

This analysis examines the hydraulic impacts of the temporary causeway and cofferdams used for the construction of the proposed IL 178 bridge over the Illinois River (S.N. 050-0256) and the temporary causeway used for the demolition of the existing IL 178 bridge over the Illinois River (S.N. 050-0088). The existing bridge is a seven-span bridge with a back-to-back length of 1158 ft and the proposed bridge is a three-span bridge with a back-to-back length of 1158 ft. The bridge crossing is located approximately 0.89 miles south of Utica, IL in LaSalle County.

A. CONSTRUCTION TIMEFRAME

During the construction stage, a temporary causeway will be built for the construction of the proposed bridge and cofferdams will be placed for the construction of the two proposed piers. Work on the construction causeway is expected to begin on April 1, 2017 and work on both cofferdams is expected to begin on June 2017. The proposed bridge is scheduled to be completed and open to traffic on November 2018.

During the demolition stage, a temporary causeway will be built for the removal of the existing structure. At this point, the construction causeway will no longer be needed and will not be in place. Work on the demolition causeway is expected to begin on November 2018 and the job completed on April 2019.

Causeway plan sheets for the construction and demolition stages are shown in Appendix A.

B. SENSITIVE FLOOD RECEPTORS

At the project location, the floodplain is a Zone AE. The 100-yr floodplain extends to the Starved Rock State Park to the south and north of the abandoned Illinois and Michigan Canal to the north. Several structures north of the Illinois River were built in the floodplain.

The low entry elevations of sensitive flood receptors at or near the floodplain were surveyed. A selected list of these sensitive flood receptors and their low entry elevations includes: (1) a strip mall west of IL 178, across from the Utica Car Wash (463.79 ft); (2) a house on 502 Clark Street (462.19 ft); (3) the Knights of Columbus building (463.32 ft); (4) the Village Hall (466.33 ft); and several properties north of Donaldson Street including, (5) Stonehead Leather Goods on 627 Clark Street (464.32 ft); (6) Village Green House Liquor Shop on 611 Clark Street (464.62 ft); (7) Mix's Trading Post on 602 Clark Street (463.96 ft); and (8) Nonies Bakery on 522 Clark Street (463.43 ft).

C. HYDRAULIC MODELING AND RESULTS

The worst-case modeling scenario includes all 6 existing and 2 proposed piers in place during construction and demolition activities. The HEC-RAS analysis includes two separate worst case scenarios as follows: (1) Plan *Proposed-D – Construction Stage*, which includes all piers, the construction causeway, and cofferdams, and (2) Plan *Proposed-D – Demolition Stage*, which includes all piers and the demolition causeway. The existing and proposed bridges are in close proximity and were modeled as a single bridge reflecting the total out-to-out width of both structures.

To model the temporary causeways, two additional cross sections were interpolated, one at the upstream face of the construction causeway (RS 229.62) and one at the downstream face of the demolition causeway (RS 229.583). The causeways were modeled as obstructions with a top elevation of 452.0 ft, which corresponds to the typical top elevation of the causeways as noted on the plans. The station of the obstruction extent into the channel corresponds to the midpoint of each causeway's 1:1 embankment slope at each end. With the construction causeway in place, the main channel narrows to 458 ft. With the demolition causeway in place, the main channel narrows to 377 ft.

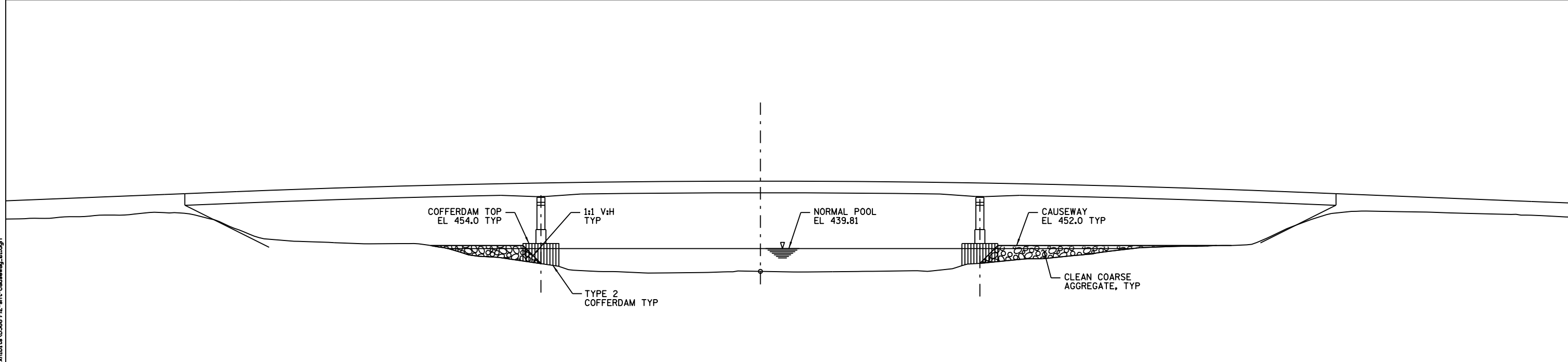
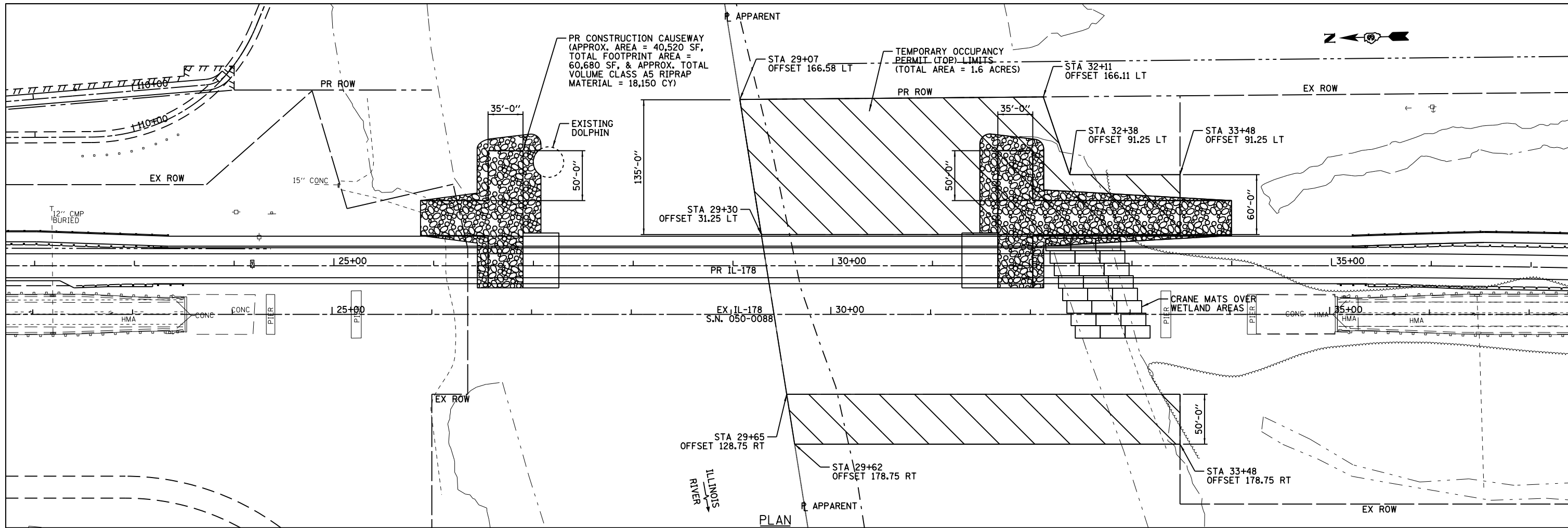
The cofferdams for the construction stage were also modeled as obstructions and have a top elevation of 454.0 ft as noted on the plans. The width of each cofferdam is calculated by adding 2 ft on each side of the 24 ft wide pier footing and up to 1.5 ft on each side for the effective wall thickness of the sheet piling, for a total obstruction width of 31 ft.

The construction stage modeling shows increases in water surface elevation of up to 0.20 ft within 1000 ft upstream of the structure for Q_{100} , compared to existing conditions, and 0.19 ft 1000 ft upstream of the structure. The demolition stage modeling shows increases in water surface elevation of up to 0.19 ft within 1000 ft upstream of the structure for Q_{100} , compared to existing conditions, and 0.18 ft 1000 ft upstream of the structure. The results show that the majority of the sensitive flood receptors would flood under natural conditions, and a few structures such as the Village Hall may get additional flooding during the 100-year storm event in the worst case scenario during the construction and demolition stages.

The HEC-RAS output is summarized in Appendix B-1 and B-2 for the construction and demolition stages, respectively. The Waterway Information Tables for both stages are provided in Appendix C.

APPENDIX A

PLAN SHEETS – PROPOSED CAUSEWAY CONSTRUCTION
STAGE AND DEMOLITION STAGE



NOTES:
 SHOULD THE CONTRACTOR DESIRE TO SIGNIFICANTLY DEVIATE FROM THE CAUSEWAY
 PLANS, THEN FULL DESIGN DETAILS INCLUDING LOCATION, MATERIAL SPECIFICATIONS,
 AND HYDRAULIC ANALYSIS SHOULD BE INCLUDED IN A REQUEST TO THE ARMY CORPS
 OF ENGINEERS. REQUESTS SHALL BE MADE TO UNITED STATES ARMY CORPS OF
 ENGINEERS, ROCK ISLAND DISTRICT, CLOCK TOWER BUILDING, ROCK ISLAND, IL 61204.

FILE NAME = T:\1687788 - IL178 Phase 2\Civil\Exhibits\0366992-ahc-causeway_01.dgn

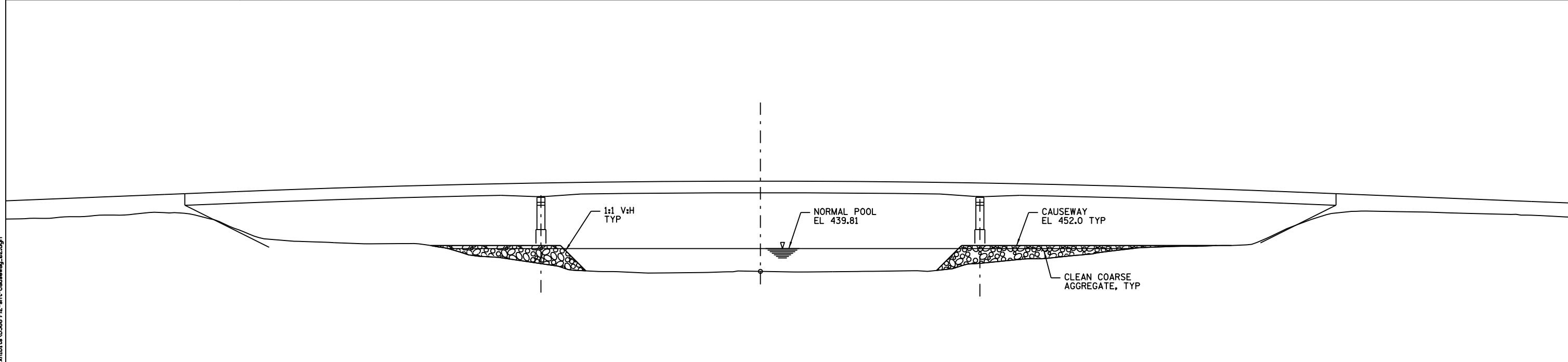
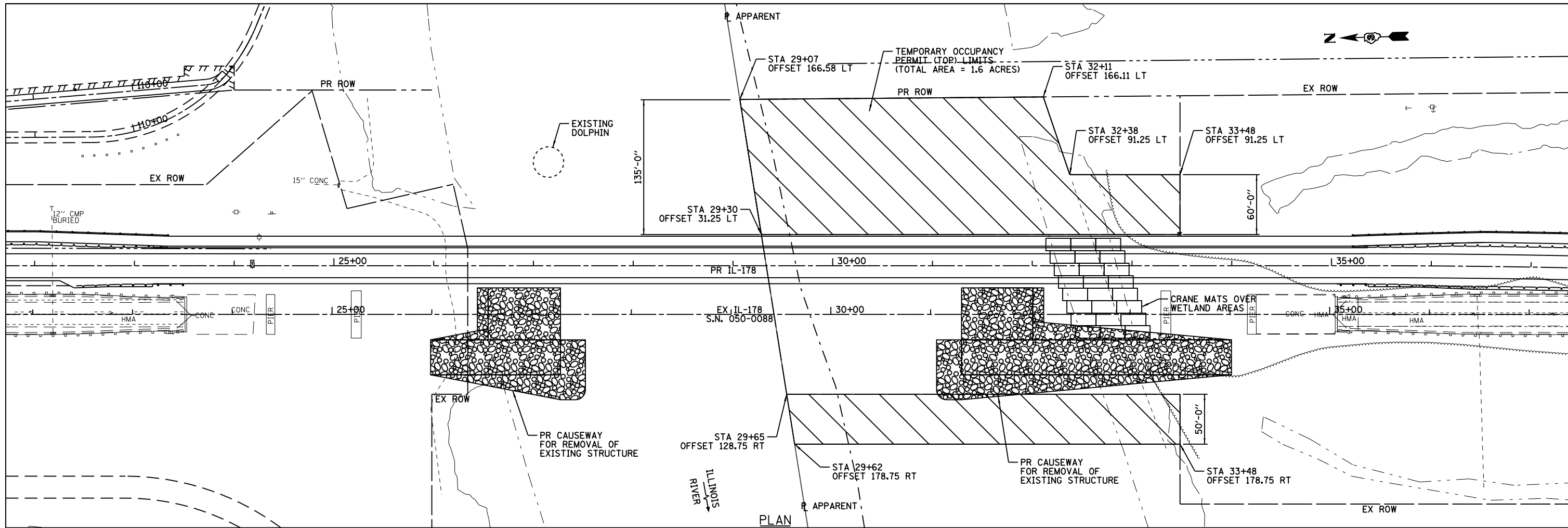
WSP PARSONS BRINCKERHOFF
 30 North LaSalle Street, Suite 4200
 Chicago, IL 60602
 (312) 782-8150 FAX# (312) 782-1684

USER NAME = lanes	DESIGNED -	REVISED -
PLOT SCALE = 100.0000' / 1"	DRAWN -	REVISED -
PLOT DATE = 27-SEP-2016	CHECKED -	REVISED -
	DATE -	REVISED -

STATE OF ILLINOIS
 DEPARTMENT OF TRANSPORTATION

S.N. 050-0088 CAUSEWAY PLAN AND PROFILE CONSTRUCTION STAGE			
SCALE: 1" = 50'	SHEET NO.	OF SHEETS	STA. TO STA.

F.A.S. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
1279	(1) BR & I	LASALLE		
CONTRACT NO. 66992				
ILLINOIS FED. AID PROJECT P-93-035-01				



NOTES:
 SHOULD THE CONTRACTOR DESIRE TO SIGNIFICANTLY DEVIATE FROM THE CAUSEWAY PLANS, THEN FULL DESIGN DETAILS INCLUDING LOCATION, MATERIAL SPECIFICATIONS, AND HYDRAULIC ANALYSIS SHOULD BE INCLUDED IN A REQUEST TO THE ARMY CORPS OF ENGINEERS. REQUESTS SHALL BE MADE TO UNITED STATES ARMY CORPS OF ENGINEERS, ROCK ISLAND DISTRICT, CLOCK TOWER BUILDING, ROCK ISLAND, IL 61204.

FILE NAME = T:\168788 - IL178 Phase 2\Civil\Exhibits\0366992-shr-causeway_02.dgn

WSP PARSONS BRINCKERHOFF
 30 North LaSalle Street, Suite 4200
 Chicago, IL 60602
 (312) 782-8150 FAX# (312) 782-1684

USER NAME = lanes	DESIGNED -	REVISED -
PLOT SCALE = 100.0000' / 1"	DRAWN -	REVISED -
PLOT DATE = 27-SEP-2016	CHECKED -	REVISED -
	DATE -	REVISED -

**STATE OF ILLINOIS
 DEPARTMENT OF TRANSPORTATION**

S.N. 050-0088 CAUSEWAY PLAN AND PROFILE DEMOLITION STAGE			
SCALE: 1" = 50'	SHEET NO.	OF SHEETS	STA. TO STA.

F.A.S. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
1279	(1) BR & I	LASALLE		
CONTRACT NO. 66992			ILLINOIS FED. AID PROJECT P-93-035-01	

APPENDIX B-1

HEC-RAS OUTPUT - CONSTRUCTION STAGE

PROJECT DATA
 Project Title: IL 178 over Illinois River
 Project File : IL178.prj
 Run Date and Time: 9/29/2016 7:13:22 AM

Project in English units

Profile Output Table - Standard Table 1

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude #	Chl
Main	230.23	10 YR	94000.00	425.97	462.24	441.93	462.40	0.000042	3.87	37895.83	5363.07		0.13
Main	230.23	50 YR	124000.00	425.97	465.69	443.74	465.84	0.000038	3.95	73271.38	6357.01		0.12
Main	230.23	100 YR	137000.00	425.97	466.94	444.40	467.09	0.000038	4.06	81282.88	6437.33		0.13
Main	230.23	500 YR	163000.00	425.97	469.10	445.63	469.26	0.000040	4.32	95454.53	6757.34		0.13
Main	229.84	10 YR	94000.00	426.13	462.01	440.09	462.28	0.000057	4.37	32266.54	4726.24		0.15
Main	229.84	50 YR	124000.00	426.13	465.40	442.38	465.71	0.000059	4.82	44070.35	5844.62		0.15
Main	229.84	100 YR	137000.00	426.13	466.64	443.28	466.97	0.000060	4.96	50282.26	5900.17		0.16
Main	229.84	500 YR	163000.00	426.13	468.79	444.95	469.13	0.000061	5.24	61134.13	6010.97		0.16
Main	229.65	10 YR	94000.00	426.19	461.91	440.80	462.22	0.000064	4.52	23381.76	4015.56		0.16
Main	229.65	50 YR	124000.00	426.19	465.22	442.82	465.64	0.000074	5.25	28301.80	5892.28		0.17
Main	229.65	100 YR	137000.00	426.19	466.44	443.63	466.89	0.000076	5.50	33764.45	5980.79		0.18
Main	229.65	500 YR	163000.00	426.19	468.55	445.19	469.05	0.000080	5.88	43486.99	6134.35		0.18
Main	229.62	10 YR	94000.00	426.02	461.77	439.93	462.20	0.000102	5.25	19849.19	3833.63		0.19
Main	229.62	50 YR	124000.00	426.02	465.06	442.14	465.61	0.000114	6.05	23627.85	5791.12		0.20
Main	229.62	100 YR	137000.00	426.02	466.25	443.06	466.86	0.000119	6.35	28385.23	5876.75		0.21
Main	229.62	500 YR	163000.00	426.02	468.36	444.77	469.02	0.000121	6.73	37713.34	6028.01		0.21
Main	229.605	10 YR	94000.00	425.94	461.71	439.47	462.18	0.000125	5.57	18385.29	3854.10		0.20
Main	229.605	50 YR	124000.00	425.94	464.97	441.89	465.60	0.000138	6.39	21744.07	5874.47		0.22
Main	229.605	100 YR	137000.00	425.94	466.16	442.88	466.85	0.000143	6.72	26188.39	5960.75		0.23
Main	229.605	500 YR	163000.00	425.94	468.28	444.73	469.01	0.000145	7.09	35546.94	6114.51		0.23
Main	229.60		Bridge										
Main	229.595	10 YR	94000.00	424.92	461.70	438.68	462.01	0.000057	4.49	22411.11	4420.82		0.15
Main	229.595	50 YR	124000.00	424.92	464.95	440.92	465.38	0.000068	5.29	25772.07	5794.06		0.17
Main	229.595	100 YR	137000.00	424.92	466.13	441.77	466.61	0.000073	5.61	30148.54	5899.51		0.17
Main	229.595	500 YR	163000.00	424.92	468.22	443.34	468.76	0.000079	6.07	39435.12	6021.08		0.18
Main	229.583	10 YR	94000.00	425.20	461.68	439.02	462.01	0.000060	4.59	22777.21	2974.19		0.15
Main	229.583	50 YR	124000.00	425.20	464.93	441.25	465.37	0.000071	5.38	26431.54	5747.53		0.17
Main	229.583	100 YR	137000.00	425.20	466.11	442.11	466.60	0.000076	5.71	30791.34	5838.37		0.18
Main	229.583	500 YR	163000.00	425.20	468.20	443.73	468.75	0.000082	6.15	40139.95	5958.83		0.18
Main	229.56	10 YR	94000.00	425.75	461.68	439.24	461.99	0.000059	4.53	24185.41	2570.35		0.15
Main	229.56	50 YR	124000.00	425.75	464.94	441.48	465.35	0.000069	5.26	28453.21	4542.58		0.17
Main	229.56	100 YR	137000.00	425.75	466.12	442.33	466.58	0.000073	5.57	30013.64	5069.14		0.17
Main	229.56	500 YR	163000.00	425.75	468.18	443.96	468.74	0.000083	6.17	32752.12	5288.21		0.19
Main	229.38	10 YR	94000.00	425.15	461.67	437.79	461.93	0.000047	4.09	29681.85	7741.58		0.14
Main	229.38	50 YR	124000.00	425.15	464.94	439.86	465.27	0.000054	4.74	35944.84	7798.42		0.15
Main	229.38	100 YR	137000.00	425.15	466.12	440.71	466.49	0.000058	5.01	38224.43	7819.05		0.15
Main	229.38	500 YR	163000.00	425.15	468.19	442.32	468.63	0.000065	5.53	42212.78	7855.08		0.17
Main	228.32	10 YR	94000.00	428.32	461.55	439.89	461.65	0.000025	2.88	70050.67	7561.67		0.10
Main	228.32	50 YR	124000.00	428.32	464.85	441.62	464.95	0.000024	3.05	95070.36	7601.69		0.10
Main	228.32	100 YR	137000.00	428.32	466.05	442.28	466.15	0.000024	3.13	104201.00	7616.25		0.10
Main	228.32	500 YR	163000.00	428.32	468.15	443.53	468.26	0.000025	3.31	120221.90	7641.72		0.10

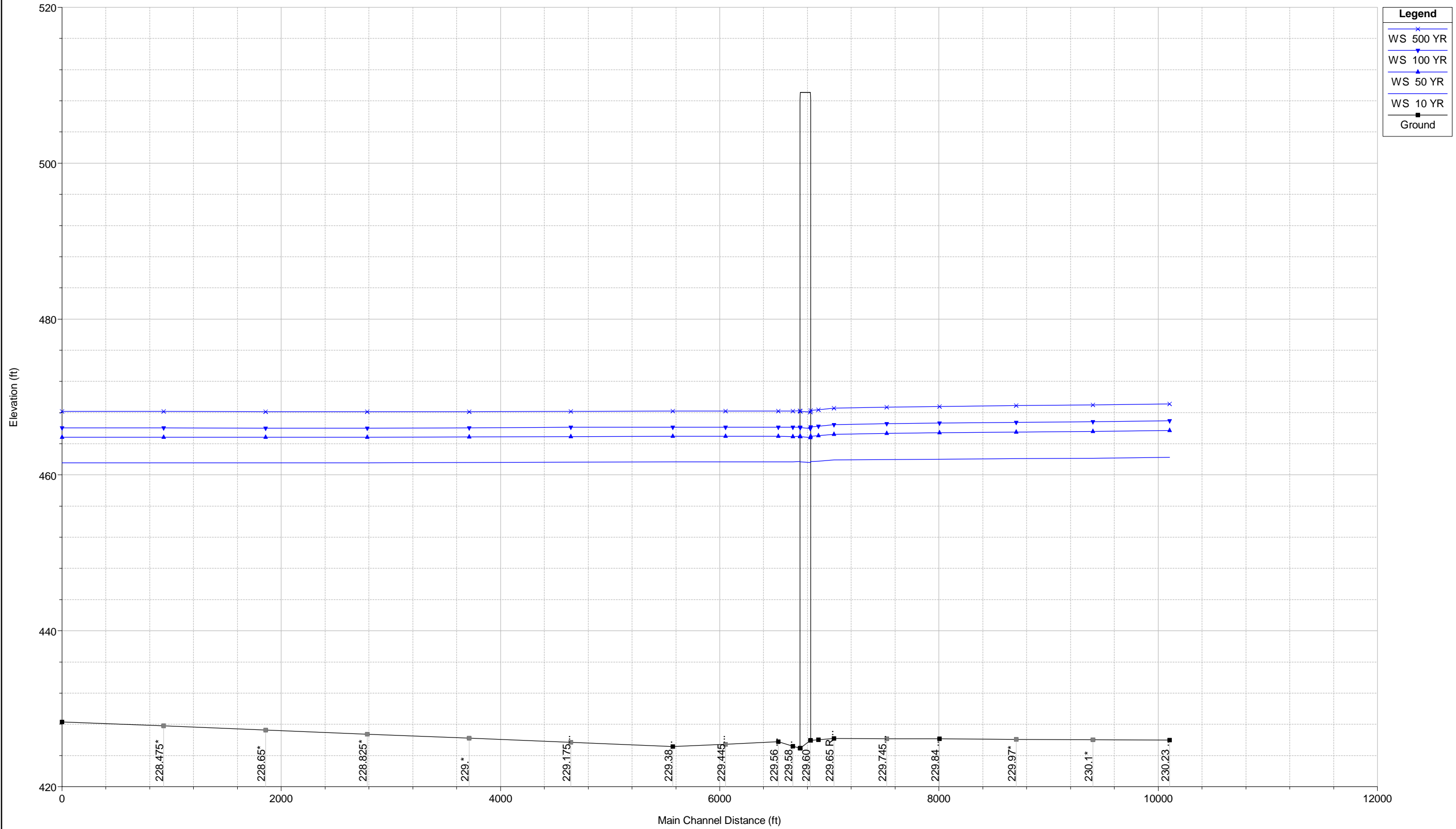
PROJECT DATA
 Project Title: IL 178 over Illinois River
 Project File : IL178.prj
 Run Date and Time: 9/29/2016 7:13:22 AM

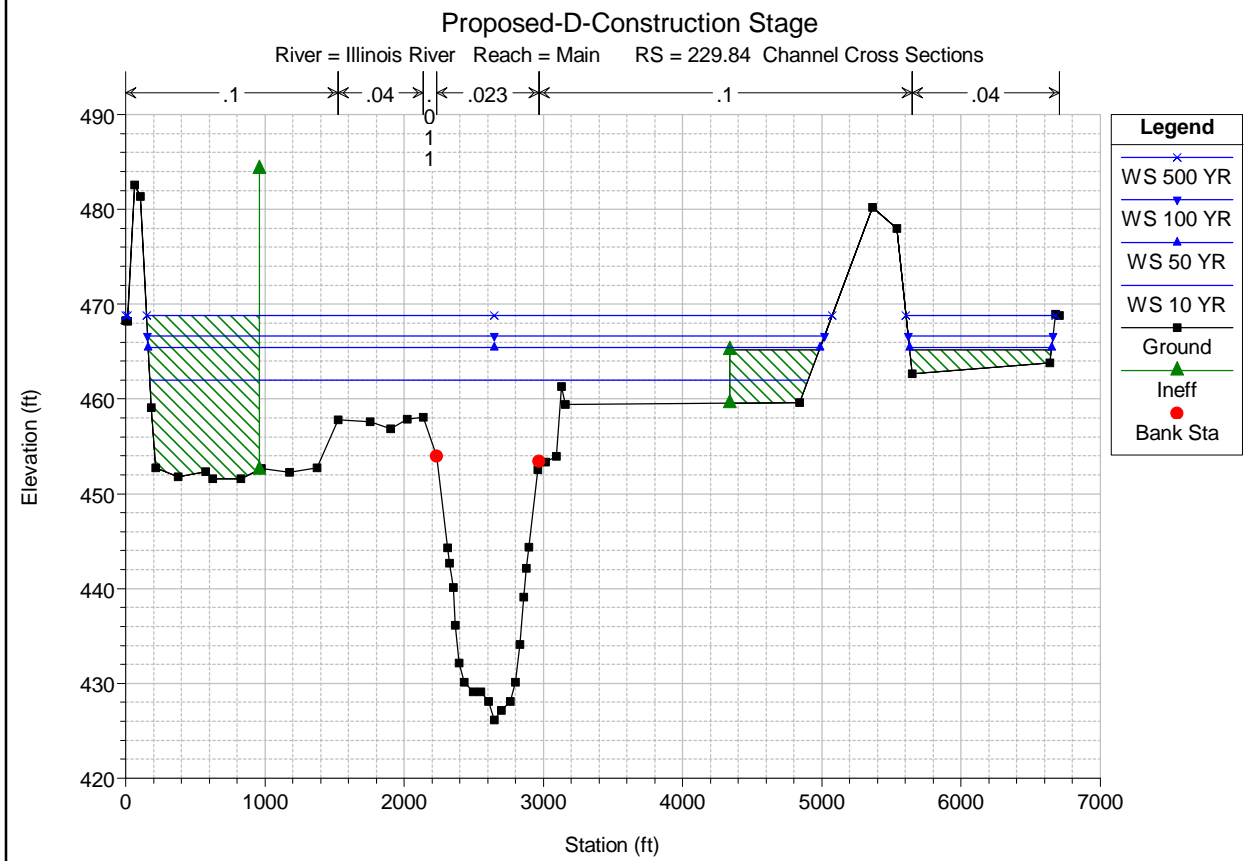
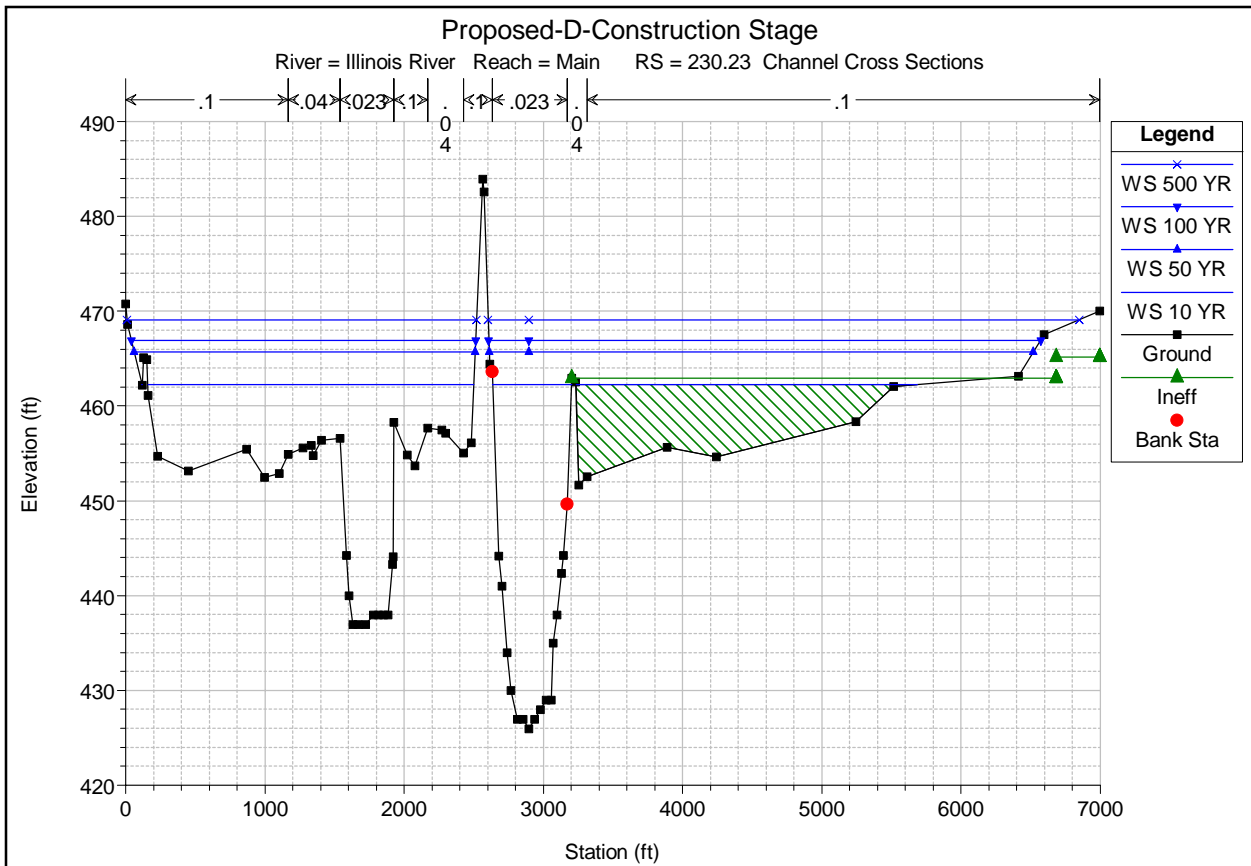
Project in English units

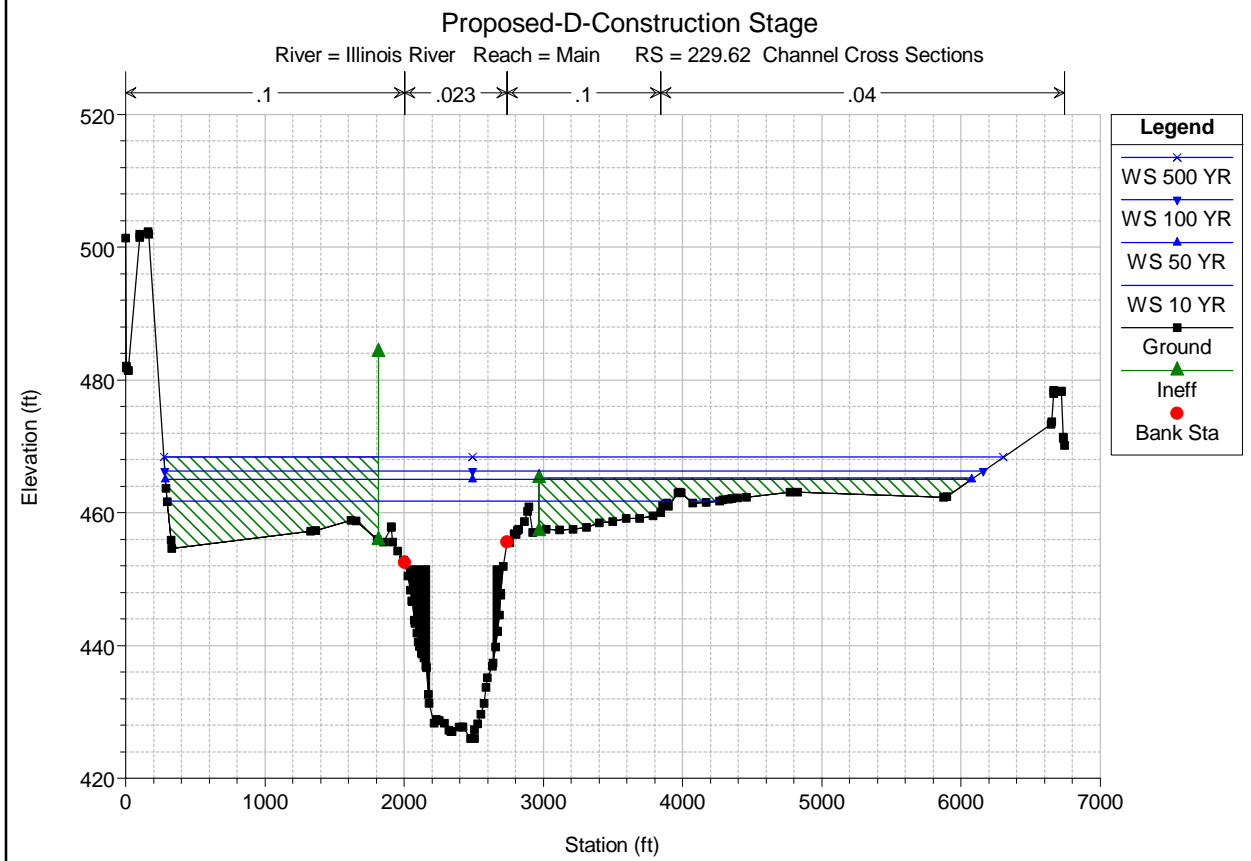
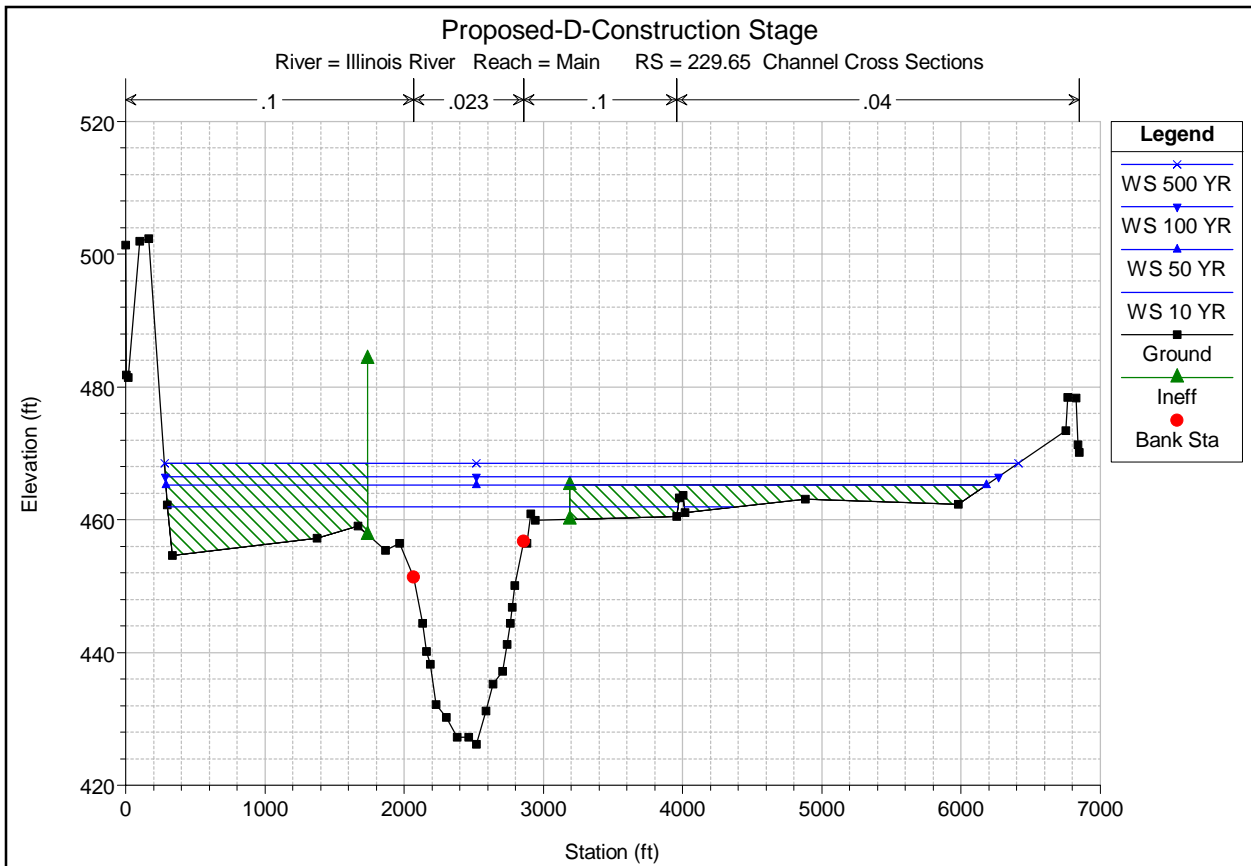
Profile Output Table - Standard Table 2

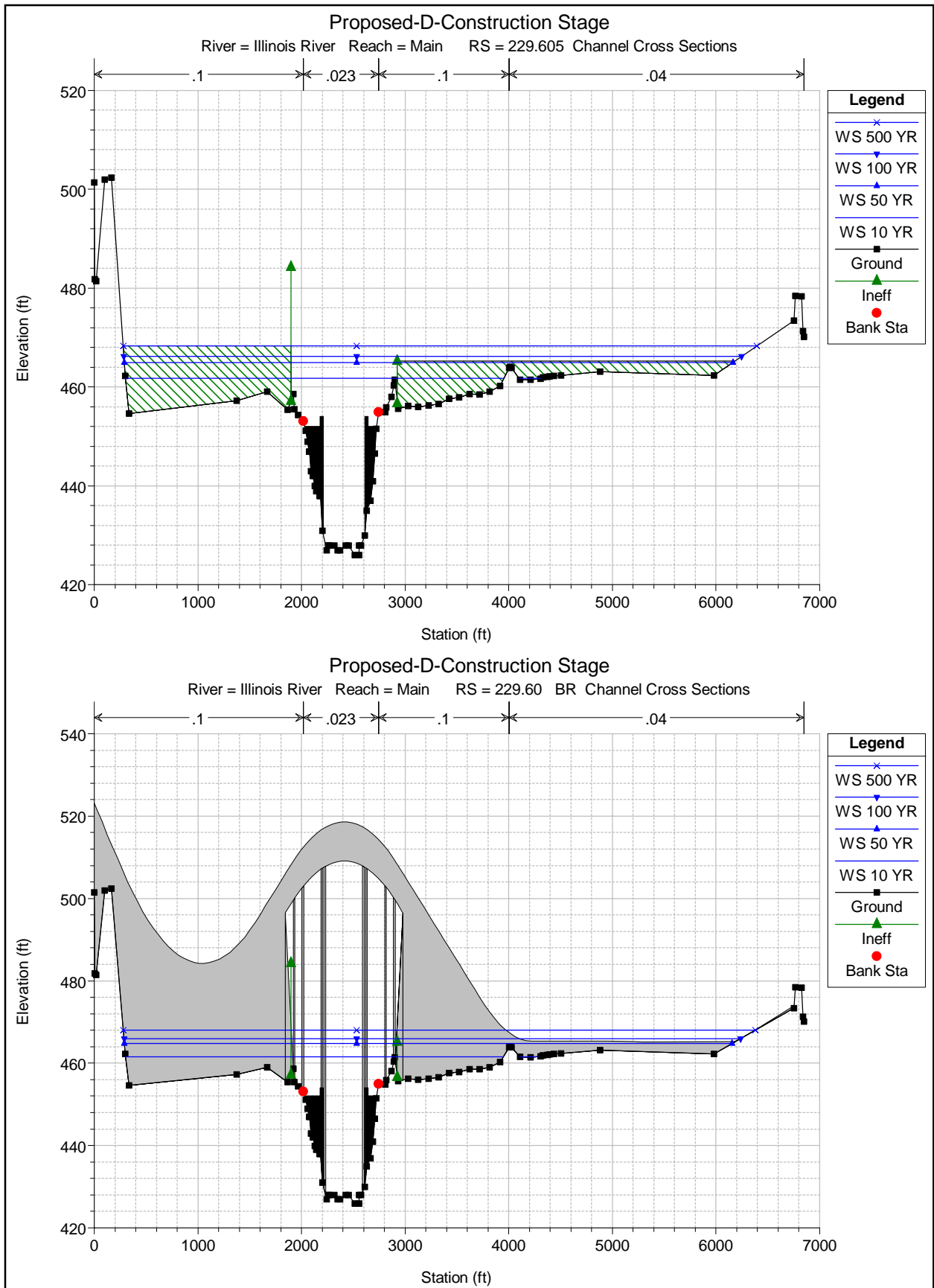
Reach	River Sta	Profile	E.G. Elev (ft)	W.S. Elev (ft)	Vel Head (ft)	Frctn Loss (ft)	C & E Loss (ft)	Q Left (cfs)	Q Channel (cfs)	Q Right (cfs)	Top Width (ft)
Main	230.23	10 YR	462.40	462.24	0.16	0.03	0.01	35132.37	58717.60	150.02	5363.07
Main	230.23	50 YR	465.84	465.69	0.15	0.03	0.01	46756.61	67359.89	9883.49	6357.01
Main	230.23	100 YR	467.09	466.94	0.15	0.03	0.01	52364.92	72026.05	12609.03	6437.33
Main	230.23	500 YR	469.26	469.10	0.16	0.03	0.01	63710.97	81534.14	17754.90	6757.34
Main	229.84	10 YR	462.28	462.01	0.27	0.03	0.00	6413.07	86589.52	997.40	4726.24
Main	229.84	50 YR	465.71	465.40	0.31	0.03	0.00	13822.60	107384.90	2792.54	5844.62
Main	229.84	100 YR	466.97	466.64	0.32	0.03	0.00	17105.84	115243.00	4651.11	5900.17
Main	229.84	500 YR	469.13	468.79	0.35	0.03	0.01	23566.42	130000.20	9433.35	6010.97
Main	229.65	10 YR	462.22	461.91	0.31	0.01	0.01	850.69	93003.77	145.54	4015.56
Main	229.65	50 YR	465.64	465.22	0.42	0.01	0.01	1837.95	121829.00	333.01	5892.28
Main	229.65	100 YR	466.89	466.44	0.45	0.01	0.02	2281.97	132820.00	1898.06	5980.79
Main	229.65	500 YR	469.05	468.55	0.50	0.01	0.02	3140.46	152028.50	7831.06	6134.35
Main	229.62	10 YR	462.20	461.77	0.42	0.01	0.01	627.46	93007.41	365.13	3833.63
Main	229.62	50 YR	465.61	465.06	0.56	0.01	0.01	1314.71	121666.40	1018.87	5791.12
Main	229.62	100 YR	466.86	466.25	0.61	0.01	0.01	1628.35	133452.80	1918.81	5876.75
Main	229.62	500 YR	469.02	468.36	0.66	0.01	0.01	2208.61	151939.90	8851.49	6028.01
Main	229.605	10 YR	462.18	461.71	0.48	0.00	0.03	444.76	93142.13	413.11	3854.10
Main	229.605	50 YR	465.60	464.97	0.62	0.00	0.04	923.19	122046.90	1029.92	5874.47
Main	229.605	100 YR	466.85	466.16	0.69	0.00	0.04	1141.53	134096.00	1762.47	5960.75
Main	229.605	500 YR	469.01	468.28	0.73	0.00	0.05	1539.98	152397.80	9062.19	6114.51
Main	229.60		Bridge								
Main	229.595	10 YR	462.01	461.70	0.31	0.00	0.00	364.50	93405.68	229.82	4420.82
Main	229.595	50 YR	465.38	464.95	0.43	0.00	0.00	743.74	122633.20	623.10	5794.06
Main	229.595	100 YR	466.61	466.13	0.48	0.00	0.00	920.26	134915.30	1164.41	5899.51
Main	229.595	500 YR	468.76	468.22	0.54	0.01	0.00	1258.04	155250.70	6491.24	6021.08
Main	229.583	10 YR	462.01	461.68	0.32	0.01	0.00	617.76	92879.85	502.39	2974.19
Main	229.583	50 YR	465.37	464.93	0.44	0.01	0.01	1207.56	121565.90	1226.50	5747.53
Main	229.583	100 YR	466.60	466.11	0.50	0.01	0.01	1482.26	133953.30	1564.48	5838.37
Main	229.583	500 YR	468.75	468.20	0.55	0.01	0.00	1994.86	153588.50	7416.62	5958.83
Main	229.56	10 YR	461.99	461.68	0.31	0.03	0.01	1228.11	91546.81	1225.07	2570.35
Main	229.56	50 YR	465.35	464.94	0.41	0.03	0.01	2260.68	118825.40	2913.89	4542.58
Main	229.56	100 YR	466.58	466.12	0.46	0.03	0.01	2732.91	130534.40	3732.71	5069.14
Main	229.56	500 YR	468.74	468.18	0.56	0.04	0.02	3707.18	153815.90	5476.91	5288.21
Main	229.38	10 YR	461.93	461.67	0.25	0.04	0.01	2321.01	90724.77	954.21	7741.58
Main	229.38	50 YR	465.27	464.94	0.33	0.05	0.01	4784.44	117069.40	2146.16	7798.42
Main	229.38	100 YR	466.49	466.12	0.37	0.05	0.01	5934.59	128350.70	2714.71	7819.05
Main	229.38	500 YR	468.63	468.19	0.44	0.06	0.02	8332.15	150753.60	3914.27	7855.08
Main	228.32	10 YR	461.65	461.55	0.10			575.87	72490.02	20934.11	7561.67
Main	228.32	50 YR	464.95	464.85	0.10			1248.00	86206.04	36545.96	7601.69
Main	228.32	100 YR	466.15	466.05	0.10			1552.00	92104.02	43343.99	7616.25
Main	228.32	500 YR	468.26	468.15	0.11			2173.37	103867.30	56959.29	7641.72

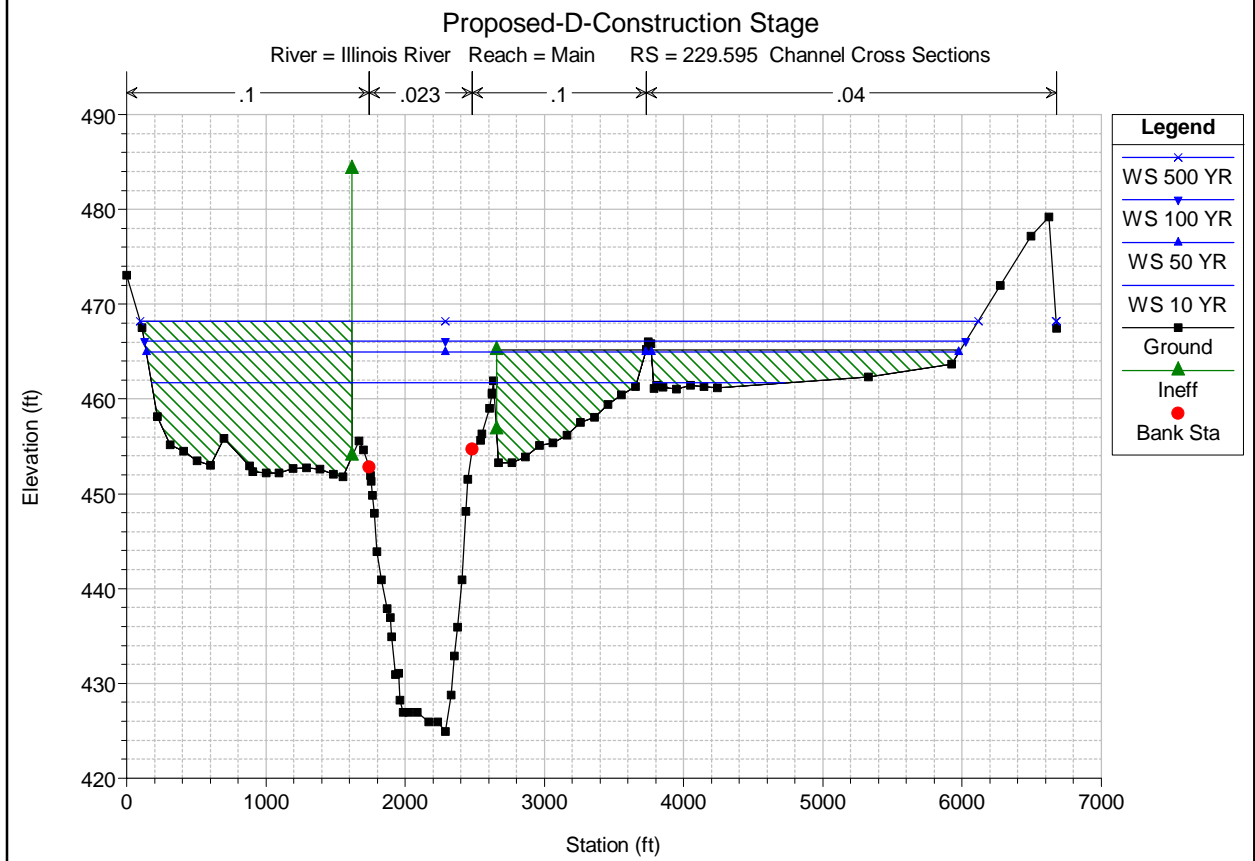
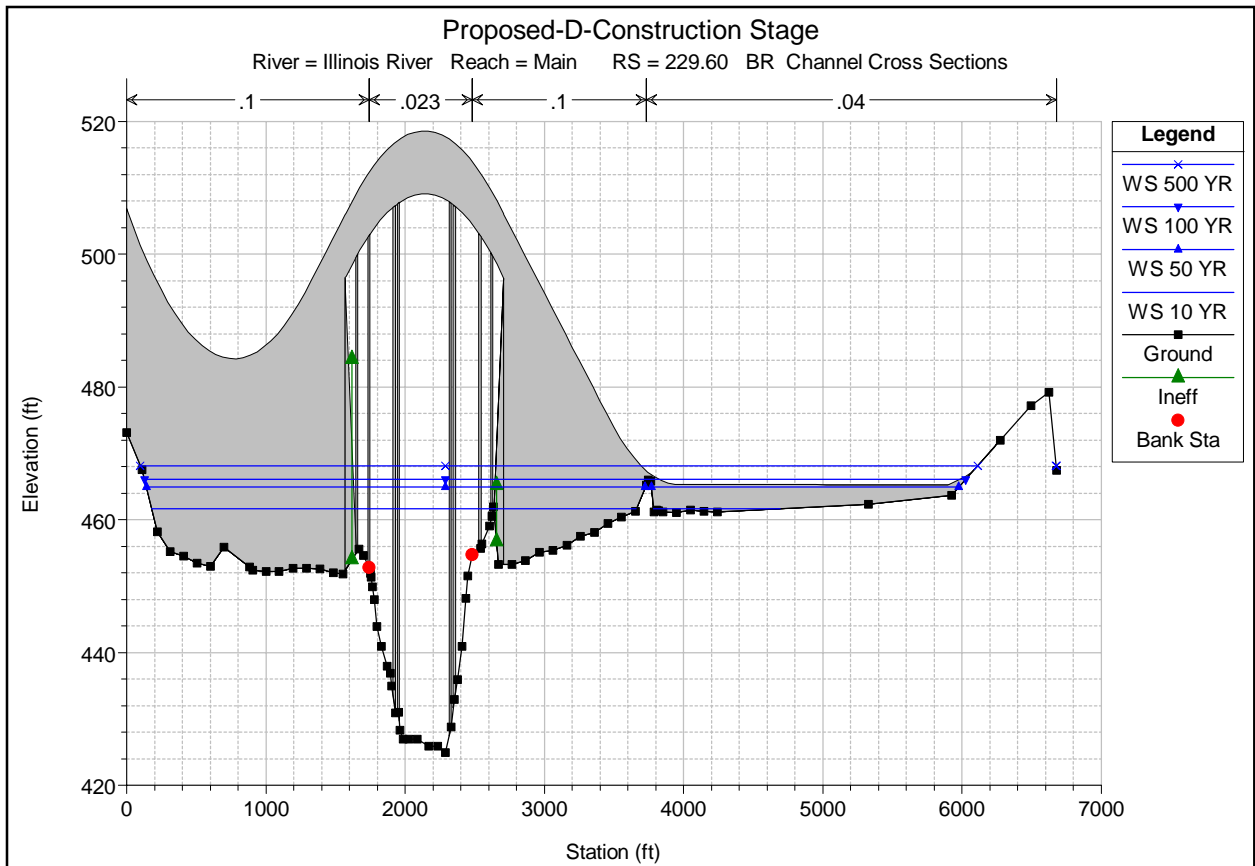
Proposed-D-Construction Stage
Water Surface Profiles

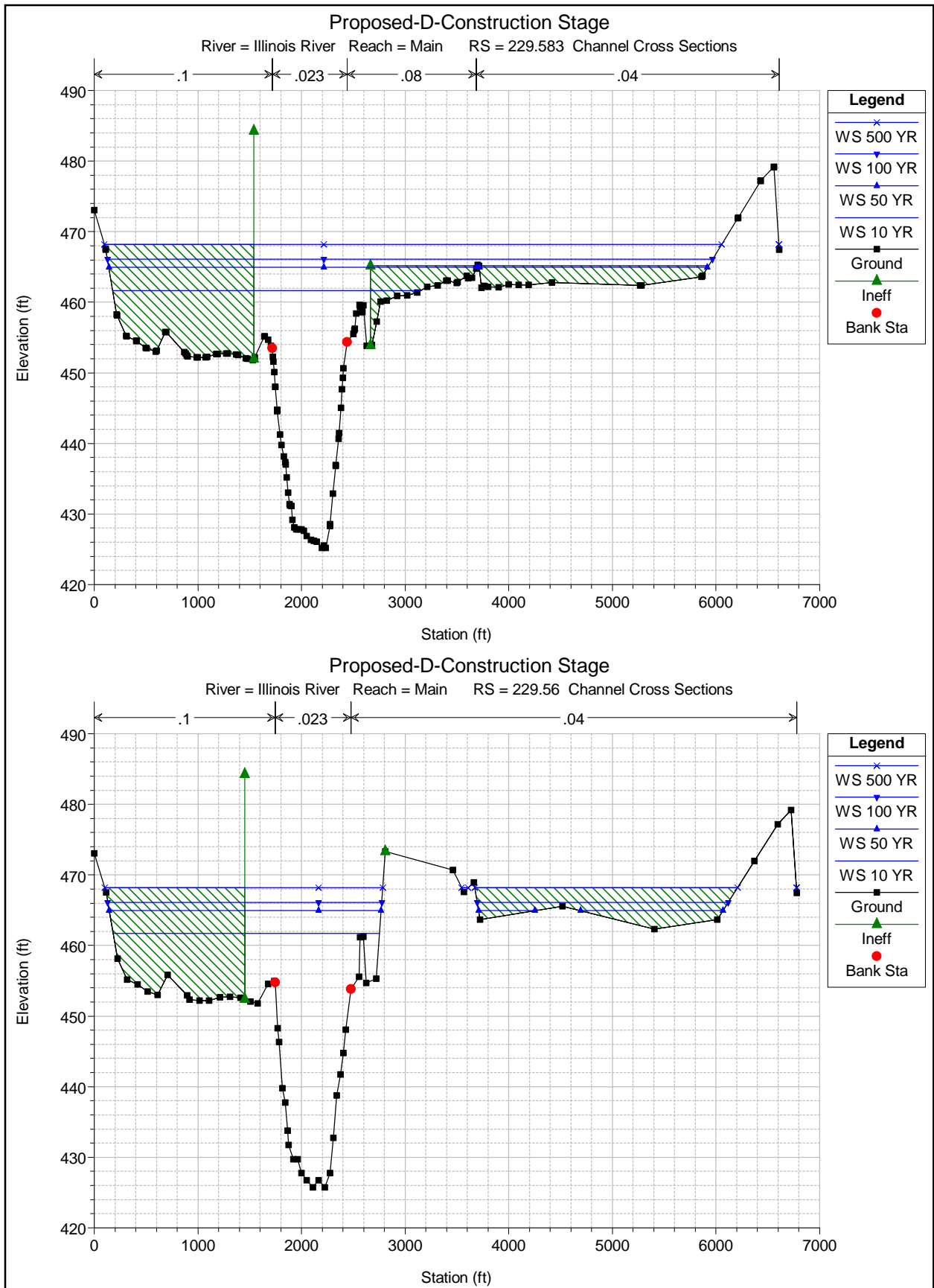


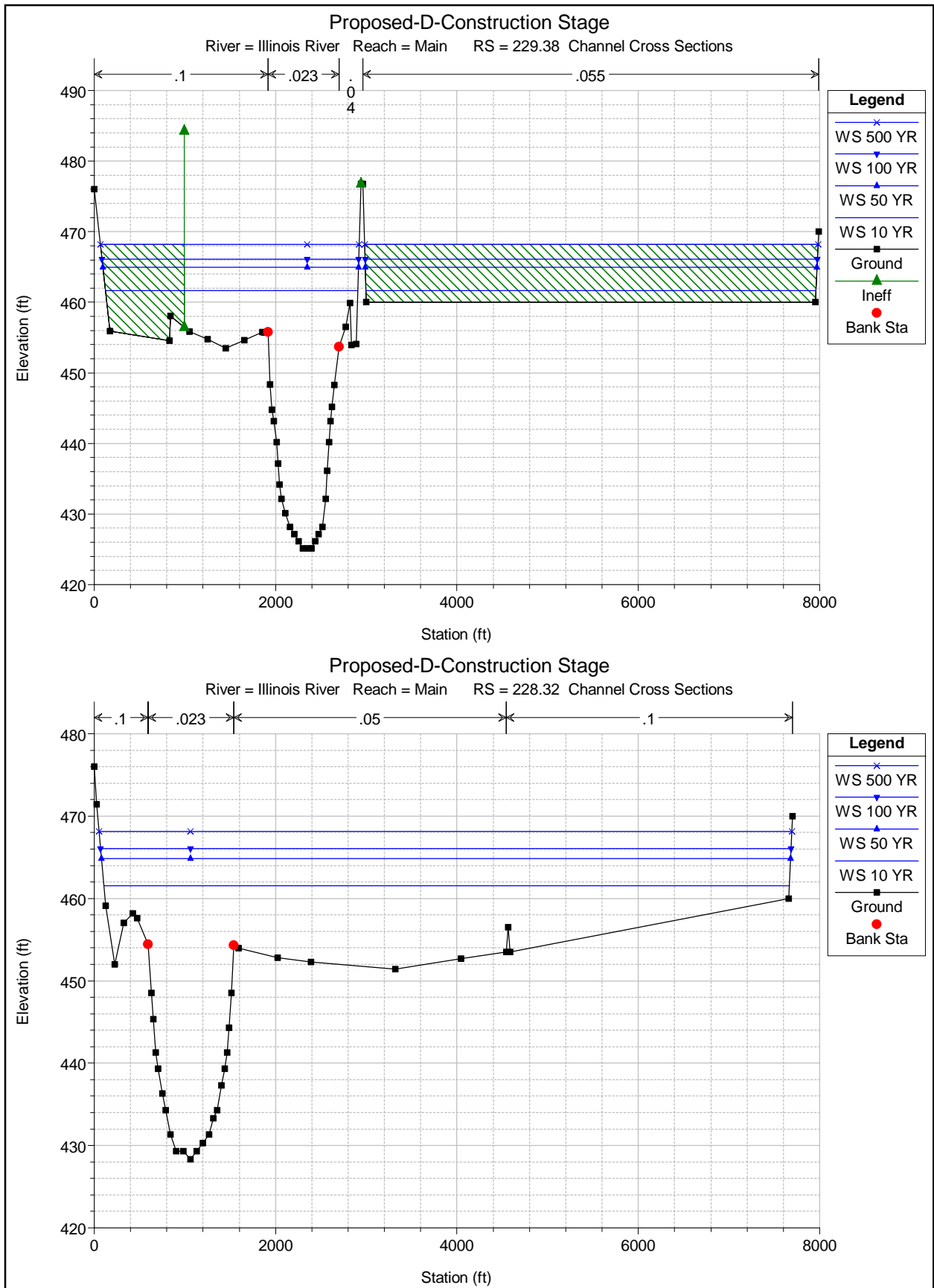












APPENDIX B-2

HEC-RAS OUTPUT - DEMOLITION STAGE

PROJECT DATA
 Project Title: IL 178 over Illinois River
 Project File : IL178.prj
 Run Date and Time: 9/29/2016 7:13:34 AM

Project in English units

Profile Output Table - Standard Table 1

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude #	Chl
Main	230.23	10 YR	94000.00	425.97	462.24	441.93	462.39	0.000042	3.87	37876.12	5357.45		0.13
Main	230.23	50 YR	124000.00	425.97	465.68	443.74	465.82	0.000038	3.95	73188.73	6356.17		0.12
Main	230.23	100 YR	137000.00	425.97	466.93	444.40	467.08	0.000038	4.07	81219.03	6436.70		0.13
Main	230.23	500 YR	163000.00	425.97	469.09	445.63	469.25	0.000040	4.32	95405.66	6756.08		0.13
Main	229.84	10 YR	94000.00	426.13	462.00	440.09	462.27	0.000057	4.37	32242.73	4726.04		0.15
Main	229.84	50 YR	124000.00	426.13	465.39	442.38	465.70	0.000059	4.82	44003.06	5844.02		0.15
Main	229.84	100 YR	137000.00	426.13	466.63	443.28	466.96	0.000060	4.97	50230.35	5899.71		0.16
Main	229.84	500 YR	163000.00	426.13	468.78	444.95	469.12	0.000061	5.25	61095.64	6010.61		0.16
Main	229.65	10 YR	94000.00	426.19	461.90	440.80	462.21	0.000064	4.52	23371.67	4012.53		0.16
Main	229.65	50 YR	124000.00	426.19	465.20	442.82	465.63	0.000074	5.25	28241.44	5891.30		0.17
Main	229.65	100 YR	137000.00	426.19	466.43	443.63	466.88	0.000077	5.50	33716.76	5980.02		0.18
Main	229.65	500 YR	163000.00	426.19	468.54	445.19	469.04	0.000080	5.88	43450.60	6133.78		0.18
Main	229.62	10 YR	94000.00	426.02	461.87	440.06	462.20	0.000064	4.64	22255.59	3855.85		0.16
Main	229.62	50 YR	124000.00	426.02	465.16	442.18	465.61	0.000075	5.43	26046.05	5798.79		0.17
Main	229.62	100 YR	137000.00	426.02	466.37	443.02	466.87	0.000079	5.73	31188.22	5885.12		0.18
Main	229.62	500 YR	163000.00	426.02	468.47	444.58	469.03	0.000084	6.15	40496.45	6035.79		0.19
Main	229.605	10 YR	94000.00	425.94	461.87	439.57	462.20	0.000062	4.62	21904.70	3878.63		0.15
Main	229.605	50 YR	124000.00	425.94	465.16	441.70	465.61	0.000073	5.42	25286.81	5887.77		0.17
Main	229.605	100 YR	137000.00	425.94	466.36	442.56	466.86	0.000078	5.73	30409.13	5975.19		0.18
Main	229.605	500 YR	163000.00	425.94	468.46	444.11	469.02	0.000083	6.17	39726.50	6127.83		0.19
Main	229.60		Bridge										
Main	229.595	10 YR	94000.00	424.92	461.59	439.03	462.07	0.000128	5.60	18230.66	4314.81		0.21
Main	229.595	50 YR	124000.00	424.92	464.82	441.56	465.45	0.000141	6.42	21567.31	5783.60		0.22
Main	229.595	100 YR	137000.00	424.92	465.99	442.59	466.68	0.000147	6.76	25461.18	5889.70		0.23
Main	229.595	500 YR	163000.00	424.92	468.08	444.52	468.82	0.000148	7.14	34763.00	6012.10		0.23
Main	229.583	10 YR	94000.00	425.20	461.56	439.85	462.06	0.000134	5.71	18664.13	2957.48		0.21
Main	229.583	50 YR	124000.00	425.20	464.79	442.37	465.43	0.000145	6.51	22298.46	5735.32		0.23
Main	229.583	100 YR	137000.00	425.20	465.96	443.41	466.67	0.000153	6.88	26153.28	5830.39		0.23
Main	229.583	500 YR	163000.00	425.20	468.06	445.36	468.81	0.000152	7.22	35550.75	5949.90		0.24
Main	229.56	10 YR	94000.00	425.75	461.68	439.24	461.99	0.000059	4.53	24185.41	2570.35		0.15
Main	229.56	50 YR	124000.00	425.75	464.94	441.48	465.35	0.000069	5.26	28453.21	4542.58		0.17
Main	229.56	100 YR	137000.00	425.75	466.12	442.33	466.58	0.000073	5.57	30013.64	5069.14		0.17
Main	229.56	500 YR	163000.00	425.75	468.18	443.96	468.74	0.000083	6.17	32752.12	5288.21		0.19
Main	229.38	10 YR	94000.00	425.15	461.67	437.79	461.93	0.000047	4.09	29681.85	7741.58		0.14
Main	229.38	50 YR	124000.00	425.15	464.94	439.86	465.27	0.000054	4.74	35944.84	7798.42		0.15
Main	229.38	100 YR	137000.00	425.15	466.12	440.71	466.49	0.000058	5.01	38224.43	7819.05		0.15
Main	229.38	500 YR	163000.00	425.15	468.19	442.32	468.63	0.000065	5.53	42212.78	7855.08		0.17
Main	228.32	10 YR	94000.00	428.32	461.55	439.89	461.65	0.000025	2.88	70050.67	7561.67		0.10
Main	228.32	50 YR	124000.00	428.32	464.85	441.62	464.95	0.000024	3.05	95070.36	7601.69		0.10
Main	228.32	100 YR	137000.00	428.32	466.05	442.28	466.15	0.000024	3.13	104201.00	7616.25		0.10
Main	228.32	500 YR	163000.00	428.32	468.15	443.53	468.26	0.000025	3.31	120221.90	7641.72		0.10

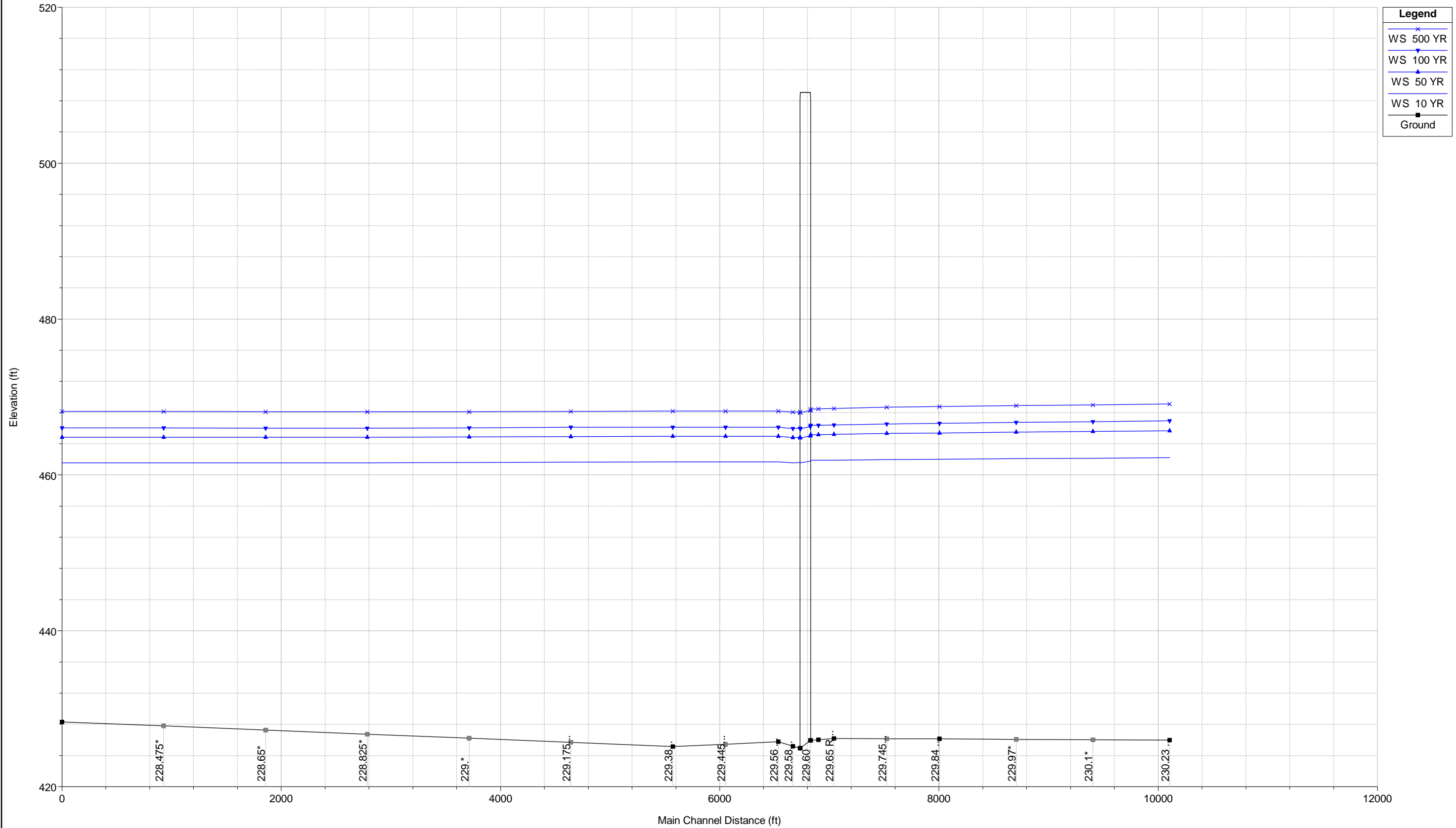
PROJECT DATA
 Project Title: IL 178 over Illinois River
 Project File : IL178.prj
 Run Date and Time: 9/29/2016 7:13:34 AM

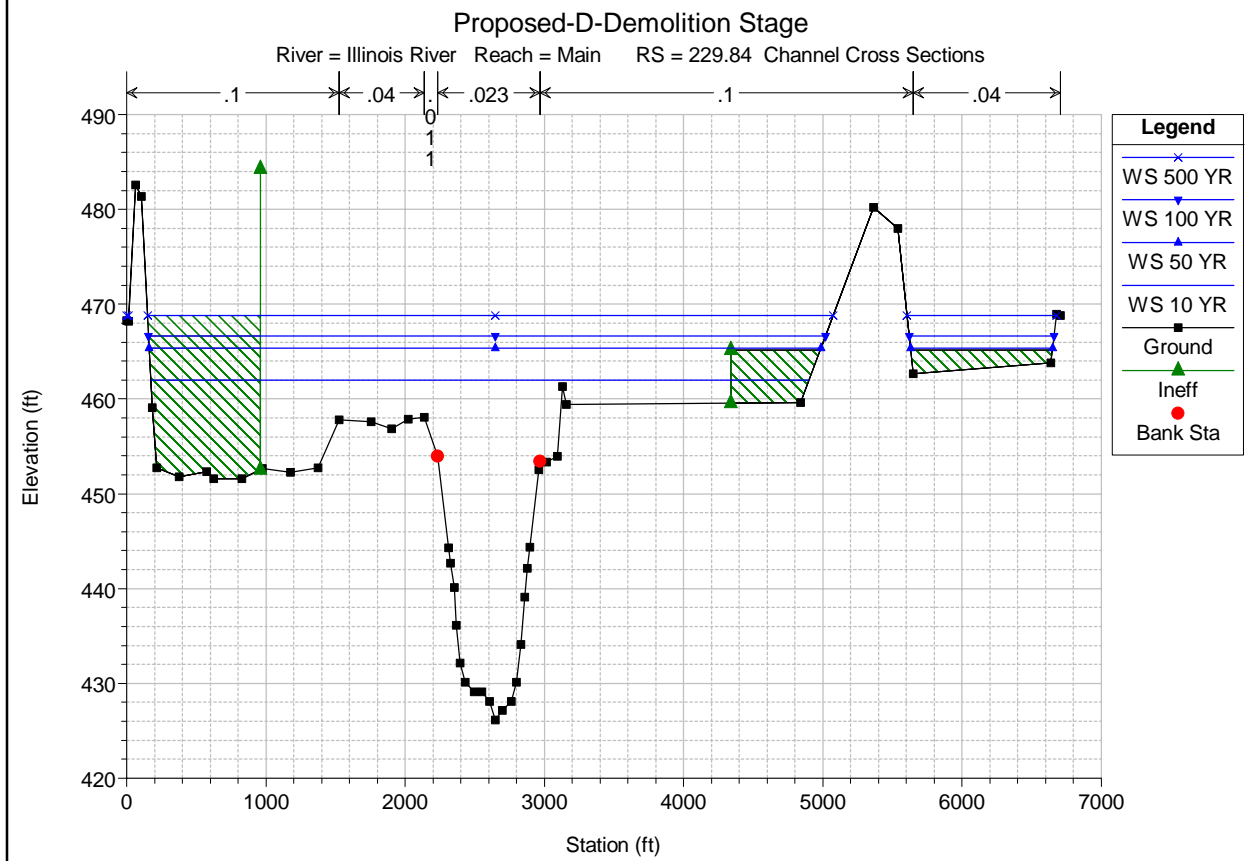
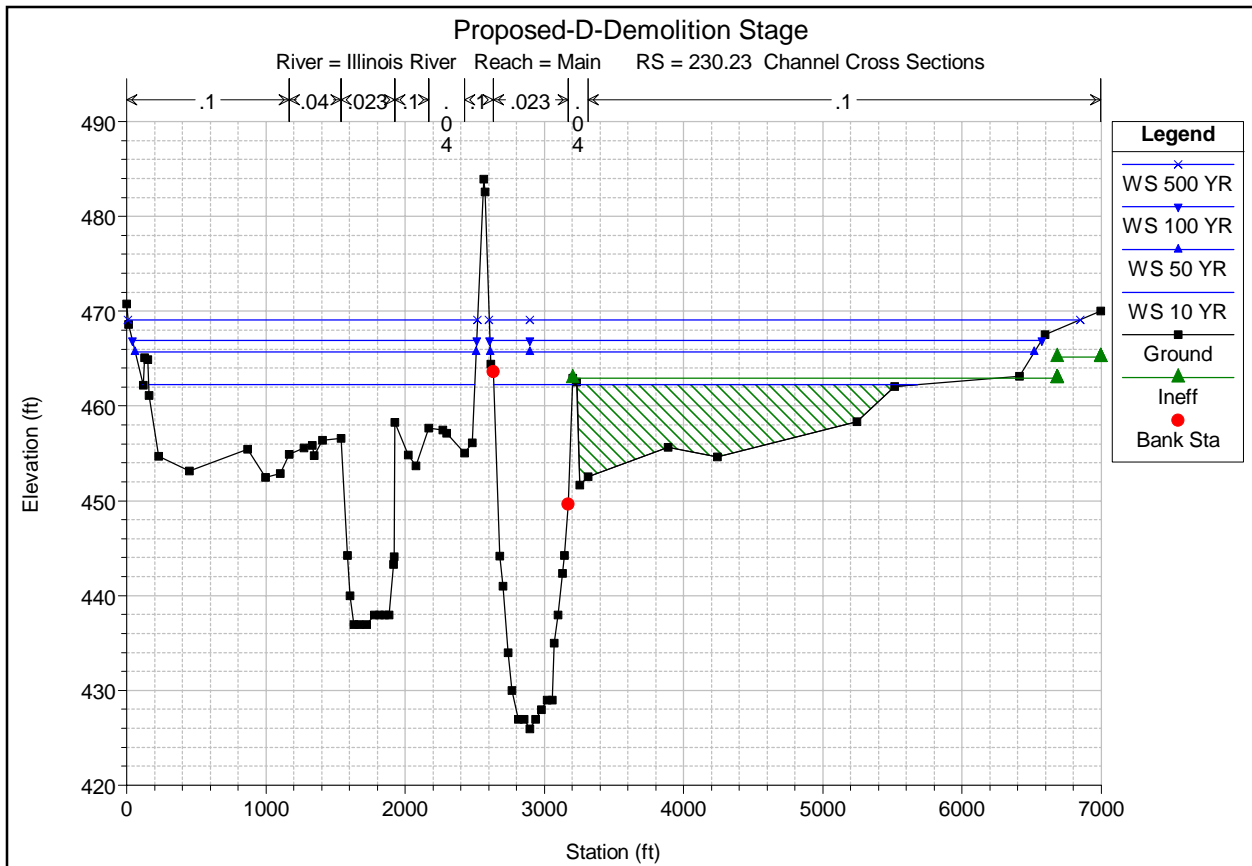
Project in English units

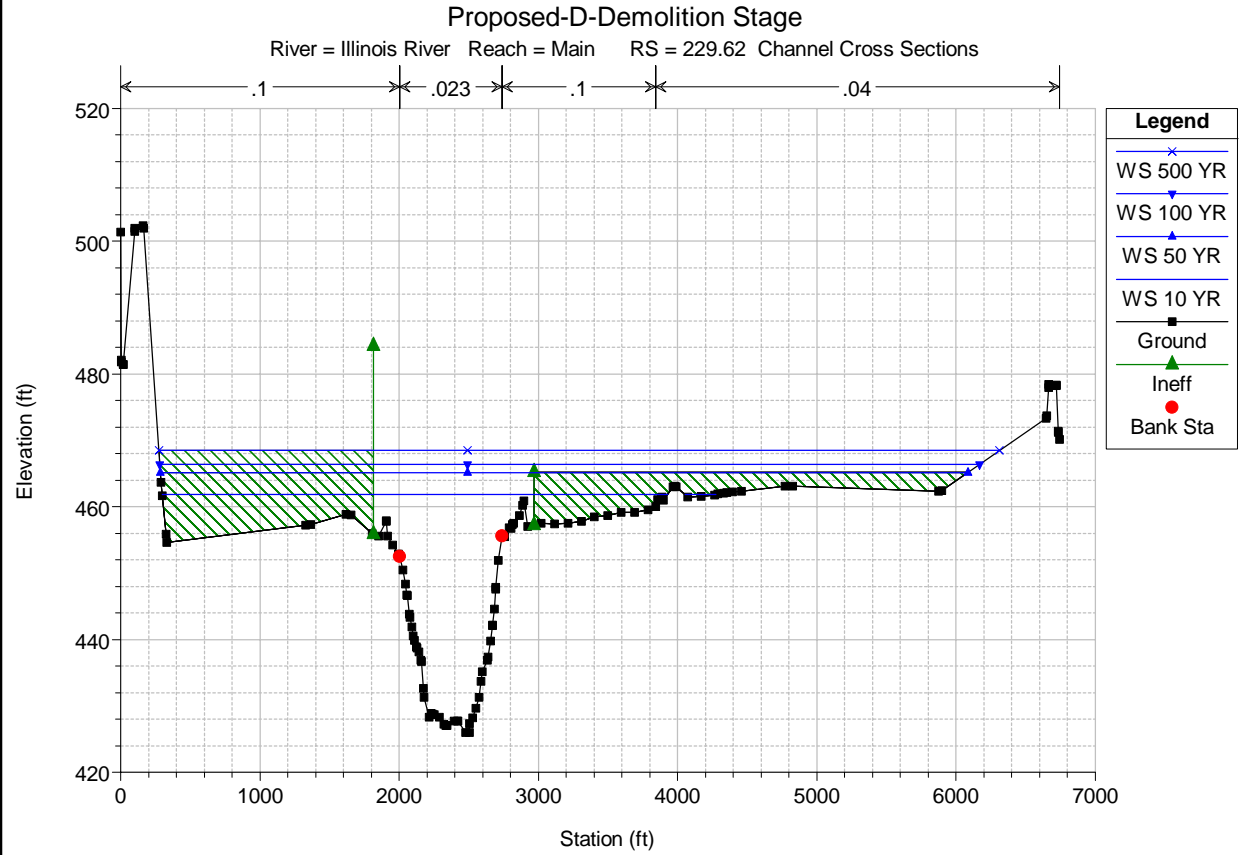
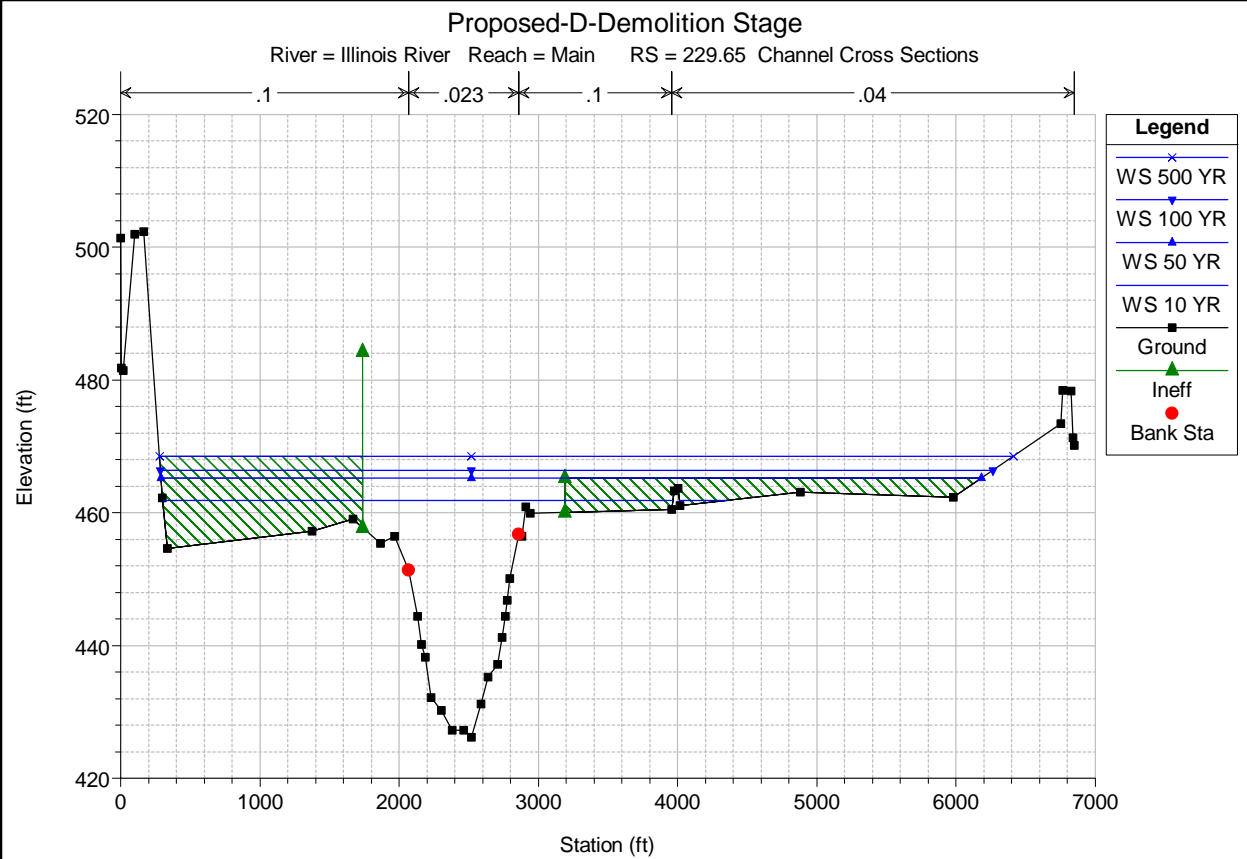
Profile Output Table - Standard Table 2

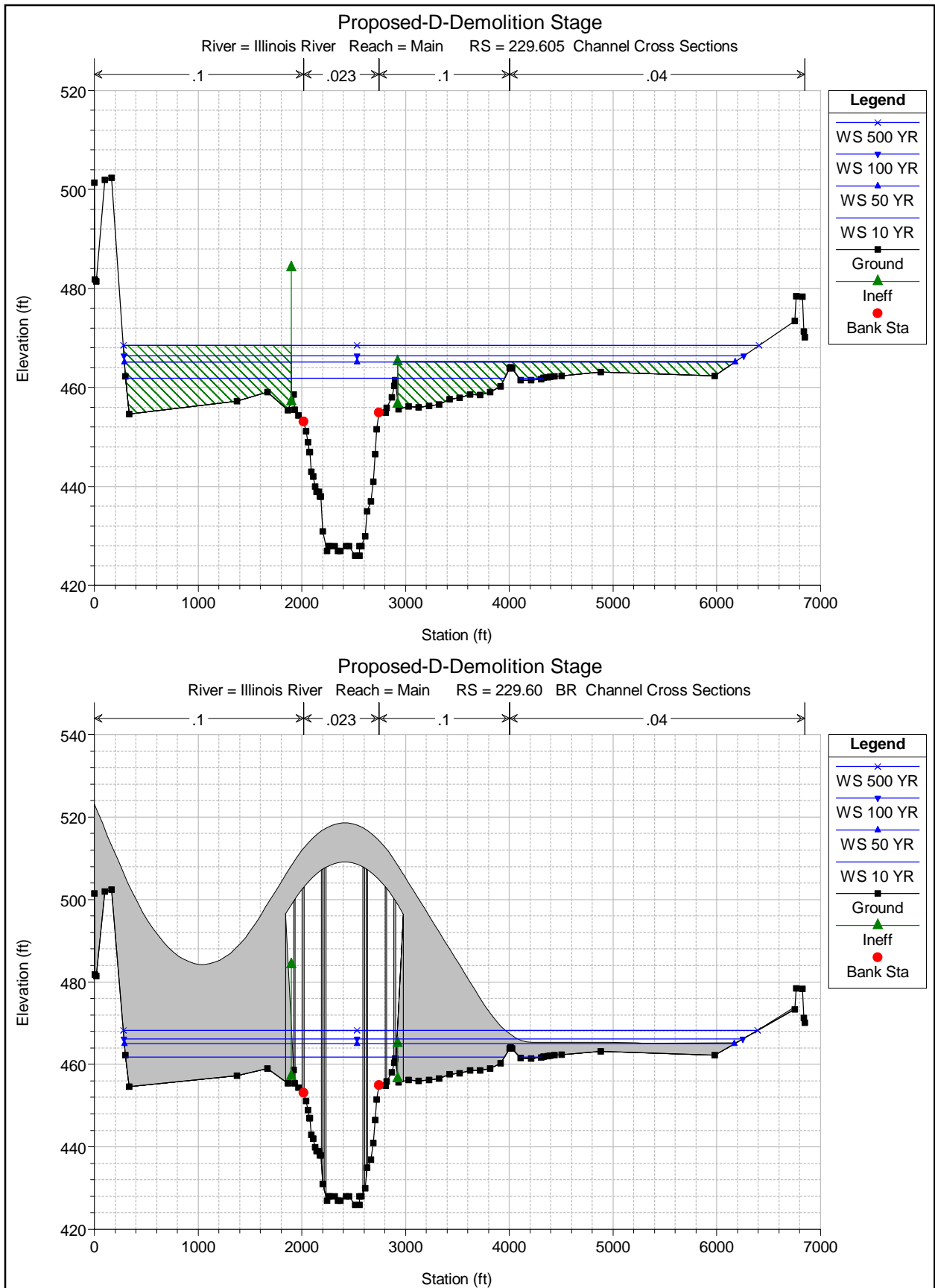
Reach	River Sta	Profile	E.G. Elev (ft)	W.S. Elev (ft)	Vel Head (ft)	Frctn Loss (ft)	C & E Loss (ft)	Q Left (cfs)	Q Channel (cfs)	Q Right (cfs)	Top Width (ft)
Main	230.23	10 YR	462.39	462.24	0.16	0.03	0.01	35124.77	58725.34	149.88	5357.45
Main	230.23	50 YR	465.82	465.68	0.15	0.03	0.01	46749.53	67383.35	9867.12	6356.17
Main	230.23	100 YR	467.08	466.93	0.15	0.03	0.01	52359.68	72044.24	12596.07	6436.70
Main	230.23	500 YR	469.25	469.09	0.16	0.03	0.01	63706.41	81547.05	17746.54	6756.08
Main	229.84	10 YR	462.27	462.00	0.27	0.03	0.00	6404.24	86601.59	994.17	4726.04
Main	229.84	50 YR	465.70	465.39	0.31	0.03	0.00	13803.42	107416.70	2779.90	5844.02
Main	229.84	100 YR	466.96	466.63	0.33	0.03	0.00	17091.45	115272.00	4636.50	5899.71
Main	229.84	500 YR	469.12	468.78	0.35	0.03	0.01	23556.21	130024.70	9419.08	6010.61
Main	229.65	10 YR	462.21	461.90	0.31	0.01	0.00	849.53	93005.63	144.84	4012.53
Main	229.65	50 YR	465.63	465.20	0.42	0.01	0.00	1835.19	121837.60	327.23	5891.30
Main	229.65	100 YR	466.88	466.43	0.46	0.01	0.00	2279.96	132840.50	1879.51	5980.02
Main	229.65	500 YR	469.04	468.54	0.50	0.01	0.01	3139.08	152053.20	7807.73	6133.78
Main	229.62	10 YR	462.20	461.87	0.33	0.00	0.00	508.21	93191.98	299.80	3855.85
Main	229.62	50 YR	465.61	465.16	0.45	0.01	0.00	1084.19	122070.80	844.96	5798.79
Main	229.62	100 YR	466.87	466.37	0.50	0.01	0.00	1351.18	133871.80	1777.06	5885.12
Main	229.62	500 YR	469.03	468.47	0.55	0.01	0.00	1859.82	153400.50	7739.69	6035.79
Main	229.605	10 YR	462.20	461.87	0.33	0.00	0.02	325.46	93368.01	306.53	3878.63
Main	229.605	50 YR	465.61	465.16	0.45	0.00	0.03	693.69	122527.50	778.80	5887.77
Main	229.605	100 YR	466.86	466.36	0.50	0.00	0.04	864.98	134494.00	1640.98	5975.19
Main	229.605	500 YR	469.02	468.46	0.56	0.00	0.04	1192.06	154314.20	7493.72	6127.83
Main	229.60		Bridge								
Main	229.595	10 YR	462.07	461.59	0.48	0.01	0.00	531.98	93136.64	331.39	4314.81
Main	229.595	50 YR	465.45	464.82	0.63	0.01	0.00	1044.71	122087.10	868.22	5783.60
Main	229.595	100 YR	466.68	465.99	0.70	0.01	0.01	1278.16	134370.40	1351.41	5889.70
Main	229.595	500 YR	468.82	468.08	0.74	0.01	0.00	1699.10	152995.80	8305.09	6012.10
Main	229.583	10 YR	462.06	461.56	0.50	0.01	0.06	898.90	92379.23	721.87	2957.48
Main	229.583	50 YR	465.43	464.79	0.64	0.01	0.07	1689.13	120606.00	1704.91	5735.32
Main	229.583	100 YR	466.67	465.96	0.71	0.01	0.08	2051.36	133096.20	1852.45	5830.39
Main	229.583	500 YR	468.81	468.06	0.75	0.01	0.06	2681.96	150845.80	9472.27	5949.90
Main	229.56	10 YR	461.99	461.68	0.31	0.03	0.01	1228.11	91546.81	1225.07	2570.35
Main	229.56	50 YR	465.35	464.94	0.41	0.03	0.01	2260.68	118825.40	2913.89	4542.58
Main	229.56	100 YR	466.58	466.12	0.46	0.03	0.01	2732.91	130534.40	3732.71	5069.14
Main	229.56	500 YR	468.74	468.18	0.56	0.04	0.02	3707.18	153815.90	5476.91	5288.21
Main	229.38	10 YR	461.93	461.67	0.25	0.04	0.01	2321.01	90724.77	954.21	7741.58
Main	229.38	50 YR	465.27	464.94	0.33	0.05	0.01	4784.44	117069.40	2146.16	7798.42
Main	229.38	100 YR	466.49	466.12	0.37	0.05	0.01	5934.59	128350.70	2714.71	7819.05
Main	229.38	500 YR	468.63	468.19	0.44	0.06	0.02	8332.15	150753.60	3914.27	7855.08
Main	228.32	10 YR	461.65	461.55	0.10			575.87	72490.02	20934.11	7561.67
Main	228.32	50 YR	464.95	464.85	0.10			1248.00	86206.04	36545.96	7601.69
Main	228.32	100 YR	466.15	466.05	0.10			1552.00	92104.02	43343.99	7616.25
Main	228.32	500 YR	468.26	468.15	0.11			2173.37	103867.30	56959.29	7641.72

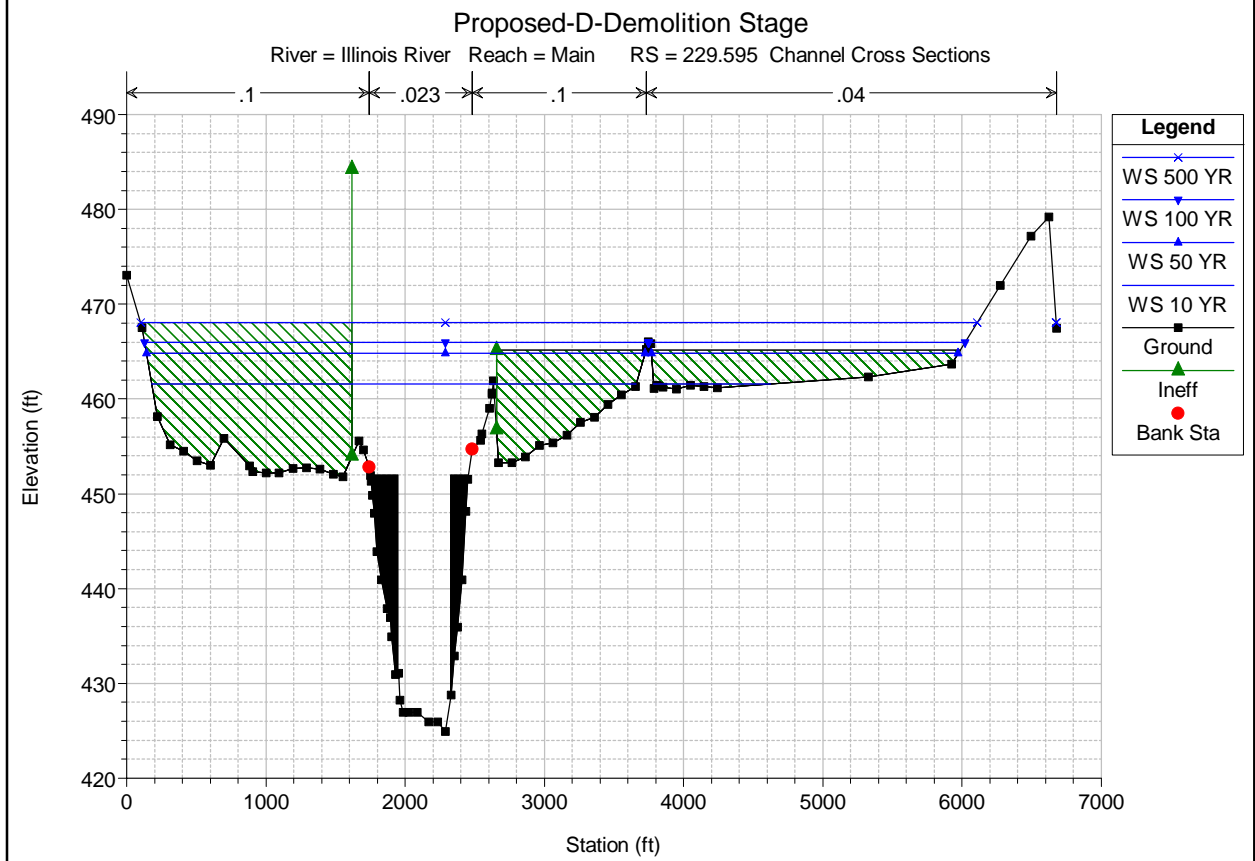
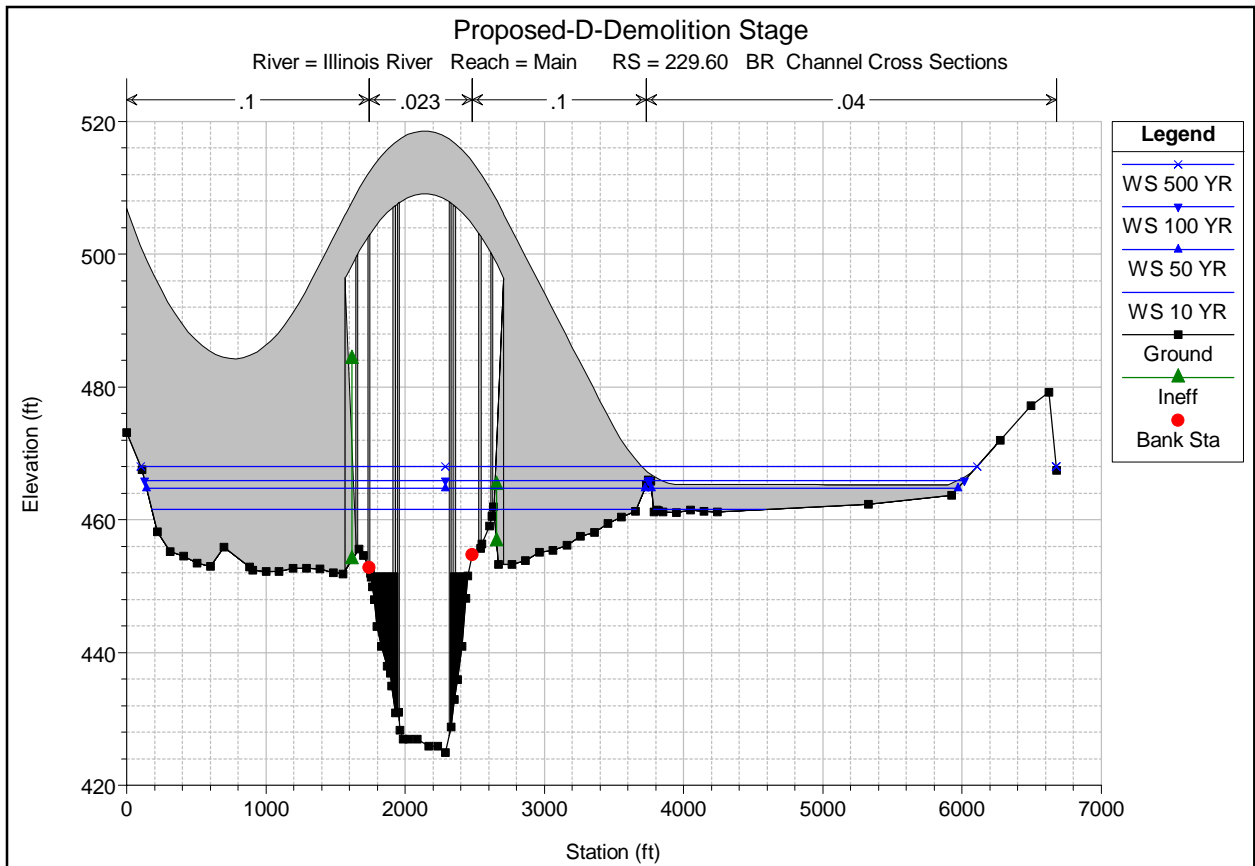
Proposed-D-Demolition Stage
Water Surface Profiles

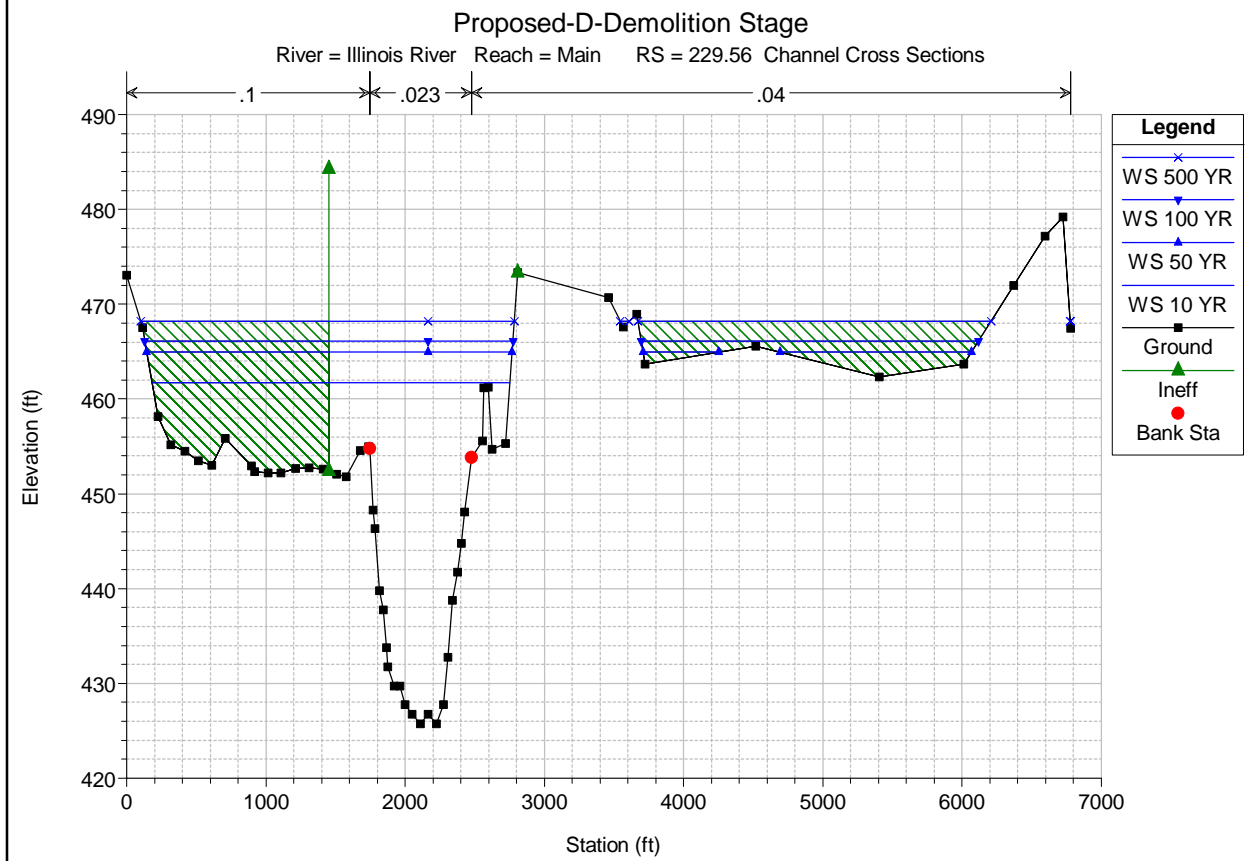
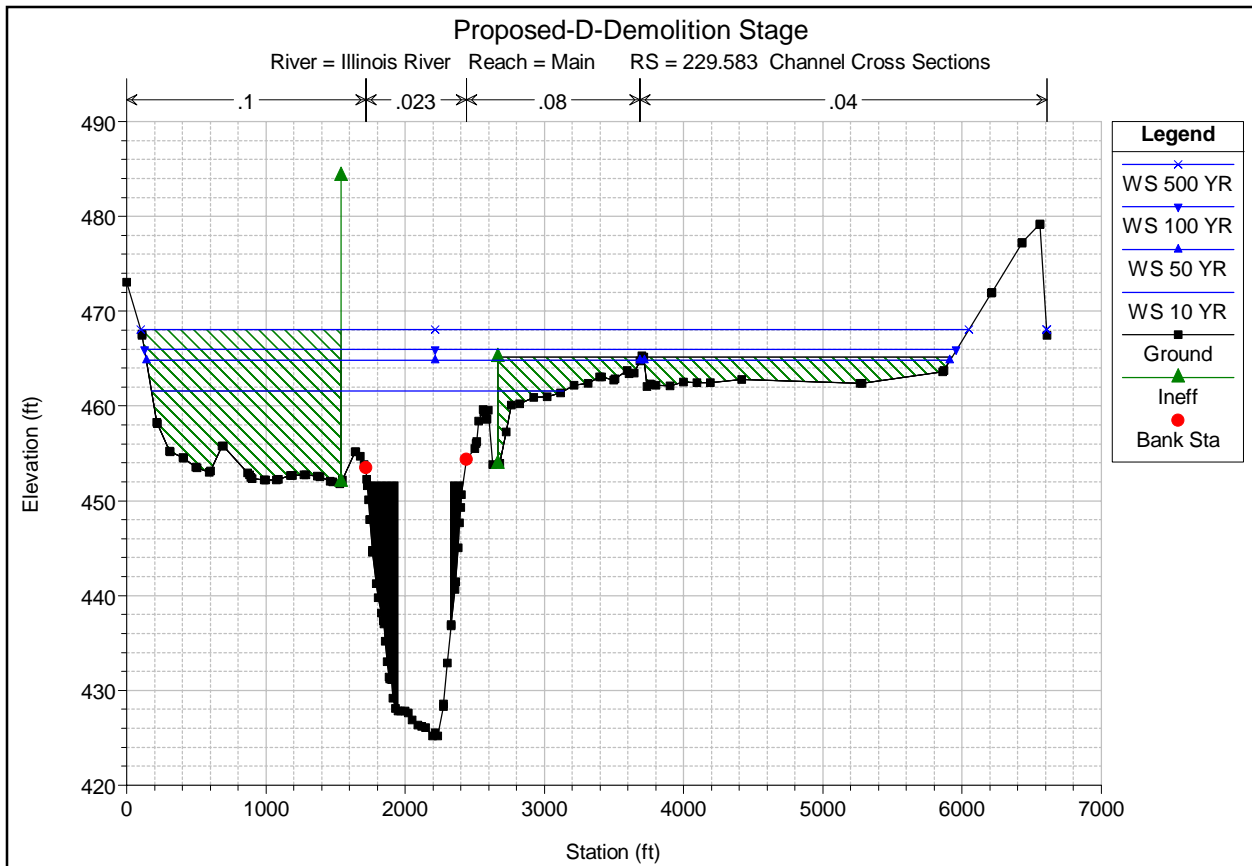


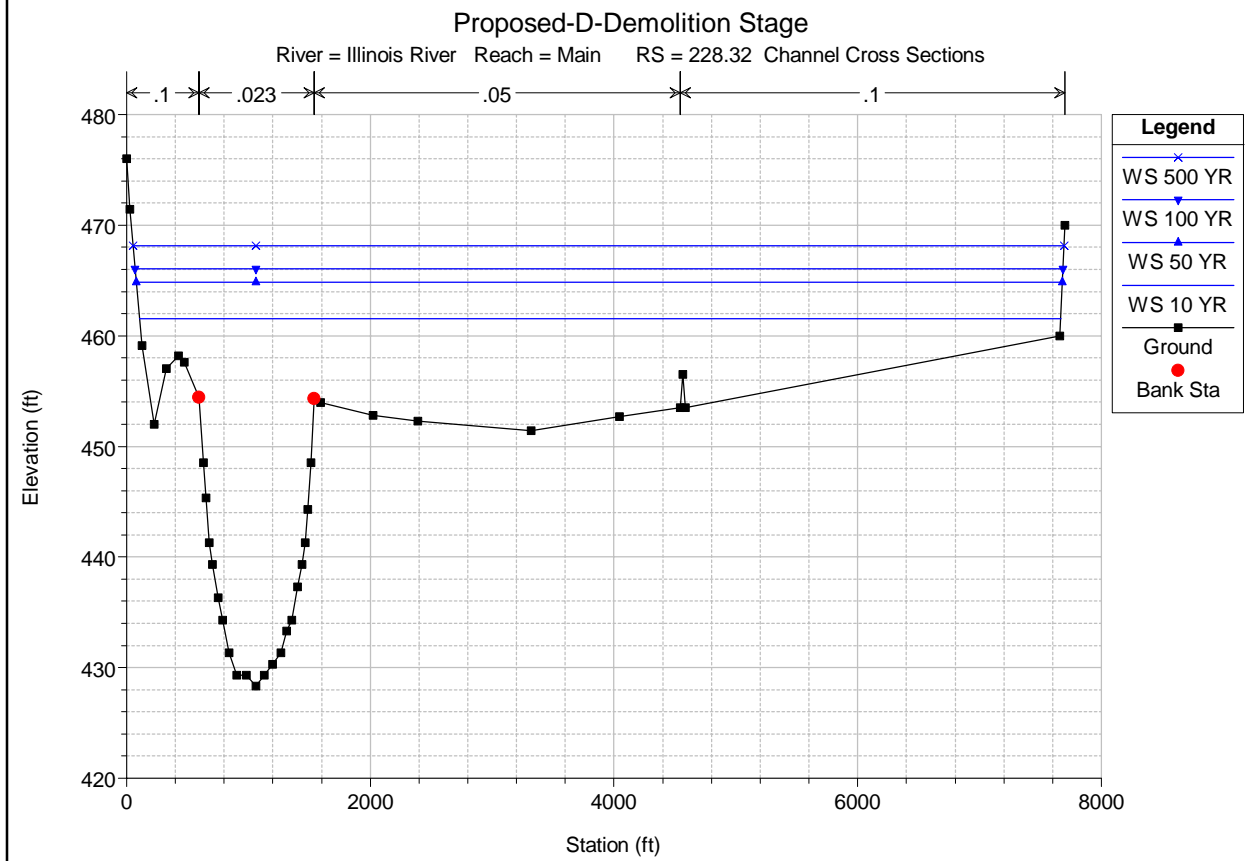
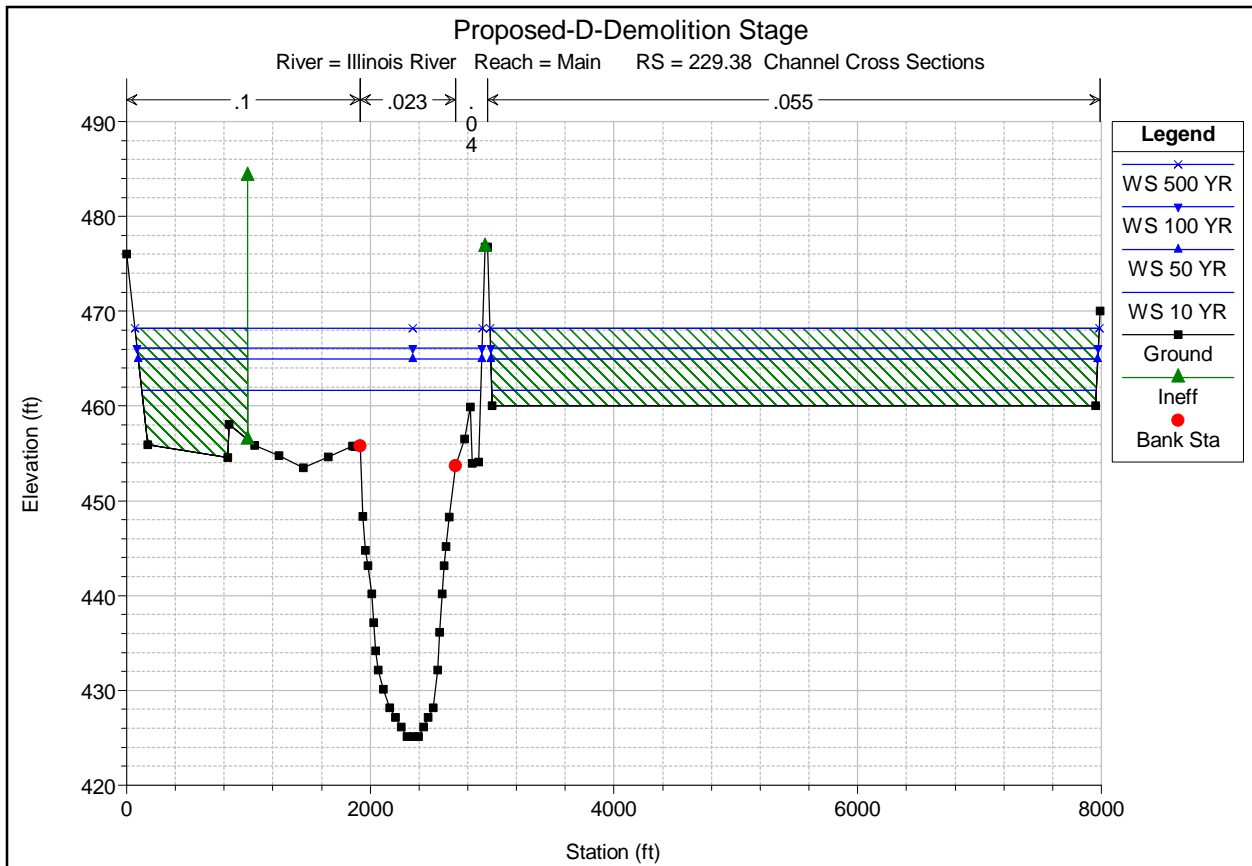












APPENDIX C

WATERWAY INFORMATION TABLES



WORST CASE SCENARIO - CONSTRUCTION STAGE

Waterway Information Table

Route: FAS Route 1279 (IL 178)
 Section: (1)BR & I
 County: LaSalle
 Date: 9/29/2016

Existing SN: 050-0088
 Proposed SN: 050-0256
 Waterway: Illinois River
 Prepared by: Parsons Brinckerhoff (PB)

Existing Overtopping Elev. = 465.18 at Sta. 0+00

Proposed Overtopping Elev. = 465.18 at Sta. 0+00

Flood	Freq. Yr.	Q Ft ³ /s	Opening - ft ²		Natural H.W.E.	Head - ft.		Headwater Elevation	
			Existing	Proposed		Existing	Proposed	Existing	Proposed
	10	94,000	20231	17197	461.7	0.9	0.2	462.6	461.9
Design	50	124,000	23249	20320	465.1	0.1	0.3	465.2	465.4
Base	100	137,000	24359	21414	466.3	0.1	0.3	466.4	466.6
Overtop Existing	>50								
Overtop Proposed	>50								
Max. Calc.	500	163,000	26323	23402	468.4	0.2	0.3	468.6	468.7

10 YEAR VELOCITY THROUGH EXISTING BRIDGE = 4.65 ft/s

10 YEAR VELOCITY THROUGH PROPOSED BRIDGE = 5.69 ft/s

ALL-TIME H.W.E. & DATE: 467.0 ft on April 2013

Scope of Work: Bridge Replacement

EXISTING STRUCTURE

TYPE: Cantilevered Steel Through-Truss
 LENGTH: 1158'-0" back-to-back
 # SPANS: 7
 LOW BEAM: 496.40
 SKEW: 10 degrees
 LOW E.O.P.: 499.99

PROPOSED STRUCTURE

TYPE: Welded Steel Plate Girder
 LENGTH: 1158'0" back-to-back
 # SPANS: 3
 LOW BEAM: 494.5
 SKEW: 10 degrees
 LOW E.O.P.: 505.76

NOTE:

Includes existing and proposed structures, proposed causeway for construction, and two cofferdams.

ROUTE: FAS Route 1279 (IL 178)
WATERWAY: ILLINOIS RIVER

MADE BY: PMK DATE: 3/8/2013
CHECKED BY: SJV DATE: 3/8/2013

WATERWAY INFORMATION TABLE BACK-UP CALCULATIONS

Note: U/S bridge face is taken at RM 229.65. Approach section is taken at RM 230.23.

CALCULATE CREATED HEAD AND HEADWATER ELEVATION

Frequency	Natural H.W.E. (ft)		Existing H.W.E. (ft)	Proposed (Worst Case) H.W.E. (ft)	Created Head (ft) at Approach Section ¹		Headwater Elevation (ft) ²	
	U/S Face of Structure	Approach Section	Approach Section	Approach Section	Existing	Proposed	Existing	Proposed
10-year	461.7	462.0	462.9	462.2	0.9	0.2	462.6	461.9
50-year	465.1	465.4	465.5	465.7	0.1	0.3	465.2	465.4
100-year	466.3	466.6	466.8	466.9	0.1	0.3	466.4	466.6
500-year	468.4	468.8	468.9	469.1	0.2	0.3	468.6	468.7

1. Created Head is difference between H.W.E. at Existing/Proposed approach section and Natural approach section.

2. Headwater Elevation is Natural H.W.E. at face of structure plus created head.

CALCULATE FREEBOARD AND CLEARANCE

Low Road Elevation (ft) ³			
Existing	Station	Proposed	Station
464.70	0+00	464.70	0+00
Low Beam Elevation (ft)			
Existing	Station	Proposed	Station
496.40	23+60	494.50	23+60
Existing Freeboard (ft) ⁴			
10-Year	50-Year	100-Year	500-Year
2.07	overtop	overtop	overtop
Proposed Freeboard (ft) ⁴			
10-Year	50-Year	100-Year	500-Year
2.76	overtop	overtop	overtop
Proposed Vertical Clearance (ft) ⁵			
10-Year	50-Year	100-Year	500-Year
32.77	29.45	28.24	26.09

3. Low road elevation is calculated at the EOP and on the low side of the roadway.

4. Freeboard is calculated from the 50-yr design headwater elevation to the proposed low road elevation in the floodplain.

5. Vertical clearance is calculated from the natural high water elevation to the low chord elevation. Minimum is set by USCG navigation guidelines.



WORST CASE SCENARIO - DEMOLITION STAGE

Waterway Information Table

Route: FAS Route 1279 (IL 178)
 Section: (1)BR & I
 County: LaSalle
 Date: 9/29/2016

Existing SN: 050-0088
 Proposed SN: 050-0256
 Waterway: Illinois River
 Prepared by: Parsons Brinckerhoff (PB)

Existing Overtopping Elev. = 465.18 at Sta. 0+00

Proposed Overtopping Elev. = 465.18 at Sta. 0+00

Flood	Freq. Yr.	Q Ft ³ /s	Opening - ft ²		Natural H.W.E.	Head - ft.		Headwater Elevation	
			Existing	Proposed		Existing	Proposed	Existing	Proposed
	10	94,000	20231	15670	461.7	0.9	0.2	462.6	461.9
Design	50	124,000	23249	18793	465.1	0.1	0.3	465.2	465.4
Base	100	137,000	24359	19887	466.3	0.1	0.3	466.4	466.6
Overtop Existing	>50								
Overtop Proposed	>50								
Max. Calc.	500	163,000	26323	21875	468.4	0.2	0.3	468.6	468.7

10 YEAR VELOCITY THROUGH EXISTING BRIDGE = 4.65 ft/s

10 YEAR VELOCITY THROUGH PROPOSED BRIDGE = 5.68 ft/s

ALL-TIME H.W.E. & DATE: 467.0 ft on April 2013

Scope of Work: Bridge Replacement

EXISTING STRUCTURE

TYPE: Cantilevered Steel Through-Truss
 LENGTH: 1158'-0" back-to-back
 # SPANS: 7
 LOW BEAM: 496.40
 SKEW: 10 degrees
 LOW E.O.P.: 499.99

PROPOSED STRUCTURE

TYPE: Welded Steel Plate Girder
 LENGTH: 1158'-0" back-to-back
 # SPANS: 3
 LOW BEAM: 494.5
 SKEW: 10 degrees
 LOW E.O.P.: 505.76

NOTE:

Includes existing and proposed structures and proposed causeway for demolition.

ROUTE: FAS Route 1279 (IL 178)
WATERWAY: ILLINOIS RIVER

MADE BY: PMK DATE: 3/8/2013
CHECKED BY: SJV DATE: 3/8/2013

WATERWAY INFORMATION TABLE BACK-UP CALCULATIONS

Note: U/S bridge face is taken at RM 229.65. Approach section is taken at RM 230.23.

CALCULATE CREATED HEAD AND HEADWATER ELEVATION

Frequency	Natural H.W.E. (ft)		Existing H.W.E. (ft)	Proposed (Worst Case) H.W.E. (ft)	Created Head (ft) at Approach Section ¹		Headwater Elevation (ft) ²	
	U/S Face of Structure	Approach Section	Approach Section	Approach Section	Existing	Proposed	Existing	Proposed
10-year	461.7	462.0	462.9	462.2	0.9	0.2	462.6	461.9
50-year	465.1	465.4	465.5	465.7	0.1	0.3	465.2	465.4
100-year	466.3	466.6	466.8	466.9	0.1	0.3	466.4	466.6
500-year	468.4	468.8	468.9	469.1	0.2	0.3	468.6	468.7

1. Created Head is difference between H.W.E. at Existing/Proposed approach section and Natural approach section.

2. Headwater Elevation is Natural H.W.E. at face of structure plus created head.

CALCULATE FREEBOARD AND CLEARANCE

Low Road Elevation (ft) ³			
Existing	Station	Proposed	Station
464.70	0+00	464.70	0+00
Low Beam Elevation (ft)			
Existing	Station	Proposed	Station
496.40	23+60	494.50	23+60
Existing Freeboard (ft) ⁴			
10-Year	50-Year	100-Year	500-Year
2.07	overtop	overtop	overtop
Proposed Freeboard (ft) ⁴			
10-Year	50-Year	100-Year	500-Year
2.76	overtop	overtop	overtop
Proposed Vertical Clearance (ft) ⁵			
10-Year	50-Year	100-Year	500-Year
32.77	29.45	28.24	26.09

3. Low road elevation is calculated at the EOP and on the low side of the roadway.

4. Freeboard is calculated from the 50-yr design headwater elevation to the proposed low road elevation in the floodplain.

5. Vertical clearance is calculated from the natural high water elevation to the low chord elevation. Minimum is set by USCG navigation guidelines.