STRUCTURE GEOTECHNICAL REPORT

US 50 OVER AN ABANDONED RAILROAD

SECTION (51-23VB)B-1
EXISTING STRUCTURE NUMBER: 051-0013
PROPOSED STUCTURE NUMBER: 051-8634

LAWRENCE COUNTY, IL

Contract Number: 74113
PTB Number: 147-28 WO#4

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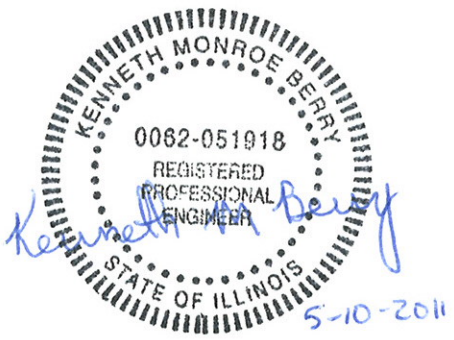
May 10, 2011



URS

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Bridge number 051-0013 carrying FAP-327 (US 50) over an abandoned railroad approximately 0.1 mile east of IL-1 in Lawrence County, IL (Figure 1), is scheduled for replacement. Bridge repairs were last made in 1987. The existing bridge is approximately 155 feet long and 36.5 feet wide. The bridge is 26 feet in height from the abandoned railroad to the bridge deck. The pavement design consists of 2 inches of asphalt over 13 inches of concrete. The bridge supports and abutments are on metal shell piles.

The proposed replacement structure will consist of a 12 feet by 13.5 feet single barrel vehicular cast-in-place culvert. The length of the culvert will be approximately 119.75 feet. Fill will be used to bring the ground up to the roadway surface.

Boring logs were provided by IDOT. Four borings were drilled on September 8 and 9, 2008. Boring depths ranged from approximately 16 to 42 feet below grade. Borings B-1 and B-2 were drilled at the east and west abutments, respectively. Borings B-3 and B-4 were drilled on the north and south sides of the abandoned railroad. The borings were considered adequate for the geotechnical report. The original foundations of the existing bridge are metal shell piles. Original bridge plans from 1958 show the planned construction. Shop drawings were not available. No major changes were detailed in the Bridge Condition Report during repairs in 1987. Structural loads were unavailable. The bridge is currently considered to be in poor condition.

3.1 Site Conditions

The topography is generally flat. Aerial photographs show the land is wooded or used for farming. The existing bridge carries US 50 over an abandoned railroad. In photographs, the railroad ties and rails have been removed. The landowner uses it as a road to get to nearby fields. No damage to the foundations was noted in the bridge condition report. Buried or overhead utilities may be present and should be identified before construction.

3.2 Subsurface Exploration

IDOT conducted a subsurface exploration program consisting of 4 borings; 1 at each abutment and 2 on either side of the abandoned railroad. Borings B-1 and B-2 were drilled at the west (Station 581+84) and east (Station 584+60) abutment to 46 feet below ground surface. Borings B-3 and B-4 were drilled on the north and south side (Station 582+84) of the railroad to 16 feet below grade. They were drilled using hollow stem augers. Samples were collected using a split spoon sampler. Blow counts were taken using an autohammer with a weight of 140 pounds. Field unconfined compression tests were also taken. Laboratory tests consisted of moisture contents.

3.3 Subsurface Conditions

Boring B-1 at a surface elevation 453.37 was drilled through the pavement of US 50, which consists of 2 inches of asphalt over 13 inches of concrete. Boring B-2 at El. 453.8 was drilled through the 9.5 inch thick asphalt shoulder. The railroad ballast encountered in B-3 at El. 425.43 and B-4 at El. 426.39 was not sampled. It is approximately 4 to 4.5 inches thick and consists of crushed stone. Boring B-1 encountered interbedded layers of clay, silty clay, and sandy to clay loams. Soils beneath the pavement to 35 feet are fill material from construction of the roadway in 1959. Native loam and clay was encountered at approximately 36 feet below grade. Between 16 feet to 30.5 feet below ground surface, a petroleum odor was noted. The soils are generally medium stiff to stiff. Borings B-2, B-3, and B-4 consisted of mostly silty clay and clay. A thin layer (0.3 inch) of sandy loam was present in B-2 between 12.5 feet and 12.8 feet below ground surface. In B-3 and B-4, the soils were mostly soft to medium stiff in consistency. B-3 had a clay layer classified as very stiff between 4 and 7 feet below ground surface. Soils in B-2 were medium stiff to very stiff. No bedrock was encountered in the borings. Figure 2 shows the subsurface profile of the soils found at the current bridge. Figures 3 through 6 are the borings logs provided to URS by IDOT.

3.4 Groundwater

No groundwater was encountered during the geotechnical investigation.

4.1 Settlement

Settlement is likely to occur under the culvert. Settlement is estimated to be approximately one inch beneath the culvert and is anticipated to occur within 3 months of completion of the structure. The current design footprint of the culvert is smaller than that of the existing bridge span. Therefore, settlement may also occur adjacent to the culvert. Fill soils compacted around the culvert may also induce settlement of approximately one inch.

4.2 Slope Stability

Slope stability models were run using Geoslope Slope-W software. B-1 and B-3 were used to model the subsurface conditions due to the presence of weak soils at depth below the anticipated base of the box culvert. The drained, undrained, and seismic conditions were performed. Table 1.0 shows the factors of safety for the critical failure planes.

Table 1.0: Factor of Safety for Slope Stability on 12 ft X 13.5 ft Box Culvert

Factor of Safety	
	Abandoned Railroad Bed
Drained	1.6
Undrained	2.2
Seismic	1.9

All conditions exceed the required FS of 1.5 for embankments slopes. The coefficient of sliding friction is 0.36 for the soils found onsite.

4.3 Foundations

The proposed box culvert will maintain the same skew as the existing structure. The existing bridge is three-span, wide flange bridge, 36.5 feet wide, and 155 feet long from inside face to inside face abutments. Metal shell piles are used to support the existing bridge. The proposed replacement, single barrel cast-in-place box culvert has 12 feet wide by 13.5 feet height opening. In this part of Illinois, the frost penetration depth is approximately 36 inches. However, wingwall footings should be founded 4 feet below the culvert invert elevation, following the standard practice for culvert design.

To provide an allowable bearing capacity of 1,800 psf with a factor of safety of 3 beneath the culvert box, a minimum of 2 feet of ballast rock should be placed below the base of the culvert. A geofabric should be installed beneath the rock.

The recommended design for the wingwalls is a vertical, cantilevered T-Type retaining wall. The wingwalls will be constructed to approximately 18.5 feet from bottom of footing to top of wall. The allowable bearing capacity for the wingwalls is estimated to be 2,670 psf. A minimum of 4 feet of ballast rock should be placed below the wingwall foundations.

The following table provides the allowable bearing capacity based on the thickness of the rock beneath the foundation.

Table 2: Allowable Bearing Capacity for Removal and Replacement

	Crushed Rock Thickness (ft)					
	2	3	4	5	6	7
Allowable Bearing Capacity, psf	1800	2200	2670	3210	3820	4490

The crushed rock should consist of material as defined in the special provisions. The geofabric should be a Mirafi 600X or approved equivalent. Removal and replacement should be under and extend 3 feet out from the culvert and all wing walls. The limits and quantities of removal and replacement shown are based on the boring data and may be modified by the District Geotechnical and Field Engineers for variable subsurface conditions encountered in the field.

4.4 Construction Considerations

Soil excavation for the culvert and wingwalls may be made by open cutting. The slopes should be no steeper than 1.5(H):1(V) with a slope angle of 34°. This complies with OSHA requirements for Soil Type C. Some minor sloughing should be anticipated. If sloping is not practical, cantilever soldier piles and lagging sheet piles or a trench box may be appropriate, if walls are 12 feet in height or less. Higher structural retention would require tiebacks or bracing.

It is understood that U.S. Highway 50 will remain open during culvert construction and bridge demolition. It is assumed that the first stage will involve the construction of the culvert beneath the bridge, the placement and compaction of soil backfill up to the elevation of at least the top of the culvert. Stage 2 would consist of demolition of the eastbound lane of the US Highway 50 bridge. and then fill placement. Protection measures such as soil cover should be in-place for the new culvert when the existing bridge is removed. In Stage 2, a temporary earth retaining system will be constructed on top of the culvert at the centerline of the roadway to prevent slope failure of the roadway embankment fill during Stage 3 soil removal and bridge demolition. Once this is complete, backfill will be brought around the culvert to build soil up to the eastbound bridge deck for roadway construction. The westbound section of the bridge is demolished in the third stage. Due to site constraints, an MSE type retention system, using either geosynthetic or metal wire

reinforcement, should be used as shown on the TS & L drawings in Appendix A. Structural options such as sheet piling and soldier pile and lagging are not appropriate, given the constraints provided by the culvert.

The contractor should decide what type of temporary retention wall would best suit the project's needs and construction constraints.

The Illinois Department of Transportation Culvert Manual (June 2000 ed.) states that culvert walls be designed using active earth pressures of 40 pcf for the depth of the fill and surcharge and 50 pcf for the height of the culvert barrel. Active pressures on wingwalls are to be designed based on Figure 3.1.2-1 of the Culvert Manual.

A review of Illinois State Geological Survey map database showed no known coal mining occurred in the area of the culvert. Therefore, no mine subsidence should occur under the culvert. The previous bridge condition report did not mention any subsidence at the abutments of the existing bridge.

Backfilling behind the culvert and wingwalls will be required to bring the elevation to grade. Approximately ten feet of fill will bring the elevation from the top of the culvert to the roadway subgrade. Non-organic native or imported soil may be used as backfill. All backfill and fill material should be placed and compacted following IDOT standard specifications.

This report discusses the geotechnical aspects of the proposed improvements and provides our recommendations. Because actual subsurface conditions can vary from those inferred from the borings, it is important that the geotechnical engineer of record be present on-site during foundation and earthwork construction to confirm that soil conditions match the design assumptions. Consequently, we recommend that URS be retained to document earthwork and foundation construction. We also recommend that we review plans and specifications related to our work to verify that our recommendations have been properly interpreted.

This report is based on our understanding of the project as described and was prepared to provide recommendations for a vehicular single barrel box culvert.

The boring logs depict subsurface conditions for the specific locations and dates. The recommendations and observations presented in the report assume that significant variations do not occur. Non-uniform conditions, however, often cannot be determined by the procedures described. Such conditions may necessitate additional expenditures to obtain a properly constructed project. We recommend that a contingency fund be budgeted to accommodate such possible expenditures.

The boring logs were produced by a party other than the geotechnical engineer. We have assumed that the data provided was accurate. All calculations and recommendations were based on this data.

Illinois Department of Transportation, January 1999, Bridge Manual, p.3-33

Illinois Department of Transportation, January 2002, Standard Specifications for Road and Bridge Construction

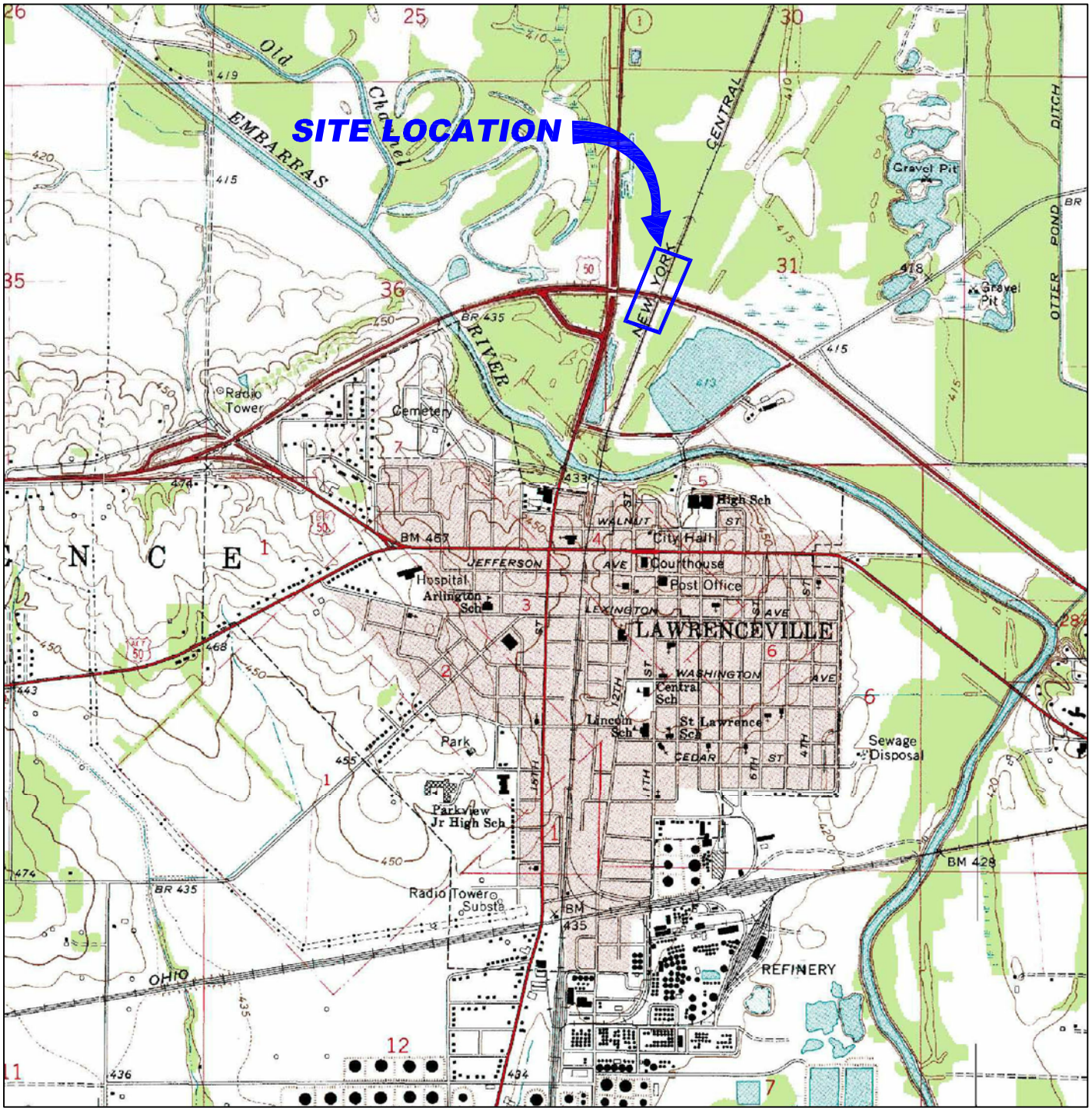
Illinois State Geological Survey, County Coal Maps, http://www.isgs.illinois.edu/maps-data-pub/coal-maps/county-index.shtml

Occupational Safety and Health Administration, Technical Manual TED 01-00-015, Section V, Chapter 2.

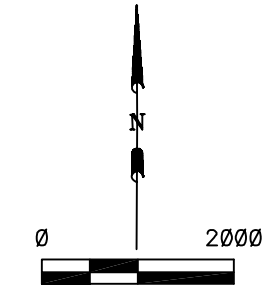
PTB 147/28, Job D-017-08 Project Management Plan

State of Illinois, Division of Highways, Plans for Proposed Federal Aid Highway, FAI-64, Section 51-23VB, 1958.

Illinois Department of Transportation, June 2000, Culvert Manual, pp. 2-3, 3-3 to 3-4



SOURCE: MAP TAKEN FROM ELECTRONIC USGS DIGITAL RASTER GRAPHIC 7.5 MINUTE TOPOGRAPHIC MAP OF LAWRENCEVILLE, ILL. REVISED 1965, SECTION B-1, TOWNSHIP 7 NORTH, RANGE 12 WEST.

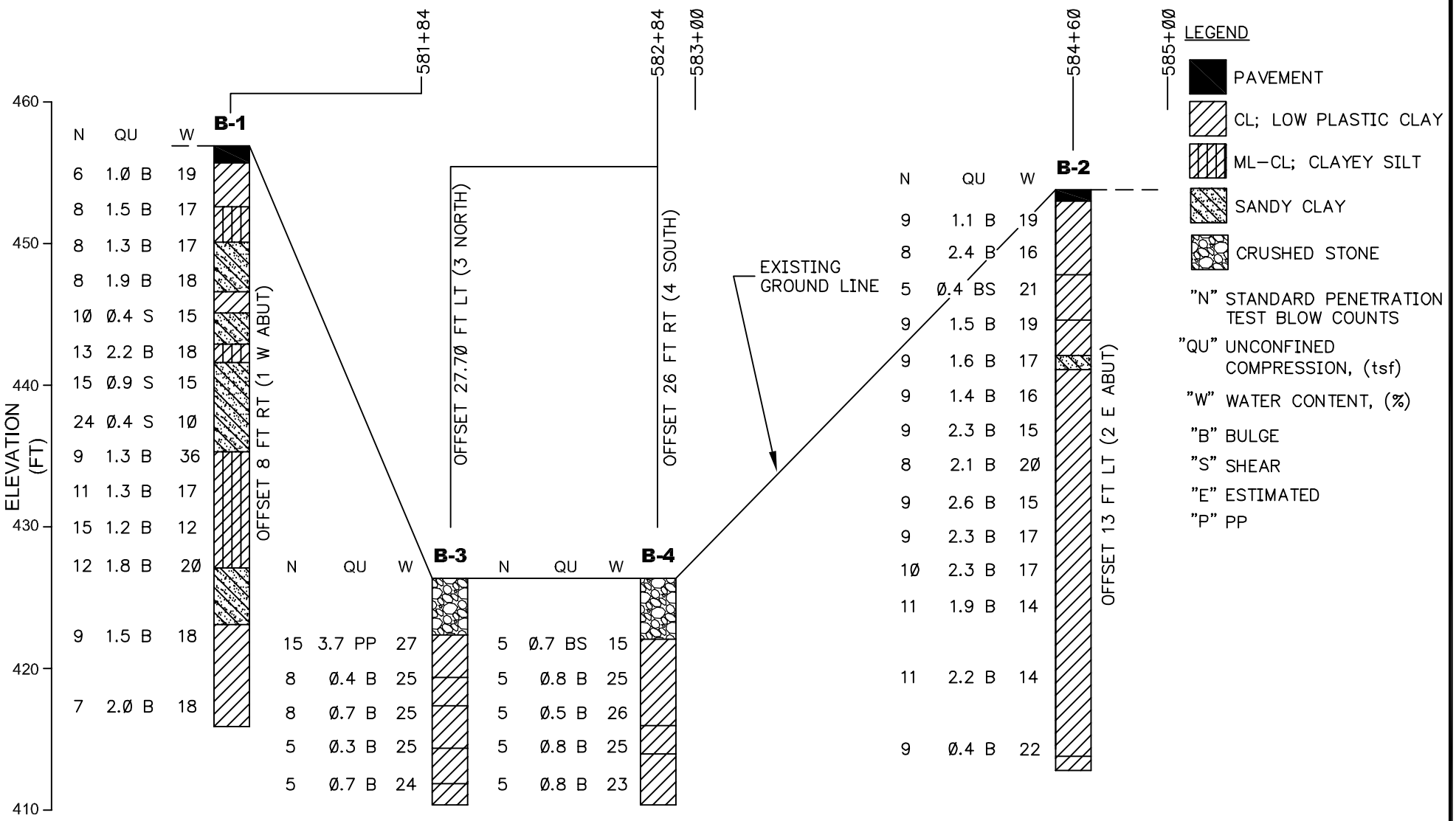


QUADRANGLE LOCATION

IDOT US 5Ø REPLACEMENT SINGLE BARREL CULVERT ROUTE FAP 325, SECTION (51-23VB) B-1 LAWRENCE COUNTY, ILLINOIS		PROJECT NO. 36432262.ØØ1ØØ
URS		
DRN. BY:djd 11/25/Ø8 DSGN. BY:sv CHKD. BY:tlc	Project Site Location Map	FIG. NO. 1

File: P:\GEOTECHNICAL\DECATUR MISC\PTB 147-28\GEOTECH\FIGURES (REPLACEMENT SINGLE BARREL)\FIGURE 1 PROJECT SITE LOCATION MAP.DWG Last edited: NOV. 25, 08 @ 09:45 a.m. by: david_deguire

File: P:\GEOTECHNICAL\DECATUR MISC\PTB 147-28\GEOTECH\FIGURES (REPLACEMENT SINGLE BARREL)\FIGURE 2 SUBSURFACE PROFILE.DWG Last edited: MAR. 10, 09 @ 10:43 a.m. by: david_deguire



0 10
VERTICAL SCALE FEET

0 60
HORIZONTAL SCALE FEET

IDOT US 50 REPLACEMENT SINGLE BARREL CULVERT
ROUTE FAP 325, SECTION (51-23VB) B-1
LAWRENCE COUNTY, ILLINOIS

PROJECT NO.
36432262.00100

URS

DRN. BY:djd 11/25/08
DSGN. BY:sv
CHKD. BY:tlc

Subsurface Profile

FIG. NO.
2

Illinois Department of Transportation
Division of Highways
Illinois Department of Transportation

SOIL BORING LOG

Date 9/8/08

ROUTE FAP 327 (US 50) **DESCRIPTION** Over abandoned railroad **LOGGED BY** E. Sandschafer

SECTION (51-23VB)B-1 **LOCATION** West 1/2 - Section 31, **SEC.**, **TWP.** 4 N, **RNG.** 11 W, 3 **PM**

COUNTY Lawrence **DRILLING METHOD** Hollow stem auger & split spoon **HAMMER TYPE** Auto 140#

STRUCT. NO. 051-0013
Station 583+36

BORING NO. 1 W Abut
Station 581+84
Offset 8.00ft Rt
Ground Surface Elev. 453.37 ft

Surface Water Elev. N/A ft
Stream Bed Elev. N/A ft

Groundwater Elev.:
First Encounter Dry ft
Upon Completion Dry ft
After 96 **Hrs.** Dry ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Description
				2" asphalt on 13" concrete pavement.
				452.07
				Medium to stiff, damp, gray, SILTY CLAY.
	1			
	3	1.0	19	
	3	B		
				448.87
-5	2			Stiff, damp, gray, CLAY LOAM.
	3	1.5	17	
	5	B		
				446.37
	1			Gray, SANDY LOAM. 445.87
	3	1.3	17	Stiff, damp, gray, SANDY CLAY LOAM.
	5	B		
				443.87
-10	3			Gray, SANDY LOAM.
	4	1.9	18	443.07
	4	B		Stiff, damp, gray, CLAY.
				441.37
	3			Medium, damp, gray, SANDY LOAM.
	4	0.4	15	
	6	S		
				438.87
-15	4			Very stiff, damp, gray, CLAY LOAM.
	5	2.2	18	
	8	B		437.57
				Medium, damp, gray, SANDY LOAM w/ petroleum odor.
	4			
	5	0.9	15	
	10	S		
-20	4			
	11	0.4	10	Medium, damp, gray, SANDY LOAM w/ petroleum odor. *(continued)*
	13	S		
				431.37
	4			Stiff, damp, gray, CLAY LOAM w/ layers of Sandy Loam and petroleum odor.
	4	1.3	36	
	5	B		
-25	4			
	5	1.3	17	
	6	B		
	3			
	8	1.2	12	
	7	B		
-30	2			
	4	1.8	20	422.87
	8	B		Gray, SANDY LOAM.
				418.87
-35	3			Stiff, damp, gray, CLAY w/ few Clay Till pieces.
	3	1.5	18	417.67
	6	B		Stiff, damp, gray, SILTY CLAY w/ many roots and wood fragments.
				413.87
-40	2			Gray, SANDY LOAM. 413.37

Latitude W 87 deg 40.944 min, Longitude N 38 deg 44.338 min, Map Datum WGS 84

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)

BBS, from 137 (Rev. 8-99)

Figure 3

Illinois Department of Transportation
Division of Highways
Illinois Department of Transportation

SOIL BORING LOG

Date 9/8/08

ROUTE FAP 327 (US 50) **DESCRIPTION** Over abandoned railroad **LOGGED BY** E. Sandschafer

SECTION (51-23VB)B-1 **LOCATION** West 1/2 - Section 31, **SEC.**, **TWP.** 4 N, **RNG.** 11 W, 3 **PM**

COUNTY Lawrence **DRILLING METHOD** Hollow stem auger & split spoon **HAMMER TYPE** Auto 140#

STRUCT. NO. 051-0013
Station 583+36

BORING NO. 1 W Abut
Station 581+84
Offset 8.00ft Rt
Ground Surface Elev. 453.37 ft

Surface Water Elev. N/A ft
Stream Bed Elev. N/A ft

Groundwater Elev.:
First Encounter Dry ft
Upon Completion Dry ft
After 96 **Hrs.** Dry ft

	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Stiff, damp, gray, SILTY CLAY w/ many roots and wood fragments. 412.37		3 4	2.0 B	18
Extent of exploration.				
Benchmark: BM 801 Chiseled square on SE corner of existing bridge on US 50 over IL 1 (approx 0.1 mile West of this structure) = 451.11' elevation. Provided by Program Development.	-45			
	-50			
	-55			
	-60			

Latitude W 87 deg 40.944 min, Longitude N 38 deg 44.338 min, Map Datum WGS 84

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)

BBS, from 137 (Rev. 8-99)

Figure 3

Illinois Department of Transportation
Division of Highways
Illinois Department of Transportation

SOIL BORING LOG

Date 9/8/08

ROUTE FAP 327 (US 50) **DESCRIPTION** Over abandoned railroad **LOGGED BY** E. Sandschafer

SECTION (51-23VB)B-1 **LOCATION** West 1/2 - Section 31, **SEC.**, **TWP.** 4 N, **RNG.** 11 W, 3 **PM**

COUNTY Lawrence **DRILLING METHOD** Hollow stem auger & split spoon **HAMMER TYPE** Auto 140#

STRUCT. NO. 051-0013
Station 583+36

BORING NO. 2 E Abut
Station 584+60
Offset 13.00ft Lt
Ground Surface Elev. 453.80 ft

Surface Water Elev. N/A ft
Stream Bed Elev. N/A ft

Groundwater Elev.:
First Encounter Dry ft
Upon Completion Dry ft
After 96 **Hrs.** Dry ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Material
				9 1/2" asphalt shoulder.
				453.00
				Stiff, damp, gray, CLAY.
	4			
	4	1.1	19	
	5	B		
-5	3			
	3	2.4	16	
	5	B		
	2			
				446.30
	2	0.4	21	Medium, very damp, gray, SILTY CLAY.
	3	BS		
				444.30
-10	2			Stiff, damp, gray mottled brown, CLAY.
	4	1.5	19	
	5	B		
	2			
				441.30
	4	1.6	17	Red, SANDY LOAM.
	5	B		441.00
				Very stiff, damp, gray mottled red, CLAY.
-15	2			
	4	1.4	16	
	5	B		
	2			
	4	2.3	15	
	5	B		
	3			
				433.80
-20				

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Material
	4	2.1	20	Very stiff, damp, gray marbled red, CLAY.
	4	B		
	2			
	4	2.6	15	
	5	B		
-25	3			
	4	2.3	17	
	5	B		
	3			
	5	2.3	17	
	5	B		
-30	2			
	4	1.9	14	
	7	B		
-35	3			
	4	2.2	14	
	7	B		
-40	2			

Latitude W 87 deg 40.883 min, Longitude N 38 deg 44.330 min, Map Datum WGS 84

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)

BBS, from 137 (Rev. 8-99)

Figure 4

Illinois Department of Transportation
Division of Highways
Illinois Department of Transportation

SOIL BORING LOG

Date 9/8/08

ROUTE FAP 327 (US 50) **DESCRIPTION** Over abandoned railroad **LOGGED BY** E. Sandschafer

SECTION (51-23VB)B-1 **LOCATION** West 1/2 - Section 31, **SEC.**, **TWP.** 4 N, **RNG.** 11 W, 3 **PM**

COUNTY Lawrence **DRILLING METHOD** Hollow stem auger & split spoon **HAMMER TYPE** Auto 140#

STRUCT. NO. 051-0013
Station 583+36

BORING NO. 2 E Abut
Station 584+60
Offset 13.00ft Lt
Ground Surface Elev. 453.80 ft

Surface Water Elev. N/A ft
Stream Bed Elev. N/A ft

Groundwater Elev.:
First Encounter Dry ft
Upon Completion Dry ft
After 96 **Hrs.** Dry ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
413.30	4	0.4	22
Medium, very damp, gray, SILTY CLAY. 412.80	5	B	
Extent of exploration.			
-45			
-50			
-55			
-60			

Benchmark: BM 801 Chiseled square on SE corner of existing bridge on US 50 over IL 1 (approx 0.1 mile West of this structure) = 451.11' elevation. Provided by Program Development.

Latitude W 87 deg 40.883 min, Longitude N 38 deg 44.330 min, Map Datum WGS 84

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)

BBS, from 137 (Rev. 8-99)

Figure 4

Illinois Department of Transportation
Division of Highways
Illinois Department of Transportation

SOIL BORING LOG

Date 9/9/08

ROUTE FAP 327 (US 50) **DESCRIPTION** Over abandoned railroad **LOGGED BY** E. Sandschafer

SECTION (51-23VB)B-1 **LOCATION** West 1/2 - Section 31, **SEC.**, **TWP.** 4 N, **RNG.** 11 W, 3 **PM**

COUNTY Lawrence **DRILLING METHOD** Hollow stem auger & split spoon **HAMMER TYPE** Auto 140#

STRUCT. NO. 051-0013
Station 583+36

BORING NO. 3 North
Station 582+84
Offset 25.70ft Lt
Ground Surface Elev. 425.43 ft

Surface Water Elev. N/A ft
Stream Bed Elev. N/A ft

Groundwater Elev.:
First Encounter Dry ft
Upon Completion Dry ft
After ____ **Hrs.** N/A ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	
Railroad ballast rock.				
421.43				
Very stiff, damp, gray, CLAY.	5			
-5	6	3.7	27	
	9	PP		
418.43				
Soft, damp, gray, SILTY CLAY.	2			
	4	0.4	25	
	4	B		
416.43				
Medium, damp, gray, CLAY w/ trace Silt.	2			
-10	4	0.7	25	
	4	B		
413.43				
Soft, damp, gray, SILTY CLAY.	1			
	2	0.3	25	
	3	B		
410.93				
Medium, damp, gray, CLAY w/ trace Silt.	1			
-15	2	0.7	24	
	3	B		
409.43				
Extent of exploration.				
Benchmark: BM 801 Chiseled square on SE corner of existing bridge on US 50 over IL 1 (approx 0.1 mile West of this structure) = 451.11' elevation. Provided by Program Development.				
-20				

Latitude W 87 deg 40.921 min, Longitude N 38 deg 44.341 min, Map Datum WGS 84

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)

BBS, from 137 (Rev. 8-99)

Figure 5

Illinois Department of Transportation
Division of Highways
Illinois Department of Transportation

SOIL BORING LOG

Date 9/9/08

ROUTE FAP 327 (US 50) DESCRIPTION Over abandoned railroad LOGGED BY E. Sandschafer

SECTION (51-23VB)B-1 LOCATION West 1/2 - Section 31, SEC., TWP. 4 N, RNG. 11 W, 3 PM

COUNTY Lawrence DRILLING METHOD Hollow stem auger & split spoon HAMMER TYPE Auto 140#

STRUCT. NO. 051-0013
Station 583+36

BORING NO. 4 South
Station 582+84
Offset 26.00ft Rt
Ground Surface Elev. 426.39 ft

Surface Water Elev. N/A ft
Stream Bed Elev. N/A ft

Groundwater Elev.:
First Encounter Dry ft
Upon Completion Dry ft
After ____ Hrs. N/A ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	
Railroad ballast rock.				
421.89				
-5	2			
Medium, damp, gray, CLAY w/ trace Silt.	2 3	0.7 BS	15	
	2			
	2 3	0.8 B	25	
-10	2			
416.09	2 3	0.5 B	26	
Soft to medium, damp, gray, SILTY CLAY.				
413.89	1			
Medium, damp, gray, CLAY w/ trace Silt.	2 3	0.8 B	25	
-15	2			
	2 3	0.8 B	23	
410.39				
Extent of exploration. Benchmark: BM 801 Chiseled square on SE corner of existing bridge on US 50 over IL 1 (approx 0.1 mile West of this structure) = 451.11' elevation. Provided by Program Development.				
-20				

Latitude W 87 deg 40.934 min, Longitude N 38 deg 44.322 min, Map Datum WGS 84

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)

BBS, from 137 (Rev. 8-99)

Figure 6

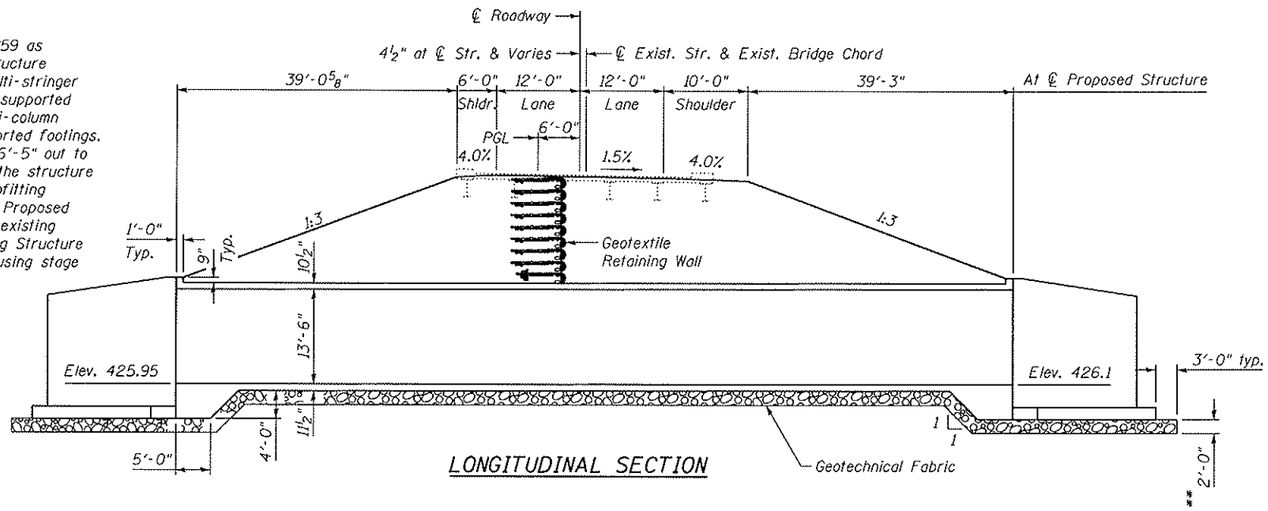
Appendix A: Type, Size, & Location Plans

Benchmark: B.M. 802, Chiseled square on S.W. Corner S.N. 051-0013, Elev. 454.13

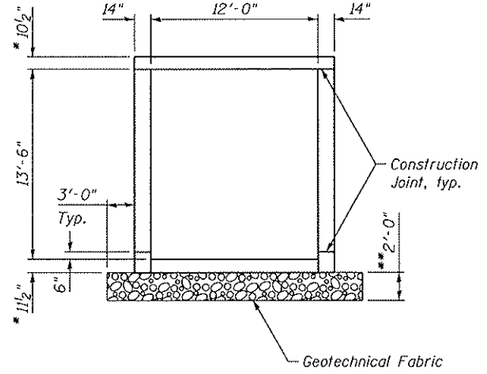
Existing structure: SN 051-0013 built in 1959 as FAI 8, Section 51-23VB. The existing structure consists of a 3-span steel continuous multi-stringer superstructure with a CIP concrete deck supported by pile bent spill thru abutments and multi-column piers with crashwalls on timber pile supported footings. 151'-0" back-to-back of abutments and 36'-5" out to out of deck. Repairs were performed on the structure in 1987, including deck patching, rail retrofitting and replacement of expansion joints. The Proposed Structure is to be constructed under the existing structure. Traffic will be maintained during Structure removal and construction of the roadway using stage construction.

No salvage.

Precast alternate is not allowed.



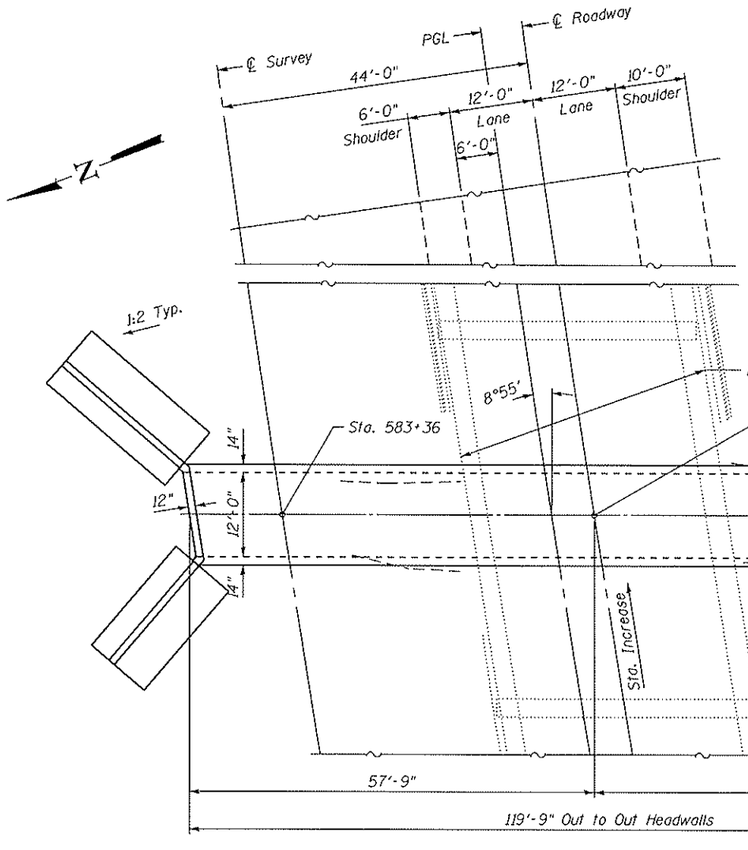
LONGITUDINAL SECTION



SECTION THRU BARREL

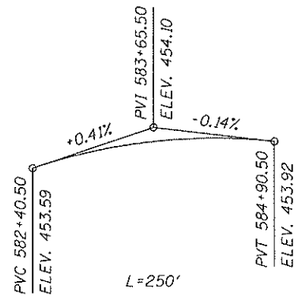
* Slab thickness subject to refinement during final design.

** Rockfill foundation



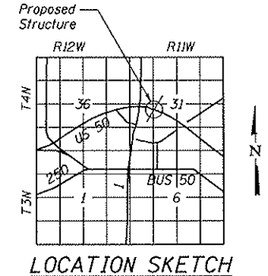
PLAN

EXIST. CURVE C1
PI STA. = 581+11.59
Δ = 66° 01' 58" (RT)
D = 1° 12' 00"
R = 4,774.65'
T = 3,102.63'
L = 5,502.73'
E = 919.52'
P.C. STA. = 550+08.96
P.T. STA. = 605+11.68
S.E. = 0.015 FT/FT



PROFILE GRADE

(Along P.G.L.)



LOCATION SKETCH

HIGHWAY CLASSIFICATION

F.A.P. Rte. 327 (U.S. Rte. 50)
Functional Class: Other Principle Arterial
ADT: 5238 (2011); 6928 (2031)
ADTT: 21.4%
DHV: 762 (2031)
Design Speed: 60 m.p.h.
Posted Speed: 55 m.p.h.
Two Way Traffic
Directional Distribution: 51:49

LOADING HS 20-44

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

DESIGN SPECIFICATIONS

2002 AASHTO Standard Specifications for Highway Bridges

DESIGN STRESSES

FIELD UNITS

f'c = 3,500 psi
fy = 60,000 psi (Reinforcement)

SEISMIC DATA

Seismic Performance Category (SPC) = A
Peak Ground Acceleration PGA) = 8.5% g
Site Coefficient (S) = 1.5

Note:
See Sheet 2 of 2 for Stage removal and construction details.

GENERAL PLAN
U.S. ROUTE 50 OVER ABANDONED RAILROAD
F.A.P. ROUTE 327 SECTION (51-23VB)B-1
LAWRENCE COUNTY
STATION 583+36.00
STRUCTURE NO 051-8634

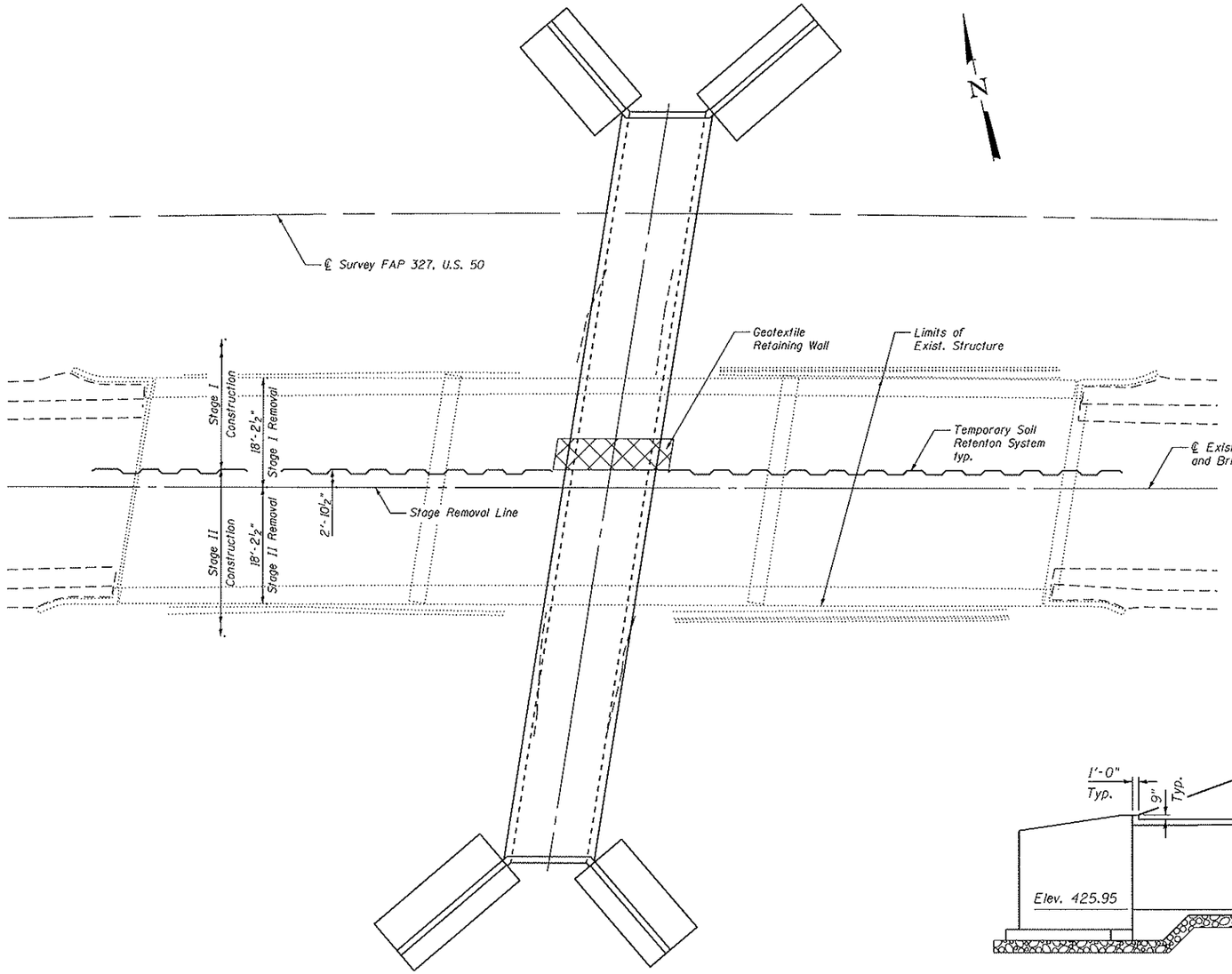
Coombe-Bloxdorf P.C.
-CIVIL ENGINEERS-
-STRUCTURAL ENGINEERS-
-LAND SURVEYORS-
Design Firm License No. 184-002703

FILE NAME =	USER NAME = .CFC.	DESIGNED -	REVISED -
...\051B634-74113-001-tsl.dgn		CHECKED -	REVISED -
	PLOT SCALE = 21:4.000000 '' / IN.	DRAWN - CFC	REVISED -
CB PROJECT NO 08023-1	PLOT DATE = 1/12/2011	CHECKED - MCB	REVISED -

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

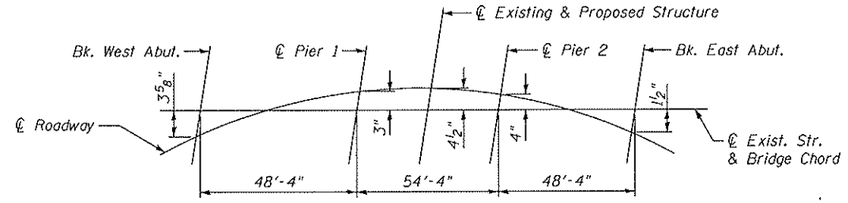
SHEET NO. 1 OF 2 SHEETS

F.A.P. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
327	(51-23VB)B-1	LAWRENCE		
		CONTRACT NO. 74113		
	ILLINOIS FED. AID PROJECT			

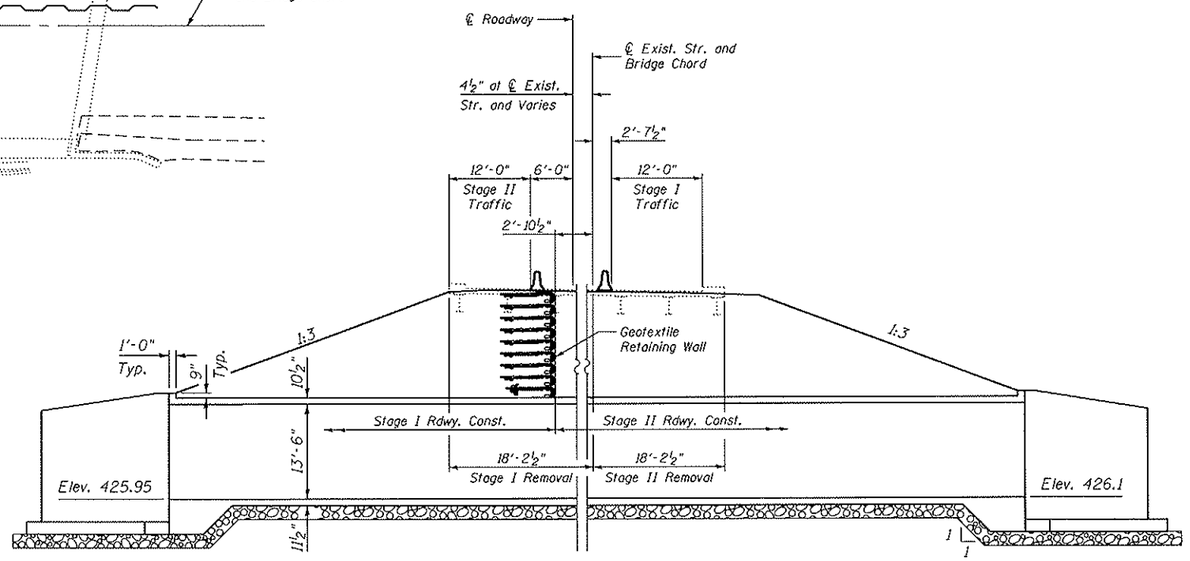


PLAN

Showing staged removal and construction



EXISTING STRUCTURE OFFSET SKETCH



LONGITUDINAL SECTION

Showing staged removal and construction

GENERAL PLAN AND ELEVATION
U.S. ROUTE 50 OVER AN ABANDONED RAILROAD
STATION 583+36.00
STRUCTURE NO 051-0013

Coombe-Bloxdorf P.C.
-CIVIL ENGINEERS-
-STRUCTURAL ENGINEERS-
-LAND SURVEYORS-
Design Firm License No. 184-002703

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		CHECKED -	REVISED -
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CB PROJECT NO 00823-1	PLOT DATE = 1/12/2011	CHECKED - MCB	REVISED -

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

SHEET NO. 2 OF 2 SHEETS

F.A.P. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
327	(51-23V8)B-1	LAWRENCE		
		CONTRACT NO. 74113		
	ILLINOIS FED. AID PROJECT			