Illinois Department of Transportation

Memorandum

To:	Ross E. Monk	Attn:	Jay P. Howell
From:	John H. Wegmeyer	By:	Patrick F. Warkins
Subject:	Soils Report		
Date:	February 15, 2007		

Project Description & Physiography:

This report addresses the proposed widening of the 4-lane Rockford Bypass to a six-lane configuration between the Mulford Road Bridge and the Harrison Road interchange, as depicted in Figure 1. As shown, the east project terminus does not include any work within the exit and entrance ramp limits.

The project lies exclusively within the Winnebago Formation of the Wisconsinan Stage glacial till deposits. This formation is composed of a predominantly sandy parent material covered with cohesive, windblown loess. As typical of glacial till deposits, the topography is gently undulating and only mildly dissected by the local precipitation runoff pattern. Much of the existing roadbed is composed of constructed embankment material native to the area, based on what was sampled for laboratory analysis.

Subsurface Investigation:

Borings for this investigation were completed during November and December of 2006. They were taken at 100 foot intervals to a 6-foot depth, and soil samples were collected from the augers for laboratory analysis. All borings were taken at the edge of the outside shoulder where a portion of the proposed widening would be constructed. Two extensive bridge approach areas were left unsampled due to the proximity of the guardrail and adjacent steep slopes; however, since only two soil types were encountered during the investigation, the chances of encountering any others in such a restricted area was remote and therefore inconsequential even if found.

Laboratory Analysis

Figure 2, Form BD508A, enumerates and classifies the soil types sampled for this project. Neither soil type sampled exhibits any unsuitable characteristics by analysis. For design purposes, an IBR of 3.6% and Subgrade Support Rating of Poor are considered appropriate. In-situ subgrade moisture contents averaged 18.7%, ranging from 9% to 29%. Although an average in-situ moisture content of 18.7% is often an indicator of fair stability, a quick evaluation of average subgrade moisture content versus an average plastic limit by laboratory analysis, shows that the subgrade is in a less than stable condition, and certainly capable of being further destabilized by construction traffic.

Design Considerations & Options:

Based upon the evidence provided through the subsurface investigation, and as depicted in Figure 3, IBV Subgrade Analysis, the following recommendations are presented:

- The following areas will need to be scheduled for increased subbase aggregate thicknesses as shown, in all widened areas:

Sta. 2620+50 to Sta. 2625+50	-	18" Aggregate Subbase
Sta. 2628+50 to Sta. 2635+50	-	Geogrid Fabric
Sta. 2656+00 to Sta. 2663+50	-	18" Aggregate Subbase
Sta. 2668+50 to Sta. 2674+50	-	18" Aggregate Subbase
Sta. 2675+50 to Sta. 2679+50	-	18" Aggregate Subbase
Sta. 2695+50 to Sta. 2705+00	-	18" Aggregate Subbase

- The areas delineated above should be laterally drained via french drain at all low points and at 250 foot intervals thereafter, per District Standard.

- Before a decision is made to construct aggregate subbases to the thicknesses shown, Section 301.04 of the Standard Specifications should be enforced to determine whether those thicknesses are necessary.

- Rubblizing of the existing pavement to provide for an improved subbase would not be advisable due to the inconsistent stability of the subgrade.

- All widened embankments should be constructed, per District Standard, by notching into the existing slope to preclude a sliding failure.

- All widened embankments should be constructed with no more than 110% of Optimum Moisture Content as determined by laboratory proctor analysis.

Because it is anticipated that both sides of the existing pavements will be widened to accommodate a six-lane section, it will be critical to maintain a consistent thickness in pavement, edge to edge. Three options to consider are as follows:

1) A total PCC reconstruct would offer the most favorable results.
2) A widened pavement, both sides, that matches the existing cross-section in thickness and composition, could be constructed and then, as done on I-88 between IL 78 and US 30, be overlaid with a bituminous mat bond-breaker before placing a full width PCC pavement on top.
3) A widened pavement, both sides, could be constructed of PCC pavement, matching the thickness of the existing PCC and aggregate subbase. After the existing bituminous overlays are rotomilled for removal, the entire PCC slab could be crack-and-seated before a new bituminous overlay is placed.

If you have any questions, please contact Tim Bratt at 815/284-5435.

Jt2-14-07-2
c: Consultant
Soils File

SOUTHEAST PART ROCKFORD

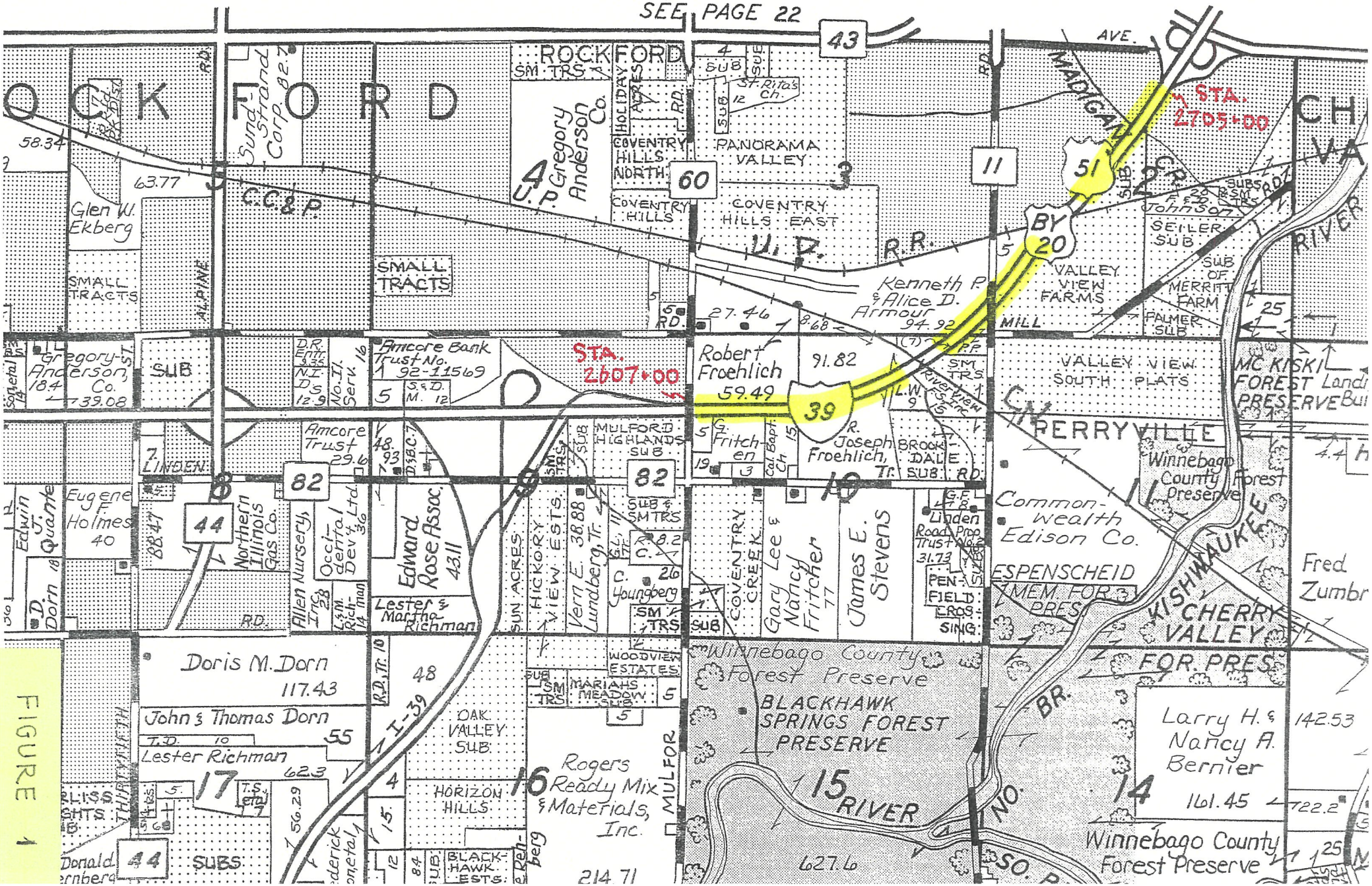

FIGURE 1

STATE OF ILLINOIS
Department of Transportation
Division of Highways

SOIL TEST DATA

ROUTE: FA 39 & FAP 301 SECTION: (201-3)K & (4-1, 5)R COUNTY: Winnebago

STATE JOB NUMBER: P92-111-06

LAB NO.				06-75	06-76
STATION				2621+00	2657+00
LOCATION				21' Rt EB CL	21' Rt EB CL
DEPTH				1' – 6'	1' – 6'
HRB CLASSIFICATION & GROUP INDEX				A-7-6(14)	A-6(9)
GRAIN SIZE CLASSIFICATION				Silty Clay Loam	Loam
GRADATION - PASSING 1" SIEVE			%	-	-
"	3/4"	"	%	-	-
"	1/2"	"	%	100.0	100.0
"	NO. 4	"	%	99.8	98.0
"	NO. 10	"	%	99.3	94.2
"	NO. 40	"	%	97.0	82.5
"	NO. 100	"	%	-	-
"	NO. 200	"	%	87.0	57.0
SAND			%	13.4	43.0
SILT			%	61.6	40.0
CLAY			%	25.0	17.0
LIQUID LIMIT			%	42.1	35.5
PLASTICITY INDEX			%	24.2	20.7
BEARING RATIO			%	6.6	3.6
STANDARD DRY DENSITY AASHTO T99				107.4	117.4
OPTIMUM MOISTURE			%	18.1	13.4
SUBGRADE SUPPORT RATING				Poor	Poor

BD-508A / jt2-14-07-1

FIGURE 2

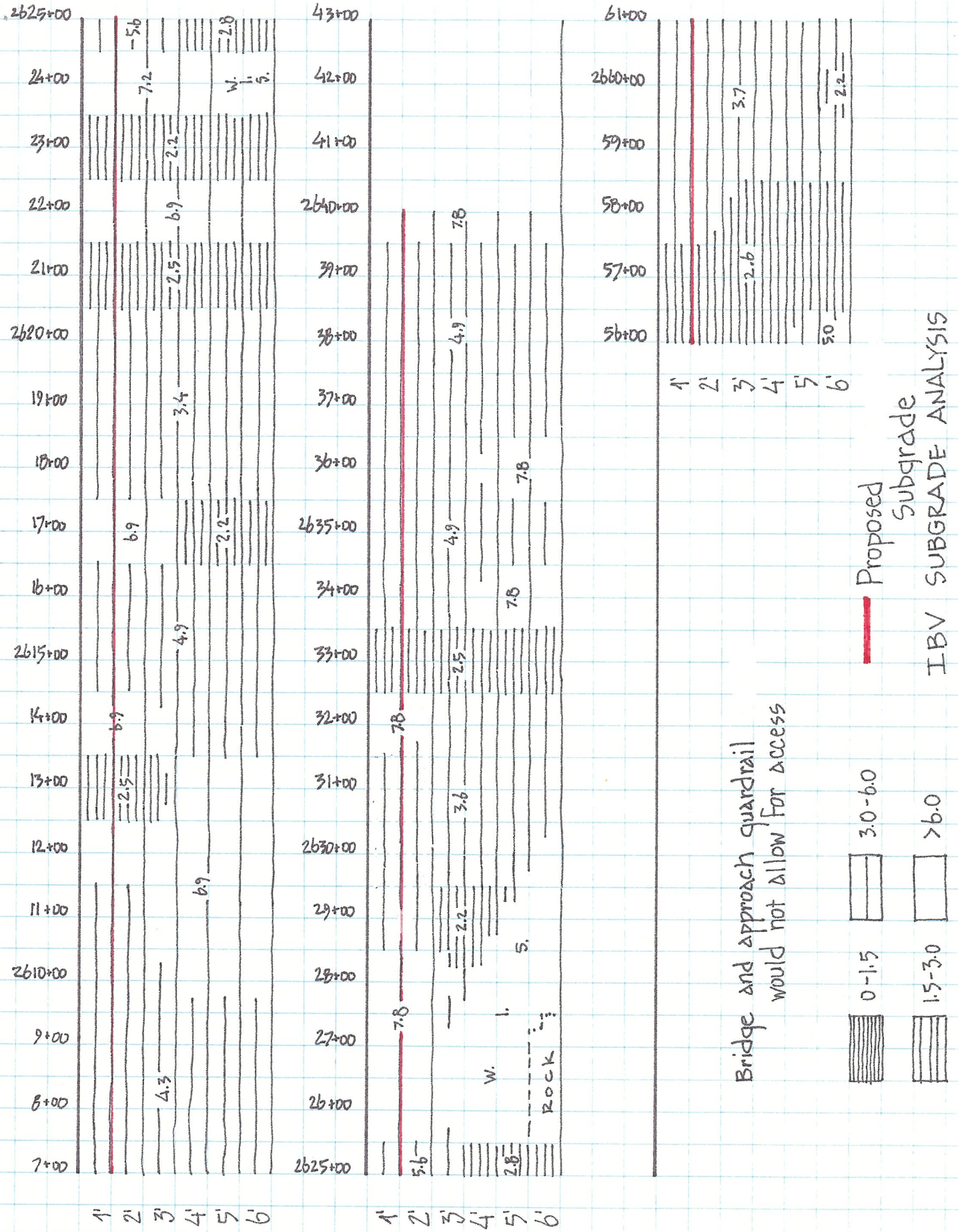
2625+00
24+00
23+00
22+00
21+00
2620+00
19+00
18+00
17+00
16+00
2615+00
14+00
13+00
12+00
11+00
2610+00
9+00
8+00
7+00
43+00
42+00
41+00
2640+00
39+00
38+00
37+00
36+00
2635+00
34+00
33+00
32+00
31+00
2630+00
29+00
28+00
27+00
26+00
2625+00
61+00
2660+00
59+00
58+00
57+00
56+00
1'
2'
3'
4'
5'
6'
W.
S.
I.
Rock
Proposed Subgrade
IBV SUBGRADE ANALYSIS
Bridge and approach guardrail would not allow for access
0-1.5
1.5-3.0
3.0-6.0
>6.0

FIGURE 3

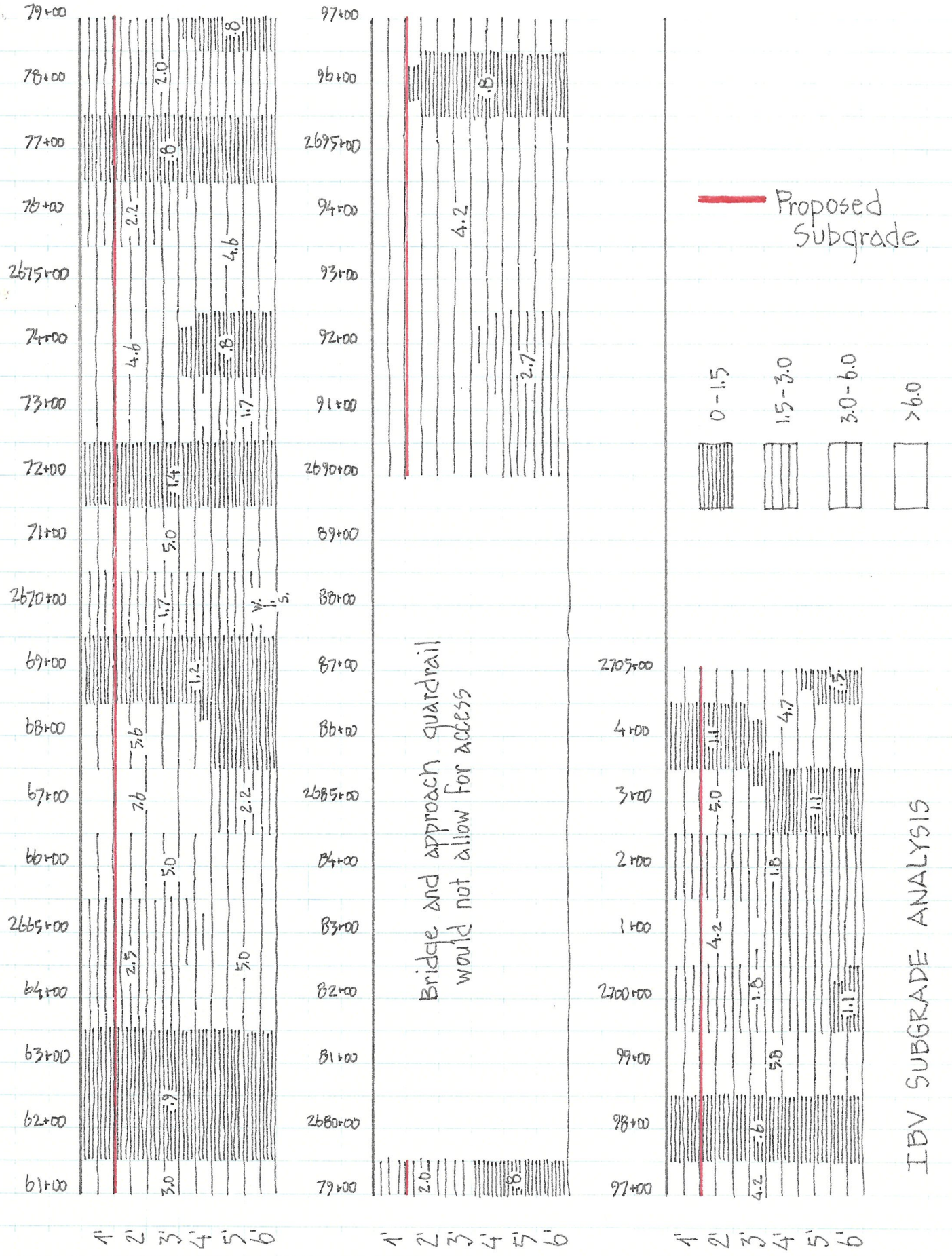
IBV SUBGRADE ANALYSIS
Proposed Subgrade
0 - 1.5
1.5 - 3.0
3.0 - 6.0
>6.0
Bridge and approach guardrail would not allow for access

FIGURE 3