

CORRESPONDENCE/MEMORANDUM

State of Wisconsin

DATE: April 24, 2000

TO: Richard Pauser
Technical Services Supervisor
Transportation District 6

FROM: Dennis G. Althaus
Geologist

SUBJECT: Site Investigation Report
Project I.D. 8110-00-01
Structure B-17-178
STH 64 over Bolen Creek
New Richmond to Connorsville
Dunn County

Attached is the Site Investigation Report for the above project.

DGA:\
Attachments

cc: District 6 (5)
C.O. Bridge
C.O. Design
Geotechnical File

SITE INVESTIGATION REPORT

Project I.D. 8110-00-01

Structure B-17-178

STH 64 over Bolen Creek

New Richmond to Connorsville

Dunn County

1. GENERAL

Three borings were done for a proposed two span structure (82' long by 36' wide) at about station 131+50 on STH 64 over Bolen Creek. The site is located about 0.4 mile east of the intersection of CTH "Q" and STH 64. The existing three span bridge is about 74' long by 26.5 feet wide, which appears to be in poor condition. The 6 foot approach fills look to be in good condition. Gently rolling hills with farm fields, trees and bushes for ground cover make up the surrounding terrain. Bolen Creek is about 42 feet wide by 1 foot deep, flows south and has a sandy silty bottom.

2. SUBSURFACE CONDITION

Three borings conforming to AASHTO Method T-206 Standard Penetration Test were performed to estimate relative density, fix presumptive bearing capacity, investigate soil properties to select suitable pile types with their support values, make a cursory review of alternative foundation possibilities, and recover samples for soil textural identification and classification. Soil textures in the borings logs are field identifications made by the drillers and were later verified in the C.O. Geotechnical Lab.

Boring 1 was done at station 131+86, 18 feet right of the existing centerline.

<u>Elevations</u>	<u>Soil Description</u>
983.1 to 982.0	topsoil
982.0 to 979.6	brown silty sand, with boulder
979.6 to 974.1	very loose black fibrous peat
974.1 to 939.0	firm to dense brown sand, some gravel, boulder at elevation 940
939.0 to 930.0	dense to very dense sand and gravel and weathered sandstone
930.0 to 923.4	very dense light brown sandstone

Boring 2 was done at station 131+14, 18 feet left of the existing centerline.

<u>Elevations</u>	<u>Soil Description</u>
982.5 to 981.5	topsoil
981.5 to 977.5	organic silt, with a trace of sand and cobbles at elevation 981.5 to 980.5
977.5 to 974.5	very loose dark brown sandy silt
974.5 to 934.5	firm to dense brown sand, some gravel
934.5 to 928.7	very dense light brown sandstone

Boring 3 was done at station 131+34, 22 feet left of the existing centerline.

<u>Elevations</u>	<u>Soil Description</u>
979.4 to 978.4	water
978.4 to 976.4	gray silt, some sand
976.4 to 937.4	firm to dense brown sand, some gravel
937.4 to 933.4	loose reddish brown sand
933.4 to 926.2	very dense light brown sandstone

The water elevation was about 979.4 at the time the borings were done.

3. BEARING CAPACITY

The subsurface soils within a practical footing depth have insufficient bearing capacity to support spread footings for this structure.

4. PILES

A cursory review indicates that the soils above rock/weathered rock would not be adequate to support friction/displacement piles at practical load levels.

H-piles or oil field pipe piles however could be driven to 9000 psi stress in the steel section if driven to rock at elevation 933 for the west abutment, elevation 933 for the pier and elevation 930 for the east abutment.

5. ALTERNATIVE FOUNDATION TYPE

Drilled caissons could be used here but the cost would be more. Dynamic and vibratory methods could not be used effectively here.

6. LATERAL EARTH PRESSURE

Grade 1 granular backfill will exert an equivalent fluid pressure of 30 to 35 psf, silty sands 45 psf, silts 65 psf, silty clays and clays 85 psf or more.

7. CONSTRUCTION PROBLEMS

Boulders and cobbles were encountered just below the topsoil at both abutment locations. The cobbles and boulder would be removed with the removal of the topsoil, peat and organic silt. These soils should be removed before placing the fill for the abutments.

8. RECOMMENDATIONS

- A) Remove the topsoil, peat and organic silt before placing the fill for the abutments.
- B) The use of some sort of drainage system behind the abutments as well as any other earth retaining structure will help prevent water caused problems such as material washout form behind these structures.
- C) It is recommended that H-piles or oil field pipe piles with pile tips driven to rock at 9000 psi load in the steel section be used at the abutment and pier locations. The piles will tip out at about elevation 930 for the east abutment, elevation 933 for the west abutment and the pier.

If you have any questions, please contact the Geotechnical Unit.

STH 64 OVER BOLEN CREEK
NEW RICHMOND TO CONNORSVILLE, DUNN COUNTY

STATE PROJECT NUMBER

SHEET NO.

8

ABBREVIATIONS
F—Fine M—Medium C—Coarse
W—Weathered S—Sound

MATERIAL SYMBOLS
Topsoil Silt Sandstone
Sand Peat Limestone
Gravel Clay Igneous Rock

LEGEND OF PROBING

95/6-95 Blows For 5' Penetration
7 Average Blows Per Foot
398' Wt. Falling 18" on a 2" O.D. Point.

LEGEND OF BORING

Unconfined Strength
Tons/Ft² 7.7
Blows Per Foot 7.7
Using 140# Wt. Falling 30"

Shelby Tube—S.T.
Ground Water Elevation
No Ground Water Observed Above This Elevation

Unless otherwise specified, the blow per foot at the location indicated are based on a 2,000 lb. hammer falling 30" on a 2" O.D. point. The blow count is taken immediately below a closed or open hole eliminating side friction on the drive pipe.

SUBSURFACE EXPLORATION FOR FOUNDATION DESIGN AND BIDDERS INFORMATION

To obtain relative data concerning the character of material in and upon which the foundation might be built, borings and/or soundings were made at points approximately as indicated on this drawing. The data presented herein represents the findings of the subsurface explorations made. However, because the depths investigated are limited and the area of the borings and/or soundings is very small in relation to the entire area, the Department of Transportation does not warrant conditions below the depths investigated or that the classification of material encountered in these investigations is necessarily typical of the entire site.

NO. DATE REVISION BY

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

STRUCTURE B-17-178

COUNTY SPEC. 1996 DRAWN BY V.J.M. SCALE 1"=10'

SUBSURFACE EXPLORATION

SHEET 1 OF 1

BOR-2

BOR-3

BOR-1

131+00

131+50

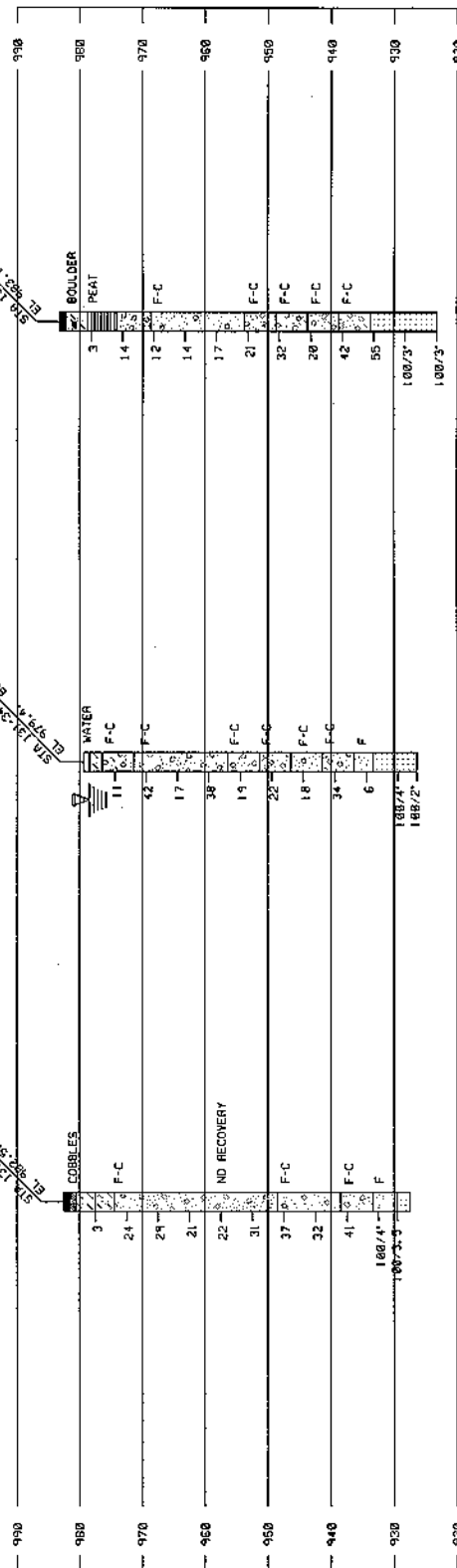
132+00

STH 64

131+00 131+50 132+00

131+00 131+50 132+00

131+00 131+50 132+00



Boring No.1

StructureB-17-17B-0

CountyDunn

Sheet1 of 2

Project8870-00018110-00-01

RoadSH64

over Boken Creek

E

Station131+06

Offset18' RT &

Surface Elevation983.1

GROUND WATER OBSERVATIONS

Streambed Elev.

Water Elev.979.4

Top of Well Elev.

Time After Drilling

Depth to Water

MOISTURE

D = Damp

M = Moist

W = Wet

HS = Hollowstem

WA = Wash Ahead

RB = Rockbit

DRILLING METHOD

ST = Shelby Tube

SS = Split spoon

DM = Drilling Mud

A = Auger

C = Coring

W = Wash

E = Easy

M = Medium

H = Hard

Start4-17

Unit1

Finish

Chief

Sample No.	Moisture	Blows on Sampler		Sample and Recovery	Total Blows	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Drilling Method	Probe Blows
		0/6	6/12							
	DM					Top Soil			A	Cal
						Br silty sand				
1		0 1	2	3	5	Very loose			SS	
						Black Fibrous Root			A	
2	W	3 7	7	14	10	Firm sand & gravel			SS	
									WA	
3		0 4	11	19	15	Firm Br F-C sand some gravel			SS	
									WA	
4		7 7	11	18	20				SS	
									WA	
5		10 7	9	19	25				SS	
									WA	
6		12 9	12	24	30	Br F-C sand & gravel			SS	
									WA	
7		15 17	18	33	35	Dense Br F-C sand & gravel			SS	
									WA	
8		12 8	13	25	40	Firm Br F-C sand some gravel			SS	
									WA	

Checked by

Final60' Poorly cemented Sand stone 50'

Boring No.1

DT143496, (Replaces EL3A(S))FIELD BORING LOGWisconsin Department of Transportation

Boring No. 1Structure B-17-178 E Abut south sideCounty DunnSheet 2 of 2

Project ~~B612-00-01~~ 8110-00-01 Road: ~~USH 5TH 64~~ over Baker Creek

Station 131+86Offset 18' RT &Surface Elevation 983.1

GROUND WATER OBSERVATIONS

Streambed Elev. _____Time After Drilling _____

Water Elev. 979.4

Top of Well Elev. _____Depth to Water _____

MOISTURE

D = DampHS = HollowstemST = Shelby TubeA = AugerE = Easy

M = MoistWA = Wash AheadSS = SplitspoonC = CoringM = Medium

W = WetRB = RockbitDM = Drilling MudW = WashH = Hard

Start 4-17Unit 1

Finish _____Chief ~~722~~

Sample No.	Moisture	Blows on Sampler		Sample and Recovery	Total Blows	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Drilling Method	Probe Blows
		0/6	6/12							
	W					Fin Br F-C sand some gravel			WA	
⑨		22	20 24	46		45 Br F-C Sand + gravel Dense			SS WA	
⑩		33	22 46	74		50 very dense (loosely cemented sandstone) H Br F sand			SS WA	
⑪	MW	100/3	100/3	100/3	55				WA	
⑫		100/3	100/3	100/3	60	59.75 LCB 6020			WA	
					25		25			
					30		30			
					35		35			
					40		40			

Checked by _____

Final 601

Boring No. 1

Boring No.2

StructureB-17-178

CountyDunn

Sheet1 of 2

Project

Road

Station131.14

Offset18' L F

Surface Elevation9825

Streambed Elev.979.4

Water Elev.

Top of Well Elev.

GROUND WATER OBSERVATIONS

Time After Drilling

Depth to Water

MOISTURE

D = Damp

M = Moist

W = Wet

HS = Hollowstem

WA = Wash Ahead

RB = Rockbit

DRILLING METHOD

ST = Shelby Tube

SS = Split spoon

DM = Drilling Mud

A = Auger

C = Coring

W = Wash

E = Easy

M = Medium

H = Hard

Start9-18 Unit1

Finish4-18-00

Chief

Sample No.	Moisture	Blows on Sampler		Sample and Recovery	Total Blows	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Drilling Method	Probe Blows
		0/6	6/12							
	M					Top Soil			A	Cas
						Cobbles mixed in with organic silt				
						Organic silt				
						tan sand				
1		1	2	3	5	Very loose Dark Br. Silty sand			SS	
									A	
2	W	6	13	24	10	Firm Br F-C sand + gravel			SS	
									WA	
3		13	14	29	15	Firm			SS	
									WA	
4		7	9	21	20	Firm			SS	
									WA	
5		5	8	22	25	Firm No Recovery			SS	
									WA	
6		13	14	27	30	Dense			SS	
									WA	
7		9	19	37	35	Dense Br F-C sand some gravel			SS	
									WA	
8		7	13	32	40	Dense			SS	
									WA	

Boring No. 2

Structure B-17178-0

County Dunn

Sheet 2 of 2

Project ~~88-10-001~~ 8110-00-01

Road 5th 64 Ave. Bk. Creek

Station 131.14

Offset 18' 1" 9

Surface Elevation 982.5

GROUND WATER OBSERVATIONS

Streambed Elev. _____

Water Elev. 979.4

Top of Well Elev. _____

Time After Drilling _____

Depth to Water _____

MOISTURE

D = Damp
M = Moist
W = Wet

HS = Hollowstem
WA = Wash Ahead
RB = Rockbit

DRILLING METHOD

ST = Shelby Tube
SS = Splitspoon
DM = Drilling Mud

A = Auger
C = Coring
W = Wash

E = Easy
M = Medium
H = Hard

Start 4-18 Unit 1

Finish 4-18-00 Chief RZ

Sample No.	Moisture	Blows on Sampler		Sample and Recovery	Total Blows	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Drilling Method	Probe Blows
		0/6	6/12							
5	W					Dense Br F-C sand some Gravel			WA	
6										
7		11	22	41		45 Dense Reddish Br F-C sand little Gravel			SS	
8		19								
9	D	61	100/4	100/4	100/4	10 50 Very Dense Fine White Sand (loosely cemented sandstone) It Brown F Sand	10		SS	
10		100/35		100/35	100/35		15			15
						54.3 LCB# 2				
					20		20			
					25		25			
					30		30			
					35		35			
					40		40			

Boring No.3

StructureB17-178X Pier

CountyDunn

Sheet1 of 2

Project8110-00-01 Road 5th 64 over Bolen Creek

Station131+34

Offset22 ft E

Surface Elevation979.4

GROUND WATER OBSERVATIONS

Streambed Elev.

Water Elev.979.4

Top of Well Elev.

Time After Drilling

Depth to Water

MOISTURE

D = Damp

M = Moist

W = Wet

HS = Hollowstem

WA = Wash Ahead

RB = Rockbit

DRILLING METHOD

ST = Shelby Tube

SS = Splitspoon

DM = Drilling Mud

A = Auger

C = Coring

W = Wash

E = Easy

M = Medium

H = Hard

Start4-18 Unit1

Finish4-18-00

ChiefM

Sample No.	Moisture	Blows on Sampler		Sample and Recovery	Total Blows	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Drilling Method	Probe Blows
		0/6	6/12							
	W					Water				
						Gray silt some sand				
①		5	6	11	11	Firm Br F-C Sand + Gravel			SS	CA
		5	7	12	12				WA	
②		17	30	47	42	Dense Br F-C Sand + Gravel			SS	
		12							WA	
③		11	9	20	17	Firm			SS	
		8							WA	
④		17	20	37	38	Dense			SS	
		18							WA	
⑤		9	8	17	19	Firm Br F-C Sand			SS	
		11				some Gravel			WA	
⑥		10	9	19	22	Firm Br F-C Sand + Gravel			SS	
		13							WA	
⑦		10	9	19	18	Firm Br F-C Sand			SS	
		9				Tr Gravel			WA	
⑧		15	17	32	31	Dense Br F-C Sand + Gravel			SS	
		17							WA	

Checked by131.09

Final53'

Boring No.3

Boring No.3

StructureB.17-170X

CountyDunn

Sheet2 of 2

Project8110-60-01

Road5TH 64

Station131434

Offset22' Lt W

Surface Elevation979.4

GROUND WATER OBSERVATIONS

Streambed Elev.

Water Elev.979.4

Top of Well Elev.

Time After Drilling

Depth to Water

MOISTURE

D = Damp
M = Moist
W = Wet

HS = Hollowstem
WA = Wash Ahead
RB = Rockbit

DRILLING METHOD

ST = Shelby Tube
SS = Splitspoon
DM = Drilling Mud

A = Auger
C = Coring
W = Wash

E = Easy
M = Medium
H = Hard

Start4:10 Unit 1

Finish4:18:00 Chief T.H.

Sample No.	Moisture	Blows on Sampler		Sample and Recovery	Total Blows	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Drilling Method	Probe Blows
		0/6	6/12							
	W					Br F. L Sand & Gravel			WA	
9		5	3	6		100 ss 45 Reels Br F. Sand			SS	
		3							WA	
10	M	100 1/4				(loose cement sandstone) 4 Very White to Lite Brown 50 Dense F Sand			SS	
11		100 1/2				lite Br F Sand (loose cement sandstone)			SS	
						55 53' 2 EOB #3				
					20					20
					25					25
					30					30
					35					35
					40					40

Checked by

Final53' Sandstone 46'

Boring No.3