STRUCTURE GEOTECHNICAL REPORT

RAMP G OVER RAMP F
(STATION 733+14.83)
Proposed SN: 010-1003

FAI RTE. 57/74
Section 10 (5-1-RS-1, 14-1,6) R
Champaign County

Contract No.: 70897
P-95-030-11
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8/22/16

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(Revision 1): June 17, 2015
(Original): April 15, 2015

Attachments: Boring Location Map
Preliminary TS&L
Subsurface Boring Logs
Boring Profile Sheet
Pile Tables
Est. Factored Loadings

1.0 Project Description

The purpose of this geotechnical study is to explore the existing subsurface conditions present at the proposed structure location (SN 010-1003) (Station 733+14.83 – Ramp G) carrying I-74 over I-57 (Ramp G over Ramp F) in Section 10R, Township 20 North, Range 8 East of the 3rd PM in the city of Champaign, Champaign County, Illinois. In addition, to determined engineering properties of the subsurface soil, and develop design and construction recommendations for the project.

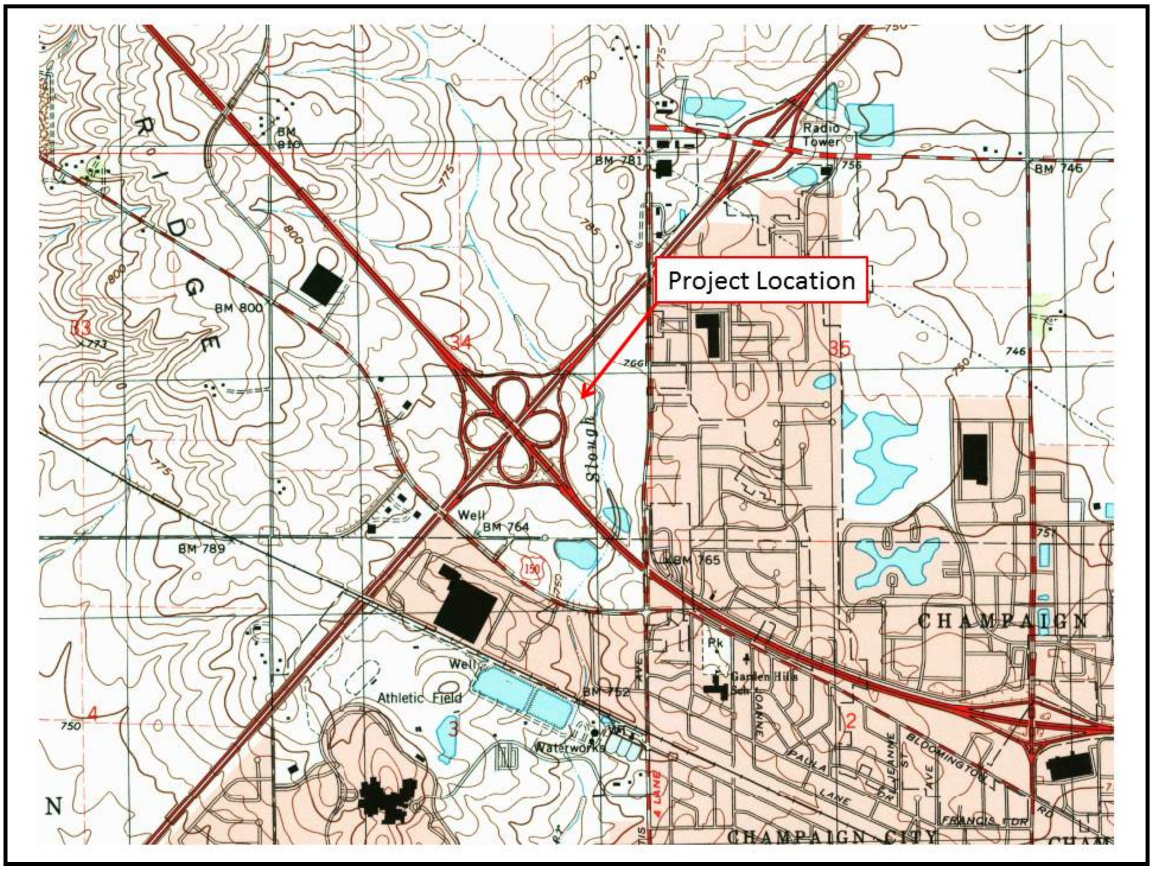

Exhibit 1: Project Location Map

2.0 Proposed Structure Information

Proposed Structures (SN 010-1003)

Based on the preliminary TS&L, the proposed structure (SN 010-1003), Station 733+14.83 will consist of a single span supported by one of two abutment options that are being considered. Two new 30 feet long approach slabs will be constructed on either end of the bridge.

The first abutment option is a PPC Bulb Tee (IL63-2438) on integral abutments with an estimated abutment length of 35' – 8". The superstructure will consist of tangent girders on a curved alignment with back to back abutment distances of 122'-11 ¼". Abutments will bear on single row of vertical steel piles.

The second abutment option is Steel Plate Girder with a 60 inch web depth on stub abutments with an abutment length of 34' – 0". The superstructure for this option would include a curved girder on curved alignment with back to back abutment distances of 124'-9 ¼". Abutments for this type of abutment will bear on two rows of piles with vertical back row and 12:3 battered pile front along the abutment and piles along the wings.

Final abutment type will be chosen based on efficiency, cost and district preference. The Type, Size and Location (TS&L) plan for the Ramp G over Ramp F has been included in the Appendix.

3.0 Existing Site Conditions

The existing location of the proposed structure is currently vacant land with elevation ranges from Elev. 756.16 to 756.36. Embankments heights of between approximately 32 to 34 feet in height are proposed in the general area.

3.1 Regional Geology

According to the Illinois State Geological Survey, "Bedrock Geology of Illinois" map, the site and surrounding area is situated in the Illinois Basin and is underlain by the Pennsylvanian-aged Tradewater Formation. The Illinois Basin is a Paleozoic depositional and structural basin centered in and underlying most of the state of Illinois. An Illinois Basin study reveals that the Tradewater Formation is composed of 70 to 80 percent shale and siltstone, 20 to 30 percent sandstone, and generally less than 5 percent coal and limestone. The Tradewater Formation is overlain by the Wedron Group, which is composed of mostly glacial till (an unsorted mixture of clay, silt, sand, and gravel) in broad ridges (last glaciation), and forms end moraines. The Wedron Group is finally capped by the

Peoria and Roxana Silts, which are composed of windblown silt (loess) generally thicker than 20 feet blankets upland surfaces in these areas.

4.0 Subsurface Exploration and Generalized Subsurface Conditions

This section describes the subsurface exploration program and laboratory testing program completed as part of this Structure Geotechnical Report (SGR). The locations and subsurface data were provided by McCleary Engineering and were completed based on field conditions and accessibility. Therefore, no site observations have been made by BFW relative to existing conditions of the structure, roadway or of subsurface sample conditions. The locations of the soil borings are shown on the Boring Location Map located in the Appendix. The subsurface exploration program was performed in accordance with applicable IDOT geotechnical manuals and procedures.

4.1 Subsurface Exploration

The site subsurface exploration was conducted from January 30 to February 2, 2015 and included advancing a total of two (2) standard penetration test (SPT) borings within the vicinity of the proposed abutment locations. The locations of the soil borings are shown on the **Boring Location Map** provided in the Appendix.

Table 1 – Summary of Subsurface Exploration US 150

Boring ID	Location	Station	Offset	Depth (feet)	Surface Elevation (feet)
B-30	South Abutment	732+43.65	5.51 LT	75	756.36
B-31	North Abutment	733+92.77	5.73 LT	75	756.36
B-40/41	Pier (N/A)	732+89.34	5.66 LT	75	756.16

The soil borings were drilled using a track mounted drill rig. All of the borings were drilled using 3¼ - inch I.D. hollow stem augers. Soil sampling was performed according to AASHTO T 206, "Penetration Test and Split Barrel Sampling of Soils." Soil samples were obtained at 2.5 foot intervals to a minimum depth of 20 feet below existing grade and 5 foot intervals thereafter. McCleary Engineering field representative inspected, visually classified and logged the soil samples during the subsurface exploration activities, and performed unconfined compressive strength tests on cohesive soil samples using a calibrated Rimac compression tester and a calibrated hand penetrometer in accordance with IDOT procedures and requirements. Representative soil samples were collected from each sample interval, and were placed in jars and returned to the laboratory for further testing and evaluation.

4.2 Laboratory Testing

All samples were inspected in the laboratory to verify the field classifications. A laboratory testing program was undertaken to characterize and determine engineering properties of the subsurface soils encountered in the area of the proposed bridge.

The following laboratory tests were performed on representative soil samples:

- Moisture content ASTM D2216 / AASHTO T-265
- Grain Size Analysis ASTM C136 / AASHTO T-88 / AASHTO T-90
- Unconfined compression ASTM D2166 / AASHTO T-208

The laboratory tests were performed in accordance with test procedures outlined in the IDOT Geotechnical Manual (1999) and per ASTM and AASHTO requirements. Based on the laboratory test results, the soils encountered were classified according to the AASHTO classification system. The results of the laboratory testing program are included in the Appendix and are shown along with the field test results in the Soil Boring Logs also located in the appendix.

4.3 Subsurface Conditions

This section provides a brief description of the soils encountered in the borings performed in the vicinity of the proposed improvements. Variations in the general subsurface soil profile were noted during the drilling activities. Detailed descriptions of the subsurface soils are provided in the Soil Boring Logs located in the Appendix and are shown graphically in the Subsurface Profiles. The soil boring logs provide specific soil conditions encountered at each soil boring location. The soil boring logs include soil descriptions, stratifications, penetration resistance, elevations, location of the samples and laboratory test data. Unless otherwise noted, soil descriptions indicated on boring logs are visual identifications. The stratifications shown on the boring logs represent the conditions only at the actual boring locations, and represent the approximate boundary between subsurface materials; however, the actual transition may be gradual.

Subsurface information was obtained during a geotechnical investigation conducted over the entire proposed I-57 / I-74 interchange modifications. Borings B-30, B-31 and B-40/41 were advanced in support of Proposed Structure 010-1003 from January 30 to February 2, 2015 along the proposed ramp alignment.

Bridge Abutments

Boring **B-30**, was advanced near the proposed south abutment, located at Station 732+32.06 (Elev. 756.36'). The boring was advanced in a relatively flat area, with approximately 12 inches of topsoil overlying the soil at each location. The soil profile underlying the topsoil in boring **B-30** is described as dark brown stiff silty clay, which extends to approximately 4 feet deep (Elev. 752.36'), where the material transitions to a loose brown sandy gravel with silt and clay. The upper soils had SPT N-values in the range of 2 to 9 and an unconfined compressive strength (Qu) of 1.5. By approximately 8 feet (Elev. 748.36'), the soil transitions to a very stiff gray silty clay loam till that extended to approximately 27 feet. The silt clay loam till soils had SPT N-values ranging from 10 to 16 and unconfined compressive strength (Qu) values from 2.27 to 2.68. At about 27 feet deep (Elev. 729.36'), a gray medium dense sand and gravel is encountered, extending deeper to approximately 32 feet deep (Elev. 724.36'). At this depth, the material changes to a gray hard silty clay loam till and continues to boring completion depth of 75 feet deep (Elev. 681.36'). The silty clay loam soils had SPT N-values ranging from 15 to 23 and unconfined compressive strength (Qu) values from 1.65 to 2.27.

Boring **B-31**, was advanced near the proposed north abutment was located at Station 733+81.80 (Elev. 756.36'). In boring **B-31**, underlying the topsoil layer is a stiff brown silty clay. The upper soils had SPT N-value of 5 and an unconfined compressive strength (Qu) of 0.91. By approximately 3 feet deep (Elev. 753.36'), the material changes to a loose, loamy medium to coarse wet sand. The sand had SPT N-values in the range of 4 to 8. At approximately 8 feet deep (Elev. 748.36'), the sand becomes mixed with gravel, exhibiting a medium dense consistency. The sand and gravel had SPT N-values of 25. By approximately 12 feet deep (Elev. 744.36'), the soil changes to a gray stiff silty clay loam till that continued in depth to approximately 22 feet deep (Elev. 734.36'). The silty clay loam till soils had SPT N-values in the range of 11 to 12 and unconfined compressive strengths (Qu) between 0.74 to 1.25. At about 22 feet the soil changes to a gray medium dense sand with trace gravel. The sandy soils had SPT N-values in the range of 22 to 27. By approximately 32 feet deep (Elev. 724.36'), the soil changes to a gray stiff silty clay loam till. This till continues with depth, becoming very stiff with trace sand, to boring completion depth of 75 feet deep (Elev. 681.36'). The soils had SPT N-values in the range of 16 to 32 and an unconfined compressive strength (Qu) between 1.46 to 3.09.

Borings **B-40 and B-41**, were originally intended as separate pier location boring but were combined to one boring **B-40/41** located at Station 732+89.34. Based on the preliminary TS&L the structure now has a single span and therefore no pier will be used. Boring **B-40/41** is presented for additional soils data. In boring **B-40/41**, underlying the topsoil layer is a moist stiff brown silty clay is encountered. By approximately 2.5 feet deep (Elev. 753.16'), the material changes to a loose brown clayey sand and gravel which increase in density with depth. At approximately 8.0 feet deep (Elev. 748.16'), the soil changes to a gray silty clay loam till where it transitions to sand and gravel at at depth of 27' (Elev. 729.16). The soil had SPT N-values ranging from 10 to 67. By approximately 32 feet deep, a stiff, wet gray silty clay till is encountered and extends to boring completion depths of 75 feet (Elev. 681.16).

4.4 Groundwater Conditions

Water levels were checked in each boring to determine the general groundwater conditions present at the site and were measured while drilling and after each boring was completed.

Groundwater was identified in each boring as follows:

Table 2 – Groundwater Elevations

Boring	Groundwater Elevation (At time of drilling)	Groundwater Elevation (@ boring completion)
B-30 (South Abut)	751.9	729.4
B-31 (North Abut)	748.4	N/A

No 24-hour groundwater readings were noted. No streambed elevations or surface water elevations were noted.

Water level readings were made in the boreholes at times and under conditions shown on the boring logs and stated in the text of this report. However, it should be noted that fluctuations in groundwater level may occur due to variations in rainfall, other climatic conditions, or other factors not evident at the time measurements were made and reported.

5.0 Geotechnical Evaluations

The section provides geotechnical analysis and recommendations for the design of the proposed bridge based on the results of the field exploration, laboratory testing, and geotechnical analysis.

5.1 Derivation of Soil Parameters for Design

Unit weights, friction angles and shear strength parameters were estimated using soil shear strength values and standard penetration test (SPT) using published correlations for N values results. **Table 3** - presents generalized soil parameters to be used based for designs on the laboratory and in-situ testing data:

Table 3 – Summary of Soil Parameters

Approximate Depth / Elevation (feet)	Soil Description	In situ Unit Weight γ (pcf)	Undrained		Drained	
			Cohesion c (psf)	Friction Angle Φ (degrees)	Cohesion c (psf)	Friction Angle Φ (degrees)
752' to surface	Silty Clay	120	1200	0	100	28
744 – 752	Sand / Sand & Gravel	130	0	34	0	34
729 – 744	Silty Clay Till	125	2,000	0	125	28

5.2 Settlement

The new approach slabs on either end of the bridge will be supported by new engineered fill. It is anticipated that approximately 32 feet (at the North abutment) and 34 feet (at the South abutment) will be placed at the new embankment approaches. Based on preliminary settlement calculations, the increase in stress due to the increase in fill would produce settlements in the range of less than 3-inch near the north and south abutments due to the consolidated nature of the site with interspersed dense sand lenses. The anticipated settlement should not adversely affect the approach pavements due to due primary settlement occurring during construction activities.

Piles are anticipated to be used at the bridge abutments and it is necessary to ensure by the use of settlement plates, enough settlement has taken place such that 0.4-inches or less of settlement remain prior to the installation of the piles to minimize the effects of any down drag forces on the piles. If this is not acceptable under an accelerated construction schedule, the SGR author should be contacted in order to provide alternate solutions that deal with downdrag issues. These solutions may include the use of wick drains to speed up settlement, or the use of precoring, or accounting for downdrag in the pile design (if possible.)

It is recommended that Settlement Platforms be constructed near Station 723+30 Offset 15' Rt. for the south abutment and Station 724+90 Offset 15' Lt for the northern abutment. Settlement plates shall be installed prior to embankment construction for monitoring the rate and amount of settlement throughout the embankment construction.

5.3 Slope Stability – Bridge Abutments

The proposed construction of Ramp G over Ramp F involves the construction of new abutments with end slopes. The proposed abutments types being considered are integral or stub with endslopes at 2 horizontal to 1 vertical (2H:1V). Slope stability of the bridge abutments was evaluated using a slope stability analysis software: *GSTABL7 with STEDwin.*

The proposed side slopes were analyzed based on the grading and the soils encountered during subsurface exploration. Three analyses were evaluated using the Bishop and Janbu analyses methods for the proposed slope geometry: end-of-construction (short term - undrained), long-term (drained) and a design seismic event. The analyses were performed using the soil parameters in Table 3 above. A critical factor of safety (FOS) was calculated for each condition. According to the current standard of practice, the target FOS is 1.5 for end-of-construction and long-term slope stability and 1.0 for the design seismic event.

In an effort to model the end-of-construction conditions, full cohesion we used with a friction angle of 0 degrees assumed. Nominal values for cohesion were used with full friction angle to model the long-term and seismic conditions to analyze the condition where pore water pressure has dissipated. The results of the analysis are shown on the following page in Table 4.

Based on the analysis performed, the proposed slopes meet the minimum required factor of safety of 1.5 (end-of-construction, long-term) and 1.0 (seismic).

Table 4 – Stability Analysis Results – Bridge Abutments

Boring Location	Slope	Calculated Critical FOS		
		End-of-Construction	Long Term	Seismic
B-30, South Abut	2H:1V	2.8	1.8	1.5
B-31, North Abut	2H:1V	2.8	1.8	1.5

5.4 Seismic Parameters

The seismic hazard for the site was analyzed per the IDOT Geotechnical Manual, IDOT Bridge Design Manual, and AASHTO LRDF Bride Design Specifications. The Seismic Soil Site Class was determined per the requirements of All Geotechnical Manual Users (AGMU) Memo 9.1, Design Guide for Seismic Site Class Determination, and the "Seismic Site class Determination" Excel spreadsheet provided by IDOT.

The proposed bridge has a total length less than 130 feet, with no single span longer than 200 feet, therefore, a global Site Class Definition was determined for this project Based on the seismic hazard maps the following coefficients should be used in design:

$\mathbf{S_s}$=0.146 g, $\mathbf{F_a}$=1.60; therefore Design Spectral Accelerations at 0.2 sec, ($\mathbf{S_{Ds}}$)=0.233g
$\mathbf{S_1}$=0.056 g, $\mathbf{F_v}$=2.40; therefore Design Spectral Accelerations at 1.0 sec, ($\mathbf{S_{D1}}$)=0.135g

According to Table 3.10.3.1-1 (Site Class Definitions) of the 2008 AASHTO LRFD Manual, the project site soil profile is most accurately described as the AASHTO Soil Site Class D. According to Table 3.10.6-1 (Seismic Zones) of the 2008 AASHTO LRFD Manual, the Seismic Performance Zone is most accurately described as (SPZ)=1 (F_vS_1#0.15)

Liquefaction analysis was conducted using Design Guide AGMU Memo 10.1 – Liquefaction Analysis. As noted in the previous paragraph the Seismic Performance Zone (SPZ) is SPZ – 1 and the Peak Ground Acceleration (PGA) modified by the zero-period site factor, F_{pga} is less than 0.15. Therefore, no liquefaction of soil layers is anticipated to occur.

Table 5 – Seismic Coefficients Summary Table

Seismic Performance Zone (SPZ)	1
Design Spectral Acceleration at 0.2 sec. ($\mathbf{S_{DS}}$)	0.233 g
Design Spectral Acceleration at 1.0 sec. ($\mathbf{S_{D1}}$)	0.135 g
Soil Site Class	D

5.5 Scour

The proposed bridge structure carrying Ramp G will cross over Ramp F and no waterways are in the vicinity of the proposed project; therefore scour will not be a concern for this project.

5.6 Mining Activity

Based on a review of the Illinois State Geological Survey's on-line collection of County Coal Maps and Directories, the proposed structure is not located over a mine or mined out area.

5.7 Liquefaction

Based on the AGMU Memo 10.1 – Liquefaction Analysis Seismic Performance Zones 3 and 4 required liquefaction analysis, as well as, SPZ 2 with a Peak Seismic Ground Surface Acceleration, As equal to or greater than 0.15. The subject site is in SPZ 1 with a less than 0.15. Therefore liquefaction was not considered as a reduction for the pile design capacity or other foundation considerations included herein.

5.8 Approach Slabs

Based on information from the structural engineer, the approach slabs are 30 feet in length and will be cast-in-place. In accordance with the IDOT Bridge Manual, BFW evaluated the foundation soils at the approach slabs for bearing capacity and excessive settlement. With proper compaction of the approach subgrades, the bearing capacity and settlement requirements of the IDOT Bridge manual will be satisfied.

6.0 Foundation Type Evaluation and Design Recommendations

6.1 Foundation Type Feasibility

Based on the preliminary TS&L, the proposed structure (SN 010-1003), Station 733+14.83 will consist of a single span supported by one of two abutment options that are being considered. Two new 30 feet long approach slabs will be constructed on either end of the bridge.

The first abutment option is a PPC Bulb Tee (IL63-2438) on integral abutments with an estimated abutment length of 35' – 8". The superstructure will consist of tangent girders on a curved alignment with back to back abutment distances of 122'-11 ¼". Abutments will bear on single row of vertical steel piles.

The second abutment option is Steel Plate Girder with a 60-inch web depth on stub abutments with an abutment length of 34' – 0". The superstructure for this option would include a curved girder on curved alignment with back to back abutment distances of 124'-9 ¼". Abutments for this type of abutment will bear on two rows of piles with vertical back row and 12:3 battered pile front and piles along the wing.

The proposed abutment type for this structure is either integral or stub depending on the type of superstructure chosen. According to the IDOT Bridge manual, Section 3.8.3 on Integral Abutments, metal shell or HP-piles are permitted based on the overall length of the bridge. Metal shell or HP-piles are also permitted for stub abutment.

6.2 Driven Pile Supported Foundations

Piles considered for this site include HP-piles and metal shell piles. The Modified IDOT static method Excel spreadsheet was used to estimate the pile lengths at various axial geotechnical resistances for driven piles per AGMU Memo 10.2. Tables 7 and 8 summarize the estimated pile lengths at various axial resistances for metal shell piles and HP-piles various sizes piles for the <u>integral</u> abutment option (Tangent Girder on Curved Alignment)

Tables 9 and 10 summarize the estimated pile lengths for various metal shell piles and HP-piles for the stub abutment option (Curved Girder on Curved Alignment). The complete IDOT Pile Design Tables for each substructure are included in the Appendix.

The factored resistance includes reduction for the geotechnical resistance of 0.55 for the pile installation. Based on the results of the subsurface investigation no geotechnical losses due to down drag or liquefaction were included in the axial pile capacity calculations. The anticipated factored structural loadings were obtained from the structural engineer and are provided in Table 6 on the following page.

The Nominal Required Bearing (R_N) represents the resistance the pile will experience during driving as well as assists the contractor in selecting a proper hammer size. The Factored Resistance Available (RF) documents the net long-term axial factored pile capacity available at the top of the pile to support factored substructure loads.

The pile cutoff elevations used for analysis were Elev. 781.48 and Elev. 779.57 for the North and South abutments, respectively for the PPC Bulb Tee option and Elev. 780.47 and 778.80 for the Steel Plate Girder option. The pile cutoff elevation included a 2 feet embedment into the integral abutment for the PPC Bulb Tee option and a 1 feet embedment into the abutment for the stub abutment as required by the Bridge Manual.

Pile shoes should be used for the metal shell due to presence of cobbles within the borings. Pile shoes HP piles should not be required due to the subsurface conditions and the absence of bedrock

Due to the relative consistency between the soil test borings, only one test pile should be required for abutments. A test pile is performed prior to production driving so that actual, on-site field data can be gathered to further evaluate pile driving requirements for the project. This is also the time in which the contractor's proposed equipment and methodologies identified in their Pile Installation Plan can be assessed.

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Table 6: Structural Loadings

I-57 - I 74 INTERCHANGE STRUCTURES Information for Geotechnical Engineering SGR's 03.24.2015				
Structure: RAMP G over RAMP F S.N. 010-1003 No. of Spans: 1			Station 733+14.83	
Option No.		**Superstructure Type / Option**	**Substructure**	
1	Details	**PPC BULB TEE IL63-2438**		
		Superstructure: Tangent Girder on Curved Alignment		
		Substructure Element	ABUT 1	ABUT 2
		Abutment Type: (Integral, Semi Integral, Stub, etc.)	Integral *	Integral *
		Pier Type	n/a	n/a
		Deck Joints	n/a	n/a
		Bearing Type	Fixed	Fixed
		Est. Bottom of Abutment Elevation	779.47	777.80
		Est. Abutment Length	35'-8"	35'-8"
		Est. Pier Bottom of Footing	n/a	n/a
		Est. Pier Footing Dimensions	n/a	n/a
		Total Factored Vertical DL + LL	1,958 Kips *	1,958 Kips *
		Additional Notes / Comments	Single row of vertical steel piles. * Dynamic Load Allowance (IM) included for integral abutment.	
2	Details	**STEEL PLATE GIRDER, WEB DEPTH = 60 IN.**	**Substructure**	
		Superstructure: Curved Girder on Curved Alignment		
		Substructure Element	ABUT 1	ABUT 2
		Abutment Type: (Integral, Semi Integral, Stub, etc.)	Stub	Stub
		Pier Type	n/a	n/a
		Deck Joints	Strip Seal	Strip Seal
		Bearing Type	Elastomeric	Elastomeric
		Est. Bottom of Abutment Elevation	779.47	777.8
		Est. Abutment Length	34'-0"	34'-0"
		Est. Pier Bottom of Footing	n/a	n/a
		Est. Pier Footing Dimensions	n/a	n/a
		Total Factored Vertical DL + LL	1,359 Kips **	1,359 Kips **
		Additional Notes / Comments	Two rows of piles. Vertical back row, 12:3 battered front row. ** Dynamic Load Allowance (IM) not included.	

6.3 Shallow Foundations

Based on the soils encountered, the new span lengths and the amount of embankment fill, shallow foundations are not a feasible option for the proposed substructures of the bridge. It is anticipated that shallow foundations designed for the loads provided will undergo settlement and therefore will not be a feasible option and are not discussed in the report.

Design Capacity Limitations

There are no downdrag, liquefaction, scour, or settlement issues at this structure that would result in the loss of capacity of the piling. Therefore, no design capacity limitations are necessary.

6.4 Lateral Load Resistance

Section 3.10.1.10 of the 2012 IDOT Bridge manual requires performing detailed structure interaction analysis if the factored lateral loading per pile exceeds 3 kips. Lateral loadings applied to pile foundations are typically resisted by battering selected piles, the soil/structure interaction, pile flexure, or a combination of these factors. Based on information provided by the structural engineer the lateral loads were anticipated to be less than 3 kips.

Pile Capacity Tables (Tables 7 & 8)
(PPC Bulb Tee Option – Integral Abutment)

Table 7 – North Abutment

Piling Driven at North Abutment (B-31 data)		
Nominal Required Bearing (Kips)	Factored Resistance Available (Kips)	Estimated Pile Length (Ft)
Metal Shell 12" Φ w/0.25 walls		
279	154	58
304	167	63
317	174	66
340	187	71
353*	194*	73
Metal Shell 14" Φ w/0.25" walls		
330	181	58
358	197	63
372	205	66
399	219	71
413*	227*	73
Metal Shell 14" Φ w/0.312 walls		
399	219	71
428	235	76
469	258	81
491	270	86
513*	282*	89
HP 12 x 53		
267	147	81
278	153	86
290	159	88
300	165	91
346**	190**	93
HP 12 x 74		
274	150	81
284	156	86
296	163	88
307	169	91
355**	195**	93
HP 14 x 73		
323	177	83
334	183	86
348	192	88
360	198	91
423**	233**	93

Table 8 – South Abutment

Piling Driven at South Abutment (B-30 data)		
Nominal Required Bearing (Kips)	Factored Resistance Available (Kips)	Estimated Pile Length (Ft)
Metal Shell 12" Φ w/0.25 walls		
230	126	50
271	149	55
301	165	60
340	187	65
353*	194*	70
Metal Shell 14" Φ w/0.25" walls		
272	150	50
324	178	55
358	197	60
402	221	65
413*	227*	67
Metal Shell 14" Φ w/0.312 walls		
402	221	65
434	238	70
462	254	75
490	270	80
513*	282*	85
HP 12 x 53		
334	184	80
355	195	85
380	209	90
408	255	95
418**	230**	98
HP 12 x 74		
291	160	65
307	169	70
324	178	75
342	188	80
363**	199**	85
HP 14 x 73		
401	221	80
425	234	85
455	250	90
491	270	95
501**	276**	98

*- Maximum Nominal Required Bearing
** - Nominal Required Bearing at End of Boring Data

Pile Capacity Tables (Tables 9 & 10)
(Steel Plate Girder Option – Stub Abutment)

Table 9 – North Abutment

Piling Driven at North Abutment (B-31 data)		
Nominal Required Bearing (Kips)	Factored Resistance Available (Kips)	Estimated Pile Length (Ft)
Metal Shell 12" Φ w/0.25 walls		
253	139	55
285	157	60
310	170	65
333	183	70
353*	194*	74
Metal Shell 14" Φ w/0.25" walls		
291	160	55
329	181	60
357	196	65
384	211	70
413*	227*	75
Metal Shell 14" Φ w/0.312 walls		
391	215	70
420	231	75
457	251	80
483	266	85
513*	282*	91
HP 12 x 53		
227	125	75
256	141	80
270	148	85
291	160	90
348**	191**	95
HP 12 x 74		
232	127	75
262	144	80
276	152	85
298	164	90
356**	196**	95
HP 14 x 73		
273	150	75
310	171	80
324	178	85
350	192	90
425**	234**	95

Table 10 – South Abutment

Piling Driven at South Abutment (B-30 data)		
Nominal Required Bearing (Kips)	Factored Resistance Available (Kips)	Estimated Pile Length (Ft)
Metal Shell 12" Φ w/0.25 walls		
230	126	49
271	149	54
301	165	59
340	187	64
353*	194*	69
Metal Shell 14" Φ w/0.25" walls		
272	150	49
324	178	54
358	197	59
402	221	64
413*	227*	66
Metal Shell 14" Φ w/0.312 walls		
434	238	69
446	245	72
475	262	77
505	278	82
513*	282*	84
HP 12 x 53		
334	184	79
355	195	84
380	209	89
408	225	94
418**	230**	97
HP 12 x 74		
342	188	79
363	199	84
388	213	89
418	230	94
427**	235**	97
HP 14 x 73		
401	221	79
425	234	84
455	250	89
491	270	94
501**	276**	97

*- Maximum Nominal Required Bearing
** - Nominal Required Bearing at End of Boring Data

BFW
BACON | FARMER | WORKMAN
ENGINEERING & TESTING, INC.

6.5 Wingwall Foundation Recommendations

Based on information provided by the structural engineer and the preliminary TS&L the wing walls for the integral abutment option will be cantilever in design and will not rely on soil bearing. Wing walls for the stub abutment option will be pile supported using pile capacity tables provided for each abutment.

7.0 Construction Considerations

All work performed for the proposed project should conform to the requirements in the IDOT Standard Specifications for Road and Bridge Construction (2012) and the Supplemental Specifications and Recurring Special Provisions (2015). Any deviation from the requirements in the manuals above should be approved by the design engineer.

7.1 Groundwater Management

Based on the depth of groundwater observed in the borings, significant groundwater management is not anticipated for bridge construction. The contactor should control groundwater and surface water infiltration to provide construction in dry condition. Temporary ditches, sumps, granular drainage blankets, stone ditch protection, or hand-laid riprap with geotextile underlayment could be used to divert groundwater if significant seepage is encountered during construction. If water seepage occurs during footing or where wet conditions are encountered such that the water cannot be removed with conventional sumping, we recommend placing open grade stone similar to IDOT CA-7 to stabilize the bottom of the excavation.

The CA-7 stone should be placed to 12 inches about the water table, in 12-inch lifts, and should be compacted with the use of a heavy smooth drum roller or heavy vibratory plate compactor until stable. The remaining portion of the excavation beneath the footing should be backfilled using approved structural fill.

7.5 Temporary Sheeting and Soil Retention

Ramp G over Ramp F is new construction and will not encounter traffic until completion therefore, temporary sheeting and/or soil retention will not be required for this structure

8.0 Limitations

This report has been prepared for the exclusive use of the Illinois Department of Transportation and its structural consultant. The recommendations provided in the repot are specific to the project described herein, and are based on the information obtained from the soil boring locations within the project limits. The analysis have been performed and the recommendations have been provided in this report are based on subsurface conditions determined at the location of the borings. The report may not reflect all variations that may occur between boring locations or at some other time, the nature and extend of which may not become evident until during the time of construction. If variations in subsurface conditions become evident after submission of this report, it will be necessary to evaluate their nature and review the recommendations provided herein in light of the new conditions

Appendix A

Soil Boring Location Map

Boring Number	Location	Station	Offset	Elevation	Latitude	Longitude
B-28	South Abut Ramp G South Structure	723+49.13	2.79 LT	753.34	40.144779	-88.280098
B-29	North Abut Ramp G, South Structure	724+97.56	3.48 LT	753.94	40.145163	-88.280278
B-30	South Abut Ramp G North Structure	732+43.65	5.51 LT	756.36	40.147194	-88.280463
B-31	N. Abutment Ramp G North Structure	733+92.77	5.73 LT	756.36	40.147596	-88.280354
B-38/39	Pier Ramp G South Structure	723+94.08	2.92 LT	753.44	40.144894	-88.280157
B-40/41	Pier Ramp G North Structure	732+89.34	5.66 LT	756.16	40.147318	-88.280435
S-3	Embankment Boring Ramp G & E	721+17.40	2.0 LT	752.94	40.144209	-88.279729
S-6	Embankment Boring Ramp G	727+16	5.40 LT	755.64	40.145747	-88.280462
S-7	Embankment boring on Ramp G	730+14.85	6.73 LT	756.24	40.146567	-88.280542
S-10	Ramp G Embankment	737+11.61	8.39 LT	755.86	40.148423	-88.279971
ST-3	Shelby Tube Boring 4.5 ft. South of Boring S-10	737+07.47	9.50 LT	755.86	40.148414	-88.279981

FILE NAME = $FILEL$ $MODELNAME$	USER NAME = $USER$ PLOT SCALE = $SCALE$ PLOT DATE = $DATE$	DESIGNED - DRAWN - CHECKED - DATE -	REVISED - REVISED - REVISED - REVISED -	STATE OF ILLINOIS DEPARTMENT OF TRANSPORTATION	RAMP G (I–57/I–74 INTERCHANGE) SCALE: SHEET OF SHEETS STA. TO STA.

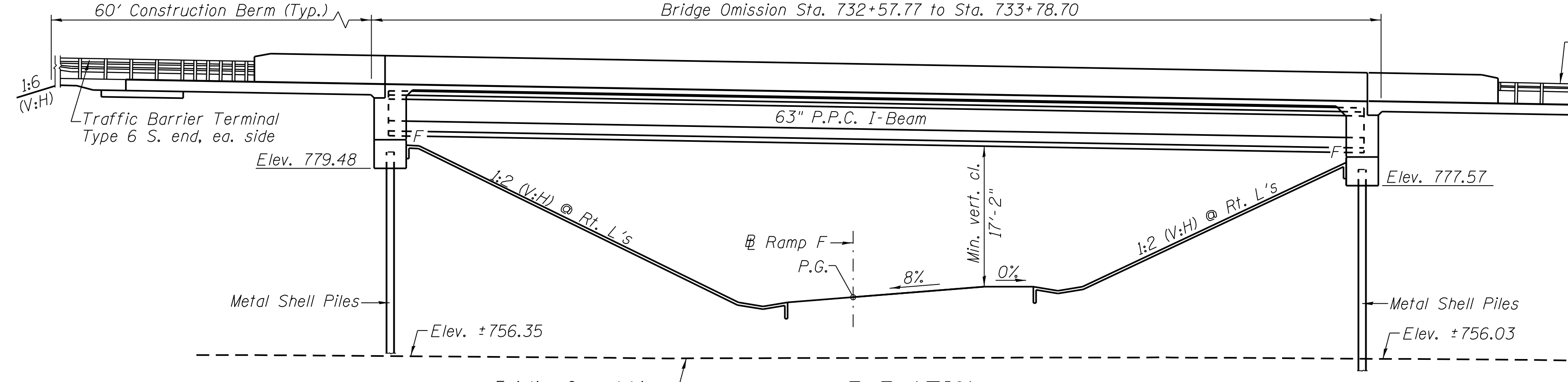
F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
57/74	10(5-1-RS-1, 14-1, 6)R	CHAMPAIGN		
		CONTRACT NO. 70897		
	ILLINOIS FED. AID PROJECT			

Appendix B

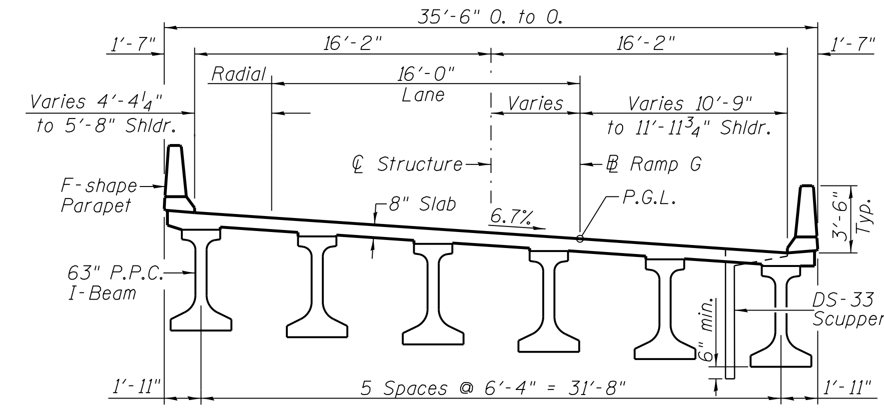
Preliminary TS&Ls

Bench Mark: Chiseled "□" on top of N.W. corner of light pole foundation #50-107 on Ramp DB, Sta. 1068+46.46
Elev. 769.173

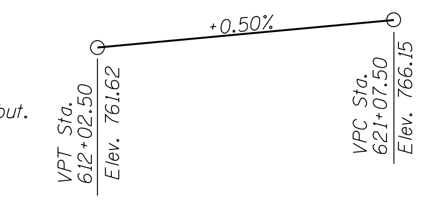
Existing Structure: None   No Salvage



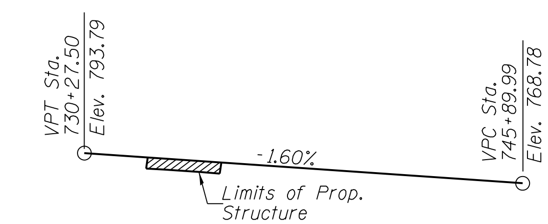
ELEVATION



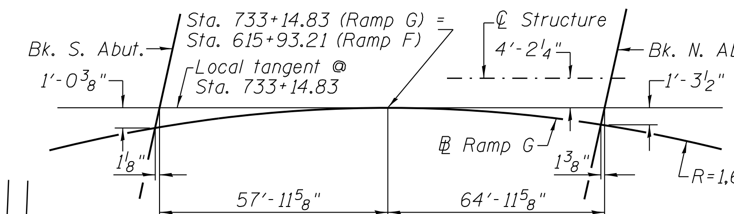
CROSS SECTION
(Looking North)



PROFILE GRADE RAMP F
(Along ℄ Roadway)



PROFILE GRADE RAMP G
(Along ℄ Roadway)



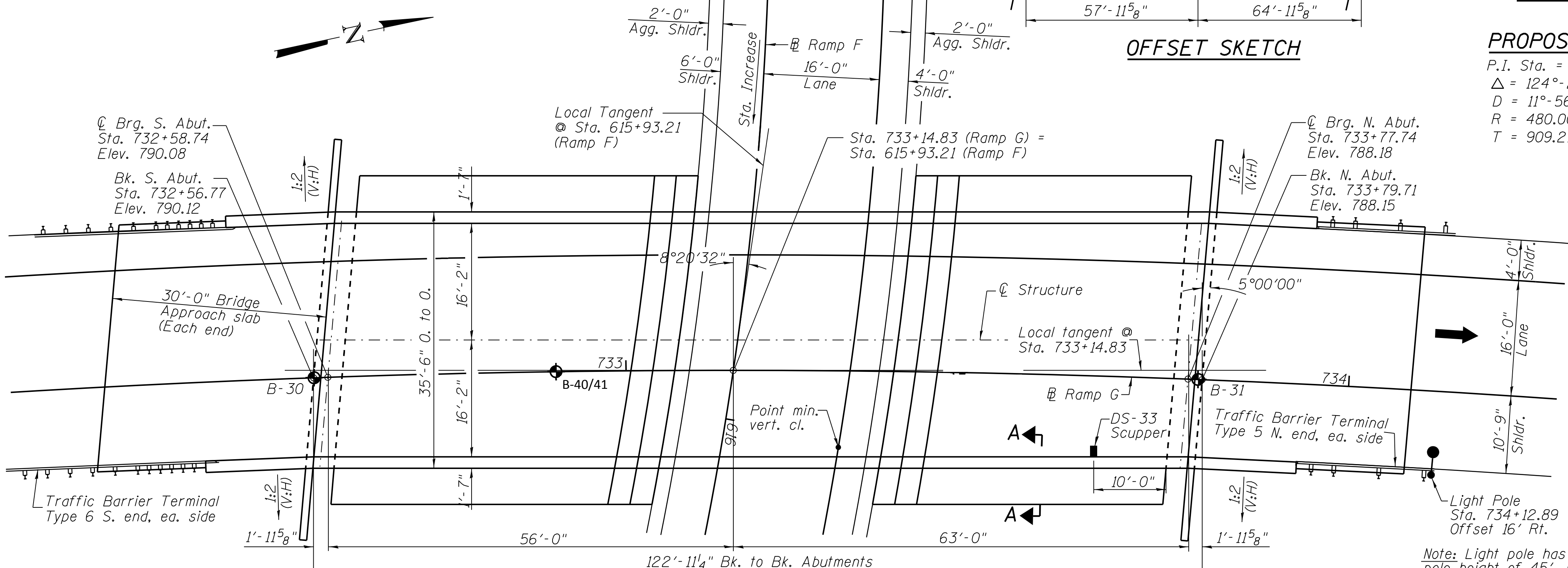
OFFSET SKETCH

PROPOSED RAMP F CURVE DATA

P.I. Sta. = 620+51.51
Δ = 124°-20'-18" (Rt.)
D = 11°-56'-12"
R = 480.00'
T = 909.21'
L = 1041.65'
E = 548.14'
S.E. 8.0%
P.C. Sta. = 611+42.29
P.C.C. Sta. = 621+83.95

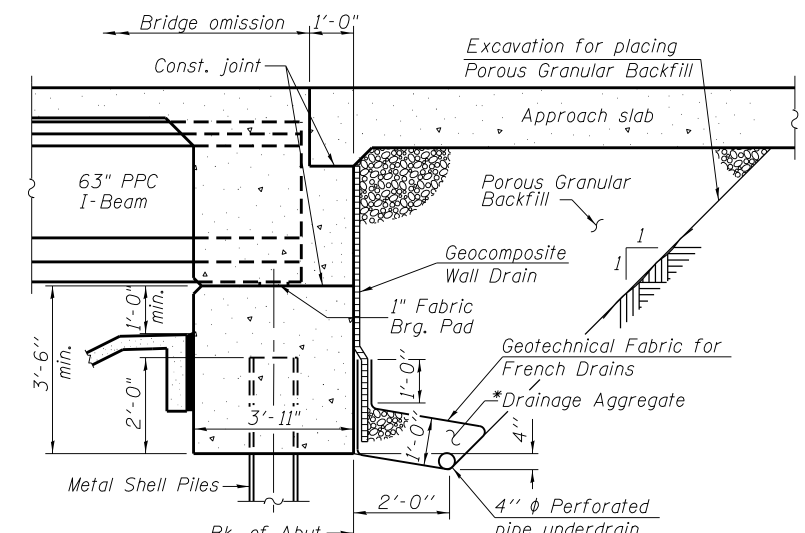
PROPOSED RAMP G CURVE DATA

P.I. Sta. = 730+86.74
Δ = 60°-51'-35" (Rt.)
D = 3°-30'-16"
R = 1,635'
T = 960.40'
L = 1,736.70'
E = 261.20'
S.E. = 6.7%
P.C. Sta. = 721+26.34
P.T. Sta. = 738+63.05

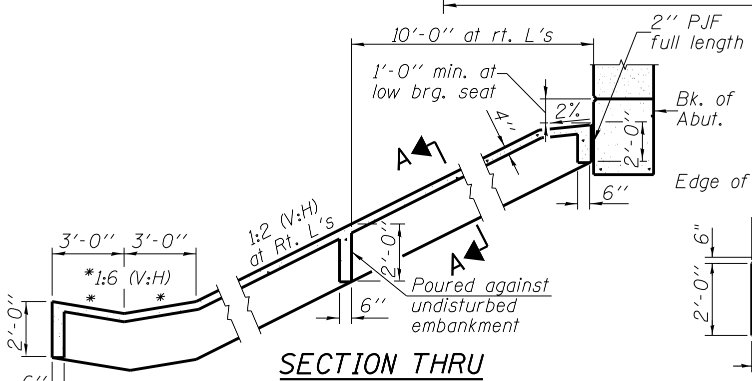


PLAN

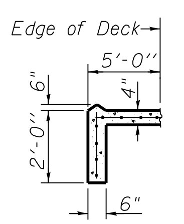
Note: Light pole has a 10"ϕ, pole height of 45', support 8' mast arms and mounted on independent foundations.



SECTION THRU INTEGRAL ABUTMENT
(Horiz. dim. @ Rt. L's)



SECTION THRU CONCRETE SLOPEWALL



SECTION A-A

LOADING HL-93

Allow 50 psf for future wearing surface

DESIGN SPECIFICATIONS

2014 AASHTO LRFD Bridge Specifications, 7th Edition

HIGHWAY CLASSIFICATION

FAI 57/74 -Ramp F
Functional Class: Interstate Ramp
ADT: 3,300 (2013); 4,950 (2040)
ADTT: 901 (2013); 1,351 (2040)
DHV: 360
Design Speed: 40 m.p.h.
Posted Speed: 40 m.p.h.
One-Way Traffic
Directional Distribution: 100% NB

FAI 57/74 -Ramp G
Functional Class: Interstate Ramp
ADT: 2,100 (2013); 2,650 (2040)
ADTT: 365 (2013); 461 (2040)
DHV: 235
Design Speed: 55 m.p.h.
Posted Speed: 55 m.p.h.
One-Way Traffic
Directional Distribution: 100% WB

DESIGN STRESSES

FIELD UNITS

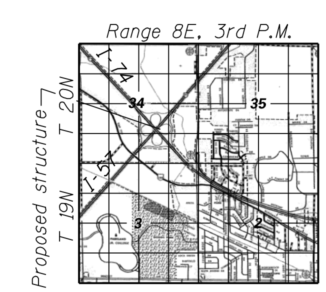
f'c = 3,500 psi (Cast-in-Place)
fy = 60,000 psi (Reinforcement)

PRECAST PRESTRESSED UNITS

f'c = 6,000 psi
fci = 5,000 psi
fpu = 270,000 psi (½" ϕ low lax strands)
fpbt = 201,960 psi (½" ϕ low lax strands)

SEISMIC DATA

Seismic Performance Zone (SPZ) = 1
Design Spectral Acceleration at 1.0 sec (SD1) = 0.135g
Design Spectral Acceleration at 0.2 sec (SDS) = 0.233g
Soil Site Class = D

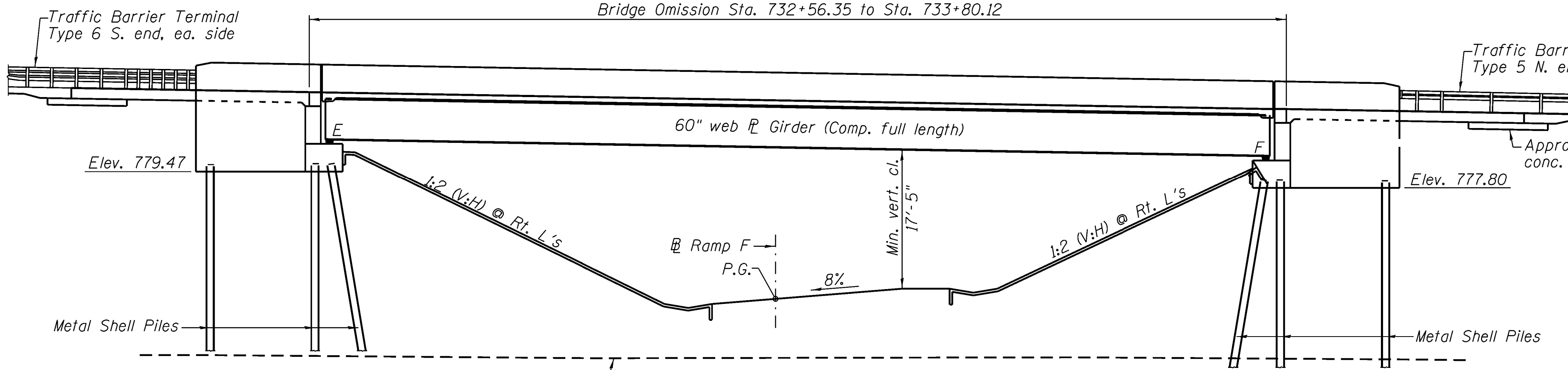


LOCATION SKETCH

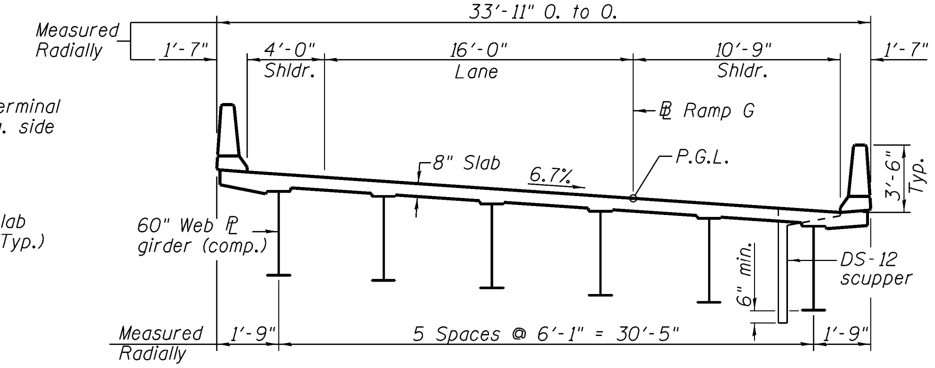
GENERAL PLAN
RAMP G OVER RAMP F
F.A.I. RTE. 57/74
SECTION 10 (5-1-RS-1, 14-1,6) R
CHAMPAIGN COUNTY
STATION 733+14.83
STRUCTURE NO. 010-1003

CMT	USER NAME =	DESIGNED - CJW	REVISED	STATE OF ILLINOIS DEPARTMENT OF TRANSPORTATION		F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		CHECKED - WLB	REVISED							
	PLOT SCALE =	DRAWN - GLD	REVISED			CONTRACT NO.				
	PLOT DATE =	CHECKED - RJK	REVISED		SHEET NO. OF SHEETS	ILLINOIS FED. AID PROJECT				

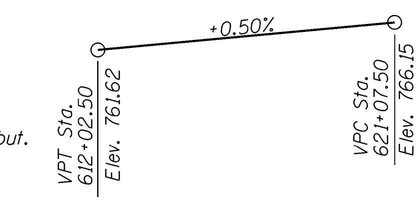
Bench Mark: Existing Structure: None   No Salvage



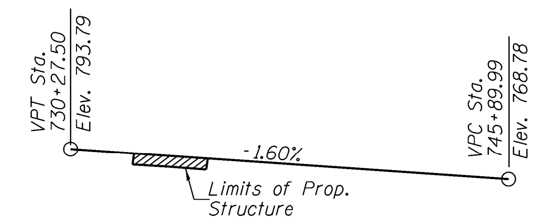
ELEVATION



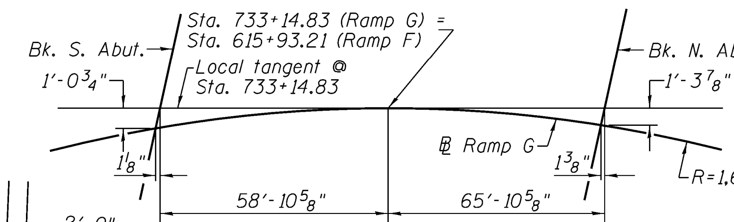
CROSS SECTION
(Looking North)



PROFILE GRADE RAMP F
(Along ℙ Roadway)



PROFILE GRADE RAMP G
(Along ℙ Roadway)



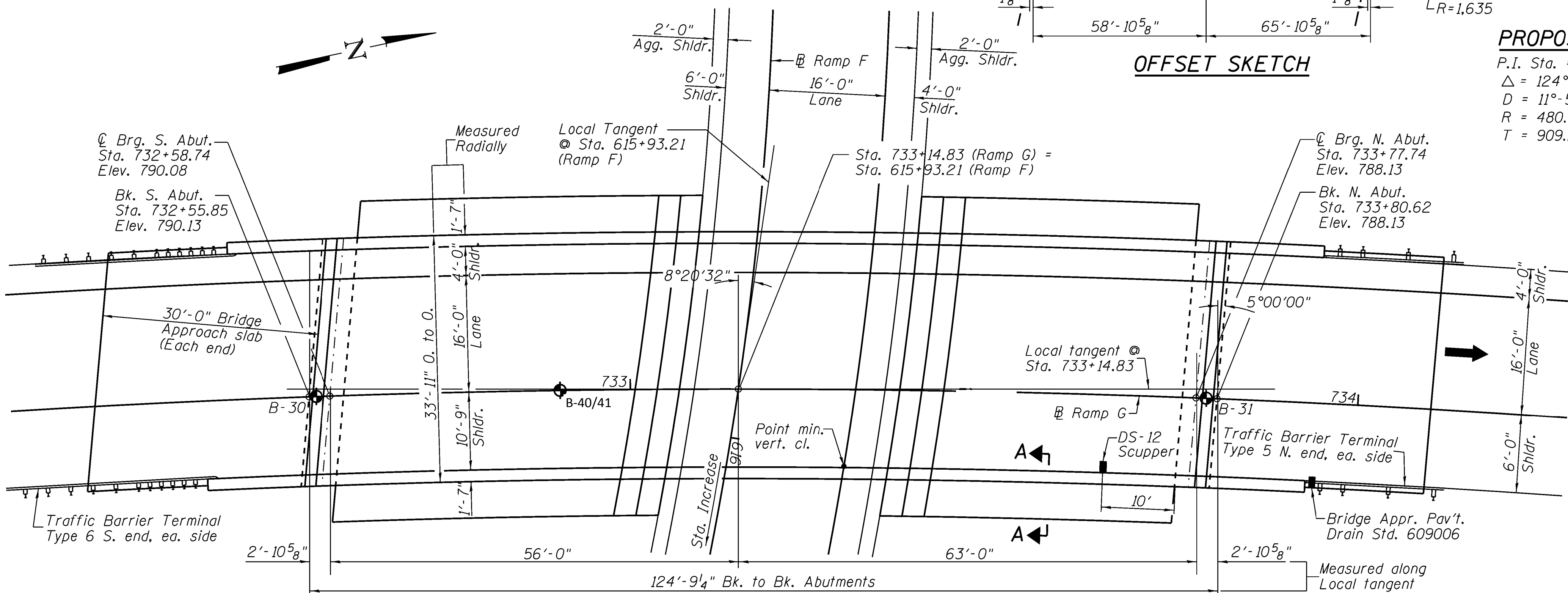
OFFSET SKETCH

PROPOSED RAMP F CURVE DATA

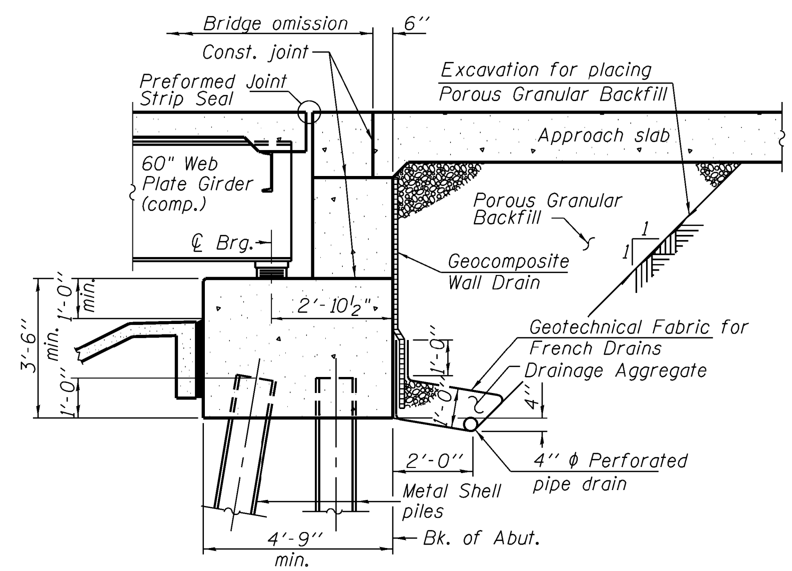
P.I. Sta. = 620+51.51   L = 1041.65'
Δ = 124°-20'-18" (Rt.)   E = 548.14'
D = 11°-56'-12"   S.E. 8.0%
R = 480.00'   P.C. Sta. = 611+42.29
T = 909.21'   P.C.C. Sta. = 621+83.95

PROPOSED RAMP G CURVE DATA

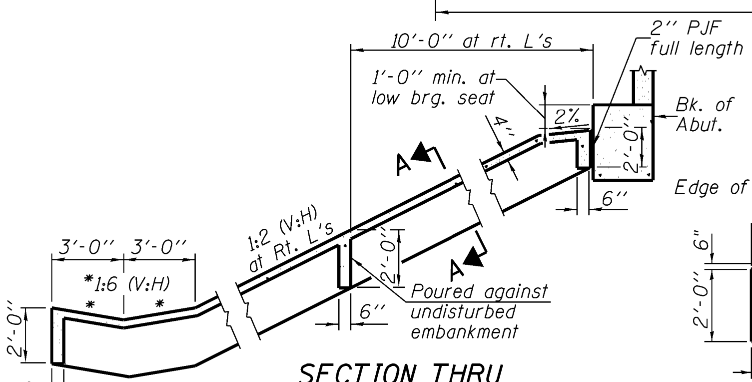
P.I. Sta. = 730+86.74   L = 1,736.70'
Δ = 60°-51'-35" (Rt.)   E = 261.20'
D = 3°-30'-16"   S.E. = 6.7%
R = 1,635'   P.C. Sta. = 721+26.34
T = 960.40'   P.T. Sta. = 738+63.05



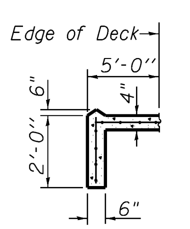
PLAN



SECTION THRU PILE SUPPORTED STUB ABUTMENT
(Horiz. dim. @ Rt. L's)



SECTION THRU CONCRETE SLOPEWALL



SECTION A-A

LOADING HL-93

Allow 50 psf for future wearing surface

DESIGN SPECIFICATIONS

2014 AASHTO LRFD Bridge Specifications, 7th Edition

HIGHWAY CLASSIFICATION

FAI 57/74 - Ramp F	FAI 57/74 - Ramp G
Functional Class: Interstate Ramp	Functional Class: Interstate Ramp
ADT: 3,300 (2013); 4,950 (2040)	ADT: 2,100 (2013); 2,650 (2040)
ADTT: 901 (2013); 1,351 (2040)	ADTT: 365 (2013); 461 (2040)
DHV: 360	DHV: 235
Design Speed: 40 m.p.h.	Design Speed: 55 m.p.h.
Posted Speed: 40 m.p.h.	Posted Speed: 55 m.p.h.
One-Way Traffic	One-Way Traffic
Directional Distribution: 100% NB	Directional Distribution: 100% WB

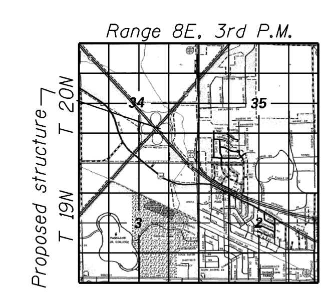
DESIGN STRESSES

FIELD UNITS

f'c = 3,500 psi (Cast-in-Place)
fy = 60,000 psi (Reinforcement)
fy = 50,000 psi (M270 Grade 50)

SEISMIC DATA

Seismic Performance Zone (SPZ) = 1
Design Spectral Acceleration at 1.0 sec (SD1) = 0.135g
Design Spectral Acceleration at 0.2 sec (SDS) = 0.233g
Soil Site Class = D



LOCATION SKETCH

GENERAL PLAN
RAMP G OVER RAMP F
F.A.I. RTE. 57/74
SECTION 10 (5-1-RS-1, 14-1,6) R
CHAMPAIGN COUNTY
STATION 733+14.83
STRUCTURE NO. 010-1003

FILE NAME =	USER NAME =	DESIGNED -	REVISED	STATE OF ILLINOIS DEPARTMENT OF TRANSPORTATION		F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		CHECKED -	REVISED							
	PLOT SCALE =	DRAWN -	REVISED			CONTRACT NO.				
	PLOT DATE =	CHECKED -	REVISED		SHEET NO. OF SHEETS	ILLINOIS FED. AID PROJECT				

Appendix C

Subsurface Boring Logs

Illinois Department of Transportation
Division of Highways
Bacone Farmer Workmand Engineering & Testing, LLC

SOIL BORING LOG

Date 1/30/15

ROUTE I-57/74 DESCRIPTION South Abut Ramp G North Structure LOGGED BY TLM

SECTION 10(5-1-RS-1, 14-1,6)R LOCATION , SEC. 34, TWP. 20N, RNG. 8E, 3rd PM, Latitude 40.147194, Longitude -88.280463

COUNTY Champaign DRILLING METHOD HSA HAMMER TYPE Auto

STRUCT. NO.
Station

BORING NO. B-30
Station 732+43.65
Offset 5.2 ft LT
Ground Surface Elev. 756.36 ft

Surface Water Elev. n/a ft
Stream Bed Elev. ft

Groundwater Elev.:
First Encounter 751.9 ft ▼
Upon Completion 729.4 ft ▽
After ___ Hrs. ft

Description	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
TOPSOIL: Silty Clay, dark brown				
755.36				
SILTY CLAY: Dark Brown, stiff		3		
		3	1.5	19
		4	P	
752.36		1		
SAND AND GRAVEL WITH SILT AND CLAY: Brown, loose ▼		1		22
	-5	1		
		1		
		3		21
		6		
748.36				
SILTY CLAY LOAM TILL: Gray, very stiff		3		
		6	2.5	12
	-10	7	B	
		4		
		8	2.5	12
		9	B	
		3		
		4	2.3	13
	-15	6	B	
		3		
		6	2.7	12
		7	B	
		2		
		6	2.5	12
	-20	6	B	

Description	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
SILTY CLAY LOAM TILL: Gray, very stiff *(continued)*				
		3		
		5	2.7	9
	-25	11	B	
729.36 ▽				
SAND AND GRAVEL: Gray, medium dense		4		
		8		14
	-30	8		
724.36				
SILTY CLAY LOAM TILL: Gray, hard		11		
		8	4.3	12
	-35	11	B	
719.36				
SILTY CLAY LOAM TILL: Gray, very stiff		6		
		8	3.5	12
	-40	14	B	

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

Illinois Department of Transportation
Division of Highways
Bacone Farmer Workmand Engineering & Testing, LLC

SOIL BORING LOG

Date 1/30/15

ROUTE I-57/74 DESCRIPTION South Abut Ramp G North Structure LOGGED BY TLM

SECTION 10(5-1-RS-1, 14-1,6)R LOCATION , SEC. 34, TWP. 20N, RNG. 8E, 3rd PM, Latitude 40.147194, Longitude -88.280463

COUNTY Champaign DRILLING METHOD HSA HAMMER TYPE Auto

STRUCT. NO. ______
Station ______

BORING NO. B-30
Station 732+43.65
Offset 5.2 ft LT
Ground Surface Elev. 756.36 ft

Surface Water Elev. n/a ft
Stream Bed Elev. ______ ft

Groundwater Elev.:
First Encounter 751.9 ft ▼
Upon Completion 729.4 ft ▽
After ____ Hrs. ______ ft

Description	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
SILTY CLAY LOAM TILL: Gray, very stiff *(continued)*				
		4		
		5	2.5	14
	-45	10	B	
709.36				
SILTY CLAY LOAM TILL: Gray, stiff				
		4		
		6	1.9	14
	-50	10	B	
		6		
		7	1.7	14
	-55	9	B	
		5		
		7	1.7	13
	-60	10	B	

Description	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
SILTY CLAY LOAM TILL: Gray, stiff *(continued)*				
		2		
		4	1.9	13
	-65	14	B	
		6		
		9	2.3	12
	-70	14	B	
		5		
		7	2.1	12
681.36	-75	11	B	
End of Boring				
	-80			

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

Illinois Department of Transportation
Division of Highways
Bacone Farmer Workmand Engineering & Testing, LLC

SOIL BORING LOG

Date 2/2/15

ROUTE I-57/74 DESCRIPTION N. Abutment Ramp G North Structure LOGGED BY TLM, TC

SECTION 10(5-1-RS-1, 14-1,6)R LOCATION , SEC. 34, TWP. 20N, RNG. 8E, 3rd PM, Latitude 40.147596, Longitude -88.280354

COUNTY Champaign DRILLING METHOD HSA HAMMER TYPE AUTO

STRUCT. NO. ______
Station ______

BORING NO. B-31
Station 733+92.77
Offset 5.7 ft LT
Ground Surface Elev. 756.36 ft

Surface Water Elev. n/a ft
Stream Bed Elev. ______ ft

Groundwater Elev.:
First Encounter 748.4 ft ▼
Upon Completion ______ ft
After ______ Hrs. ______ ft

Description	Elev.	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
12" TOPSOIL: Silty Clay, dark brown	755.36				
SILTY CLAY: Brown, stiff			2		
			2	0.9	17
	753.36		3	B	
SAND: Loose, loamy, medium to coarse, wet but no free water			1		
			2	0.2	19
		-5	2	B	
			2		
			4		17
	748.36 ▼		4		
SAND AND GRAVEL: Brown, medium dense			5		
			13		12
		-10	12		
			6		
	744.36		12	1.3	14
SILTY CLAY LOAM TILL: Gray, stiff			13	P	
			3		
			5	0.7	14
	740.86	-15	6	B	
SILTY CLAY TILL: Gray, stiff			2		
			4	1.0	14
			8	B	
			2		
			5	1.0	13
		-20	7	B	

Description	Elev.	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
SILTY CLAY TILL: Gray, stiff *(continued)*	734.36				
SAND: Gray, medium dense, medium, trace gravel			5		
			6		14
		-25	16		
			11		
			14		12
	724.36	-30	13		
SILTY CLAY LOAM TILL: Gray, stiff			7		
			8	1.7	13
	719.36	-35	8	B	
SILTY CLAY LOAM TILL: Gray, very stiff			6		
			9	2.4	13
		-40	13	B	

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

Illinois Department of Transportation
Division of Highways
Bacone Farmer Workmand Engineering & Testing, LLC

SOIL BORING LOG

Date 2/2/15

ROUTE I-57/74 DESCRIPTION N. Abutment Ramp G North Structure LOGGED BY TLM, TC

SECTION 10(5-1-RS-1, 14-1,6)R LOCATION , SEC. 34, TWP. 20N, RNG. 8E, 3rd PM, Latitude 40.147596, Longitude -88.280354

COUNTY Champaign DRILLING METHOD HSA HAMMER TYPE AUTO

STRUCT. NO. ____
Station ____

BORING NO. B-31
Station 733+92.77
Offset 5.7 ft LT
Ground Surface Elev. 756.36 ft

Surface Water Elev. n/a ft
Stream Bed Elev. ____ ft

Groundwater Elev.:
First Encounter 748.4 ft ▼
Upon Completion ____ ft
After ____ Hrs. ____ ft

Description	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
SILTY CLAY LOAM TILL: Gray, very stiff *(continued)*				
714.36				
SILTY CLAY TILL: Gray, stiff, trace sand		2 5 11	1.6 B	13
	-45			
		4 7 11	1.5 B	12
	-50			
		4 7 11	1.6 B	13
	-55			
699.36				
SILTY CLAY TILL: Gray, very stiff, trace sand		4 8 13	2.3 B	13
	-60			
SILTY CLAY TILL: Gray, very stiff, trace sand *(continued)*				
		6 10 11	1.5 B	14
	-65			
		6 9 12	1.7 B	13
	-70			
		7 14 18	3.1 B	12
681.36	-75			
End of Boring				
	-80			

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

Illinois Department of Transportation
Division of Highways
Bacone Farmer Workmand Engineering & Testing, LLC

SOIL BORING LOG

Date 1/30/15

ROUTE I-57/74 DESCRIPTION Pier Ramp G North Structure LOGGED BY TLM, TC

SECTION 10(5-1-RS-1, 14-1,6)R LOCATION , SEC. 34, TWP. 20N, RNG. 8E, 3rd PM, Latitude 40.147318, Longitude -88.280435

COUNTY Champaign DRILLING METHOD HSA HAMMER TYPE Auto

STRUCT. NO. ______
Station ______

BORING NO. B-40/41
Station 732+89.34
Offset 5.7 ft LT
Ground Surface Elev. 756.16 ft

Surface Water Elev. n/a ft
Stream Bed Elev. ______ ft

Groundwater Elev.:
First Encounter 750.2 ft ▼
Upon Completion washed ft
After ____ Hrs. ______ ft

Description	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
TOPSOIL: Silty Clay, dark brown				
755.16				
SILTY CLAY: Brown, stiff		2		
		3	1.2	19
		4	B	
753.16				
CLAYEY SAND: Very loose, coarse		1		
		1		21
	-5	1		
750.66				
SAND AND GRAVEL: Brown, loose, clean ▼		2		
		2		21
		2		
748.16				
SILTY CLAY LOAM TILL: Gray, very stiff		6		
		4	2.9	12
	-10	7	B	
		5		
		6	2.3	13
		7	B	
		5		
		6	2.5	13
	-15	6	B	
		6		
		2	0.9	14
		8	B	
		5		
		6	2.5	12
	-20	6	B	

Description	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
SILTY CLAY LOAM TILL: Gray, very stiff *(continued)*				
		15		
No recovery, cobble		31		
	-25	36		
729.16				
SAND AND GRAVEL: Gray, medium dense				
washed sample, 3 ft. of sand flowed up into auger		6		
		3		16
	-30	10		
724.16				
SILTY CLAY TILL: Gray, very stiff, trace gravel		13		
		10	3.5	12
	-35	14	B	
719.66				
SILTY CLAY TILL: Gray, very stiff		6		
		8	2.5	13
	-40	12	B	

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

Illinois Department of Transportation
Division of Highways
Bacone Farmer Workmand Engineering & Testing, LLC

SOIL BORING LOG

Date 1/30/15

ROUTE I-57/74 DESCRIPTION Pier Ramp G North Structure LOGGED BY TLM, TC

SECTION 10(5-1-RS-1, 14-1,6)R LOCATION , SEC. 34, TWP. 20N, RNG. 8E, 3rd PM, Latitude 40.147318, Longitude -88.280435

COUNTY Champaign DRILLING METHOD HSA HAMMER TYPE Auto

STRUCT. NO. ______
Station ______

BORING NO. B-40/41
Station 732+89.34
Offset 5.7 ft LT
Ground Surface Elev. 756.16 ft

Surface Water Elev. n/a ft
Stream Bed Elev. ______ ft

Groundwater Elev.:
First Encounter 750.2 ft ▼
Upon Completion washed ft
After ____ Hrs. ______ ft

Description	Elev. (ft)	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
SILTY CLAY TILL: Gray, very stiff *(continued)*			4 / 7 / 12	2.3 B	13
		-45			
	709.16				
SILTY CLAY TILL: Gray, stiff			7 / 8 / 12	1.4 B	13
		-50			
	704.16				
SILTY CLAY TILL: Gray, very stiff			9 / 6 / 10	2.5 B	13
		-55			
			6 / 9 / 10	2.3 B	13
		-60			
SILTY CLAY TILL: Gray, very stiff *(continued)*					
	694.16				
SANDY CLAY LOAM: Gray, stiff			11 / 8 / 9	1.3 B	16
		-65			
2" Thick sand seam			7 / 8 / 14	0.9 B	12
		-70			
	684.16				
SILTY CLAY LOAM TILL: Gray, very stiff			7 / 9 / 35	2.3 B	12
	681.16	-75			
End of Boring					
		-80			

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

Appendix D

Boring Profile Sheet

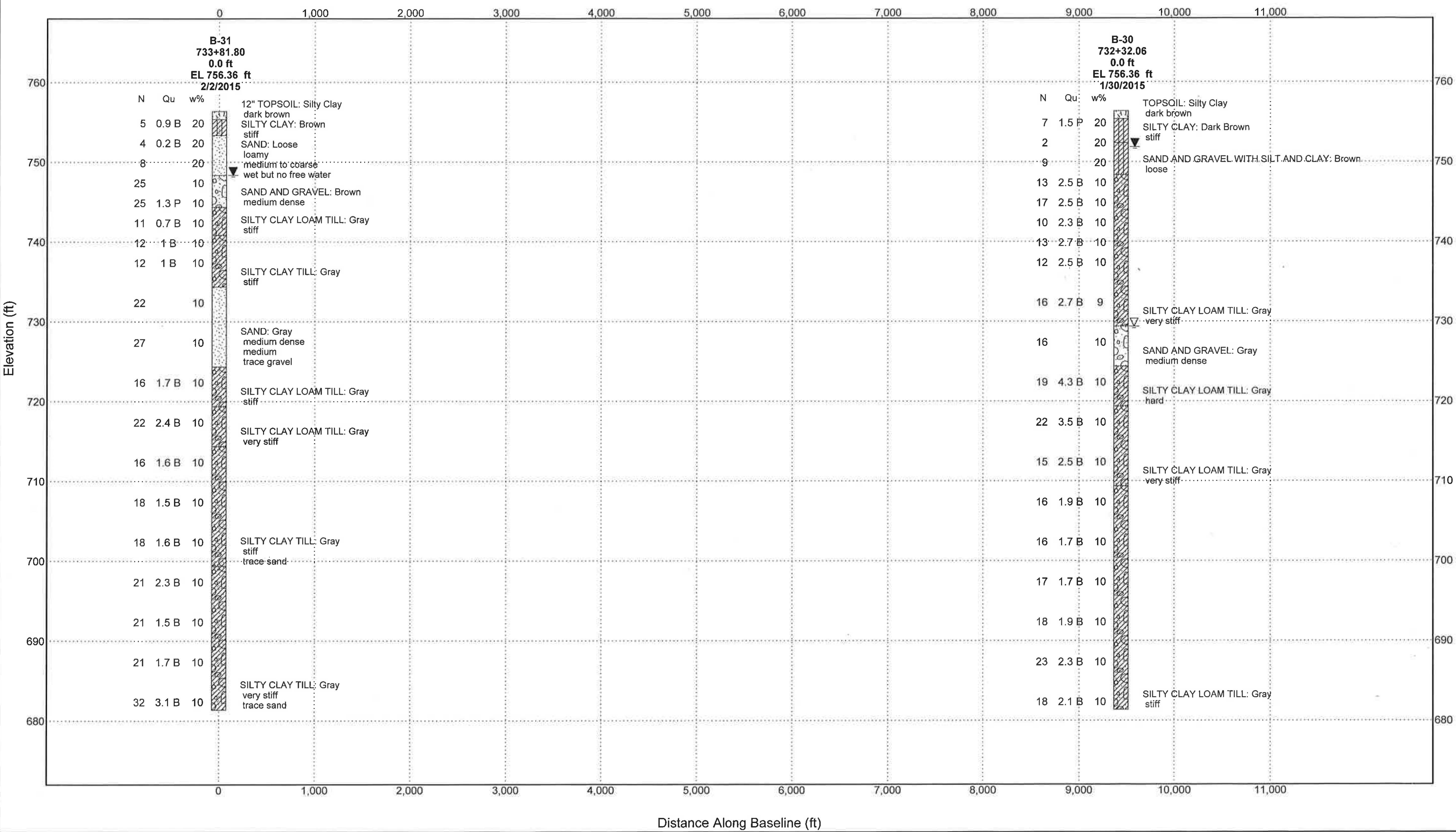
Illinois Department of Transportation
Division of Highways
Bacone Farmer Workmand Engineering & Testing, LLC

ROUTE I-57/74
SECTION 10(5-1-RS-1, 14-1,6)R
COUNTY Champaign
PROJECT LOCATION

SUBSURFACE PROFILE 010-1003

LEGEND
EL = Elevation (ft)
D = Depth Below Existing Ground Surface (ft)
N = SPT N-Value (AASHTO T206)
Qu = Unconfined compressive Strength (tsf)
Failure Mode (B= Bulge, S= shear, P= penetrometer)
w% = Moisture Content Percentage

WATER TABLE LEGEND
▼ = First Encountered
▽ = Upon Completion
▽ = After __ hours



ROADWAY PROFILE - BETA 1 57 74 CHAMPAIGN COUNTY.GPJ IL_DOT_D4_9-15-10.GDT 4/27/15

Appendix E

Pile Tables (North Abutment, South Abutment)

Pile Design Table for North Abutment - Integral utilizing Boring #31

	Nominal Required Bearing (Kips)	Factored Resistance Available (Kips)	Estimated Pile Length (Ft.)
Metal Shell 12"Φ w/.179" walls			
	168	93	41
Metal Shell 12"Φ w/.25" walls			
	168	93	41
	248	136	53
	260	143	56
	279	154	58
	295	162	61
	304	167	63
	317	174	66
	328	180	68
	340	187	71
	352	194	73
Metal Shell 14"Φ w/.25" walls			
	198	109	41
	292	160	53
	306	169	56
	330	181	58
	349	192	61
	358	197	63
	372	205	66
	385	212	68
	399	219	71
Metal Shell 14"Φ w/.312" walls			
	198	109	41
	292	160	53
	306	169	56
	330	181	58
	349	192	61
	358	197	63
	372	205	66
	385	212	68
	399	219	71
	414	227	73
	428	235	76
	450	248	78
	469	258	81
	477	262	83
	491	270	86
	506	279	88
Steel HP 8 X 36			
	222	122	93
Steel HP 10 X 42			
	228	126	86
	238	131	88
	246	136	91
	280	154	93

	Nominal Required Bearing (Kips)	Factored Resistance Available (Kips)	Estimated Pile Length (Ft.)
Steel HP 10 X 57			
	225	124	83
	233	128	86
	243	134	88
	252	138	91
	286	157	93
Steel HP 12 X 53			
	225	124	73
	235	129	76
	255	140	78
	267	147	81
	268	148	83
	278	153	86
	290	159	88
	300	165	91
	346	190	93
Steel HP 12 X 63			
	227	125	73
	237	130	76
	257	141	78
	270	148	81
	271	149	83
	280	154	86
	292	161	88
	303	167	91
	350	192	93
Steel HP 12 X 74			
	219	121	71
	230	127	73
	240	132	76
	261	143	78
	274	150	81
	275	151	83
	284	156	86
	296	163	88
	307	169	91
	355	195	93
Steel HP 12 X 84			
	222	122	71
	234	128	73
	244	134	76
	264	145	78
	277	153	81
	278	153	83
	288	158	86
	300	165	88
	311	171	91
	360	198	93

	Nominal Required Bearing (Kips)	Factored Resistance Available (Kips)	Estimated Pile Length (Ft.)
Steel HP 14 X 73			
	226	124	63
	237	131	66
	247	136	68
	259	142	71
	272	149	73
	283	156	76
	309	170	78
	323	177	83
	334	183	86
	348	192	88
	360	198	91
	423	233	93
Steel HP 14 X 89			
	229	126	63
	240	132	66
	250	138	68
	262	144	71
	275	151	73
	287	158	76
	312	172	78
	326	179	83
	337	186	86
	352	194	88
	365	201	91
	428	236	93
Steel HP 14 X 102			
	217	119	58
	231	127	63
	243	134	66
	253	139	68
	265	146	71
	278	153	73
	290	159	76
	316	174	78
	330	181	83
	341	188	86
	356	196	88
	369	203	91
	434	239	93
Steel HP 14 X 117			
	219	121	58
	234	129	63
	246	135	66
	256	141	68
	268	147	71
	281	155	73
	293	161	76
	320	176	78
	334	184	83

345	190	86
361	198	88
373	205	91
439	242	93
Precast 14"x 14"		
180	99	25
Timber Pile		
145	79	36

Pile Design Table for North Abutment - Stub utilizing Boring #31

	Nominal Required Bearing (Kips)	Factored Resistance Available (Kips)	Estimated Pile Length (Ft.)
Metal Shell 12"Φ w/.179" walls			
	74	41	25
	114	63	27
	141	78	35
	150	83	38
	159	88	40
	168	93	43
Metal Shell 12"Φ w/.25" walls			
	74	41	25
	114	63	27
	141	78	35
	150	83	38
	159	88	40
	168	93	43
	247	136	55
	260	143	58
	279	153	60
	295	162	63
	304	167	65
	316	174	68
	327	180	70
	339	186	73
	351	193	75
Metal Shell 14"Φ w/.25" walls			
	87	48	25
	141	78	27
	166	91	35
	177	97	38
	188	103	40
	198	109	43
	291	160	55
	306	168	58
	329	181	60
	348	191	63
	357	196	65
	371	204	68
	384	211	70
	398	219	73
	413	227	75
Metal Shell 14"Φ w/.312" walls			
	87	48	25
	141	78	27
	166	91	35
	177	97	38
	188	103	40
	198	109	43
	291	160	55
	306	168	58
	329	181	60
	348	191	63
	357	196	65
	371	204	68
	384	211	70
	398	219	73
	413	227	75
	427	235	78
	450	247	80
	468	257	83
	476	262	85
	490	269	88
	506	278	90
Steel HP 8 X 36			
	91	50	55
	98	54	58
	110	60	60
	118	65	63
	122	67	65
	129	71	68
	135	74	70
	141	78	73

	Nominal Required Bearing (Kips)	Factored Resistance Available (Kips)	Estimated Pile Length (Ft.)
Steel HP 10 X 57			
	91	50	43
	117	64	55
	125	69	58
	142	78	60
	153	84	63
	155	85	65
	164	90	68
	171	94	70
	179	99	73
	188	103	75
	196	108	78
	212	117	80
	223	122	83
	225	124	85
	233	128	88
	243	134	90
	251	138	93
	286	157	95
Steel HP 12 X 53			
	95	52	38
	102	56	40
	109	60	43
	141	78	55
	151	83	58
	172	95	60
	185	102	63
	186	103	65
	196	108	68
	205	113	70
	214	118	73
	225	124	75
	235	129	78
	254	140	80
	267	147	83
	268	148	85
	278	153	88
	290	159	90
	300	165	93
	346	190	95
Steel HP 12 X 63			
	96	53	38
	103	57	40
	110	61	43
	143	78	55
	153	84	58
	174	95	60
	187	103	63
	188	104	65
	198	109	68
	207	114	70
	216	119	73
	227	125	75
	237	130	78
	257	141	80
	270	148	83
	271	149	85
	280	154	88
	292	161	90
	303	166	93
	349	192	95
Steel HP 12 X 74			
	87	48	35
	97	53	38
	105	58	40
	112	62	43
	145	80	55
	155	85	58
	176	97	60
	189	104	63

	Nominal Required Bearing (Kips)	Factored Resistance Available (Kips)	Estimated Pile Length (Ft.)
Steel HP 14 X 73			
	73	40	25
	99	54	27
	103	57	35
	116	64	38
	124	68	40
	133	73	43
	172	95	55
	184	101	58
	211	116	60
	226	124	65
	237	130	68
	247	136	70
	258	142	73
	271	149	75
	283	156	78
	308	170	80
	322	177	85
	333	183	88
	348	191	90
	360	198	93
	423	233	95
Steel HP 14 X 89			
	74	41	25
	100	55	27
	105	58	35
	117	64	38
	126	69	40
	134	74	43
	174	96	55
	187	103	58
	214	117	60
	228	126	65
	240	132	68
	250	138	70
	261	144	73
	275	151	75
	286	157	78
	312	172	80
	326	179	85
	337	185	88
	352	194	90
	364	200	93
	428	236	95
Steel HP 14 X 102			
	75	41	25
	102	56	27
	106	58	35
	118	65	38
	127	70	40
	136	75	43
	177	97	55
	189	104	58
	216	119	60
	231	127	65
	243	134	68
	253	139	70
	265	145	73
	278	153	75
	290	159	78
	316	174	80
	330	181	85
	341	188	88
	356	196	90
	369	203	93
	434	239	95
Steel HP 14 X 117			
	76	42	25
	103	57	27
	107	59	35

148	81	75
155	85	78
166	91	80
175	96	83
178	98	85
184	101	88
192	106	90
199	109	93
222	122	95
Steel HP 10 X 42		
89	49	43
114	63	55
123	68	58
138	76	60
149	82	63
152	84	65
160	88	68
168	92	70
175	97	73
184	101	75
192	106	78
207	114	80
218	120	83
220	121	85
228	126	88
238	131	90
246	135	93
280	154	95

191	105	65
201	110	68
210	115	70
219	121	73
230	127	75
240	132	78
261	143	80
273	150	83
274	151	85
284	156	88
296	163	90
307	169	93
355	195	95
Steel HP 12 X 84		
89	49	35
99	54	38
106	58	40
114	62	43
147	81	55
157	86	58
179	98	60
192	106	63
193	106	65
204	112	68
212	117	70
222	122	73
233	128	75
244	134	78
264	145	80
277	152	83
278	153	85
288	158	88
300	165	90
311	171	93
360	198	95

120	66	38
129	71	40
138	76	43
179	98	55
191	105	58
219	121	60
234	129	65
246	135	68
256	141	70
268	147	73
281	155	75
293	161	78
320	176	80
334	183	85
345	190	88
360	198	90
373	205	93
439	242	95
Precast 14"x 14"		
67	37	14
107	59	22
111	61	25
180	99	27
Timber Pile		
88	48	27
124	68	30
137	75	35
145	79	38

Pile Design Table for South Abutment - Integral utilizing Boring #30

	Nominal Required Bearing (Kips)	Factored Resistance Available (Kips)	Estimated Pile Length (Ft.)
Metal Shell 12"Φ w/.179" walls			
	178	98	43
	194	107	45
	212	117	48
	230	126	50
Metal Shell 12"Φ w/.25" walls			
	178	98	43
	194	107	45
	212	117	48
	230	126	50
	263	145	53
	271	149	55
	276	152	58
	301	165	60
	318	175	63
	340	187	65
	352	193	68
Metal Shell 14"Φ w/.25" walls			
	171	94	38
	194	106	40
	211	116	43
	230	127	45
	252	139	48
	272	150	50
	315	173	53
	324	178	55
	329	181	58
	358	197	60
	377	208	63
	402	221	65
Metal Shell 14"Φ w/.312" walls			
	171	94	38
	194	106	40
	211	116	43
	230	127	45
	252	139	48
	272	150	50
	315	173	53
	324	178	55
	329	181	58
	358	197	60
	377	208	63
	402	221	65
	414	228	68
	434	238	70
	446	245	73
	462	254	75
	475	262	78
	490	270	80
	505	278	83

	Nominal Required Bearing (Kips)	Factored Resistance Available (Kips)	Estimated Pile Length (Ft.)
Steel HP 10 X 57			
	164	90	55
	194	107	58
	211	116	60
	220	121	63
	235	129	65
	239	131	68
	250	138	70
	256	141	73
	265	146	75
	272	150	78
	281	154	80
	289	159	83
	298	164	85
	309	170	88
	319	175	90
	332	182	93
	342	188	95
	351	193	98
Steel HP 12 X 53			
	184	101	48
	195	107	53
	196	108	55
	238	131	58
	258	142	60
	267	147	63
	284	156	65
	287	158	68
	300	165	70
	305	168	73
	316	174	75
	324	178	78
	334	184	80
	345	189	83
	355	195	85
	368	203	88
	380	209	90
	396	218	93
	408	225	95
	418	230	98
Steel HP 12 X 63			
	169	93	45
	186	102	48
	196	108	53
	198	109	55
	241	132	58
	261	144	60
	270	148	63
	287	158	65
	289	159	68

	Nominal Required Bearing (Kips)	Factored Resistance Available (Kips)	Estimated Pile Length (Ft.)
Steel HP 14 X 73			
	178	98	40
	190	105	43
	206	113	45
	226	124	48
	235	129	53
	237	130	55
	295	162	58
	319	175	60
	327	180	63
	347	191	65
	347	191	68
	363	199	70
	367	202	73
	381	209	75
	389	214	78
	401	221	80
	413	227	83
	425	234	85
	442	243	88
	455	250	90
	476	262	93
	491	270	95
	501	276	98
Steel HP 14 X 89			
	180	99	40
	193	106	43
	209	115	45
	229	126	48
	238	131	53
	240	132	55
	299	165	58
	323	178	60
	331	182	63
	351	193	65
	351	193	68
	367	202	70
	372	204	73
	385	212	75
	394	216	78
	406	223	80
	418	230	83
	430	237	85
	447	246	88
	461	253	90
	481	265	93
	496	273	95
	507	279	98
Steel HP 14 X 102			
	183	101	40

Steel HP 8 X 36		
182	100	65
187	103	68
196	108	70
202	111	73
209	115	75
215	118	78
222	122	80
229	126	83
236	130	85
245	135	88
252	139	90
262	144	93
271	149	95
278	153	98
Steel HP 10 X 42		
161	88	55
190	104	58
207	114	60
215	118	63
229	126	65
234	129	68
245	135	70
250	138	73
260	143	75
267	147	78
275	151	80
283	156	83
292	161	85
303	166	70
308	169	73
319	176	75
327	180	78
337	186	80
348	191	83
358	197	85
372	204	88
383	211	90
399	220	93
412	227	95
422	232	98
Steel HP 12 X 74		
172	95	45
188	104	48
199	109	53
201	111	55
245	135	58
265	146	60
273	150	63
291	160	65
293	161	68
307	169	70
312	172	73
324	178	75
331	182	78
342	188	80
352	194	83
363	199	85
196	108	43
212	116	45
232	127	48
240	132	53
243	133	55
303	167	58
328	180	60
335	184	63
355	196	68
371	204	70
376	207	73
390	214	75
398	219	78
410	226	80
423	232	83
435	239	85
452	249	88
466	256	90
487	268	93
502	276	95
513	282	98
Steel HP 14 X 117		
162	89	38
185	102	40
198	109	43
214	118	45
235	129	48
243	134	53
245	135	55

Pile Design Table for South Abutment - Stub utilizing Boring #30

	Nominal Required Bearing (Kips)	Factored Resistance Available (Kips)	Estimated Pile Length (Ft.)
Metal Shell 12"Φ w/.179" walls			
	109	60	31
	125	69	34
	143	79	37
	162	89	39
	178	98	42
	194	107	44
	212	117	47
	230	126	49
Metal Shell 12"Φ w/.25" walls			
	109	60	31
	125	69	34
	143	79	37
	162	89	39
	178	98	42
	194	107	44
	212	117	47
	230	126	49
	263	145	52
	271	149	54
	276	152	57
	301	165	59
	318	175	62
	340	187	64
	352	193	67
Metal Shell 14"Φ w/.25" walls			
	103	57	26
	131	72	31
	150	82	34
	171	94	37
	194	106	39
	211	116	42
	230	127	44
	252	139	47
	272	150	49
	315	173	52
	324	178	54
	329	181	57
	358	197	59
	377	208	62
	402	221	64
Metal Shell 14"Φ w/.312" walls			
	103	57	26
	131	72	31
	150	82	34
	171	94	37
	194	106	39
	211	116	42
	230	127	44
	252	139	47

	Nominal Required Bearing (Kips)	Factored Resistance Available (Kips)	Estimated Pile Length (Ft.)
Steel HP 10 X 57			
	102	56	37
	117	64	39
	127	70	42
	138	76	44
	151	83	47
	162	89	52
	164	90	54
	194	107	57
	211	116	59
	220	121	62
	235	129	64
	239	131	67
	250	138	69
	256	141	72
	265	146	74
	272	150	77
	281	154	79
	289	159	82
	298	164	84
	309	170	87
	319	175	89
	332	182	92
	342	188	94
	351	193	97
Steel HP 12 X 53			
	98	54	31
	112	62	34
	125	69	37
	143	79	39
	154	85	42
	168	92	44
	184	101	47
	195	107	52
	196	108	54
	238	131	57
	258	142	59
	267	147	62
	284	156	64
	287	158	67
	300	165	69
	305	168	72
	316	174	74
	324	178	77
	334	184	79
	345	189	82
	355	195	84
	368	203	87
	380	209	89
	396	218	92

	Nominal Required Bearing (Kips)	Factored Resistance Available (Kips)	Estimated Pile Length (Ft.)
Steel HP 14 X 73			
	105	58	29
	119	65	31
	140	77	34
	155	85	37
	178	98	39
	190	105	42
	206	113	44
	226	124	47
	235	129	52
	237	130	54
	295	162	57
	319	175	59
	327	180	62
	347	191	64
	347	191	67
	363	199	69
	367	202	72
	381	209	74
	389	214	77
	401	221	79
	413	227	82
	425	234	84
	442	243	87
	455	250	89
	476	262	92
	491	270	94
	501	276	97
Steel HP 14 X 89			
	107	59	29
	121	67	31
	142	78	34
	157	86	37
	180	99	39
	193	106	42
	209	115	44
	229	126	47
	238	131	52
	240	132	54
	299	165	57
	323	178	59
	331	182	62
	351	193	64
	351	193	67
	367	202	69
	372	204	72
	385	212	74
	394	216	77
	406	223	79
	418	230	82

272	150	49
315	173	52
324	178	54
329	181	57
358	197	59
377	208	62
402	221	64
414	228	67
434	238	69
446	245	72
462	254	74
475	262	77
490	270	79
505	278	82
Steel HP 8 X 36		
107	59	44
117	64	47
126	70	49
128	70	52
129	71	54
149	82	57
162	89	59
171	94	62
182	100	64
187	103	67
196	108	69
202	111	72
209	115	74
215	118	77
222	122	79
229	126	82
236	130	84
245	135	87
252	139	89
262	144	92
271	149	94
278	153	97
Steel HP 10 X 42		
100	55	37
114	63	39
124	68	42
135	74	44
148	81	47
159	87	52
161	88	54
190	104	57
207	114	59
215	118	62
229	126	64
234	129	67
245	135	69
250	138	72
260	143	74
267	147	77
275	151	79
408	225	94
418	230	97
Steel HP 12 X 63		
100	55	31
113	62	34
126	70	37
145	80	39
156	86	42
169	93	44
186	102	47
196	108	52
198	109	54
241	132	57
261	144	59
270	148	62
287	158	64
289	159	67
303	166	69
308	169	72
319	176	74
327	180	77
337	186	79
348	191	82
358	197	84
372	204	87
383	211	89
399	220	92
412	227	94
422	232	97
Steel HP 12 X 74		
102	56	31
115	63	34
128	71	37
147	81	39
158	87	42
172	95	44
188	104	47
199	109	52
201	111	54
245	135	57
265	146	59
273	150	62
291	160	64
293	161	67
307	169	69
312	172	72
324	178	74
331	182	77
342	188	79
352	194	82
363	199	84
377	207	87
388	213	89
405	223	92
418	230	94
430	237	84
447	246	87
461	253	89
481	265	92
496	273	94
507	279	97
Steel HP 14 X 102		
108	59	29
122	67	31
144	79	34
159	88	37
183	101	39
196	108	42
212	116	44
232	127	47
240	132	52
243	133	54
303	167	57
328	180	59
335	184	62
355	196	67
371	204	69
376	207	72
390	214	74
398	219	77
410	226	79
423	232	82
435	239	84
452	249	87
466	256	89
487	268	92
502	276	94
513	282	97
Steel HP 14 X 117		
83	46	26
110	60	29
124	68	31
146	80	34
162	89	37
185	102	39
198	109	42
214	118	44
235	129	47
243	134	52
245	135	54
308	169	57
332	183	59
339	187	62
360	198	67
376	207	69
380	209	72
394	217	74
403	221	77
415	228	79
427	235	82

283	156	82
292	161	84
303	167	87
312	172	89
325	179	92

427	235	97
Steel HP 12 X 84		
103	57	31
117	64	34
130	72	37
149	82	39
161	88	42
175	96	44
191	105	47
202	111	52
204	112	54
248	137	57
269	148	59
278	153	62
295	162	64
297	164	67
311	171	69
316	174	72
328	180	74
336	185	77
346	191	79
357	196	82
367	202	84
382	210	87
393	216	89
410	226	92
423	233	94
433	238	97

440	242	84
457	252	87
471	259	89
492	271	92
508	279	94
519	285	97
Precast 14"x 14"		
67	37	15
116	64	23
132	72	26
167	92	31
191	105	34
217	119	37
246	136	39
Timber Pile		
95	52	31
111	61	34
130	72	37
147	81	39

Appendix F

Estimated Factored Structural Loadings

I-57 - I 74 INTERCHANGE STRUCTURES

Information for Geotechnical Engineering SGR's 03.24.2015

Structure:	RAMP G over RAMP F	Station
S.N.	010-1003	733+14.83
No. of Spans:	1	

Option No.		Superstructure Type / Option	Substructure	
1	Details	**PPC BULB TEE IL63-2438**		
		Superstructure: Tangent Girder on Curved Alignment		
		Substructure Element	ABUT 1	ABUT 2
		Abutment Type: (Integral, Semi Integral, Stub, etc.)	Integral *	Integral *
		Pier Type	n/a	n/a
		Deck Joints	n/a	n/a
		Bearing Type	Fixed	Fixed
		Est. Bottom of Abutment Elevation	779.47	777.8
		Est. Abutment Length	35'-8"	35'-8"
		Est. Pier Bottom of Footing	n/a	n/a
		Est. Pier Footing Dimensions	n/a	n/a
		Total Factored Vertical DL + LL	1,958 Kips *	1,958 Kips*
		Additional Notes / Comments	Single row of vertical steel piles. * Dynamic Load Allowance (IM) included for integral abutment.	
2	Details	**STEEL PLATE GIRDER, WEB DEPTH = 60 IN.**	**Substructure**	
		Superstructure: Curved Girder on Curved Alignment		
		Substructure Element	ABUT 1	ABUT 2
		Abutment Type: (Integral, Semi Integral, Stub, etc.)	Stub	Stub
		Pier Type	n/a	n/a
		Deck Joints	Strip Seal	Strip Seal
		Bearing Type	Elastomeric	Elastomeric
		Est. Bottom of Abutment Elevation	779.47	777.8
		Est. Abutment Length	34'-0"	34'-0"
		Est. Pier Bottom of Footing	n/a	n/a
		Est. Pier Footing Dimensions	n/a	n/a
		Total Factored Vertical DL + LL	1,359 Kips **	1,359 Kips**
		Additional Notes / Comments	Two rows of piles. Vertical back row, 12:3 battered front row. ** Dynamic Load Allowance (IM) not included.	