



Illinois Department of Transportation

Memorandum

RECEIVED
BUREAU OF
LOCAL ROADS & STREETS
OCT 26 2018

LOCAL ROADS & STREETS

To: Anthony J. Quigley, District 1 Attn: Christopher J. Holt
From: D. Carl Puzey By: Timothy A. Armbrecht
Subject: PRELIMINARY BRIDGE DESIGN APPROVAL
Date: October 24, 2018

Timothy A. Armbrecht
aka

STP – Bridge Funding
City of Highland Park
Section 15-00125-00-PV

SN 049-6585

FAU 1265 (Clavey Road) & Multi-Use Path over Skokie River

The Preliminary Bridge Design and Hydraulic Report (PBDHR) for the above-designated project, dated February 2, 2018, is satisfactory based on the consultant's disposition to our review comments and revised Type, Size, & Location drawings, received on September 27, 2018, which adequately address our review comments. The preliminary bridge design is hereby approved.

This approval is contingent on the hydraulics being approved by your office or by the Bartlett IDNR Office of Water Resources.

As discussed during our review, it appears it may be advantageous to skew the structures to match the alignment of Skokie River. If changes are determined to be appropriate at a later date, please contact our office for resubmittal requirements.

The design of the proposed pedestrian bridge superstructure and substructure elements must comply with the requirements of the current "American Association of State Highway Transportation Officials (AASHTO) LRFD Guide Specifications for Design of Pedestrian Bridges, with Interims", and the "2017, 8th Edition AASHTO LRFD Bridge Design Specifications, with updates, as well as other specifications referenced within the above documents. A current copy of Guide Bridge Special Provision GBSP 33, "Pedestrian Truss Superstructure", shall be inserted into the project special provisions **without modification**. GBSP 33 may be found at <http://www.idot.illinois.gov/Assets/uploads/files/Doing-Business/Manuals-Guides-&-Handbooks/Highways/Bridges/Bridge-Special-Provisions/gbsp33.pdf>.

The PBDHR indicates the Consultant will perform the shop drawing review and steel fabrication inspection. Please advise the City that if they would like the Department to perform steel fabrication inspection services, a letter requesting such should be sent to the Bureau of Bridges and Structures (BBS) as soon as possible after the steel fabricator is determined. The letter (see attached example) should include the following:

Mr. Anthony J. Quigley, District 1
SN 049-6585
Page 2
October 24, 2018

1. Job information (structure number, route, section, county, city, IDOT contract # if applicable, C-# if applicable).
2. Point of contact for questions and who to send reports to at job completion; name, contact and location for fabricator and prime contractor.
3. The approximate start date and duration if known.

This request would essentially authorize the BBS fabrication inspector to act as the City's representative. The inspector will need a copy of the shop drawings, approved by the City's consultant. A second copy should also be provided to the BBS for office use in assisting the inspector with technical or interpretation questions. The inspector and this office will also require reference copies of any special provisions or project-specific specifications applicable to fabrication that are different from IDOT's Standard & Supplemental Specifications.

Please be aware fabrication inspection services supplied by the Department are subject to resource availability and are not guaranteed. In particular, if the fabricator is located outside the area served by Department inspectors, it may be necessary for the City to retain the services of their own fabrication inspection service to ensure the inspection of the steel.

The locations of the proposed foundations appear to be at or near the existing substructure locations. Care must be taken during construction to locate existing substructure elements to prevent damage or conflicts with the new pile locations. If conflicts arise and modifications are required of the pile locations or design shown on the plans, the Structural Engineer of record should be notified for approval of revisions.

SN 049-6585. The final structural plans and specifications for this project may be accepted by the District based on the Structural Engineer's seal, certification and signature per BLRS Manual Section 23-7.02.1, and on a **sealed structure load rating** submittal as described in BLRS Circular Letter 2017-16 and Structural Services Manual Section 4.2.2.

Prefabricated Pedestrian Bridge. The final structural plans and specifications for this project may be accepted by the District based on the Structural Engineer's seal, certification and signature per BLRS Manual Section 23-7.02.1.

If you have any questions, contact Matt Humke at 217/782-5929 or matt.humke@illinois.gov.

One copy of the approved report are being returned to you and we will retain one copy for our files.

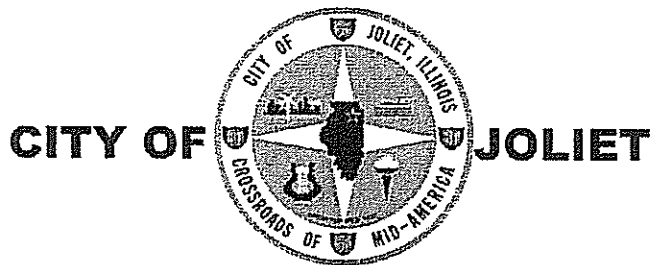
MDH

January 25, 2016

Illinois Department of Transportation
Bureau of Bridges and Structures
2300 South Dirksen Parkway
Room 240
Springfield, Illinois 62764

Attention: D. Carl Puzey

Re: Section 09-00425-00-BR
Structure No. 099-3323
F.A.U. Route 292
Caton Farm Road over DuPage River
Project No. BHM-9003(658)
Job No. C-91-605-10
Contract No. 61B98
District #1
City of Joliet



150 WEST JEFFERSON STREET
JOLIET, ILLINOIS 60432-4158

RECEIVED
BUREAU OF BRIDGES
AND STRUCTURES
JAN 28 2016

Dear Mr. Puzey:

We formally request that the Illinois Department of Transportation perform the fabrication inspection of the steel structures to be fabricated for the above referenced project. This request is in accordance with the Bureau of Local Roads and Streets Manual, Section 23-7.02 1. The prime contractor and fabricator information is as follows:

Prime Contractor

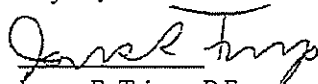
D. Construction
1488 South Broadway
Coal City, IL 60416
(815)634-2555
Attention: Steve Wahl

Steel Fabricator

Indiana Steel & Engineering Corp.
957 J Street
P.O. Box 668
Bedford, IN 47421-0668
Attn: Troy Moyes

The contractor tentatively plans to begin construction April 1, 2016. If you have any questions concerning this project, please contact me.

Sincerely,
City of Joliet


James R. Trizna, P.E.
Director of Public Works

Cc: Greg P. Ruddy, P.E., Public Works Administrator
Mark S. Sefcik, Civil Engineer I
Peter L. Pascua, P.E., Willett, Hofmann & Associates
File

Municipality City of Highland Park
County Lake
Road District 1
Other Agency _____
Project BRM-4003(613)
Section 15-00125-00-PV



Illinois Department of Transportation

Preliminary Bridge Design and Hydraulic Report

Route Clavey Road (FAU 1265)
Stream Skokie River
Ex. St. No. 049-6586
Pr. St. No. 049-6585
Prepared by JJD/JH
Agency/Firm Robinson Engineering, Ltd.
Date 2/2/2018

Funding Type: ☐ HBP ☐ STU ☐ STR ☐ Enhancement
☐ TBP ☐ MFT ☐ Non-MFT ☒ Other (STP-BR-On)

Sufficiency Rating 53.0 (72.5) Existing clear span 63'-0"

Functionally Obsolete ☒ Yes ☐ No

Structurally Deficient ☒ Yes ☐ No

Construction Information

Proposed Letting Date 1/19/2019

Shop Plan Review by ☐ Local Agency ☒ Consultant ☐ State

Fabrication Inspection by ☐ Local Agency ☒ Consultant ☐ State

Approach Roadway Information

Surface Type: Existing PCC Proposed PCC

Surface Width: Existing 24'-0" Proposed 26'-0"

Shldr to Shldr Width: Existing 24'-0" Proposed 26'-0"

Elevation of Low Point: Existing 634.1, 133+50 Proposed 633.93, 133+63

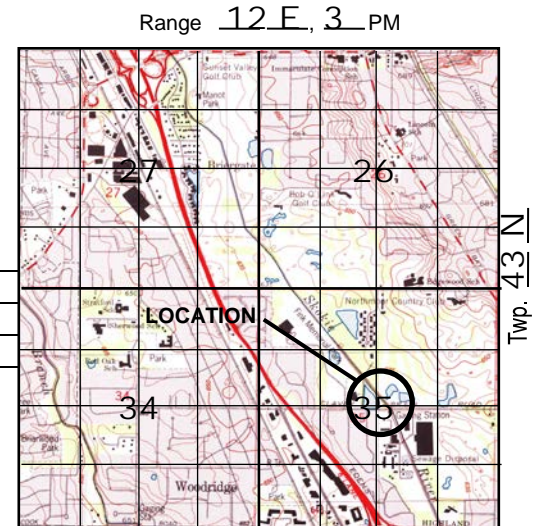
Proposed Side Slopes 2H:1V

Roadway Functional Classification Major Collector

DHV 1200 Current ADT 8600 Design Year ADT 9600

% Trucks 1 Design Speed 35 mph

3R Design Guidelines Used ☐ Yes ☒ No



Locate bridge accurately above

Proposed Structure Information

Type of Structure Proposed ☒ Bridge ☐ Culvert ☐ "Standard Plans" Bridge ☐ Pedestrian/Bicycle

Vehicle Design Loading HL93 Pedestrian/Bicycle Design Loading N/A

Superstructure Type Steel Stringer / Multi-Beam / Cast-In-Place Concrete Deck

Structure Length Back to Back Abutments ~67'-0" Span Length 66'-3" (to expansion joint C/L)

Clear Roadway Width 30'-0" Rail Type Conc. Barrier Crash Tested Rail Required ☒ Yes ☐ No

Wearing Surface Type None Wearing Surface Thickness N/A

Deicing Agents Used ☒ Yes ☐ No

Embankment Slope Under Bridge N/A Proposed Skew Angle 0 deg Forward on. ☒ Rt. ☐ Lt.

Pier Type N/A Abutment Type Cast-In-Place Concrete

Proposed Pile Type TBD

Borings By Geocon Professional Services Expected Submittal Date for Borings TBD

Hydraulic Data

Exist. Br. Cr. El. 638.88 @ Sta. multiple Prop. Br. Cr. El. 638.98 @ Sta. 29+47

Exist. Low Beam Elev. 636.35 Proposed Low Beam Elev. ~634.90

Exist. Freeboard 0.9 ft @ EOP (calc.) Proposed Freeboard 0.8 ft @ EOP (calc.) Streambed Elev. ~623.55

Drainage Area ~20.9 sq. mi. Crossing Location ☐ Rural ☒ Urban

Crossing Located within a Mapped National Flood Insurance Program Area ☒ Yes ☐ No (Map No. 17097C0291K)

Crossing Located within a Northeast Region (District #1) FEMA Mapped Floodway ☒ Yes ☐ No (Zone AE)

Crossing Located over designated "Public Bodies of Water" ☐ Yes ☒ No

Design Flood Data

Design Flood Frequency 50 yr Design Discharge 1,454 cfs Design High Water Elev. 632.9

Exist. Br. Opening 352 sq.ft. Exist. Over-the-Road 0

Prop. Br. Opening 352 sq.ft. Prop. Over-the-Road 0

100 Year Flood Data

100 Year Discharge 1,751 cfs 100 Year High Water Elev. 633.4 (Calc.)

Exist. Br. Opening 383 sq.ft. Exist. Over-the-Road 0 Exist. Created Head 0.0 ft

Prop. Br. Opening 383 sq.ft. Prop. Over-the-Road 0 Prop. Created Head 0.0 ft

If proposed structure and over-the-road area will not carry entire flow, state kind and area of additional waterway
The proposed structure will carry the entire flow.

Type of Streambed soil Peotone silty clay loam Will drift or ice permit pier in channel ? ☒ Yes ☐ No
Has scour occurred at or near existing structure ? ☒ Yes ☐ No; If yes, reason for scour _____
Modest scour appears to have occurred towards the left (east) abutment due to the upstream pointing skew of the embankment. Existing structure scour rating is 5 by Calculation.
Comments on hydraulic adequacy of existing structure Existing structure is adequate.

Has the existing structure been the cause of demonstrable flood damage to adjacent property? ☐ Yes ☒ No
If yes, describe damage _____

Comments on the hydraulic adequacy of upstream and downstream structures and their comparable relationship to the proposed structure Nearest upstream structures are pedestrian bridges which overtop near to the 10-year event. Next downstream structure at a Private Drive does not overtop for up to 500-yr. The next downstream structure at Lake-Cook Road does not overtop for all events up to 500-yr and is adequate.
Will houses, places of business or valuable property be affected by backwater from the proposed bridge? ☒ Yes ☐ No
If yes, describe property and effect of backwater There is the potential that if backwater were to be increased more than the mapped regulatory 100-year flood elevation, structures may be impacted. The proposed bridge will not cause such an increase. The calculated Base High Water Elevation is less than the FIS regulatory 100-year flood elevation.
Is any channel excavation beyond that required to construct the substructure required in the channel? ☐ Yes ☒ No
If yes, describe extent of channel excavation Any transitional grading will be minimal. Channel excavation is not required. Excavation for proposed bridge abutments should be outside the existing channel.

Will a channel realignment be required? ☐ Yes ☒ No (If yes, attach Channel Change Sketch)
Are stream flow data (gaging station or flood study) available for the stream at or near the proposed site? ☒ Yes ☐ No
(If yes, attach an analysis of the stream flow data)
Provide information regarding high water from other streams, reservoirs, flood control projects, proposed channel changes, strip mine areas or other controls affecting the hydraulic or hydrologic properties of the crossing site _____
A FEMA flood insurance study (FIS) is available. There are no known extraordinary affects on the hydraulic or hydrologic properties of the crossing site.

Scour Analysis

Was a HEC-18 scour analysis performed? ☒ Yes ☐ No
Were all substructure units being utilized evaluated to consider the effect of anticipated scour? ☒ Yes ☐ No
Will scour protection or corrective actions be required? ☒ Yes ☐ No
If yes, describe protection or corrective actions. Proposed vertical wall abutments will be protected with standard riprap. No piers are proposed. Bridge will be approximately same length and opening as the existing bridge. Contraction scour will be prevented via smaller channel riprap (standard sizing).

Attachments (Check those items below that are included.)

- ☒ Reproduction of applicable portion of USGS quadrangle showing locations of proposed bridge and properties affected by backwater caused by the proposed structure
- ☒ Cross sections as required by WSPRO including floodplain above high water elevation **(from HEC-RAS)**
- ☒ Streambed profile **(See HEC-RAS profile in Hydraulic Report)**
- ☒ Profile of existing and proposed roadway across floodplain
- ☒ Hydraulic calculations
- ☒ Joint Application Form for construction permit submittals (Joint Form NCR-426) **(to be provided at later date)**
- ☐ Waterway sketch
- ☐ Channel change sketch
- ☒ Applicable certification(s)
- ☐ Boring data
- ☒ Scour analysis/evaluation **(HEC-RAS analysis; Scour Critical Evaluation Coding Report)**
- ☒ Other Permit Summary Form for Floodway Construction in NE Illinois

Municipality City of Highland Park
County Lake
Road District 1
Other Agency _____
Project BRM-4003(613)
Section 15-00125-00-PV



Illinois Department of Transportation

Preliminary Bridge Design and Hydraulic Report

Route Clavey Road (FAU 1265)
Stream Skokie River
Ex. St. No. N/A
Pr. St. No. N/A
Prepared by JJD/JH
Agency/Firm Robinson Engineering, Ltd.
Date 2/2/2018

Funding Type: ☐ HBP ☐ STU ☐ STR ☐ Enhancement
☐ TBP ☐ MFT ☐ Non-MFT ☒ Other (STP-BR-On)

Sufficiency Rating N/A Existing clear span 63'-0"

Functionally Obsolete ☒ Yes ☐ No

Structurally Deficient ☒ Yes ☐ No

Construction Information

Proposed Letting Date 1/19/2019

Shop Plan Review by ☐ Local Agency ☒ Consultant ☐ State

Fabrication Inspection by ☐ Local Agency ☒ Consultant ☐ State

Approach Roadway Information

Surface Type: Existing Steel grate Proposed Timber

Surface Width: Existing 5 Proposed 10

Shldr to Shldr Width: Existing N/A Proposed N/A

Elevation of Low Point: Existing 634.1, 133+50 Proposed 633.93, 133+63

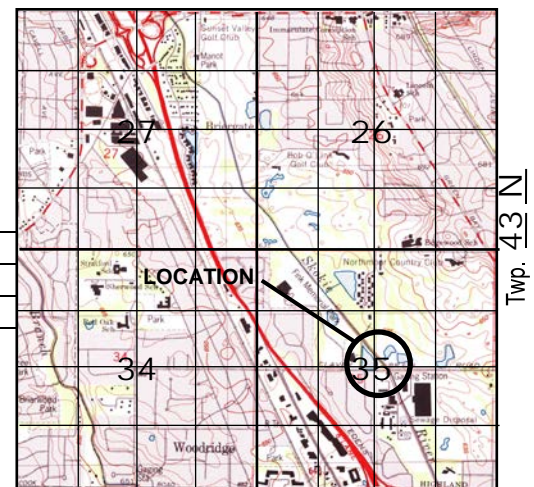
Proposed Side Slopes 2H:1V

Roadway Functional Classification Major Collector (adjacent)

DHV 1200 Current ADT 8600 Design Year ADT 9600

% Trucks 1 Design Speed 35 mph

3R Design Guidelines Used ☐ Yes ☒ No



Locate bridge accurately above

Proposed Structure Information

Type of Structure Proposed ☐ Bridge ☐ Culvert ☐ "Standard Plans" Bridge ☒ Pedestrian/Bicycle

Vehicle Design Loading N/A Pedestrian/Bicycle Design Loading 90 psf + 10000 Veh L

Superstructure Type Bowstring Steel / Floor beam, Timber Deck

Structure Length Back to Back Abutments ~67'-0" Span Length 66'-3" (to expansion joint C/L)

Clear Roadway Width N/A Rail Type Steel Crash Tested Rail Required ☐ Yes ☒ No

Wearing Surface Type None Wearing Surface Thickness N/A

Deicing Agents Used ☐ Yes ☒ No

Embankment Slope Under Bridge N/A Proposed Skew Angle 0 degrees Forward on. ☒ Rt. ☐ Lt.

Pier Type N/A Abutment Type Cast-In-Place Concrete

Proposed Pile Type TBD

Borings By Geocon Professional Services Expected Submittal Date for Borings TBD

Hydraulic Data

Exist. Br. Cr. El. 638.88 @ Sta. multiple Prop. Br. Cr. El. 638.98 @ Sta. 29+47

Exist. Low Beam Elev. 636.35 Proposed Low Beam Elev. ~634.90

Exist. Freeboard 0.9 ft @ EOP (calc.) Proposed Freeboard 0.8 ft @ EOP (calc.) Streambed Elev. ~623.55

Drainage Area ~20.9 sq. mi. Crossing Location ☐ Rural ☒ Urban

Crossing Located within a Mapped National Flood Insurance Program Area ☒ Yes ☐ No (Map No. 17097C0291K)

Crossing Located within a Northeast Region (District #1) FEMA Mapped Floodway ☒ Yes ☐ No (Zone AE)

Crossing Located over designated "Public Bodies of Water" ☐ Yes ☒ No

Design Flood Data

Design Flood Frequency 50 yr Design Discharge 1,454 cfs Design High Water Elev. 632.9

Exist. Br. Opening 352 sq.ft. Exist. Over-the-Road 0

Prop. Br. Opening 352 sq.ft. Prop. Over-the-Road 0

100 Year Flood Data

100 Year Discharge 1,751 cfs 100 Year High Water Elev. 633.4 (Calc.)

Exist. Br. Opening 383 sq.ft. Exist. Over-the-Road 0 Exist. Created Head 0.0 ft

Prop. Br. Opening 383 sq.ft. Prop. Over-the-Road 0 Prop. Created Head 0.0 ft

If proposed structure and over-the-road area will not carry entire flow, state kind and area of additional waterway
The proposed structure will carry the entire flow.

Type of Streambed soil Peotone silty clay loam Will drift or ice permit pier in channel ? ☒ Yes ☐ No
Has scour occurred at or near existing structure ? ☒ Yes ☐ No; If yes, reason for scour _____
Modest scour appears to have occurred towards the left (east) abutment due to the upstream pointing skew of the embankment. Existing structure scour rating is 5 by Calculation.
Comments on hydraulic adequacy of existing structure Existing structure is adequate.

Has the existing structure been the cause of demonstrable flood damage to adjacent property? ☐ Yes ☒ No
If yes, describe damage _____

Comments on the hydraulic adequacy of upstream and downstream structures and their comparable relationship to the proposed structure Nearest upstream structures are pedestrian bridges which overtop near to the 10-year event. Next downstream structure at a Private Drive does not overtop for up to 500-yr. The next downstream structure at Lake-Cook Road does not overtop for all events up to 500-yr and is adequate.
Will houses, places of business or valuable property be affected by backwater from the proposed bridge? ☒ Yes ☐ No
If yes, describe property and effect of backwater There is the potential that if backwater were to be increased more than the mapped regulatory 100-year flood elevation, structures may be impacted. The proposed bridge will not cause such an increase. The calculated Base High Water Elevation is less than the FIS regulatory 100-year flood elevation.
Is any channel excavation beyond that required to construct the substructure required in the channel? ☐ Yes ☒ No
If yes, describe extent of channel excavation Any transitional grading will be minimal. Channel excavation is not required. Excavation for proposed bridge abutments should be outside the existing channel.

Will a channel realignment be required? ☐ Yes ☒ No (If yes, attach Channel Change Sketch)
Are stream flow data (gaging station or flood study) available for the stream at or near the proposed site? ☒ Yes ☐ No
(If yes, attach an analysis of the stream flow data)
Provide information regarding high water from other streams, reservoirs, flood control projects, proposed channel changes, strip mine areas or other controls affecting the hydraulic or hydrologic properties of the crossing site _____
A FEMA flood insurance study (FIS) is available. There are no known extraordinary affects on the hydraulic or hydrologic properties of the crossing site.

Scour Analysis

Was a HEC-18 scour analysis performed? ☒ Yes ☐ No
Were all substructure units being utilized evaluated to consider the effect of anticipated scour? ☒ Yes ☐ No
Will scour protection or corrective actions be required? ☒ Yes ☐ No
If yes, describe protection or corrective actions. Proposed vertical wall abutments will be protected with standard riprap. No piers are proposed. Bridge will be approximately same length and opening as the existing bridge. Contraction scour will be prevented via smaller channel riprap (standard sizing).

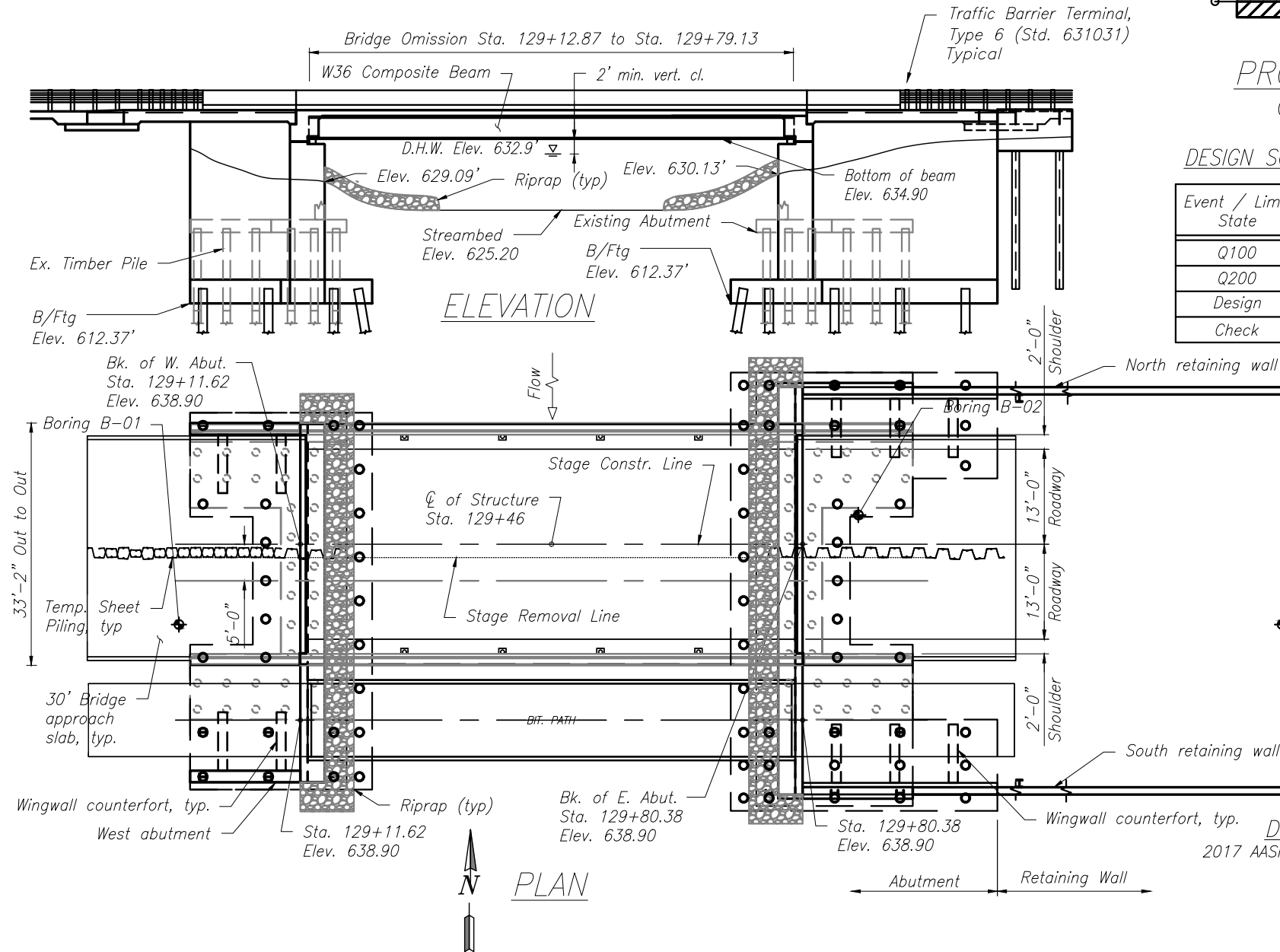
Attachments (Check those items below that are included.)

- ☒ Reproduction of applicable portion of USGS quadrangle showing locations of proposed bridge and properties affected by backwater caused by the proposed structure
- ☒ Cross sections as required by WSPRO including floodplain above high water elevation **(from HEC-RAS)**
- ☒ Streambed profile **(See HEC-RAS profile in Hydraulic Report)**
- ☒ Profile of existing and proposed roadway across floodplain
- ☒ Hydraulic calculations
- ☒ Joint Application Form for construction permit submittals (Joint Form NCR-426) **(to be provided at later date)**
- ☐ Waterway sketch
- ☐ Channel change sketch
- ☒ Applicable certification(s)
- ☐ Boring data
- ☒ Scour analysis/evaluation **(HEC-RAS analysis; Scour Critical Evaluation Coding Report)**
- ☒ Other Permit Summary Form for Floodway Construction in NE Illinois

Bench Mark: -----

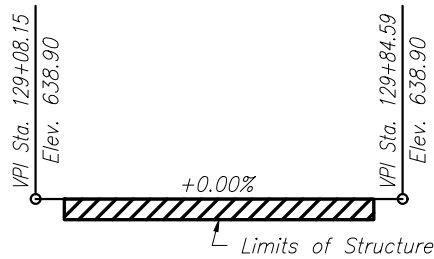
Existing Structures: S.N. 049-6586. Built in 1950 and rehabilitated in 2002 as Clavey Road over the Skokie Ditch. The existing structure consists of a reinforced concrete deck spanning over seven single span steel beams 69'-0" bk. to bk. abutments, 32'-4 1/2" out to out. The contractor shall remove the existing structure except for the existing piles and replace it with a single span wide flange superstructure on semi-integral abutments. The road shall be kept open to one lane of traffic at all times by utilizing stage construction.

Salvage only the existing piles.



WATERWAY INFORMATION

		Exist. Overtopping Elev. =		634.06 ft. (C/L)		at Sta. 133+50			
Drainage Area = ~20.9 sq. mi.		Prop. Overtopping Elev. =		633.96 ft. (C/L)		at Sta. 133+31.38			
Flood Event	Freq. Year	Discharge C.F.S.	Waterway Opening – Sq.Ft.		Natural H.W.E. (ft.)	Head (ft.)		Headwater Elev (ft.)	
			Existing	Proposed		Existing	Proposed	Existing	Proposed
10 Year	10	962	292	292	631.8	0.0	0.0	631.8	631.8
30 Year	30	–	–	–	–	–	–	–	–
Design	50	1,454	352	352	633.1	0.0	0.0	632.9	632.9
Base	100	1,751	383	383	633.6	0.0	0.0	633.4	633.4
Max Calc.	500	2,843	499	499	635.4	0.1	0.1	635.5	635.5



PROFILE GRADE
(Along CL Roadway)

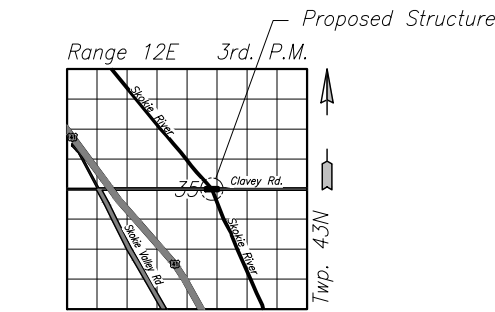
DESIGN SCOUR ELEVATION TABLE

Event / Limit State	Design Scour Elevations (ft.)		
	W. Abut	E. Abut	Item 113
Q100	622.20	615.70	5
Q200	619.56	611.88	
Design	615.70	615.70	
Check	615.70	611.88	

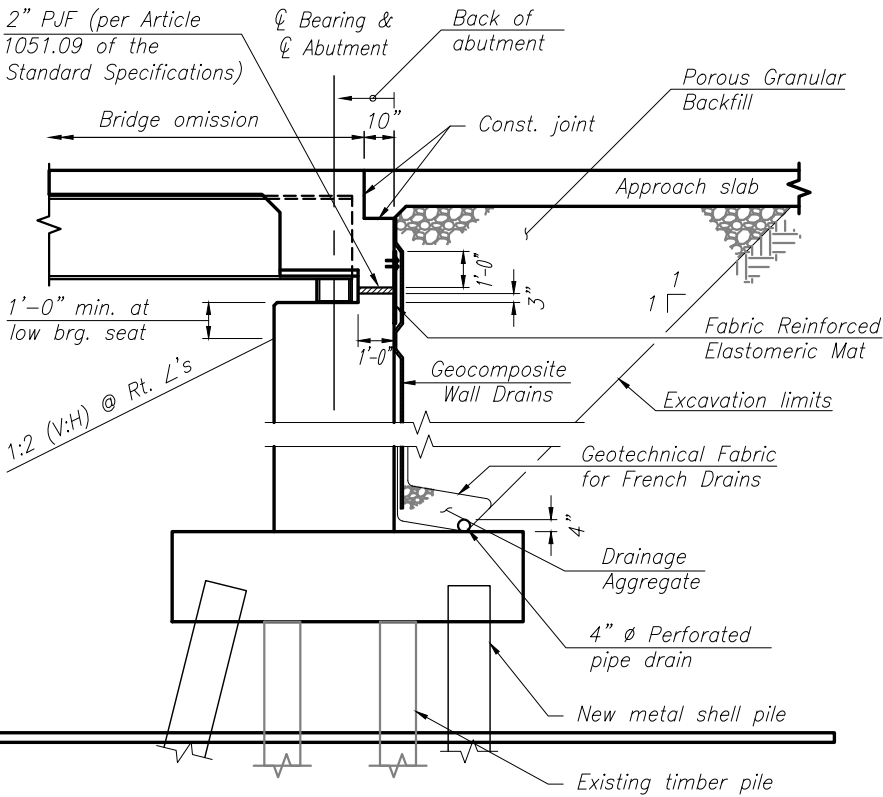
HIGHWAY CLASSIFICATION

Clavey Road
Functional class: Major Collector
ADT: 8568 (2016) 11000 (2040)
ADTT: 171 (2016) 275 (2040)
DHV: 928
Design Speed: 40 mph
Posted Speed: 35 mph (Statute)
Two-way traffic directional distribution: 44/56

DESIGN SPECIFICATIONS
2017 AASHTO LRFD Bridge Design Specifications
8th Edition



LOCATION SKETCH



TYPICAL SECTION THRU SEMI-INTEGRAL ABUTMENT

LOADING HL-93

Allow 50 lb/sq.ft. for future wearing surface

DESIGN STRESSES

Field Units
 $f'_c = 5,000$ psi (Superstructure)
 $f'_c = 3,500$ psi (Substructure)
 $f_y = 60,000$ psi (reinforcement)
 $f_y = 50,000$ psi (M270 Grade 50)

SEISMIC DATA

Seismic Performance Zone (SPZ) = 1
Design Spectral Acceleration at 1.0 sec. (S_{D1}) = 0.057
Design Spectral Acceleration at 0.2 sec. (S_{D5}) = 0.100
Soil Site Class = C

**GENERAL PLAN & ELEVATION
CLAVEY ROAD OVER SKOKIE DITCH
SECTION 15-00125-00-PV
LAKE COUNTY
STATION 129+46.00
STRUCTURE NO. 049-6585**

ROBINSON ENGINEERING, LTD.
CONSULTING REGISTERED PROFESSIONAL ENGINEERS
AND PROFESSIONAL LAND SURVEYORS
17000 SOUTH PARK AVENUE SOUTH HOLLAND, ILLINOIS 60673
(708) 351-6700 FAX (708) 351-8026
© COPYRIGHT
ILLINOIS DESIGN FIRM REGISTRATION NO. 194001128.

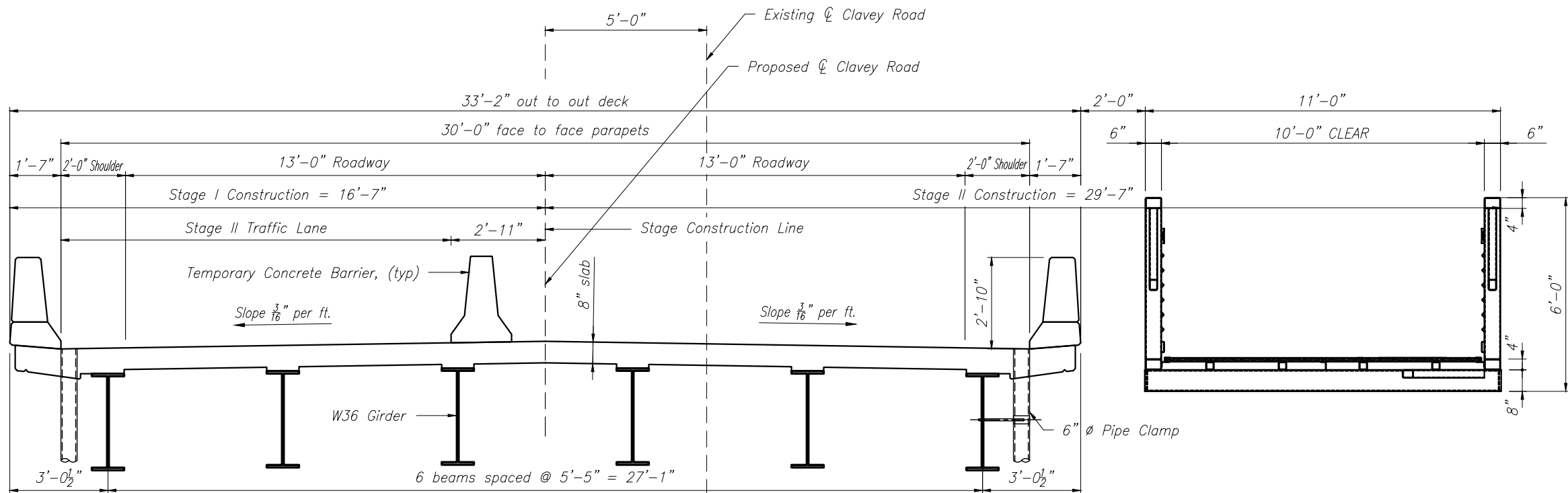
USER NAME =	DESIGNED -- RSF	REVISED --
	CHECKED -- PGV	REVISED --
PLOT SCALE =	DRAWN --	REVISED --
PLOT DATE = 09/13/2018	CHECKED --	REVISED --

**STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION**

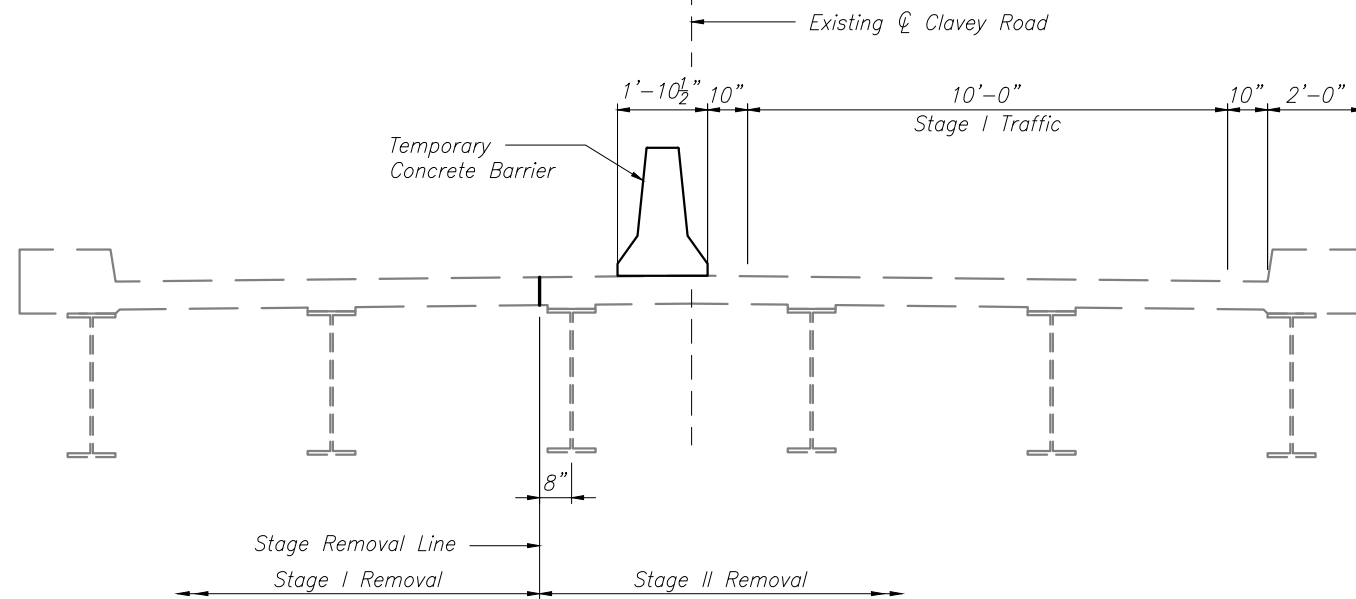
**GENERAL PLAN & ELEVATION
STRUCTURE NO. 049-6585**

SCALE: NOT TO SCALE SHEET NO. 01 OF 05 SHEETS STA. 0+00.00 TO STA. 0+00.00

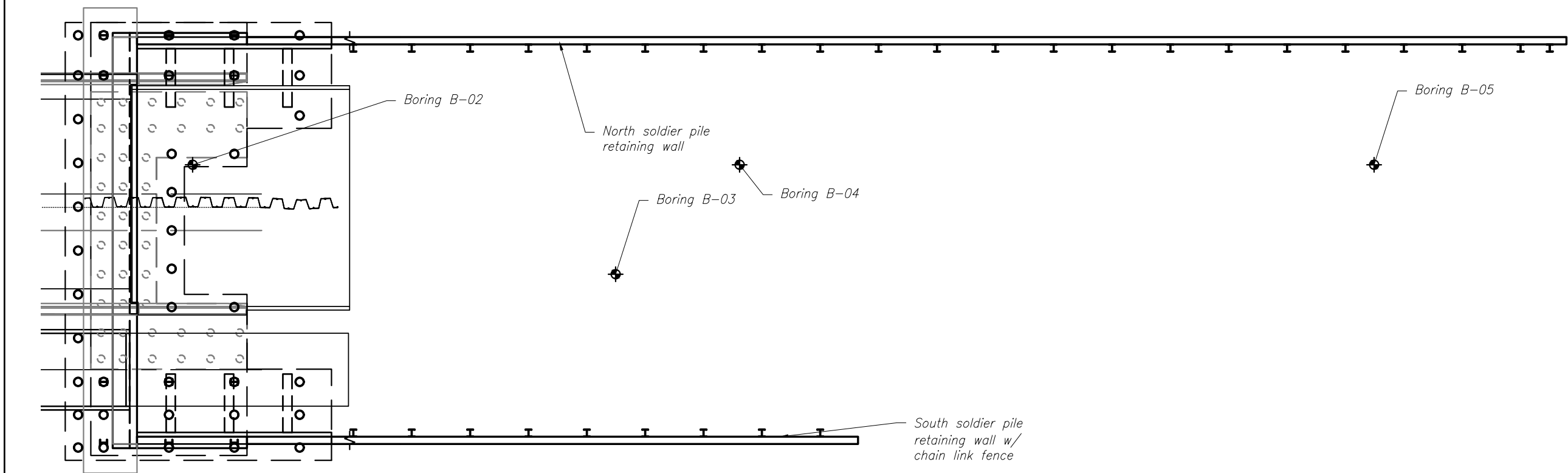
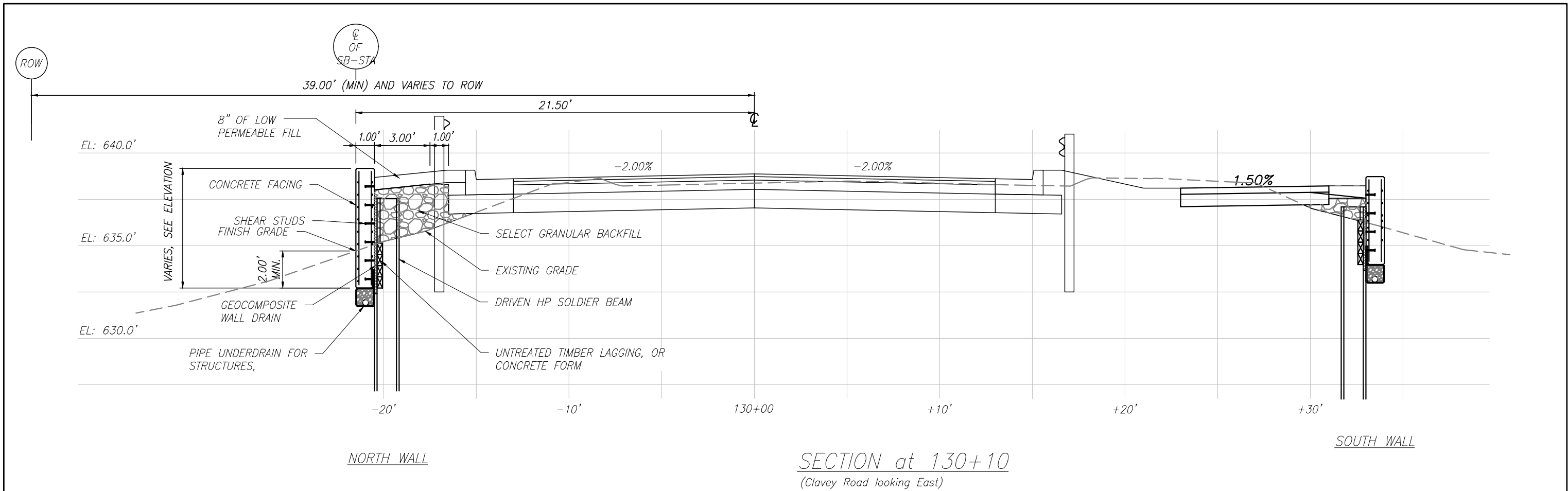
F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
1265	15-00125-00-PV	LAKE		
CONTRACT NO. #####				
FED. ROAD DIST. NO. 1 ILLINOIS FED. AID PROJECT BRM-4003(613)				



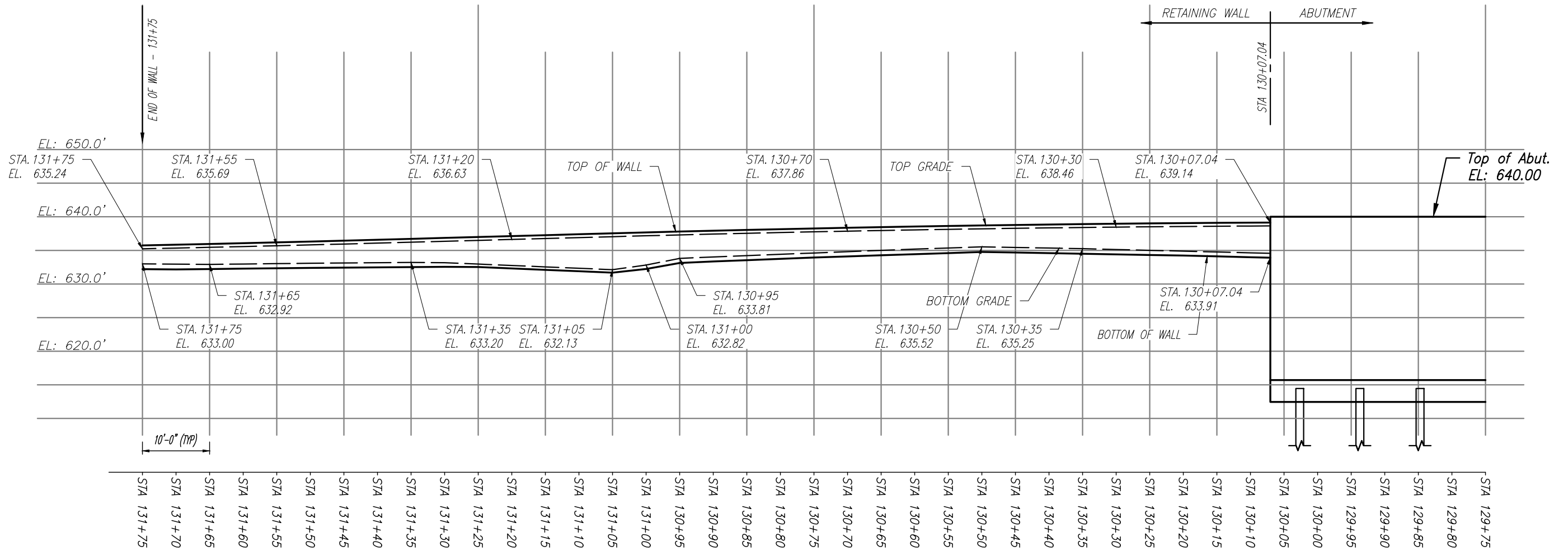
PROPOSED CROSS SECTION



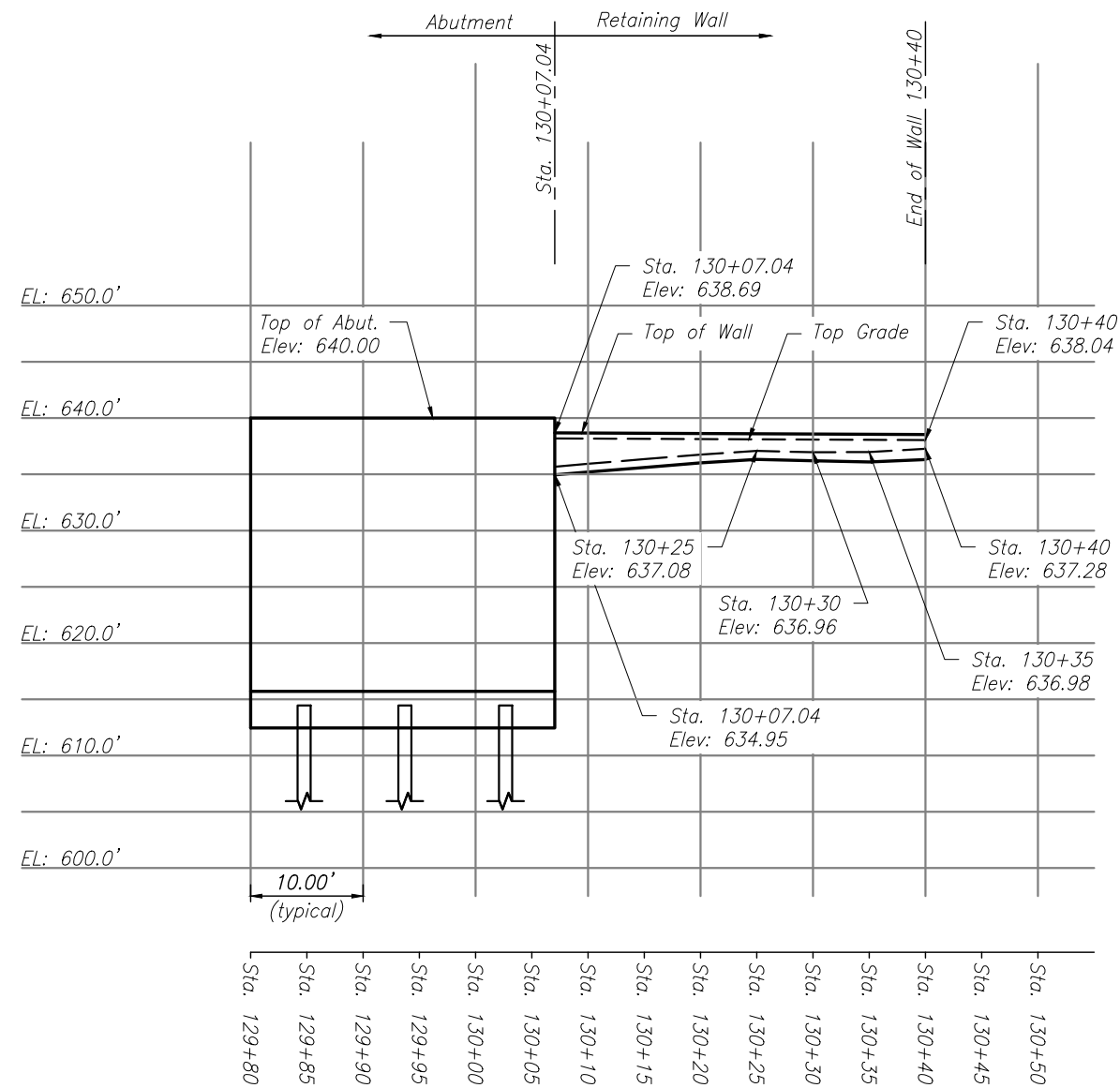
EXISTING CROSS SECTION



ROBINSON ENGINEERING, LTD. CONSULTING REGISTERED PROFESSIONAL ENGINEERS AND PROFESSIONAL LAND SURVEYORS 17000 SOUTH PARK AVENUE SOUTH HOLLAND, ILLINOIS 60673 (708) 331-6700 FAX (708) 331-8525 © COPYRIGHT ILLINOIS DESIGN FIRM REGISTRATION NO. 194001128.	USER NAME =	DESIGNED — RSF	REVISED —	STATE OF ILLINOIS DEPARTMENT OF TRANSPORTATION	ROADWAY SECTION STRUCTURE NO. 049-6585				F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.	
		CHECKED — PGV	REVISED —						1265	15-00125-00-PV	LAKE			
	PLOT SCALE =	DRAWN —	REVISED —		CONTRACT NO. #####									
	PLOT DATE = 09/13/2018	CHECKED —	REVISED —		SCALE: NOT TO SCALE				SHEET NO. 03 OF 05 SHEETS	STA. 0+00.00 TO STA. 0+00.00	FED. ROAD DIST. NO. 1	ILLINOIS	FED. AID PROJECT	BRM-4003(613)



NORTH WALL ELEVATION



SOUTH RETAINING WALL ELEVATION



This form is used for reporting coding recommendations for Scour Critical Evaluation (ISIS Item 113) and other associated ISIS items.

Location and Inventory Information

049 - 6585	LAKE	1
Structure Number	County	District
CLAVEY ROAD	SKOKIE DITCH	
Facility Carried	Feature Crossed	
0.4 M E 41	HIGHLAND PARK	
Location	Bridge Owner	

Scour Critical Evaluation

Report Action:

- ☒ New Evaluation
☐ Re-Evaluation
☐ Error Revision

Refer to IDOT Illinois Highway Information System Structure Information and Procedure Manual for information related to the coding of ISIS Item 113, 113A, 113B, 113C and 113D.

Item 113 – Scour Critical Evaluation: 5 (valid codes: 0-9)
Item 113A – Scour Critical Analysis Date: 09/17/18 (mm/dd/yr)
Item 113B - Scour Critical Evaluation Method: A (valid codes: A, B, C, D)
Item 113C - Scour Critical Analysis by: JAMES HUS
Item 113D - Scour Critical Remarks:

JAMES HUS	ROBINSON ENGINEERING	9/17/18
Submitted by	Agency / Company	Date

Note: Any structure with a Scour Critical Evaluation (Item 113) rating of “1-4” or “7” must have a Scour Plan of Action (POA). Program Managers should be notified, and a scour POA must be completed and a copy retained in the bridge file. The need for a Special Inspection(s) should be assessed according to Structural Services Manual Figure 3.4.3-1 and Table 3.4.3.

CLAVEY ROAD BRIDGE CROSSING - HIGHLAND PARK, IL**Abutment Scour Analysis***(Reference HEC-18 dated April 2012)*

ROUTE:	CLAVEY ROAD (CLAVEY LANE TO GREEN BAY ROAD)
SECTION:	15-00125-00-PV
STATION:	29+45
COUNTY:	LAKE
FEDERAL PROJ #:	BRM-4003(613)
STRUCTURE #:	049-6586

	10-Year	→ Q10 =	962	cfs
Hydraulic Design Event =	50-Year	→ Q50 =	1,454	cfs
Scour Event =	100-Year	→ Q100 =	1,751	cfs
Check Event =	200-Year	→ Q200 =	2,130	cfs
Max =	500-Year	→ Q500 =	2,843	cfs

Froehlich's Abutment Scour Equation (TRB 1989):

$$\frac{y_s}{y_a} = 2.27 K_1 K_2 \left(\frac{L'}{y_a} \right)^{0.43} Fr^{0.61} + 1 \quad (8.1)$$

where:

- K_1 = Coefficient for abutment shape (Table 8.1)
- K_2 = Coefficient for angle of embankment to flow
- K_2 = $(\theta/90)^{0.13}$ (see Figure 8.5 for definition of θ)
 - $\theta < 90^\circ$ if embankment points downstream
 - $\theta > 90^\circ$ if embankment points upstream
- L' = Length of active flow obstructed by the embankment, ft (m)
- A_e = Flow area of the approach cross section obstructed by the embankment, ft² (m²)
- Fr = Froude Number of approach flow upstream of the abutment = $V_e/(gy_a)^{1/2}$
- V_e = Q_e/A_e , ft/s (m/s)
- Q_e = Flow obstructed by the abutment and approach embankment, ft³/s (m³/s)
- y_a = Average depth of flow on the floodplain (A_e/L), ft (m)
- L = Length of embankment projected normal to the flow, ft (m)
- y_s = Scour depth, ft (m)

HIRE Abutment Scour Equation (FHWA 2001):

(The HIRE equation is applicable when the ratio of projected abutment length (L) to the flow depth (y_1) is greater than 25.)

$$\frac{y_s}{y_1} = 4 Fr^{0.33} \frac{K_1}{0.55} K_2 \quad (8.2)$$

where:

- y_s = Scour depth, ft (m)
- y_1 = Depth of flow at the abutment on the overbank or in the main channel, ft (m)
- Fr = Froude Number based on the velocity and depth adjacent to and upstream of the abutment
- K_1 = Abutment shape coefficient (from Table 8.1)
- K_2 = Coefficient for skew angle of abutment to flow calculated as for Froehlich's equation (Section 8.7.1)

→ Abutment ends to be protected against scour with min. RR4/RR5 size riprap

→ Channel to be protected against contraction scour with min. RR3 size riprap

HEC-RAS Scour Results (HEC-18 Methodology) **Clavey Road Bridge - Highland Park, IL** **10-YR Skokie River**

Hydraulic Design Data

Contraction Scour

	Left	Channel	Right
Input Data			
Average Depth (ft):	1.19	5.98	0.13
Approach Velocity (ft/s):	0.82	3.29	0.22
Br Average Depth (ft):	1.61	6.15	0.37
BR Opening Flow (cfs):	8.17	953.42	0.42
BR Top WD (ft):	4	46	2.42
Grain Size D50 (mm):	0.01	0.01	0.01
Approach Flow (cfs):	75.18	885.63	1.19
Approach Top WD (ft):	76.78	45	41.69
K1 Coefficient:	0.69	0.69	0.69

Results

Scour Depth Ys (ft):	0	0.12	0.13
Critical Velocity (ft/s):	0.37	0.48	0.26
Equation:	Live	Live	Clear

Abutment Scour

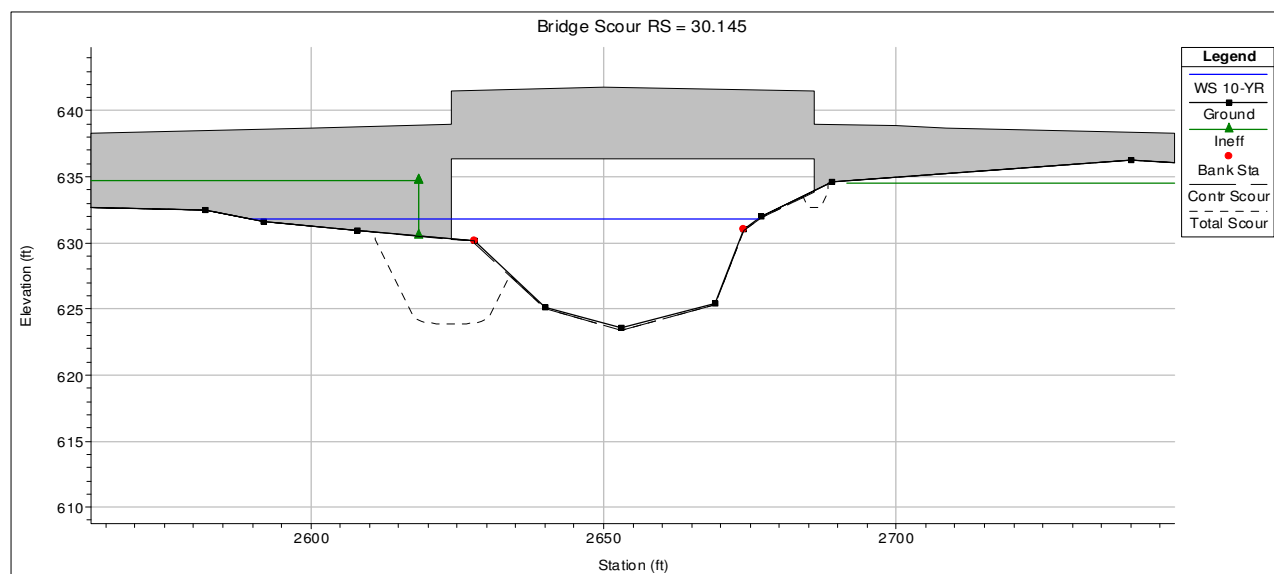
	Left	Right
Input Data		
Station at Toe (ft):	2624	2686
Toe Sta at appr (ft):	1657	1718
Abutment Length (ft):	76.78	41.69
Depth at Toe (ft):	1.53	0.32
K1 Shape Coef:	1.00 - Vertical abutment	
Degree of Skew (degrees):	119	61
K2 Skew Coef:	1.04	0.95
Projected Length L' (ft):	67.15	36.46
Avg Depth Obstructed Ya (ft):	1.19	0.13
Flow Obstructed Qe (cfs):	75.18	1.19
Area Obstructed Ae (sq ft):	91.32	5.34

Results

Scour Depth Ys (ft):	6.46	1.16
Froude #:	0.17	0.14
Equation:	HIRE	HIRE

Combined Scour Depths

Left abutment scour + contraction scour (ft):	6.46
Right abutment scour + contraction scour (ft):	1.29



HEC-RAS Scour Results (HEC-18 Methodology)**Clavey Road Bridge - Highland Park, IL****50-YR Skokie River**

Hydraulic Design Data

Contraction Scour

	Left	Channel	Right
Input Data			
Average Depth (ft):	2.14	7.16	1.22
Approach Velocity (ft/s):	1.18	3.58	0.81
Br Average Depth (ft):	2.67	7.21	0.83
BR Opening Flow (cfs):	21.82	1426.87	5.31
BR Top WD (ft):	4	46	7
Grain Size D50 (mm):	0.01	0.01	0.01
Approach Flow (cfs):	222.4	1153.46	78.14
Approach Top WD (ft):	88.34	45	79
K1 Coefficient:	0.69	0.69	0.69

Results

Scour Depth Ys (ft):	0	1.25	0
Critical Velocity (ft/s):	0.41	0.5	0.37
Equation:	Live	Live	Live

Abutment Scour

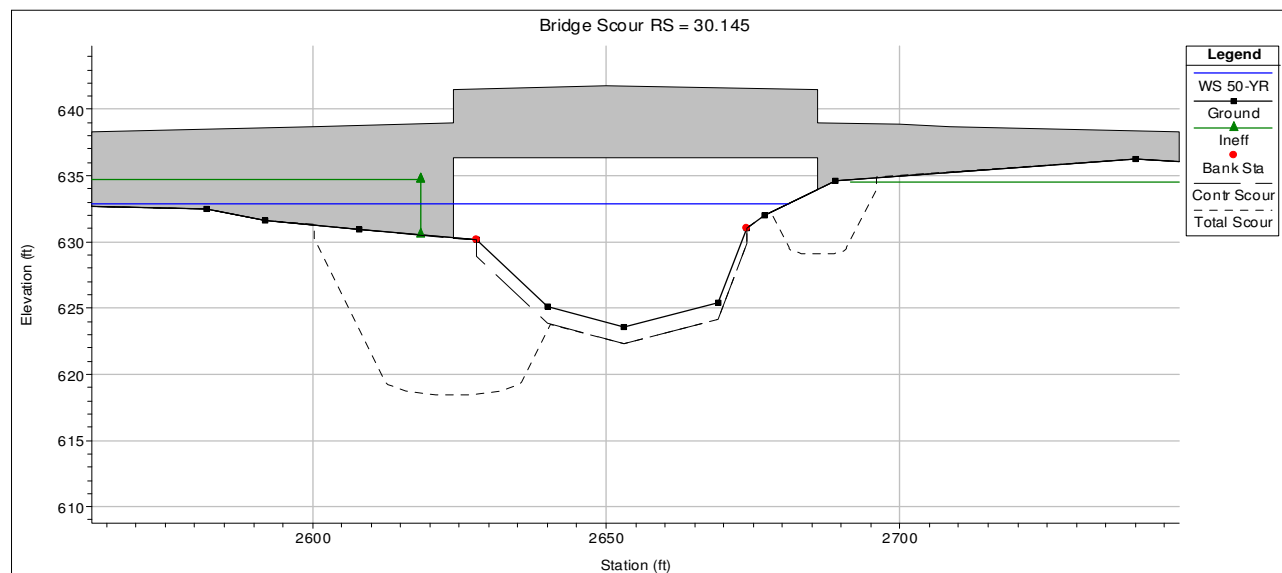
	Left	Right
Input Data		
Station at Toe (ft):	2624	2686
Toe Sta at appr (ft):	1657	1718
Abutment Length (ft):	88.34	79
Depth at Toe (ft):	2.61	1.38
K1 Shape Coef:	1.00 - Vertical abutment	
Degree of Skew (degrees):	119	61
K2 Skew Coef:	1.04	0.95
Projected Length L' (ft):	77.26	69.09
Avg Depth Obstructed Ya (ft):	2.14	1.22
Flow Obstructed Qe (cfs):	222.4	78.14
Area Obstructed Ae (sq ft):	189.22	96.57

Results

Scour Depth Ys (ft):	11.85	4.92
Froude #:	0.21	0.14
Equation:	HIRE	HIRE

Combined Scour Depths

Left abutment scour + contraction scour (ft):	11.85
Right abutment scour + contraction scour (ft):	4.92



HEC-RAS Scour Results (HEC-18 Methodology) **Clavey Road Bridge - Highland Park, IL** **100-YR Skokie River**

Hydraulic Design Data

Contraction Scour

	Left	Channel	Right
Input Data			
Average Depth (ft):	2.62	7.74	1.8
Approach Velocity (ft/s):	1.31	3.7	1.03
Br Average Depth (ft):	3.17	7.71	1.06
BR Opening Flow (cfs):	31.12	1708.41	11.47
BR Top WD (ft):	4	46	9.26
Grain Size D50 (mm):	0.01	0.01	0.01
Approach Flow (cfs):	317.92	1286.68	146.4
Approach Top WD (ft):	92.41	45	79
K1 Coefficient:	0.69	0.69	0.69

Results

Scour Depth Ys (ft):	0	2.01	0
Critical Velocity (ft/s):	0.42	0.5	0.4
Equation:	Live	Live	Live

Abutment Scour

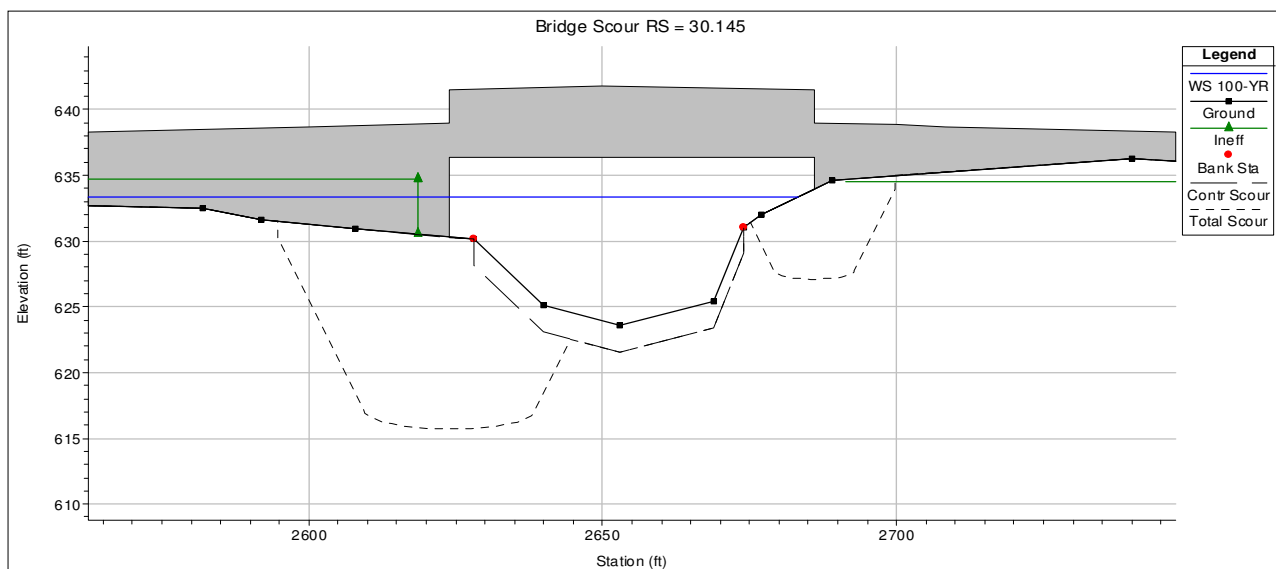
	Left	Right
Input Data		
Station at Toe (ft):	2624	2686
Toe Sta at appr (ft):	1657	1718
Abutment Length (ft):	92.41	79
Depth at Toe (ft):	3.12	1.88
K1 Shape Coef:	1.00 - Vertical abutment	
Degree of Skew (degrees):	119	61
K2 Skew Coef:	1.04	0.95
Projected Length L' (ft):	80.82	69.09
Avg Depth Obstructed Ya (ft):	2.62	1.8
Flow Obstructed Qe (cfs):	317.92	146.4
Area Obstructed Ae (sq ft):	241.8	142.53

Results

Scour Depth Ys (ft):	14.6	6.89
Froude #:	0.23	0.15
Equation:	HIRE	HIRE

Combined Scour Depths

Left abutment scour + contraction scour (ft):	14.6
Right abutment scour + contraction scour (ft):	6.89



HEC-RAS Scour Results (HEC-18 Methodology) **Clavey Road Bridge - Highland Park, IL** **200-YR Skokie River**

Hydraulic Design Data

Contraction Scour

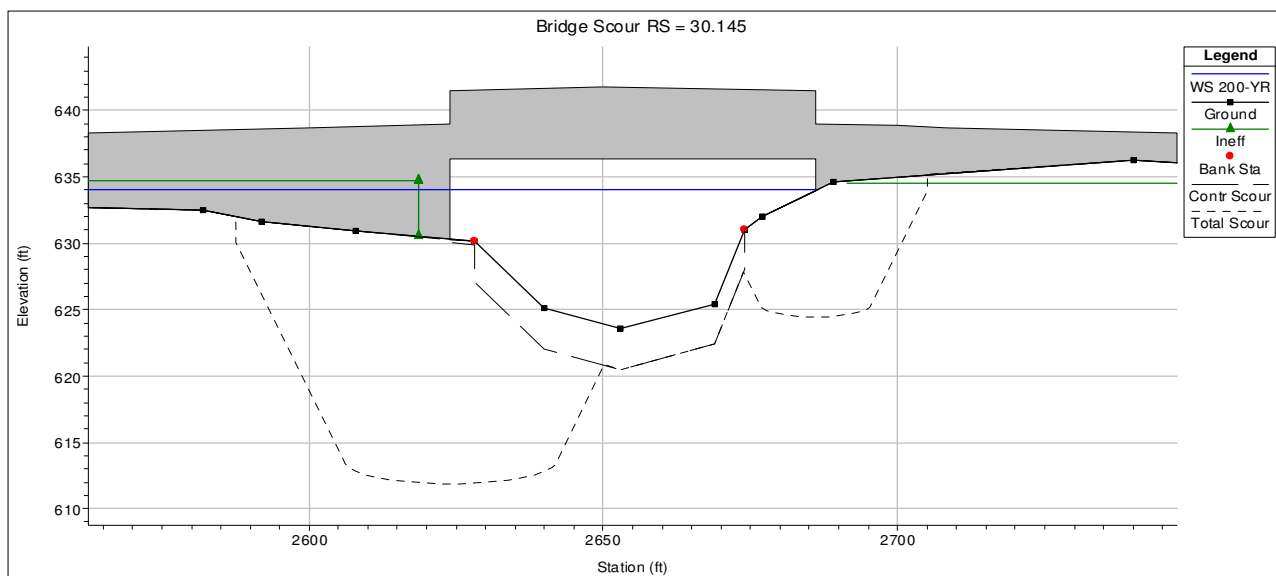
	Left	Channel	Right
Input Data			
Average Depth (ft):	3.21	8.49	2.55
Approach Velocity (ft/s):	1.44	3.75	1.23
Br Average Depth (ft):	3.82	8.36	1.41
BR Opening Flow (cfs):	44.78	2060.34	24.88
BR Top WD (ft):	4	46	12
Grain Size D50 (mm):	0.01	0.01	0.01
Approach Flow (cfs):	449.3	1431.5	249.2
Approach Top WD (ft):	97.66	45	79
K1 Coefficient:	0.69	0.69	0.69
Results			
Scour Depth Ys (ft):	0.21	3.06	0
Critical Velocity (ft/s):	0.44	0.51	0.42
Equation:	Live	Live	Live

Abutment Scour

	Left	Right
Input Data		
Station at Toe (ft):	2624	2686
Toe Sta at appr (ft):	1657	1718
Abutment Length (ft):	97.66	79
Depth at Toe (ft):	3.79	2.54
K1 Shape Coef:	1.00 - Vertical abutment	
Degree of Skew (degrees):	119	61
K2 Skew Coef:	1.04	0.95
Projected Length L' (ft):	470.7	1256.96
Avg Depth Obstructed Ya (ft):	3.21	2.55
Flow Obstructed Qe (cfs):	449.3	249.2
Area Obstructed Ae (sq ft):	313.09	201.79
Results		
Scour Depth Ys (ft):	18.2	9.53
Froude #:	0.25	0.16
Equation:	HIRE	HIRE

Combined Scour Depths

Left abutment scour + contraction scour (ft):	18.42
Right abutment scour + contraction scour (ft):	9.53



HEC-RAS Scour Results (HEC-18 Methodology) **Clavey Road Bridge - Highland Park, IL** **500-YR Skokie River**

Hydraulic Design Data

Contraction Scour

	Left	Channel	Right
Input Data			
Average Depth (ft):	3.82	9.62	2.86
Approach Velocity (ft/s):	0.41	1.04	0.38
Br Average Depth (ft):	5.25	9.79	2.83
BR Opening Flow (cfs):	22.05	777.52	23.22
BR Top WD (ft):	4	46	12
Grain Size D50 (mm):	0.01	0.01	0.01
Approach Flow (cfs):	845.87	450.69	1546.44
Approach Top WD (ft):	538.18	45	1437.15
K1 Coefficient:	0.69	0.69	0.69

Results

Scour Depth Ys (ft):	4.4	5.33	1.1
Critical Velocity (ft/s):	0.45	0.52	0.43
Equation:	Clear	Live	Clear

Abutment Scour

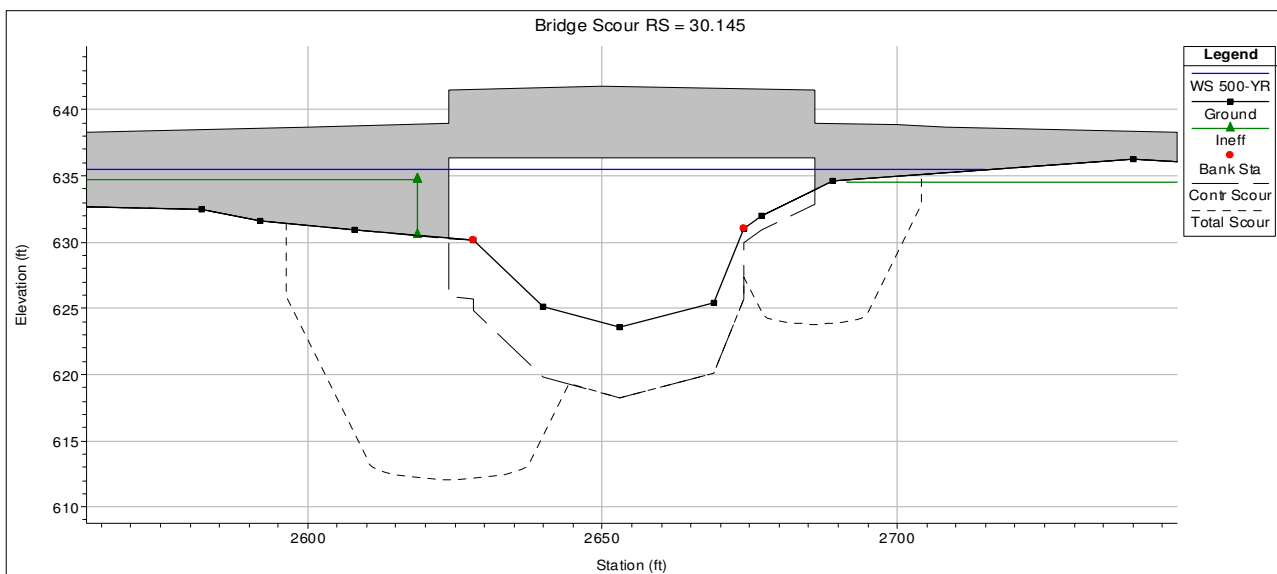
	Left	Right
Input Data		
Station at Toe (ft):	2624	2686
Toe Sta at appr (ft):	1657	1718
Abutment Length (ft):	538.18	1437.15
Depth at Toe (ft):	5.21	3.96
K1 Shape Coef:	1.00 - Vertical abutment	
Degree of Skew (degrees):	119	61
K2 Skew Coef:	1.04	0.95
Projected Length L' (ft):	470.7	1256.96
Avg Depth Obstructed Ya (ft):	3.82	2.86
Flow Obstructed Qe (cfs):	845.87	1546.44
Area Obstructed Ae (sq ft):	2053.53	4107.04

Results

Scour Depth Ys (ft):	13.81	9.09
Froude #:	0.04	0.04
Equation:	HIRE	HIRE

Combined Scour Depths

Left abutment scour + contraction scour (ft):	18.21
Right abutment scour + contraction scour (ft):	10.19





17000 South Park Avenue South Holland, IL 60473-0386 (708)
331-6700 FAX (708) 331-3826

To: IDOT District 1 - Local Roads
201 West Center Court
Schaumburg, IL 60196-1096
Attn: Gerardo Fierro
From: James Hus Jr., PE, PTOE

Date: 2/7/2018
Proj. Name: Clavey Road Reconstruction
Proj. No: 15-528
Subject: BLR 10220 Submittal - Sec 15-00125-00-PV

WE ARE SENDING YOU:

☒ Attached ☐ Under Separate Cover Via _____

The following items:

☐ Prints ☐ Plans ☐ Shop Drawings
☐ Specifications ☐ Copy of Letter ☒ Documents
☐ _____

COPIES	DATE	NO.	DESCRIPTION
4	-	-	Form BLR 10220 - Asbestos Certification - SN 049-6586

THESE ARE TRANSMITTED AS CHECKED BELOW:

☒ For Approval ☐ As Requested ☐ _____
☐ For Your Use ☒ For Review & Comment ☐ _____

REMARKS:

-Gerardo

Per correspondence with Matt Humke of BBS, attached are completed BLR 10220 Asbestos Certification forms for the existing structure over the Skokie River

Please forward onto BBS at your earliest convenience for review. Thank you.

COPY TO: File

SIGNED: James Hus Jr., PE, PTOE jhus@retld.com Phone: 708.210.5685



Asbestos Determination Certification of
Local Highway Bridges



Local Public Agency

CITY OF HIGHLAND PARK

County

Lake

Structure Number (s)

049-6586

Asbestos Determination

1. ☐ The identified structure(s) were included in the 5/10/2002 list the USEPA exempted from the asbestos notification requirement in its letter of October 19, 2001.
2. ☒ The identified structure(s) were unconfirmed for asbestos involvement as of 5/10/2002 but have subsequently been determined, on the basis of information available from the local highway authority, not to involve asbestos in a bituminous bridge deck wearing surface or waterproofing membrane.
3. ☐ The identified structure(s) were unconfirmed for asbestos involvement as of 5/10/2002 but have subsequently been determined, through testing, not to contain asbestos in a bituminous bridge deck wearing surface or waterproofing membrane. The test results were obtained in conformance with the approved "Sampling and Testing Procedures for Asbestos in Bituminous Bridge Deck Wearing Surface or Waterproofing Membrane" (Reference BDE Manual, Chapter 27). Attach the result of testing procedures from approved testing facility.
4. ☐ The identified structure(s) have been determined to involve asbestos in a bituminous bridge deck wearing surface and/or waterproofing membrane. The local highway authority will ensure compliance with the asbestos notification requirements for work on these structures that could disturb the asbestos-containing materials. The local highway authority also will ensure that the special provision for "Asbestos Waterproofing Membrane and Asbestos Bituminous Concrete Surface Removal" is included in any contract for demolition of these structures or for other work involving removal of the existing bituminous bridge deck wearing surface and/or waterproofing membrane. Attach result of testing procedures from approved testing facility.
5. ☐ The identified structure(s) had been determined to involve asbestos in a bituminous bridge deck wearing surface and/or waterproofing membrane. Removal operations have been completed for all asbestos bituminous concrete surface and asbestos waterproofing membrane on the identified structures in accordance with USEPA requirements.

Certification

Name

JAMES HUS JR., PE, PTOE

Title

PROJECT ENGINEER

Office Address

17000 SOUTH PARK AVENUE, SOUTH HOLLAND, IL 60473

E-mail

JHUS@RELTD.COM

Phone Number

(708) 210-5685

License Number of Registered Professional Engineer

062.068024

Signature of Engineer

Date

02/07/18