# STRUCTURE GEOTECHNICAL REPORT

## 059-0511

**Existing SN 059-0029**

**FAS 735 (Shipman Blacktop) over Coops Creek**
**Section 7BNRS-BR**
**Macoupin County**

**D-96-556-02**

**Contract 72686**



**Prepared By:** Brian Laningham
IDOT Region 4 District 6
Geotechnical Unit
217-782-6709

**Date:** December 1, 2015

**Checked By:** Jacki Jones

**Approved By:** Brian Laningham, PE
D-6 Geotechnical Engr.
Lic. #062-053757

**Date:** December 1, 2015

**Prepared For:** EFK-Moen, LLC
Civil Engineering
Design Firm
618-206-4250

**Attachments:** Preliminary TSL
Subsurface Profile
Boring Logs

*This Report has been prepared based on a preliminary TSL dated November 2011. Contact the author if there are any questions regarding this Report or if there are modifications to structure location, size, geometry, or vertical alignment.*

*Electronic copies of boring logs are available upon request for inclusion in the plans.*

This Report has been prepared according to the 2012 IDOT Bureau of Bridges and Structures Bridge Manual and AASHTO LRFD Bridge Design Specifications 5th Edition – 2010 with 2008, 2009 Interims.

***Project Description and Proposed Structure Information***

The project includes replacing an existing ±40ft long single span closed abutment structure carrying unmarked state route (Shipman Blacktop) over Coops Creek with a new ±95ft long and ±35ft wide, single span structure. The proposed structure includes integral abutments. Work will be completed under a roadway closure.


***Site Investigation***

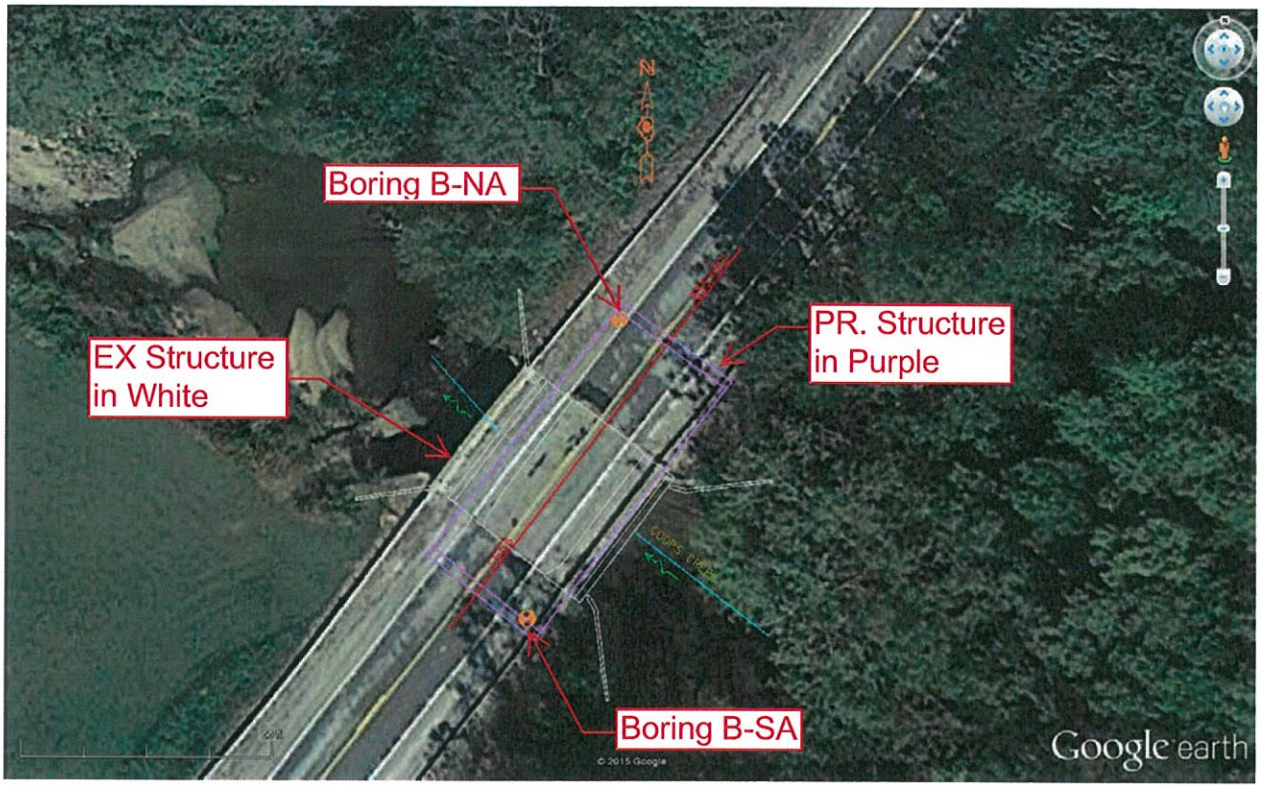
The project is located approximately 2.5 miles Northeast of Shipman. It carries an unmarked state route (Shipman Blacktop) of Coops Creek. Approximately 200 ft. downstream to the Southeast is a Union Pacific two barrel box culvert, and approximately 200 ft. upstream to the Northwest is a single span truss bridge carrying a township road.

The existing structure is located in rolling terrain on 18±ft of fill. Primary land use is a mix of rural residential, agriculture and timber. Near the structure embankment slopes are 2H: 1V or flatter. No slope stability problems were observed along the embankment. The side slopes of the channel banks are 1H: 1V or steeper and show signs of sloughing. No signs of pavement settlement are visible.

The existing structure was originally constructed in 1935 with subsequent HMA overlay placed as a wearing surface. The existing abutments are founded on timber piles. No pile driving data is available.

Borings were advanced by the District 6 drill crew using hollow stem auger methods according to AASHTO T 206 and the IDOT Geotechnical Manual. Borings were obtained at the proposed abutment locations on the existing blacktop lanes. The boring data indicates layers of Silty Clay, Silty Clay Loam and Clay Loam over ±11ft to ±17ft of Sand on top of Shale.

Borings were filled with cuttings immediately after drilling to allow traffic on the roadway. Ground water was encountered during drilling at the North abutment at an elevation of 563.50± ft, and an elevation of 551.00±ft at the South abutment.




***Geotechnical Evaluation***

*Settlement.* Settlement is not anticipated to be a problem since no change in grade is proposed.

*Slope Stability.* The slope stability analysis models a 2H:1V end slope at the north abutment between elevation ±572.5ft and ±529.0ft which corresponds to the pavement elevation and the top of Shale bedrock elevation. The analysis is based on the more critical Boring B N. Abut data. The resulting factor of safety is 2.6. No slope stability problems are anticipated.

*Seismic Considerations.* The following table shows recommended seismic design data based on a 1000 year return period event.

| | |
|---|---|
| Seismic Performance Zone (SPZ) | 2 |
| Spectral Acceleration at 1 second ($S_{D1}$) | 0.279g |
| Design Spectral Acceleration at 0.2 Seconds ($S_{DS}$) | 0.630g |
| Soil Site Class | E |

Seismic Performance Zone 2 requires liquefaction and seismic slope stability analysis to be performed.

*Liquefaction.* In general the liquefiable layers are below the non-liquefiable layers beginning at elevation 554±ft and terminating at 528±ft at the North abutment. At the South abutment liquefiable layers begin at ±553.5ft and terminate at ±522.5ft.

*Seismic Settlement.* The potential liquefaction induced settlement at both abutments has not been calculated, however, the liquefiable layers are at a depth of ±18.5ft below the bottom of abutment. Any settlement that would occur would only affect the roadway itself. This would allow the structure to remain in service with some roadway restrictions. As such, no remedial action is warranted.

*Seismic Slope Stability.* The stability of a 2:1 end slope using a peak horizontal ground acceleration of 0.1g with a return period of 5% in 50 years has been analyzed at the north and south abutments. The factor-of-safety is 1.5 for both abutments. Slope stability problems are not anticipated following a seismic event.

*Scour.* The design scour elevation at each abutment is equal to the bottom of the abutment elevation shown on the TSL; adjustments may be made during final design.

*Mining Activity.* ISGS records indicate no mines located near the proposed project location.

***Foundation Evaluation***

*Axial Loading*

Preliminary maximum factored loads, provided by the structure designer, are approximately 1217 kips vertical at the abutments. Spread footings will not be evaluated because of inadequate bearing capacity. Drilled shafts will not be evaluated because the required shaft depth would make them uneconomical when compared to driven piles. A driven pile foundation is recommended at each substructure.

Because Shale bedrock is fairly shallow at ±45ft. to ±50ft., Metal Shell and H-Piles were analyzed. After analyzing Metal Shell pile, it was determined that not enough skin friction was developed before encountering Shale bedrock. The pile supported foundation would need to utilize end bearing. Metal Shell piles <u>are not</u> recommended because of potential damage that could occur during driving. H-piles <u>are</u> recommended. No piles shoes are required.

The following table shows Max. Nominal Required Bearing (NRB), Max.Factored Resistance Available (FRA) and Max. Seismic Resistance Available (SRA) for each pile size.

## North Abutment

| Pile Section | NRB, (kips) | FRA, (kips) | Seismic Downdrag, (kips) | SRA, (kips) | Driving Elev. (Ft.) | Cutoff Elev. (Ft). | Est. Tip Elev. (Ft.) | Est. Cutoff Elev. (Ft.) |
|---|---|---|---|---|---|---|---|---|
| HP 10x42 | 335 | 184 | 41 | 294 | 565.4 | 567.4 | 523.5 | 43.9 |
| HP 12x53 | 419 | 230 | 49 | 370 | 565.4 | 567.4 | 523.5 | 43.9 |
| HP 12x63 | 497 | 273 | 49 | 448 | 565.4 | 567.4 | 522.5 | 44.9 |

# South Abutment

| Pile Section | NRB, kips | FRA, kips | Seismic Downdrag, kips | SRA, kips | Driving Elev. (Ft.) | Cutoff Elev. (Ft). | Est. Tip Elev. (Ft.) | Est. Cutoff Elev. (Ft.) |
|---|---|---|---|---|---|---|---|---|
| HP 10x42 | 335 | 184 | 48 | 287 | 565.5 | 567.5 | 522.6 | 44.9 |
| HP 12x53 | 419 | 230 | 58 | 361 | 565.5 | 567.5 | 522.6 | 44.9 |
| HP 12x63 | 497 | 273 | 58 | 439 | 565.5 | 567.5 | 521.6 | 45.9 |

***Lateral Loading***

The pile response due to lateral loads from thermal expansion and contraction of the structure has already been accounted for in the Integral Abutment Pile Selection Chart provided in ABD Memo 12.3. In addition, LRFD 4.7.4.2 indicates that a seismic analysis is not required for single span bridges, regardless of seismic zone. All other lateral pile loads are anticipated to be minimal and a lateral pile analysis is not anticipated for final design. As such, no lateral load pile analysis data is provided in the SGR.

If the structural designer determines during final design that a lateral load pile analysis is required, soil inputs have been provided to facilitate a more detailed analysis if required by the structural designer.

**Soil Parameters**

| Substructure Unit | Layer | Elevation | | Unit Weight | | Cohesion | $\phi$ | k | $e_{50}$ | Description |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Top | Bottom | (pcf) | (pci) | (psi) | (deg) | (pci) | | |
| North Abutment Boring B-NA | 1 | 565.4 | 562.0 | 110 | 0.064 | 4.20 | | 72.0 | 0.140 | Clay Loam |
| | 2 | 562.0 | 559.0 | 110 | 0.064 | 6.90 | | 233.4 | 0.009 | Clay Loam |
| | 3 | 559.0 | 556.5 | 115 | 0.067 | 6.90 | | 233.4 | 0.009 | Clay Loam |
| | 4 | 556.5 | 554.0 | 110 | 0.064 | 4.20 | | 72.0 | 0.140 | Clay Loam |
| | 5 | 554.0 | 552.0 | 105 | 0.061 | 2.10 | | 24.0 | 0.024 | Clay Loam |
| | 6 | 552.0 | 549.5 | 105 | 0.061 | | 26 | 9.0 | | Sand |
| | 7 | 549.5 | 545.5 | 110 | 0.064 | 0.70 | | 8.0 | 0.030 | Clay Loam |
| | 8 | 545.5 | 540.0 | 105 | 0.061 | 1.40 | | 16.0 | 0.029 | Clay Loam |
| | 9 | 540.0 | 529.5 | 115 | 0.067 | | 30 | 17.00 | | Sand |
| | | | | | | | | | | |
| South Abutment Boring B-SA | 1 | 564.5 | 560.6 | 110 | 0.064 | 6.30 | | 180.0 | 0.009 | Clay Loam |
| | 2 | 560.6 | 558.1 | 110 | 0.064 | 8.30 | | 340.0 | 0.008 | Clay Loam |
| | 3 | 558.1 | 553.6 | 110 | 0.064 | 6.90 | | 233.4 | 0.009 | Clay Loam |
| | 4 | 553.6 | 550.1 | 110 | 0.064 | 2.80 | | 34.7 | 0.019 | Clay Loam |
| | 5 | 553.1 | 548.6 | 110 | 0.064 | | 28 | 12.00 | | Sand |
| | 6 | 548.6 | 543.6 | 110 | 0.064 | 3.50 | | 53.40 | 0.017 | Clay Loam |
| | 7 | 543.6 | 539.1 | 110 | 0.064 | 3.50 | | 53.40 | 0.017 | Clay Loam |
| | 8 | 539.1 | 528.6 | 115 | 0.067 | | 30 | 17.00 | | Sand |

$\phi$ = phi angle
k = subgrade modulus
$E_{50}$ = strain at 50% deflection in p-y curve

***Approach Pavement***

Foundation conditions beneath proposed approach pavement footings have been reviewed, based on available boring data, the available bearing capacity is greater than required. For structure replacement projects experience indicates approach pavement footings do not experience excessive settlement when there is no new fill beneath the footing and it is constructed on undisturbed soil. No remedial action in required.

***Construction Considerations***

*Stage Construction:* This project will constructed under a roadway closure. No Temp. Soil Retention System is required.

*Ground Improvement:* No ground improvement is required.

*Earthwork:* No unusual construction conditions are expected.

*Foundation Construction:* No unusual construction conditions are anticipated. It does not appear there are any conflicts with the existing foundation. Test piles are recommended at each substructure farthest from the boring locations. No Shoes are required.

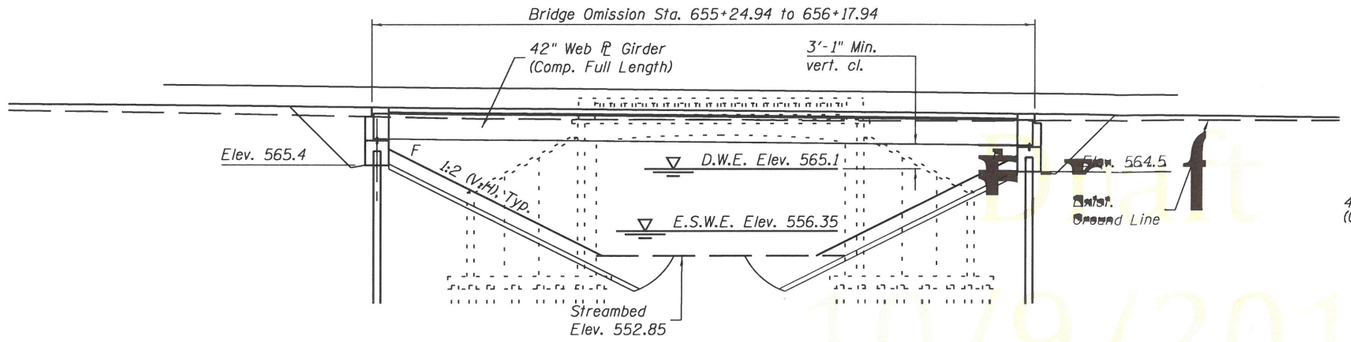
The following is a list of spreadsheets and software programs that were used in the geotechnical analysis:

- *Slide5.0* by Rocscience
- Seismic Site Class Determination Spreadsheet by BBS (Modified 12/10/10)
- AASHTO Guide Specifications for LRFD Seismic Bridge Design 2007
- IDOT Static Method of Estimating Pile Length by BBS (Modified 10/18/11)
- *AllPile* by Civil Tech

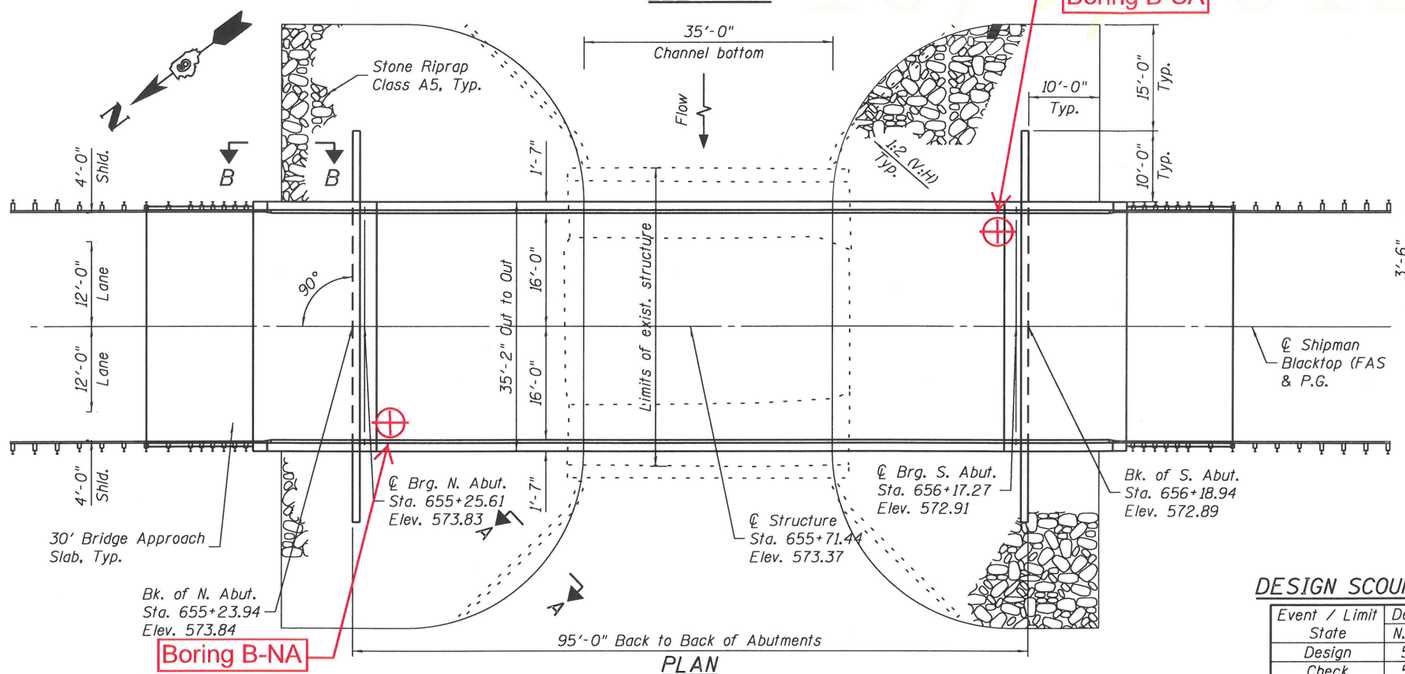
Benchmark: WS-1, Chiseled "□" on southeast abutment of old Township Road bridge; Sta. 656+31.7, 198.9' Rt., Elev. 564.54

Existing Structure: S.N. 059-0029 has an estimated construction date of 1935. The three sided rigid frame structure is 40'-0" bk.-bk. of sidewalls and 43'-6" out to out of deck. Road to be closed during construction of the bridge.

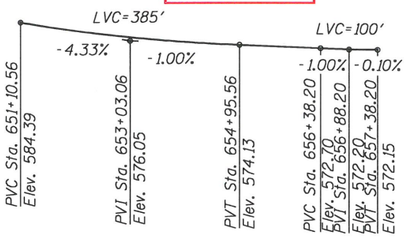
Salvage: None




## ELEVATION

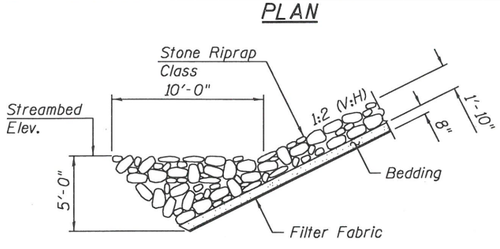



## PLAN

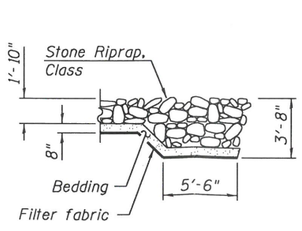



## PROFILE GRADE

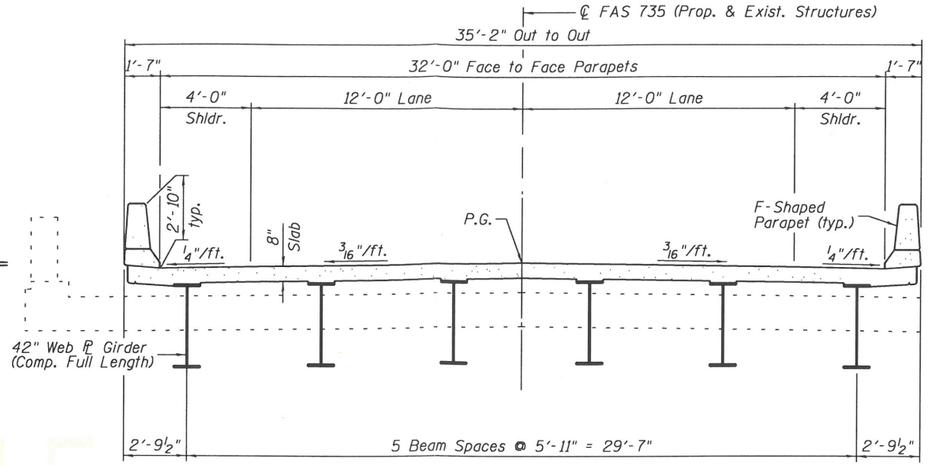
Along ℄ Roadway




## SECTION A-A

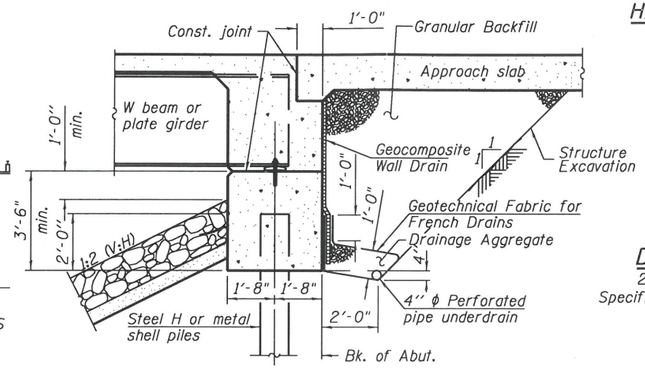



## SECTION B-B




## CROSS SECTION

(Looking South)




## SECTION THRU INTEGRAL ABUTMENT

## HIGHWAY CLASSIFICATION

FAS Route 735 (Shipman Blacktop)
Functional Class: Major Collector
ADT: 1150 (2005); 1500 (2032)
DHV: XXXXX (2032)
ADTT: XXXX%
Design Speed: 55 mph
Posted Speed: 55 mph

## LOADING HL-93

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

## DESIGN SPECIFICATIONS

2014 AASHTO LRFD Bridge Design Specifications, 7th Edition with 2015 Interims

## DESIGN STRESSES

### FIELD UNITS

f'c = 3,500 psi
f'c = 4,000 psi (Superstructure Concrete)
fy = 60,000 psi (Reinforcement)
fy = 50,000 psi (M270 Grade 50W)

## SEISMIC DATA

Seismic Performance Zone (SPZ) =
Design Spectral Acceleration at 1.0 sec. ($S_{D1}$) =
Design Spectral Acceleration at 0.2 sec. ($S_{DS}$) =
Soil Site Class =

## DESIGN SCOUR ELEVATION TABLE

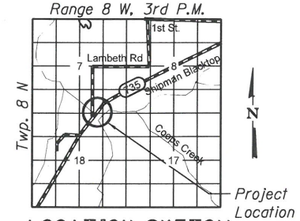
| Event / Limit State | Design Scour Elevations (ft.) | | |
|---|---|---|---|
| | N. Abut. | S. Abut. | Item 113 |
| Design | 565.4 | 564.5 | 8 |
| Check | 565.4 | 564.5 | 8 |

## WATERWAY INFORMATION

Drainage Area = 21.3 sq. mi.
Exist. Low Grade Elev. 571.6 @ Sta. 640+93
Prop. Low Grade Elev. 571.8 @ Sta. 659+25

| Flood | Freq. Yr. | Q C.F.S. | Opening Sq. Ft. Exist. | Opening Sq. Ft. Prop. | Nat. H.W.E. | Head - Ft. Exist. | Head - Ft. Prop. | Headwater El. Exist. | Headwater El. Prop. |
|---|---|---|---|---|---|---|---|---|---|
| | 10 | 3358 | 382 | 663 | 563.7 | 1.2 | 0.0 | 564.8 | 563.7 |
| Design | 50 | 5456 | 426 | 771 | 565.0 | 3.2 | 0.1 | 568.2 | 565.1 |
| Base | 100 | 6409 | 438 | 801 | 565.3 | 4.7 | 0.2 | 570.0 | 565.5 |
| Scour Check | 200 | 6961 | 444 | 816 | 565.5 | 5.5 | 0.3 | 571.0 | 565.8 |
| Overtop Exist. | >500 | | | | | | | | |
| Overtop Prop. | >500 | | | | | | | | |
| Max. Calc. | 500 | 8773 | 459 | 856 | 565.9 | 8.4 | 0.7 | 574.3 | 566.6 |

10-year existing velocity = 10.0 ft/s
10-year proposed velocity = 5.5 ft/s




## LOCATION SKETCH

## GENERAL PLAN & ELEVATION
## SHIPMAN BLACKTOP OVER
## COOPS CREEK
## F.A.S. RTE. 735 - SEC. 7BNRS-BR
## MACOUPIN COUNTY
## STATION 655+71.44
## STRUCTURE NO. 059-0511



EFK•Moen, LLC
Civil Engineering Design
303 Fountains Parkway, Suite 240
Fairview Heights, IL 62208
Phone 618-206-4250

| | | | |
|---|---|---|---|
| USER NAME = cdl | DESIGNED - CDL | REVISED - | |
| | CHECKED - CTW | REVISED - | |
| PLOT SCALE = @2 '=' / in. | DRAWN - JAA | REVISED - | |
| PLOT DATE = 10/9/2015 | DATE - 10/9/2015 | REVISED - | |

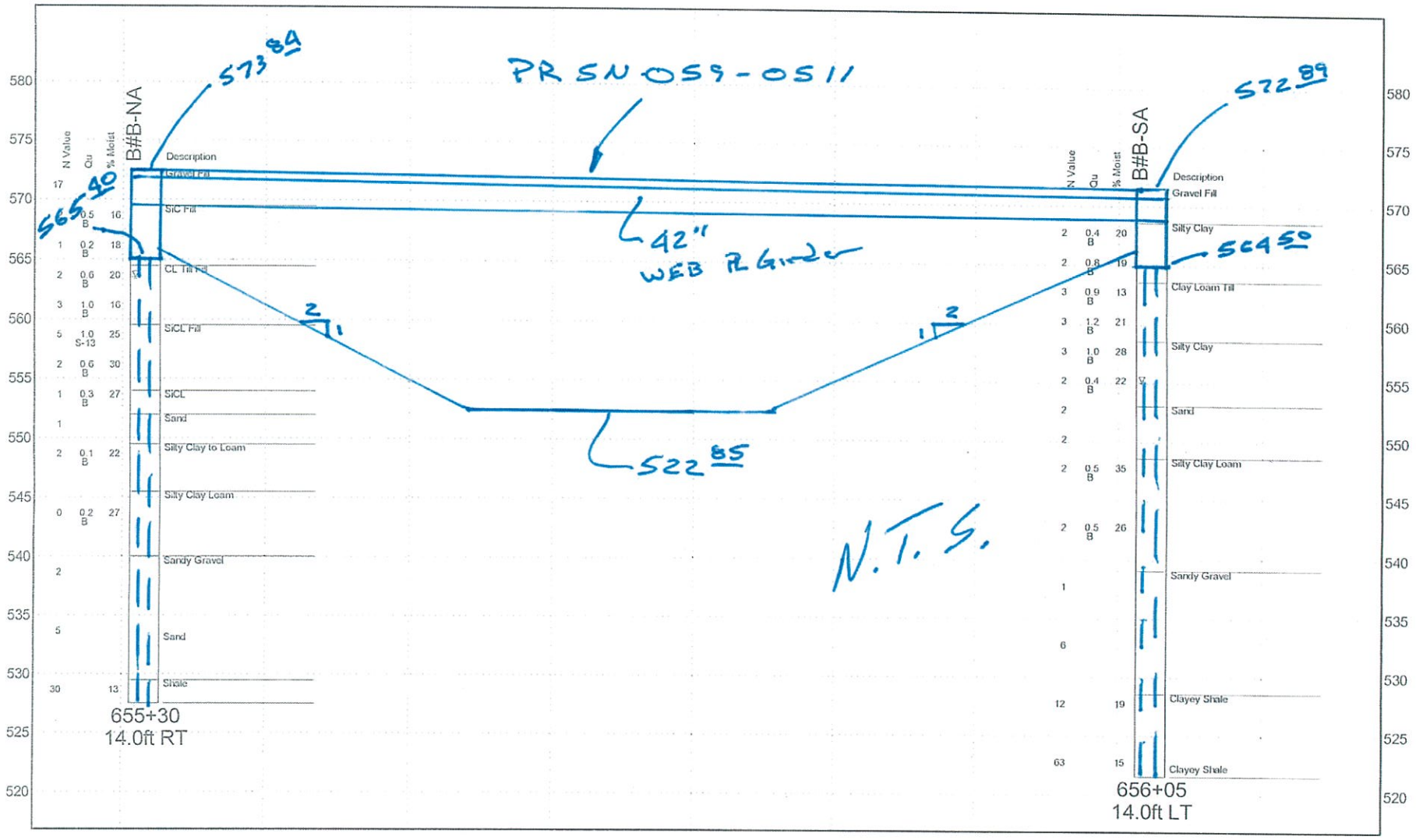
STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

SHEET NO. OF SHEETS

| F.A.S. RTE. | SECTION | COUNTY | TOTAL SHEETS | SHEET NO. |
|---|---|---|---|---|
| 735 | 7BNRS-BR | MACOUPIN | | |
| | | CONTRACT NO. | | |
| | | ILLINOIS FED. AID PROJECT | | |

PRINT DATE: 10/9/2015 10:17:53 AM Y:\15040.01\D6 WO\Shipman\DGN\Bridge\prelim\Plotsheets\059-0511TSL.dgn

Structure Number PR SN 059-0511 EX SN 059-0029 North Abutment Shipman Black Top over Coops Cr.
Located in the SE 1/4 of Section 7, Township 8N, Range 8W of the 3 P.M.




NOT TO HORIZONTAL SCALE

Illinois Department of Transportation
Division of Highways
IDOT

**VARIATIONS IN SUBSURFACE CONDITIONS MAY EXIST BETWEEN BORINGS**

Groundwater
▽ First Encounter
▼ Completion
▼ after (refer to log) hours

Abbreviations
WOH - Sampler Advanced by Weight of Hammer, WOP - Weight of Pipe
B.S. - Before Seating

**SUBSURFACE DATA PROFILE**

Route: FAS 735
Section: 7BNRS-BR
County: Macoupin

SUBSURFACE DATA PROFILE 059-0511 SHIPMAN BLACKTOP OVER COOPS CREEK.GPJ D6TEMPLT.GDT 12/7/15

SUBSURFACE DATA PROFILE 059-0511 SHIPMAN BLACKTOP OVER COOPS CREEK.GPJ D6TEMPLT.GDT 12/7/15

# Illinois Department of Transportation
Division of Highways
District 6

# SOIL BORING LOG

Date 9/14/10

ROUTE FAS 735 DESCRIPTION North Abutment Shipman Black Top over Coops Cr. LOGGED BY M. Tappan

SECTION 7BNRS-BR LOCATION SE 1/4, SEC. 7, TWP. 8N, RNG. 8W, 3 PM

COUNTY Macoupin DRILLING METHOD HSA HAMMER TYPE 140# Auto

STRUCT. NO. PR SN 059-0511 EX SN 059-0029
Station 655+67

BORING NO. B-NA
Station 655+30
Offset 14.0ft RT
Ground Surface Elev. 572.5 ft

Surface Water Elev. 544.4 ft
Stream Bed Elev. 553.1 ft

Groundwater Elev.:
▽ First Encounter 563.5 ft
▽ Upon Completion Washed ft
▼ After ____ Hrs. Plugged ft

| DEPTH (ft) | BLOWS /6" | UCS Qu (tsf) | MOIST (%) | Description |
|---|---|---|---|---|
| | | | | Gray Moist GRAVEL (Fill) |
| | 3 | | | |
| | 15 | | | |
| | 2 | | | |
| 569.50 | | | | |
| | 0 | | | Grayish Brown V. Moist SILTY CLAY (Fill) |
| | 1 | 0.5 | 16 | |
| -5 | 1 | B | | |
| | 0 | | | |
| | 0 | 0.2 | 18 | |
| | 1 | B | | |
| 564.50 | | | | |
| | 0 | | | Gray and Brown Moist CLAY LOAM TILL (Fill) ▽ FREE WATER |
| | 0 | 0.6 | 20 | |
| -10 | 2 | B | | |
| | 0 | | | |
| | 1 | 1.0 | 16 | |
| | 2 | B | | |
| 559.50 | | | | |
| | 1 | | | Black Moist SILTY CLAY LOAM (Fill) w/6" layer Gray Fine Sandy Gravel |
| | 2 | 1.0 | 25 | |
| -15 | 3 | S-13 | | |
| | 0 | | | |
| | 0 | 0.6 | 30 | Black Moist SILTY CLAY LOAM (Fill) Gray Fine Sand at 17' |
| | 2 | B | | |
| 554.00 | | | | |
| | 0 | | | V. Dark Gray V. Moist SILTY CLAY LOAM |
| | 0 | 0.3 | 27 | |
| -20 | 1 | B | | |
| 552.00 | | | | Gray Med SAND |
| | 0 | | | |
| | 0 | | | |
| | 1 | | | |
| 549.50 | | | | |
| | 0 | | | Lt Brown and Gray Wet SILTY CLAY to LOAM Washed |
| | 1 | 0.1 | 22 | |
| -25 | 1 | B | | |
| 545.50 | | | | |
| | 0 | | | Lt Gray Wet SILTY CLAY LOAM |
| | 0 | 0.2 | 27 | |
| -30 | 0 | B | | |
| | WOH | | | |
| 540.00 | | | | |
| | 0 | | | Gray Med SANDY GRAVEL |
| | 0 | | | |
| -35 | 2 | | | |
| | 1 | | | |
| | 1 | | | Gray Dirty Med SAND w/ some Woody Organics |
| -40 | 4 | | | |

**The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer, E-Estimated)**
**Abbreviations W.O.H - Sampler Advanced By Weight of Hammer, W.O.P - Advanced by Weight of Pipe, B.S. - Before Seating**
**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)**

File Name S:\SOILS\IGINT FILES\059 MACOUPIN\059-0511 SHIPMAN BLACKTOP OVER COOPS CREEK.GPJ Data Template D6TEMPLT.GDT Date Printed 12/7/15
Latitude 39D 8.732N Longitude 90D 1.365W Datum NAD83 Job Number 72686

# Illinois Department of Transportation
Division of Highways
District 6

# SOIL BORING LOG

Date 9/14/10

ROUTE FAS 735 DESCRIPTION North Abutment Shipman Black Top over Coops Cr. LOGGED BY M. Tappan

SECTION 7BNRS-BR LOCATION SE 1/4, SEC. 7, TWP. 8N, RNG. 8W, 3 PM

COUNTY Macoupin DRILLING METHOD HSA HAMMER TYPE 140# Auto

STRUCT. NO. PR SN 059-0511 EX SN 059-0029
Station 655+67

BORING NO. B-NA
Station 655+30
Offset 14.0ft RT
Ground Surface Elev. 572.5 ft

Surface Water Elev. 544.4 ft
Stream Bed Elev. 553.1 ft

Groundwater Elev.:
▽ First Encounter 563.5 ft
▽ Upon Completion Washed ft
▼ After ____ Hrs. Plugged ft

| | DEPTH (ft) | BLOWS /6" | UCS Qu (tsf) | MOIST (%) |
|---|---|---|---|---|
| Washed<br>Gray Med SANDY GRAVEL<br>*(continued)* | | | | |
| 529.50 | | | | |
| Gray Dry Fissile CLAYEY SHALE<br>Drilled Hard at 43' | | 18 | | |
| | | 30 | | 13 |
| 527.50 | -45 | 70/5" | | |
| Boring Complete | | | | |
| | -50 | | | |
| | -55 | | | |
| | -60 | | | |

**The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer, E-Estimated)**
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File Name S:\SOIL SIGINT FILES\059 MACOUPIN\059-0511 SHIPMAN BLACKTOP OVER COOPS CREEK.GPJ Data Template D8TEMPLT.GDT Date Printed 12/7/15
Latitude 39D 8.732N Longitude 90D 1.365W Datum NAD83 Job Number 72686

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SECTION 7BNRS-BR LOCATION SE 1/4, SEC. 7, TWP. 8N, RNG. 8W, 3 PM

COUNTY Macoupin DRILLING METHOD HSA HAMMER TYPE 140# Auto

STRUCT. NO. PR SN 059-0511 / EX SN 059-0029
Station 655+67

BORING NO. B-SA
Station 656+05
Offset 14.0ft LT
Ground Surface Elev. 571.6 ft

Surface Water Elev. 544.4 ft
Stream Bed Elev. 553.1 ft

Groundwater Elev.:
▽ First Encounter 555.1 ft
▼ Upon Completion Washed ft
▼ After ____ Hrs. Plugged ft

| DEPTH (ft) | BLOWS /6" | UCS Qu (tsf) | MOIST (%) | Description |
|---|---|---|---|---|
| | | | | Gravel Fill |
| 568.60 | | | | |
| | 0 | | | Gray and Brown V. Moist SILTY CLAY (Fill) |
| -5 | 1<br>1 | 0.4<br>B | 20 | |
| | 0 | | | |
| | 0<br>2 | 0.8<br>B | 19 | Moist |
| 563.60 | | | | |
| | 0 | | | Gray and Brown Moist CLAY LOAM (Till) Fill |
| -10 | 1<br>2 | 0.9<br>B | 13 | |
| | 1 | | | |
| | 1<br>2 | 1.2<br>B | 21 | |
| 558.60 | | | | |
| | 1 | | | Black Moist SILTY CLAY Fill w/ Gray Moist Loam Seams |
| -15 | 1<br>2 | 1.0<br>B | 28 | |
| | 0 | | | |
| | 1<br>1 | 0.4<br>B | 22 | Dk Gray Wet SILTY CLAY w/ Loam Seams<br>FREE WATER |
| 553.10 | | | | |
| | 0 | | | Dk Gray V. Dirty Fine SAND |
| -20 | 0<br>2 | | | |

| DEPTH (ft) | BLOWS /6" | UCS Qu (tsf) | MOIST (%) | Description |
|---|---|---|---|---|
| | 1 | | | Dk Gray V. Dirty Fine SAND *(continued)* |
| | 1<br>1 | | | Gray Coarse SAND<br>Washed |
| 548.60 | | | | |
| | 0 | | | Dk Gray Moist SILTY CLAY LOAM |
| -25 | 1<br>1 | 0.5<br>B | 35 | |
| | 0 | | | |
| | 1<br>1 | 0.5<br>B | 26 | Gray V. Moist SILTY CLAY LOAM w/ Gray Loam Seams |
| 539.10 | | | | |
| | 0 | | | Gray Med SANDY GRAVEL<br>Washed |
| -35 | 0<br>1 | | | |
| | 1 | | | |
| | 3<br>3 | | | Gray Dirty Fine to Med SAND<br>Washed |
| -40 | | | | |

**The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer, E-Estimated)**
**Abbreviations W.O.H - Sampler Advanced By Weight of Hammer, W.O.P - Advanced by Weight of Pipe, B.S. - Before Seating**
**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)**

File Name S:\SOILS\GINT FILES\1059 MACOUPIN\059-0511 SHIPMAN BLACKTOP OVER COOPS CREEK.GPJ Data Template D6TEMPLT.GDT Date Printed 12/7/15
Latitude 39D 8.722N Longitude 90D 1.368W Datum NAD83 Job Number 72686

Illinois Department of Transportation
Division of Highways
District 6

# SOIL BORING LOG

Date 9/14/10

ROUTE FAS 735 DESCRIPTION South Abutment Shipman Black Top over Coops Cr. LOGGED BY M. Tappan

SECTION 7BNRS-BR LOCATION SE 1/4, SEC. 7, TWP. 8N, RNG. 8W, 3 PM

COUNTY Macoupin DRILLING METHOD HSA HAMMER TYPE 140# Auto

STRUCT. NO. PR SN 059-0511 EX SN 059-0029
Station 655+67

BORING NO. B-SA
Station 656+05
Offset 14.0ft LT
Ground Surface Elev. 571.6 ft

Surface Water Elev. 544.4 ft
Stream Bed Elev. 553.1 ft

Groundwater Elev.:
▽ First Encounter 555.1 ft
▼ Upon Completion Washed ft
▼ After ____ Hrs. Plugged ft

| | DEPTH (ft) | BLOWS /6" | UCS Qu (tsf) | MOIST (%) |
|---|---|---|---|---|
| Gray Med SANDY GRAVEL Washed *(continued)* | | | | |
| 528.60 | | | | |
| Olive Brown and Blue Gray Moist CLAYEY SHALE Washed | | 1 | | |
| | | 4 | | 19 |
| | -45 | 8 | | |
| | | 7 | | |
| Gray Dry Fissile CLAYEY SHALE | | 63 | | 15 |
| 521.60 | -50 | 37/1" | | |
| Boring Complete | -55 | | | |
| | -60 | | | |

**The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer, E-Estimated)**
**Abbreviations W.O.H - Sampler Advanced By Weight of Hammer, W.O.P - Advanced by Weight of Pipe, B.S. - Before Seating**
**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)**

File Name S:\SOILS\GINT FILES\059 MACOUPIN\059-0511 SHIPMAN BLACKTOP OVER COOPS CREEK.GPJ Data Template D6TEMPLT.GDT Date Printed 12/7/15
Latitude 39D 8.722N Longitude 90D 1.366W Datum NAD83 Job Number 72686