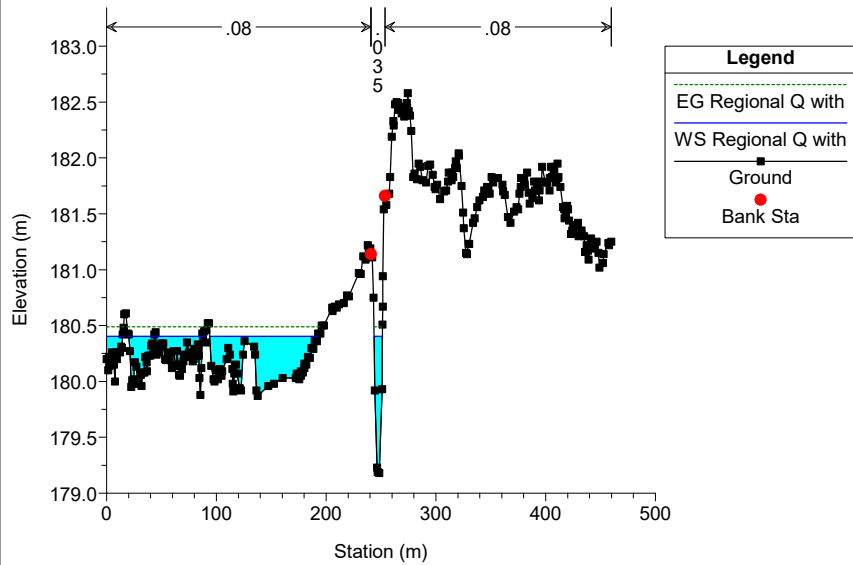


**Attachment B:
Proposed Condition Hydraulic Model
Results**

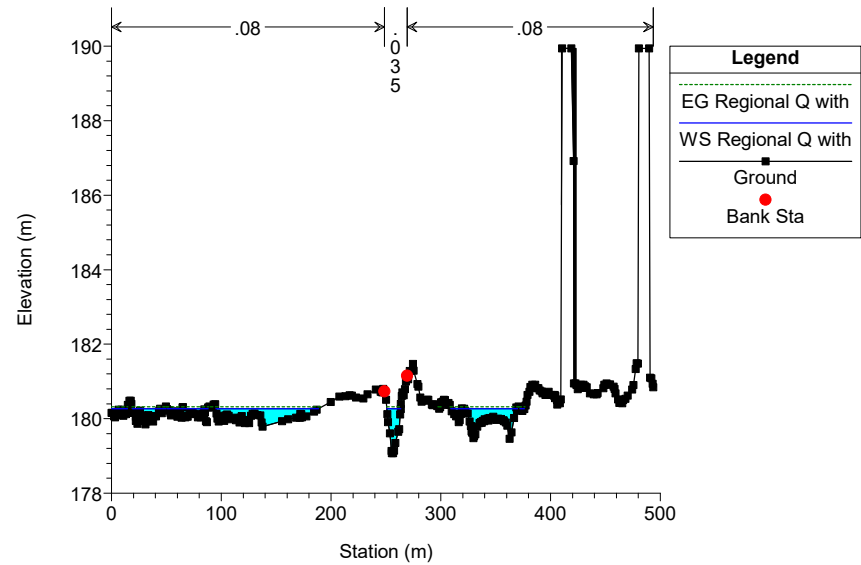
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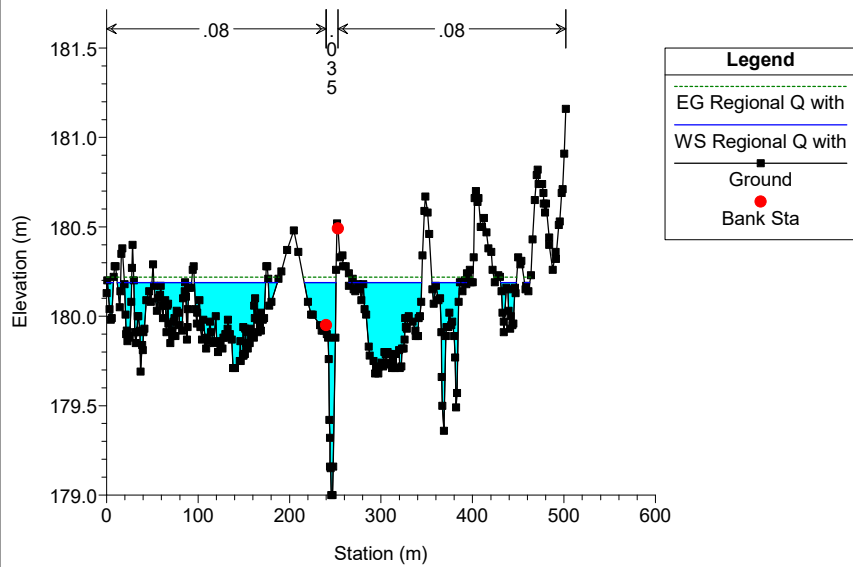
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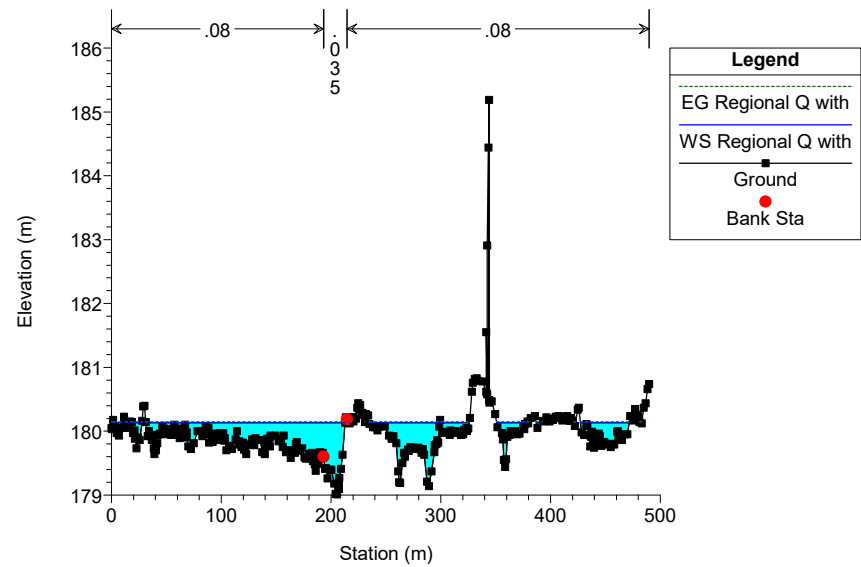
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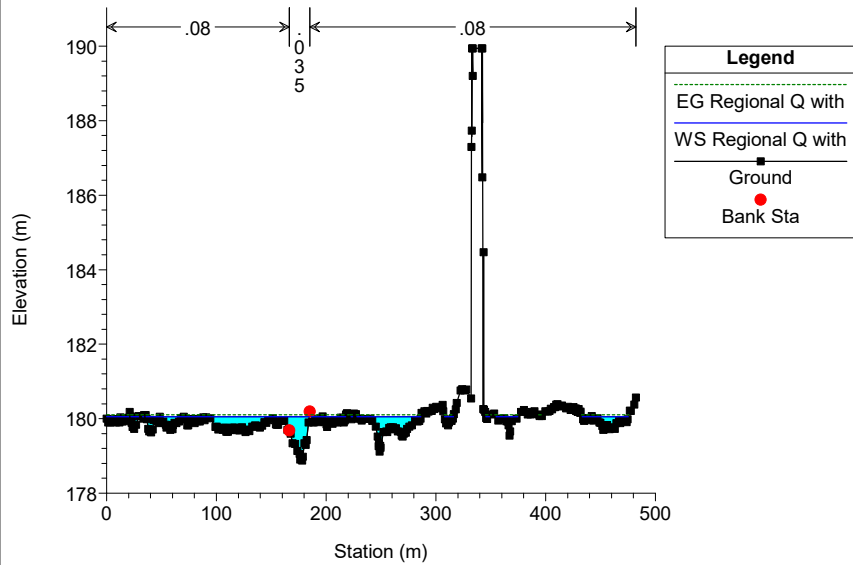
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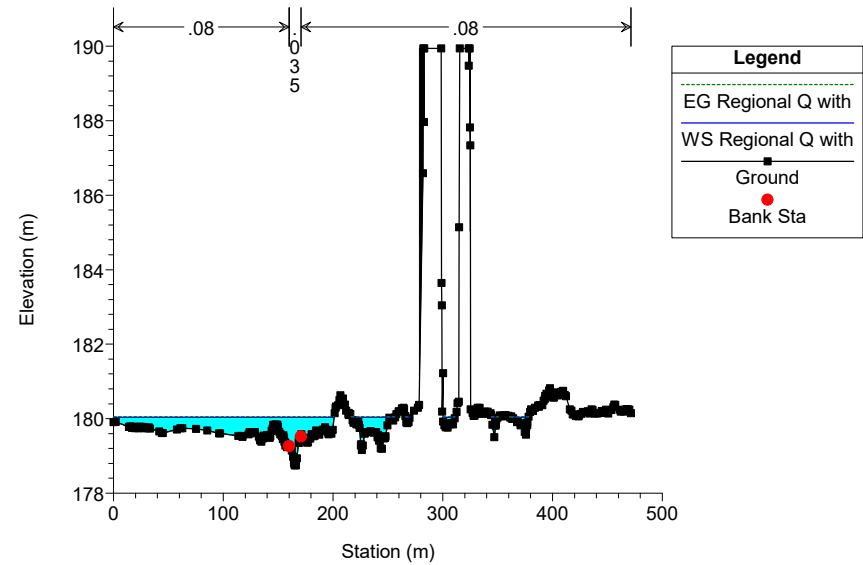
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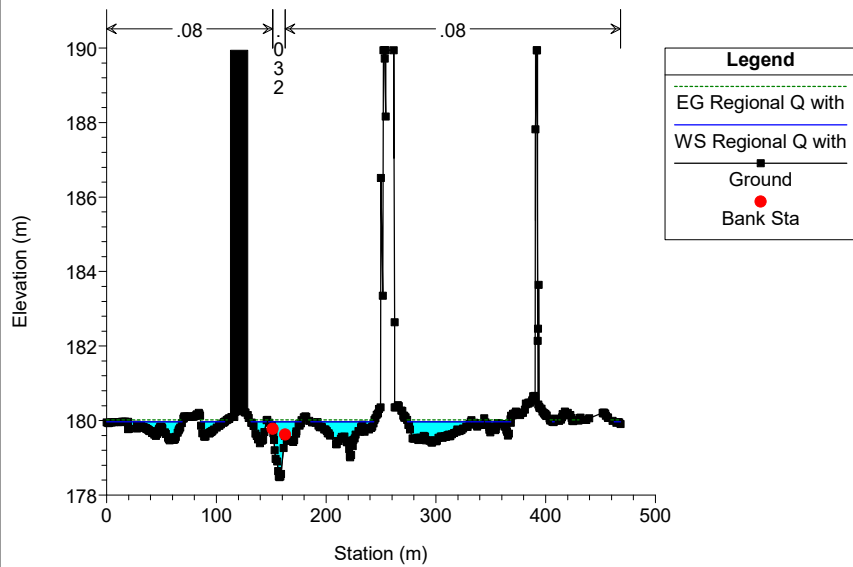
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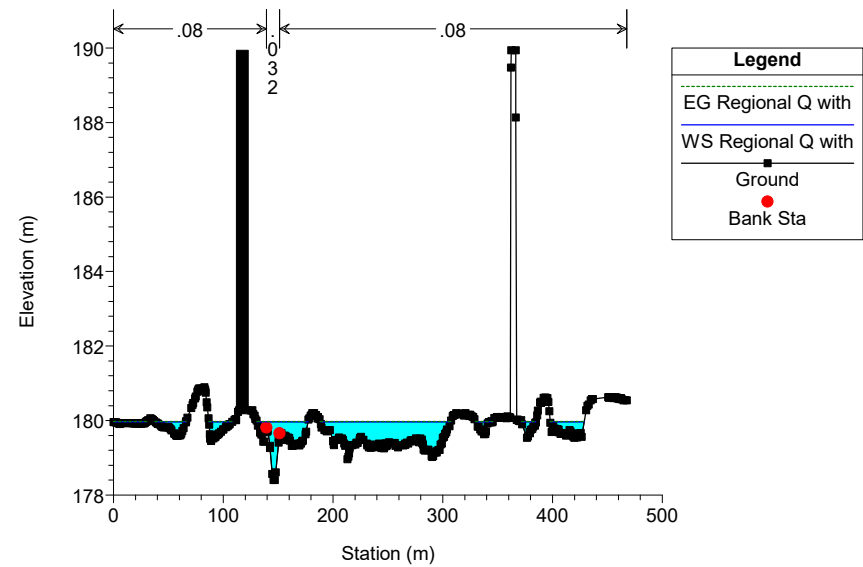
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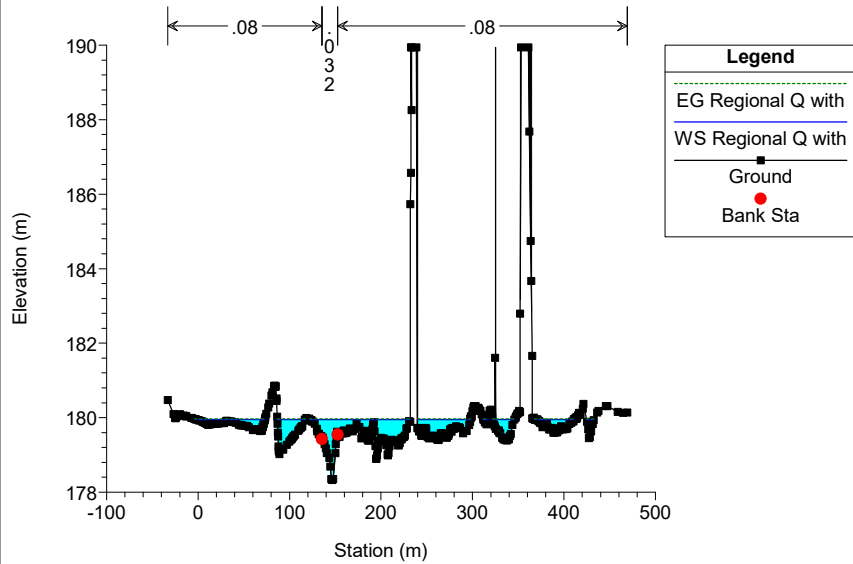
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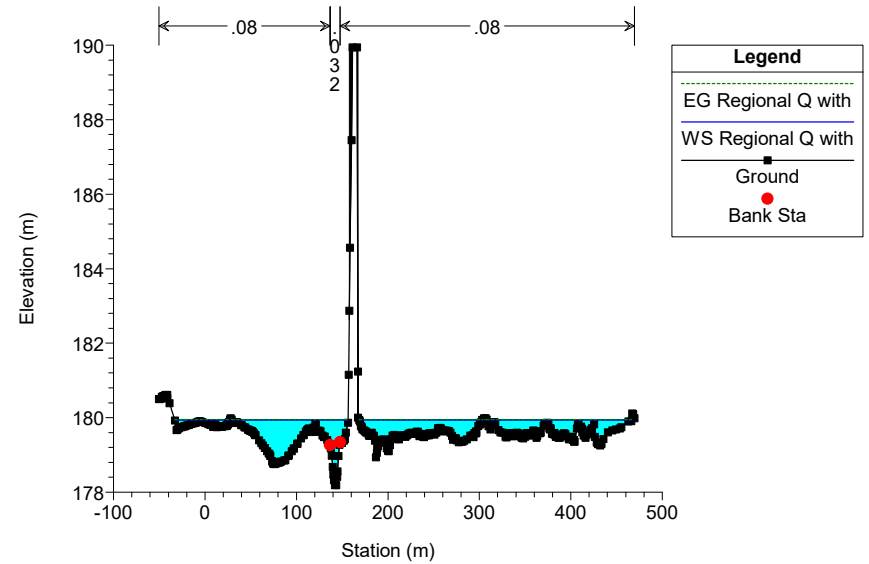
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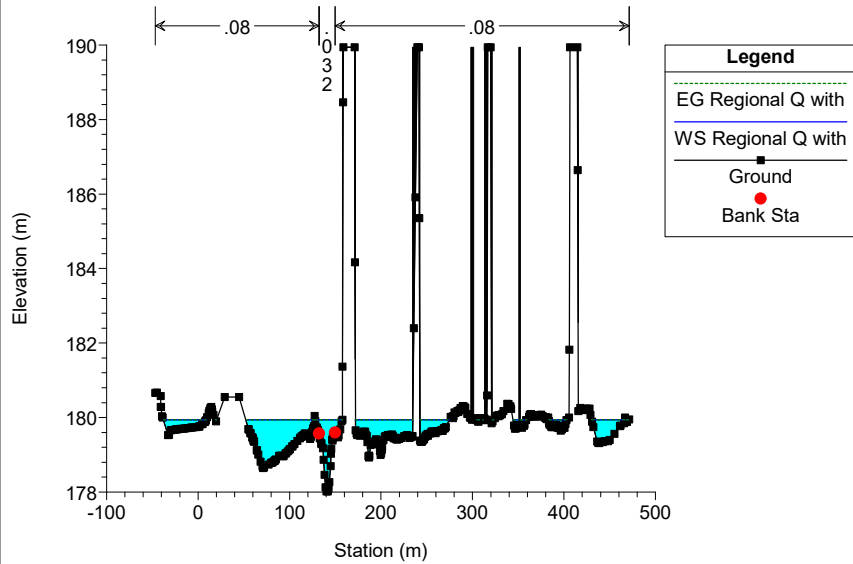
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HEC-RAS Model Plan: Proposed Conditions July 2024 7/10/2024
November 2019 topographic survey supplemented with SWOOP data.

