

DATE: September 24, 1990

TO: Thomas Carlson, P.E. Director
Transportation District 6

Attention: George McCleod, P.E.
District Chief Construction and
Materials Engineer

FROM: Stephen Shober, P.E.
State Materials Engineer for
Highways

SUBJECT: Materials
Soils
Site Investigation Report
Project ID 7220-07-00
USH 12/STH 29 over Red Cedar River
Structure 13-17-98
City of Menominee
Dunn County

We are attaching copies of our Site Investigation Report for the project noted above. This report is to replace the one submitted October 30, 1984. This work is based on additional drill exploration and some changes in the state of the art. We suggest the October 1984 report be voided and destroyed.

By: 

Clyde N. Laughter
Chief Soils Engineer

CNL:t00029

cc: District 6 (original plus 3)
Bridge (2)
CO Design
SFS
MO File
Soil File✓

Site Investigation Report
Project ID 7220-07-00
USH 12/STH 29 over Red Cedar River
Structure B-17-98
City of Menominee
Dunn County

1. General.

Additional borings have been made to supplement and in a sense replace the report made October 20, 1984 for this project. The impetus for this renewed effort was to get adequate information to better evaluate the use of drilled shafts or caissons in lieu of cofferdams in the deeper water. All borings have been replotted and to avoid problems for the designer in working with 2 reports, the old data from the 1984 report is incorporated into this submission. Therefore, the early report and boring plot can be voided and destroyed.

The proposed structure carries USH 12/STH 29, station 15±, over the Red Cedar River in the North part of Menominee. The proposed bridge will be behind a dam forming Lake Menominee which has rather deep water (30-35 feet) as a result.

The deeper water with wind impeded drilling. An added problem in the 1990 boring program was swift stream current caused by heavy rains during the boring operation. These factors are recognized to impair coring recoveries.

The new structure will be parallel to the existing plate girder bridge immediately west of the site. The existing bridge, built in 1939, is supported on spread footings which are noted on old plans as "concrete blocks". No capacity could be located. At the time of the construction of the existing bridge the pool level was elevation 804±. The proposed work will be over an old dam and power house site so some relics of this earlier work may be encountered in this job.

2. Subsurface Conditions.

The borings made for the dam in 1955 by Longyear have been reviewed, Robinson reviewed the local geology and stated that bedrock will be Cambrian sandstone at shallow depths. The drill logs by WDOT personnel logs it largely as sandy shale where as earlier Longyear had designated the rock as sandstone coupled with a geologic name. For design purposes, proper designation rather moot consideration for the assigned values are made from physical characteristics and not from geotechnical nomenclatures.

The investigations were made in essential compliance with AASHTO Method T-206, Standard Penetration Tests, and T-225, Diamond Core Drilling for Site Investigations. Probes were also made to better delineate the rock surface at some pier sites. The conditions are so diverse that each foundation unit will be addressed separately.

At the south abutment, station 11±, Borings 13, 14, 15 and 3 (1990) apply. There is about 17 to 27 feet of loose to dense sand logged over shaley sandstone bedrock. The bedrock obviously slopes down sharply from west to east, say 10 feet vertical to 100 feet horizontal. The original cores gave variable recovery and Boring 3 (1990) was made to give better and deeper coring data with 33% recovery in shallow (upper 5 feet of rock) penetration and 85% at the bottom of accumulative 15 feet of NX coring.

Borings 9, 10, 11, 6 (1990) and probes 8, 9 and 10 were made for pier 1, station 12 + 88. Here the water was about 30 feet deep with a thin (5'±) cover of sandy soil. Boring 6 (1990) was made largely to evaluate deeper rock and both the original borings as well as the 1990 work indicates competent rock with 75-95% recovery of NX runs.

For Pier 2, station 14 + 45, Borings 7, 8, 5A (1990) and 5B (1990) and probes 6 and 7 apply. Here the water depths are 17 to 20 feet above lake bottom evaluation 794± with loose to firm sands containing peaty inclusions down to bedrock at elevation 780±. All borings indicate competent bedrock with recoveries of 85 to 100% on NX cores.

Borings 5, 6, and 4 (1990) and probes 1 and 2 were made for Pier 3, station 16 + 06. Some 18 feet of water was logged to lake bottom elevation 796±. Loose alternating layers of sand and peat were then encountered to bedrock elevation 784±. The rock was of good quality giving recoveries of 84 to 97% for NX runs. Borings 1, 2, 3, 4 and 1 (1990) and probes 3, 4, and 5 were made for Pier 4, station 17 + 68. The water was 15 to 18 feet deep with then a stratum of peaty soil down to rock at elevation 796 to 788±.

For the north abutment, station 19 + 20, Borings 2 (1990) and 12 were made. The over burden of firm sand was logged down to bedrock which was encountered at elevation 805± in Boring 12 and at 786± in Boring 2 (1990) giving a slope of 19 feet vertical in 30 feet horizontal. The bedrock was of good quality with 80 to 95% recovery on NX cores.

It can be hypothesized and is believed that the deep water with unavoidable barge movements caused bit whip that reduced recovery. The soil texture and rock designations are driller's held identification with a later verifying check in the central soils office.

Two unexplained and disturbing things were noted. Borings 9 and 13 the cores logged concrete and worse, in Borings 9 some 10 feet of sound rock was cored above the concrete. One explanation, totally unprovable, is that fissures or cavities were created by blocking in the construction of the existing bridge. Also, another weak explanation is that there was drift of the drill hole so that existing footings were encountered.

This clay seams were noted in the same cores. The longer borings for the dam refer to this as "intercalated layers". These thin layers mandate some reduction in capacities.

Ground water at the times of drilling was lake datum at elevation 814 with some ± 0.5' fluctuation.

3. Foundation Selection.

Ordinarily the Site Investigation Report sets out bearing capacity, piling, alternates, etc. At this bridge the diversity of foundation conditions, some of the construction considerations as deep water, lack of toe material, etc. makes it desirable to discuss each unit separately.

The conditions are such that vibratory methods (Vibroflotation, Terra-Probe, etc.) dynamic methods (so called Dynamic Consolidation, Ground Pounding, etc.) and stone columns are not viable options here. Other approaches will be considered individually with some evaluation of alternates.

South Abutment Station 11±.

Footings set into the rock near elevation 816± can be designed to 6tsf, steel H-piles with chilled steel points for bite into the rock can be designed for 10,000psi in the steel section. A third approach is drilled shafts socketed into the rock. A 6 foot socket into the sandy shales can be designed for 30 tsf on the shaft base and a 10 foot socket can be designed to 45tsf. Footings on rock would require deep structural excavation so either piles or shafts are most desirable. If shafts are selected for the other and deeper water piers, a strong cane can be made for shafts at this abutment. However, for the spans contemplated here no adverse effects will result from any difference in deflection between adjacent units of piles and shafts.

Pier 1, Station 13±

Piles will not achieve the required penetration of 10 feet below footing grade. The options then are footings on rock requiring seals or drilled shafts designed for 30tsf with 6 foot penetration or 45tsf with 10 feet. The lack of toe and 30 feet of head make consideration of drilled shafts very attractive.

Pier 2, Station 14±

Here any of 3 methods are possible. Piles can be used and with chilled steel points be designed for loads of 10,000psi in the steel section. Footings on rock designed to 6tsf is an alternate but the water depth plus over-burden to rock places a negative opinion for this. However there is more than adequate toe for the cofferdam. Again drilled shafts at 30tsf on the base with 6 foot of rock penetration or 45tsf with 10 feet can be used. If shafts are considered suitable and used for other units, then this is the preferred selection here.

Pier 3, Station 16±

The water is 18 feet deep here, below this there is some 12 feet of weak peaty soil above the bedrock elevation 784±, If the footing is embedded 5 feet into the stream bottom which is a questionable minimum here, piles will be about 3 feet less than the specification 10 feet. This eliminates piles. Footings on rock require coffeerdam and seals with a 28 foot head. If used the footings should be designed to tsf bearing. The last alternate is of course drilled caissons socketed 6 feet into rock for 30tsf bearing or 45tsf with 10 feet penetration.

Pier 4, Station 17 + 68

Piles cannot achieve adequate penetration here. This then leaves footings on rock inside a cofferdam which will present construction problems or to resort to drilled shafts at the by-now-aft-repeated 30tsf with 6 feet of penetration or 45tsf with 10 feet depths.

North Abutment, Station 19 + 20

Footings on rock would require work on a sloping rock surface with over 20 feet of excavation. Piles with points to bite into the sharp sloped rock surface are workable. With points, 10,000psi in the steel would be acceptable. Another into rock at 30 or 45tsf capacity for 6 and 10 feet penetration respectively. There is one detraction from shafts here. On this sloping rock surface, the initial cut with the coring bit may be difficult because of the rock slope and a churn drill or similar effort may be required to provide a starter surface.

4. Lateral Earth Pressure

The active lateral earth pressure (equivalent fluid) on abutment backwalls or other earth restraining structures will be 30psf for a clean granular soil if well compacted and thoroughly drained. For silts, the minimum pressure would be 56psf for the same placement and a clay will give 85psf regardless of composition or drainage.

If drainage fails, the minimum pressure must be 63psf.

5. Construction Problems

The deep water will pose problems regardless of the foundation system used. This can be exacerbated by the lack of cover to easily toe in sheet pile for cofferdam.

6. Discussion and Recommendations

It is impractical, even impossible to use piles for all units. This then indicates either drilled shafts or excavation to bedrock. For all units to be on bedrock poses problems with cofferdam construction and dewatering--this means either a mixture of foundation types will be required or drilled shafts must be the selected foundation.

The expedient of draw down and work in dry may be put forth. The chance of success are almost non-existent with the potential for disruption to recreation on the lake plus wildlife endangerment.

No undue or severe differential deflections are foreseen if piles are ordered down for the abutments and drilled shafts installed for the intermediate piers.

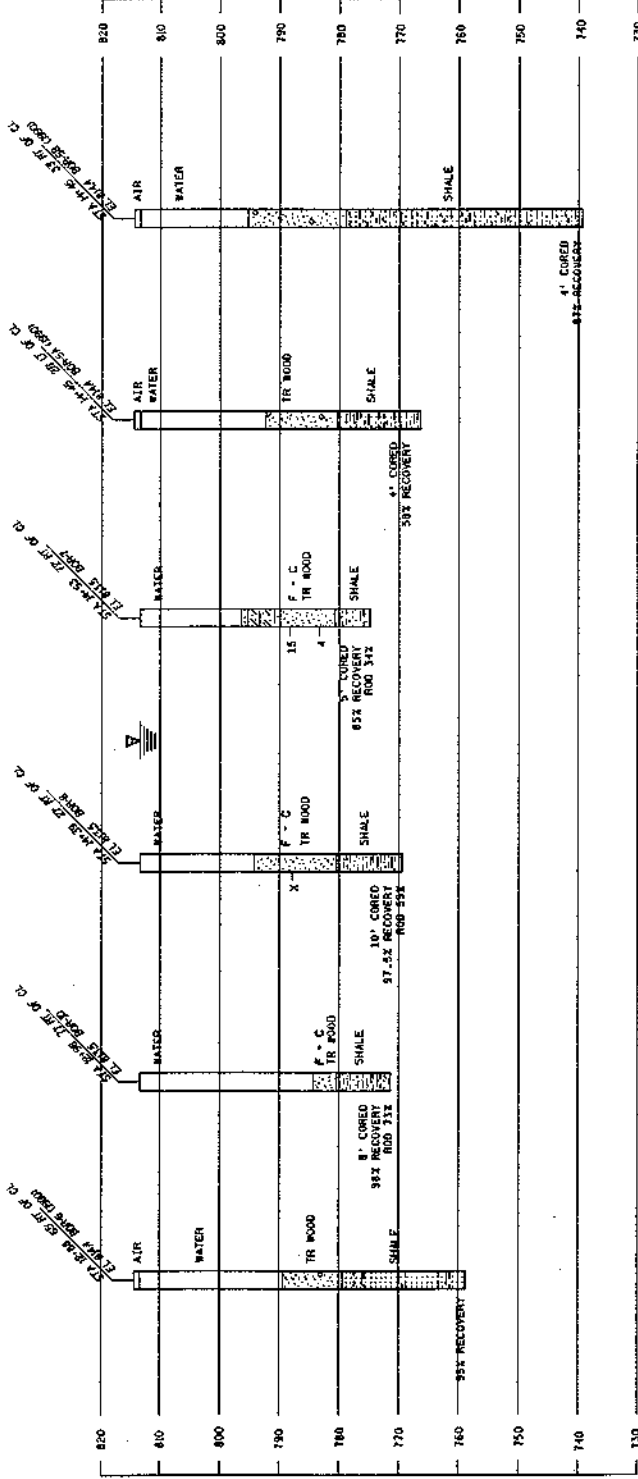
The bearings/penetration for shafts are admittedly conservative. This is true because these are thin clay seams in the rock and also there is a traditional conservative view on shaley materials.



80R-8 ① 80R-5A (1990)
② 80R-5B (1990)

① BOR-6 (1990)
 ② BOR-10

BOA-7

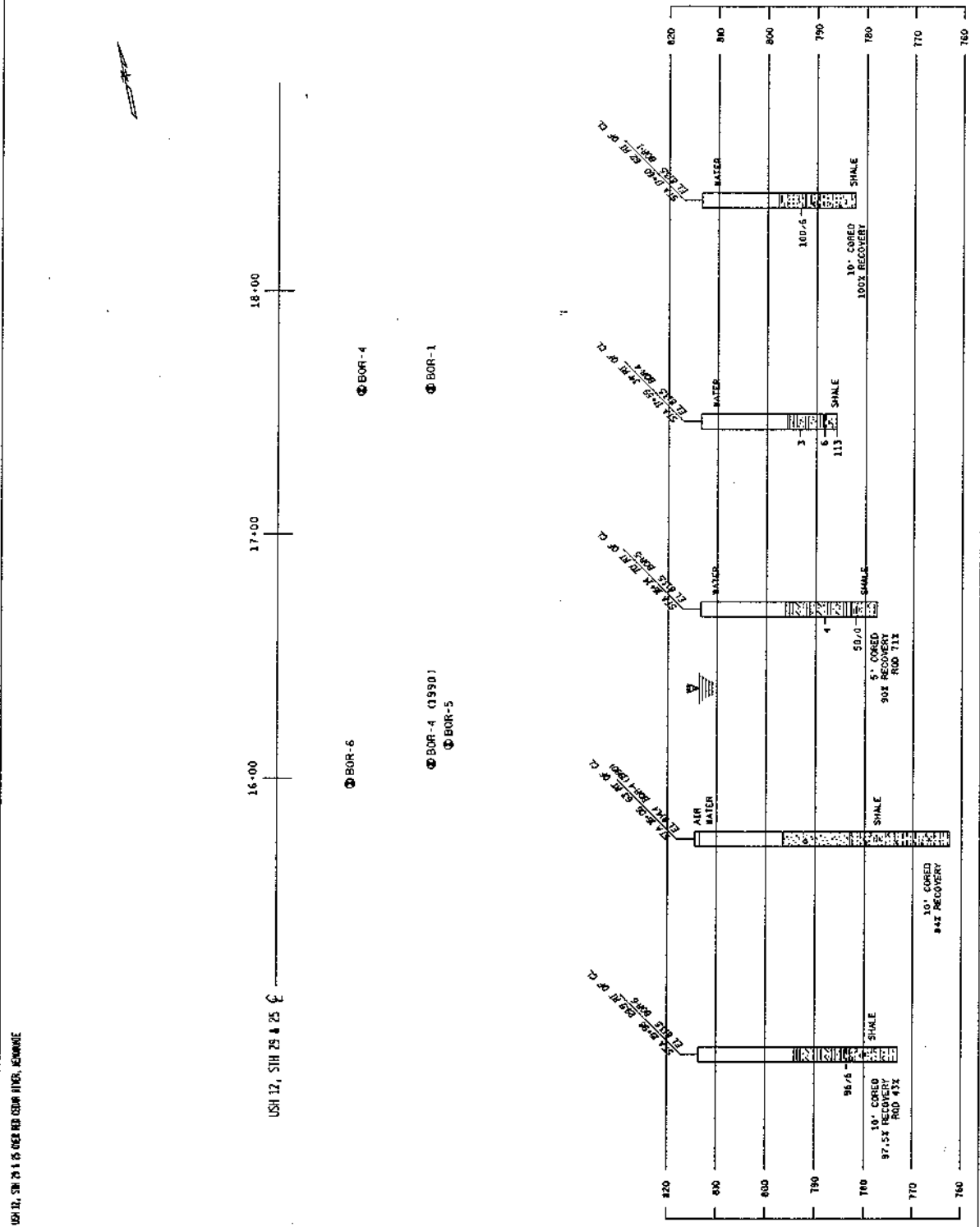


SUBSURFACE EXPLORATION FOR FOUNDATION DESIGN AND BIDDERS' INFORMATION

[illegible]

| | | | | | |
|--|------|----------|-----------|--------------|----|
| | | | HOL. DATE | REVISION | B7 |
| STATE OF WISCONSIN DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS | | | | | |
| STRUCTURE | | | | | |
| CORR. SPEC. | 1986 | DRAWN BY | JAR | P.LANS L'VEL | |
| SUBSURFACE EXPLORATION | | | | SHEET 2 OF 6 | X |

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|---|----------|--------------|----------|---------|------|-----------|------|------|-----------|--------|------|--------------|
| STATE PROJECT NUMBER | | SHEET NO. | | | | | | | | | | |
| <p>ABBREVIATIONS F—Fine M—Medium Co—Coarse W—Weathered S—Sand</p> | | | | | | | | | | | | |
| <p>MATERIAL SYMBOLS</p> <table border="0"> <tr> <td>Topsoil</td> <td>Silt</td> <td>Sandstone</td> </tr> <tr> <td>Sand</td> <td>Clay</td> <td>Limestone</td> </tr> <tr> <td>Gravel</td> <td>Clay</td> <td>Igneous Rock</td> </tr> </table> | | | | Topsoil | Silt | Sandstone | Sand | Clay | Limestone | Gravel | Clay | Igneous Rock |
| Topsoil | Silt | Sandstone | | | | | | | | | | |
| Sand | Clay | Limestone | | | | | | | | | | |
| Gravel | Clay | Igneous Rock | | | | | | | | | | |
| <p>LEGEND OF PROBING</p> <p>95/6-96 Blows for 6" Penetration Probing taken with a 300# S.T. Falling 18" on a 2" O.D. Point. Refusal 95/6</p> | | | | | | | | | | | | |
| <p>LEGEND OF BORING</p> <p>Unconfined Strength—7.7 Blows Per Ft. Using 140# Wt. Falling 30" Mash Sample Shelby Tube—S.T. Ground Water Elevation No Ground Water Observed Above This Elevation Silty Clay Sandy Gravel Boulders or Cobbles Sand Limestone</p> | | | | | | | | | | | | |
| <p>SUBSURFACE EXPLORATION FOR FOUNDATION DESIGN AND BIDDERS INFORMATION</p> <p>To obtain relative data concerning the character of material in and upon which the foundation will 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 of the foundation of Highway 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.</p> | | | | | | | | | | | | |
| NO. DATE | REVISION | BY | | | | | | | | | | |
| STATE OF MISSISSIPPI DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS | | | | | | | | | | | | |
| STRUCTURE | | | | | | | | | | | | |
| SHEET NO. | 1986 | DATE | JAN 1986 | | | | | | | | | |
| SUBSURFACE EXPLORATION | | SHEET 3 OF 5 | | | | | | | | | | |
| EXPLOSION | | X | | | | | | | | | | |



US 12, STA 29 & 25 E

STATE PROJECT NUMBER SHEET NO.



18-00

19-00

20-00

US 12, STA 29 & 25 E

BOR-1 (1990) BOR-2

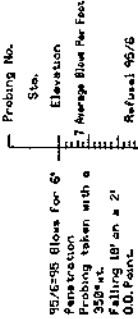
BOR-12

BOR-3

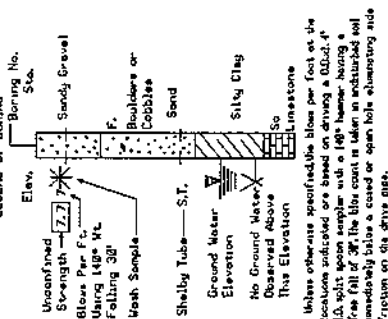
BOR-2 (1990)

| ABBREVIATIONS | |
|------------------|--------------|
| F—Fine | Coarse |
| M—Medium | S—Sand |
| MATERIAL SYMBOLS | |
| Topsoil | Silt |
| Peat | Sandstone |
| Gravel | Limestone |
| Clay | Igneous Rock |

LEGEND OF PROBING



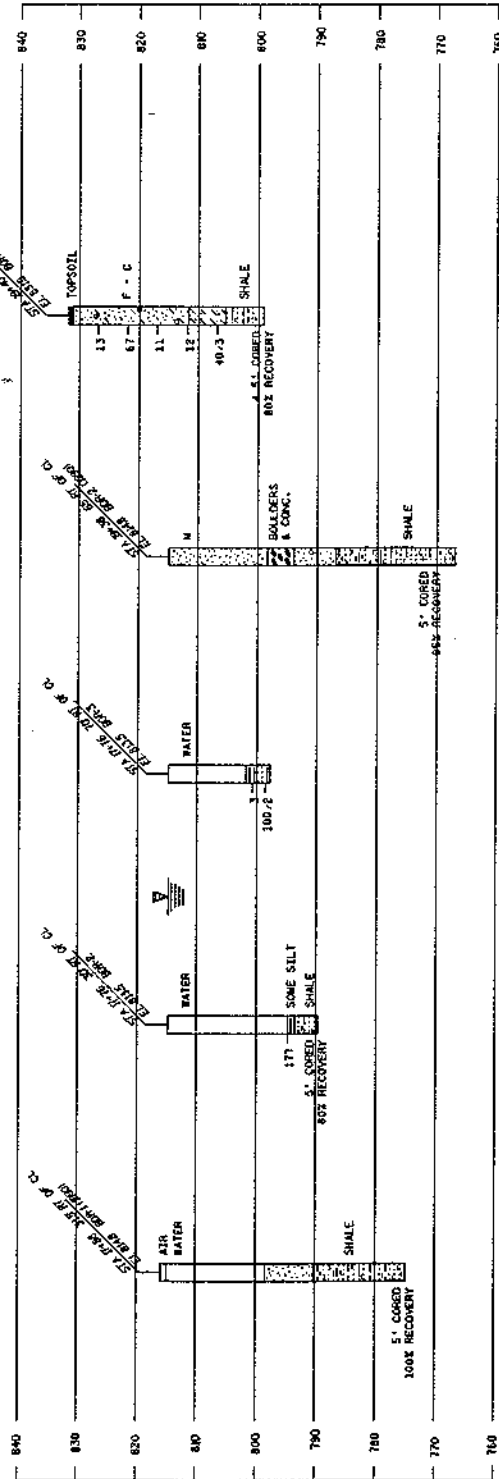
LEGEND OF BORING

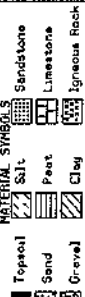


DESIGN AND BIDDERS INFORMATION

To obtain relative data concerning the character of material in and upon which the foundation is to be built, it is necessary to determine the nature and extent of the subsurface conditions. The data obtained from borings and tests are used to determine the nature and extent of the subsurface conditions. The data obtained from borings and tests are used to determine the nature and extent of the subsurface conditions.

| | | | |
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| NO. | DATE | REVISION | BY |
| STATE OF MISSOURI | | | |
| DEPARTMENT OF HIGHWAYS | | | |
| STRUCTURE | | | |
| SUBSURFACE EXPLORATION | | | |
| SHEET 4 OF 5 | | | |
| X | | | |





LEGEND OF PROBING

| Probing No. | Sta. | Elevation | 7 Average Blows Per Foot | Refusal |
|----------------------|--------------|-----------|--------------------------|--------------|
| 95/8-95 | Blows for 8" | | | Refusal 95/8 |
| Penetration | | | | |
| Probing taken with a | | | | |
| 350-wt. | | | | |
| Falling 18" on a 2" | | | | |
| O.D. Point. | | | | |

LEGEND OF BORING

Boring No.

77 * 1.1 Sndy Gravel

1

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 |
|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|

Boulders of

Cobbles

1.5
pues

1001

SALES

[illegible]

 Limestone

specified, the blows per foot at the

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0893-3200/97/\$12.00 DOI: 10.1037/0893-3200.11.4.535

tion program is taken as input at that stage.

എല്ലാ മനുഷ്യരും ജനങ്ങൾക്കും നൽകേണ്ടതാണ്.

EXPLORATION FOR FOUNDATION

NO BIDDERS INFORMATION

ive data concerning the character of

Temperature and humidity are important factors in the development of mold.

is drawing. The data presented herein

put yourself on postcard every day

un great idea si stancunus agpue abe

on such a percentage basis as may be the subject investigated.

eriel encountered in these investigations of the entire life.

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STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION

DEPARTMENT OF TRANSPORTATION
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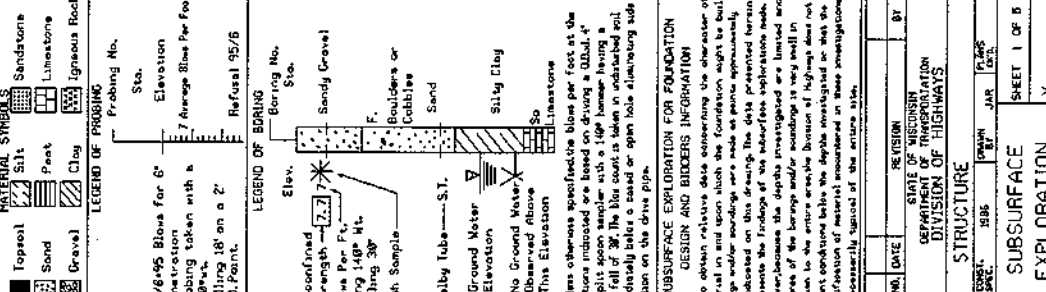
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SHEET 1 OF 5

FIELD BORING LOG #3

EL3(S) 385

State of Wisconsin/Department of Transportation

Boring No. B-4 Pier #3 Structure B-17-130 Lake Menominee County Dunn Sheet 2 of 2

Project 7220-07-00 Road USH 12 & STH 29 in City of Menominee

Station 16+06 Offset 43' Rt of East Edge of Present Sth Surface Elevation 813.4

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
DRILLING METHOD HS = Hollowstem ST = Shelby tube A = Auger E = Easy
WA = Washhead SS = Split spoon C = Coring M = Medium
RB = Rockbit DM = Drilling mud W = Wash H = Hard
Start 8/27/20 Unit FT
Finish _____ 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 | Size | |
| | | | | 40' | End of Run #1 | 40' | | | | | Cone |
| | | | | 45' | Sec. Run: 10' 84% Recovery | 45' | | | | | |
| | | | | 50' | (42' to 44' V - Broken - cut easy) | 50' | | | | | |
| | | | | 55' | | 55' | | | | | |
| | | | | 60' | | 60' | | | | | |
| | | | | 25' | | 25' | | | | | |
| | | | | 30' | | 30' | | | | | |
| | | | | 35' | | 35' | | | | | |
| | | | | 40' | | 40' | | | | | |

Checked by _____ Final _____ Boring No. B-4 Pier #3

FIELD BORING LOG

Boring No. 6 Pier # 1 Structure B-17-730 Lake Menominee County Dunn Sheet 1 of 2

Project 2220-07-00 Road USH 72 & STH 25 in City of Menominee

Station 12+88 Offset 45' Rt of East Edge Present Surface Elevation 813.4

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

HS = Hollowstem
 WA = Washhead
 RB = Rockbit

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

A = Auger
 C = Coring
 W = Wash

E = Easy
 M = Medium
 H = Hard

Start 9/5/80 Unit VT
 Finish _____ 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 | |
| | | | | | <u>Barge Deck</u> | | | | | <u>W</u> |
| | | | | | <u>Water</u> | | | | | |
| | | | | | <u>28' water depth</u> | | | | | |
| | | | | | <u>Water depth 20'</u> | | | | | |
| | | | | | <u>Water depth 19'</u> | | | | | |
| | | | | | <u>Water depth 25'</u> | | | | | |
| | | | | | <u>U. Loose - SAND - Tr. Wood</u> | | | | | |
| | | | | | <u>Sand - Tr. Gravel</u> | | | | | |
| | | | | | <u>weathered Rock - Rotten bit ahead</u> | | | | | |
| | | | | | <u>First Run Start at 35' 5"</u> | | | | | |
| | | | | | <u>10' Recovery 95%</u> | | | | | |
| | | | | | <u>Sandstone - shale</u> | | | | | |

Checked by _____ Final _____ Boring No. 6 Pier # 1

FIELD BORING LOG #1

EL3(S) 385

State of Wisconsin/Department of Transportation

Boring No. 6 Pier #1 Structure B-17-130 Lake Menominee County Dunn Sheet 2 of 2

Project 7220-07-00 Road USH-12 & 5TH-25 in City of Menomonie

Station 12+88 Offset 45' N of East Edge of Present St. Surface Elevation 813.4

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
HS = Hollowstem
WA = Washahead
RB = Rockbit
ST = Shelby tube
SS = Split spoon
DM = Drilling mud
A = Auger
C = Coring
W = Wash
E = Easy
M = Medium
H = Hard
Start 2/5/80 Unit VI
Finish _____ 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 | |
| | | | | 40' | 95% Recovery. | | | | | Core |
| | | | | 45' | End of First Run | | | | | |
| | | | | 50' | Sec. Run 10' Run. 95% Recovery. | | | | | |
| | | | | 55' | Soft - Broken | | | | | |
| | | | | 60' | End of Sec. Run | | | | | |
| | | | | 65' | End of Bor. | | | | | |
| | | | | 70' | 55.5' | | | | | |
| | | | | 75' | | | | | | |
| | | | | 80' | | | | | | |
| | | | | 85' | | | | | | |
| | | | | 90' | | | | | | |
| | | | | 95' | | | | | | |
| | | | | 100' | | | | | | |
| | | | | 105' | | | | | | |
| | | | | 110' | | | | | | |
| | | | | 115' | | | | | | |
| | | | | 120' | | | | | | |
| | | | | 125' | | | | | | |
| | | | | 130' | | | | | | |
| | | | | 135' | | | | | | |
| | | | | 140' | | | | | | |
| | | | | 145' | | | | | | |
| | | | | 150' | | | | | | |
| | | | | 155' | | | | | | |
| | | | | 160' | | | | | | |
| | | | | 165' | | | | | | |
| | | | | 170' | | | | | | |
| | | | | 175' | | | | | | |
| | | | | 180' | | | | | | |
| | | | | 185' | | | | | | |
| | | | | 190' | | | | | | |
| | | | | 195' | | | | | | |
| | | | | 200' | | | | | | |
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| | | | | 280' | | | | | | |
| | | | | 285' | | | | | | |
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| | | | | 380' | | | | | | |
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| | | | | 400' | | | | | | |
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| | | | | 410' | | | | | | |
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| | | | | 425' | | | | | | |
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| | | | | 610' | | | | | | |
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| | | | | 625' | | | | | | |
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| | | | | 640' | | | | | | |
| | | | | 645' | | | | | | |
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| | | | | 670' | | | | | | |
| | | | | 675' | | | | | | |
| | | | | 680' | | | | | | |
| | | | | 685' | | | | | | |
| | | | | 690' | | | | | | |
| | | | | 695' | | | | | | |
| | | | | 700' | | | | | | |
| | | | | 705' | | | | | | |
| | | | | 710' | | | | | | |
| | | | | 715' | | | | | | |
| | | | | 720' | | | | | | |
| | | | | 725' | | | | | | |
| | | | | 730' | | | | | | |
| | | | | 735' | | | | | | |
| | | | | 740' | | | | | | |
| | | | | 745' | | | | | | |
| | | | | 750' | | | | | | |
| | | | | 755' | | | | | | |
| | | | | 760' | | | | | | |
| | | | | 765' | | | | | | |
| | | | | 770' | | | | | | |
| | | | | 775' | | | | | | |
| | | | | 780' | | | | | | |
| | | | | 785' | | | | | | |
| | | | | 790' | | | | | | |
| | | | | 795' | | | | | | |
| | | | | 800' | | | | | | |
| | | | | 805' | | | | | | |
| | | | | 810' | | | | | | |
| | | | | 815' | | | | | | |
| | | | | 820' | | | | | | |
| | | | | 825' | | | | | | |
| | | | | 830' | | | | | | |
| | | | | 835' | | | | | | |
| | | | | 840' | | | | | | |
| | | | | 845' | | | | | | |
| | | | | 850' | | | | | | |
| | | | | 855' | | | | | | |
| | | | | 860' | | | | | | |
| | | | | 865' | | | | | | |
| | | | | 870' | | | | | | |
| | | | | 875' | | | | | | |
| | | | | 880' | | | | | | |
| | | | | 885' | | | | | | |
| | | | | 890' | | | | | | |
| | | | | 895' | | | | | | |
| | | | | 900' | | | | | | |
| | | | | 905' | | | | | | |
| | | | | 910' | | | | | | |
| | | | | 915' | | | | | | |
| | | | | 920' | | | | | | |
| | | | | 925' | | | | | | |
| | | | | 930' | | | | | | |
| | | | | 935' | | | | | | |
| | | | | 940' | | | | | | |
| | | | | 945' | | | | | | |
| | | | | 950' | | | | | | |
| | | | | 955' | | | | | | |
| | | | | 960' | | | | | | |
| | | | | 965' | | | | | | |
| | | | | 970' | | | | | | |
| | | | | 975' | | | | | | |
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| | | | | 985' | | | | | | |
| | | | | 990' | | | | | | |
| | | | | 995' | | | | | | |
| | | | | 1000' | | | | | | |

Checked by _____ Final _____ Boring No. 6-6 Pier #1

FIELD BORING LOG State of Wisconsin/Department of Transportation
Boring No. B-5A - Pier 2 EL3(S) 385 Lake Menominee County Dunn Sheet 2 of 2
Project 2220-07-00 Road USH 12 & STH 25 in City of Menominee
Station 14+45 Offset 8' E of East Edge of Present Str. Surface Elevation 813.4

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 | HS = Hollowstem WA = Washahead RB = Rockbit | ST = Shelby tube SS = Split spoon DM = Drilling mud | DRILLING METHOD A = Auger C = Coring W = Wash | E = Easy M = Medium H = Hard | Start <u>8/28/90</u> Unit <u>III</u> | Finish <u>8/29/90</u> Chief <u>Mayors</u> |
|---|--|--|---|---|--------------------------------------|---|

| 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 | Size | | |
| | | | | 40' | Scudstone & Shale. | 40 | | | | | | Case |
| | | | | | End First Run | | | | | | | |
| | | | | 45' | Sec. Run - 4' Recovery 58% | 45 | | | | | | |
| | | | | 48' | | | | | | | | |
| | | | | | E.B. | | | | | | | |
| | | | | 50' | (Thick Run Broke Bit lost Drill water) | 50 | | | | | | |
| | | | | 55' | | 55 | | | | | | |
| | | | | 60' | | 60 | | | | | | |
| | | | | 25 | | 25 | | | | | | |
| | | | | 30 | | 30 | | | | | | |
| | | | | 35 | | 35 | | | | | | |
| | | | | 40 | | 40 | | | | | | |

| | | |
|------------------|-------------|----------------------------------|
| Checked by _____ | Final _____ | Boring No. <u>B-5A - Pier #2</u> |
|------------------|-------------|----------------------------------|

FIELD BORING LOG *Pier 2*

EL3(S) 385

State of Wisconsin/Department of Transportation

Boring No. *B-5-B-* Structure *B-17-130 Lake Menominee* County *Dunn* Sheet *2* of *2*

Project *7220-07-00* Road *USH 72- STA 25* in City of *Menomonie*

Station *14+45* Offset *13' Rt of East Edge - Present Stn* Surface Elevation *813.4*

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

DRILLING METHOD
HS = Hollowstem
WA = Washahead
RB = Rockbit
ST = Shelby tube
SS = Split spoon
DM = Drilling mud
A = Auger
C = Coring
W = Wash
E = Easy
M = Medium
H = Hard

Start *8/27/90* Unit *SE*
Finish *9/5/90* 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 | |
| | | | | <i>10</i> | <i>Sandstone - Shale 42% Recovery</i> | <i>40</i> | | | | | <i>Cone</i> |
| | | | | | <i>End of First Run</i> | | | | | | |
| | | | | <i>4</i> | <i>Sec. Run. 8' Recovery</i> | | | | | | |
| | | | | | <i>56%.</i> | <i>45</i> | | | | | |
| | | | | <i>5</i> | | | | | | | |
| | | | | <i>20</i> | <i>End of Sec Run</i> | <i>10</i> | | | | | |
| | | | | | <i>Third Run 8' Recovery</i> | | | | | | |
| | | | | | <i>75%.</i> | | | | | | |
| | | | | <i>55</i> | | <i>515</i> | | | | | |
| | | | | | <i>End of Run #3</i> | | | | | | |
| | | | | <i>60</i> | <i>Start Fourth Run - 72% Recovery</i> | <i>620</i> | | | | | |
| | | | | | <i>3.5' Broken.</i> | | | | | | |
| | | | | <i>65</i> | <i>Start 5th Run - 5' 95% Recovery</i> | <i>625</i> | | | | | |
| | | | | | <i>Broken.</i> | | | | | | |
| | | | | <i>70</i> | <i>6th Run 4' Recovery 80%</i> | <i>730</i> | | | | | |
| | | | | | <i>Broken.</i> | | | | | | |
| | | | | <i>75</i> | <i>7th Run 4' Recovery 87%</i> | <i>735</i> | | | | | |
| | | | | | <i>Broken.</i> | | | | | | |
| | | | | <i>80</i> | <i>End of Bor</i> | <i>840</i> | | | | | |

Checked by _____ Final _____ Boring No. *B-5-B- Pier 2*

State of Wisconsin/Department of Transportation

| | | |
|------------|-------|------------|
| Checked by | Final | Boring No. |
| | RPR | 1 |

State of Wisconsin/Department of Transportation

| | | |
|------------|-------|--------------|
| Checked by | Final | Boring No. 4 |
|------------|-------|--------------|

State of Wisconsin/Department of Transportation

| | | | | | | |
|-----------|----------------|-------------------|------------|------------|-----------------------|---------------------|
| MOISTURE | | DRILLING METHOD | | | Start <u>9/26/84</u> | Unit <u>12</u> |
| D = Damp | WA = Washahead | ST = Shelby tube | A = Auger | E = Easy | | |
| M = Moist | FT = Fish tail | SS = Split spoon | C = Coring | M = Medium | | |
| W = Wet | RB = Rock bit | DM = Drilling mud | W = Wash | H = Hard | Finish <u>9/26/84</u> | Chief <u>Haynes</u> |

| | | |
|------------|-------|------------|
| Checked by | Final | Boring No. |
| | | 5 |

State of Wisconsin/Department of Transportation

Chief *Meyers*

| | | |
|------------|-------|------------|
| Checked by | Final | Boring No. |
|------------|-------|------------|

Final

RFE

Boring No.

4

State of Wisconsin/Department of Transportation

| | | |
|------------|-------|------------|
| Checked by | Final | Boring No. |
| | PFR | 7 |

State of Wisconsin/Department of Transportation

Surface
Elevation

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

Start 10/1/84 Unit V

Finish - Chief *Meyers*

Checked by

Final

| | |
|------------|--|
| Boring No. | |
|------------|--|

2

FIELD BORING LOG

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

State of Wisconsin/Department of Transportation

Boring No. 8 Structure Red Cedar River - City Menomonie County Dunn Sheet 2 of 2

Project 72 24-07-00 Road STH. 25

Station 14+39 Offset 27' Rt & Present Str. Surface Elevation _____

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 10/1/84 Unit ST
Finish _____ Chief Mayers

| 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 | Size | |
| | | | | 40' | Gray Sandy SHALE | 40' | | | | | C |
| | | | | | 100% Recovery. | | | | | | |
| | | | | | End Sec. Run. | | | | | | |
| | | | | 45 | End of Bor. | 45 | | | | | |
| | | | | 50 | | 50 | | | | | |
| | | | | 55 | | 55 | | | | | |
| | | | | 60 | | 60 | | | | | |
| | | | | 65 | | 65 | | | | | |
| | | | | 70 | | 70 | | | | | |
| | | | | 75 | | 75 | | | | | |
| | | | | 80 | | 80 | | | | | |
| | | | | 85 | | 85 | | | | | |
| | | | | 90 | | 90 | | | | | |
| | | | | 95 | | 95 | | | | | |
| | | | | 100 | | 100 | | | | | |

Checked by _____

Final

Boring No. 8

State of Wisconsin/Department of Transportation

Surface
Elevation

GROUND WATER OBSERVATIONS

Start 10/2/84 Unit 25
Finish " " Chief MeYers

Boring No.

Project 7220-07-00

Road STH 25

Station 12+80

Offset 28' RT & Present Str.

Surface Elevation

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

DRILLING METHOD

ST = Shelby tube

SS = Split spoon

DM = Drilling mud

A = Auger

C = Coring

W = Wash

E = Easy

M = Medium

H = Hard

Start 10/2/84

Unit

Finish

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 | |
| | | | | 40' | Sandy SHALE | 40' | | | | | | |
| | | | | | First Run. 5' 80% Recovery. | | | | | | | |
| | | | | | 39' to 44' | | | | | | | |
| | | | | 45' | Sec. Run. 4.5' | 45' | | | | | | |
| | | | | | Recovery. 78% Recovery. | | | | | | | |
| | | | | | Concrete 145 to 115' | | | | | | | |
| | | | | 50' | End of Run | 50' | | | | | | |
| | | | | 55' | | 55' | | | | | | |
| | | | | 60' | | 60' | | | | | | |
| | | | | 65' | | 65' | | | | | | |
| | | | | 70' | | 70' | | | | | | |
| | | | | 75' | | 75' | | | | | | |
| | | | | 80' | | 80' | | | | | | |

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

State of Wisconsin/Department of Transportation

Boring No. 11 Structure Red Cedar River - City of Menomonie County Dunn Sheet 1 of 1

Project 7220-07-00 Road STH 25

| Station | Offset | Surface Elevation |
|---------|------------------------|-------------------|
| 12+96 | 32' Rt of Present Str. | |

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 | Chart 1-12 Bell |
|----------|-----------------|-----------------|

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 10/3/84 Unit DE

Finish *21* *22* Chief *Mayer*

[illegible]

Checked by _____

Final

| | |
|------------|--|
| Boring No. | |
|------------|--|

FIELD BORING LOG

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

State of Wisconsin Department of Transportation

Boring No. 12 Structure Red Cedar River - City Menomonie County Dunn Sheet 1 of 1

Project 7220-07-00 Road STH 25

Station 19+40 Offset 35' RT @ Present Rd Surface Elevation 831.9

GROUND WATER OBSERVATIONS

While drilling water at 19' 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 10/4/84 Unit ST
 Finish 6/8/84 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 | |
| | | | | | <u>Topsoil</u> | | | | | <u>A</u> |
| 1 | D | 6 | 4 | | <u>Firm Br. Fines to Coarse SAND - Tr. Gravel and silt</u> | | | | | |
| 2 | D | 58 | 9 | | <u>Concrete Slab</u> | | | | | |
| 3 | M | 5 | 6 | | | | | | | |
| 4 | W | 7 | 5 | | <u>Firm Br SILT - with small layers of Sand.</u> | | | 22 | | |
| | | | | | | | | 40 | | |
| | | | | | | | | 80 | | |
| | | | | | | | | 78 | | |
| | | | | | | | | 67 | | |
| 5 | W | 40 | 9 | | <u>U. Dense Gray Sandy SHALE</u> | | | 30 | | |
| | | | | | <u>Cored 4.5'</u> | | | 91 | | |
| | | | | | <u>Recovery 80%</u> | | | 80 | | |
| | | | | | <u>End of bor.</u> | | | | | |
| | | | | | <u>Piles Penetrate all depths</u> | | | | | |

Checked by

Final

Boring No.

12

FIELD BORING LOG

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

State of Wisconsin/Department of Transportation

Boring No. 13 Structure Red Cedar River - City of Menomonie County Dunn Sheet 1 of 1

Project 7220-07-00 Road STH 25

Station 10 + 97 Offset 23' Rt & Surface Elevation 845.5

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 = Washhead
 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 10/9/84 Unit 21

Finish 10/9/84 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 # | Probe Size | |
| | | | | | <u>On Sandy Topsoil</u> | | | | | <u>A</u> |
| | | | | | <u>From On Fine to Coarse SAND - To Gravel and Silt</u> | | | | | |
| 1 | M | 6 | 8 | | | | | | | |
| | | 9 | 13 | | | | | | | |
| 2 | M | 3 | 3 | | <u>Loose</u> | | | 3 | | <u>W</u> |
| | | 5 | 7 | | | | | 5 | | |
| | | | | | | | | 6 | | |
| | | | | | | | | 7 | | |
| | | | | | | | | 8 | | |
| 3 | M | 8 | 4 | | <u>SS Refusal</u> | | | 12 | | <u>RB</u> |
| | | | | | <u>Concrete. Cored 5' First Run. 100% Recovery on Concrete.</u> | | | 50' | | <u>Abnormal Amount</u> |
| | | | | | <u>Sandy SHALE</u> | | | | | |
| | | | | | <u>100% Recovery on SHALE</u> | | | | | |
| | | | | | <u>End of Run 22.5'</u> | | | | | |

Checked by _____ Final _____ Boring No. 13

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

State of Wisconsin/Department of Transportation

Boring No. 14 Structure Red Cedar River - City of Menomonie County Owen Sheet 1 of 1

Project 7220-07-00 Road STH "25"

| | | | | | |
|---------|---------|--------|--------|-------------------|--------|
| Station | 10 + 97 | Offset | 31' RT | Surface Elevation | 845.5' |
|---------|---------|--------|--------|-------------------|--------|

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
BB = Rock bit

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

A = Auger
C = Coring
W = Wash

E = Easy
M = Medium
H = Hard

Start 10/9/84 Unit II

Finish 10/10/84 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 | |
| | | | | | Topsoil - Br Sandy | | | | | A |
| | | | | | Firm Br Fine to Coarse SAND - Th Gravel and silt | | | | | |
| 1 | M | 9 | 6 | | | | | | | |
| | | 6 | 7 | | | | | | | |
| 2 | M | 3 | 5 | | | | | | | Y |
| | | 7 | 7 | | | | | | | W |
| 3 | M | 7 | 11 | | | | | | | |
| | | 31 | 29 | | V. Dense Act Br. med SAND | | | | | |
| | | | | | Cored 4' 5" | | | | | |
| | | | | | Recovery 10% | | | | | |
| | | | | | First Run. | | | | | |
| | | | | | SHALE and SANDSTONE | | | | | |
| | | | | | No Recovery - Lost Bit. | | | | | |
| | | | | | Sec. Run. | | | | | |
| | | | | | End of Box | | | | | |

Checked by

Final

Boring No.

14

State of Wisconsin/Department of Transportation

Surface Elevation 847.0

Water Notes

Start 10/11/84 Unit 22
Finish 6 11 Chief Meyers

| | |
|-------------|--|
| Barling No. | |
|-------------|--|

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Page # 1
Serial No. 1

State of Wisconsin/Department of Transportation

Form No. 1 Structure Red Cedar River - City of Minneapolis County Dunn Sheet 1 of 1

Project 7220-07-00 Road S.T.H. "25"

| Station | Offset | Present Sta | Surface Elevation |
|---------|---------------------------------|-------------|-------------------|
| 16 + 14 | 29' to ^{RT} | | |

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
BB = Rock bit

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

A = Auger
C = Coring
W = Wash

E = Easy
M = Medium
H = Hard

Start 9/27/84 Unit 32

Finish *to* Chief *Mayors*

[illegible]

Checked by _____

Final

Drawing No.

Probe #1

FIELD BORING LOG E-L-3(5)-8-76 State of Wisconsin/Department of Transportation
 Boring No. 2 Structure Real Cedar River - City of Menomonie County Dunn Sheet 1 of 1

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

State of Wisconsin/Department of Transportation

Boat No. 2 Structure Real Cedar River - City of Menomonie County Dunn Sheet 1 of 1

Project 7220-07-00 Road SR14, "25"

| Station | Offset | Present | Surface Elevation |
|---------|--------|---------|-------------------|
| 15+98 | 66' RT | 2 | |

GROUND WATER OBSERVATIONS

White 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 | 7/27/64 | Unit | 1000000000 |
|-------|---------|------|------------|

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

Finish As 4 Chief Meyer

[illegible]

Checked by

Final

8221g No.

Page 2

FIELD BORING LOG E-L-3(5)-8-76 State of Wisconsin/Department of Transportation
Boring No. 3 Structure Red Cedar River - City Menomonie County Dunn Sheet 1 of 1

State of Wisconsin/Department of Transportation

Boring No. 3 Structure Red Cedar River - City Minneapolis County Dennison Sheet 1 of 1

Project 7220-07-00 Road STA. 25"

| Station | Offset | Surface Elevation |
|---------|-------------------------|-------------------|
| 17+68 | 31' Rt. of Present Sta. | |

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=Wash ahead
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 9/27/54 Unit VI

Finish 11 01 Chief *Meyers*

[illegible]

Checked by

Final!

| | |
|-------------|--|
| Working No. | |
|-------------|--|

Model # 3

FIELD BORING LOG E-L-3(5)-8-76 State of Wisconsin/Department of Transportation
 Boring No. 4 Structure Ash Cedar River - City Menomonie County Dunn Sheet 1 of 1

State of Wisconsin/Department of Transportation

Building No. 4 Structure Red Cedar River - City Menomonee County Dunn Sheet 1 of 1

Project 7220-07-00 Road STH. 25

| Station | Offset | Present | Surface Elevation |
|---------|--------|---------|-------------------|
| 17+62 | 54' Rt | CL | |

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 7/27/64 Unit 17 |
|----------|-----------------|-----------------------|

DRILLING METHOD

Start 7/27/64 Unit VI

Finish 9/2/84 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 | |
| | | | | | <u>Barge Deck</u> | | | | | |
| | | | | | <u>Air</u> | | | | | |
| | | | | | <u>Water</u> | | | | | |
| | | | | 5 | | 5 | | | | |
| | | | | 10 | | 10 | | | | |
| | | | | 15 | <u>Stream Bed</u> | 15 | | | | |
| | | | | | <u>Refusal. 50/100</u> | | | | <u>3/83</u> | |
| | | | | | <u>End Probe 14'</u> | | | | | |
| | | | | 20 | | 20 | | | | |
| | | | | 25 | | 25 | | | | |
| | | | | 30 | | 30 | | | | |
| | | | | 35 | | 35 | | | | |
| | | | | 40 | | 40 | | | | |

Checked by

Final

Blank No.

Probe #4

FIELD BORING LOG

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

State of Wisconsin/Department of Transportation

Being No. 5 Structure Red Cedar River - City - Monomonic County Dunn Sheet 6 of 1

Project 7220-07-00 Road SH-25

| Station | Offset | Present Sta. | Surface Elevation |
|---------|--------|--------------|-------------------|
| 17 + 61 | 42' Rt | | |

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 9/27/84 | Unit <u>WT</u> |
| By Pump | W - Washed | ST - Shelby tube | S - Auger | F - Free | | |

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 9/27/84 Unit VI

Finish 11 Chief Meyer

[illegible]

| | | |
|------------|-------|--------------------------|
| Checked by | Final | Boiling No. Probe # 5 |
|------------|-------|--------------------------|

State of Wisconsin/Department of Transportation

Boring No. 6

FIELD BORING LOG E-L-3(S)-8-76 State of Wisconsin/Department of Transportation
 Boring No. 7 Structure Red Cedar River - City of Menomonie County Dunn Sheet 1 of 1

State of Wisconsin/Department of Transportation

Spring No. 7 Structure Red Cedar River - City of Menomonie County Dunn Sheet 1 of 1

Project 7220-07-00 Road STA 25th

| | | | | |
|---------|-------|--------|-----------------------|----------------------|
| Station | 14+38 | Offset | 68' Rt & Present Str. | Surface Elevation |
|---------|-------|--------|-----------------------|----------------------|

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>10/1/84</u> Unit <u>V</u> |
|----------|-----------------|------------------------------------|

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 10/1/84 Unit U

Finish 11 6 Chief *M. J. Jones*

[illegible]

Checked by _____

Final

No.

Page 7

Probe
Basin No. 8 Structure Red Cedar River County Dunn Sheet 1 of 1

State of Wisconsin/Department of Transportation

Project 7226-07-00 Road STH "25"

| Station | Offset | Surface Elevation |
|---------|-----------------------|-------------------|
| 12+78 | 52' Rt & Present Str. | |

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 = Molst
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 10/3/84 Unit ~~IV~~

Finish . . . Chief *Meyers*

[illegible]

Checked by _____

Final

Bulb No.

Probe 8

FIELD BORING LOG E-L-3(5)-8-76 State of Wisconsin/Department of Transportation
Boring No. 9 Structure Red Cedar River - City of Marinette County Dunn Sheet 1 of 1

State of Wisconsin/Department of Transportation

Probe 9 Structure Red Cedar Ruins - City of Massena County Dunn Sheet 1 of 1

Project 7220-07-80 Road STH. "25"

| Station | Offset | Surface Elevation |
|---------|-----------------------|-------------------|
| 12 + 81 | 71' R4 @ Present Str. | |

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 10/2/55 | End 12/2/55 |
|----------|-----------------|---------------|-------------|

MOISTURE
D = Damp
M = Moist
W = Wet

WA=Washahead
FT = Fish tail
RB = Rock blt

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

A = Auger
C = Coring
W = Wash

E = Easy
M = Medium
H = Hard

Start 10/3/84 Unit 84

Finish *11* Chief *Myers*

[illegible]

Checked by _____

Final

Exchg. No.

Prob. #9

Building No. 10 Structure Red Cedar River - City, Menomonie County Dunn Sheet 1 of 1

State of Wisconsin/Department of Transportation

Building No. 10 Structure Red Cedar River - City, Menomonie County Dunn Sheet 1 of 1

Road STH. 25

Offset 47' rt @ Present Sfr

Surface Elevation

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 14/3/64 Unit 77 |
|----------|-----------------|-----------------------|

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 10/3/84 Unit 17

Finish to Chief *Moyers*

| | | |
|------------|-------|------------------------|
| Checked by | Final | Entry No. Probe #10 |
|------------|-------|------------------------|