

CORRESPONDENCE/MEMORANDUM

Date: June 12, 1981

File Ref:

To: Mr. Thomas Clark, District Transportation Director
ATTN: Mr. Louie Schmidt, District Chief Materials &
Construction Engineer.

From: Mr. G. H. Zuehlke, Chief Materials Engineer

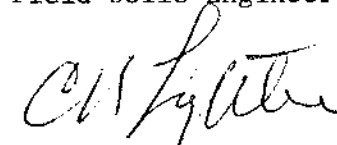
Subject: MATERIALS

SOILS
SITE INVESTIGATION REPORT
Project I.D. 7651-01-00
So. Fork Kinnickinnick River Bridge
So. Main St. City of River Falls
Structure B-47-55
Pierce County

Attached is the Site Investigation Report for the structure that will carry South Main Street (STH-29) over the South Fork of the Kinnickinnick River in the City of River Falls.

By


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Field Soils Engineer


C. N. Laughter
Chief Soils Engineer

WRF:CNL:dk
CC:Dist 6(3)
SWW(2)
GHZ
DLS
MOF
Soils✓

Site Investigation Report
Project I.D. 7651-01-00
So. Fork Kinnickinnick River Bridge
So. Main St. City of River Falls
Structure B-47-55
Pierce County

1. General

The proposed structure will replace the present structure that carries STH-29 (So. Main St) over the So. Fork of the Kinnickinnick River in the City of River Falls. The present structure will be removed and the new structure will be the same length and wider. There are numerous utilities in the area, on the bridge and under the abutment fills.

The general geology of the area is thin moraine over shallow limestone bedrock.

2. Subsurface Conditions

Two machine probings, eight hand soundings and four borings were made at the structure site. Standard Penetration Tests (AASHTO T-206) were made in the four borings to obtain soil samples for testing and classification, to estimate relative soil density, to evaluate bearing capacity, and to estimate soil pile support values. The soils were sampled, tested and classified in the field by the drill crew chief with subsequent checks made at the Central Soils Office. The soils sampled were a mixture of sand and gravel and sandy silt. Due to previous construction and utility construction the soils are very mixed and non uniform.

The surface of the bedrock varied considerably over a footing area. At the south abutment the surface of the weathered bedrock was elevation 888⁺ at probe #4 and boring #1. It was at elevation 882⁻ at boring #2 and probe #3.

At the north abutment, the surface of the bedrock along a line right and left of station 48 + 00, was elevation 887⁺. Hand soundings along a line at station 47 + 90 show the rock surface as low as elevation 878⁻ at the west end of the abutment to a high of 888⁻ at the east end of the abutment.

The surface of the stream was elevation 865.5 at the time of drilling (4-9-81). No ground water was encountered in the borings.

3. Bearing Capacity

No bearing values can be assigned to the overburden soils. These soils have been disturbed by utility construction.

The bearing capacity of the weathered limestone (upper 3') is 6000 PSF. The bearing capacity of the more competent bedrock is 10,000 PSF.

4. Piles

Piles would not be needed and if used, they would have inadequate penetrations.

5. Construction Problems

Complete excavation would be the only way to more closely delineate the surface of the bedrock. There will be considerable bedrock surface variations across the site and in a very short space within the footing area.

6. Recommendations

Spread footings placed 1 to 2 feet into the weathered rock would be the most economical footings for the proposed structure. Piles would be very short, with less than minimum penetrations. Some stepping of the footing both longitudinal and laterally will be needed to match the irregular bedrock surface.

Equivalent fluid pressures of 32 PCF can be used to proportion structure units.

Vibroflotation and drilled caissons would not be needed or be economically competitive to using spread footings.

FIELD BORING LOG

E-L-3(5)-8-76

State of Wisconsin/Department of Transportation

Boring No. 1 Structure B-47-SS So. Fork Kinnickinnic County Pierce Sheet 6 of 1
 Project 7651-01-00 Road STH. 29
 Station 46+52 Offset 6.5' W Surface Elevation 899.6

GROUND WATER OBSERVATIONS

While drilling _____ Time after drilling creep level 865.6
 Before casing removal 19.3' Depth to water _____
 After Boring Completed _____ Depth to cave-in _____
 Cave In _____ Water Notes _____

MOISTURE
 D = Damp
 M = Moist
 W = Wet
 WA = Washahead
 FT = Fish tail
 RB = Rock bit
 DRILLING METHOD
 ST = Shelby tube
 SS = Split spoon
 DM = Drilling mud
 A = Auger
 C = Coring
 W = Wash
 E = Easy
 M = Medium
 H = Hard
 Start 4/7/81 Unit I
 Finish 4/8/81 Chief Meyers

Sample No.	Moisture	Blows on Sampler		Sample and Recovery	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Blows on		Drilling Method
		0/6	6/12					Casing Size	Probe Size	
					8" Concrete					A
1	M	2	3		Loose Br. SAND and GRAVEL - TA silt.			4		W
		3	3					8		
								13		
								14		
								12/2		
2	W	12	7		Firm Yellow weathered Limestone, Boulders and Sand.			4		
			13					11		
								16		
								16		
								12/1		
3	W	3	3		V. Dense weathered Sandy Limestone			7		
		3	16					38		
								168		
					Run #1 50% Recovery.					
					Run #2 66% Recovery.					
					Run #3 100% Recovery.					
					Sandy Limestone					
					End of Bor.					

Checked by _____ Final RFR Boring No. 1

E-L-3(S)- 8-76

State of Wisconsin/Department of Transportation

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State of Wisconsin/Department of Transportation

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Final

Boring No.

4

FIELD BORING LOG E-L-3(S)-8-76 State of Wisconsin/Department of Transportation
Boring No. 14 Structure B-47-56 So Fork Kinnichininic River County Pierce Sheet 1 of 1

Road SH-29 ⁴⁰⁰

Offset 28' 4" f 2

Surface Elevation 893.5

While drilling _____ Time after drilling _____

Before casing removal _____ Depth to water _____

After Boring Completed _____ Depth to cave-in _____

Cave In _____ Water Notes _____

MOISTURE	DRILLING METHOD	Start <u>5/12/81</u>	Unit <u>C</u>
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DRILLING METHOD

Start 5/12/81

Unit

Finish 5/12/81

Chief *Meyers*

Checked by	Final	Boring No. Photo # 14
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E-L-3(S)- 8-76

State of Wisconsin/Department of Transportation

Probe # 2 Structure B-47-55 - So Fork Kinnickinnoc River County Pierce Sheet 1 of 1

Project 7657+01.00 Road STH. 29

Station	47+25	Offset	28' Rt E	Surface Elevation	894.8
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GROUND WATER OBSERVATIONS

While drilling _____ Time after drilling _____

Before casing removal _____ Depth to water _____

After Boring Completed _____ Depth to cave-in _____

Cave In _____ Water Notes _____

MOISTURE
D = Damp
M = Moist
W = Wet

WA=Washahead
FT = Fish tail
RB = Rock bit

ST = Shelby tube
SS = Split spoon
DM = Drilling mud

A = Auger
C = Coring
W = Wash

E = Easy
M = Medium
H = Hard

Start 4/9/81 Unit I

Finish 4/9/81 Chief Weyers

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Final

EWING No.

Probe 2

FIELD BORING LOG E-L-3(S)- 8-76
Boring No. 3 Structure B-47-53 - 5. Fork Kinnickinnie River State of Wisconsin/Department of Transportation
County Pierce Sheet 1 of 1

F-1-3(S)- 8-76

12 State of Wisconsin/Department of Transportation

Boring No. 3 Structure B-42-58 - S. Fork Minnichinnit County Pierce Sheet 1 of 1

Project 7651-0100 Road STH. 29

Station 46 + 62 Offset 30' R+ C Surface Elevation 887.1

GROUND WATER OBSERVATIONS

While drilling _____ Time after drilling _____

Before casing removal _____ Depth to water _____

After Boring Completed _____ Depth to cave-in _____

Cave In _____ Water Notes _____

MOISTURE	DRILLING METHOD	Start <u>4/9/87</u> Unit <u>7</u>
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MOISTURE

D = Damp
M = Moist
W = Wet

WA=Washahead
FT = Fish tail
BB = Back bit

ST = Shelby tube
SS = Split spoon
DM = Drilling mud

A = Auger
C = Coring
W = Wash

E = Easy
M = Medium
H = Hard

Start 4/9/87 Unit 2

Finish 4/9/91 Chief M. J. 018

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Checked by

Final

Exhibit No. 3

FIELD BORING LOG

E-L-3(5)-8-76

State of Wisconsin Department of Transportation

Boring No. 4 Structure B-47-55 So. Fork Kinnickinnic River County Pierce Sheet 6 of 7

Station	46 + 62	Offset	28' Lt. E	Surface Elevation	892.0
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Before casing removal _____ Depth to water _____

After Boring Completed _____ Depth to cave-in _____

Cave In _____ Water Notes _____

MOISTURE	DRILLING METHOD	Start <i>4/10/61</i>	Unit <i>7</i>
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D = Damp WA = Washahead ST = Shelby tube A = Auger E = Easy Start 7/7/81 Unit 2
M = Moist FT = Fish tail SS = Spill spoon C = Coring M = Medium Finish 4/6/81 Chief Meyers
W = Wet RB = Rock bit DM = Drilling mud W = Wash H = Hard

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FIELD BORING LOG

Probe 7 Boring No. 7 Structure B-47-56 E-L-3(S)-8-76 So. Fork Kinnickinnic River State of Wisconsin Department of Transportation County Pierce Sheet 1 of 1

Project 7651-01-00 Road STH "29"

GROUND WATER OBSERVATIONS

Before casing removal _____ Depth to water _____

Cave In	Water Notes
MOISTURE	DRILLING METHOD

M = Moist	FT = Fish tail	SS = Split spoon	C = Coring	M = Medium	Finish <u>5/12/81</u> Chief <u>Meyers</u>
W = Wet	RB = Rock bit	DM = Drilling mud	W = Wash	H = Hard	

Sample Number	Structure	Sampler	Date and Time	Observer	Length	Depth	Number of Fish	Sex	Age	Weight	Length	Girth	Fork	Snout	Tail	Fin	Scales	Color	Remarks

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Boring No. 10 Structure B-47-5C - So. Fork Kinnickinnic River County Pierce Sheet 1 of 1

State of Wisconsin/Department of Transportation

Boring No. 10 Structure B-47-5C - Sockoth Kinnickinnick County Perce Sheet 1 of 1

Project 7651-01-00 Road STH. 29

Station	47 + 89	Offset	on E	Surface Elevation	888.0
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While drilling _____ Time after drilling _____

Before casing removal _____ Depth to water _____

After Boring Completed _____ Depth to cave-in _____

Cave In Water Notes

MOISTURE	DRILLING METHOD				Start	5/14/89	Unit	I
B = Bone	W = Wheelhead	CT = Shelby tube	A = Auger	E = Easy				

MOISTURE
B x D = 0.000

D = Damp
M = Moist
W = Wet

WA=Washahead
FT = Fish tail
RB = Rock bit

ST = Shelby tube
SS = Split spoon
DM = Drilling mud

A = Auger
C = Coring
W = Wash

E = Easy
M = Medium
H = Hard

Start 5/4/87 Unit 2

Finish	5/12/81	Chief	Meyer
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Checked by	Final	Boring No.
		Probe #10

FIELD BORING LOG
 Boring No. 11 Structure B-47-56 E-L-3(S)-8-76
60 Feet Pierced County Pierce State of Wisconsin/Department of Transportation
 Sheet 1 of 1

Project 7651-01-00 Road ST 14.29

Station	47+88.5'	Offset	9' Lt. FL	Surface Elevation	886.9
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While drilling _____ Time after drilling _____
 Before casing removal _____ Depth to water _____

After Boring Completed _____ Depth to cave-in _____
 Cave In _____ Water Notes _____

MOISTURE	DRILLING METHOD	Start 8/13/81	Unit T
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D = Damp
M = Moist
W = Wet

ST = Shelby tube
SS = Split spoon
DM = Drilling mud

A = Auger
C = Coring
W = Wash

E = Easy
M = Medium
H = Hard

Start 6/12/81 Unit I

Finish *5/12/81* Chief *Meyers*

Checked by	Final	Boring No. Probe #11
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FIELD BORING LOG

E-L-3(S)- 8-76

State of Wisconsin/Department of Transportation

Probe # 12 Structure B-47-56 - So. Fork Kinnickinnick River County Pierce Sheet 1 of 1

Project 76-51-01-00 Road STH. 29

Station 47 + 89 Offset 18' 4" E Surface Elevation 889.1

GROUND WATER OBSERVATIONS

While drilling _____ Time after drilling _____

Before casing removal _____ Depth to water _____

After Boring Completed _____ Depth to cave-in _____

Cave In	Water Notes
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MOISTURE

D = Damp
M = Moist

M = Moist
W = Wet

WA=Washahead
ET = Fish tail

FT = Fish tail
RB = Rock bit

RE REOR B1

ST = Shelby tube
SS = Split spoon

SS = Split spoon
DM = Drilling mu

SW - Shipping and

A = Auger
C = Coring

C= Coring
W= Wash

04 000000

E = Easy
M = Med

M = Med
H = Hard

Start 5/12/81 Unit: D

Finish 5/12/80 Chief Meyers

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Boring No. Probe #12

FIELD BORING LOG E-L-3(S)-8-76 State of Wisconsin/Department of Transportation
Boring No. Probe # 13 Structure B-47-56 So. Fork Kinnickinnic River County Pierce Sheet 1 of 1

Station	47+90	Offset	28' Lt. A2	Surface Elevation	889.8
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While drilling _____ Time after drilling _____

After Boring Completed _____ Depth to cave-in _____

MOISTURE DRILLING METHOD
D = Damp WA = Washahead ST = Shelby tube A = Auger E = Easy Start 5/12/81 Unit L

Q	WOL	RB - Rock Bit	DM - Drilling Mud	W - Wash	FF - Fluid	Finish	Chisel
1		Blows on					

VISUAL FIELD CLASSIFICATION AND REMARKS		com eng	ulde ing a be e	lin tho
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FIELD BORING LOG E-L-3(S)-8-76 State of Wisconsin/Department of Transportation
Boring No. 14 Structure B-47-56 So Fork Kinnichininic River County Pierce Sheet 1 of 1

Road SH-29 ⁴⁰⁰

Offset 28' 4" + 12

Surface Elevation 893.5

While drilling _____	Time after drilling _____	_____	_____	_____	_____
Before casing removal _____	Depth to water _____	_____	_____	_____	_____
After Boring Completed _____	Depth to cave-in _____	_____	_____	_____	_____
Cave In _____	Water Notes _____	_____	_____	_____	_____

DRILLING METHOD

WA=Washahead
FT = Fish tail
RB = Rock bit

ST = Shelby tube
SS = Split spoon
DM = Drilling mud

A = Auger
C = Coring
W = Wash

E = Easy
M = Medium
H = Hard

Start 5/12/81

Unit

Finish 5/12/81

Chief *Meyers*

Checked by	Final	Boring No.
		Probe # 14