Illinois Department of Transportation

Abbreviated Structure Geotechnical Report

Original Report Date:	May 17, 2013	Proposed SN:	053-2580	Route:	FAP 681 (IL 116)
Revised Date:	N/A	Existing SN:	053-2557	Section:	(113)CR
Geotechnical Engineer:	Michael Short, IDOT District 3			County:	Livingston
Structural Engineer:	Mark Wylie, Farnsworth Group			Contract:	66C19

Indicate the proposed structure type, substructure types, and foundation locations (attach plan and elevation drawing): The proposed structure is a single barrel cast in place concrete box culvert 10 feet wide by 5 feet high with an upstream drop structure. Skew will be 10 degrees right ahead.

Discuss the existing boring data, existing plans foundation information, new subsurface exploration and need for any additional exploration to be provided with SGR Technical Memo (attach all data and subsurface profile plot): Two soil borings were performed by IDOT District 3 in 2013. The existing structure is a single barrel box culvert 8 feet wide by 5 feet high with an upstream drop structure.

Provide the location and maximum height of any new soil fill or magnitude of footing bearing pressure. Estimate the amount and time of the expected settlement. Indicate if further testing, analysis, and/or ground improvement/treatment is necessary: The profile of the roadway is not expected to change, therefore there will not be any significant additional load applied to the soils. A field inspection of the existing structure did not find any evidence of settlement problems. Settlement is not anticipated to be significiant and no further analysis is necessary.

Identify any new cuts or fill slope angles and heights. Estimate the factor of safety against slope failure. Indicate if further testing, analysis or ground improvement/treatment is necessary. The existing structure does not have any slope stability problems. The proposed side slopes are typically 1:5 and less than 5 feet high. Further analysis of slope stability is not warranted.

Indicate at each substructure, the 100-year and 500-year total scour depths in the Hydraulics report, the non-granular scour depth reduction, the proposed ground surface, and the recommended foundation design scour elevations. Scour depths are not applicable at the upstream drop structure. The design scour elevation at the downstream end of the box culvert is 665.60 feet.

Determining the seismic soil site class, the seismic performance zone, the 0.2 and 1.0 second design spectral accelerations and indicate if that the soils are liquefiable. Not applicable for box culverts.

Confirm feasibility of the proposed foundation or wall type and provide design parameters. Attach a pile design table indicating feasible pile types, various nominal required bearings, factored resistances available and corresponding estimated lengths at locations where piles will be used. Provide factored bearing resistance and unit sliding resistance at various elevations and confirm no ground improvement/treatment is necessary where spread footings are proposed. Estimated top of rock elevations as well as preliminary skin friction and end bearing values shall be indicated when drilled shafts are proposed. Ground improvement underneath the proposed box culvert is not necessary. Horizontal cantilever wingwalls are feasible for the downstream side of the box culvert. A drop structure is proposed and is feasible for the upstream side of the box culvert.

Calculate the estimated water surface elevation and determine the need for cofferdam(s) and seal coat: The structure can be constructed using conventional methods determined by the contractor.

Assess the need for sheeting/soil retention versus using a temporary construction slope and provide recommendation for the most feasible option. This structure will be constructed using stage construction. Due to soil strengths in excess of 4.5 tsf, temporary sheet pile should not be used. Instead, the pay item "Temporary Soil Retention System" should be used.

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SOIL BORING LOG

Date 1/16/13

ROUTE IL 116 (FAP 681) **DESCRIPTION** IL 116 over a Stream, 9.37 miles East of IL 23 **LOGGED BY** Larry Myers

SECTION 113 **LOCATION** NE 1/4, **SEC.** 24, **TWP.** 28N, **RNG.** 6E

COUNTY Livingston **DRILLING METHOD** Hollow Stem Auger **HAMMER TYPE** CME Automatic

STRUCT. NO. 053-2557 (Exist.)
Station 424+00

BORING NO. 1 (S.W. Quad.)
Station 423+69
Offset 13.00ft Rt.
Ground Surface Elev. 675.19 ft

Surface Water Elev. Dry ft
Stream Bed Elev. 668.69 ft

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

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Augered White Shoulder Stone, Black Silty Clay Loam Fill			
672.69			
Hard Black Silty Clay Loam Fill	5		
	6 5	4.5 P	23.6
670.69			
-5 Very Stiff Brown & Gray Silty Clay Loess	4		
	3 5	3.8 B	19.5
668.19			
Hard Brown & Gray Silty Clay Loam Till	3		
	4 5	4.2 S	22.2
-10	5		
	6 8	5.1 S	17.5
	5		
	5 6	4.7 S	20.5
-15	5		
	5 6	4.7 S	21.8
658.19			
Hard to Very Stiff Gray Silty Clay with Clay & Silt Layers	4		
	5 5	4.1 S	24.5
655.69			
-20 Hard Gray Silty Clay Loam Till			

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Hard Gray Silty Clay Loam Till *(continued)*	3		
	4 5	4.1 S	24.2
	4		
	5 6	4.1 S	25.6
-25	4		
	5 6	4.1 S	18.3
	3		
	4 5	4.0 S	20.4
-30	4		
	4 5	4.0 S	20.9
-35	4		
	5 6	4.1 S	23.5
638.69			
End of Boring			
-40			

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, form 137 (Rev. 8-99)

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SOIL BORING LOG

Date 1/16/13

ROUTE IL 116 (FAP 681) **DESCRIPTION** IL 116 over a Stream, 9.37 miles East of IL 23 **LOGGED BY** Larry Myers

SECTION 113 **LOCATION** SE 1/4, **SEC.** 13, **TWP.** 28N, **RNG.** 6E

COUNTY Livingston **DRILLING METHOD** Hollow Stem Auger **HAMMER TYPE** CME Automatic

STRUCT. NO. 053-2557 (Exist.)
Station 424+00

BORING NO. 2 (N.E. Quad.)
Station 424+13
Offset 13.00ft Lt.
Ground Surface Elev. 675.32 ft

Surface Water Elev. Dry ft
Stream Bed Elev. 668.89 ft

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

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Augered White Shoulder Stone, Black Silty Clay Loam Fill			
672.82			
Very Stiff Black Silty Clay Loam Fill	4		
	3	2.5	23.5
	3	P	
670.32 -5			
Very Stiff Brown & Gray Silty Clay Loess	3		
	4	3.5	20.7
	4	P	
667.82			
Very Stiff Brown & Gray Silty Clay Loam Till	3		
	3	3.4	21.1
	4	B	
-10			
	3		
	3	3.0	21.2
	3	P	
	3		
	4	3.7	26.3
	5	B	
-15			
	3		
	4	3.9	25.5
	5	B	
658.32			
Hard Gray Silty Clay Loam Till	4		
	4	4.1	21.9
	5	S	
-20			

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Hard Gray Silty Clay Loam Till *(continued)*	3		
	4	4.1	16.2
	5	S	
	4		
	4	4.0	21.5
	6	S	
-25			
	4		
	4	4.1	19.8
	4	S	
	4		
	4	4.1	26.4
	6	S	
-30			
	4		
	5	4.1	22.9
	6	S	
-35			
	4		
	5	4.1	20.1
638.82	6	S	
End of Boring			
-40			

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)