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LETTER OF TRANSMITTAL

To: Michael Stormer, PE
ODOT District 2
317 E. Poe Road

Bowling Green, Ohio 43402

Project #: H2530002
Date: July 3, 2014

Re: PID 22984 HEN-New Maumee River Bridge – Structure Type Study

Enclosed are the following:

No. of Copies	Description
1	PDF – Copy of Structure Type Study

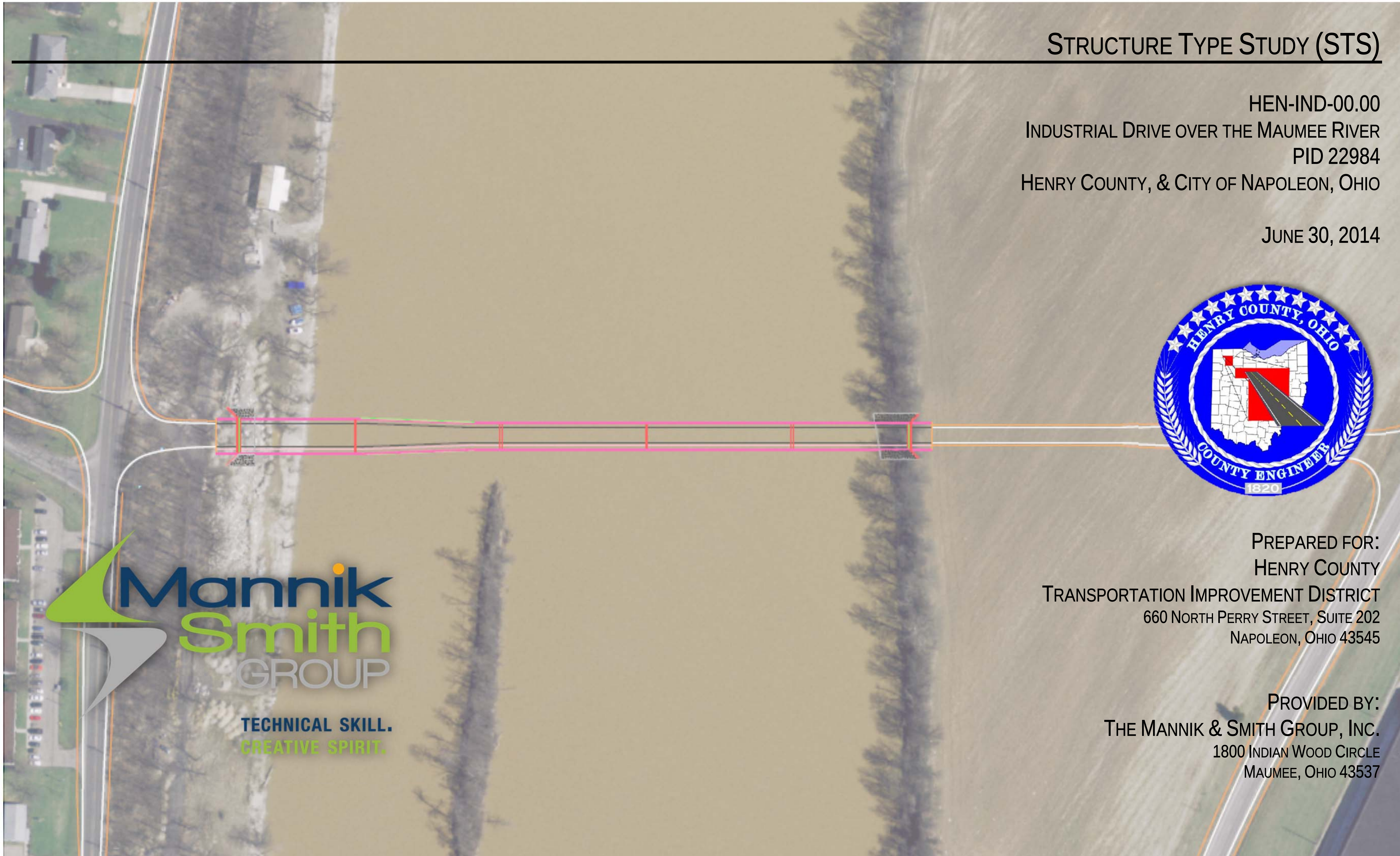
The above items are transmitted as checked below:

☐ For review and approval
☐ For your use
☐ As requested
☒ For review and comment
☐ Approved as submitted
☐ Other:
☐ Returned for corrections
☐ Approved as noted

Remarks:

Copies To: File
Tim Schumm, PE, PS – Henry Co Eng
Pat McColley, PE – Henry Co Chief Dep Eng

Signed: [signature]
Printed: Russell Critelli, PE, PS
VP/Senior Project Manager



Structure Type Study (STS)

HEN-IND-00.00
Industrial Drive over the Maumee River
PID 22984
Henry County, & City of Napoleon, Ohio

June 30, 2014

Henry County, Ohio
County Engineer
1820

Prepared for:
Henry County
Transportation Improvement District
660 North Perry Street, Suite 202
Napoleon, Ohio 43545

Provided by:
The Mannik & Smith Group, Inc.
1800 Indian Wood Circle
Maumee, Ohio 43537

Mannik Smith Group
TECHNICAL SKILL.
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1.0 STRUCTURE TYPE STUDY

1.1 Purpose of Study

This Structure Type Study (STS), developed by The Mannik & Smith Group (MSG) design team, is the first step in development of the construction plans for a new bridge on Industrial Drive over the Maumee River. The purpose of the (STS) is to determine the preferred structure alternative for the proposed bridge on Industrial Drive over the Maumee River.

See Figure 1 for the Study Area Map for the location of the project.

MSG is responsible to prepare a STS as part of the Preliminary Phase of this project as required by the ODOT Project Development Process. MSG has evaluated four structure alternatives on the preferred alignment. While bridge options were studied on all alignment alternatives in the Feasibility Study, for the simplification of this report only those on the preferred alignment are presented.

1.2 Design Methods/Approach

The MSG design team has determined the most feasible structure type per the following detailed study and recommendation. The resulting recommended structure type has been detailed on the Preferred Preliminary Alternative as detailed herein.

1.2.1 ODOT/AASHTO LRFD

The STS is based on the 2007 ODOT Bridge Design Manual (BDM) for new structures utilizing the AASHTO Load & Resistance Factor Design (LRFD) specifications.

1.3 Narrative of Bridge Alternatives

The proposed bridge on Industrial Drive over the Maumee River will result in an eight span continuous 72" deep prestressed concrete girder (WF72-49) with composite superstructure and reinforced concrete deck on typical reinforced concrete abutments (founded on HP12x53 piles) and reinforced concrete wall type piers (founded on 4'-0" drilled shafts). The proposed bridge cross section will have the following characteristics:

- 2 ~ 11'-0" thru lanes
- 1 ~ 4'-0" outside shoulder on the right side of the bridge (opposite side of sidewalk).
- 1 ~ 2'-0" outside shoulder on the left side of the bridge (adjacent to sidewalk).
- 1 ~ 6'-0" sidewalk located on the left side of the bridge
- 1 ~ 1'-6" SBR-1-13 barriers on the right side of the bridge
- 1 ~ 1'-0" barrier with pedestrian handrail on the left side of the bridge
- Varying width in span 8 to accommodate the roundabout at East Riverview Dr.

Four (4) bridge alternatives have been evaluated for the bridge superstructure for the Structure Type Study. Additional span arrangements or options with fewer or more beam lines were evaluated in a preliminary step and were determined to be less economical than the four options chosen to be carried out to full conceptual design and cost estimates. All bridge option span arrangements were determine with consideration for the forward abutment to be placed so sufficient room may be provided to accommodate the existing Anthony Wayne Trail that parallels the river at this location. The bridge alternatives consist of the following:

1.3.1 Alternative A – 92" Steel Plate Girder

This alternative consists of providing a 92" (approx.) depth and 30" (approx.) flange width fabricated Plate Girders (using A588/A709 50W Weathering Steel) with cast-in-place deck superstructure. The optimized span arrangement for this alternative is 5 spans (162.5'-205'-205'-205'-162.5'). Preliminary analysis indicates this will require 4 stringers spaced at 9'-8" for most of the bridge but with a flared deck on the forward end of the bridge to accommodate roadway tapers that increases the beam spacing to 11'-3 1/2".

1.3.2 Alternative B – 85" Steel Plate Girder

This alternative consists of providing 85" depth (approx.) and 24" (approx.) flange width fabricated Plate Girders (using A588/A709 50W Weathering Steel) with cast-in-place deck superstructure. The optimized span arrangement for this alternative is 6 spans (134'-168'-168'-168'-168'-134'). While preliminary analysis indicates this will require 4 stringers spaced at 9'-8" for most of the bridge, but with a flared deck on the forward end of the bridge to accommodate roadway tapers that increases the beam spacing to 11'-3 1/2".

1.3.3 Alternative C – 72" Prestressed Concrete I-Beam

This alternative consists of providing a 72" depth WF72-49 Prestressed Concrete I-Beam with cast-in-place deck superstructure. The optimized span arrangement for this alternative is 8 spans (117.5'-117.5'-117.5'-117.5'-117.5'-117.5'-117.5'-117.5'). Preliminary analysis indicates this will require 4 stringers spaced at 10'-0" for most of the bridge, but with a flared deck in span 8 to accommodate roadway tapers that increases the beam spacing to 11'-8".

1.3.4 Alternative D – 96" Prestressed Concrete I-Beam

This alternative consists of providing a 96" depth Modified WF72-49 Prestressed Concrete I-Beam with cast-in-place deck superstructure. The optimized span arrangement for this alternative is 7 spans (120'-120'-140'-140'-140'-140'-140'). Preliminary analysis indicates this will require 4 stringers spaced at 10'-0" for most of the bridge, but with a flared deck on the forward end of the bridge to accommodate roadway tapers that increases the beam spacing to 11'-8".

1.4 Cost Analysis

1.4.1 Conventional Costs

The procedures for the cost analyses shown below follow the guidance provided by ODOT for preparing estimates during preliminary design. Specifically, the majority of the cost item quantities are approximated to arrive at an initial total cost. The initial cost is then multiplied by 1.05 to compensate for changes to the quantities that might occur to arrive at an approximate structure cost. The structure cost is then multiplied by a design contingency (based on 20% of completion) and an inflation factor (based on July 15, 2015 construction mid point date). Cost estimates are based on similar structures, current ODOT bid tab and estimating data and ODOT projected inflation factors.

In addition, a life cycle analysis was completed for an estimated bridge life of 80 years. The maintenance costs were obtained from ODOT's Estimator Program Catalogs, the ODOT Preventative Maintenance/Repair Guidelines for Bridges and Culverts and the ODOT's Procedure for Budget Estimating. The Present Worth Factor (PWF) was then calculated for each interval to convert future rehabilitation/maintenance costs into current dollars.

1.4.2 *Bridge Cost Estimate Summary*

The estimated probable construction costs and life cycle maintenance costs for each structure are summarized as follows:

Table 1.1 Bridge Cost Estimate

Alt	Structure Type	Cost Estimate (48% contigency)	Life Cycle Cost	Total Costs
A	Steel Straight Plate Girders 92" Depth	$11,830,756	$1,854,327	$13,685,083
B	Steel Straight Plate Girders 86" Depth	$10,377,975	$1,835,821	$12,213,796
C	Prestressed Concrete I-Beams WF72-49	$7,801,254	$2,066,075	***$9,867,329***
D	Prestressed Concrete I-Beams Modified WF72-49 (96")	$8,155,127	$2,231,616	$10,386,743

The 48% contingency is the product of a 5% quantity change contingency, 25% design contingency, 12.4% inflation increase for 07/2016.

1.5 Hydraulic Analysis

1.5.1 *Flood Hazard Evaluation*

It should be noted that the scope of the project involves construction of a new river crossing. The proposed multi-stringer option will add restriction to river flows in the event of a flood. The following hydraulic analysis has taken this into consideration with regard to capacity and profile modification.

The FEMA flood plain map shows that the structure is located within a Zone AE for a 100 year flood. Zone AE is an area where base flood elevations have been determined. The base flood elevation within the Maumee River at the existing condition is elev. 656. The calculated existing 100 year water surface elevation immediately upstream of proposed bridge location is 656.63.

The proposed structure is designed for the 25 year design flood and also per the 100 year water surface allowed (less than 1ft) when encroaching on a NFIP designated floodway (44 CFR 60.3(d)(3)). The 500 year flood was analyzed in lieu of accurate historic high water data.

There are no building located upstream from the proposed structure that are within the extents of a 100 year flood. There is one commercial building downstream that is located with the existing 100 year flood region.

1.5.2 *Hydraulic Report*

The hydraulic analysis was performed using a GIS based HEC-RAS model, utilizing the existing condition and proposed Alternative C. The Alternative C structure is located above the calculated 100 year water surface.

A full Streamflow Statistics Report for the Maumee River in the vicinity of the bridge was obtained from USGS Streamstats website, as directed by the BDM. Flows at the proposed bridge location were estimated using gaged comparisons of upstream (Defiance) and downstream (Waterville) gages, from USGS, and adjusted using known 100 year flow from the Henry County FIS. The maximum drainage area and resulting flow for the river is as follows:

Drainage Area = 5,650 Square Miles
Channel Slope = 1.26 Feet per Mile
Storage Area = 1.95 %

The existing channel has a muddy/rocky bottom with an island splitting flows upstream from the proposed bridge location. There is a narrow tree line and field on the south bank and a steep bank with moderate vegetation on the north bank.

The HEC-RAS model was built using survey data of the existing channel and surrounding area performed by MSG personnel. In addition, the model was extended to the limits shown in the analysis by using LIDAR data. As a result the model includes surrounding topography as accurately as possible without performing a complete survey of the project area.

Table 1.2 100 Year Storm Backwater Elevations (Upstream)

Maumee River	Discharge (CFS)	Backwater Elevation (ft)	FEMA Flood Elevation (ft)	Outlet Velocity (fps)	Opening Area (sf)
Existing Condition	110,100	656.63	656	5.49	20,275.46
Proposed Structure (Alt C)	110,100	656.65	656	5.49	20,295.94

With the proposed bridge there are encroachments added creating slightly higher water surface elevations upstream and no change to velocities downstream. Per the analysis results, the water surface and velocity returns to normal (matches existing) within 500' downstream of the proposed crossing.

The deck drainage will be collected by scuppers and at the end of the approach slab.

1.5.3 *Scour Analysis*

A detailed scour analysis can be performed during the detail design phase of the project if desired. Additionally, the proposed structure alternative is intended to incorporate the use of driven HP12x53 piles, 4'-0" diameter drilled shafts and Type C slope protection, which greatly reduces the risks associated with scour.

1.5.4 *Hydraulic Conclusions*

Alternative C is the recommended structure for the 25 year design flood and also for meeting the 100 year water surface requirements mentioned above. Preliminary analysis also shows this structure clears the 100 year flood elevation in conjunction with utilizing the proposed profile on the Preliminary Alternative alignment. The freeboard clearance of the 25 year flood is 8.48 feet. See Appendix C of this STS for the Site Plan(s) and all supporting hydraulic data. Included with the hydraulic data is an aerial map showing the impact to FEMA NFIP flood zones.

1.6 Maintenance of Traffic

The bridge will not replace an existing structure. The proposed structure will be constructed on a new alignment. No maintenance of traffic is anticipated.

1.7 Foundation Recommendations

A full geotechnical investigation is scheduled to be performed in Stage 1 Design under the current Project Development Process. The MSG team has conducted research regarding the soil and geological conditions and has used this information to draw preliminary conclusions on the appropriate foundation type required for this structure location. The information shows that given the proximity of bedrock to the ground surface that drilled shaft anchored into the bedrock can be used at the piers, and that the abutments can be founded on capped pile footings. Pile foundations at the abutments are feasible since the distance from the bottom of the abutment foundation to bedrock is estimated to be greater than 15'. The use of drilled shafts (48" diameter) is expected to be used at the piers as the Preferred Alternative bridge design will be carried forward.

A complete Geotechnical Investigation will be conducted during Stage 1 design (Task 2.7.D). The investigation findings will be provided in a Geotechnical Exploration Report that will address the final recommendations (max factored resistance for drilled shafts) for the bridge pier foundations and (max factored pile capacity) for the bridge abutment foundations. The results will be provided in the Bridge Design Report (Task 2.7.F).

1.8 Aesthetic Evaluation

The primarily driving force for the construction of this bridge at this location is economic growth. Function rather than form is more significant in developing the bridge concept and details. With that said, it is still important to not overlook aesthetic treatment that is appropriate for a structure of this nature and not adversely drive up the cost. The ODOT Aesthetic Guidelines will be followed as aesthetic treatment is recommended for this bridge. Some appropriate features to consider are:

- A shared use path under the proposed bridge at the forward abutment to accommodate the existing Anthony Wayne Trail.
- Color scheme to incorporate concrete sealing colors
- Bridge piers, abutment walls and bridge railing may be textured to have the appearance of stone
- Bridge ornamental lighting

Aesthetic Evaluation to determine appropriate aesthetic treatment will be coordinated as the project progresses.

1.9 Bridge Alternative Evaluation

The major drivers in determining a superstructure type for the bridge are cost, hydraulics, and ability to incorporate aesthetic elements. As seen from the Cost Analysis above Alternative C has the most economical construction and total costs. Alternative C provides a hydraulic opening that allows for the water levels for the design floods to stay relatively the same. All alternatives may incorporate aesthetic features consistent with stakeholder feedback.

1.10 Structure Recommendations

The recommended structure is Alternative C - This alternative consists of providing a 72" depth WF72-49 Prestressed Concrete I-Beam with cast-in-place deck superstructure. The optimized span arrangement for this alternative is 8 spans (117.5'-117.5'-117.5'-117.5'-117.5'-117.5'-117.5'-117.5'). Preliminary analysis indicates this will require 4 stringers spaced at 10'-0" for most of the bridge, but with a flared deck in span 8 to accommodate roadway tapers that increases the beam spacing to 11'-8". The total cost savings over the life of the structure is estimated to be $519,414 less than the next least costly alternative.

APPENDIX A:
LOCATION MAP

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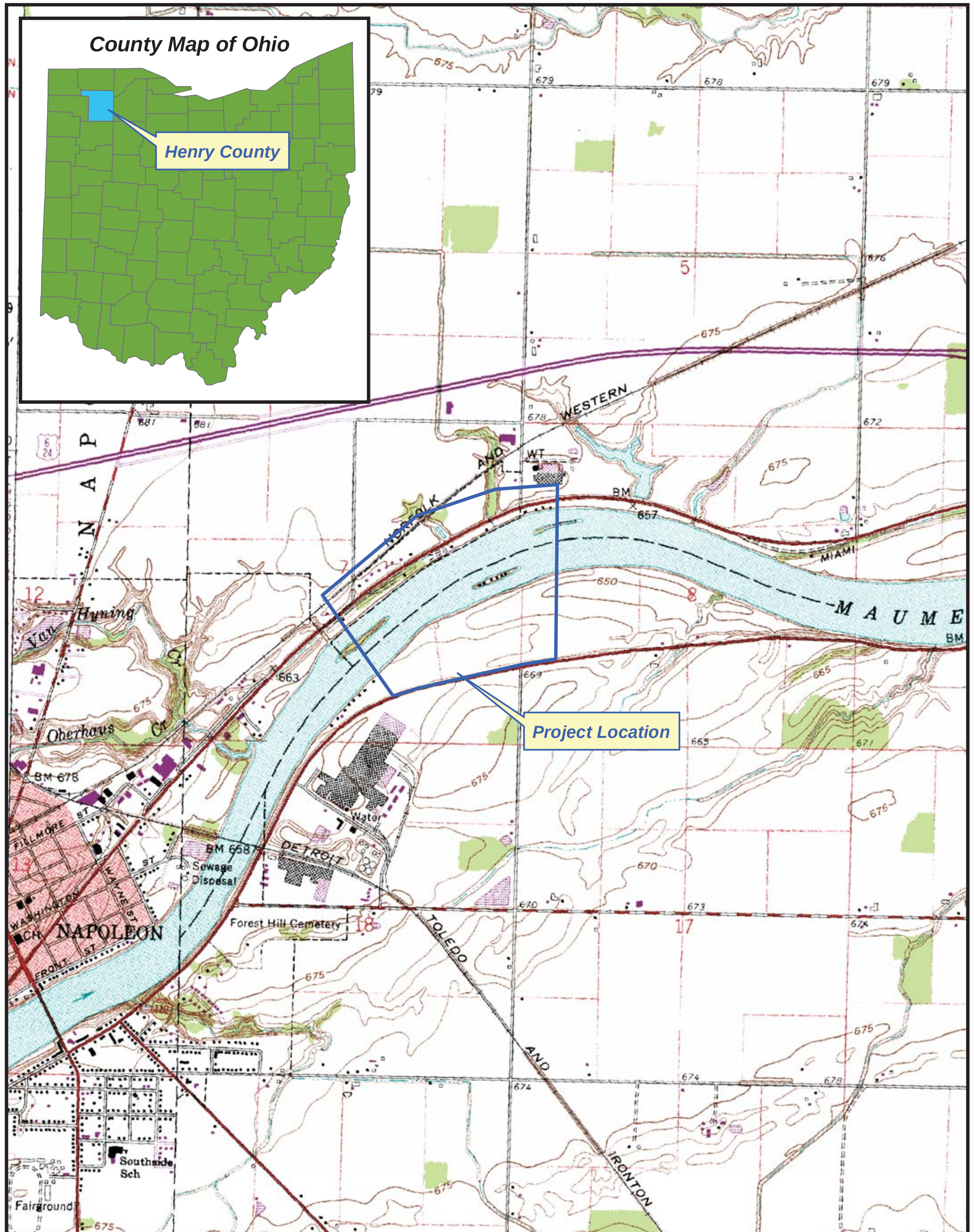

Figure 1: Site Location Map
Proposed Maumee River Crossing
Napoleon, Ohio

Notes
USGS Quadrangle, 7.5' Series Topographic
Napoleon East, OH 1960, Revised 1977

0 1,000 2,000 Feet

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APPENDIX B:
COST ESTIMATE INFORMATION

The Mannik & Smith Group, Inc.

Estimate - Alt. A

Estimated Cost:$7,993,754.05

Contingency: 48.00%

Estimated Total: $11,830,755.99

Estimate for alt A - 5 span steel plate girder Roadway Alignment: Roundabout

Base Date: 02/27/14

Spec Year: 13

Unit System: E

Work Type: BRIDGE REPLACEMENT

Highway Type:

Urban/Rural Type: URBAN CLASS

Season: WINTER

County: HENRY

Midpoint of Latitude: 412417

Midpoint of Longitude: 840614

District: 02

Federal/State Project Number: 22984

Prepared by KRH
Checked by SCT

The Mannik & Smith Group, Inc.

Group 0100: Initial Group

Line #	Item Number / Description / *Supplemental Description*	Quantity	Units	Unit Price	Extension
0005	503E11100 COFFERDAMS AND EXCAVATION BRACING *based on "SCA" 2013 pg 61 avg unit price x No. of piers rounded up*	1.000	LS	$81,250.00000	$81,250.00
0006	503E21100 UNCLASSIFIED EXCAVATION	770.000	CY	$34.49433	$26,560.63
0007	505E11100 PILE DRIVING EQUIPMENT MOBILIZATION *based on "SCA" 2013 pg 62*	1.000	LS	$17,250.00000	$17,250.00
0008	507E93300 STEEL POINTS OR SHOES	40.000	EACH	$142.27242	$5,690.90
0009	507E00200 STEEL PILES HP12X53, FURNISHED	1,000.000	FT	$34.78310	$34,783.10
0010	507E00250 STEEL PILES HP12X53, DRIVEN	800.000	FT	$8.56500	$6,852.00
0011	509E10000 EPOXY COATED REINFORCING STEEL	543,320.000	LB	$0.89901	$488,450.11
0012	511E21542 CLASS QC2 CONCRETE WITH QC/QA, SUPERSTRUCTURE *based on "SCA" 2013 unit price for 511e21522 pg 63*	1,371.000	CY	$700.00000	$959,700.00
0015	511E40510 CLASS QC1 CONCRETE, PIER ABOVE FOOTINGS *Based on "SCA" for 511e40512 rounded down for higher qty.*	541.000	CY	$660.00000	$357,060.00
0016	511E44112 CLASS QC1 CONCRETE WITH QC/QA, ABUTMENT NOT INCLUDING FOOTING *based on "SCA" 2013 pg 66*	263.000	CY	$575.00000	$151,225.00
0017	511E46512 CLASS QC1 CONCRETE WITH QC/QA, FOOTING *based on "SCA" 2013 pg 67*	449.000	CY	$417.00000	$187,233.00
0018	512E10100 SEALING OF CONCRETE SURFACES (EPOXY-URETHANE)	3,962.000	SY	$14.30688	$56,683.86
0019	513E10280 STRUCTURAL STEEL MEMBERS, LEVEL 4 *10% gross wt addded for struct steel other than girder*	3,738,092.000	LB	$1.36000	$5,083,805.12
0020	513E20000 WELDED STUD SHEAR CONNECTORS	16,208.000	EACH	$3.27692	$53,112.32
0021	516E12400 SPECIAL - MODULAR EXPANSION JOINT *based on "SCA" 2013 pg 74*	80.920	FT	$1,750.00000	$141,610.00
0024	516E44000 ELASTOMERIC BEARING WITH INTERNAL LAMINATES AND LOAD PLATE (NEOPRENE)	16.000	EACH	$741.43185	$11,862.91
0025	516E44100 ELASTOMERIC BEARING WITH INTERNAL LAMINATES AND LOAD PLATE (NEOPRENE)	8.000	EACH	$823.49632	$6,587.97
0026	517E75120 RAILING (CONCRETE PARAPET WITH TWIN STEEL TUBE RAILING)	946.000	FT	$142.12253	$134,447.91
0027	518E21200 POROUS BACKFILL WITH FILTER FABRIC	306.000	CY	$47.56940	$14,556.24
0028	518E40000 6" PERFORATED CORRUGATED PLASTIC PIPE	211.670	FT	$5.85530	$1,239.39
0029	518E40010 6" NON-PERFORATED CORRUGATED PLASTIC PIPE, INCLUDING SPECIALS	50.000	FT	$9.35917	$467.96
0030	523E20000 DYNAMIC LOAD TESTING	1.000	EACH	$3,526.19048	$3,526.19
0032	524E94902 DRILLED SHAFTS, 48" DIAMETER, ABOVE BEDROCK *based on "SCA" 2013 pg 83*	48.000	FT	$651.00000	$31,248.00
0033	524E94904 DRILLED SHAFTS, 48" DIAMETER, INTO BEDROCK	96.000	FT	$653.27268	$62,714.18

Line #	Item Number	Quantity	Units	Unit Price	Extension
	Description				
	Supplemental Description				
0034	526E30000	262.000	SY	$210.94302	$55,267.07
	REINFORCED CONCRETE APPROACH SLABS (T=17")				
0035	601E32210	436.000	CY	$47.17933	$20,570.19
	ROCK CHANNEL PROTECTION, TYPE C WITH AGGREGATE FILTER				

Total for Group 0100:$7,993,754.05

Estimate - Alt. B

Estimated Cost:$7,012,145.40

Contingency: 48.00%

Estimated Total: $10,377,975.19

Estimate for alt B - 6 span steel plate girder Roadway Alignment: Roundabout

Base Date: 02/27/14

Spec Year: 13

Unit System: E

Work Type: BRIDGE REPLACEMENT

Highway Type:

Urban/Rural Type: URBAN CLASS

Season: WINTER

County: HENRY

Midpoint of Latitude: 412417

Midpoint of Longitude: 840614

District: 02

Federal/State Project Number: 22984

Prepared by KRH
Checked by SCT

Group 0100: Initial Group

Line #	Item Number / Description / *Supplemental Description*	Quantity	Units	Unit Price	Extension
0005	503E11100 COFFERDAMS AND EXCAVATION BRACING *based on "SCA" 2013 pg 61 avg unit price x No. of piers rounded up*	1.000	LS	$65,000.00000	$65,000.00
0006	503E21100 UNCLASSIFIED EXCAVATION	848.000	CY	$33.81782	$28,677.51
0007	505E11100 PILE DRIVING EQUIPMENT MOBILIZATION *based on "SCA" 2013 pg 62*	1.000	LS	$17,250.00000	$17,250.00
0008	507E93300 STEEL POINTS OR SHOES	40.000	EACH	$142.27242	$5,690.90
0009	507E00200 STEEL PILES HP12X53, FURNISHED	1,000.000	FT	$34.78310	$34,783.10
0010	507E00250 STEEL PILES HP12X53, DRIVEN	800.000	FT	$8.56500	$6,852.00
0011	509E10000 EPOXY COATED REINFORCING STEEL	585,470.000	LB	$0.89399	$523,404.33
0012	511E21542 CLASS QC2 CONCRETE WITH QC/QA, SUPERSTRUCTURE *based on "SCA" 2013 unit price for 511e21522 pg 63*	1,371.000	CY	$700.00000	$959,700.00
0015	511E40510 CLASS QC1 CONCRETE, PIER ABOVE FOOTINGS *Based on "SCA" for 511e40512 rounded down for higher qty.*	676.000	CY	$660.00000	$446,160.00
0016	511E44112 CLASS QC1 CONCRETE WITH QC/QA, ABUTMENT NOT INCLUDING FOOTING *based on "SCA" 2013 pg 66*	268.000	CY	$575.00000	$154,100.00
0017	511E46512 CLASS QC1 CONCRETE WITH QC/QA, FOOTING *based on "SCA" 2013 pg 67*	495.000	CY	$417.00000	$206,415.00
0018	512E10100 SEALING OF CONCRETE SURFACES (EPOXY-URETHANE)	4,505.000	SY	$14.30688	$64,452.49
0019	513E10280 STRUCTURAL STEEL MEMBERS, LEVEL 4 *10% gross wt addded for struct steel other than girders*	2,894,121.000	LB	$1.36000	$3,936,004.56
0020	513E20000 WELDED STUD SHEAR CONNECTORS	16,208.000	EACH	$3.27692	$53,112.32
0021	516E12400 SPECIAL - MODULAR EXPANSION JOINT *based on "SCA" 2013 pg 74*	80.920	FT	$1,750.00000	$141,610.00
0024	516E44000 ELASTOMERIC BEARING WITH INTERNAL LAMINATES AND LOAD PLATE (NEOPRENE)	20.000	EACH	$741.43185	$14,828.64
0025	516E44100 ELASTOMERIC BEARING WITH INTERNAL LAMINATES AND LOAD PLATE (NEOPRENE)	8.000	EACH	$823.49632	$6,587.97
0026	517E75120 RAILING (CONCRETE PARAPET WITH TWIN STEEL TUBE RAILING)	946.000	FT	$142.12253	$134,447.91
0027	518E21200 POROUS BACKFILL WITH FILTER FABRIC	305.740	CY	$47.57360	$14,545.15
0028	518E40000 6" PERFORATED CORRUGATED PLASTIC PIPE	211.670	FT	$5.85530	$1,239.39
0029	518E40010 6" NON-PERFORATED CORRUGATED PLASTIC PIPE, INCLUDING SPECIALS	50.000	FT	$9.35917	$467.96
0030	523E20000 DYNAMIC LOAD TESTING	1.000	EACH	$3,526.19048	$3,526.19
0032	524E94902 DRILLED SHAFTS, 48" DIAMETER, ABOVE BEDROCK *based on "SCA" 2013 pg 83*	60.000	FT	$651.00000	$39,060.00
0033	524E94904 DRILLED SHAFTS, 48" DIAMETER, INTO BEDROCK	120.000	FT	$653.27268	$78,392.72

Line #	Item Number	Quantity	Units	Unit Price	Extension
Description					
Supplemental Description					
0034	526E30000	262.000	SY	$210.94302	$55,267.07
REINFORCED CONCRETE APPROACH SLABS (T=17")					
0035	601E32210	436.000	CY	$47.17933	$20,570.19
ROCK CHANNEL PROTECTION, TYPE C WITH AGGREGATE FILTER					

Total for Group 0100:$7,012,145.40

Estimate - Alt. C

Estimated Cost:$5,271,117.65

Contingency: 48.00%

Estimated Total: $7,801,254.12

Estimate for alt C - 8 span, prestrssed concrete I-beams   Roadway Alignment: Roundabout

Base Date: 02/27/14

Spec Year: 13

Unit System: E

Work Type: BRIDGE REPLACEMENT

Highway Type:

Urban/Rural Type: URBAN CLASS

Season: WINTER

County: HENRY

Midpoint of Latitude: 412417

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District: 02

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Prepared by KRH
Checked by SCT

Group 0100: Initial Group

Line #	Item Number / Description / *Supplemental Description*	Quantity	Units	Unit Price	Extension
0005	503E11100 COFFERDAMS AND EXCAVATION BRACING *based on "SCA" 2013 pg 61 avg unit price x No. piers (rounded up)*	1.000	LS	$113,750.00000	$113,750.00
0006	503E21100 UNCLASSIFIED EXCAVATION	1,026.000	CY	$32.52061	$33,366.15
0007	505E11100 PILE DRIVING EQUIPMENT MOBILIZATION *based on "SCA" 2013 pg 62*	1.000	LS	$17,250.00000	$17,250.00
0008	507E93300 STEEL POINTS OR SHOES	40.000	EACH	$142.27242	$5,690.90
0009	507E00200 STEEL PILES HP12X53, FURNISHED	1,000.000	FT	$34.78310	$34,783.10
0010	507E00250 STEEL PILES HP12X53, DRIVEN	800.000	FT	$8.56500	$6,852.00
0011	509E10000 EPOXY COATED REINFORCING STEEL	828,720.000	LB	$0.87101	$721,823.41
0012	511E21542 CLASS QC2 CONCRETE WITH QC/QA, SUPERSTRUCTURE *based on "SCA" 2013 unit price for 511e21522 pg 63*	1,450.000	CY	$700.00000	$1,015,000.00
0015	511E40512 CLASS QC1 CONCRETE WITH QC/QA, PIER ABOVE FOOTINGS *Based on "SCA" for 511e40512 rounded down for higher qty.*	1,367.000	CY	$660.00000	$902,220.00
0016	511E44112 CLASS QC1 CONCRETE WITH QC/QA, ABUTMENT NOT INCLUDING FOOTING *based on "SCA" 2013 pg 66*	279.000	CY	$575.00000	$160,425.00
0017	511E46512 CLASS QC1 CONCRETE WITH QC/QA, FOOTING *based on "SCA" 2013 pg 67*	586.000	CY	$417.00000	$244,362.00
0018	512E10100 SEALING OF CONCRETE SURFACES (EPOXY-URETHANE)	7,413.000	SY	$14.30688	$106,056.90
0019	515E16000 PRESTRESSED CONCRETE BRIDGE I-BEAM MEMBERS, MISC.: *based on prelim price from vendor @ $207/ft*	32.000	EACH	$40,000.00000	$1,280,000.00
0020	515E20000 INTERMEDIATE DIAPHRAGMS	32.000	EACH	$1,046.56132	$33,489.96
0021	516E12400 SPECIAL - MODULAR EXPANSION JOINT *based on "SCA" 2013 pg 74*	80.920	FT	$1,750.00000	$141,610.00
0024	516E44000 ELASTOMERIC BEARING WITH INTERNAL LAMINATES AND LOAD PLATE (NEOPRENE)	56.000	EACH	$949.65861	$53,180.88
0025	516E44100 ELASTOMERIC BEARING WITH INTERNAL LAMINATES AND LOAD PLATE (NEOPRENE)	8.000	EACH	$823.49632	$6,587.97
0026	517E75120 RAILING (CONCRETE PARAPET WITH TWIN STEEL TUBE RAILING)	947.000	FT	$142.12253	$134,590.04
0027	518E21200 POROUS BACKFILL WITH FILTER FABRIC	306.000	CY	$47.56940	$14,556.24
0028	518E40000 6" PERFORATED CORRUGATED PLASTIC PIPE	215.000	FT	$5.85059	$1,257.88
0029	518E40010 6" NON-PERFORATED CORRUGATED PLASTIC PIPE, INCLUDING SPECIALS	50.000	FT	$9.35917	$467.96
0030	523E20000 DYNAMIC LOAD TESTING	1.000	EACH	$3,526.19048	$3,526.19
0032	524E94902 DRILLED SHAFTS, 48" DIAMETER, ABOVE BEDROCK *based on "SCA" 2013 pg 83*	84.000	FT	$651.00000	$54,684.00
0033	524E94904 DRILLED SHAFTS, 48" DIAMETER, INTO BEDROCK	168.000	FT	$653.27268	$109,749.81

Line #	Item Number	Quantity	Units	Unit Price	Extension
	Description				
	Supplemental Description				
0034	526E30000	262.000	SY	$210.94302	$55,267.07
	REINFORCED CONCRETE APPROACH SLABS (T=17")				
0035	601E32210	436.000	CY	$47.17933	$20,570.19
	ROCK CHANNEL PROTECTION, TYPE C WITH AGGREGATE FILTER				

Total for Group 0100:$5,271,117.65

Estimate - Alt. D

Estimated Cost:$5,510,221.24

Contingency: 48.00%

Estimated Total: $8,155,127.44

Estimate for Alt D -7 span, prestrssed concrete I-beams Roadway Alignment: Roundabout

Base Date: 02/27/14

Spec Year: 13

Unit System: E

Work Type: BRIDGE REPLACEMENT

Highway Type:

Urban/Rural Type: URBAN CLASS

Season: WINTER

County: HENRY

Midpoint of Latitude: 412417

Midpoint of Longitude: 840614

District: 02

Federal/State Project Number: 22984

Prepared by KRH
Checked by SCT

Group 0100: Initial Group

Line #	Item Number / Description / *Supplemental Description*	Quantity	Units	Unit Price	Extension
0005	503E11100 COFFERDAMS AND EXCAVATION BRACING *based on "SCA" 2013 pg 61 avg unit price x No. piers (rounded up)*	1.000	LS	$97,500.00000	$97,500.00
0006	503E21100 UNCLASSIFIED EXCAVATION	927.000	CY	$33.20509	$30,781.12
0007	505E11100 PILE DRIVING EQUIPMENT MOBILIZATION *based on "SCA" 2013 pg 62*	1.000	LS	$17,250.00000	$17,250.00
0008	507E93300 STEEL POINTS OR SHOES	40.000	EACH	$142.27242	$5,690.90
0009	507E00200 STEEL PILES HP12X53, FURNISHED	1,000.000	FT	$34.78310	$34,783.10
0010	507E00250 STEEL PILES HP12X53, DRIVEN	800.000	FT	$8.56500	$6,852.00
0011	509E10000 EPOXY COATED REINFORCING STEEL	717,640.000	LB	$0.88046	$631,853.31
0012	511E21542 CLASS QC2 CONCRETE WITH QC/QA, SUPERSTRUCTURE *based on "SCA" 2013 unit price for 511e21522 pg 63*	1,450.000	CY	$700.00000	$1,015,000.00
0015	511E40512 CLASS QC1 CONCRETE WITH QC/QA, PIER ABOVE FOOTINGS *Based on "SCA" for 511e40512*	1,171.000	CY	$660.00000	$772,860.00
0016	511E44112 CLASS QC1 CONCRETE WITH QC/QA, ABUTMENT NOT INCLUDING FOOTING *based on "SCA" 2013 pg 66*	260.000	CY	$575.00000	$149,500.00
0017	511E46512 CLASS QC1 CONCRETE WITH QC/QA, FOOTING *based on "SCA" 2013 pg 67*	540.000	CY	$417.00000	$225,180.00
0018	512E10100 SEALING OF CONCRETE SURFACES (EPOXY-URETHANE)	7,533.000	SY	$14.30688	$107,773.73
0019	515E16000 PRESTRESSED CONCRETE BRIDGE I-BEAM MEMBERS, MISC.: *based on prelim price from vendor @ $335/ft*	28.000	EACH	$65,000.00000	$1,820,000.00
0020	515E20000 INTERMEDIATE DIAPHRAGMS	28.000	EACH	$1,046.56132	$29,303.72
0021	516E12400 SPECIAL - MODULAR EXPANSION JOINT *based on "SCA" 2013 pg 74*	80.920	FT	$1,750.00000	$141,610.00
0024	516E44000 ELASTOMERIC BEARING WITH INTERNAL LAMINATES AND LOAD PLATE (NEOPRENE)	48.000	EACH	$969.71099	$46,546.13
0025	516E44100 ELASTOMERIC BEARING WITH INTERNAL LAMINATES AND LOAD PLATE (NEOPRENE)	8.000	EACH	$823.49632	$6,587.97
0026	517E75120 RAILING (CONCRETE PARAPET WITH TWIN STEEL TUBE RAILING)	947.000	FT	$142.12253	$134,590.04
0027	518E21200 POROUS BACKFILL WITH FILTER FABRIC	305.740	CY	$47.57360	$14,545.15
0028	518E40000 6" PERFORATED CORRUGATED PLASTIC PIPE	211.670	FT	$5.85530	$1,239.39
0029	518E40010 6" NON-PERFORATED CORRUGATED PLASTIC PIPE, INCLUDING SPECIALS	50.000	FT	$9.35917	$467.96
0030	523E20000 DYNAMIC LOAD TESTING	1.000	EACH	$3,526.19048	$3,526.19
0032	524E94902 DRILLED SHAFTS, 48" DIAMETER, ABOVE BEDROCK *based on "SCA" 2013 pg 83*	72.000	FT	$651.00000	$46,872.00
0033	524E94904 DRILLED SHAFTS, 48" DIAMETER, INTO BEDROCK	144.000	FT	$653.27268	$94,071.27

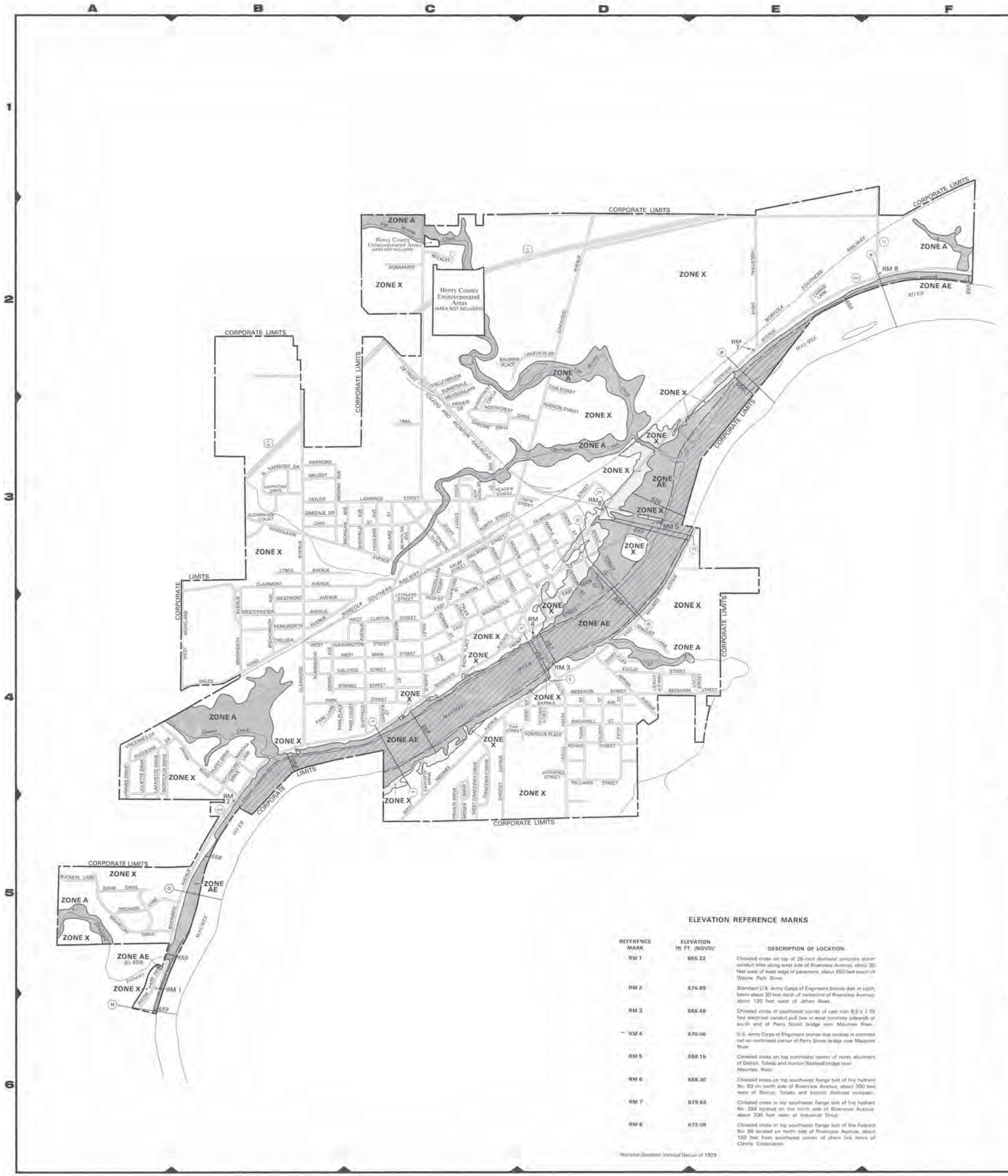
Line #	Item Number	Quantity	Units	Unit Price	Extension
	Description *Supplemental Description*				
0034	526E30000	262.000	SY	$210.94302	$55,267.07
	REINFORCED CONCRETE APPROACH SLABS (T=17")				
0035	601E32210	436.000	CY	$47.17933	$20,570.19
	ROCK CHANNEL PROTECTION, TYPE C WITH AGGREGATE FILTER				

Total for Group 0100:$5,510,221.24

The Mannik Smith, Inc.
23225 Mercantile Rd
Beachwood, OH 44122
(216) 378-1490

Maintenance Item Cost -- INDUSTRIAL DRIVE OVER MAUMEE RIVER -- TYPE STUDY

MAINTENANCE ITEMS (SUPERSTRUCTURE ONLY)	NUMBER OF YEARS																
	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	
Present Worth Factor for Life Cycle Events	**0.863**	**0.744**	**0.642**	**0.554**	**0.478**	**0.412**	**0.355**	**0.307**	**0.264**	**0.228**	**0.197**	**0.170**	**0.146**	**0.126**	**0.109**		
Alternative A																	
Steel Straight Plate Girders 92" Depth																	
Narrow Secton Web 92" x 1";Top Flange 26" x (2.0",2.5",3.5"); Bot. Flange26" x (2.0",2.5",3.5")&																	
Wide SectionWeb 92" x 1.375";Top Flange 30" x (2.0",2.5",3.75"); Bot. Flange 30" x (2.0",2.5",3.75")																	
Seal Entire Surface of Deck & Approaches w/ Silane/Siloxane Every 5 Years	$37,868.53	$32,665.72	$28,177.74	$24,306.37	$20,966.88	$18,086.22	$15,601.33		$11,608.86	$10,013.90	$8,638.08	$7,451.28	$6,427.54	$5,544.45	$4,782.69		
Remove Surface Rust And Repaint (Prime, Intermediate and Finish Coats)								$116,261.68				$60,535.31					
Seal Surface of Sidewalks & Barriers With Silane/Siloxane Every 5 Years			$33,344.73			$21,402.71					$10,222.05			$6,561.15			
(Or Assume That Epoxy-Urethane Can Be Used Every 15 Years)																	
Hydro-demolition Of Top Surface And Replacement With Concrete Overlay					$733,196.19								$224,766.31				
Full Replacement of Deck								$415,890.34									
Alternative B																	
Steel Straight Plate Girders 86" Depth																	
Narrow Section Web 86" x 1";Top Flange 20" x (1.5",2.5",3.5"); Bot. Flange20" x (1.5",2.5",3.5")&																	
Wide Section Web 86" x 1.375";Top Flange 24" x (1.5",2.5",3.75"); Bot. Flange 24" x (1.5",2.5",3.75")																	
Seal Entire Surface of Deck & Approaches w/ Silane/Siloxane Every 5 Years	$37,868.53	$32,665.72	$28,177.74	$24,306.37	$20,966.88	$18,086.22	$15,601.33		$11,608.86	$10,013.90	$8,638.08	$7,451.28	$6,427.54	$5,544.45	$4,782.69	**Full Bridge Replacement Assumed**	
Remove Surface Rust And Repaint (Prime, Intermediate and Finish Coats)								$103,815.47				$54,475.84					
Seal Surface of Sidewalks & Barriers With Silane/Siloxane Every 5 Years			$33,344.73			$21,402.71					$10,222.05			$6,561.15			
(Or Assume That Epoxy-Urethane Can Be Used Every 15 Years)																	
Hydro-demolition Of Top Surface And Replacement With Concrete Overlay					$733,196.19								$224,766.31				
Full Replacement of Deck								$415,890.34									
Alternative C																	
Prestressed Concrete I-Beams WF72-49																	
Seal Entire Surface of Deck & Approaches w/ Silane/Siloxane Every 5 Years	$37,868.53	$32,665.72	$28,177.74	$24,306.37	$20,966.88	$18,086.22	$15,601.33		$11,608.86	$10,013.90	$8,638.08	$7,451.28	$6,427.54	$5,544.45	$4,782.69		
Seal Surface of Sidewalks & Barriers With Silane/Siloxane Every 5 Years			$33,344.73			$21,402.71					$10,222.05			$6,561.15			
(Or Assume That Epoxy-Urethane Can Be Used Every 15 Years)																	
Hydro-demolition Of Top Surface And Replacement With Concrete Overlay					$733,196.19								$224,766.31				
Full Replacement of Superstructure								$392,392.76									
Full Replacement of Deck								$412,043.05									
Alternative D																	
Prestressed Concrete I-Beams Modified WF72-49 (96")																	
Seal Entire Surface of Deck & Approaches w/ Silane/Siloxane Every 5 Years	$37,868.53	$32,665.72	$28,177.74	$24,306.37	$20,966.88	$18,086.22	$15,601.33		$11,608.86	$10,013.90	$8,638.08	$7,451.28	$6,427.54	$5,544.45	$4,782.69		
Seal Surface of Sidewalks & Barriers With Silane/Siloxane Every 5 Years			$33,344.73			$21,402.71					$10,222.05			$6,561.15			
(Or Assume That Epoxy-Urethane Can Be Used Every 15 Years)																	
Hydro-demolition Of Top Surface And Replacement With Concrete Overlay					$733,196.19								$224,766.31				
Full Replacement of Superstructure								$557,933.45									
Full Replacement of Deck								$412,043.05									
Steel Straight Plate Girders 92" Depth	$37,869	$32,666	$61,523	$24,307	$754,164	$39,489	$15,602	$532,153	$11,609	$10,014	$18,861	$67,987	$231,194	$12,106	$4,783	**Unknown**	**$1,854,327**
Steel Straight Plate Girders 86" Depth	$37,869	$32,666	$61,523	$24,307	$754,164	$39,489	$15,602	$519,706	$11,609	$10,014	$18,861	$61,928	$231,194	$12,106	$4,783	**Unknown**	**$1,835,821**
Prestressed Concrete I-Beams WF72-49	$37,869	$32,666	$61,523	$24,307	$754,164	$39,489	$15,602	$804,436	$11,609	$10,014	$18,861	$7,452	$231,194	$12,106	$4,783	**Unknown**	**$2,066,075**
Prestressed Concrete I-Beams Modified WF72-49 (96")	$37,869	$32,666	$61,523	$24,307	$754,164	$39,489	$15,602	$969,977	$11,609	$10,014	$18,861	$7,452	$231,194	$12,106	$4,783	**Unknown**	**$2,231,616**



ELEVATION REFERENCE MARKS

REFERENCE MARK	ELEVATION IN FT. (NGVD)*	DESCRIPTION OF LOCATION
RM 1	655.22	Chiseled cross on top of 26-inch diameter concrete storm conduit inlet along west side of Riverview Avenue, about 20 feet west of west edge of pavement, about 450 feet south of Wayne Park Drive.
RM 2	676.89	Standard U.S. Army Corps of Engineers bronze disk in catch basin about 30 feet north of centerline of Riverview Avenue, about 120 feet west of Jahan Road.
RM 3	666.48	Chiseled cross in southwest corner of cast iron 8.5 x 1.75 feet electrical conduit pull box in west concrete sidewalk at south end of Perry Street bridge over Maumee River.
RM 4	670.06	U.S. Army Corps of Engineers bronze disk located in concrete rail on northwest corner of Perry Street bridge over Maumee River.
RM 5	658.15	Chiseled cross on top northwest corner of north abutment of Detroit, Toledo and Ironton Railroad bridge over Maumee River.
RM 6	658.30	Chiseled cross on top southwest flange bolt of fire hydrant No. 83 on north side of Riverview Avenue, about 300 feet west of Detroit, Toledo and Ironton Railroad overpass.
RM 7	679.63	Chiseled cross in top southwest flange bolt of fire hydrant No. 284 located on the north side of Riverview Avenue, about 200 feet west of Industrial Drive.
RM 8	672.08	Chiseled cross in top southwest flange bolt of fire hydrant No. 88 located on north side of Riverview Avenue, about 150 feet from southwest corner of chain link fence of Clevite Corporation.

*National Geodetic Vertical Datum of 1929

LEGEND

SPECIAL FLOOD HAZARD AREAS INUNDATED BY 100-YEAR FLOOD

- **ZONE A** No base flood elevations determined.
- **ZONE AE** Base flood elevations determined.
- **ZONE AH** Flood depths of 1 to 3 feet (usually areas of ponding); base flood elevations determined.
- **ZONE AO** Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
- **ZONE A99** To be protected from 100-year flood by Federal flood protection system under construction; no base flood elevations determined.
- **ZONE V** Coastal flood with velocity hazard (wave action); no base flood elevations determined.
- **ZONE VE** Coastal flood with velocity hazard (wave action); base flood elevations determined.

FLOODWAY AREAS IN ZONE AE

OTHER FLOOD AREAS

- **ZONE X** Areas of 500-year flood; areas of 100-year flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 100-year flood.

OTHER AREAS

- **ZONE X** Areas determined to be outside 500-year floodplain.
- **ZONE D** Areas in which flood hazards are undetermined.

UNDEVELOPED COASTAL BARRIERS†

Identified 1983 | Identified 1990 or Later | Otherwise Protected Areas Identified 1991 Or Later

†Coastal barrier areas are normally located within or adjacent to special flood hazard areas.

Floodplain Boundary

Floodway Boundary

Zone D Boundary

Boundary Dividing Special Flood Hazard Zones, and Boundary Dividing Areas of Different Coastal Base Flood Elevations Within Special Flood Hazard Zones.

~~~ 513 ~~~ Base Flood Elevation Line; Elevation in Feet*

(D)——(D) Cross Section Line

(EL 987) Base Flood Elevation in Feet Where Uniform Within Zone*

RM 7× Elevation Reference Mark

•M1.5 River Mile

*Referenced to the National Geodetic Vertical Datum of 1929

NOTES

This map is for use in administering the National Flood Insurance Program; it does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size, or all planimetric features outside Special Flood Hazard Areas. The community map repository should be consulted for possible updated flood hazard information prior to use of this map for property purchase or construction purposes.

Coastal base flood elevations apply only landward of 0.0 NGVD, and include the effects of wave action; these elevations may also differ significantly from those developed by the National Weather Service for hurricane evacuation planning.

Areas of special flood hazard (100-year flood) include Zones A, AE, AH, AO, A99, V, and VE.

Certain areas not in Special Flood Hazard Areas may be protected by flood control structures.

Boundaries of the floodways were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the Federal Emergency Management Agency.

Floodway widths in some areas may be too narrow to show to scale. Floodway widths are provided in the Flood Insurance Study Report.

MAP REPOSITORY

Office of Zoning Administration, 255 West Riverview Avenue, Napoleon, Ohio 43545-0151 (Maps available for reference only, not for distribution.)

INITIAL IDENTIFICATION:

MAY 31, 1974

FLOOD HAZARD BOUNDARY MAP REVISIONS:

OCTOBER 3, 1975

JANUARY 26, 1979

FLOOD INSURANCE RATE MAP EFFECTIVE:

MARCH 4, 1988

FLOOD INSURANCE RATE MAP REVISIONS:

November 2, 1995 - to decrease base flood elevations, to change special flood hazard areas, to update map format and to incorporate previously issued letter of map amendment.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at (800) 638-6620.

N

APPROXIMATE SCALE

1000 0 1000 FEET

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

CITY OF
NAPOLEON,
OHIO
HENRY COUNTY

(ONLY PANEL PRINTED)

COMMUNITY-PANEL NUMBER
390266 0005 D

MAP REVISED:
NOVEMBER 2, 1995

Federal Emergency Management Agency
~~~

LEGEND

SPECIAL FLOOD HAZARD AREAS INUNDATED BY 100-YEAR FLOOD

ZONE A No base flood elevations determined.

ZONE AE Base flood elevations determined.

ZONE AH Flood depths of 1 to 3 feet (usually areas of ponding); base flood elevations determined.

ZONE AO Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.

ZONE A99 To be protected from 100-year flood by Federal flood protection system under construction; no base flood elevations determined.

ZONE V Coastal flood with velocity hazard (wave action); no base flood elevations determined.

ZONE VE Coastal flood with velocity hazard (wave action); base flood elevations determined.

FLOODWAY AREAS IN ZONE AE

OTHER FLOOD AREAS

ZONE X Areas of 500-year flood; areas of 100-year flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 100-year flood.

OTHER AREAS

ZONE X Areas determined to be outside 500-year floodplain.

ZONE D Areas in which flood hazards are undetermined.

UNDEVELOPED COASTAL BARRIERS†

Identified 1983 | Identified 1990 or later | Otherwise Protected Areas

†Coastal barrier areas are normally located within or adjacent to special flood hazard areas.

Floodplain Boundary

Floodway Boundary

Zone D Boundary

Boundary Dividing Special Flood Hazard Zones

513 Base Flood Elevation Line; Elevation in Feet*

(D)—(D) Cross Section Line

(EL 987) Base Flood Elevation in Feet Where Uniform Within Zone*

RM 7x Elevation Reference Mark

•M1.5 River Mile

*Referenced to the National Geodetic Vertical Datum of 1929

NOTES

This map is for use in administering the National Flood Insurance Program; it does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size, or all planimetric features outside Special Flood Hazard Areas. The community map repository should be consulted for possible updated flood hazard information prior to use of this map for property purchase or construction purposes.

Coastal base flood elevations apply only landward of 0.0 NGVD, and include the effects of wave action; these elevations may also differ significantly from those developed by the National Weather Service for hurricane evacuation planning.

Areas of special flood hazard (100-year flood) include Zones A, AE, AH, AO, A99, V, and VE.

Certain areas not in Special Flood Hazard Areas may be protected by flood control structures.

Boundaries of the floodways were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the Federal Emergency Management Agency.

Floodway widths in some areas may be too narrow to show to scale. Floodway widths are provided in the Flood Insurance Study Report.

For adjoining map panels see separately printed Map Index.

MAP REPOSITORY

Henry County Planning Office, 104 East Washington Street, Hahn Center, Suite 301, Napoleon, Ohio 43545 (Maps available for reference only, not for distribution.)

INITIAL IDENTIFICATION:

NOVEMBER 25, 1977

FLOOD HAZARD BOUNDARY MAP REVISIONS:

NONE

FLOOD INSURANCE RATE MAP EFFECTIVE:

DECEMBER 5, 1995

FLOOD INSURANCE RATE MAP REVISIONS:

Refer to the Flood Insurance Rate Map Effective date shown on this map to determine when actuarial rates apply to structures in the zones where elevations or depths have been established.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at (800) 638-6620.

APPROXIMATE SCALE

2000 0 2000 FEET

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

HENRY COUNTY, OHIO (UNINCORPORATED AREAS)

PANEL 25 OF 150

(SEE MAP INDEX FOR PANELS NOT PRINTED)

COMMUNITY-PANEL NUMBER 390776 0025 B

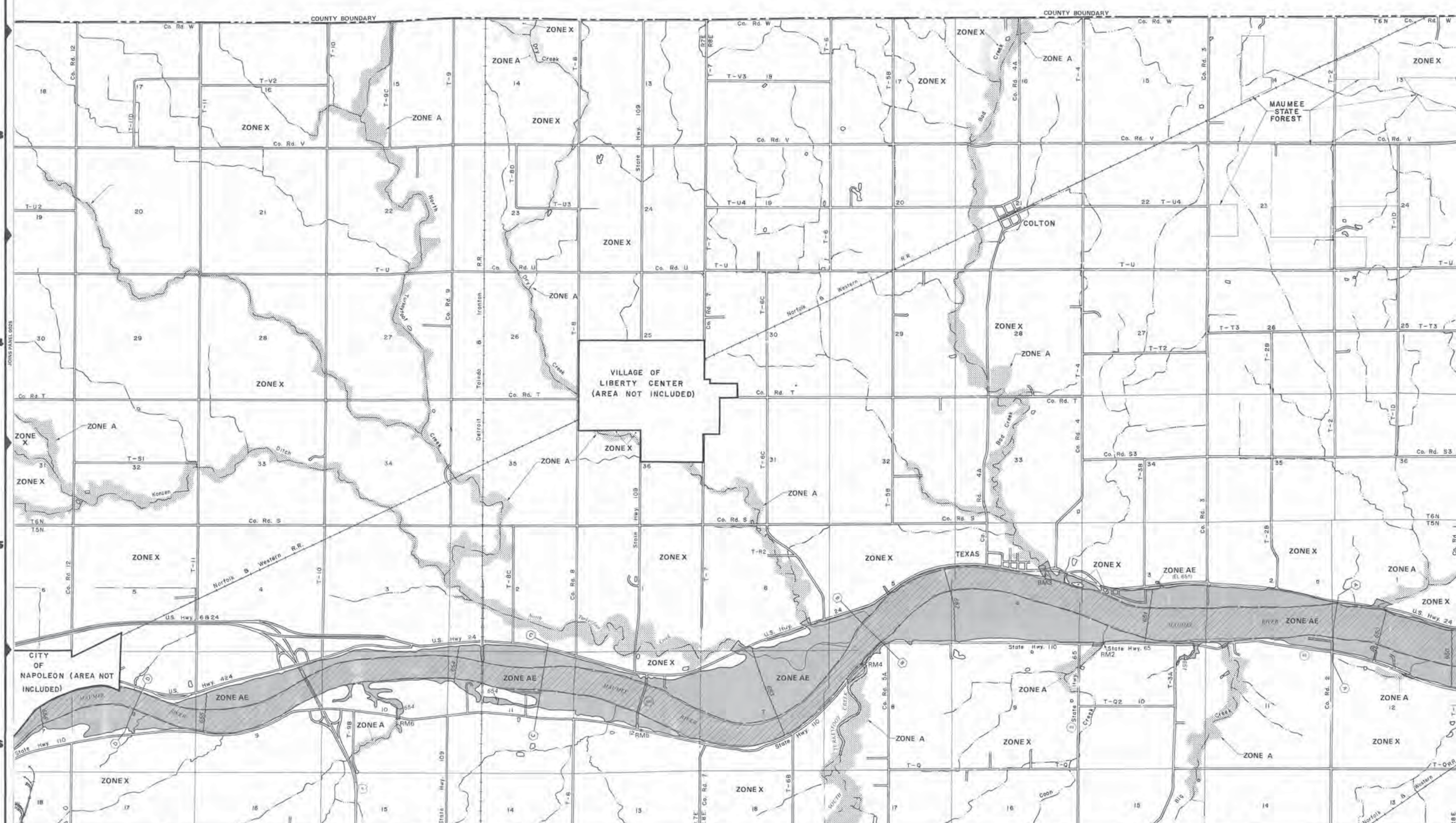
EFFECTIVE DATE: DECEMBER 5, 1995

Federal Emergency Management Agency

ELEVATION REFERENCE MARKS

REFERENCE MARK	ELEVATION IN FT. (NGVD)[1]	DESCRIPTION OF LOCATION
RM 1	662.86	USGS standard disk set in concrete pad, approximately 26 feet north of State Route 65, approximately 97 feet east of Wood/Henry County line and approximately 3 feet west of power pole.
RM 2	649.05	USGS standard disk, stamped 48 DAW 1959 648, on State Route 65 bridge over Coon Creek.
RM 3	656.22	USGS standard disk, stamped 46 DAW 1959 656, set in concrete base of pyramid-shaped concrete monument, with lettering, Sec. 53 W. & E. C. completed 1842 James Durbin, located along canal towpath on north side of Maumee River, approximately 20 feet south of U.S. Highway 6.
RM 4	655.53	USGS standard disk, stamped 48 DAW 1959 656, on State Route 110 bridge over South Turkeyfoot Creek.
RM 5	666.36	USGS standard disk, stamped 20 DAB 1959, set in east end of concrete slab, approximately 109 feet east of State Route 109 north of State Route 110 located near intersection of State Route 109 and State Route 110.
RM 6	661.26	USGS standard disk, stamped 21 DAB 1959, set in south-east headwall of concrete bridge along State Route 110, approximately 0.4 mile west of intersection of State Route 110 and State Route 109.

[1]National Geodetic Vertical Datum of 1929



LEGEND

SPECIAL FLOOD HAZARD AREAS INUNDATED BY 100-YEAR FLOOD

- **ZONE A** No base flood elevations determined.
- **ZONE AE** Base flood elevations determined.
- **ZONE AH** Flood depths of 1 to 3 feet (usually areas of ponding); base flood elevations determined.
- **ZONE AO** Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
- **ZONE A99** To be protected from 100-year flood by Federal flood protection system under construction; no base flood elevations determined.
- **ZONE V** Coastal flood with velocity hazard (wave action); no base flood elevations determined.
- **ZONE VE** Coastal flood with velocity hazard (wave action); base flood elevations determined.

FLOODWAY AREAS IN ZONE AE

OTHER FLOOD AREAS

- **ZONE X** Areas of 500-year flood; areas of 100-year flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 100-year flood.

OTHER AREAS

- **ZONE X** Areas determined to be outside 500-year floodplain.
- **ZONE D** Areas in which flood hazards are undetermined.

UNDEVELOPED COASTAL BARRIERS†

Identified 1983 | Identified 1990 or Later | Otherwise Protected Areas

†Coastal barrier areas are normally located within or adjacent to special flood hazard areas.

- Floodplain Boundary
- Floodway Boundary
- Zone D Boundary
- Boundary Dividing Special Flood Hazard Zones
- ~~513~~ Base Flood Elevation Line; Elevation in Feet*
- (D)—(D) Cross Section Line
- (EL 987) Base Flood Elevation in Feet Where Uniform Within Zone*
- RM 7× Elevation Reference Mark
- •M1.5 River Mile

*Referenced to the National Geodetic Vertical Datum of 1929

NOTES

This map is for use in administering the National Flood Insurance Program; it does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size, or all planimetric features outside Special Flood Hazard Areas. The community map repository should be consulted for possible updated flood hazard information prior to use of this map for property purchase or construction purposes.

Coastal base flood elevations apply only landward of 0.0 NGVD, and include the effects of wave action; these elevations may also differ significantly from those developed by the National Weather Service for hurricane evacuation planning.

Areas of special flood hazard (100-year flood) include Zones A, AE, AH, AO, A99, V, and VE.

Certain areas not in Special Flood Hazard Areas may be protected by flood control structures.

Boundaries of the floodways were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the Federal Emergency Management Agency.

Floodway widths in some areas may be too narrow to show to scale. Floodway widths are provided in the Flood Insurance Study Report.

For adjoining map panels see separately printed Map Index.

MAP REPOSITORY

Henry County Planning Office, 104 East Washington Street, Hahn Center, Suite 301, Napoleon, Ohio 43545. (Maps available for reference only, not for distribution.)

INITIAL IDENTIFICATION:

NOVEMBER [illegible]

FLOOD HAZARD BOUNDARY MAP REVISIONS:

NONE

FLOOD INSURANCE RATE MAP EFFECTIVE:

DECEMBER 5, 1995

FLOOD INSURANCE RATE MAP REVISIONS:

Refer to the Flood Insurance Rate Map Effective date shown on this map to determine when actuarial rates apply to structures in the zones where elevations or depths have been established.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at (800) 638-6620.

APPROXIMATE SCALE

2000 0 2000 FEET

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

HENRY COUNTY, OHIO
(UNINCORPORATED AREAS)

PANEL 50 OF 150

(SEE MAP INDEX FOR PANELS NOT PRINTED)

COMMUNITY-PANEL NUMBER
390776 0050 B

EFFECTIVE DATE:
DECEMBER 5, 1995

Federal Emergency Management Agency

HEC-RAS Version 4.1.0 Jan 2010
U.S. Army Corps of Engineers
Hydrologic Engineering Center
609 Second Street
Davis, California

```
X     X  XXXXXX    XXXX        XXXX       XX      XXXX
X     X  X        X    X       X   X     X  X    X
X     X  X        X            X   X    X    X   X
XXXXXXX  XXXX     X       XXX  XXXX     XXXXXX    XXXX
X     X  X        X            X  X     X    X        X
X     X  X        X    X       X   X    X    X        X
X     X  XXXXXX    XXXX        X    X   X    X   XXXXX
```

PROJECT DATA
Project Title: 22984
Project File : 22984.prj
Run Date and Time: 6/27/2014 8:27:30 AM

Project in English units

Project Description:
MAUMEE RIVER

PLAN DATA

Plan Title: existing
Plan File : w:\Projects\Projects F-J\H2530002\22984\structures\HENIND_0000\Engapps\HECRAS\22984.p01

Geometry Title: exsisting
Geometry File : w:\Projects\Projects F-J\H2530002\22984\structures\HENIND_0000\Engapps\HECRAS\22984.g02

Flow Title : Flow 01
Flow File : w:\Projects\Projects F-J\H2530002\22984\structures\HENIND_0000\Engapps\HECRAS\22984.f01

Plan Summary Information:

Number of:				
Cross Sections	= 20	Multiple Openings	=	0
Culverts	= 0	Inline Structures	=	0
Bridges	= 0	Lateral Structures	=	0

Computational Information
- Water surface calculation tolerance = 0.01
- Critical depth calculation tolerance = 0.01
- Maximum number of iterations = 20
- Maximum difference tolerance = 0.3
- Flow tolerance factor = 0.001

Computation Options
- Critical depth computed only where necessary
- Conveyance Calculation Method: At breaks in n values only
- Friction Slope Method: Average Conveyance
- Computational Flow Regime: Subcritical Flow

FLOW DATA

Flow Title: Flow 01
Flow File : w:\Projects\Projects F-J\H2530002\22984\structures\HENIND_0000\Engapps\HECRAS\22984.f01

Flow Data (cfs)

River	Reach	RS	PK2	PK10	PK25	PK50	PK100	PK500
001	MRCL	11000.00	46142	73567	87780	98290	110100	143130

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
001	MRCL	PK2	Normal S = 0.0002	Normal S = 0.0002
001	MRCL	PK10	Normal S = 0.0002	Normal S = 0.0002
001	MRCL	PK25	Normal S = 0.0002	Normal S = 0.0002
001	MRCL	PK50	Normal S = 0.0002	Normal S = 0.0002
001	MRCL	PK100	Normal S = 0.0002	Normal S = 0.0002
001	MRCL	PK500	Normal S = 0.0002	Normal S = 0.0002

SUMMARY OF MANNING'S N VALUES

River:001

Reach	River Sta.	n1	n2	n3	n4	n5
MRCL	11000.00	.06	.03	.05		
MRCL	10900.00	.06	.03	.05		
MRCL	10800.00	.06	.03	.05		
MRCL	10700.00	.06	.03	.05		
MRCL	10600.00	.06	.03	.05		

MRCL	10500.00	.06	.03	.08	.03	.05
MRCL	10400.00	.06	.03	.08	.03	.05
MRCL	10300.00	.06	.03	.08	.03	.05
MRCL	10200.00	.06	.03	.08	.03	.05
MRCL	10100.00	.06	.03	.08	.03	.05
MRCL	10025.00	.04	.03	.04		
MRCL	10000.00	.04	.03	.04		
MRCL	9975.000	.04	.03	.04		
MRCL	9900.000	.06	.03	.05		
MRCL	9800.000	.06	.03	.05		
MRCL	9700.000	.06	.03	.05		
MRCL	9600.000	.06	.03	.05		
MRCL	9500.000	.06	.03	.05		
MRCL	9400.000	.06	.03	.05		
MRCL	9350.000	.06	.03	.05		

SUMMARY OF REACH LENGTHS

River: 001

Reach	River Sta.	Left	Channel	Right
MRCL	11000.00	100	100	100
MRCL	10900.00	100	100	100
MRCL	10800.00	100	100	100
MRCL	10700.00	100	100	100
MRCL	10600.00	100	100	100
MRCL	10500.00	100	100	100
MRCL	10400.00	100	100	100
MRCL	10300.00	100	100	100
MRCL	10200.00	100	100	100
MRCL	10100.00	75	75	75
MRCL	10025.00	25	25	25
MRCL	10000.00	25	25	25
MRCL	9975.000	75	75	75
MRCL	9900.000	100	100	100
MRCL	9800.000	100	100	100
MRCL	9700.000	100	100	100
MRCL	9600.000	100	100	100
MRCL	9500.000	100	100	100
MRCL	9400.000	50	50	50
MRCL	9350.000	100	100	100

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: 001

Reach	River Sta.	Contr.	Expan.
MRCL	11000.00	.1	.3
MRCL	10900.00	.1	.3
MRCL	10800.00	.1	.3
MRCL	10700.00	.1	.3
MRCL	10600.00	.1	.3
MRCL	10500.00	.1	.3
MRCL	10400.00	.1	.3
MRCL	10300.00	.1	.3
MRCL	10200.00	.1	.3
MRCL	10100.00	.1	.3
MRCL	10025.00	.1	.3
MRCL	10000.00	.1	.3
MRCL	9975.000	.1	.3
MRCL	9900.000	.1	.3
MRCL	9800.000	.1	.3
MRCL	9700.000	.1	.3
MRCL	9600.000	.1	.3
MRCL	9500.000	.1	.3
MRCL	9400.000	.1	.3
MRCL	9350.000	.1	.3

HEC-RAS Version 4.1.0 Jan 2010
U.S. Army Corps of Engineers
Hydrologic Engineering Center
609 Second Street
Davis, California

```
X     X  XXXXXX    XXXX        XXXX       XX      XXXX
X     X  X        X    X       X   X     X  X    X
X     X  X        X            X   X    X    X   X
XXXXXXX  XXXX     X       XXX  XXXX     XXXXXX    XXXX
X     X  X        X            X  X     X    X        X
X     X  X        X    X       X   X    X    X        X
X     X  XXXXXX    XXXX        X    X   X    X   XXXXX
```

PROJECT DATA
Project Title: 22984
Project File : 22984.prj
Run Date and Time: 6/27/2014 8:29:46 AM

Project in English units

Project Description:
MAUMEE RIVER

PLAN DATA

Plan Title: proposedC
Plan File : w:\Projects\Projects
F-J\H2530002\22984\structures\HENIND_0000\Engapps\HECRAS\22984.p02

Geometry Title: proposedC
Geometry File : w:\Projects\Projects
F-J\H2530002\22984\structures\HENIND_0000\Engapps\HECRAS\22984.g03

Flow Title   : Flow 01
Flow File   : w:\Projects\Projects
F-J\H2530002\22984\structures\HENIND_0000\Engapps\HECRAS\22984.f01

```
Plan Summary Information:
Number of:  Cross Sections =   19    Multiple Openings  =    0
            Culverts       =    0    Inline Structures  =    0
            Bridges        =    1    Lateral Structures =    0

Computational Information
    Water surface calculation tolerance  =  0.01
    Critical depth calculation tolerance =  0.01
    Maximum number of iterations         =  20
    Maximum difference tolerance         =  0.3
    Flow tolerance factor                =  0.001

Computation Options
    Critical depth computed only where necessary
    Conveyance Calculation Method: At breaks in n values only
    Friction Slope Method:         Average Conveyance
    Computational Flow Regime:     Subcritical Flow
```


FLOW DATA

Flow Title: Flow 01
Flow File : w:\Projects\Projects
F-J\H2530002\22984\structures\HENIND_0000\Engapps\HECRAS\22984.f01

Flow Data (cfs)

```
  River           Reach           RS                     PK2            PK10
  PK25            PK50           PK100           PK500
   001            MRCL            11000.00             46142           73567
 87780           98290          110100          143130
```

Boundary Conditions

```
  River           Reach           Profile                        Upstream
    Downstream

  001             MRCL            PK2                        Normal S = 0.0002
Normal S = 0.0002
  001             MRCL            PK10                       Normal S = 0.0002
Normal S = 0.0002
  001             MRCL            PK25                       Normal S = 0.0002
Normal S = 0.0002
  001             MRCL            PK50                       Normal S = 0.0002
Normal S = 0.0002
  001             MRCL            PK100                      Normal S = 0.0002
Normal S = 0.0002
  001             MRCL            PK500                      Normal S = 0.0002
Normal S = 0.0002
```

SUMMARY OF MANNING'S N VALUES

River:001

Reach	River Sta.	n1	n2	n3	n4	n5
MRCL	11000.00	.06	.03	.05		
MRCL	10900.00	.06	.03	.05		
MRCL	10800.00	.06	.03	.05		
MRCL	10700.00	.06	.03	.05		
MRCL	10600.00	.06	.03	.05		

MRCL	10500.00	.06	.03	.08	.03	.05
MRCL	10400.00	.06	.03	.08	.03	.05
MRCL	10300.00	.06	.03	.08	.03	.05
MRCL	10200.00	.06	.03	.08	.03	.05
MRCL	10100.00	.06	.03	.08	.03	.05
MRCL	10025.00	.04	.03	.04		
MRCL	10021	Bridge				
MRCL	9975.000	.04	.03	.04		
MRCL	9900.000	.06	.03	.05		
MRCL	9800.000	.06	.03	.05		
MRCL	9700.000	.06	.03	.05		
MRCL	9600.000	.06	.03	.05		
MRCL	9500.000	.06	.03	.05		
MRCL	9400.000	.06	.03	.05		
MRCL	9350.000	.06	.03	.05		

SUMMARY OF REACH LENGTHS

River: 001

Reach	River Sta.	Left	Channel	Right
MRCL	11000.00	100	100	100
MRCL	10900.00	100	100	100
MRCL	10800.00	100	100	100
MRCL	10700.00	100	100	100
MRCL	10600.00	100	100	100
MRCL	10500.00	100	100	100
MRCL	10400.00	100	100	100
MRCL	10300.00	100	100	100
MRCL	10200.00	100	100	100
MRCL	10100.00	75	75	75
MRCL	10025.00	50	50	50
MRCL	10021	Bridge		
MRCL	9975.000	75	75	75
MRCL	9900.000	100	100	100
MRCL	9800.000	100	100	100
MRCL	9700.000	100	100	100
MRCL	9600.000	100	100	100
MRCL	9500.000	100	100	100
MRCL	9400.000	50	50	50
MRCL	9350.000	100	100	100

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: 001

Reach	River Sta.	Contr.	Expan.
MRCL	11000.00	.1	.3
MRCL	10900.00	.1	.3
MRCL	10800.00	.1	.3
MRCL	10700.00	.1	.3
MRCL	10600.00	.1	.3
MRCL	10500.00	.1	.3
MRCL	10400.00	.1	.3
MRCL	10300.00	.1	.3
MRCL	10200.00	.1	.3
MRCL	10100.00	.1	.3
MRCL	10025.00	.1	.3
MRCL	10021	Bridge	
MRCL	9975.000	.1	.3
MRCL	9900.000	.1	.3
MRCL	9800.000	.1	.3
MRCL	9700.000	.1	.3
MRCL	9600.000	.1	.3
MRCL	9500.000	.1	.3
MRCL	9400.000	.1	.3
MRCL	9350.000	.1	.3

USGS Ohio StreamStats

Flow Estimates Based on Flows at Nearby Streamgaging Stations

Date: Tue Mar 25 2014 12:36:49 Mountain Daylight Time
NAD27 Latitude: 41.4052 (41 24 19)
NAD27 Longitude: -84.1026 (-84 06 09)
NAD83 Latitude: 41.4052 (41 24 19)
NAD83 Longitude: -84.1025 (-84 06 09)
ReachCode: 04100009000086
Measure: 83.01
User-Selected Site Watershed Area, in square miles: 5650
Use Regulated Station: No

Upstream Gage(s)

STATID	NAME	AREA (mi^2)	RATIO	ISREGULATED
04192500	Maumee River near Defiance OH	5545	0.9814	No
04191500	Auglaize River near Defiance OH	2318	0.4103	No
04184000	Maumee River near Sherwood OH	2275	0.4027	No
04183500	Maumee River at Antwerp OH	2129	0.3768	No
04183000	MAUMEE RIVER AT NEW HAVEN, IND.	1967.00	0.3481	Yes
04180500	ST. JOSEPH RIVER NEAR FORT WAYNE, IN	1060.00	0.1876	Yes
04179000	ST. JOSEPH RIVER AT CEDARVILLE, IND.	763	0.1350	Yes
04182000	ST. MARYS RIVER NEAR FORT WAYNE, IND.	762.000	0.1349	Yes
04190000	Blanchard River near Dupont OH	756	0.1338	Yes
04189950	Blanchard River at Cuba OH	745	0.1319	No
04185500	Tiffin River near Brunersburg OH	736	0.1303	Yes
04178500	ST. JOSEPH RIVER AT HURSH, IN	734	0.1299	Undefined
04189500	Blanchard River at Glandorf OH	644	0.1140	No
04181500	ST. MARYS RIVER AT DECATUR, IND.	621.000	0.1099	Yes
04178000	ST. JOSEPH RIVER NEAR NEWVILLE, IN	610.000	0.1080	Undefined
04185000	Tiffin River at Stryker OH	410	0.0726	No
04177500	St Joseph River near Blakeslee OH	394	0.0697	Yes
04181000	St Marys River near Willshire OH	354	0.0627	Undefined
04189000	Blanchard River near Findlay OH	346	0.0612	No
04186500	Auglaize River near Fort Jennings OH	332	0.0588	Yes
04188000	Ottawa River at Kalida OH	309	0.0547	Yes
04180000	CEDAR CREEK NEAR CEDARVILLE, IND.	270.000	0.0478	Undefined
04184500	Bean Creek at Powers OH	206	0.0365	No
04187500	Ottawa River at Allentown OH	160	0.0283	No
04187100	Ottawa River at Lima OH	128	0.0227	No
04177810	FISH CREEK NEAR ARTIC, IN	98	0.0173	Undefined
04179520	CEDAR CREEK AT 18TH STREET AT AUBURN, IN	90.2	0.0160	Undefined
04179500	CEDAR CREEK AT AUBURN, IND.	87.300	0.0155	Undefined
04188500	Eagle Creek near Findlay OH	55	0.0097	No
04177720	FISH CREEK AT HAMILTON, IND.	37.500	0.0066	Undefined
04182590	HARBER DITCH AT FORT WAYNE, IND.	21.900	0.0039	Undefined
04191000	Town Creek near Van Wert OH	21.2	0.0038	Yes
04182810	SPY RUN CREEK AT FORT WAYNE, IN	14	0.0025	Undefined
04190500	Roller Creek at Ohio City OH	5.14	0.0009	Undefined
04185440	Unnamed Tributary to Lost Creek near Farmers OH	4.23	0.0007	No

Downstream Gage(s)

STATID	NAME	AREA (mi^2)	RATIO	ISREGULATED
04193500	Maumee River at Waterville OH	6330	1.1204	No

The following flows were estimated based on the closest upstream streamgage for the selected ungaged site.

Upstream drainage-area ratio estimates based on station 04192500

Peak-Flow Statistics

Flow types	Flow description	Flow factor	Streamgage flows	Streamgage years of record	Estimated ungaged flows
PK2R	Regression_2_Year_Peak_Flood	1.0189	34600		35300
PK2W	Weighted_2_Year_Peak_Flood	1.0189	45200		46100
PK2W	Weighted_2_Year_Peak_Flood	1.0189	45200		46100
PK2	2_Year_Peak_Flood	1.0189	45400		46300
PK10R	Regression_10_Year_Peak_Flood	1.0189	51800		52800
PK25R	Regression_25_Year_Peak_Flood	1.0189	59800		60900
PK5W	Weighted_5_Year_Peak_Flood	1.0189	60400		61500
PK5	5_Year_Peak_Flood	1.0189	61000		62200
PK50R	Regression_50_Year_Peak_Flood	1.0189	65400		66600
PK10W	Weighted_10_Year_Peak_Flood	1.0189	69900		71200
PK100R	Regression_100_Year_Peak_Flood	1.0189	70700		72000
PK10	10_Year_Peak_Flood	1.0189	70800		72100
PK25W	Weighted_25_Year_Peak_Flood	1.0189	81300		82800
PK500R	Regression_500_Year_Peak_Flood	1.0189	82500		84100
PK25	25_Year_Peak_Flood	1.0189	82700		84300
PK50W	Weighted_50_Year_Peak_Flood	1.0189	89500		91200
PK50	50_Year_Peak_Flood	1.0189	91400		93100
PK100W	Weighted_100_Year_Peak_Flood	1.0189	97500		99300
PK100	100_Year_Peak_Flood	1.0189	99800		102000
PK500W	Weighted_500_Year_Peak_Flood	1.0189	116000		118000
PK500	500_Year_Peak_Flood	1.0189	119000		121000

Low-Flow Statistics

Flow types	Flow description	Flow factor	Streamgage flows	Streamgage years of record	Estimated ungaged flows
M7D50Y	7_Day_50_Year_Low_Flow	1.0189	90		91.7
M1D20Y	1_Day_20_Year_Low_Flow	1.0189	93		94.8
M30D50Y	30_Day_50_Year_Low_Flow	1.0189	109		111
M7D20Y	7_Day_20_Year_Low_Flow	1.0189	117		119
M1D10Y	1_Day_10_Year_Low_Flow	1.0189	121		123
M30D20Y	30_Day_20_Year_Low_Flow	1.0189	139		142
M7D10Y	7_Day_10_Year_Low_Flow	1.0189	146		149
M1D5Y	1_Day_5_Year_Low_Flow	1.0189	161		164
M30D10Y	30_Day_10_Year_Low_Flow	1.0189	174		177
M7D5Y	7_Day_5_Year_Low_Flow	1.0189	187		191
M90D50Y	90_Day_50_Year_Low_Flow	1.0189	212		216
M30D5Y	30_Day_5_Year_Low_Flow	1.0189	231		235
M1D2Y	1_Day_2_Year_Low_Flow	1.0189	246		251
M90D20Y	90_Day_20_Year_Low_Flow	1.0189	253		258
M7D2Y	7_Day_2_Year_Low_Flow	1.0189	285		290
M90D10Y	90_Day_10_Year_Low_Flow	1.0189	305		311
M90D5Y	90_Day_5_Year_Low_Flow	1.0189	394		401
M30D2Y	30_Day_2_Year_Low_Flow	1.0189	406		414
M90D2Y	90_Day_2_Year_Low_Flow	1.0189	725		739

Flow-Duration Statistics

Flow types	Flow description	Flow factor	Streamgage flows	Streamgage years of record	Estimated ungaged flows
D99	99_Percent_Duration	1.0189	82	72	83.6
D95	95_Percent_Duration	1.0189	166	72	169
D90	90_Percent_Duration	1.0189	228	72	232

D80	80_Percent_Duration	1.0189	376	72	383
D75	75_Percent_Duration	1.0189	469.25	72	478
D70	70_Percent_Duration	1.0189	586	72	597
D60	60_Percent_Duration	1.0189	916	72	933
D50	50_Percent_Duration	1.0189	1410	72	1440
D40	40_Percent_Duration	1.0189	2180	72	2220
D30	30_Percent_Duration	1.0189	3480	72	3550
D25	25_Percent_Duration	1.0189	4610	72	4700
D20	20_Percent_Duration	1.0189	6273	72	6390
D10	10_Percent_Duration	1.0189	12500	72	12700

Annual Flow Statistics

Flow types	Flow description	Flow factor	Streamgage flows	Streamgage years of record	Estimated ungaged flows
QA	Mean_Annual_Flow	1.0189	4420		4500

Seasonal Flow Statistics

Flow types	Flow description	Flow factor	Streamgage flows	Streamgage years of record	Estimated ungaged flows
M1D50Y0511	1_Day_50_Year_lowflow_May_to_Nov	1.0189	66		67.2
M7D50Y0511	7_Day_50_Year_lowflow_May_to_Nov	1.0189	90		91.7
M1D20Y0511	1_Day_20_Year_lowflow_May_to_Nov	1.0189	93		94.8
M30D50Y0511	30_Day_50_Year_lowflow_May_to_Nov	1.0189	108		110
M7D20Y0511	7_Day_20_Year_lowflow_May_to_Nov	1.0189	117		119
M1D10Y0511	1_Day_10_Year_lowflow_May_to_Nov	1.0189	121		123
M1D50Y0911	1_Day_50_Year_lowflow_Sep_to_Nov	1.0189	128		130
M30D20Y0511	30_Day_20_Year_lowflow_May_to_Nov	1.0189	139		142
M30D20Y0511	30_Day_20_Year_lowflow_May_to_Nov	1.0189	139		142
M7D10Y0511	7_Day_10_Year_lowflow_May_to_Nov	1.0189	146		149
M7D50Y0911	7_Day_50_Year_lowflow_Sep_to_Nov	1.0189	152		155
M1D10Y0911	1_Day_10_Year_lowflow_Sep_to_Nov	1.0189	153		156
M1D5Y0511	1_Day_5_Year_lowflow_May_to_Nov	1.0189	161		164
M7D20Y0911	7_Day_20_Year_lowflow_Sep_to_Nov	1.0189	169		172
M1D5Y0911	1_Day_5_Year_lowflow_Sep_to_Nov	1.0189	174		177
M30D10Y0511	30_Day_10_Year_lowflow_May_to_Nov	1.0189	175		178
M30D50Y0911	30_Day_50_Year_lowflow_Sep_to_Nov	1.0189	177		180
M7D5Y0511	7_Day_5_Year_lowflow_May_to_Nov	1.0189	187		191
M7D10Y0911	7_Day_10_Year_lowflow_Sep_to_Nov	1.0189	188		192
D98_05_11	98_Percent_Duration_MAY_NOV	1.0189	189		193
D98_09_11	98_Percent_Duration_SEP_NOV	1.0189	194		198
M30D20Y0911	30_Day_20_Year_lowflow_Sep_to_Nov	1.0189	201		205
M90D50Y0511	90_Day_50_Year_lowflow_May_to_Nov	1.0189	209		213
M1D50Y1202	1_Day_50_Year_lowflow_Dec_to_Feb	1.0189	214		218
M7D50Y1202	7_Day_50_Year_lowflow_Dec_to_Feb	1.0189	216		220
D98_04_03	98_Percent_Duration_APR_MAR	1.0189	218		222
M7D5Y0911	7_Day_5_Year_lowflow_Sep_to_Nov	1.0189	219		223
D95_09_11	95_Percent_Duration_SEP_NOV	1.0189	227		231
M30D10Y0911	30_Day_10_Year_lowflow_Sep_to_Nov	1.0189	232		236
M30D10Y0911	30_Day_10_Year_lowflow_Sep_to_Nov	1.0189	232		236
D95_05_11	95_Percent_Duration_MAY_NOV	1.0189	241		246
M1D2Y0911	1_Day_2_Year_lowflow_Sep_to_Nov	1.0189	244		249
M1D2Y0511	1_Day_2_Year_lowflow_May_to_Nov	1.0189	246		251
M90D20Y0511	90_Day_20_Year_lowflow_May_to_Nov	1.0189	251		256
M1D20Y1202	1_Day_20_Year_lowflow_Dec_to_Feb	1.0189	264		269
D90_09_11	90_Percent_Duration_SEP_NOV	1.0189	265		270

	7_Day_20_Year_lowflow_Dec_to_Feb	1.0189	269		274
M30D5Y0911	30_Day_5_Year_lowflow_Sep_to_Nov	1.0189	283		288
M30D50Y1202	30_Day_50_Year_lowflow_Dec_to_Feb	1.0189	284		289
M7D2Y0511	7_Day_2_Year_lowflow_May_to_Nov	1.0189	285		290
D95_04_03	95_Percent_Duration_APR_MAR	1.0189	286		291
M90D10Y0511	90_Day_10_Year_lowflow_May_to_Nov	1.0189	303		309
M90D10Y0511	90_Day_10_Year_lowflow_May_to_Nov	1.0189	303		309
D90_05_11	90_Percent_Duration_MAY_NOV	1.0189	305		311
M7D2Y0911	7_Day_2_Year_lowflow_Sep_to_Nov	1.0189	313		319
M1D10Y1202	1_Day_10_Year_lowflow_Dec_to_Feb	1.0189	318		324
M1D10Y1202	1_Day_10_Year_lowflow_Dec_to_Feb	1.0189	318		324
M7D10Y1202	7_Day_10_Year_lowflow_Dec_to_Feb	1.0189	330		336
D80_09_11	80_Percent_Duration_SEP_NOV	1.0189	343		349
D98_12_02	98_Percent_Duration_DEC_FEB	1.0189	349		356
D85_05_11	85_Percent_Duration_MAY_NOV	1.0189	367		374
D90_04_03	90_Percent_Duration_APR_MAR	1.0189	382		389
D90_04_03	90_Percent_Duration_APR_MAR	1.0189	382		389
D75_09_11	75_Percent_Duration_SEP_NOV	1.0189	390		397
M90D5Y0511	90_Day_5_Year_lowflow_May_to_Nov	1.0189	395		402
M1D5Y1202	1_Day_5_Year_lowflow_Dec_to_Feb	1.0189	398		406
M30D2Y0511	30_Day_2_Year_lowflow_May_to_Nov	1.0189	410		418
M7D5Y1202	7_Day_5_Year_lowflow_Dec_to_Feb	1.0189	424		432
D80_05_11	80_Percent_Duration_MAY_NOV	1.0189	434		442
D70_09_11	70_Percent_Duration_SEP_NOV	1.0189	445		453
D95_12_02	95_Percent_Duration_DEC_FEB	1.0189	456		465
M30D2Y0911	30_Day_2_Year_lowflow_Sep_to_Nov	1.0189	465		474
M90D20Y0911	90_Day_20_Year_lowflow_Sep_to_Nov	1.0189	472		481
D85_04_03	85_Percent_Duration_APR_MAR	1.0189	494		503
M30D10Y1202	30_Day_10_Year_lowflow_Dec_to_Feb	1.0189	499		508
D75_05_11	75_Percent_Duration_MAY_NOV	1.0189	511		521
D60_09_11	60_Percent_Duration_SEP_NOV	1.0189	575		586
D70_05_11	70_Percent_Duration_MAY_NOV	1.0189	605		616
D90_12_02	90_Percent_Duration_DEC_FEB	1.0189	617		629
D90_12_02	90_Percent_Duration_DEC_FEB	1.0189	617		629
D80_04_03	80_Percent_Duration_APR_MAR	1.0189	619		631
M90D10Y0911	90_Day_10_Year_lowflow_Sep_to_Nov	1.0189	661		674
M30D5Y1202	30_Day_5_Year_lowflow_Dec_to_Feb	1.0189	695		708
M7D2Y1202	7_Day_2_Year_lowflow_Dec_to_Feb	1.0189	701		714
M90D2Y0511	90_Day_2_Year_lowflow_May_to_Nov	1.0189	738		752
D85_12_02	85_Percent_Duration_DEC_FEB	1.0189	740		754
D50_09_11	50_Percent_Duration_SEP_NOV	1.0189	760		774
D75_04_03	75_Percent_Duration_APR_MAR	1.0189	765		779
D60_05_11	60_Percent_Duration_MAY_NOV	1.0189	840		856
D70_04_03	70_Percent_Duration_APR_MAR	1.0189	949		967
D80_12_02	80_Percent_Duration_DEC_FEB	1.0189	953		971
M90D5Y0911	90_Day_5_Year_lowflow_Sep_to_Nov	1.0189	979		998
D40_09_11	40_Percent_Duration_SEP_NOV	1.0189	1070		1090
D50_05_11	50_Percent_Duration_MAY_NOV	1.0189	1170		1190
D75_12_02	75_Percent_Duration_December_to_February	1.0189	1230		1250
M30D2Y1202	30_Day_2_Year_lowflow_Dec_to_Feb	1.0189	1334		1360
D60_04_03					

	60_Percent_Duration_APR_MAR	1.0189	1430		1460
D70_12_02	70_Percent_Duration_DEC_FEB	1.0189	1460		1490
D30_09_11	30_Percent_Duration_SEP_NOV	1.0189	1600		1630
D40_05_11	40_Percent_Duration_MAY_NOV	1.0189	1720		1750
M90D50Y1202	90_Day_50_Year_lowflow_Dec_to_Feb	1.0189	1851		1890
M90D2Y0911	90_Day_2_Year_lowflow_Sep_to_Nov	1.0189	1974		2010
D60_12_02	60_Percent_Duration_DEC_FEB	1.0189	2010		2050
D50_04_03	50_Percent_Duration_APR_MAR	1.0189	2050		2090
M90D20Y1202	90_Day_20_Year_lowflow_Dec_to_Feb	1.0189	2390		2440
D30_05_11	30_Percent_Duration_MAY_NOV	1.0189	2560		2610
D50_12_02	50_Percent_Duration_December_to_February	1.0189	2730		2780
D20_09_11	20_Percent_Duration_SEP_NOV	1.0189	2910		2970
D40_04_03	40_Percent_Duration_APR_MAR	1.0189	2930		2990
M90D10Y1202	90_Day_10_Year_lowflow_Dec_to_Feb	1.0189	2964		3020
M90D5Y1202	90_Day_5_Year_lowflow_Dec_to_Feb	1.0189	3788		3860
D40_12_02	40_Percent_Duration_DEC_FEB	1.0189	3880		3950
D20_05_11	20_Percent_Duration_MAY_NOV	1.0189	4110		4190
D30_04_03	30_Percent_Duration_APR_MAR	1.0189	4450		4530
D30_12_02	30_Percent_Duration_DEC_FEB	1.0189	5790		5900
M90D2Y1202	90_Day_2_Year_lowflow_Dec_to_Feb	1.0189	5796		5910
D10_09_11	10_Percent_Duration_SEP_NOV	1.0189	7240		7380
D20_04_03	20_Percent_Duration_APR_MAR	1.0189	7480		7620
D10_05_11	10_Percent_Duration_MAY_NOV	1.0189	8400		8560
D20_12_02	20_Percent_Duration_DEC_FEB	1.0189	9320		9500
D10_04_03	10_Percent_Duration_APR_MAR	1.0189	13900		14200
D10_12_02	10_Percent_Duration_DEC_FEB	1.0189	16200		16500

General Flow Statistics

Flow types	Flow description	Flow factor	Streamgage flows	Streamgage years of record	Estimated ungaged flows
MINDV	Minimum_daily_flow	1.0189	3	72	3.06
AVE_DV	Average_daily_streamflow	1.0189	4387.322	72	4470
SDQD	Std_Dev_of_daily_flows	1.0189	7503.006	72	7650
MAXDV	Maximum_daily_flow	1.0189	98800	72	101000

The following flows were estimated based on the closest downstream streamgage for the selected ungaged site.

Downstream drainage-area ratio estimates based on station 04193500

Peak-Flow Statistics

Flow types	Flow description	Flow factor	Streamgage flows	Streamgage years of record	Estimated ungaged flows
PK2R	Regression_2_Year_Peak_Flood	0.8926	38000		33900
PK5R	Regression_5_Year_Peak_Flood	0.8926	49200		43900
PK2W	Weighted_2_Year_Peak_Flood	0.8926	51400		45900
PK2	2_Year_Peak_Flood	0.8926	51700		46100
PK10R	Regression_10_Year_Peak_Flood	0.8926	56300		50300
PK25R	Regression_25_Year_Peak_Flood	0.8926	64800		57800
PK5W	Weighted_5_Year_Peak_Flood	0.8926	69200		61800
PK5	5_Year_Peak_Flood	0.8926	69900		62400
PK50R	Regression_50_Year_Peak_Flood	0.8926	70800		63200
PK100R	Regression_100_Year_Peak_Flood	0.8926	76600		68400
PK10W	Weighted_10_Year_Peak_Flood	0.8926	81000		72300
PK10	10_Year_Peak_Flood	0.8926	82300		73500
PK500R	Regression_500_Year_Peak_Flood	0.8926	89100		79500
PK25W	Weighted_25_Year_Peak_Flood	0.8926	96100		85800

PK25	25_Year_Peak_Flood	0.8926	98200		87700
PK50W	Weighted_50_Year_Peak_Flood	0.8926	108000		96400
PK50	50_Year_Peak_Flood	0.8926	110000		98200
PK100W	Weighted_100_Year_Peak_Flood	0.8926	119000		106000
PK100	100_Year_Peak_Flood	0.8926	123000		110000
PK500W	Weighted_500_Year_Peak_Flood	0.8926	147000		131000
PK500	500_Year_Peak_Flood	0.8926	153000		137000

Low-Flow Statistics

Flow types	Flow description	Flow factor	Streamgage flows	Streamgage years of record	Estimated ungaged flows
M1D20Y	1_Day_20_Year_Low_Flow	0.8926	39		34.8
M7D50Y	7_Day_50_Year_Low_Flow	0.8926	55		49.1
M1D10Y	1_Day_10_Year_Low_Flow	0.8926	57		50.9
M7D20Y	7_Day_20_Year_Low_Flow	0.8926	75		66.9
M1D5Y	1_Day_5_Year_Low_Flow	0.8926	86		76.8
M7D10Y	7_Day_10_Year_Low_Flow	0.8926	97		86.6
M30D50Y	30_Day_50_Year_Low_Flow	0.8926	102		91
M30D20Y	30_Day_20_Year_Low_Flow	0.8926	121		108
M7D5Y	7_Day_5_Year_Low_Flow	0.8926	131		117
M90D50Y	90_Day_50_Year_Low_Flow	0.8926	142		127
M30D10Y	30_Day_10_Year_Low_Flow	0.8926	144		129
M1D2Y	1_Day_2_Year_Low_Flow	0.8926	169		151
M90D20Y	90_Day_20_Year_Low_Flow	0.8926	177		158
M30D5Y	30_Day_5_Year_Low_Flow	0.8926	180		161
M90D10Y	90_Day_10_Year_Low_Flow	0.8926	219		195
M7D2Y	7_Day_2_Year_Low_Flow	0.8926	225		201
M90D5Y	90_Day_5_Year_Low_Flow	0.8926	291		260
M30D2Y	30_Day_2_Year_Low_Flow	0.8926	297		265
M90D2Y	90_Day_2_Year_Low_Flow	0.8926	542		484

Flow-Duration Statistics

Flow types	Flow description	Flow factor	Streamgage flows	Streamgage years of record	Estimated ungaged flows
D99	99_Percent_Duration	0.8926	57	82	50.9
D95	95_Percent_Duration	0.8926	140	82	125
D90	90_Percent_Duration	0.8926	225	82	201
D80	80_Percent_Duration	0.8926	396	82	353
D75	75_Percent_Duration	0.8926	507.5	82	453
D70	70_Percent_Duration	0.8926	647	82	577
D60	60_Percent_Duration	0.8926	1030	82	919
D50	50_Percent_Duration	0.8926	1640	82	1460
D40	40_Percent_Duration	0.8926	2520	82	2250
D30	30_Percent_Duration	0.8926	4050	82	3610
D25	25_Percent_Duration	0.8926	5290	82	4720
D20	20_Percent_Duration	0.8926	7070	82	6310
D10	10_Percent_Duration	0.8926	14100	82	12600

Annual Flow Statistics

Flow types	Flow description	Flow factor	Streamgage flows	Streamgage years of record	Estimated ungaged flows
QA	Mean_Annual_Flow	0.8926	4980		4450

Seasonal Flow Statistics

Flow types	Flow description	Flow factor	Streamgage flows	Streamgage years of record	Estimated ungaged flows
M1D50Y0511	1_Day_50_Year_lowflow_May_to_Nov	0.8926	25		22.3
M1D50Y0911	1_Day_50_Year_lowflow_Sep_to_Nov	0.8926	34		30.3
M1D20Y0511	1_Day_20_Year_lowflow_May_to_Nov	0.8926	39		34.8
M1D20Y0911	1_Day_20_Year_lowflow_Sep_to_Nov	0.8926	48		42.8

	7_Day_50_Year_lowflow_May_to_Nov	0.8926	55		49.1
M1D10Y0511	1_Day_10_Year_lowflow_May_to_Nov	0.8926	57		50.9
M1D10Y0911	1_Day_10_Year_lowflow_Sep_to_Nov	0.8926	65		58
M1D10Y0911	1_Day_10_Year_lowflow_Sep_to_Nov	0.8926	65		58
M7D20Y0511	7_Day_20_Year_lowflow_May_to_Nov	0.8926	75		66.9
M7D20Y0911	7_Day_20_Year_lowflow_Sep_to_Nov	0.8926	84		75
M1D5Y0511	1_Day_5_Year_lowflow_May_to_Nov	0.8926	86		76.8
M1D5Y0911	1_Day_5_Year_lowflow_Sep_to_Nov	0.8926	92		82.1
M7D10Y0511	7_Day_10_Year_lowflow_May_to_Nov	0.8926	97		86.6
D98_09_11	98_Percent_Duration_SEP_NOV	0.8926	98		87.5
M30D50Y0511	30_Day_50_Year_lowflow_May_to_Nov	0.8926	101		90.2
M7D10Y0911	7_Day_10_Year_lowflow_Sep_to_Nov	0.8926	105		93.7
M1D50Y1202	1_Day_50_Year_lowflow_Dec_to_Feb	0.8926	108		96.4
M30D50Y0911	30_Day_50_Year_lowflow_Sep_to_Nov	0.8926	109		97.3
M30D20Y0511	30_Day_20_Year_lowflow_May_to_Nov	0.8926	121		108
D98_05_11	98_Percent_Duration_MAY_NOV	0.8926	123		110
M90D50Y0911	90_Day_50_Year_lowflow_Sep_to_Nov	0.8926	125		112
M30D20Y0911	30_Day_20_Year_lowflow_Sep_to_Nov	0.8926	128		114
M7D5Y0511	7_Day_5_Year_lowflow_May_to_Nov	0.8926	131		117
D95_09_11	95_Percent_Duration_SEP_NOV	0.8926	132		118
M7D50Y1202	7_Day_50_Year_lowflow_Dec_to_Feb	0.8926	134		120
M7D5Y0911	7_Day_5_Year_lowflow_Sep_to_Nov	0.8926	138		123
M90D50Y0511	90_Day_50_Year_lowflow_May_to_Nov	0.8926	141		126
M30D10Y0511	30_Day_10_Year_lowflow_May_to_Nov	0.8926	144		129
M30D50Y1202	30_Day_50_Year_lowflow_Dec_to_Feb	0.8926	146		130
M30D50Y1202	30_Day_50_Year_lowflow_Dec_to_Feb	0.8926	146		130
M30D10Y0911	30_Day_10_Year_lowflow_Sep_to_Nov	0.8926	150		134
M1D20Y1202	1_Day_20_Year_lowflow_Dec_to_Feb	0.8926	151		135
M1D2Y0511	1_Day_2_Year_lowflow_May_to_Nov	0.8926	169		151
M1D2Y0511	1_Day_2_Year_lowflow_May_to_Nov	0.8926	169		151
D95_05_11	95_Percent_Duration_MAY_NOV	0.8926	170		152
M1D2Y0911	1_Day_2_Year_lowflow_Sep_to_Nov	0.8926	175		156
M90D20Y0511	90_Day_20_Year_lowflow_May_to_Nov	0.8926	177		158
M30D5Y0511	30_Day_5_Year_lowflow_May_to_Nov	0.8926	181		162
M7D20Y1202	7_Day_20_Year_lowflow_Dec_to_Feb	0.8926	183		163
M30D5Y0911	30_Day_5_Year_lowflow_Sep_to_Nov	0.8926	190		170
M90D20Y0911	90_Day_20_Year_lowflow_Sep_to_Nov	0.8926	198		177
D95_04_03	95_Percent_Duration_APR_MAR	0.8926	202		180
M1D10Y1202	1_Day_10_Year_lowflow_Dec_to_Feb	0.8926	203		181
D85_09_11	85_Percent_Duration_SEP_NOV	0.8926	205		183
D98_12_02	98_Percent_Duration_DEC_FEB	0.8926	206		184
M90D10Y0511	90_Day_10_Year_lowflow_May_to_Nov	0.8926	220		196
M7D2Y0511	7_Day_2_Year_lowflow_May_to_Nov	0.8926	225		201
D90_05_11	90_Percent_Duration_MAY_NOV	0.8926	226		202
M30D20Y1202	30_Day_20_Year_lowflow_Dec_to_Feb	0.8926	231		206
D80_09_11	80_Percent_Duration_SEP_NOV	0.8926	237		212
M7D2Y0911	7_Day_2_Year_lowflow_Sep_to_Nov	0.8926	238		212
M7D10Y1202	7_Day_10_Year_lowflow_Dec_to_Feb	0.8926	241		215
D95_12_02	95_Percent_Duration_DEC_FEB	0.8926	256		228
D75_09_11	75_Percent_Duration_SEP_NOV	0.8926	274		245
D90_04_03					

	90_Percent_Duration_APR_MAR	0.8926	277		247
D85_05_11	85_Percent_Duration_MAY_NOV	0.8926	280		250
M1D5Y1202	1_Day_5_Year_lowflow_Dec_to_Feb	0.8926	286		255
M90D5Y0511	90_Day_5_Year_lowflow_May_to_Nov	0.8926	295		263
M90D10Y0911	90_Day_10_Year_lowflow_Sep_to_Nov	0.8926	298		266
M30D2Y0511	30_Day_2_Year_lowflow_May_to_Nov	0.8926	300		268
D70_09_11	70_Percent_Duration_SEP_NOV	0.8926	314		280
M7D5Y1202	7_Day_5_Year_lowflow_Dec_to_Feb	0.8926	337		301
M30D2Y0911	30_Day_2_Year_lowflow_Sep_to_Nov	0.8926	339		303
M30D2Y0911	30_Day_2_Year_lowflow_Sep_to_Nov	0.8926	339		303
M30D10Y1202	30_Day_10_Year_lowflow_Dec_to_Feb	0.8926	346		309
D85_04_03	85_Percent_Duration_APR_MAR	0.8926	360		321
D90_12_02	90_Percent_Duration_DEC_FEB	0.8926	368		328
D75_05_11	75_Percent_Duration_MAY_NOV	0.8926	404		361
D60_09_11	60_Percent_Duration_SEP_NOV	0.8926	412		368
M90D50Y1202	90_Day_50_Year_lowflow_Dec_to_Feb	0.8926	450		402
D80_04_03	80_Percent_Duration_APR_MAR	0.8926	456		407
D70_05_11	70_Percent_Duration_MAY_NOV	0.8926	477		426
M90D5Y0911	90_Day_5_Year_lowflow_Sep_to_Nov	0.8926	483		431
D85_12_02	85_Percent_Duration_DEC_FEB	0.8926	500		446
M1D2Y1202	1_Day_2_Year_lowflow_Dec_to_Feb	0.8926	533		476
D50_09_11	50_Percent_Duration_SEP_NOV	0.8926	546		487
M90D2Y0511	90_Day_2_Year_lowflow_May_to_Nov	0.8926	557		497
M30D5Y1202	30_Day_5_Year_lowflow_Dec_to_Feb	0.8926	558		498
D75_04_03	75_Percent_Duration_APR_MAR	0.8926	577		515
M7D2Y1202	7_Day_2_Year_lowflow_Dec_to_Feb	0.8926	631		563
D60_05_11	60_Percent_Duration_MAY_NOV	0.8926	673		601
D80_12_02	80_Percent_Duration_DEC_FEB	0.8926	677		604
D70_04_03	70_Percent_Duration_APR_MAR	0.8926	718		641
D40_09_11	40_Percent_Duration_SEP_NOV	0.8926	739		660
M90D20Y1202	90_Day_20_Year_lowflow_Dec_to_Feb	0.8926	863		770
D75_12_02	75_Percent_Duration_December_to_February	0.8926	882		787
D50_05_11	50_Percent_Duration_MAY_NOV	0.8926	961		858
D30_09_11	30_Percent_Duration_SEP_NOV	0.8926	1120		1000
D30_09_11	30_Percent_Duration_SEP_NOV	0.8926	1120		1000
D60_04_03	60_Percent_Duration_APR_MAR	0.8926	1140		1020
M90D2Y0911	90_Day_2_Year_lowflow_Sep_to_Nov	0.8926	1187		1060
M30D2Y1202	30_Day_2_Year_lowflow_Dec_to_Feb	0.8926	1351		1210
D40_05_11	40_Percent_Duration_MAY_NOV	0.8926	1420		1270
M90D10Y1202	90_Day_10_Year_lowflow_Dec_to_Feb	0.8926	1450		1290
D60_12_02	60_Percent_Duration_DEC_FEB	0.8926	1650		1470
D50_04_03	50_Percent_Duration_APR_MAR	0.8926	1740		1550
D20_09_11	20_Percent_Duration_SEP_NOV	0.8926	1870		1670
D30_05_11	30_Percent_Duration_MAY_NOV	0.8926	2130		1900
D50_12_02	50_Percent_Duration_December_to_February	0.8926	2380		2120
M90D5Y1202	90_Day_5_Year_lowflow_Dec_to_Feb	0.8926	2526		2250
D40_04_03	40_Percent_Duration_APR_MAR	0.8926	2620		2340
D20_05_11	20_Percent_Duration_MAY_NOV	0.8926	3530		3150
D40_12_02	40_Percent_Duration_DEC_FEB	0.8926	3620		3230
D30_04_03	30_Percent_Duration_APR_MAR	0.8926	4220		3770
D10_09_11					

	10_Percent_Duration_SEP_NOV	0.8926	4620		4120
D30_12_02	30_Percent_Duration_DEC_FEB	0.8926	5740		5120
M90D2Y1202	90_Day_2_Year_lowflow_Dec_to_Feb	0.8926	5923		5290
D10_05_11	10_Percent_Duration_MAY_NOV	0.8926	7050		6290
D20_04_03	20_Percent_Duration_APR_MAR	0.8926	7280		6500
D20_12_02	20_Percent_Duration_DEC_FEB	0.8926	9920		8850
D10_04_03	10_Percent_Duration_APR_MAR	0.8926	14500		12900
D10_12_02	10_Percent_Duration_DEC_FEB	0.8926	18700		16700

General Flow Statistics

Flow types	Flow description	Flow factor	Streamgage flows	Streamgage years of record	Estimated ungaged flows
MINDV	Minimum_daily_flow	0.8926	0	82	0
AVE_DV	Average_daily_streamflow	0.8926	4987.766	82	4450
SDQD	Std_Dev_of_daily_flows	0.8926	8541.999	82	7620
MAXDV	Maximum_daily_flow	0.8926	113000	82	101000

Estimated flows and equivalent years of record presented below for the user-selected site were determined by linear interpolation between the flow estimates based on the above upstream and downsteam gaging stations, based on a method described by Ries, K.G., III, and Dillow, J.J.A., 2006.

Weighted flows estimates based on the closest upstream and downstream gage stations

Peak-Flow Statistics

Flow types	Flow description	Upstream gage flows	Downstream gage flows	Weighted estimates	Weighted equivalent years of record
PK2R	Regression_2_Year_Peak_Flood	34600	38000	35100	
PK5R	Regression_5_Year_Peak_Flood	45200	49200	45800	
PK2W	Weighted_2_Year_Peak_Flood	45200	51400	46000	
PK2	2_Year_Peak_Flood	45400	51700	46200	
PK10R	Regression_10_Year_Peak_Flood	51800	56300	52400	
PK25R	Regression_25_Year_Peak_Flood	59800	64800	60500	
PK5W	Weighted_5_Year_Peak_Flood	60400	69200	61600	
PK5	5_Year_Peak_Flood	61000	69900	62200	
PK50R	Regression_50_Year_Peak_Flood	65400	70800	66200	
PK10W	Weighted_10_Year_Peak_Flood	69900	81000	71400	
PK100R	Regression_100_Year_Peak_Flood	70700	76600	71500	
PK10	10_Year_Peak_Flood	70800	82300	72300	
PK25W	Weighted_25_Year_Peak_Flood	81300	96100	83200	
PK500R	Regression_500_Year_Peak_Flood	82500	89100	83500	
PK25	25_Year_Peak_Flood	82700	98200	84700	
PK50W	Weighted_50_Year_Peak_Flood	89500	108000	91900	
PK50	50_Year_Peak_Flood	91400	110000	93800	
PK100W	Weighted_100_Year_Peak_Flood	97500	119000	100000	
PK100	100_Year_Peak_Flood	99800	123000	103000	
PK500W	Weighted_500_Year_Peak_Flood	116000	147000	120000	
PK500	500_Year_Peak_Flood	119000	153000	123000	

Low-Flow Statistics

Flow types	Flow description	Upstream gage flows	Downstream gage flows	Weighted estimates	Weighted equivalent years of record
M7D50Y	7_Day_50_Year_Low_Flow	90	55	86	
M1D20Y	1_Day_20_Year_Low_Flow	93	39	86.7	
M30D50Y	30_Day_50_Year_Low_Flow	109	102	108	
M7D20Y	7_Day_20_Year_Low_Flow	117	75	112	
M1D10Y	1_Day_10_Year_Low_Flow	121	57	114	
M30D20Y	30_Day_20_Year_Low_Flow	139	121	137	
M7D10Y	7_Day_10_Year_Low_Flow	146	97	140	

M1D5Y	1_Day_5_Year_Low_Flow	161	86	152	
M30D10Y	30_Day_10_Year_Low_Flow	174	144	171	
M7D5Y	7_Day_5_Year_Low_Flow	187	131	181	
M90D50Y	90_Day_50_Year_Low_Flow	212	142	204	
M30D5Y	30_Day_5_Year_Low_Flow	231	180	225	
M1D2Y	1_Day_2_Year_Low_Flow	246	169	237	
M90D20Y	90_Day_20_Year_Low_Flow	253	177	244	
M7D2Y	7_Day_2_Year_Low_Flow	285	225	278	
M90D10Y	90_Day_10_Year_Low_Flow	305	219	295	
M90D5Y	90_Day_5_Year_Low_Flow	394	291	383	
M30D2Y	30_Day_2_Year_Low_Flow	406	297	394	
M90D2Y	90_Day_2_Year_Low_Flow	725	542	705	

Flow-Duration Statistics

Flow types	Flow description	Upstream gage flows	Downstream gage flows	Weighted estimates	Weighted equivalent years of record
D99	99_Percent_Duration	82	57	79.2	73.3
D95	95_Percent_Duration	166	140	163	73.3
D90	90_Percent_Duration	228	225	228	73.3
D80	80_Percent_Duration	376	396	379	73.3
D75	75_Percent_Duration	469	508	475	73.3
D70	70_Percent_Duration	586	647	594	73.3
D60	60_Percent_Duration	916	1030	931	73.3
D50	50_Percent_Duration	1410	1640	1440	73.3
D40	40_Percent_Duration	2180	2520	2230	73.3
D30	30_Percent_Duration	3480	4050	3560	73.3
D25	25_Percent_Duration	4610	5290	4700	73.3
D20	20_Percent_Duration	6270	7070	6380	73.3
D10	10_Percent_Duration	12500	14100	12700	73.3

Annual Flow Statistics

Flow types	Flow description	Upstream gage flows	Downstream gage flows	Weighted estimates	Weighted equivalent years of record
QA	Mean_Annual_Flow	4420	4980	4500	

Seasonal Flow Statistics

Flow types	Flow description	Upstream gage flows	Downstream gage flows	Weighted estimates	Weighted equivalent years of record
M1D50Y0511	1_Day_50_Year_lowflow_May_to_Nov	66	25	61.2	
M7D50Y0511	7_Day_50_Year_lowflow_May_to_Nov	90	55	86	
M1D20Y0511	1_Day_20_Year_lowflow_May_to_Nov	93	39	86.7	
M30D50Y0511	30_Day_50_Year_lowflow_May_to_Nov	108	101	107	
M7D20Y0511	7_Day_20_Year_lowflow_May_to_Nov	117	75	112	
M1D10Y0511	1_Day_10_Year_lowflow_May_to_Nov	121	57	114	
M1D50Y0911	1_Day_50_Year_lowflow_Sep_to_Nov	128	34	117	
M1D20Y0911	1_Day_20_Year_lowflow_Sep_to_Nov	139	48	128	
M30D20Y0511	30_Day_20_Year_lowflow_May_to_Nov	139	121	137	
M7D10Y0511	7_Day_10_Year_lowflow_May_to_Nov	146	97	140	
M7D50Y0911	7_Day_50_Year_lowflow_Sep_to_Nov	152	65	142	
M1D10Y0911	1_Day_10_Year_lowflow_Sep_to_Nov	153	65	143	
M1D5Y0511	1_Day_5_Year_lowflow_May_to_Nov	161	86	152	
M7D20Y0911	7_Day_20_Year_lowflow_Sep_to_Nov	169	84	159	
M1D5Y0911	1_Day_5_Year_lowflow_Sep_to_Nov	174	92	165	
M30D50Y0911	30_Day_50_Year_lowflow_Sep_to_Nov	177	109	169	
M30D10Y0511	30_Day_10_Year_lowflow_May_to_Nov	175	144	172	
M7D10Y0911	7_Day_10_Year_lowflow_Sep_to_Nov	188	105	178	

M7D5Y0511	7_Day_5_Year_lowflow_May_to_Nov	187	131	181	
D98_05_11	98_Percent_Duration_MAY_NOV	189	123	182	
D98_09_11	98_Percent_Duration_SEP_NOV	194	98	183	
M30D20Y0911	30_Day_20_Year_lowflow_Sep_to_Nov	201	128	193	
M90D50Y0511	90_Day_50_Year_lowflow_May_to_Nov	209	141	201	
M1D50Y1202	1_Day_50_Year_lowflow_Dec_to_Feb	214	108	202	
M7D50Y1202	7_Day_50_Year_lowflow_Dec_to_Feb	216	134	207	
M7D5Y0911	7_Day_5_Year_lowflow_Sep_to_Nov	219	138	210	
D98_04_03	98_Percent_Duration_APR_MAR	218	146	210	
D95_09_11	95_Percent_Duration_SEP_NOV	227	132	216	
M30D10Y0911	30_Day_10_Year_lowflow_Sep_to_Nov	232	150	223	
M30D5Y0511	30_Day_5_Year_lowflow_May_to_Nov	232	181	226	
D95_05_11	95_Percent_Duration_MAY_NOV	241	170	233	
M1D2Y0911	1_Day_2_Year_lowflow_Sep_to_Nov	244	175	236	
M1D2Y0511	1_Day_2_Year_lowflow_May_to_Nov	246	169	237	
M90D20Y0511	90_Day_20_Year_lowflow_May_to_Nov	251	177	243	
M1D20Y1202	1_Day_20_Year_lowflow_Dec_to_Feb	264	151	251	
D90_09_11	90_Percent_Duration_SEP_NOV	265	169	254	
M7D20Y1202	7_Day_20_Year_lowflow_Dec_to_Feb	269	183	259	
M30D50Y1202	30_Day_50_Year_lowflow_Dec_to_Feb	284	146	268	
M30D5Y0911	30_Day_5_Year_lowflow_Sep_to_Nov	283	190	272	
D95_04_03	95_Percent_Duration_APR_MAR	286	202	277	
M7D2Y0511	7_Day_2_Year_lowflow_May_to_Nov	285	225	278	
D85_09_11	85_Percent_Duration_SEP_NOV	303	205	292	
M90D10Y0511	90_Day_10_Year_lowflow_May_to_Nov	303	220	294	
M90D50Y0911	90_Day_50_Year_lowflow_Sep_to_Nov	318	125	296	
D90_05_11	90_Percent_Duration_MAY_NOV	305	226	296	
M7D2Y0911	7_Day_2_Year_lowflow_Sep_to_Nov	313	238	305	
M1D10Y1202	1_Day_10_Year_lowflow_Dec_to_Feb	318	203	305	
M7D10Y1202	7_Day_10_Year_lowflow_Dec_to_Feb	330	241	320	
D80_09_11	80_Percent_Duration_SEP_NOV	343	237	331	
D98_12_02	98_Percent_Duration_DEC_FEB	349	206	333	
D85_05_11	85_Percent_Duration_MAY_NOV	367	280	357	
M30D20Y1202	30_Day_20_Year_lowflow_Dec_to_Feb	382	231	365	
D90_04_03	90_Percent_Duration_APR_MAR	382	277	370	
D75_09_11	75_Percent_Duration_SEP_NOV	390	274	377	
M90D5Y0511	90_Day_5_Year_lowflow_May_to_Nov	395	295	384	
M1D5Y1202	1_Day_5_Year_lowflow_Dec_to_Feb	398	286	385	
M30D2Y0511	30_Day_2_Year_lowflow_May_to_Nov	410	300	398	
M7D5Y1202	7_Day_5_Year_lowflow_Dec_to_Feb	424	337	414	
D80_05_11	80_Percent_Duration_MAY_NOV	434	339	424	
D70_09_11	70_Percent_Duration_SEP_NOV	445	314	430	
D95_12_02	95_Percent_Duration_DEC_FEB	456	256	433	
M90D20Y0911	90_Day_20_Year_lowflow_Sep_to_Nov	472	198	440	
M30D2Y0911	30_Day_2_Year_lowflow_Sep_to_Nov	465	339	451	
D85_04_03	85_Percent_Duration_APR_MAR	494	360	479	
M30D10Y1202	30_Day_10_Year_lowflow_Dec_to_Feb	499	346	482	
D75_05_11	75_Percent_Duration_MAY_NOV	511	404	499	
D60_09_11	60_Percent_Duration_SEP_NOV	575	412	557	
D90_12_02	90_Percent_Duration_DEC_FEB	617	368	589	
D70_05_11					

	70_Percent_Duration_MAY_NOV	605	477	591	
D80_04_03	80_Percent_Duration_APR_MAR	619	456	601	
M1D2Y1202	1_Day_2_Year_lowflow_Dec_to_Feb	617	533	608	
M90D10Y0911	90_Day_10_Year_lowflow_Sep_to_Nov	661	298	619	
M30D5Y1202	30_Day_5_Year_lowflow_Dec_to_Feb	695	558	680	
M7D2Y1202	7_Day_2_Year_lowflow_Dec_to_Feb	701	631	694	
D85_12_02	85_Percent_Duration_DEC_FEB	740	500	713	
M90D2Y0511	90_Day_2_Year_lowflow_May_to_Nov	738	557	718	
D50_09_11	50_Percent_Duration_SEP_NOV	760	546	736	
D75_04_03	75_Percent_Duration_APR_MAR	765	577	744	
D60_05_11	60_Percent_Duration_MAY_NOV	840	673	822	
M90D5Y0911	90_Day_5_Year_lowflow_Sep_to_Nov	979	483	922	
D80_12_02	80_Percent_Duration_DEC_FEB	953	677	922	
D70_04_03	70_Percent_Duration_APR_MAR	949	718	923	
D40_09_11	40_Percent_Duration_SEP_NOV	1070	739	1030	
D50_05_11	50_Percent_Duration_MAY_NOV	1170	961	1150	
D75_12_02	75_Percent_Duration_December_to_February	1230	882	1190	
M30D2Y1202	30_Day_2_Year_lowflow_Dec_to_Feb	1330	1350	1340	
D60_04_03	60_Percent_Duration_APR_MAR	1430	1140	1400	
D70_12_02	70_Percent_Duration_DEC_FEB	1460	1120	1420	
D30_09_11	30_Percent_Duration_SEP_NOV	1600	1120	1550	
M90D50Y1202	90_Day_50_Year_lowflow_Dec_to_Feb	1850	450	1690	
D40_05_11	40_Percent_Duration_MAY_NOV	1720	1420	1690	
M90D2Y0911	90_Day_2_Year_lowflow_Sep_to_Nov	1970	1190	1880	
D60_12_02	60_Percent_Duration_DEC_FEB	2010	1650	1970	
D50_04_03	50_Percent_Duration_APR_MAR	2050	1740	2020	
M90D20Y1202	90_Day_20_Year_lowflow_Dec_to_Feb	2390	863	2210	
D30_05_11	30_Percent_Duration_MAY_NOV	2560	2130	2510	
D50_12_02	50_Percent_Duration_December_to_February	2730	2380	2690	
M90D10Y1202	90_Day_10_Year_lowflow_Dec_to_Feb	2960	1450	2790	
D20_09_11	20_Percent_Duration_SEP_NOV	2910	1870	2790	
D40_04_03	40_Percent_Duration_APR_MAR	2930	2620	2900	
M90D5Y1202	90_Day_5_Year_lowflow_Dec_to_Feb	3790	2530	3650	
D40_12_02	40_Percent_Duration_DEC_FEB	3880	3620	3860	
D20_05_11	20_Percent_Duration_MAY_NOV	4110	3530	4050	
D30_04_03	30_Percent_Duration_APR_MAR	4450	4220	4430	
D30_12_02	30_Percent_Duration_DEC_FEB	5790	5740	5800	
M90D2Y1202	90_Day_2_Year_lowflow_Dec_to_Feb	5800	5920	5820	
D10_09_11	10_Percent_Duration_SEP_NOV	7240	4620	6940	
D20_04_03	20_Percent_Duration_APR_MAR	7480	7280	7470	
D10_05_11	10_Percent_Duration_MAY_NOV	8400	7050	8260	
D20_12_02	20_Percent_Duration_DEC_FEB	9320	9920	9410	
D10_04_03	10_Percent_Duration_APR_MAR	13900	14500	14000	
D10_12_02	10_Percent_Duration_DEC_FEB	16200	18700	16500	

General Flow Statistics

Flow types	Flow description	Upstream gage flows	Downstream gage flows	Weighted estimates	Weighted equivalent years of record
MINDV	Minimum_daily_flow	3	0	2.65	73.3
AVE_DV	Average_daily_streamflow	4390	4990	4470	73.3
SDQD	Std_Dev_of_daily_flows	7500	8540	7640	73.3
MAXDV	Maximum_daily_flow	98800	113000	101000	73.3

Maumee River Near Defiance											
A_{DEF}=	5545	mi^2	A_{NAP}=	5650	mi^2						
DEF GAGE			EST @ NAP GAGE			b	Δ	ADJ NAP GAGE			b_{ADJ}
Q_2	45400	cfs	Q_2	46300	cfs	1.046428	0.007928	Q_2	49976.76	cfs	5.120021
Q_5	61000	cfs	Q_5	62200	cfs	1.0385	0.068559	Q_5	67139.41	cfs	5.112093
Q_{10}	70800	cfs	Q_{10}	72100	cfs	0.969941	-0.05156	Q_{10}	77825.59	cfs	5.043534
Q_{25}	82700	cfs	Q_{25}	84300	cfs	1.021501	0.039104	Q_{25}	90994.41	cfs	5.095095
Q_{50}	91400	cfs	Q_{50}	93100	cfs	0.982397	-0.17996	Q_{50}	100493.2	cfs	5.05599
Q_{100}	99800	cfs	Q_{100}	102000	cfs	1.16236		Q_{100}	110100	cfs	5.235954
Q_{500}	119000	cfs	Q_{500}	121000	cfs	0.888487	0.273874	Q_{500}	130608.8	cfs	4.96208

$$Q_{NAP} = Q_{DEF} \times \left({}^{A_{NAP}}/_{A_{DEF}}\right)^{b}$$

$$b = \frac{\ln\left({}^{Q_{NAP}}/_{Q_{DEF}}\right)}{\ln\left({}^{A_{NAP}}/_{A_{DEF}}\right)}$$

Maumee River Near Waterville											
A_{WAT}=	6330	mi^2	A_{NAP}=	5650	mi^2						
WATERVILLE GAGE*			EST @ NAP GAGE*			b	Δ	ADJ NAP GAGE			b_{ADJ}
Q_2	51700	cfs	Q_2	46100	cfs	1.008801	0.01007	Q_2	46141.91	cfs	1.000805
Q_5	69900	cfs	Q_5	62400	cfs	0.99873	0.003649	Q_5	62456.73	cfs	0.990734
Q_{10}	82300	cfs	Q_{10}	73500	cfs	0.995081	1.22E-05	Q_{10}	73566.82	cfs	0.987085
Q_{25}	98200	cfs	Q_{25}	87700	cfs	0.995069	-0.00343	Q_{25}	87779.73	cfs	0.987073
Q_{50}	110000	cfs	Q_{50}	98200	cfs	0.998499	0.015576	Q_{50}	98289.27	cfs	0.990504
Q_{100}	123000	cfs	Q_{100}	110000	cfs	0.982923		Q_{100}	110100	cfs	0.974927
Q_{500}	153000	cfs	Q_{500}	137000	cfs	0.97195	0.010973	Q_{500}	137124.5	cfs	0.963955

known value from Henry County FIS ..\Alt C 8 Span Prestressed\HEC-RAS\FromH2530001\HEND2A3\FEMA download\Henry FIS.pdf

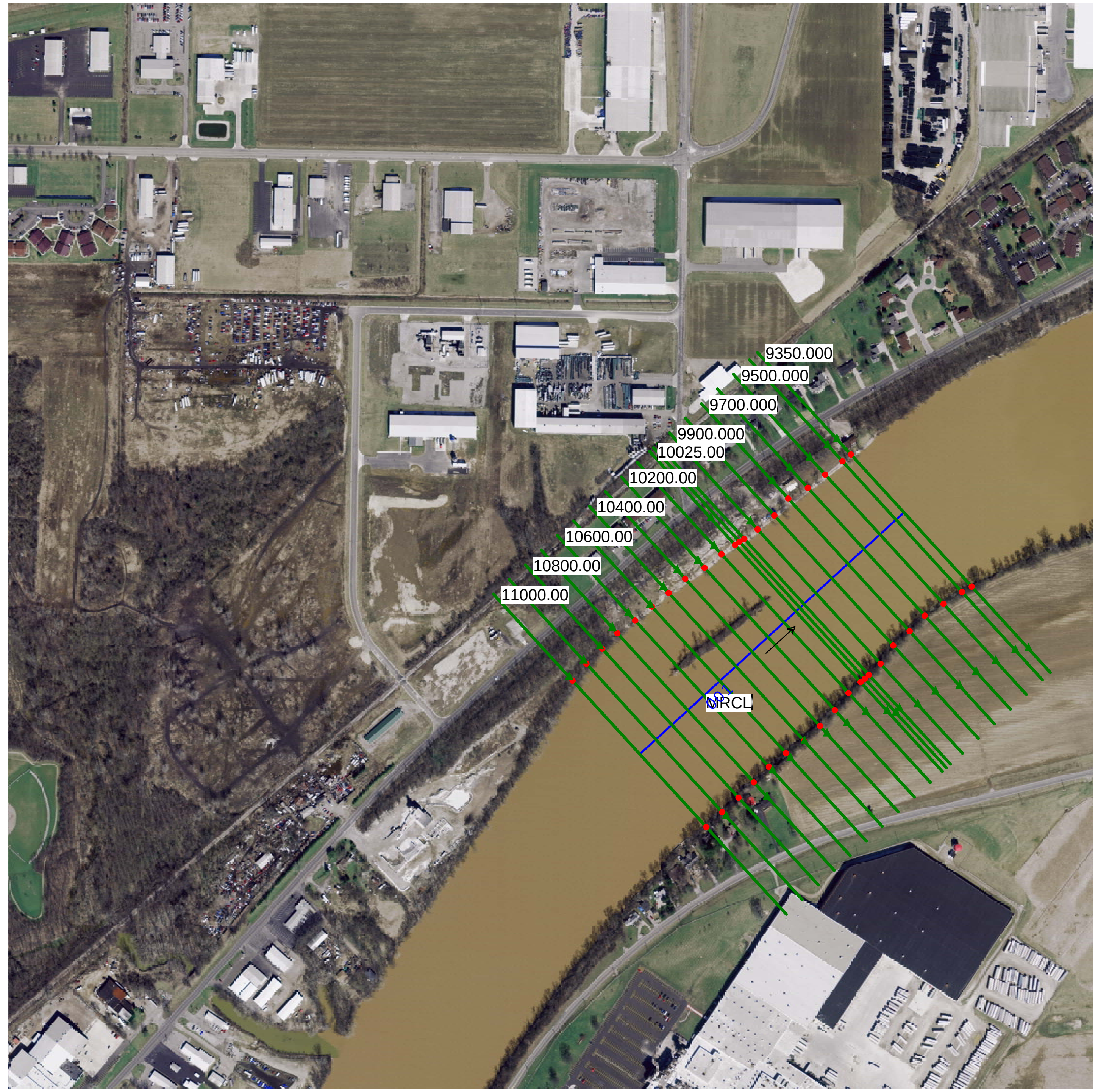
*Streamstats values GageFlowsRepor.pdf

Use Q's from waterville adjustment due to the consistency of the Badj

NAPOLEON ADJUSTED ESTIMATED GAGE

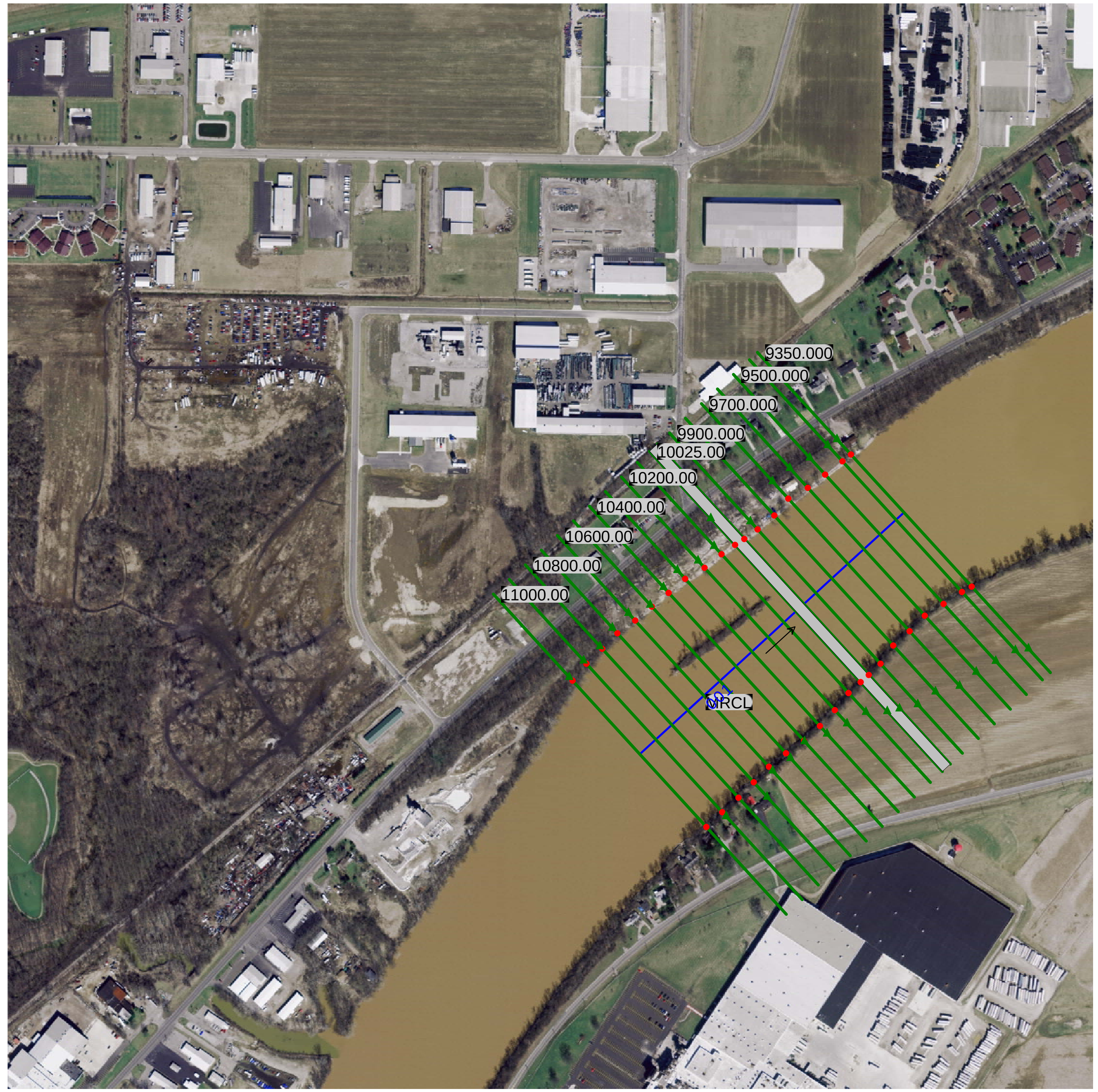
Q2	Q5	Q10	Q25	Q50	Q100	~~Q500~~	Q500 = 1.3*Q100
46142	62457	73567	87780	98290	110100	~~137125~~	143130

Existing



9350.000
9500.000
9700.000
9900.000
10025.00
10200.00
10400.00
10600.00
10800.00
11000.00
MRCL

Proposed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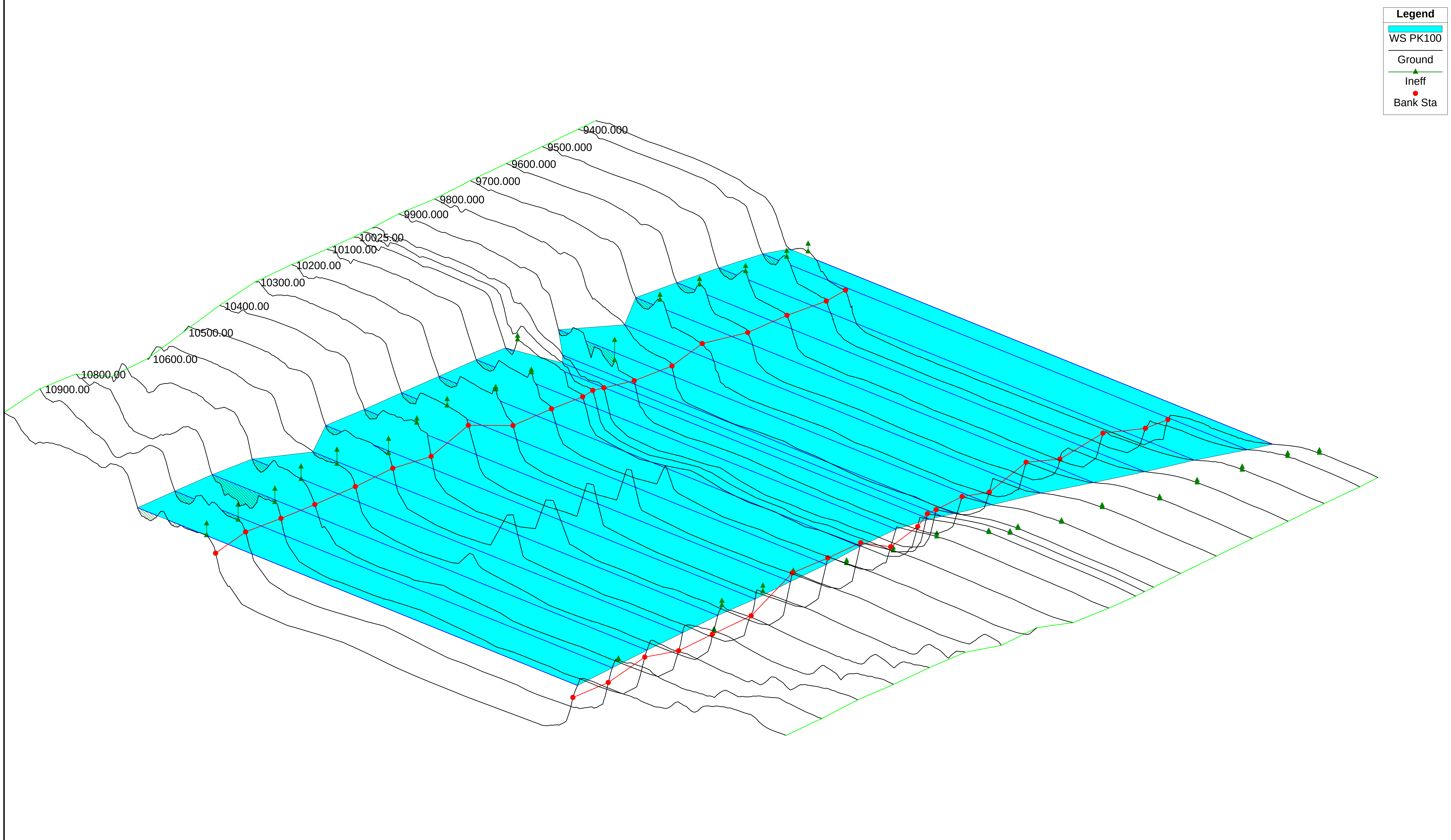
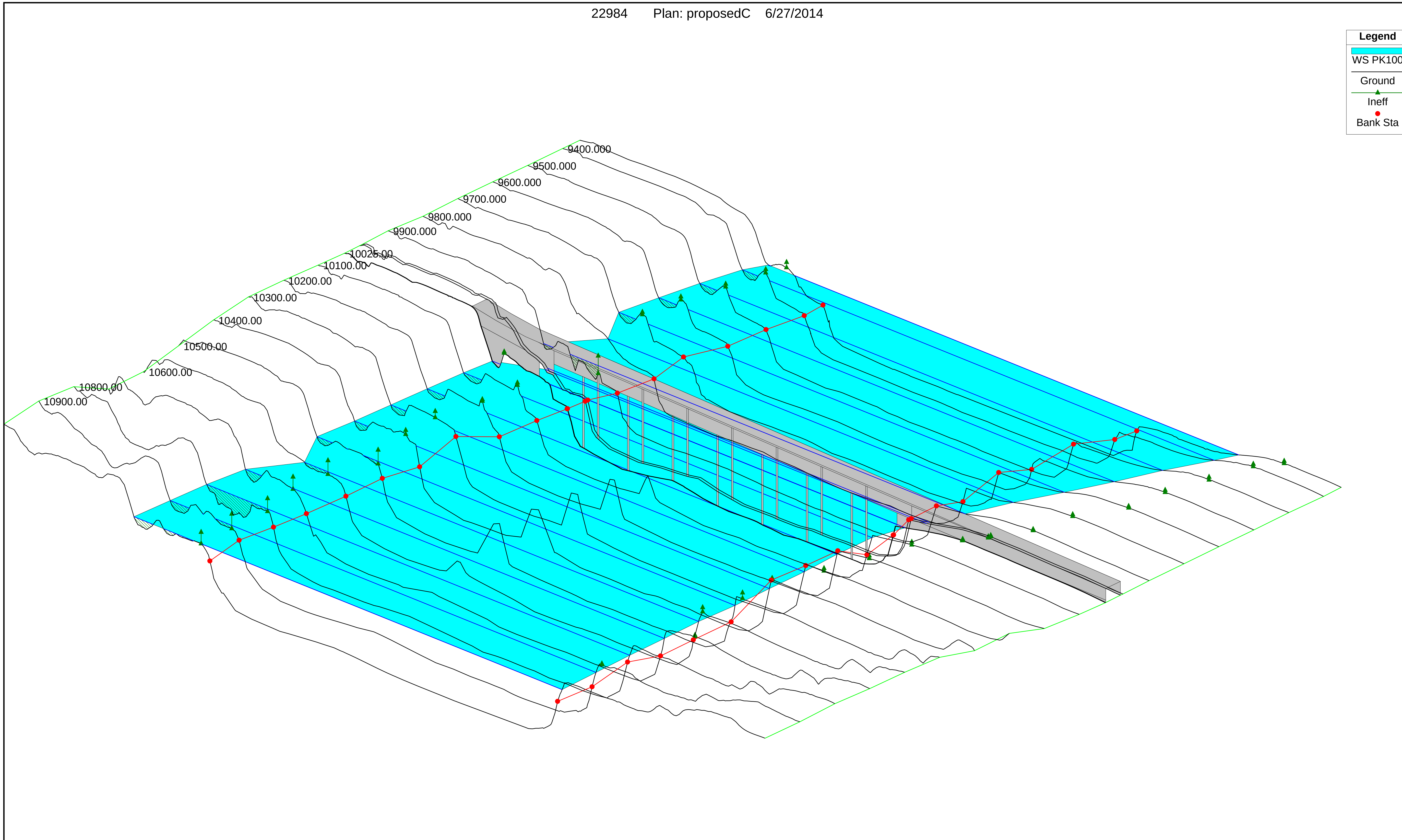
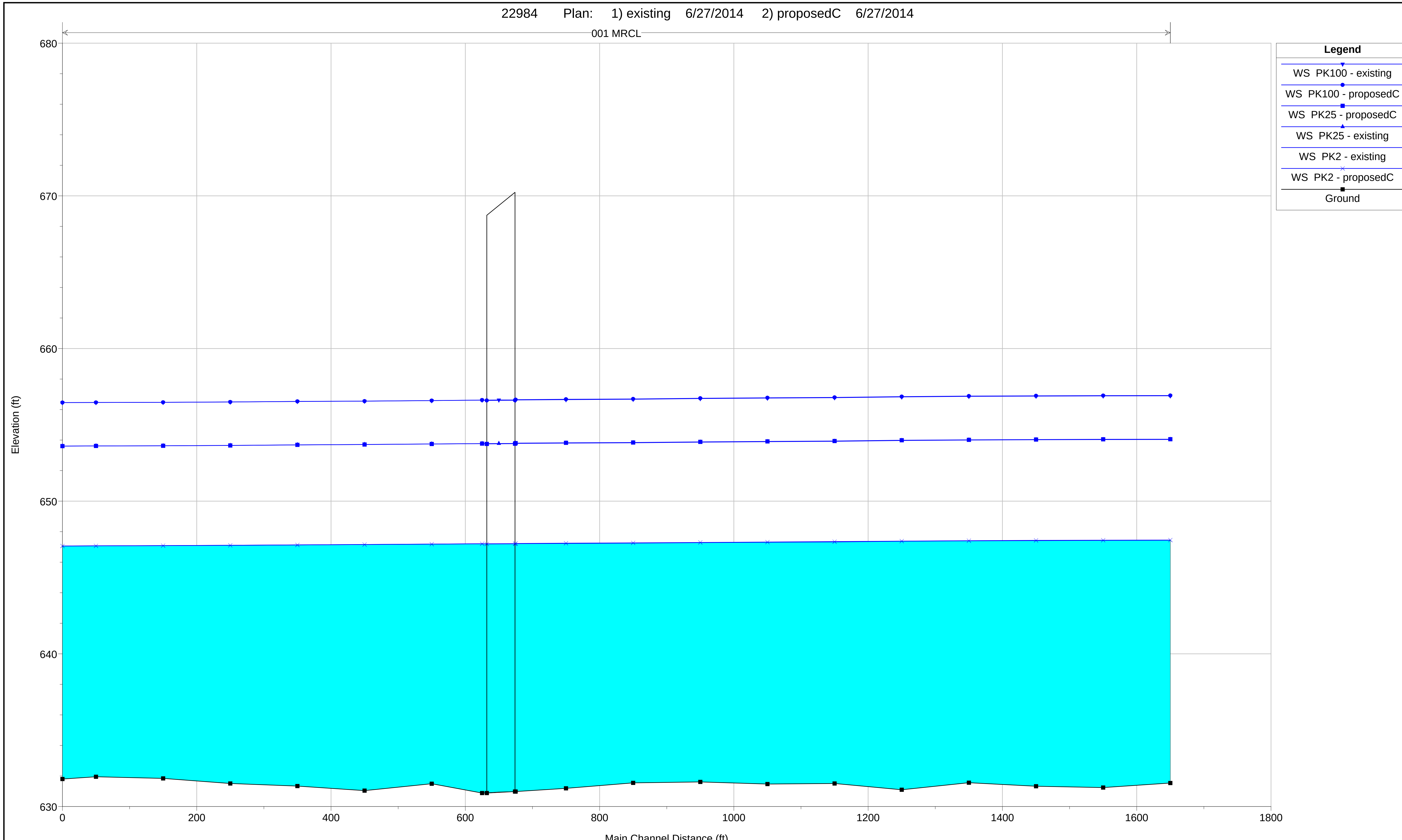
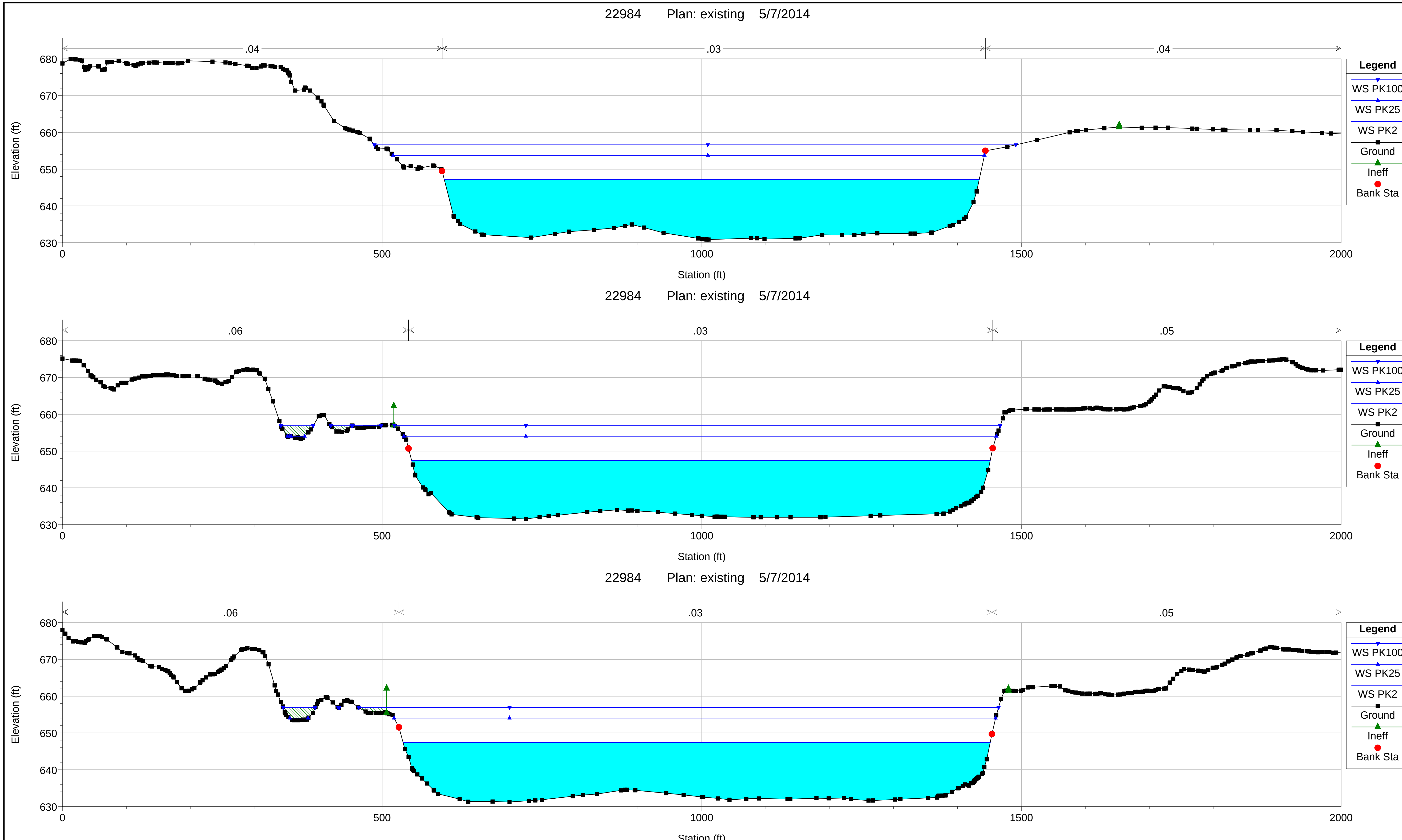
MRCL

22984 Plan: existing 4/30/2014




22984 Plan: proposedC 6/27/2014
9400.000
9500.000
9600.000
9700.000
9800.000
9900.000
10025.00
10100.00
10200.00
10300.00
10400.00
10500.00
10600.00
10800.00
10900.00
Legend
WS PK100
Ground
Ineff
Bank Sta


22984 Plan: 1) existing 6/27/2014 2) proposedC 6/27/2014
001 MRCL
Legend
WS PK100 - existing
WS PK100 - proposedC
WS PK25 - proposedC
WS PK25 - existing
WS PK2 - existing
WS PK2 - proposedC
Ground
Elevation (ft)
680
670
660
650
640
630
0
200
400
600
800
1000
1200
1400
1600
1800
Main Channel Distance (ft)


22984 Plan: existing 5/7/2014
.04
.03
.04
Elevation (ft)
Station (ft)
680
670
660
650
640
630
0
500
1000
1500
2000
Legend
WS PK100
WS PK25
WS PK2
Ground
Ineff
Bank Sta
22984 Plan: existing 5/7/2014
.06
.03
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Elevation (ft)
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22984 Plan: existing 5/7/2014
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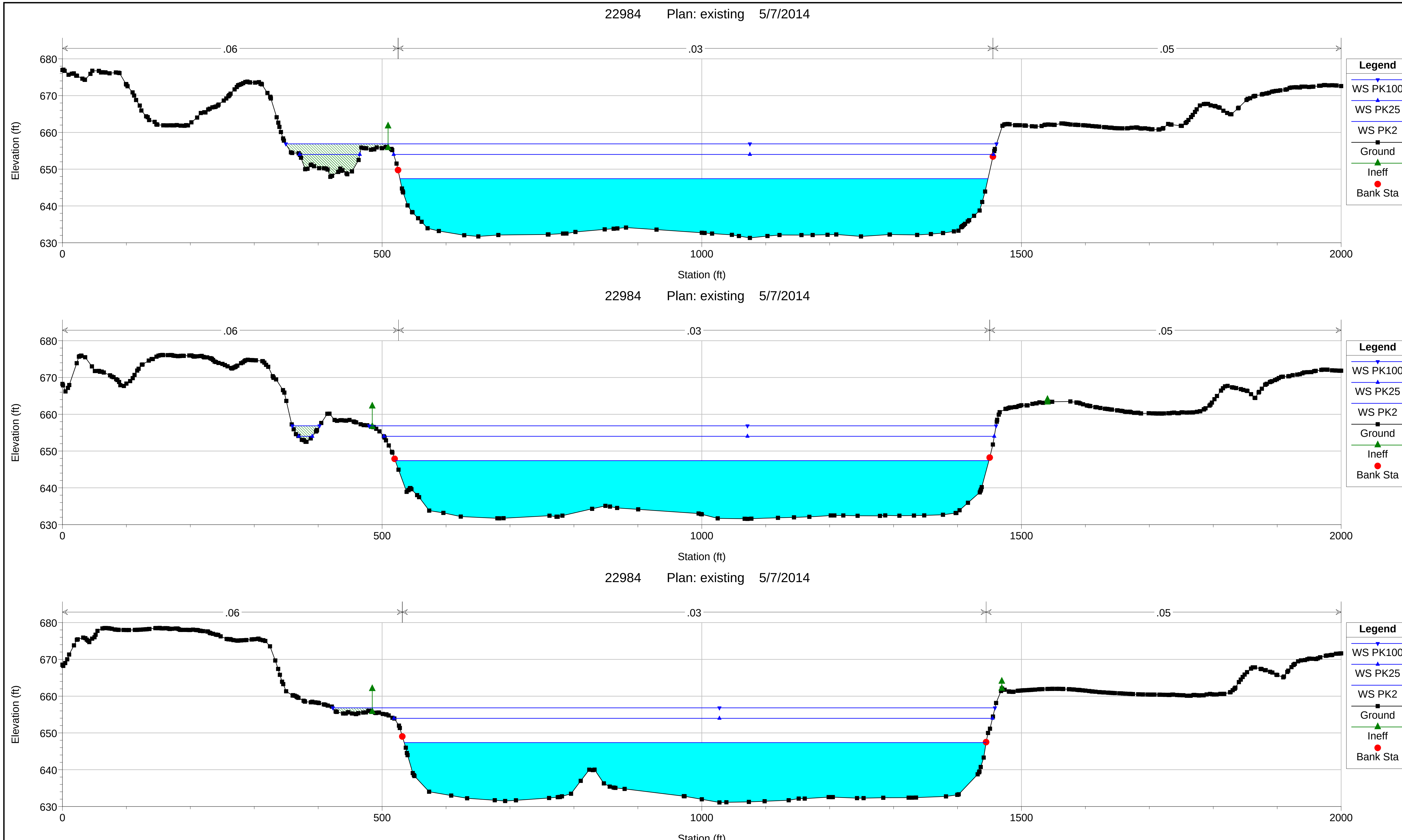
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Elevation (ft)
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22984 Plan: existing 5/7/2014
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Elevation (ft)
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22984 Plan: existing 5/7/2014
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Elevation (ft)
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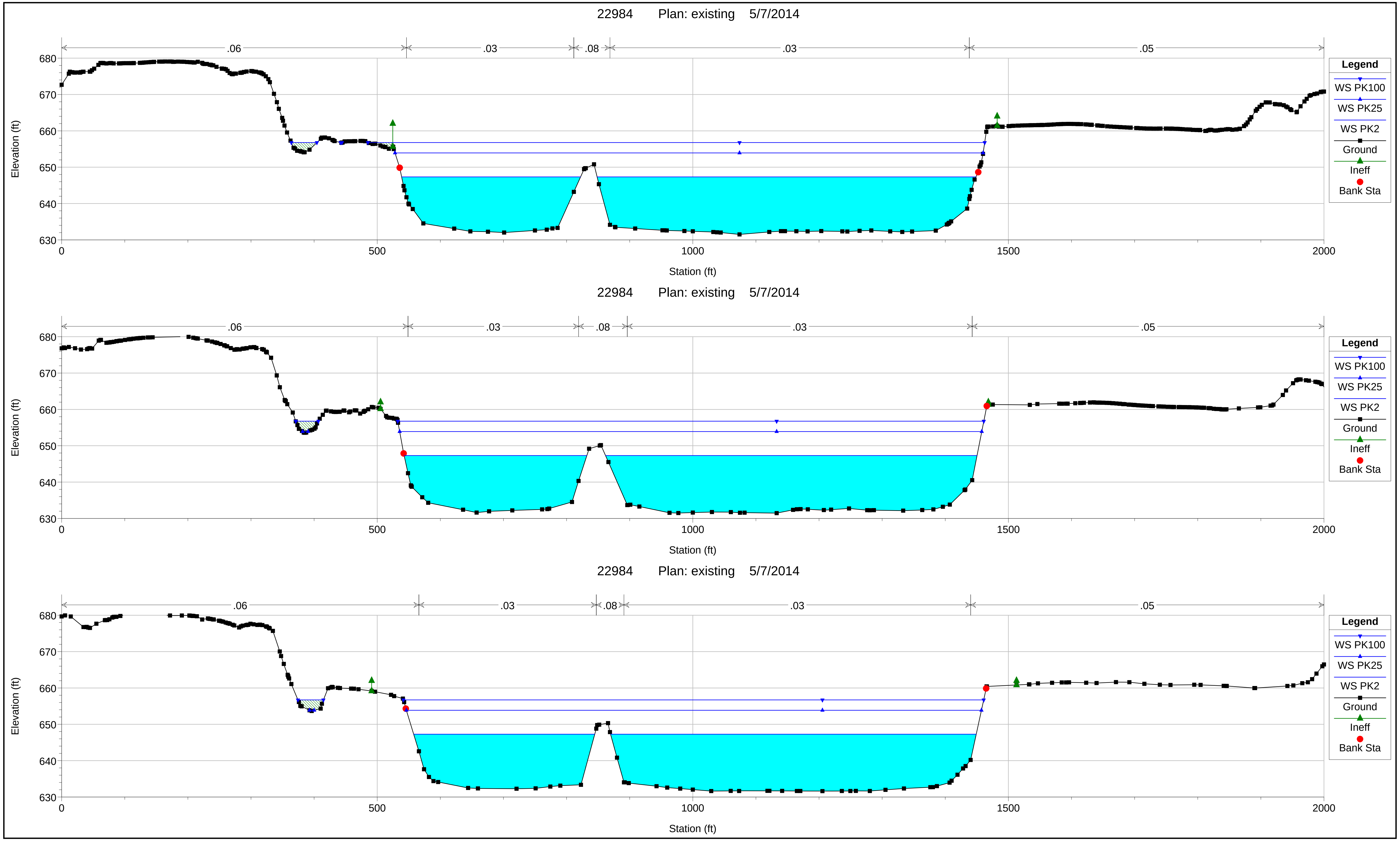
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Elevation (ft)
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22984 Plan: existing 5/7/2014
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22984 Plan: existing 5/7/2014
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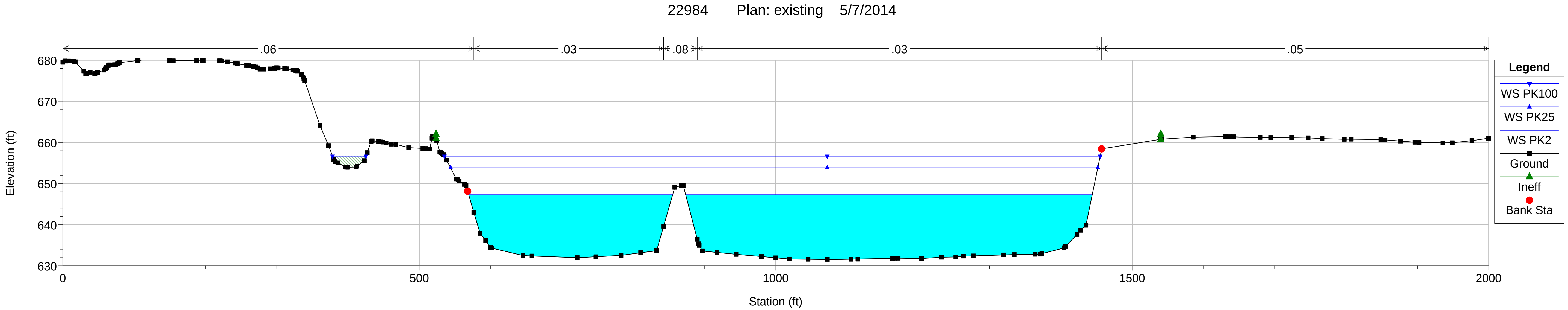
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Elevation (ft)
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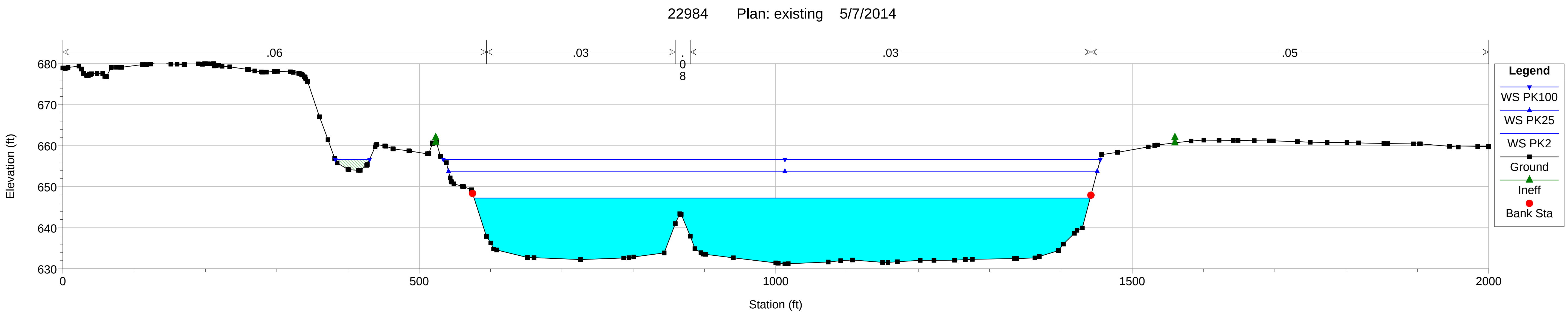
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Elevation (ft)
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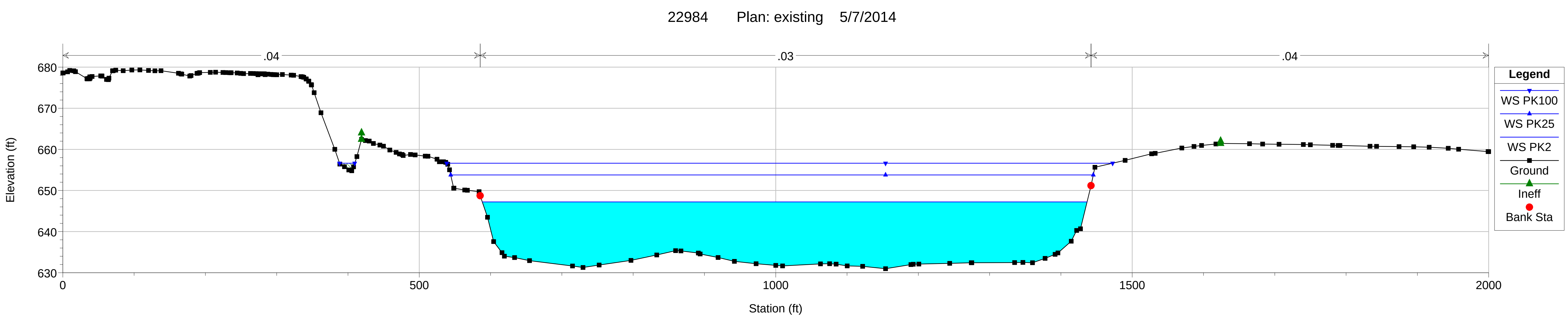
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Elevation (ft)
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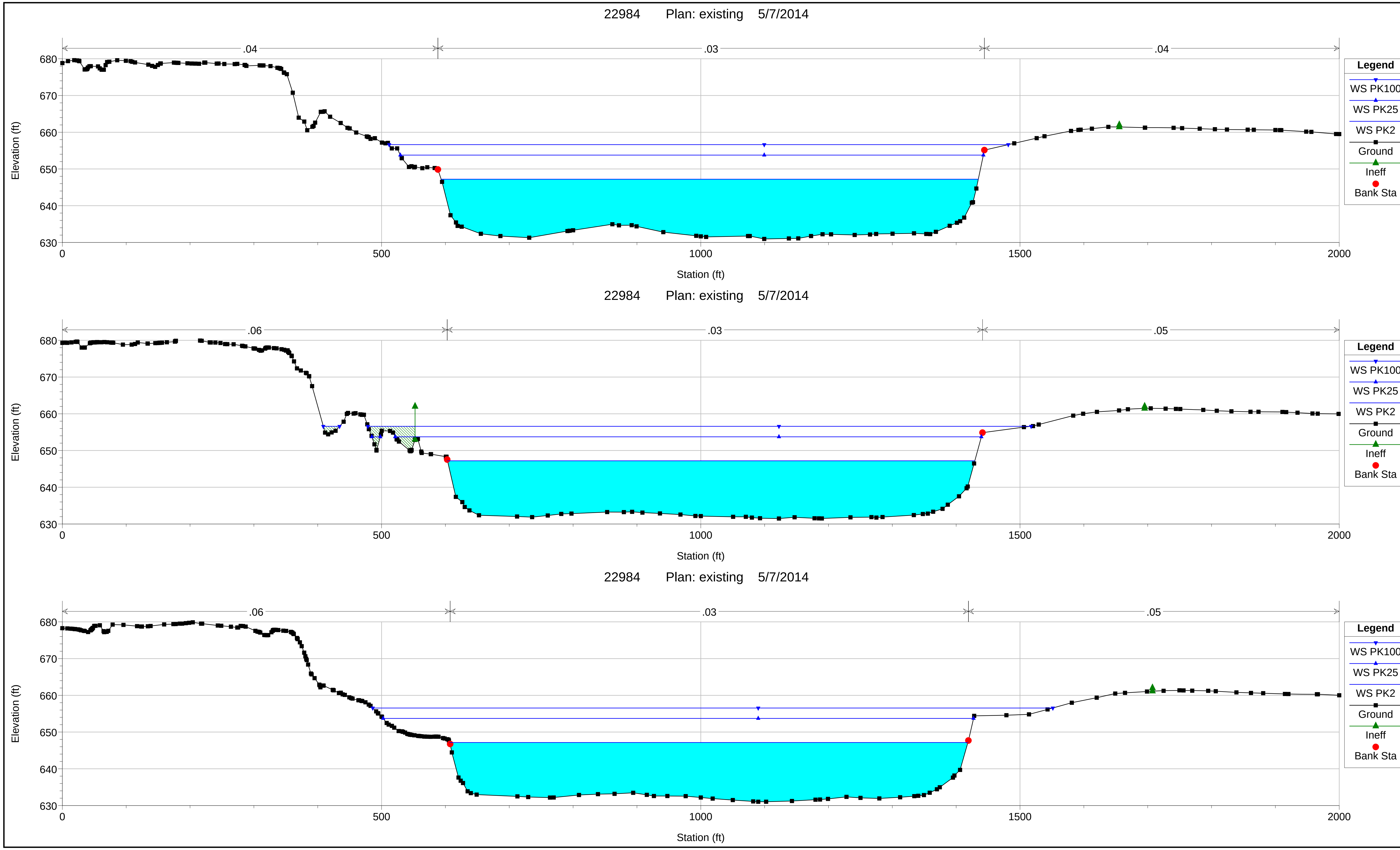
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22984 Plan: existing 5/7/2014
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22984 Plan: existing 5/7/2014
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Elevation (ft)
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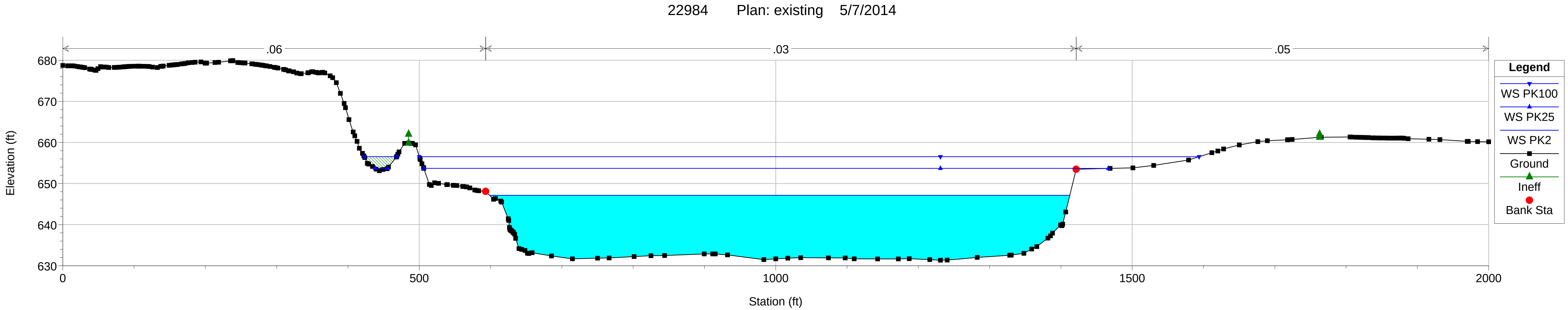
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Elevation (ft)
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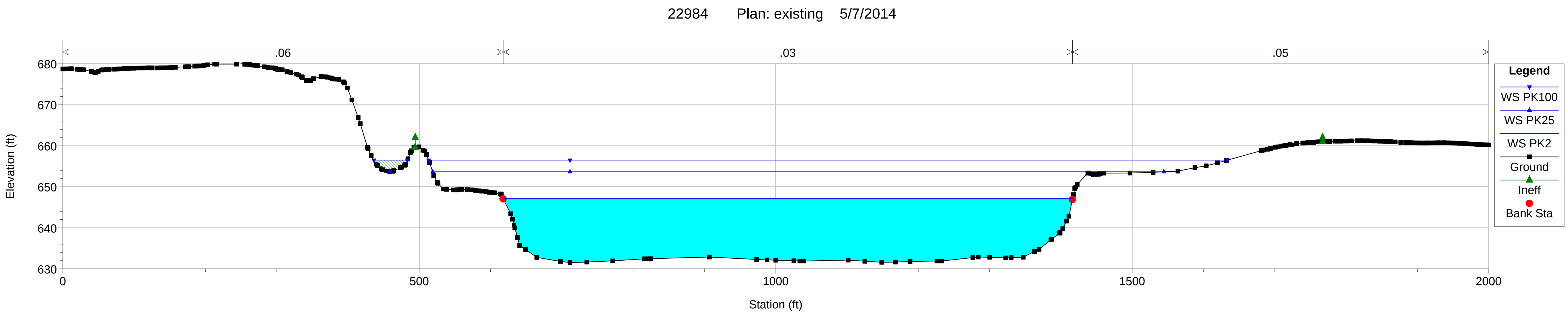
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Elevation (ft)
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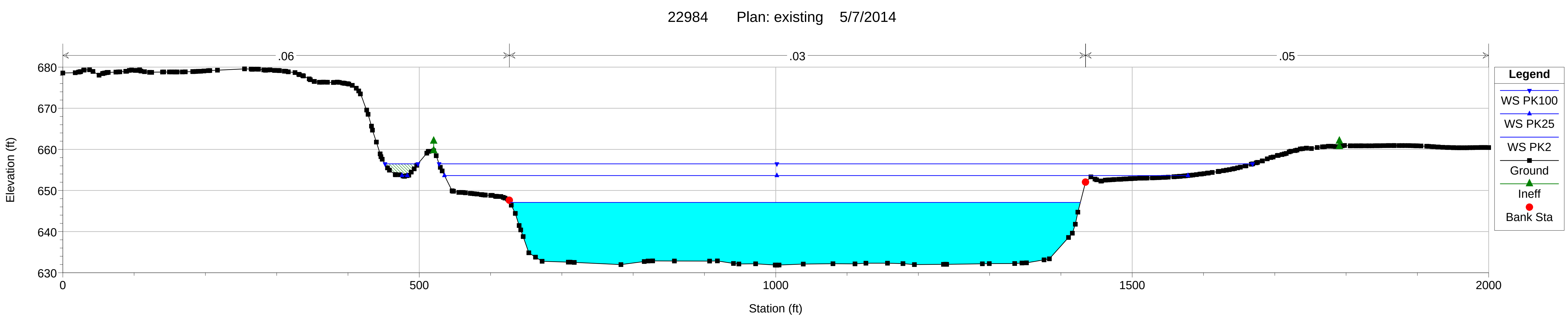
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Elevation (ft)
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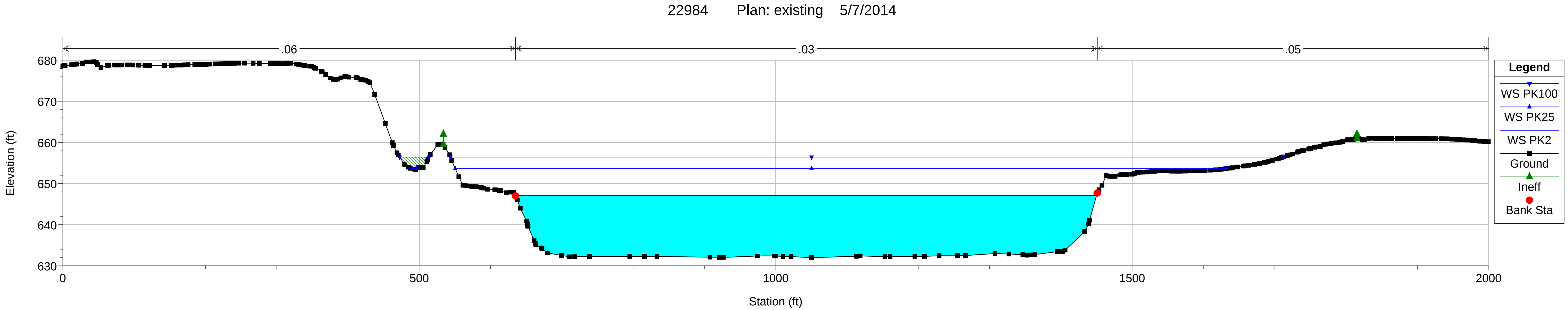
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Elevation (ft)
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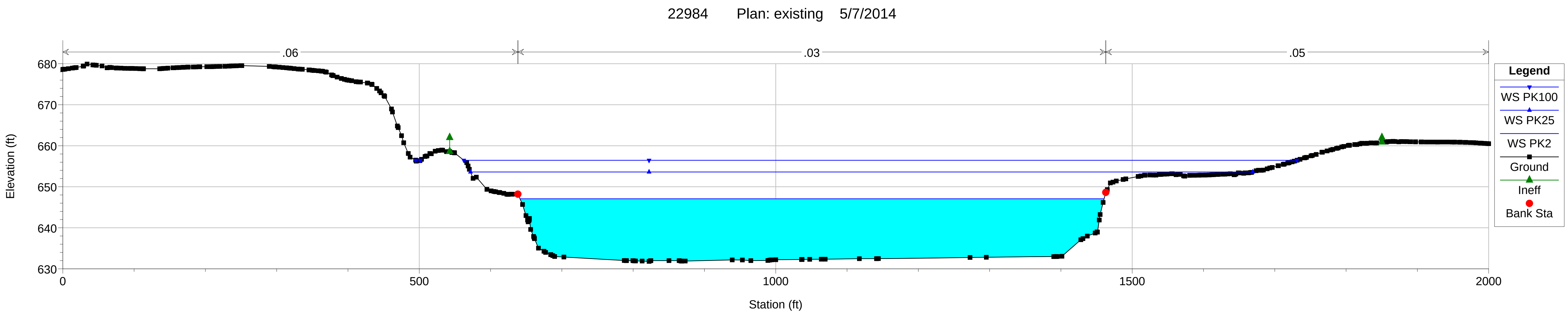
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Elevation (ft)
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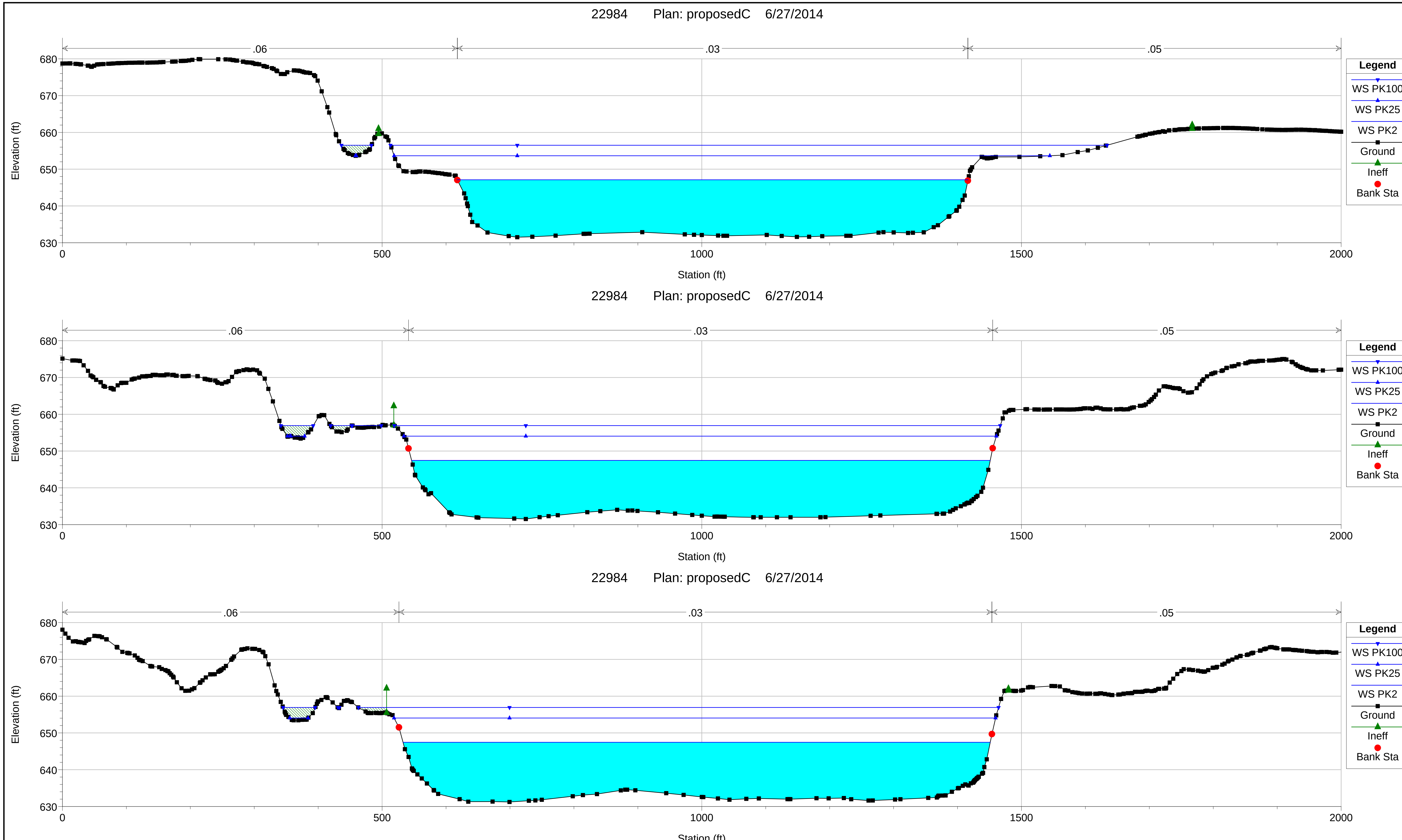
22984 Plan: proposedC 6/27/2014
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Elevation (ft)
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22984 Plan: proposedC 6/27/2014
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22984 Plan: proposedC 6/27/2014
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Elevation (ft)
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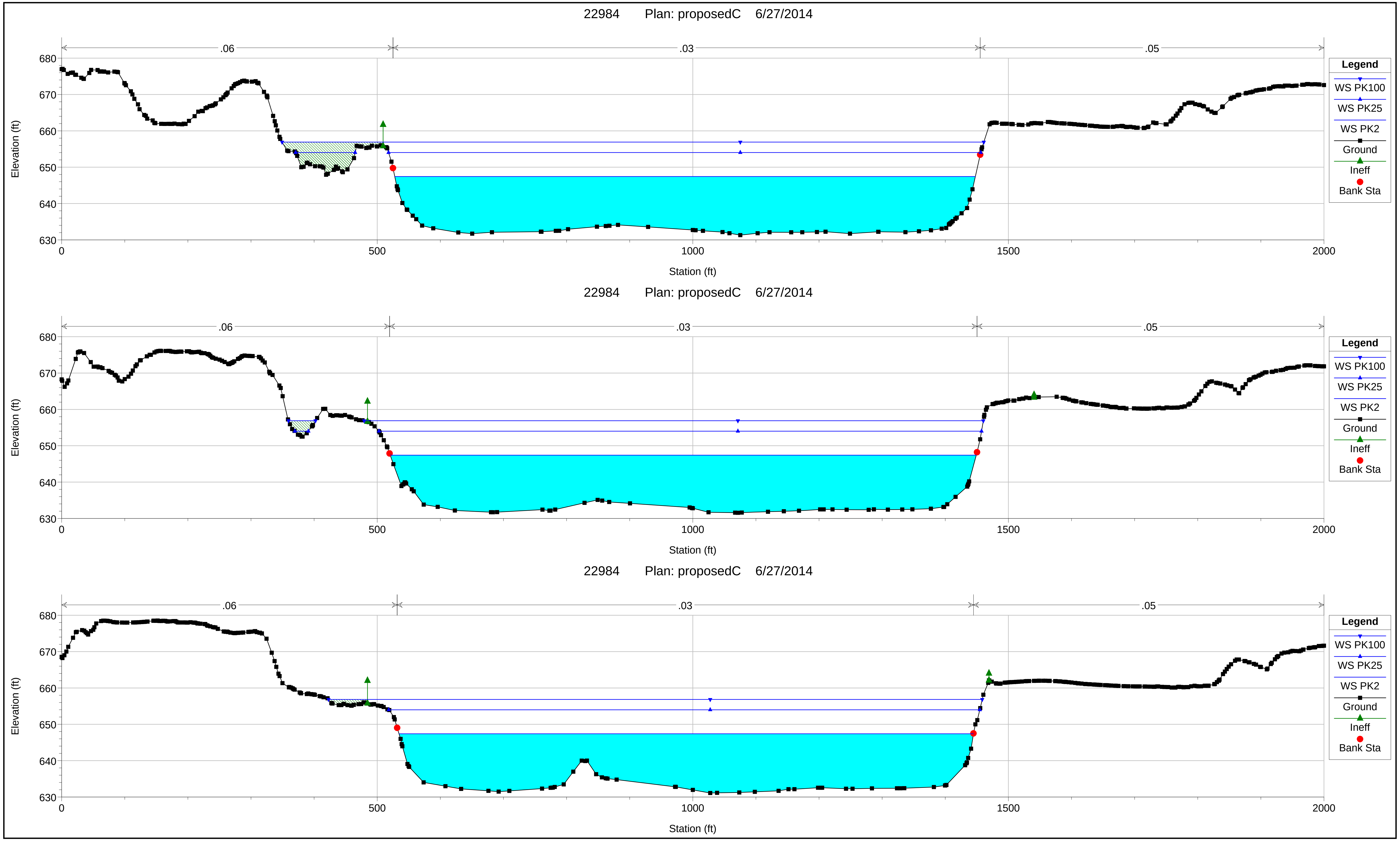
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Elevation (ft)
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22984 Plan: proposedC 6/27/2014
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22984 Plan: proposedC 6/27/2014
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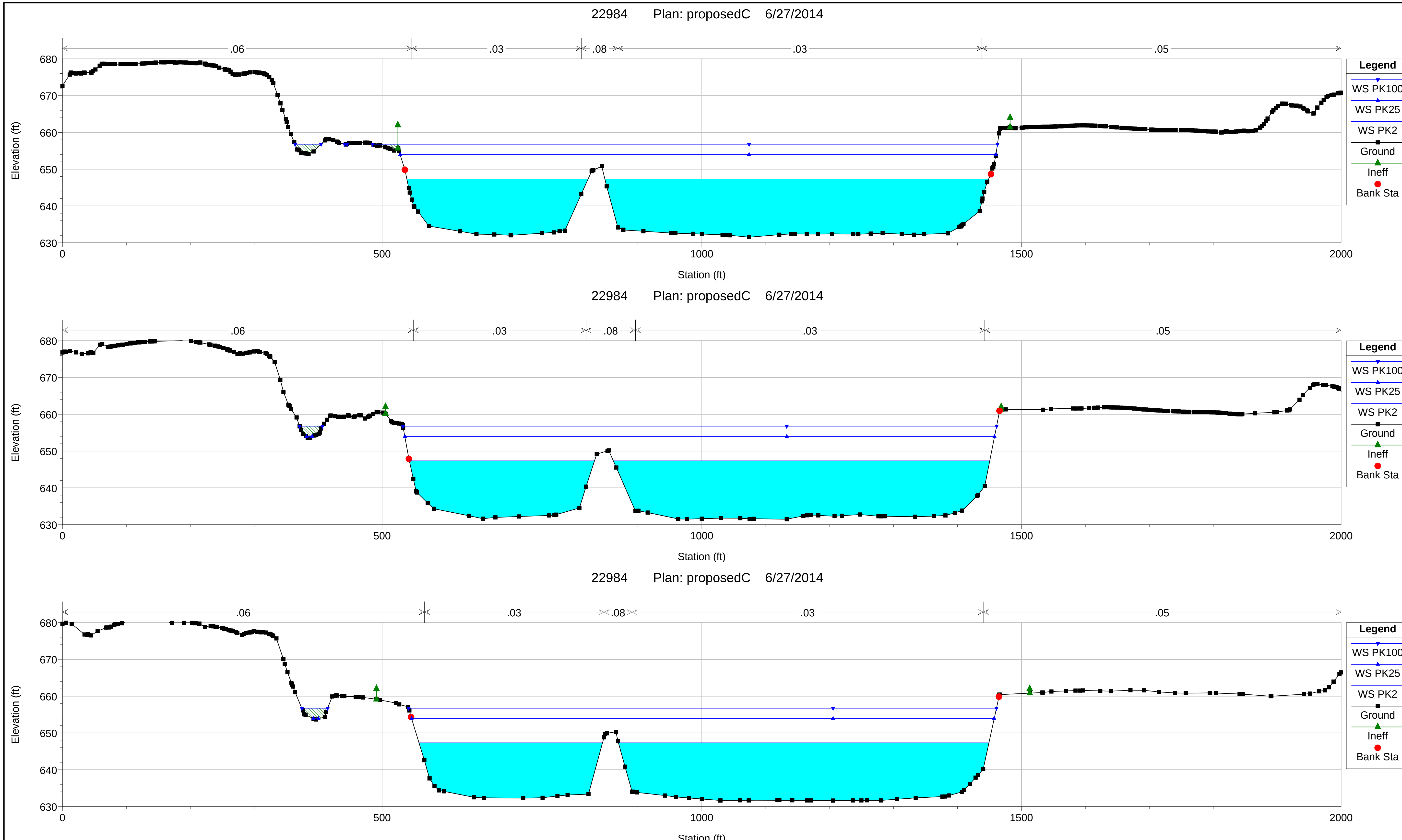
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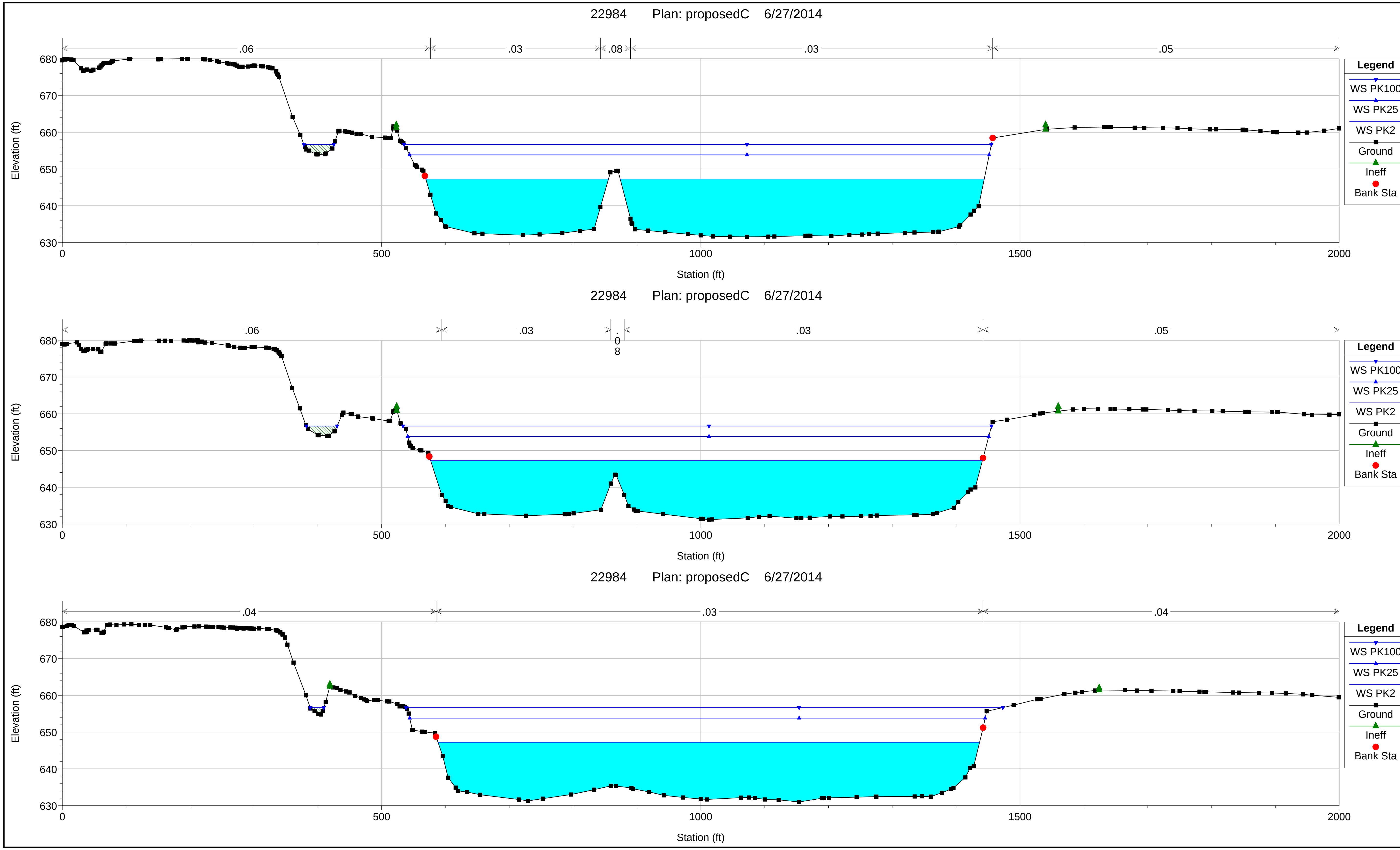
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Elevation (ft)
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22984 Plan: proposedC 6/27/2014
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Elevation (ft)
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22984 Plan: proposedC 6/27/2014
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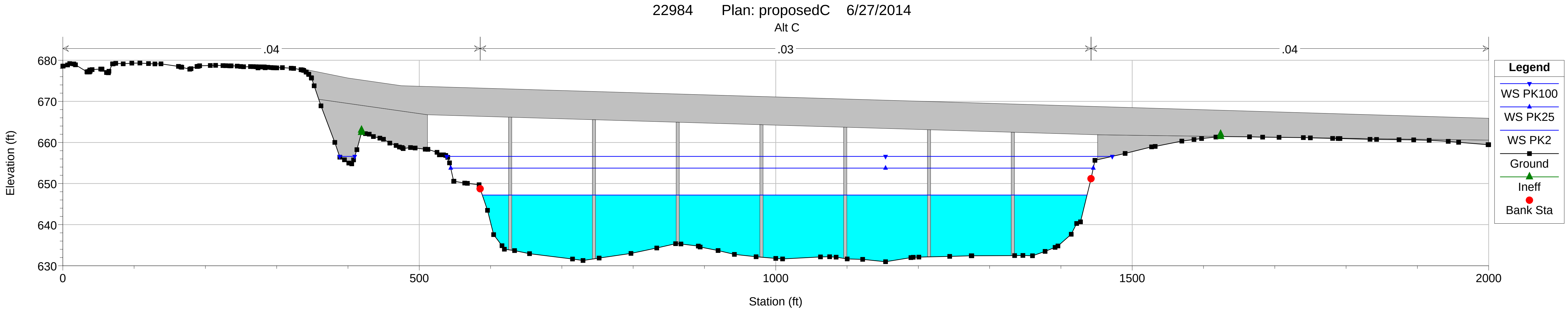

22984 Plan: proposedC 6/27/2014
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Elevation (ft)
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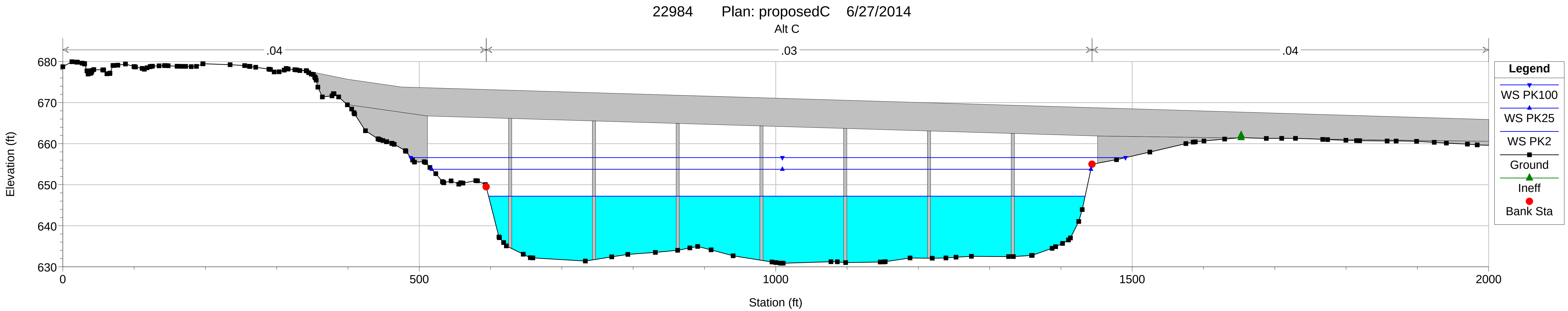

22984 Plan: proposedC 6/27/2014
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Elevation (ft)
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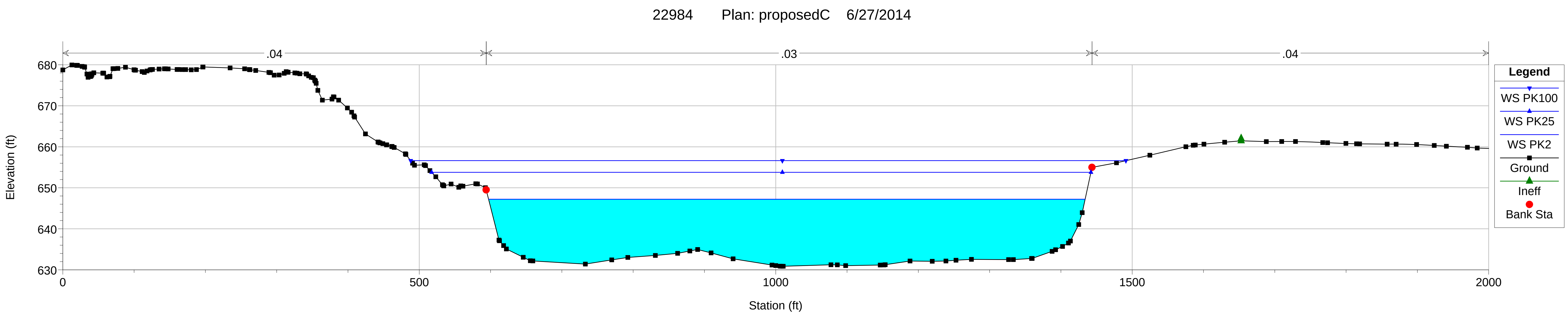

22984 Plan: proposedC 6/27/2014
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Elevation (ft)
Station (ft)
Legend
WS PK100
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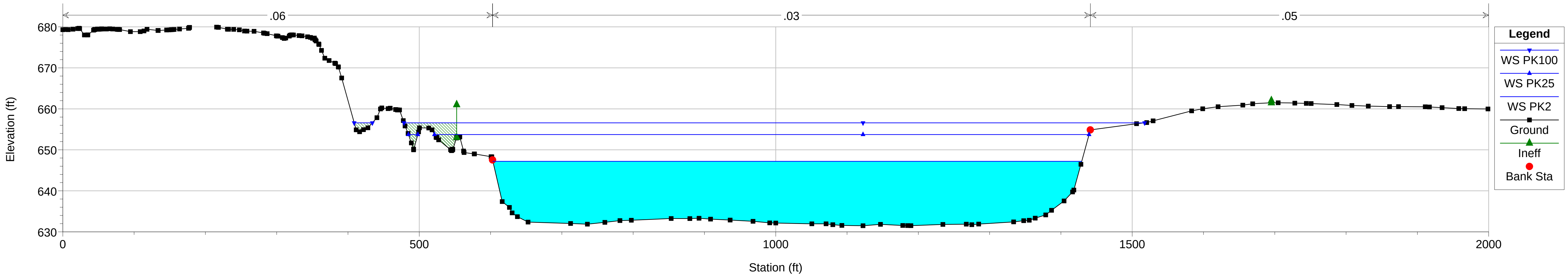
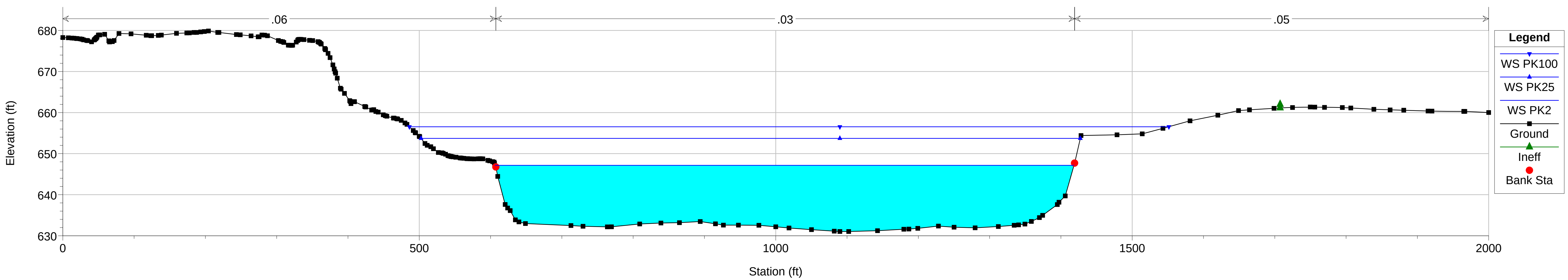
22984 Plan: proposedC 6/27/2014



22984 Plan: proposedC 6/27/2014



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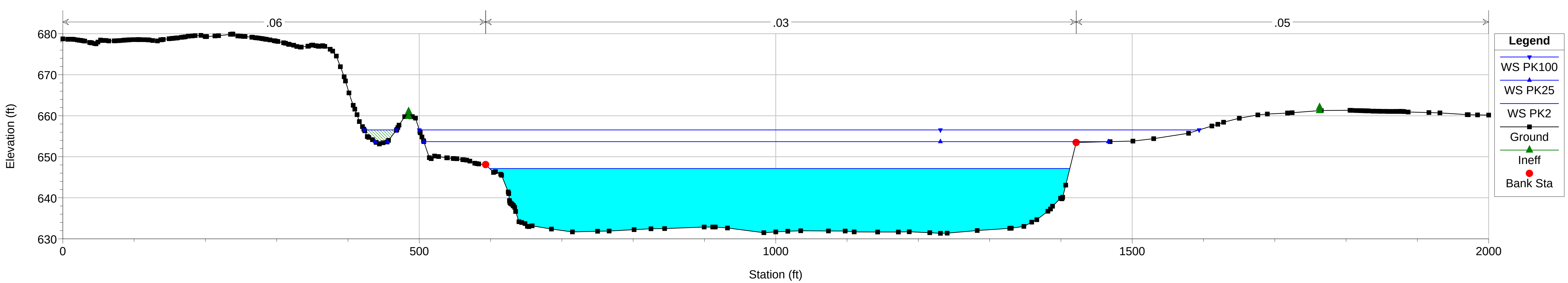
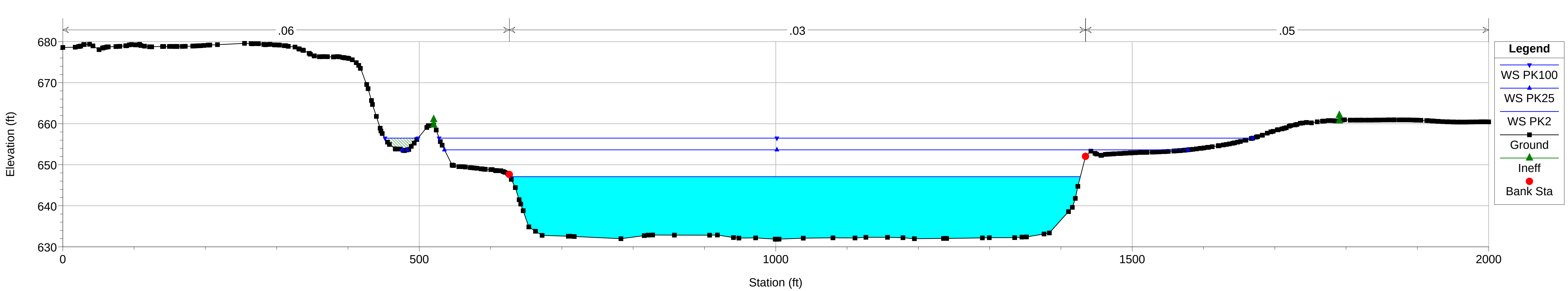
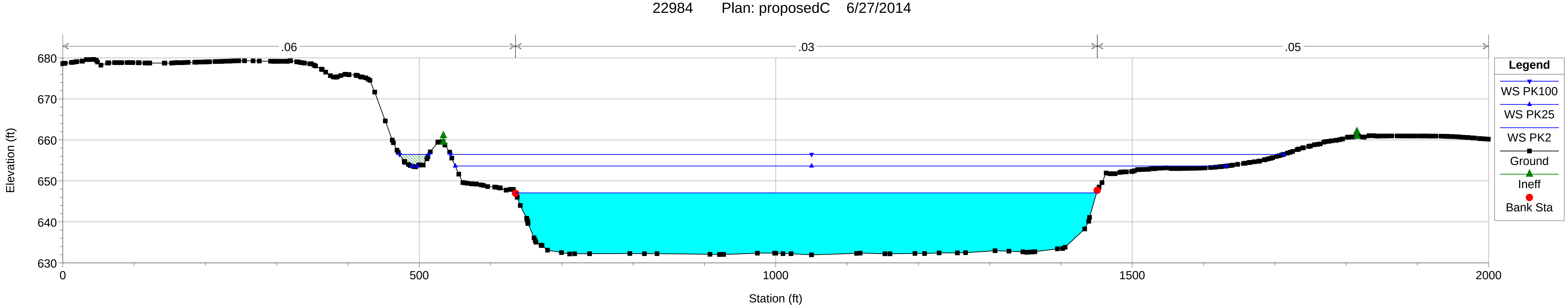


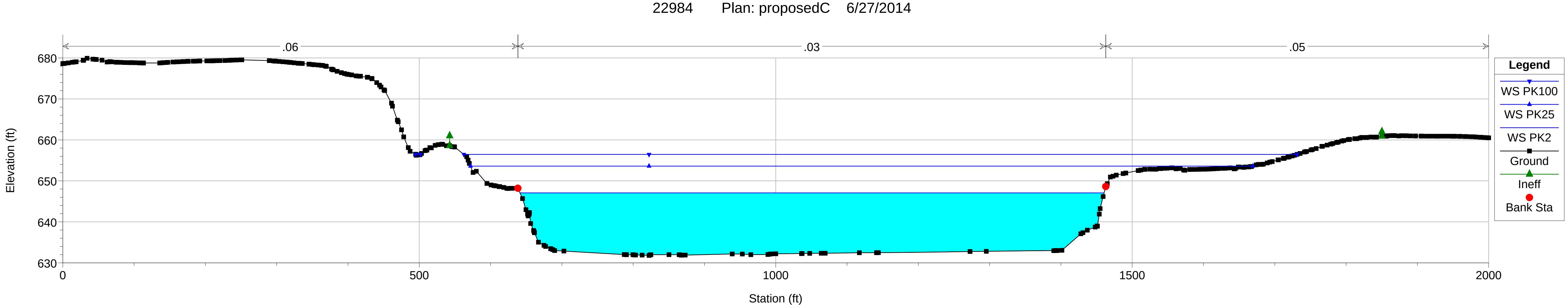
22984 Plan: proposedC 6/27/2014



22984 Plan: proposedC 6/27/2014



22984 Plan: proposedC 6/27/2014



HEC-RAS River: 001 Reach: MRCL

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft/s)	(sq ft)	(ft)	
MRCL	11000.00	PK2	existing	46142.00	631.54	647.44	637.27	3.60	12824.79	904.97	0.17
MRCL	11000.00	PK2	proposedC	46142.00	631.54	647.45	637.27	3.59	12835.07	905.00	0.17
MRCL	11000.00	PK25	existing	87780.00	631.54	654.04	639.71	4.66	18858.84	951.22	0.18
MRCL	11000.00	PK25	proposedC	87780.00	631.54	654.06	639.71	4.65	18875.07	952.50	0.18
MRCL	11000.00	PK100	existing	110100.00	631.54	656.90	640.84	5.13	21536.08	1075.42	0.19
MRCL	11000.00	PK100	proposedC	110100.00	631.54	656.92	640.84	5.13	21555.58	1076.69	0.19
MRCL	10900.00	PK2	existing	46142.00	631.24	647.43	637.10	3.51	13131.37	918.39	0.16
MRCL	10900.00	PK2	proposedC	46142.00	631.24	647.44	637.10	3.51	13141.79	918.42	0.16
MRCL	10900.00	PK25	existing	87780.00	631.24	654.03	639.53	4.56	19260.55	969.57	0.18
MRCL	10900.00	PK25	proposedC	87780.00	631.24	654.05	639.53	4.56	19277.10	969.85	0.18
MRCL	10900.00	PK100	existing	110100.00	631.24	656.90	640.64	5.03	21981.35	1053.18	0.18
MRCL	10900.00	PK100	proposedC	110100.00	631.24	656.92	640.64	5.02	22001.09	1053.81	0.18
MRCL	10800.00	PK2	existing	46142.00	631.33	647.42	637.09	3.50	13187.64	919.79	0.16
MRCL	10800.00	PK2	proposedC	46142.00	631.33	647.43	637.09	3.50	13198.14	919.82	0.16
MRCL	10800.00	PK25	existing	87780.00	631.33	654.02	639.48	4.55	19317.61	1032.54	0.18
MRCL	10800.00	PK25	proposedC	87780.00	631.33	654.04	639.48	4.54	19334.15	1032.70	0.18
MRCL	10800.00	PK100	existing	110100.00	631.33	656.88	640.58	5.01	22021.73	1111.61	0.18
MRCL	10800.00	PK100	proposedC	110100.00	631.33	656.90	640.58	5.01	22041.31	1111.72	0.18
MRCL	10700.00	PK2	existing	46142.00	631.56	647.40	637.26	3.53	13056.47	928.48	0.17
MRCL	10700.00	PK2	proposedC	46142.00	631.56	647.41	637.26	3.53	13067.18	928.52	0.17
MRCL	10700.00	PK25	existing	87780.00	631.56	654.00	639.67	4.57	19271.02	976.01	0.18
MRCL	10700.00	PK25	proposedC	87780.00	631.56	654.02	639.67	4.57	19288.04	976.27	0.18
MRCL	10700.00	PK100	existing	110100.00	631.56	656.86	640.78	5.03	22030.68	1023.14	0.18
MRCL	10700.00	PK100	proposedC	110100.00	631.56	656.88	640.78	5.03	22050.87	1023.70	0.18
MRCL	10600.00	PK2	existing	46142.00	631.10	647.38	637.27	3.61	12795.91	910.05	0.17
MRCL	10600.00	PK2	proposedC	46142.00	631.10	647.39	637.27	3.60	12806.52	910.08	0.17
MRCL	10600.00	PK25	existing	87780.00	631.10	653.97	639.74	4.66	18873.45	936.27	0.18
MRCL	10600.00	PK25	proposedC	87780.00	631.10	653.99	639.74	4.66	18890.31	936.57	0.18
MRCL	10600.00	PK100	existing	110100.00	631.10	656.83	640.90	5.13	21614.59	1035.60	0.19
MRCL	10600.00	PK100	proposedC	110100.00	631.10	656.85	640.90	5.13	21635.04	1035.72	0.19
MRCL	10500.00	PK2	existing	46142.00	631.51	647.33	637.45	3.81	12114.76	883.70	0.18
MRCL	10500.00	PK2	proposedC	46142.00	631.51	647.34	637.45	3.81	12125.22	883.79	0.18
MRCL	10500.00	PK25	existing	87780.00	631.51	653.92	640.02	4.85	18128.08	931.86	0.19
MRCL	10500.00	PK25	proposedC	87780.00	631.51	653.94	640.02	4.85	18145.03	931.91	0.19
MRCL	10500.00	PK100	existing	110100.00	631.51	656.78	641.18	5.31	20799.84	1020.01	0.20
MRCL	10500.00	PK100	proposedC	110100.00	631.51	656.80	641.18	5.31	20819.64	1022.18	0.20
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MRCL	10400.00	PK2	proposedC	46142.00	631.47	647.32	637.28	3.79	12182.49	878.21	0.18
MRCL	10400.00	PK25	existing	87780.00	631.47	653.90	639.87	4.84	18141.39	930.99	0.19
MRCL	10400.00	PK25	proposedC	87780.00	631.47	653.91	639.87	4.84	18158.22	931.36	0.19
MRCL	10400.00	PK100	existing	110100.00	631.47	656.75	641.04	5.31	20784.23	964.35	0.20
MRCL	10400.00	PK100	proposedC	110100.00	631.47	656.77	641.04	5.30	20803.84	964.51	0.20
MRCL	10300.00	PK2	existing	46142.00	631.61	647.29	637.25	3.81	12115.13	866.40	0.18
MRCL	10300.00	PK2	proposedC	46142.00	631.61	647.30	637.25	3.81	12125.44	866.48	0.18
MRCL	10300.00	PK25	existing	87780.00	631.61	653.86	639.81	4.88	17986.41	918.58	0.19
MRCL	10300.00	PK25	proposedC	87780.00	631.61	653.88	639.81	4.88	18003.09	919.24	0.19
MRCL	10300.00	PK100	existing	110100.00	631.61	656.72	640.99	5.35	20598.61	959.75	0.20
MRCL	10300.00	PK100	proposedC	110100.00	631.61	656.74	640.99	5.34	20618.08	959.92	0.20
MRCL	10200.00	PK2	existing	46142.00	631.55	647.25	637.33	3.87	11920.03	856.29	0.18
MRCL	10200.00	PK2	proposedC	46142.00	631.55	647.27	637.33	3.87	11930.28	856.36	0.18
MRCL	10200.00	PK25	existing	87780.00	631.55	653.83	639.89	4.96	17739.07	907.81	0.20
MRCL	10200.00	PK25	proposedC	87780.00	631.55	653.84	639.89	4.96	17755.80	907.88	0.20
MRCL	10200.00	PK100	existing	110100.00	631.55	656.68	641.10	5.44	20343.74	966.74	0.20
MRCL	10200.00	PK100	proposedC	110100.00	631.55	656.70	641.10	5.44	20363.33	966.92	0.20
MRCL	10100.00	PK2	existing	46142.00	631.19	647.23	637.37	3.85	11974.70	864.21	0.18
MRCL	10100.00	PK2	proposedC	46142.00	631.19	647.25	637.37	3.85	11985.04	864.25	0.18
MRCL	10100.00	PK25	existing	87780.00	631.19	653.80	639.96	4.96	17811.72	910.01	0.19
MRCL	10100.00	PK25	proposedC	87780.00	631.19	653.82	639.96	4.96	17828.49	910.06	0.19
MRCL	10100.00	PK100	existing	110100.00	631.19	656.65	641.13	5.45	20417.52	969.67	0.20
MRCL	10100.00	PK100	proposedC	110100.00	631.19	656.67	641.13	5.45	20437.15	969.94	0.20

HEC-RAS River: 001 Reach: MRCL (Continued)

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft/s)	(sq ft)	(ft)	
MRCL	10025.00	PK2	existing	46142.00	630.98	647.22	637.39	3.87	11925.09	848.27	0.18
MRCL	10025.00	PK2	proposedC	46142.00	630.98	647.23	637.39	3.87	11935.29	848.31	0.18
MRCL	10025.00	PK25	existing	87780.00	630.98	653.78	639.91	5.00	17685.60	901.40	0.19
MRCL	10025.00	PK25	proposedC	87780.00	630.98	653.80	639.91	4.99	17702.33	901.45	0.19
MRCL	10025.00	PK100	existing	110100.00	630.98	656.63	641.09	5.49	20275.46	955.45	0.20
MRCL	10025.00	PK100	proposedC	110100.00	630.98	656.65	641.09	5.48	20295.43	956.20	0.20
MRCL	10000.00	PK2	existing	46142.00	630.96	647.21	637.26	3.85	11970.80	841.30	0.18
MRCL	10000.00	PK25	existing	87780.00	630.96	653.78	639.79	4.99	17723.44	913.29	0.19
MRCL	10000.00	PK100	existing	110100.00	630.96	656.63	640.96	5.48	20376.35	969.75	0.20
MRCL	9975.000	PK2	existing	46142.00	630.88	647.21	637.20	3.85	11981.19	836.76	0.18
MRCL	9975.000	PK2	proposedC	46142.00	630.88	647.21	637.20	3.85	11981.19	836.76	0.18
MRCL	9975.000	PK25	existing	87780.00	630.88	653.77	639.73	5.00	17735.04	924.88	0.19
MRCL	9975.000	PK25	proposedC	87780.00	630.88	653.77	639.73	5.00	17735.04	924.88	0.19
MRCL	9975.000	PK100	existing	110100.00	630.88	656.62	640.90	5.49	20450.50	1003.20	0.20
MRCL	9975.000	PK100	proposedC	110100.00	630.88	656.62	640.90	5.49	20450.50	1003.20	0.20
MRCL	9900.000	PK2	existing	46142.00	631.49	647.19	637.25	3.92	11779.23	825.93	0.18
MRCL	9900.000	PK2	proposedC	46142.00	631.49	647.19	637.26	3.92	11779.23	825.93	0.18
MRCL	9900.000	PK25	existing	87780.00	631.49	653.74	639.83	5.08	17445.20	931.33	0.20
MRCL	9900.000	PK25	proposedC	87780.00	631.49	653.74	639.82	5.08	17445.20	931.33	0.20
MRCL	9900.000	PK100	existing	110100.00	631.49	656.59	641.02	5.59	20035.03	1064.30	0.20
MRCL	9900.000	PK100	proposedC	110100.00	631.49	656.59	641.02	5.59	20035.03	1064.30	0.20
MRCL	9800.000	PK2	existing	46142.00	631.04	647.16	637.28	3.99	11567.86	811.72	0.19
MRCL	9800.000	PK2	proposedC	46142.00	631.04	647.16	637.28	3.99	11567.86	811.72	0.19
MRCL	9800.000	PK25	existing	87780.00	631.04	653.71	639.89	5.18	17339.16	924.77	0.20
MRCL	9800.000	PK25	proposedC	87780.00	631.04	653.71	639.89	5.18	17339.16	924.77	0.20
MRCL	9800.000	PK100	existing	110100.00	631.04	656.55	641.08	5.68	20195.23	1065.35	0.21
MRCL	9800.000	PK100	proposedC	110100.00	631.04	656.55	641.08	5.68	20195.23	1065.35	0.21
MRCL	9700.000	PK2	existing	46142.00	631.34	647.14	637.15	4.02	11471.50	813.78	0.19
MRCL	9700.000	PK2	proposedC	46142.00	631.34	647.14	637.17	4.02	11471.50	813.78	0.19
MRCL	9700.000	PK25	existing	87780.00	631.34	653.69	639.83	5.18	17235.44	977.50	0.20
MRCL	9700.000	PK25	proposedC	87780.00	631.34	653.69	639.83	5.18	17235.44	977.50	0.20
MRCL	9700.000	PK100	existing	110100.00	631.34	656.53	641.02	5.67	20221.16	1139.19	0.21
MRCL	9700.000	PK100	proposedC	110100.00	631.34	656.53	641.04	5.67	20221.16	1139.19	0.21
MRCL	9600.000	PK2	existing	46142.00	631.51	647.11	637.32	4.09	11280.88	799.01	0.19
MRCL	9600.000	PK2	proposedC	46142.00	631.51	647.11	637.32	4.09	11280.88	799.01	0.19
MRCL	9600.000	PK25	existing	87780.00	631.51	653.65	639.98	5.29	17021.06	1026.96	0.21
MRCL	9600.000	PK25	proposedC	87780.00	631.51	653.65	639.98	5.29	17021.06	1026.96	0.21
MRCL	9600.000	PK100	existing	110100.00	631.51	656.49	641.20	5.79	20100.91	1167.76	0.21
MRCL	9600.000	PK100	proposedC	110100.00	631.51	656.49	641.20	5.79	20100.91	1167.76	0.21
MRCL	9500.000	PK2	existing	46142.00	631.84	647.09	637.35	4.09	11276.09	799.66	0.19
MRCL	9500.000	PK2	proposedC	46142.00	631.84	647.09	637.36	4.09	11276.09	799.66	0.19
MRCL	9500.000	PK25	existing	87780.00	631.84	653.63	640.00	5.28	17034.32	1050.41	0.21
MRCL	9500.000	PK25	proposedC	87780.00	631.84	653.63	640.01	5.28	17034.32	1050.41	0.21
MRCL	9500.000	PK100	existing	110100.00	631.84	656.48	641.22	5.77	20163.82	1187.22	0.21
MRCL	9500.000	PK100	proposedC	110100.00	631.84	656.48	641.22	5.77	20163.82	1187.22	0.21
MRCL	9400.000	PK2	existing	46142.00	631.95	647.07	637.36	4.04	11433.98	815.31	0.19
MRCL	9400.000	PK2	proposedC	46142.00	631.95	647.07	637.36	4.04	11433.98	815.31	0.19
MRCL	9400.000	PK25	existing	87780.00	631.95	653.62	639.96	5.21	17347.12	1088.56	0.20
MRCL	9400.000	PK25	proposedC	87780.00	631.95	653.62	639.96	5.21	17347.12	1088.56	0.20
MRCL	9400.000	PK100	existing	110100.00	631.95	656.47	641.14	5.68	20569.44	1209.94	0.21
MRCL	9400.000	PK100	proposedC	110100.00	631.95	656.47	641.14	5.68	20569.44	1209.94	0.21
MRCL	9350.000	PK2	existing	46142.00	631.80	647.06	637.44	4.04	11428.44	819.27	0.19
MRCL	9350.000	PK2	proposedC	46142.00	631.80	647.06	637.44	4.04	11428.44	819.27	0.19
MRCL	9350.000	PK25	existing	87780.00	631.80	653.61	640.02	5.20	17290.10	1097.33	0.20
MRCL	9350.000	PK25	proposedC	87780.00	631.80	653.61	640.03	5.20	17290.10	1097.33	0.20
MRCL	9350.000	PK100	existing	110100.00	631.80	656.46	641.23	5.67	20519.12	1175.20	0.21
MRCL	9350.000	PK100	proposedC	110100.00	631.80	656.46	641.23	5.67	20519.12	1175.20	0.21

PROPOSED FLOOD MAP (WITHIN PROJECT LIMITS)

HEN-IND-0000

Date Saved: 3/31/2014 10:36:12 AM
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0 50 100 200
HORIZONTAL SCALE IN FEET

FLOOD MAP
(WITHIN PROJECT LIMITS)

HEN-IND-0000

Date Saved: 3/31/2014 10:36:12 AM

Document Path: W:\Projects\Projects F-J\H25300002\22984\structures\HENIND_0000\Engapps\GIS\H2530002_FloodMap.mxd

Photo 1: North Bank looking South

Photo 2: North Bank looking North

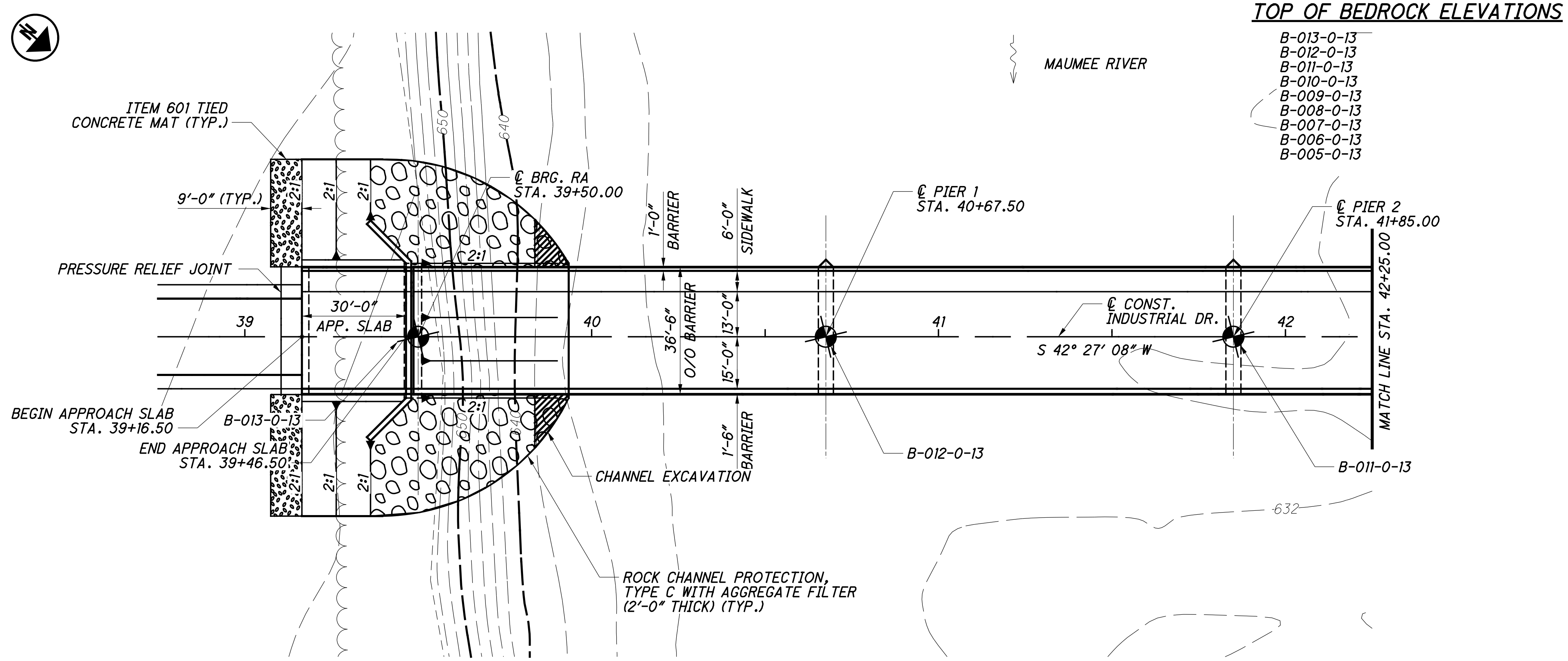
Photo 3: North Bank and Island looking South

Photo 4: South Bank looking North

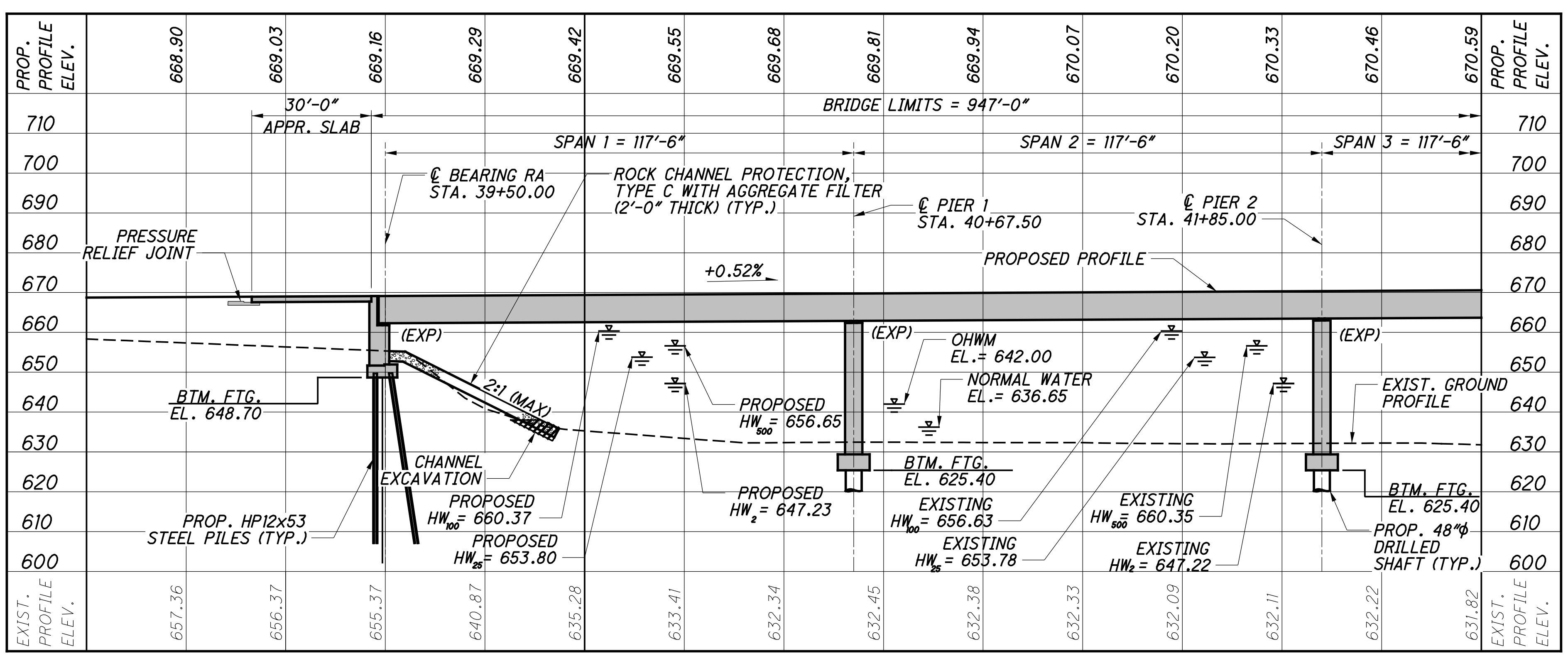
APPENDIX D:
PROJECT PLANS

TOP OF BEDROCK ELEVATIONS

B-013-0-13
B-012-0-13
B-011-0-13
B-010-0-13
B-009-0-13
B-008-0-13
B-007-0-13
B-006-0-13
B-005-0-13



PART PLAN



PART PROFILE ALONG ℄ CONST. INDUSTRIAL DRIVE

BENCHMARK DATA

BM #1 STA. ,	ELEV. ,	OFFSET ,	
BM #2 STA. ,	ELEV. ,	OFFSET ,	
BM #3 STA. ,	ELEV. ,	OFFSET ,	
BM #4 STA. ,	ELEV. ,	OFFSET ,	

NOTES

1. EARTHWORK LIMITS SHOWN ARE APPROXIMATE. ACTUAL SLOPES SHALL CONFORM TO PLAN CROSS SECTIONS.
2. FOR BENCHMARK DESCRIPTIONS SEE ROADWAY PLANS

DESIGN TRAFFIC:
2015 ADT = 7660 2015 ADTT = 690
2015 ADT = 9860 2035 ADTT = 890
DIRECTIONAL DISTRIBUTION = 0.55

LEGEND

BORING LOCATION
- CHANNEL EXCAVATION

HYDRAULIC DATA

DRAINAGE AREA = 5650 SQ. MILES
Q (25) = 87780 CFS V (25) = 5.00 FT/S
Q (100) = 110100 CFS V (100) = 5.49 FT/S
STRUCTURE CLEARS THE 25 YEAR DESIGN HW BY 8.48 FEET.

ESTIMATED PILE PAY LENGTH

REAR ABUTMENT (HP12X53) =
FORWARD ABUTMENT (HP12X53) =

ESTIMATED DRILLED SHAFT PAY LENGTH

48"ϕ =

PROPOSED STRUCTURE

TYPE: EIGHT SPAN COMPOSITE PRESTRESSED I-BEAM SUPERSTRUCTURE WITH REINFORCED CONCRETE DECK SUPPORTED BY REINFORCED CONCRETE ABUTMENTS AND PIERS WITH SLOPED EMBANKMENTS

SPANS: 117'-6", 117'-6", 117'-6", 117'-6", 117'-6", 117'-6", 117'-6", 117'-6"

ROADWAY: VARIABLE WIDTH 34'-0" MIN. TO 38'-10" MAX. TOE/TOE BARRIER WITH 6'-0" SIDEWALK (LEFT SIDE)

LOADING: HL-93 W/60 PSF FUTURE WEARING SURFACE

SKEW: NONE

APPROACH SLABS: 30'-0" LONG (AS-1-81)

ALIGNMENT: TANGENT

CROWN: 0.016 FT/FT

COORDINATES: LATITUDE N 41° 24' 16"
LONGITUDE W 84° 06' 11"

Mannik Smith GROUP
1800 INDIAN WOOD CIRCLE
MAUMEE, OHIO 43537

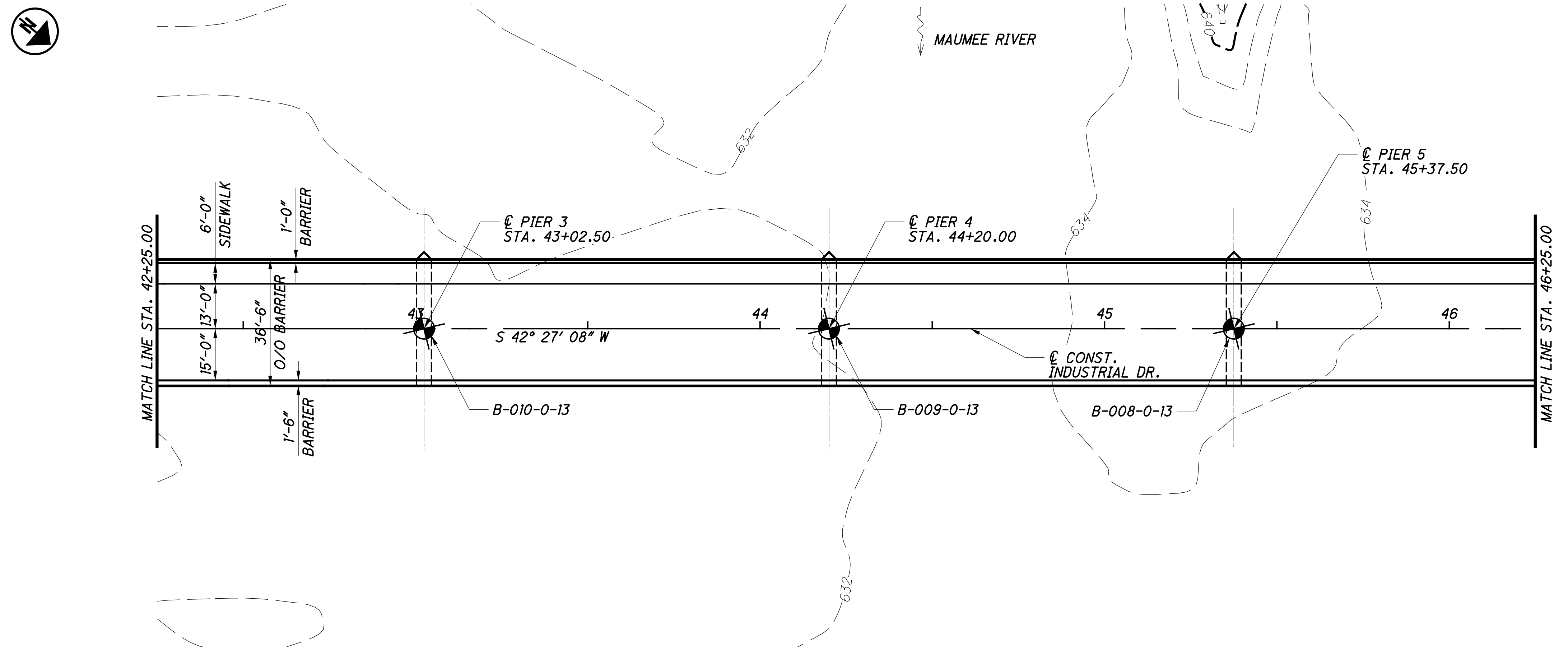
DESIGNED	CHECKED	DRAWN	REVISED	REVIEWED	DATE
KRH	SCT	AMK		BWP	04/2014

STRUCTURE FILE NUMBER

HENRY COUNTY
STA. 39+46.50
STA. 48+93.50

SITE PLAN (ALT. C)
HEN-IND-0000
INDUSTRIAL DRIVE OVER MAUMEE RIVER

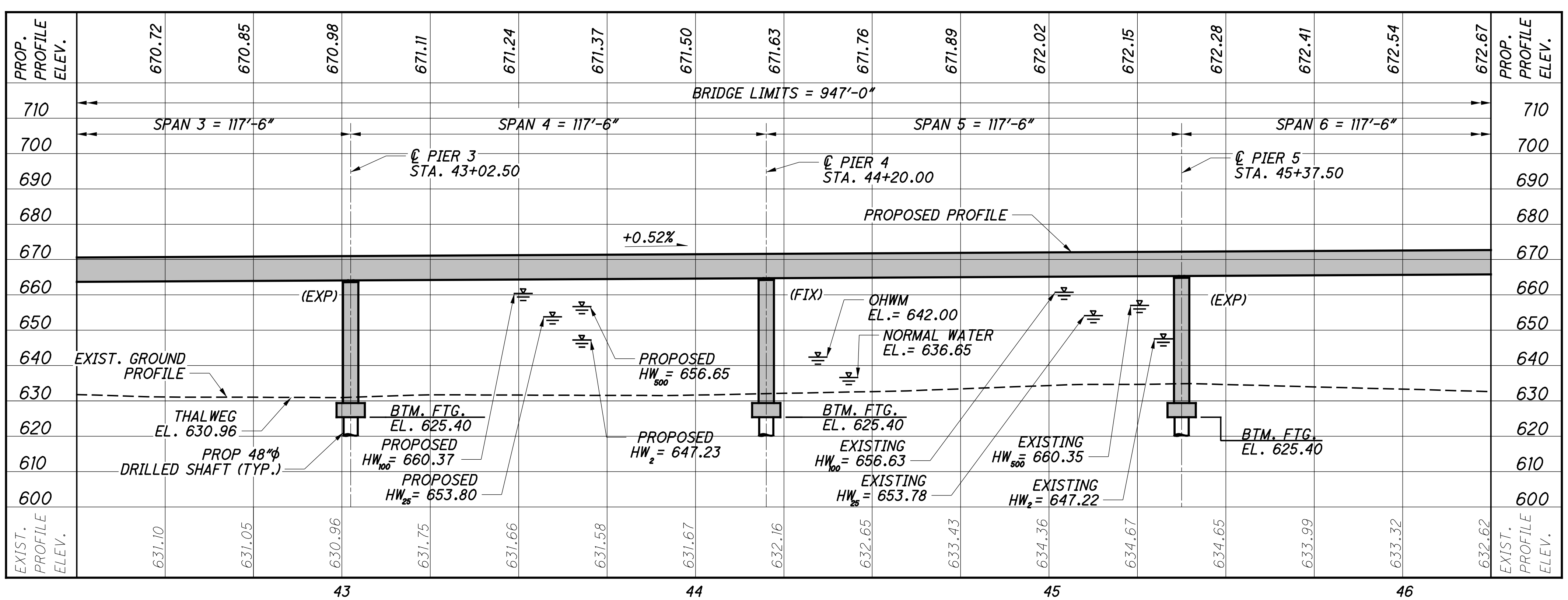
HEN-IND-0000
PID No. 22984



PART PLAN

NOTES

1. FOR PLAN NOTES AND LEGEND SEE SHEET XX/XX



PART PROFILE ALONG ℄ CONST. INDUSTRIAL DRIVE

Mannik Smith GROUP
1800 INDIAN WOOD CIRCLE
MAUMEE, OHIO 43537

DESIGNED	DRAWN	REVIEWED	DATE
KRH	AMK		
CHECKED	REVISED	STRUCTURE FILE NUMBER	
SCT			

HENRY COUNTY
STA. 39+46.50
STA. 48+93.50

SITE PLAN (ALT. C)
HEN-IND-0000
INDUSTRIAL DRIVE OVER MAUMEE RIVER

HEN-IND-0000
PID No. 22984

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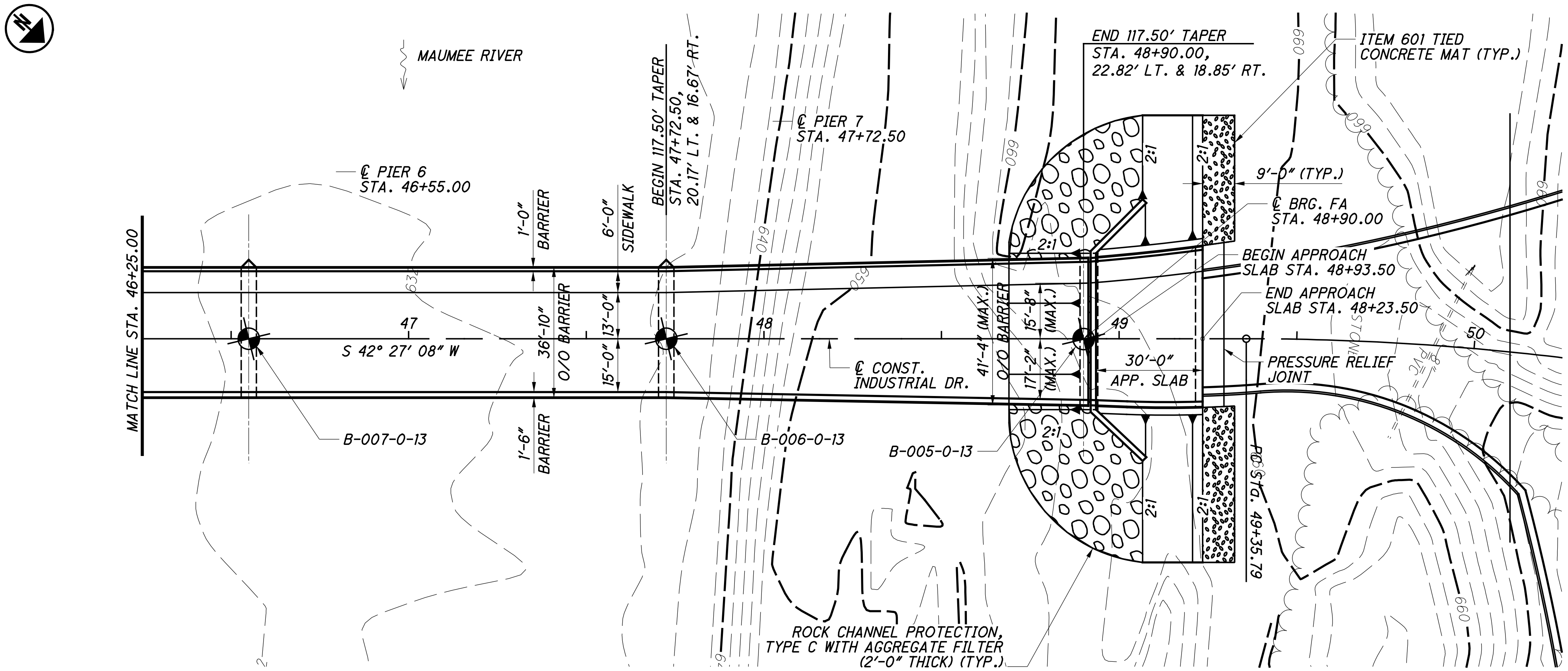
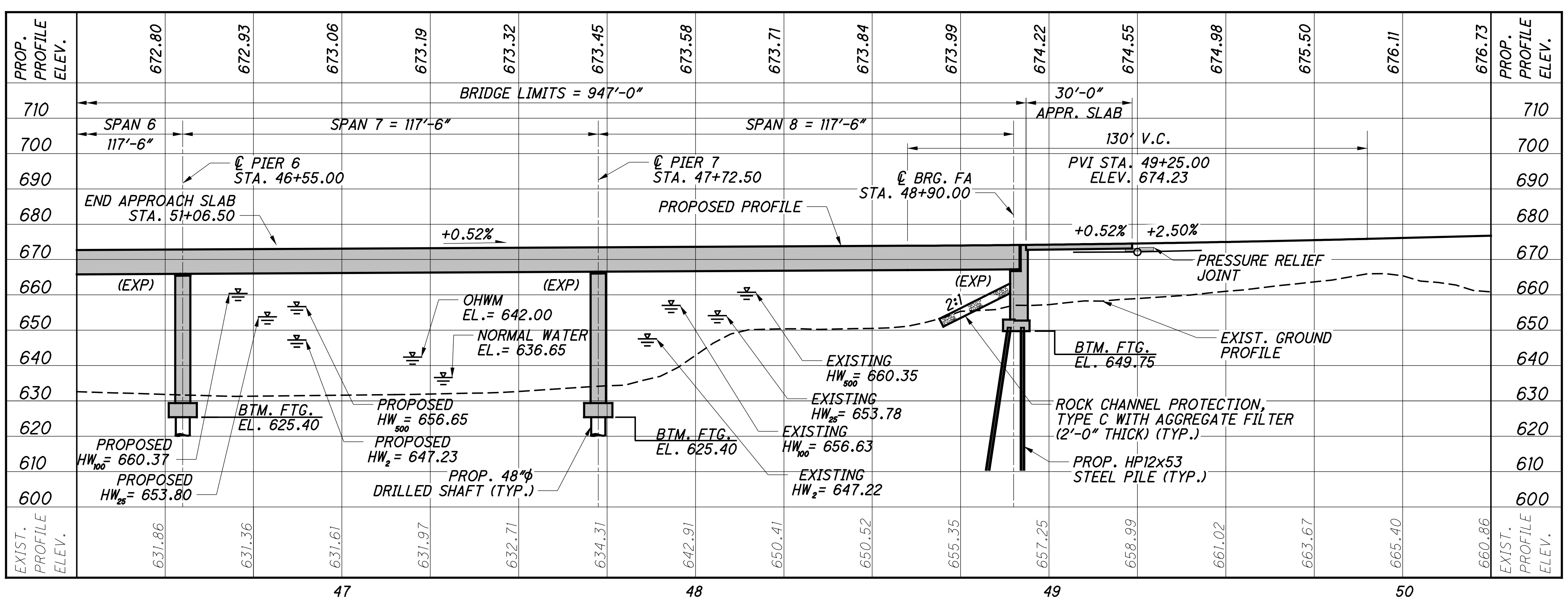
NOTES

1. FOR PLAN NOTES AND LEGEND SEE SHEET XX/XX



PART PLAN



PART PROFILE ALONG ℄ CONST. INDUSTRIAL DRIVE

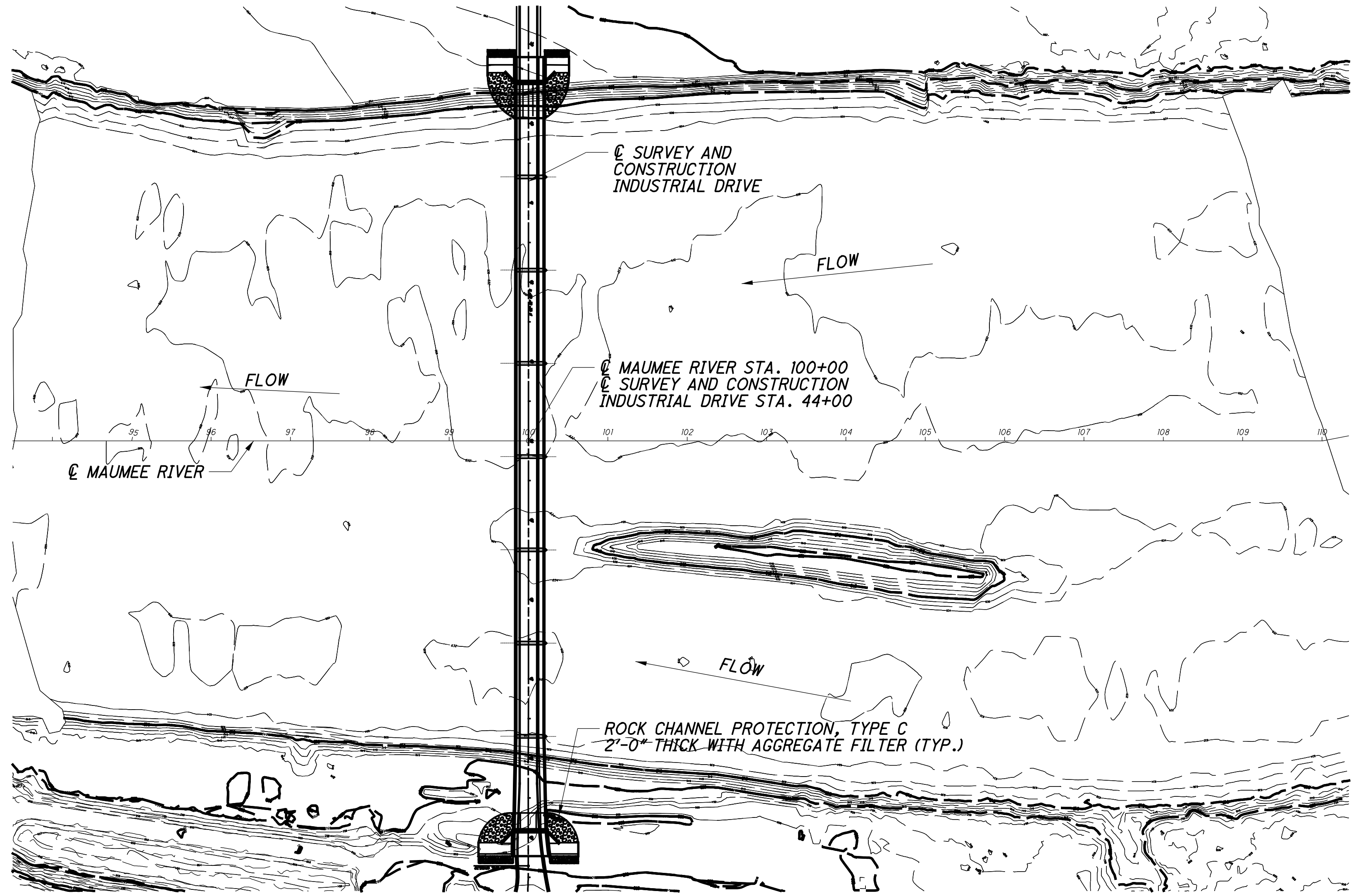
Mannik Smith GROUP
1800 INDIAN WOOD CIRCLE
MAUMEE, OHIO 43537

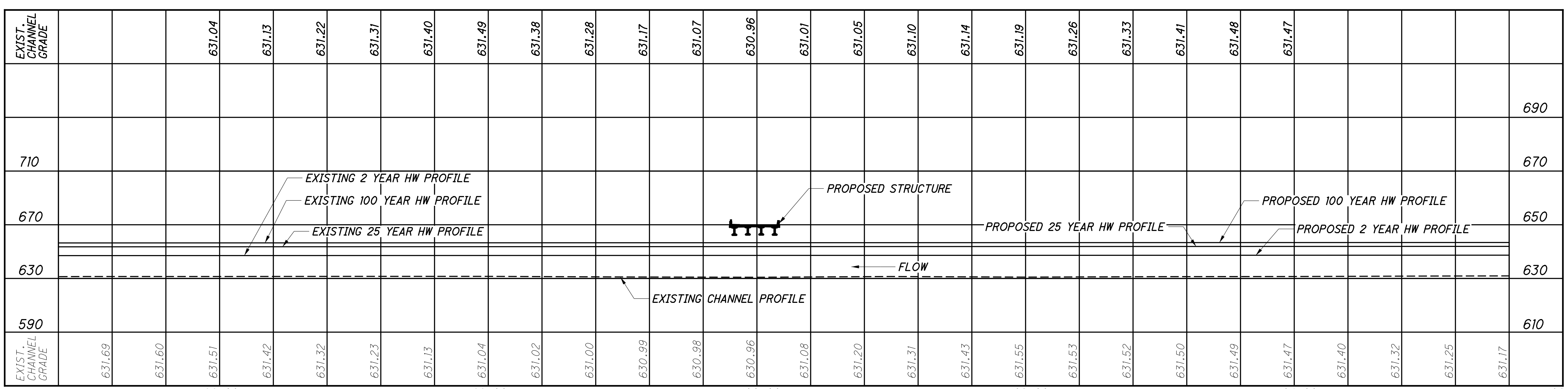
DESIGNED	CHECKED	DRAWN	REVISED	REVIEWED	DATE
KRH	SCT	AMK		BWP	04/2014

STRUCTURE FILE NUMBER

HENRY COUNTY
STA. 39+46.50
STA. 48+93.50

SITE PLAN (ALT. C)
HEN-IND-0000
INDUSTRIAL DRIVE OVER MAUMEE RIVER





HYDRAULIC PROFILE ALONG ℄ OF CHANNEL

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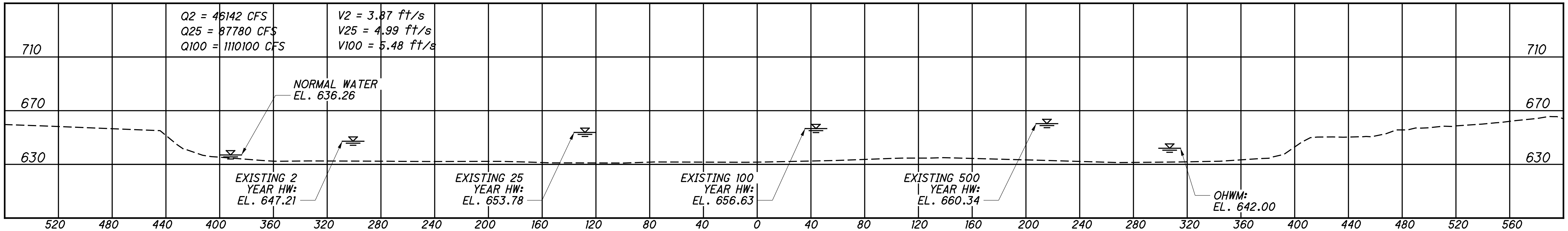
Mannik Smith GROUP
1800 INDIAN WOOD CIRCLE
MAUMEE, OHIO 43537

DESIGNED	DRAWN	REVIEWED	DATE
KRH	KRH	BWP	04/2014
CHECKED	REVISED	STRUCTURE FILE NUMBER	
SCT			

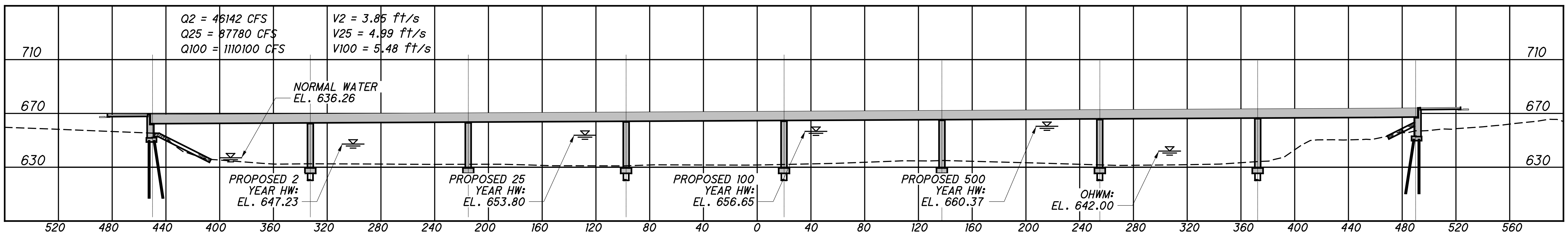
SUPPLEMENTAL SITE PLAN
HEN-INDUSTRIAL DRIVE-0000
INDUSTRIAL DRIVE OVER MAUMEE RIVER

HEN-IND-00.00
PID No. 22984



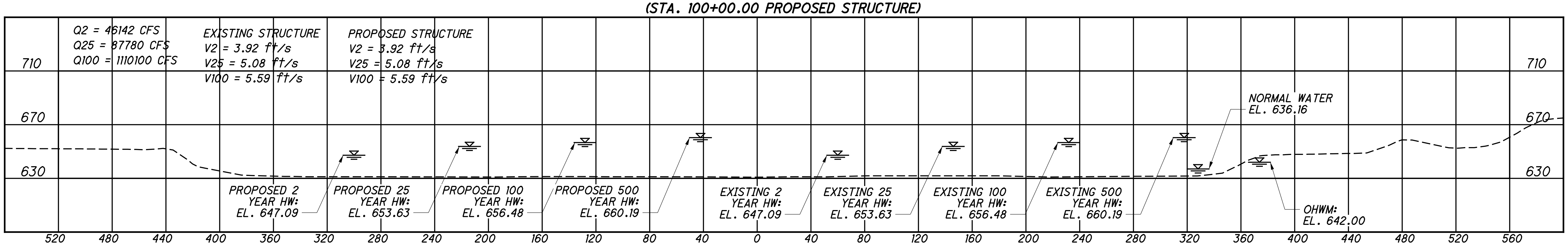
SECTION B-B

(STA. 100+00.00 EXISTING STRUCTURE)



SECTION B-B

(STA. 100+00.00 PROPOSED STRUCTURE)



SECTION A-A

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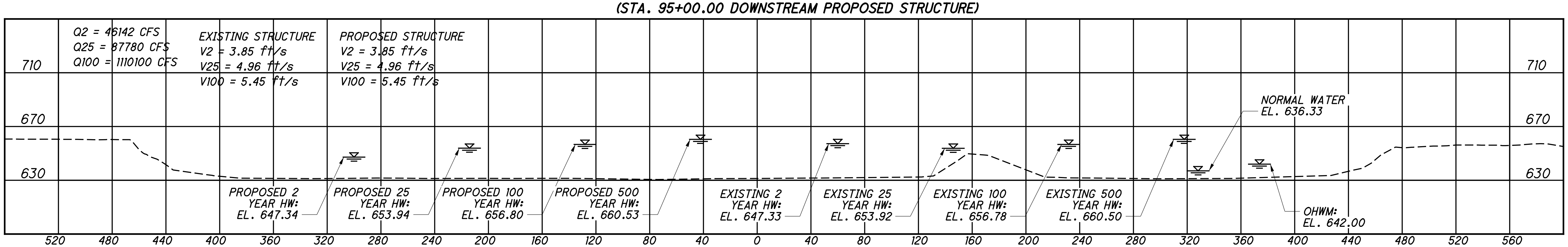


SECTION C-C

(STA. 105+00.00 UPSTREAM PROPOSED STRUCTURE)

NOTE

500 YEAR FLOOD ELEVATION EVALUATED IN LIEU OF HISTORIC HIGH WATER MARK

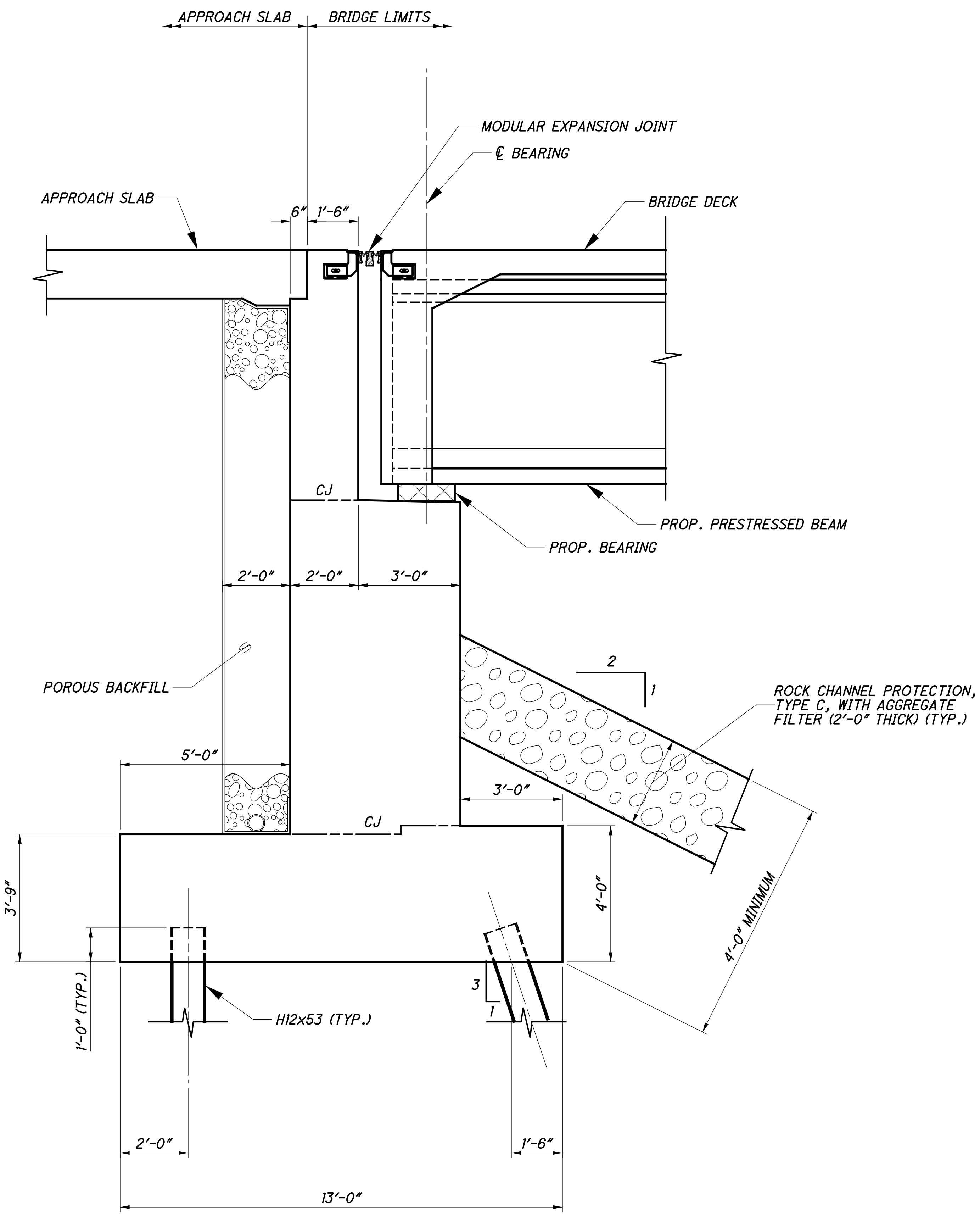
Mannik Smith GROUP
1800 INDIAN WOOD CIRCLE
MAUMEE, OHIO 43537

REVIEWED BWP | DATE 04/2014 | STRUCTURE FILE NUMBER

DESIGNED KRH | DRAWN KRH | REVISED | CHECKED SCT

SUPPLEMENTAL SITE PLAN
HEN-INDUSTRIAL DRIVE-0000
INDUSTRIAL DRIVE OVER MAUMEE RIVER

HEN-IND-00.00
PID No. 22984



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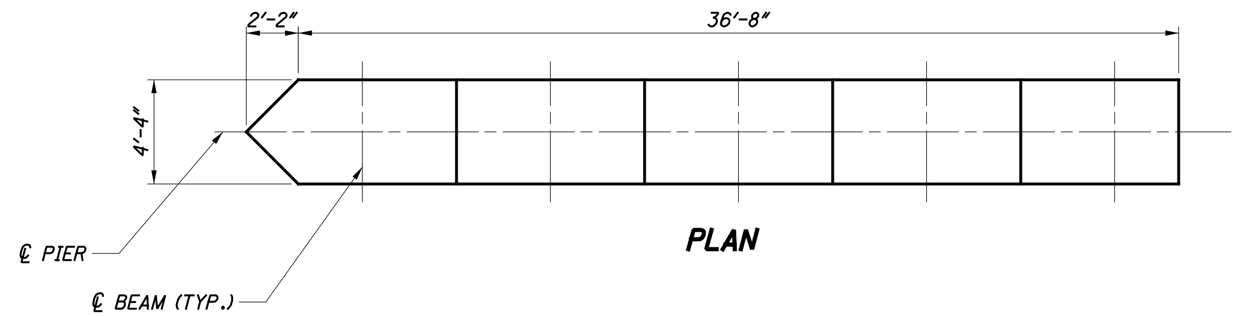
Mannik Smith GROUP
1800 INDIAN WOOD CIRCLE
MAUMEE, OHIO 43537

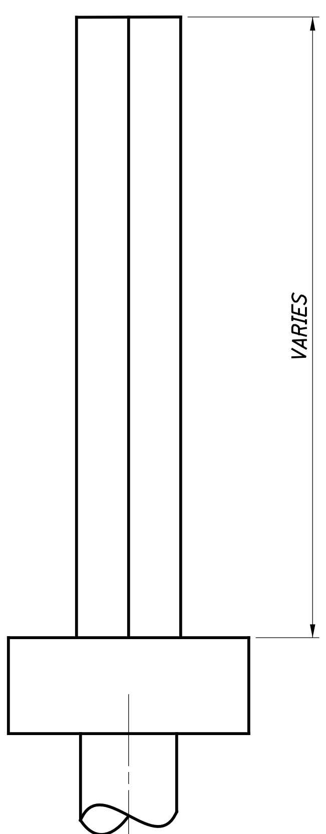
DESIGNED	DRAWN	REVIEWED	DATE
KRH	KRH	BWP	04/2014
CHECKED	REVISED	STRUCTURE FILE NUMBER	
SCT			

ABUTMENT SECTION DETAIL
HEN-INDUSTRIAL DRIVE-0000
INDUSTRIAL DRIVE OVER MAUMEE RIVER

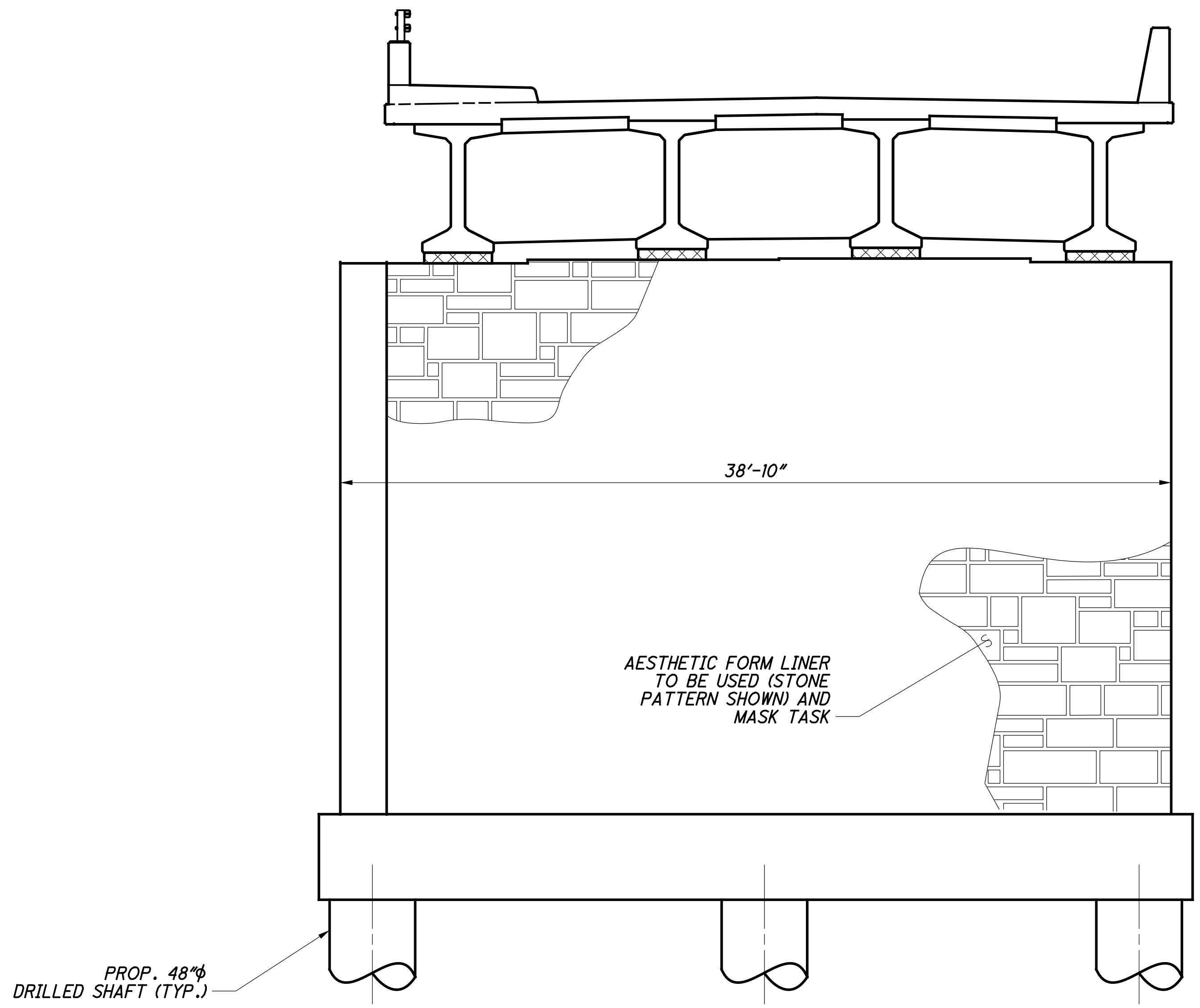
HEN-IND-00.00
PID No. 22984



PLAN



SIDE



ELEVATION

DESIGNED	DRAWN	REVIEWED	DATE
KRH	KRH	BWP	04/2014
CHECKED	REVISED	STRUCTURE FILE NUMBER	
SCT			

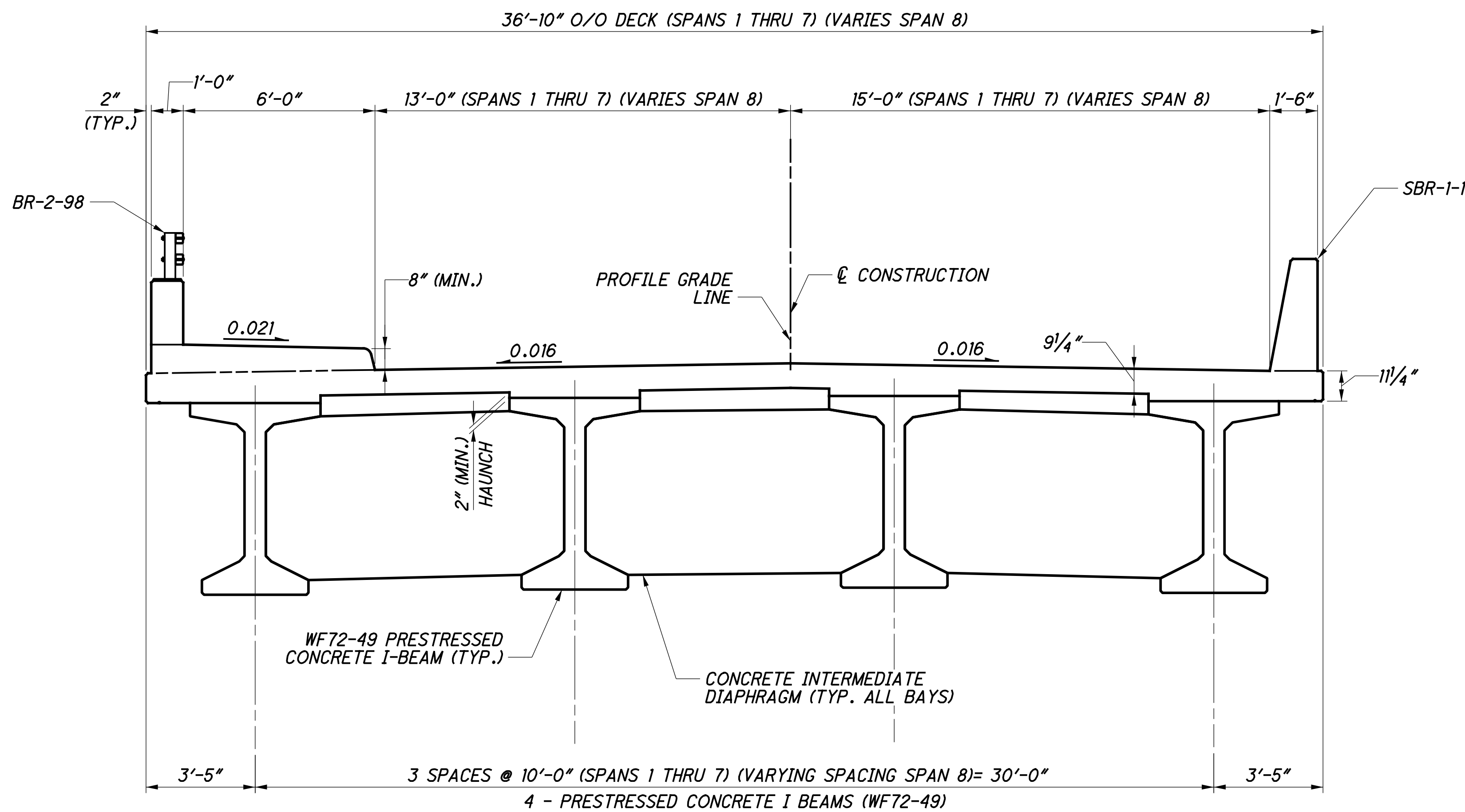
Mannik Smith GROUP
1800 INDIAN WOOD CIRCLE
MAUMEE, OHIO 43537

PIER DETAIL

HEN-INDUSTRIAL DRIVE-0000
INDUSTRIAL DRIVE OVER MAUMEE RIVER

HEN-IND-00.00

PID No. 22984



BRIDGE TYPICAL SECTION

8 SPAN PRESTRESSED CONC. I- BEAM (ALTERNATIVE C)

TRANSVERSE SECTION

HEN-INDUSTRIAL DRIVE-0000

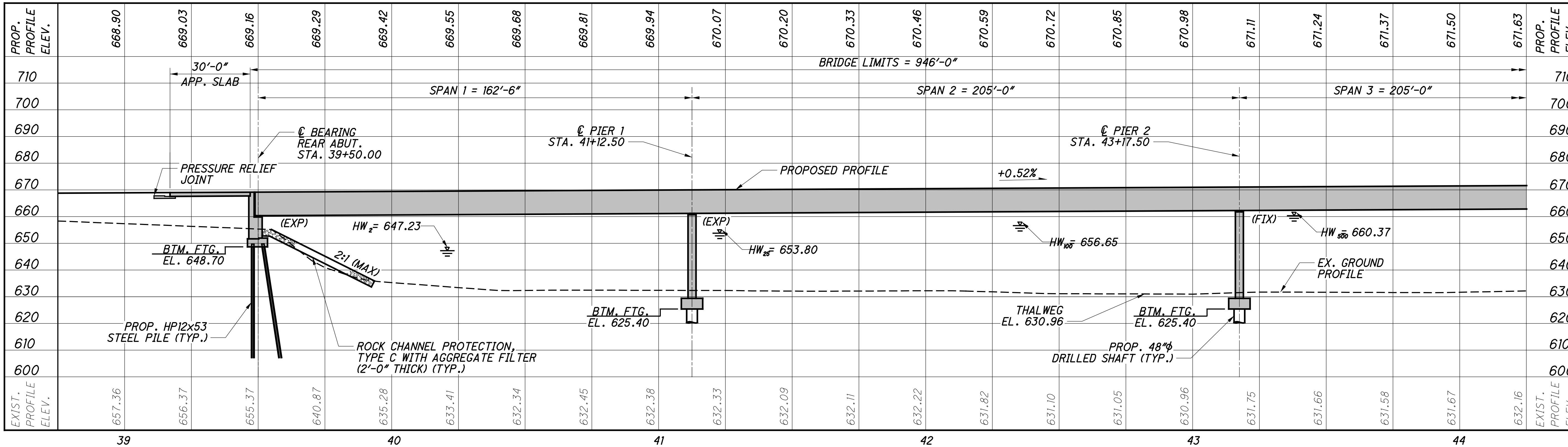
INDUSTRIAL DRIVE OVER MAUMEE RIVER

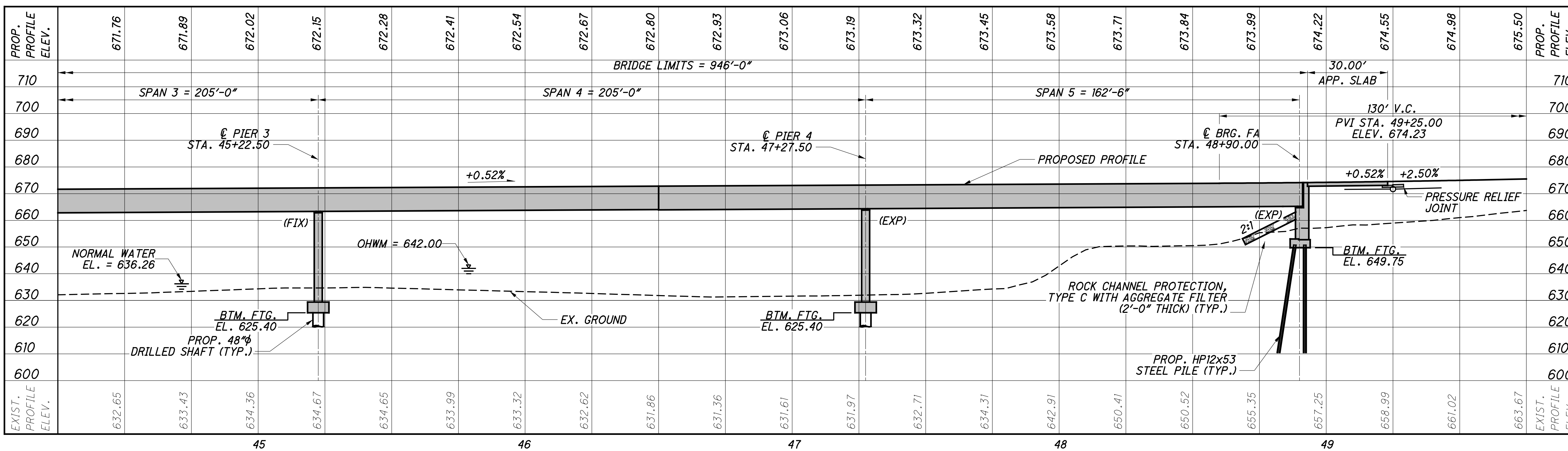
DESIGNED	DRAWN	REVIEWED	DATE
KRH	AMK	BWP	04/2014
CHECKED	REVISED	STRUCTURE FILE NUMBER	
SCT			

Mannik Smith GROUP
1800 INDIAN WOOD CIRCLE
MAUMEE, OHIO 43537

HEN-IND-0000

PID No. 22984





PROFILE ALONG ℄ CONST. INDUSTRIAL DRIVE

1800 INDIAN WOOD CIRCLE
MAUMEE, OHIO 43537

DESIGNED	DRAWN	REVIEWED	DATE
KRH	AMK	BWP	04/2014
CHECKED	REVISED	STRUCTURE FILE NUMBER	
SCT			

HENRY COUNTY
STA. 39+47.00
STA. 48+93.50

5 SPAN STEEL GIRDER (ALT. A)
HEN-IND-0000
INDUSTRIAL DRIVE OVER MAUMEE RIVER

HEN-IND-0000
PID No. 22984

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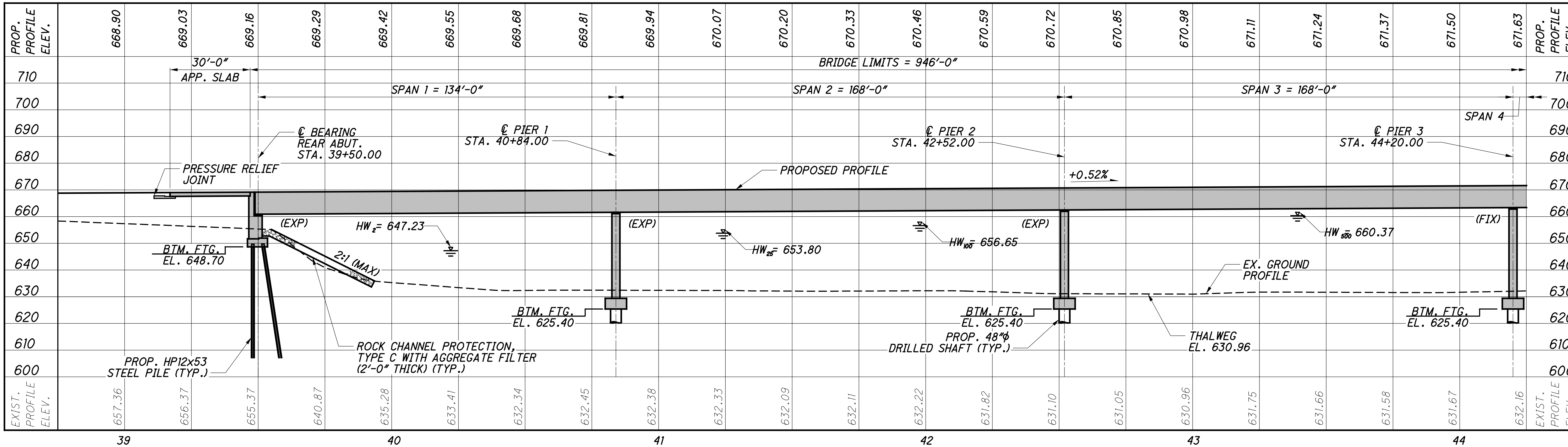
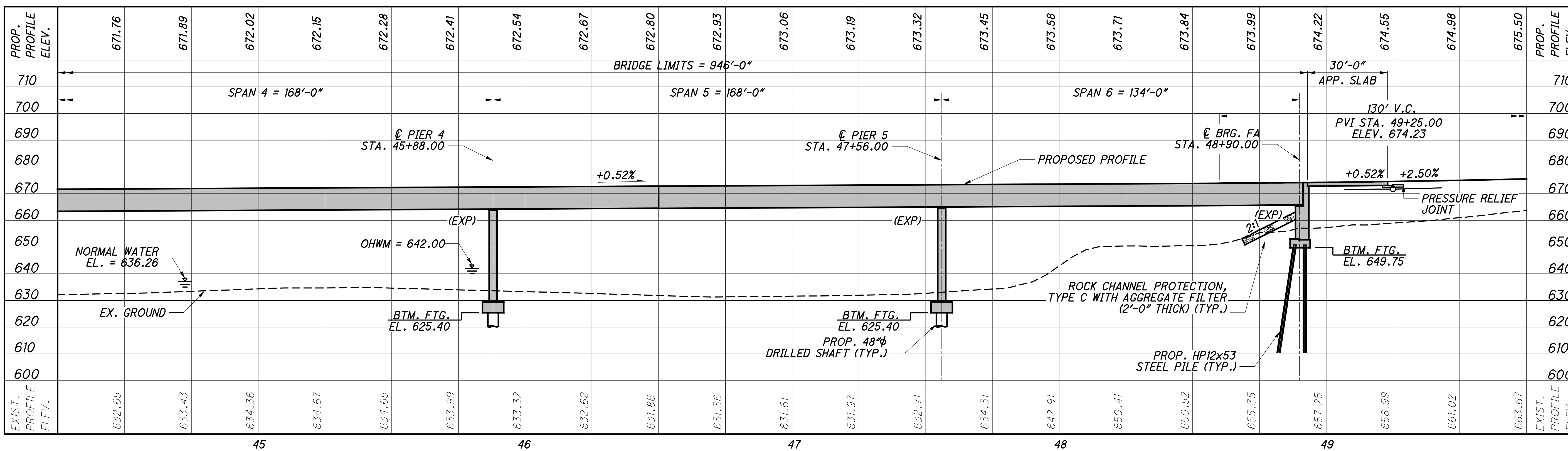




PROFILE ALONG ℄ CONST. INDUSTRIAL DRIVE

W:\Projects\Projects F-J\H2530002\22984\structures\HENIND_0000\Sheets\IND_0000CPROF_ALT_B.DGN 6/29/2014 2:24:34 PM

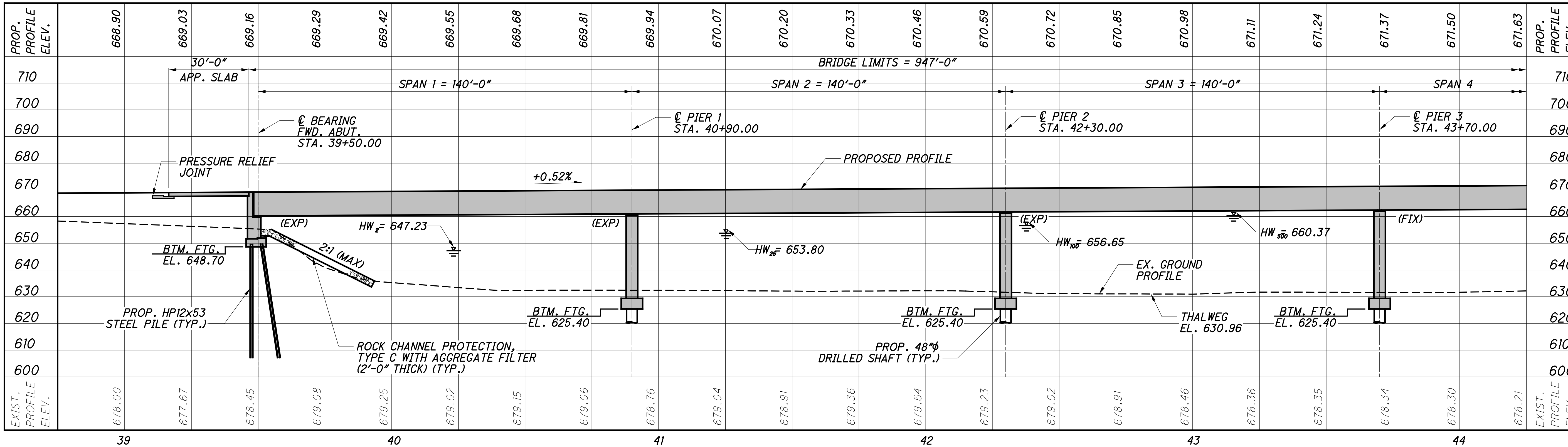
Mannik Smith GROUP
1800 INDIAN WOOD CIRCLE MAUMEE, OHIO 43537

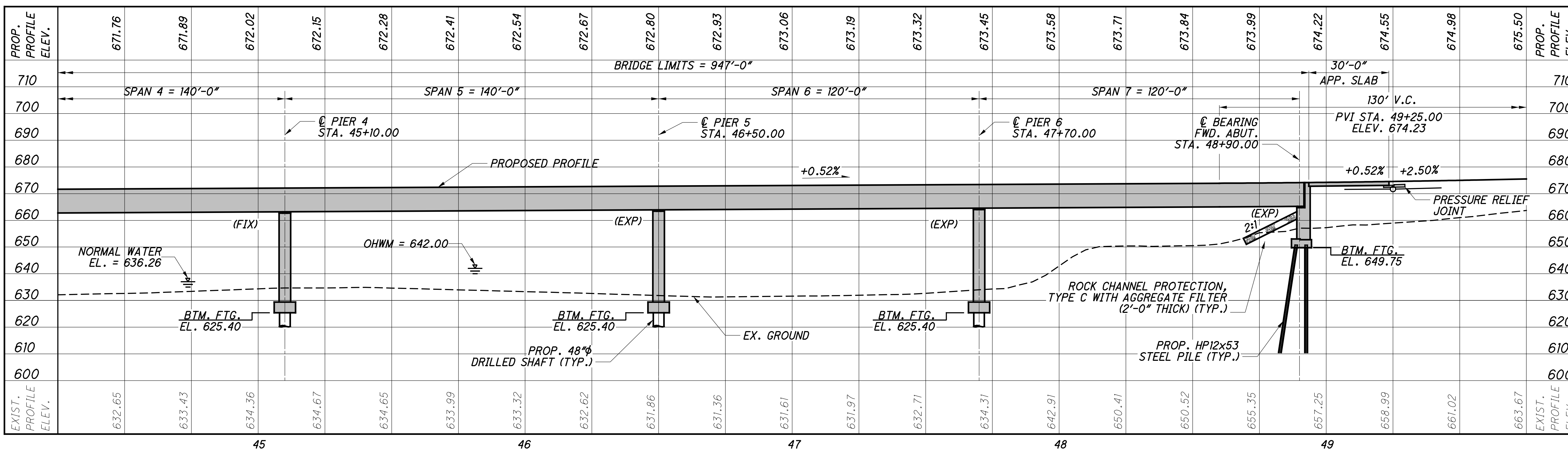
DESIGNED	DRAWN	REVIEWED	DATE
KRH	AMK	BWP	04/2014
CHECKED	REVISED	STRUCTURE FILE NUMBER	
SCT			

HENRY COUNTY
STA. 39+47.00
STA. 48+93.00

6 SPAN STEEL GIRDER (ALT. B)
HEN-IND-0000
INDUSTRIAL DRIVE OVER MAUMEE RIVER

HEN-IND-0000
PID No. 22984





PROFILE ALONG ℄ CONST. INDUSTRIAL DRIVE

W:\Projects\Projects F-J\H2530002\22984\structures\HENIND_0000\Sheets\IND_0000CPROF_ALT_D.DGN 6/29/2014 2:24:35 PM

Mannik Smith GROUP
1800 INDIAN WOOD CIRCLE MAUMEE, OHIO 43537

DESIGNED	DRAWN	REVIEWED	DATE
KRH	AMK	BWP	04/2014
CHECKED	REVISED	STRUCTURE FILE NUMBER	
SCT			

HENRY COUNTY
STA. 51+10.00
STA. 60+50.00

7 SPAN PRESTRESSED BEAM (ALT. D)
HEN-IND-0000
INDUSTRIAL DRIVE OVER MAUMEE RIVER

HEN-IND-0000
PID No. 22984