

REFERENCE: B-5624

PROJECT: 45579

SEE SHEET 3 FOR PLAN SHEET LAYOUT  
AT TIME OF INVESTIGATION

**STATE OF NORTH CAROLINA**  
DEPARTMENT OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
GEOTECHNICAL ENGINEERING UNIT

|       |                             |           |              |
|-------|-----------------------------|-----------|--------------|
| STATE | STATE PROJECT REFERENCE NO. | SHEET NO. | TOTAL SHEETS |
| N.C.  | B-5624                      | 1         | 18           |

**CONTENTS**

| <u>LINE</u> | <u>STATION</u> | <u>PLAN</u> |
|-------------|----------------|-------------|
| -L-         | 10+44 TO 24+47 | 4-5         |
| -LDET-      | 10+00 TO 24+07 | 4-5         |

**CROSS SECTIONS**

| <u>LINE</u> | <u>STATION</u> | <u>SHEETS</u> |
|-------------|----------------|---------------|
| -L-         | 12+00 TO 23+50 | 6-18          |
| -LDET-      | 11+55 TO 22+11 | 6-18          |

# ROADWAY SUBSURFACE INVESTIGATION

COUNTY BRUNSWICK  
PROJECT DESCRIPTION BRIDGE NO. 57 ON -L- (NC 211)  
OVER DRIVING CREEK

## INVENTORY

**CAUTION NOTICE**

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N.C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT (919) 707-6850. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT PART OF THE CONTRACT.

GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND THE IN SITU (IN-PLACE) TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOIL MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN DETAILS ARE DIFFERENT. FOR BIDDING AND CONSTRUCTION PURPOSES, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT. THE DEPARTMENT DOES NOT WARRANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERPRETATIONS MADE, OR OPINION OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS AND CONDITIONS TO BE ENCOUNTERED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO MAKE SUCH INDEPENDENT SUBSURFACE INVESTIGATIONS AS HE DEEMS NECESSARY TO SATISFY HIMSELF AS TO CONDITIONS TO BE ENCOUNTERED ON THE PROJECT. THE CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

- NOTES:
1. THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N.C. DEPARTMENT OF TRANSPORTATION AS ACCURATE NOR IS IT CONSIDERED PART OF THE PLANS, SPECIFICATIONS OR CONTRACT FOR THE PROJECT.
  2. BY HAVING REQUESTED THIS INFORMATION, THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

PERSONNEL

S.N. ZIMARINO  
R.E. SMITH

INVESTIGATED BY T.C. BOTTOMS  
DRAWN BY T.C. BOTTOMS  
CHECKED BY D.N. ARGENBRIGHT  
SUBMITTED BY D.N. ARGENBRIGHT  
DATE JULY 2019



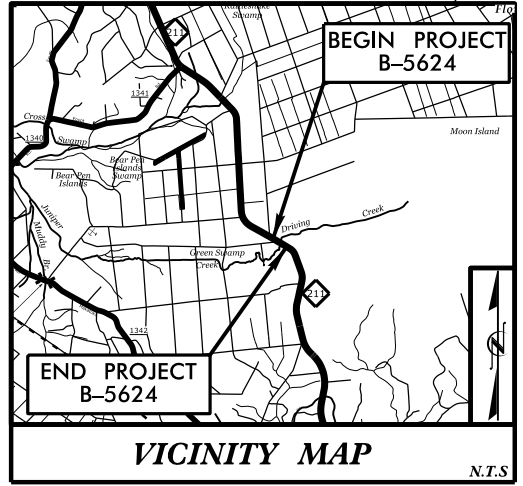
DocuSigned by:  
Tyler Bottoms 7/11/2019  
48A2D3BD08CE4A6...  
SIGNATURE DATE

**DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED**



05/08/19

See Sheet 1-A For Index of Sheets  
See Sheet 1-B For Conventional Symbols



STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

**BRUNSWICK COUNTY**

LOCATION: REPLACE BRIDGE NO. 57 OVER DRIVING CREEK  
ON NC 211 (GREEN SWAMP ROAD NW)

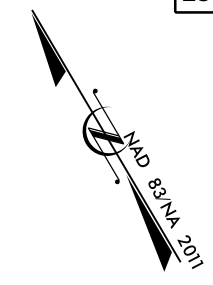
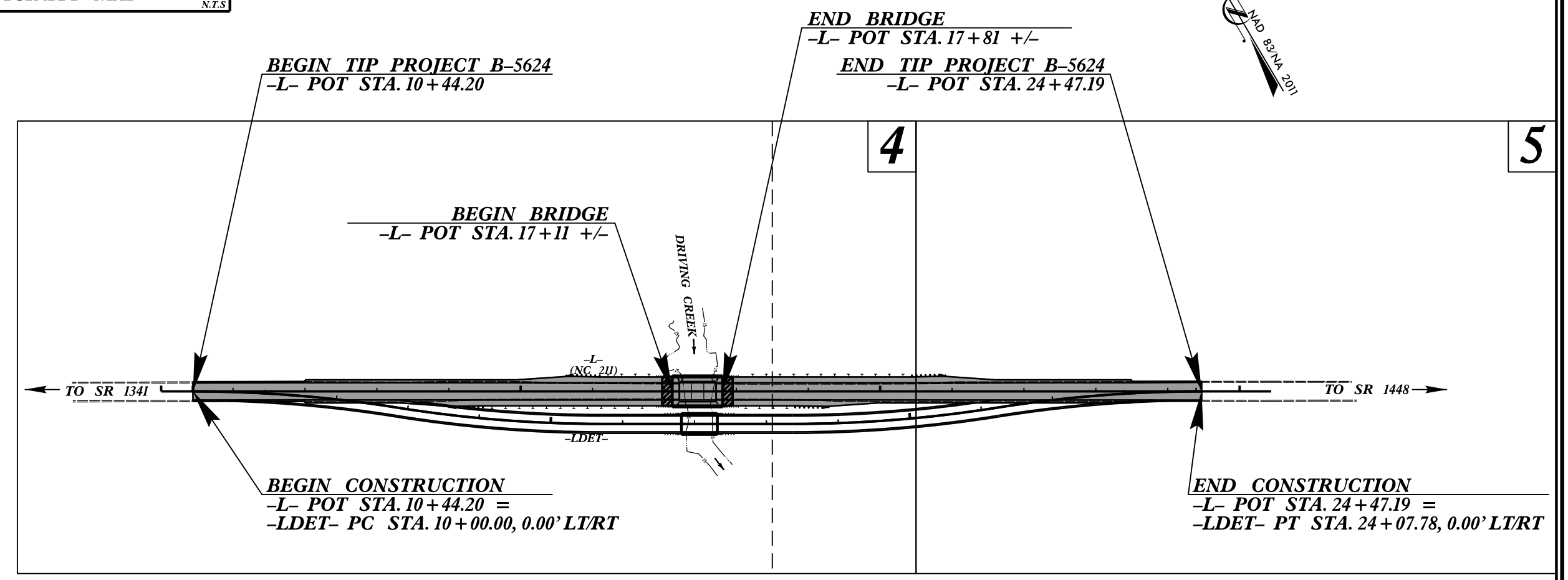
TYPE OF WORK: GRADING, DRAINAGE, PAVING AND STRUCTURE

| STATE           | STATE PROJECT REFERENCE NO. | SHEET NO.   | TOTAL SHEETS |
|-----------------|-----------------------------|-------------|--------------|
| N.C.            | B-5624                      | 3           | 18           |
| STATE PROJ. NO. | F.A. PROJ. NO.              | DESCRIPTION |              |
| 45579.1.1       | N/A                         | PE          |              |
|                 |                             |             |              |
|                 |                             |             |              |
|                 |                             |             |              |
|                 |                             |             |              |

INCOMPLETE PLANS  
DO NOT USE FOR R/W ACQUISITION

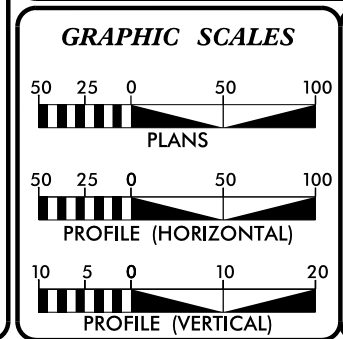
25% APPROVED PLANS

CONTRACT: TIP PROJECT: B-5624



CLEARING AND GRUBBING ON THIS PROJECT SHALL BE TO THE LIMITS ESTABLISHED BY METHOD II.

DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED



**DESIGN DATA**

|              |                               |
|--------------|-------------------------------|
| ADT 2020 =   | 1,917                         |
| ADT 2040 =   | 3,000                         |
| K =          | 9 %                           |
| D =          | 55 %                          |
| T =          | 15 % *                        |
| V =          | 60 MPH                        |
| * TTST =     | 9% DUAL 6%                    |
| FUNC CLASS = | MAJOR COLLECTOR REGIONAL TIER |

**PROJECT LENGTH**

|                                       |             |
|---------------------------------------|-------------|
| LENGTH ROADWAY TIP PROJECT B-5624 =   | 0.253 MILES |
| LENGTH STRUCTURE TIP PROJECT B-5624 = | 0.013 MILES |
| TOTAL LENGTH TIP PROJECT B-5624 =     | 0.266 MILES |

Prepared in the Office of:  
**CDM Smith**  
FOR THE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
2018 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:  
SEPTEMBER 13, 2019

LETTING DATE:  
JULY 21, 2020

DAVID Z. KEISER, P.E.  
PROJECT ENGINEER

TRUNG T. NGUYEN, P.E.  
PROJECT DESIGN ENGINEER

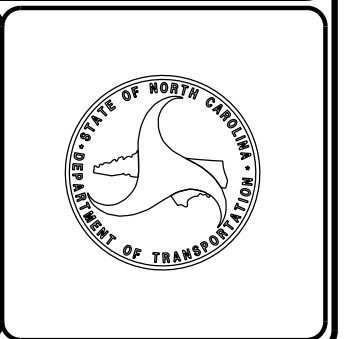
TIERRE R. PETERSON, P.E.  
NCDOT CONTACT

HYDRAULICS ENGINEER

SIGNATURE: \_\_\_\_\_ P.E.

ROADWAY DESIGN ENGINEER

SIGNATURE: \_\_\_\_\_ P.E.



02-JUL-2019 14:20  
B5624\_Rdy\_TSh.dgn  
\$\$\$\$\$USERNAME\$\$\$\$\$



STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION

ROY COOPER  
GOVERNOR

JAMES H. TROGDON, III  
SECRETARY

July 2, 2019

State Project: 45579.1.1 (B-5624)  
F.A. Project: N/A  
County: Brunswick  
Description: Bridge No. 57 on -L- (NC 211) over Driving Creek

Subject: Geotechnical Inventory Report

**Project Description**

This project begins approximately 700 feet northwest of Bridge Number 57 over Driving Creek in Brunswick County and extends east along NC 211 for approximately 0.27 miles. This project primarily consists of widening NC 211 to accommodate the bridge replacement and construction of a temporary detour and detour bridge. This geotechnical investigation was confined to the areas of proposed construction.

Fieldwork was conducted in June of 2019. Hand auger borings and push probes were completed at various offsets along the project corridor. Representative soil samples were collected for visual classification in the field.

The following alignments were investigated. Selected cross sections of these alignments are included in this report.

| <u>Line</u> | <u>Station(±)</u> |
|-------------|-------------------|
| -L-         | 10+44 to 24+47    |
| -LDET-      | 10+00 to 24+07    |

**Areas of Special Geotechnical Interest**

- 1) The entire project was found to exhibit seasonal high ground water:
- 2) The entire project contains organic material which has the potential to cause embankment/subgrade and/or slope stability problems during construction.

**Physiography and Geology**

This project corridor is located within the Coastal Plain Physiographic Province. Topography along the project is nearly flat to gently sloping. Natural ground elevations ranged from 55± to 65± feet above sea level.

Surficial soils in this area are generally classified as undivided coastal plain sediments and are underlain by formational soils belonging to the Waccamaw Formation. The Waccamaw Formation was not encountered in this report.

**Ground Water**

Ground water data was collected in June of 2019. Ground water elevations ranged from 53± to 57± feet above sea level.

**Soils**

Soils encountered within this project area have been divided into three categories: Roadway Embankment, artificial fill and alluvial sediments.

Roadway embankment soils were found along the existing NC 211 corridor. Where encountered it was composed of 1± to 13± feet of loose sand (A-2-4).

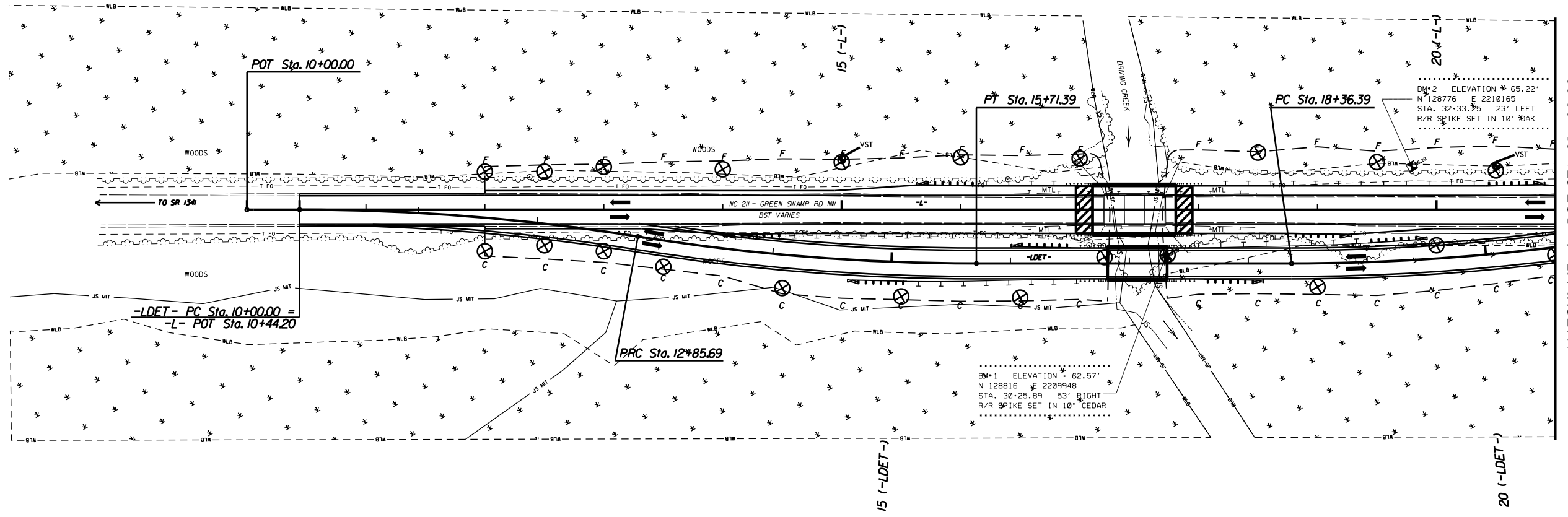
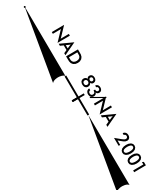
Soils identified as artificial fill are composed of 1± to 8± feet of loose sand. These soils are present along the south side of NC 211.

Alluvial soils were encountered in the flood plain and beneath the roadway embankment and artificial fill. These soils consist of 8± feet or more of loose to medium dense sand and 8± to 20± feet of very soft muck. Vane Shear tests within the muck returned shear strength values between 146 and 1336 psf. Higher shear strength values are attributed to an abundance of wood fragments within the muck.

8/17/99

REVISIONS

|  |   |
|--|---|
| PROJECT REFERENCE NO.<br><b>B-5624</b>   | SHEET NO.<br><b>4</b>   |
| RW SHEET NO.   |   |
| ROADWAY DESIGN ENGINEER  | HYDRAULICS ENGINEER   |
| <b>INCOMPLETE PLANS</b><br>DO NOT USE FOR R/W ACQUISITION  |   |
| <b>CDM Smith</b><br>CDM Smith Inc.<br>2400 Glenwood Avenue<br>Suite 400<br>Raleigh, NC 27612-3229<br>NC CDA No. F-1265 | <b>SUNGATE DESIGN GROUP, P.A.</b><br>115 JONES PARKWAY ROAD<br>RALEIGH, NORTH CAROLINA 27612<br>NC CDA No. C-6889 |
| <b>DOCUMENT NOT CONSIDERED FINAL</b><br>UNLESS ALL SIGNATURES COMPLETED  |   |



MATCHLINE -L- POT STA. 21+00.00  
SEE SHEET 5

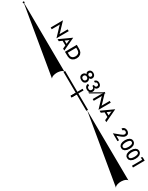
15 (-LDEET-)

20 (-LDEET-)

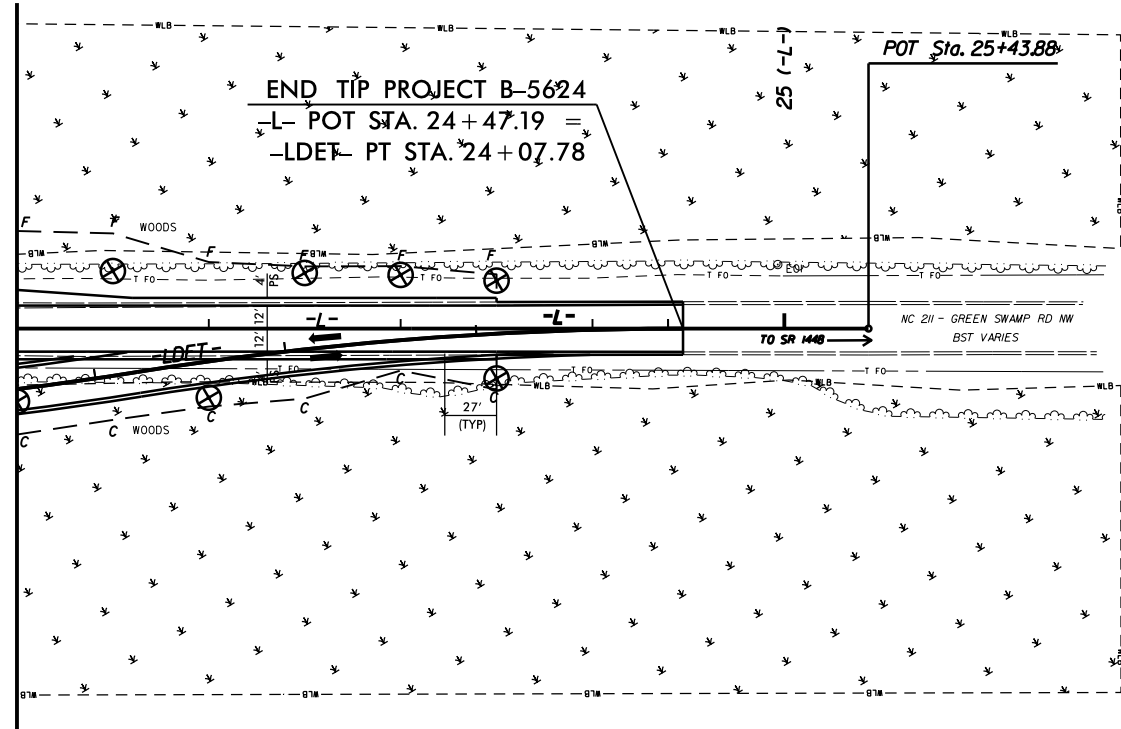
8/17/99

REVISIONS

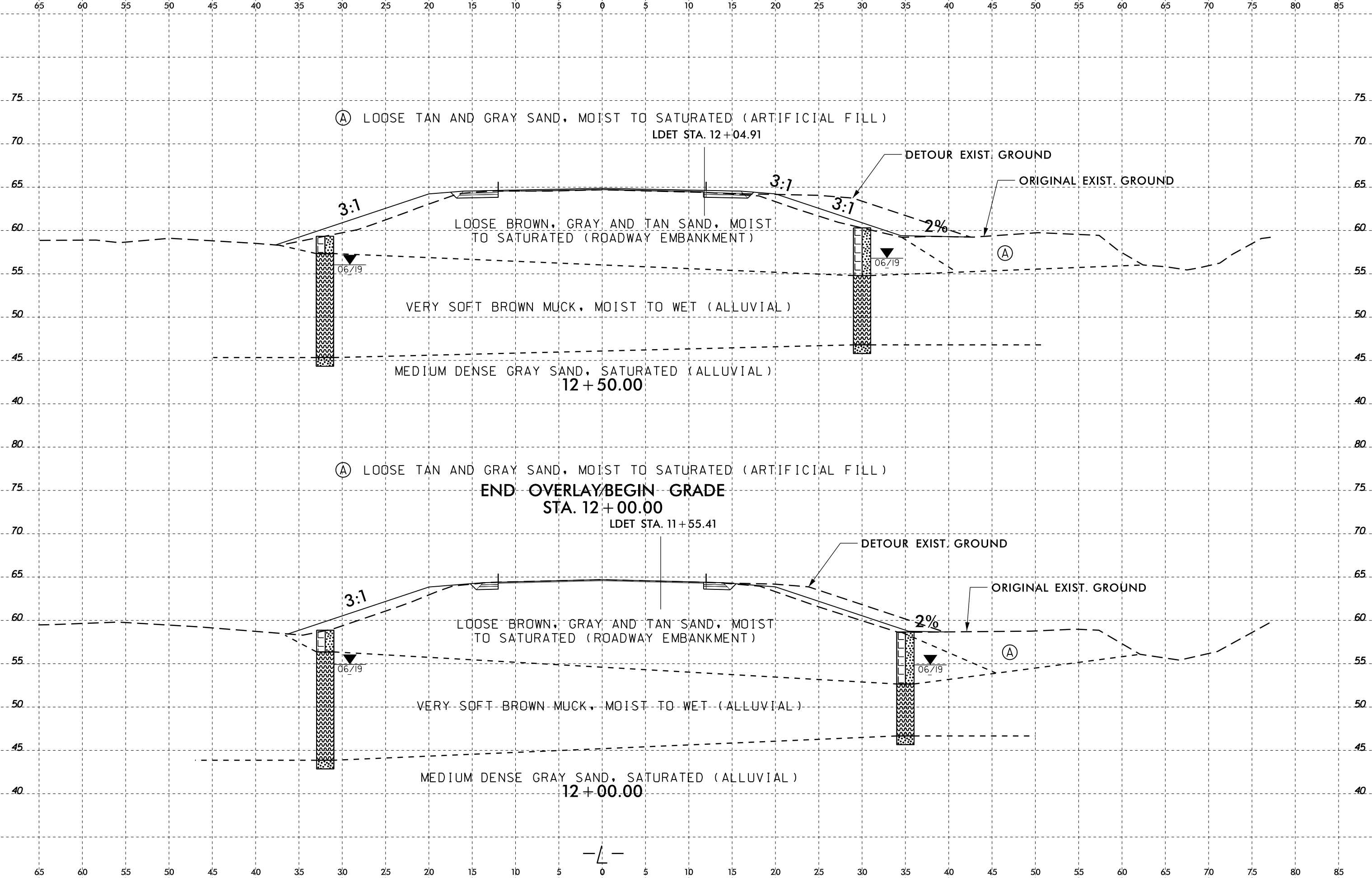
|  |  |
|--|--|
| PROJECT REFERENCE NO.<br><b>B-5624</b>   | SHEET NO.<br><b>5</b>  |
| RW SHEET NO.   |  |
| ROADWAY DESIGN ENGINEER  | HYDRAULICS ENGINEER  |
| <b>INCOMPLETE PLANS</b><br>DO NOT USE FOR R/W ACQUISITION  |  |
| <b>CDM Smith</b><br>CDM Smith Inc.<br>2402 Glenwood Avenue<br>Suite 400<br>Raleigh, NC 27612-3278<br>NC CCA No. F-1285 | <b>SUNGATE DESIGN GROUP P.A.</b><br>Sungate Design Group P.A.<br>10000 Sunset Blvd<br>Raleigh, NC 27615<br>NC CCA No. C-2580 |
| <b>DOCUMENT NOT CONSIDERED FINAL<br/>UNLESS ALL SIGNATURES COMPLETED</b>   |  |

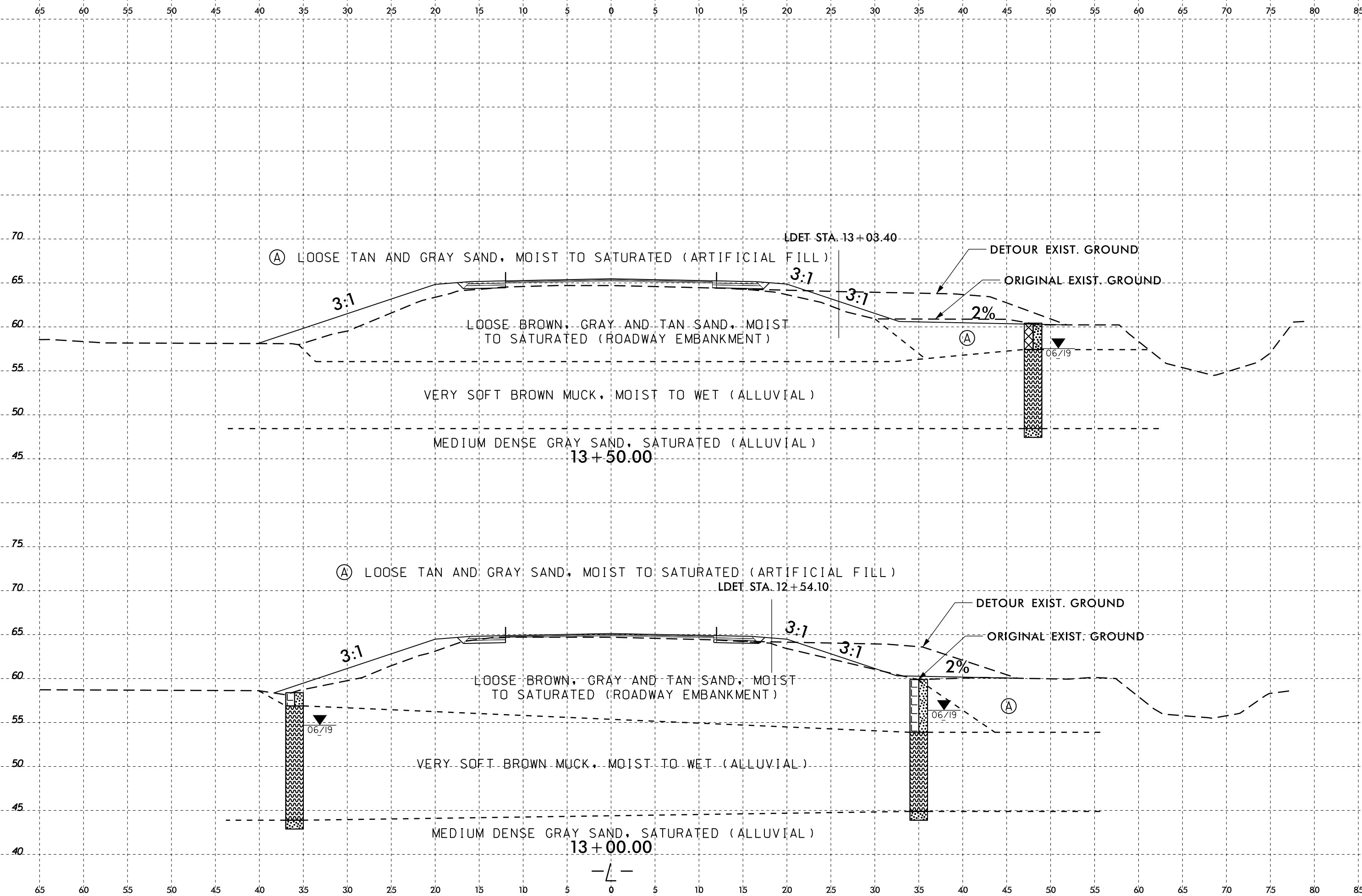


MATCHLINE -L- POT STA. 21+00.00  
SEE SHEET 4

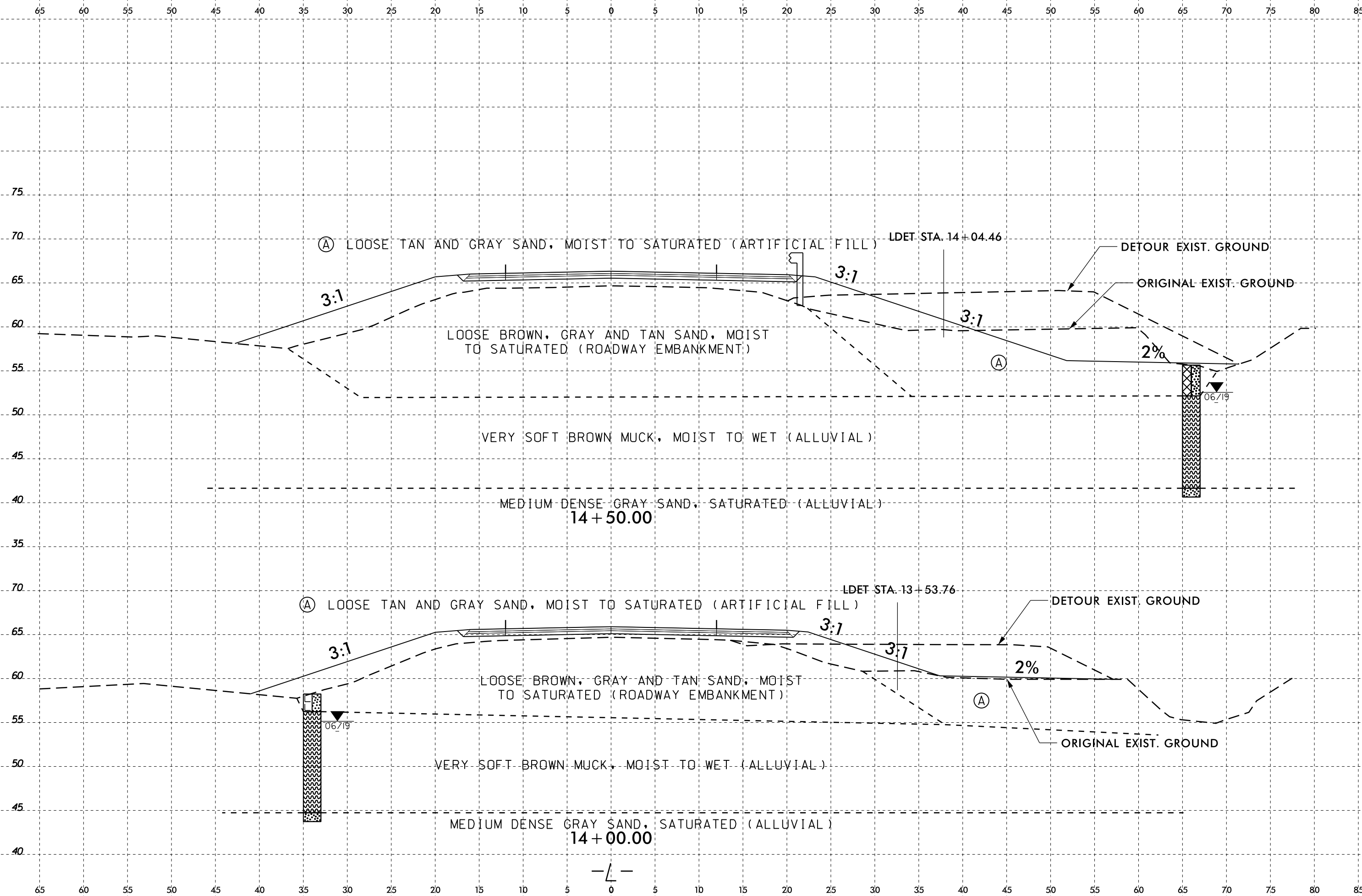


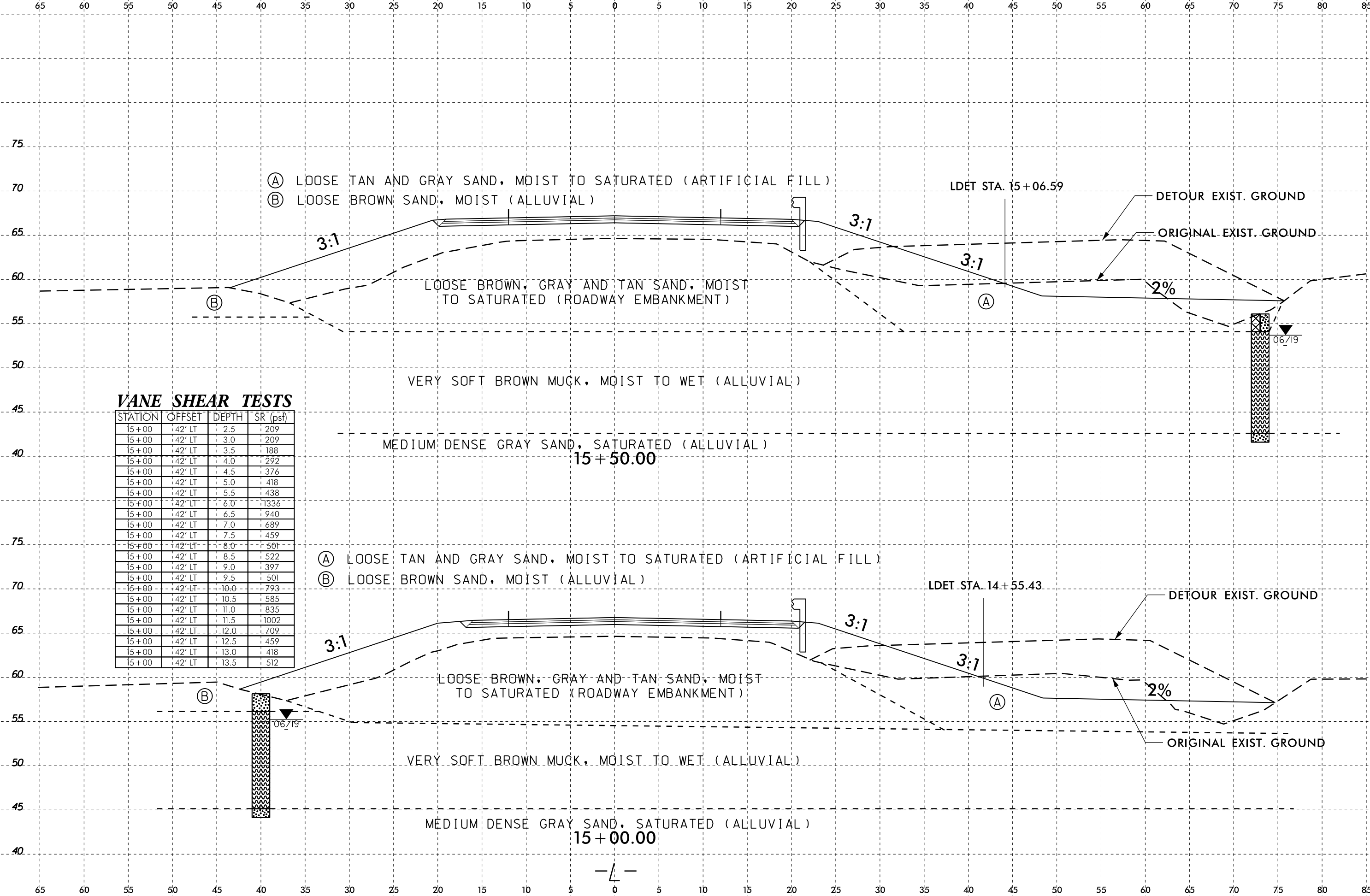
BU





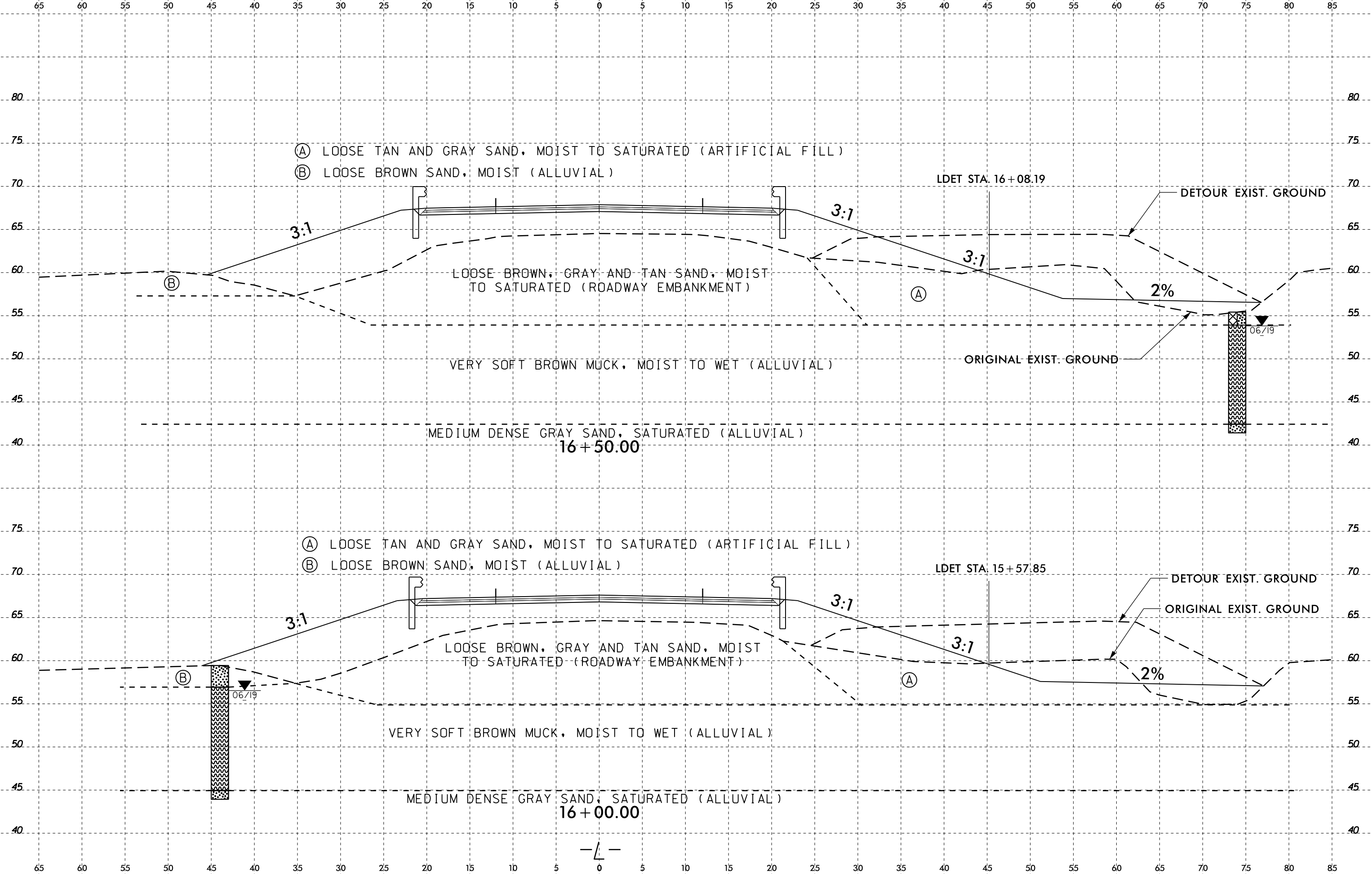


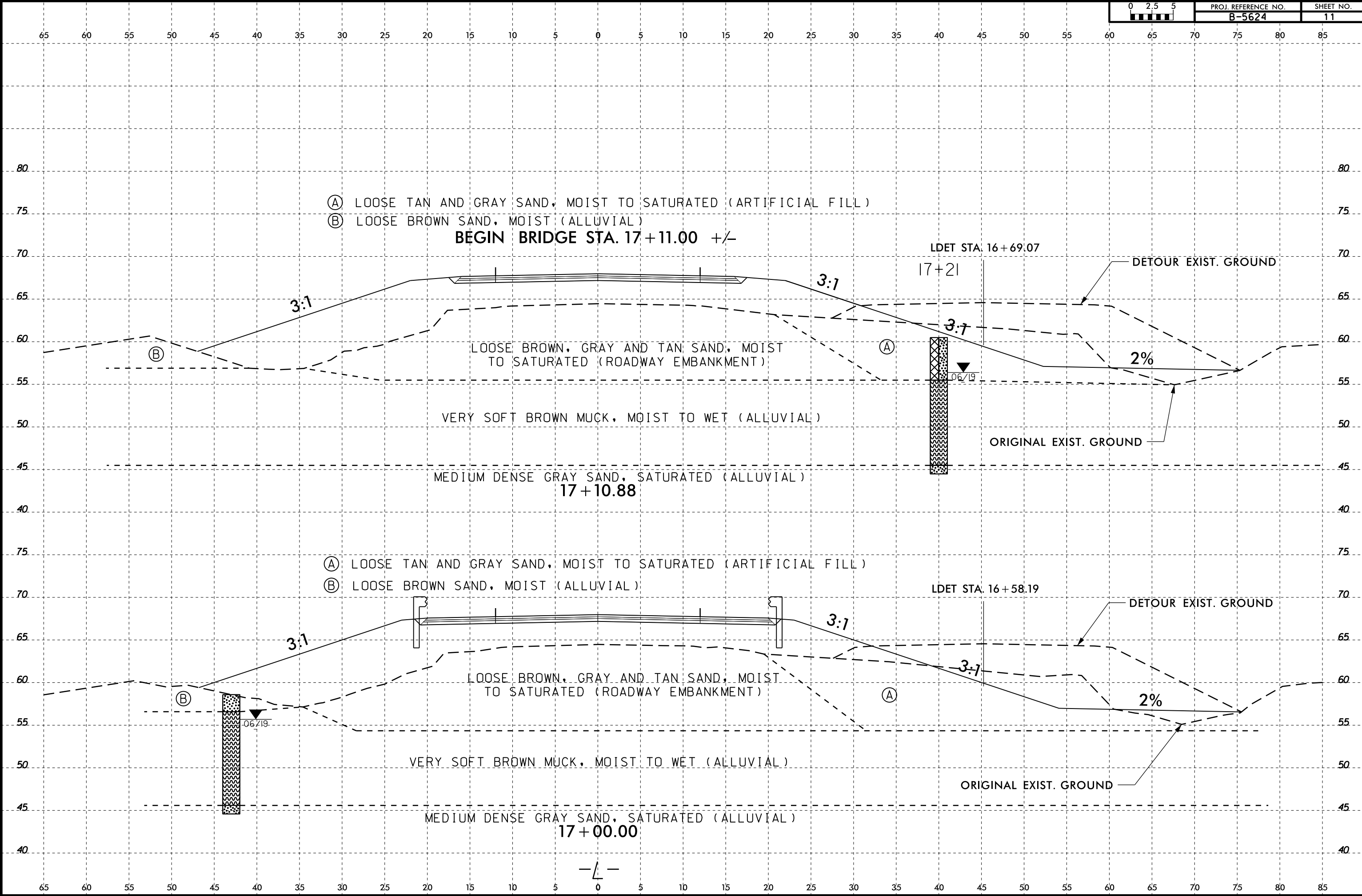


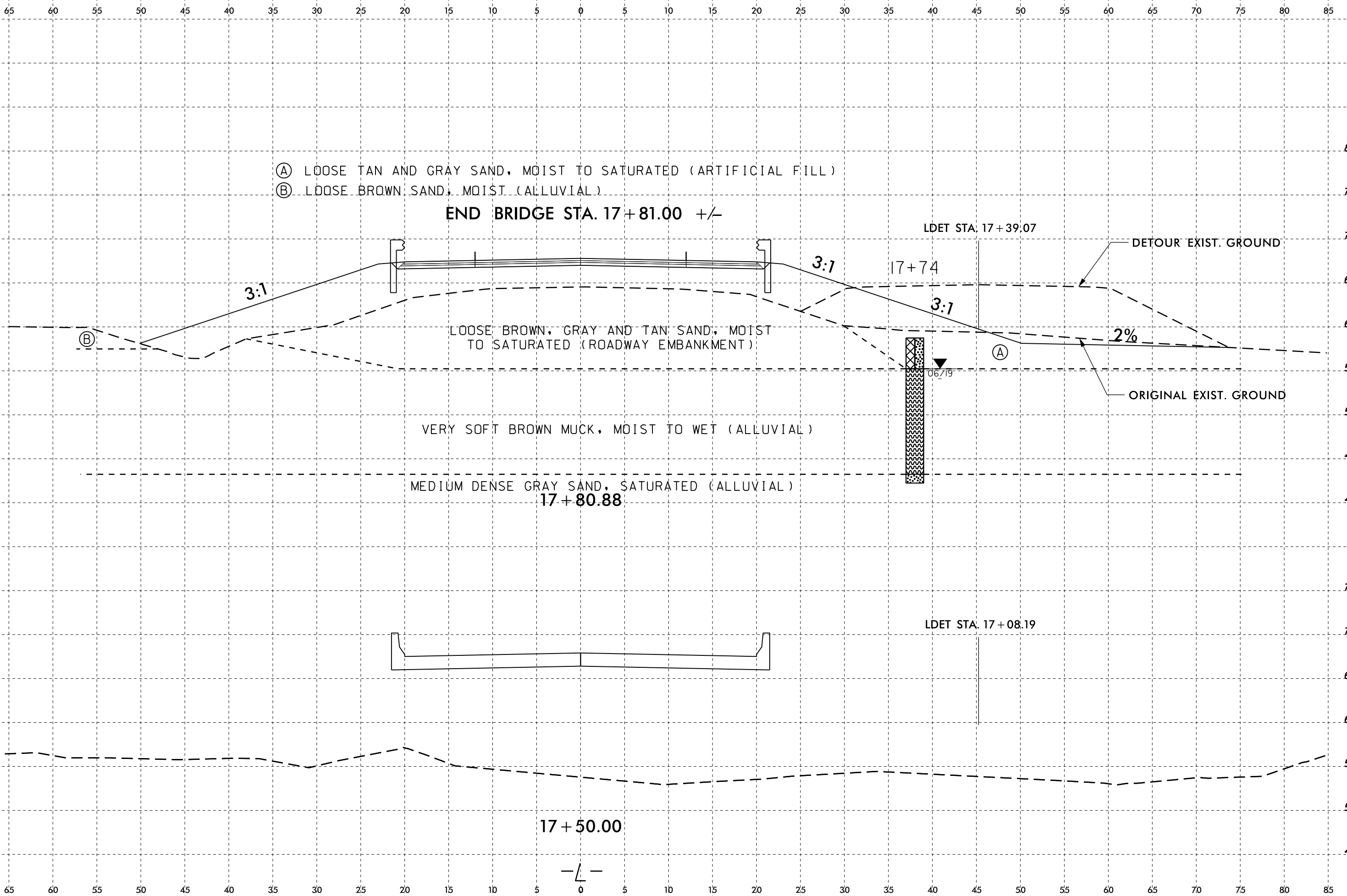


**VANE SHEAR TESTS**

| STATION | OFFSET | DEPTH | SR (psf) |
|---------|--------|-------|----------|
| 15+00   | 42' LT | 2.5   | 209      |
| 15+00   | 42' LT | 3.0   | 209      |
| 15+00   | 42' LT | 3.5   | 188      |
| 15+00   | 42' LT | 4.0   | 292      |
| 15+00   | 42' LT | 4.5   | 376      |
| 15+00   | 42' LT | 5.0   | 418      |
| 15+00   | 42' LT | 5.5   | 438      |
| 15+00   | 42' LT | 6.0   | 1336     |
| 15+00   | 42' LT | 6.5   | 940      |
| 15+00   | 42' LT | 7.0   | 689      |
| 15+00   | 42' LT | 7.5   | 459      |
| 15+00   | 42' LT | 8.0   | 501      |
| 15+00   | 42' LT | 8.5   | 522      |
| 15+00   | 42' LT | 9.0   | 397      |
| 15+00   | 42' LT | 9.5   | 501      |
| 15+00   | 42' LT | 10.0  | 793      |
| 15+00   | 42' LT | 10.5  | 585      |
| 15+00   | 42' LT | 11.0  | 835      |
| 15+00   | 42' LT | 11.5  | 1002     |
| 15+00   | 42' LT | 12.0  | 709      |
| 15+00   | 42' LT | 12.5  | 459      |
| 15+00   | 42' LT | 13.0  | 418      |
| 15+00   | 42' LT | 13.5  | 512      |







- (A) LOOSE TAN AND GRAY SAND, MOIST TO SATURATED (ARTIFICIAL FILL)
- (B) LOOSE BROWN SAND, MOIST (ALLUVIAL)

END BRIDGE STA. 17+81.00 +/-

LDET STA. 17+39.07

DETOUR EXIST. GROUND

3:1

3:1

17+74

3:1

2%

(B)

LOOSE BROWN, GRAY AND TAN SAND, MOIST TO SATURATED (ROADWAY EMBANKMENT)

(A)

ORIGINAL EXIST. GROUND

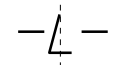
VERY SOFT BROWN MUCK, MOIST TO WET (ALLUVIAL)

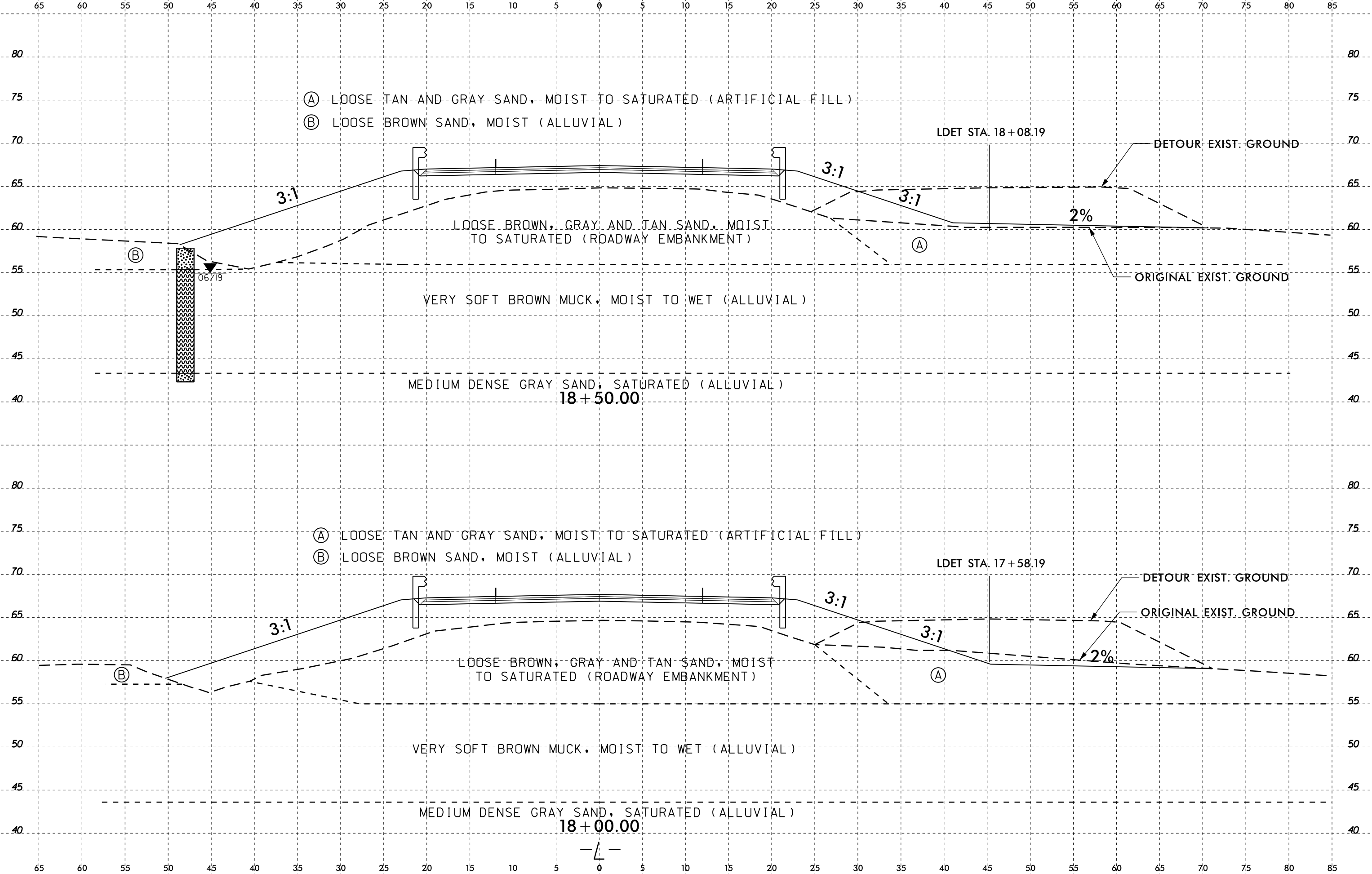
MEDIUM DENSE GRAY SAND, SATURATED (ALLUVIAL)

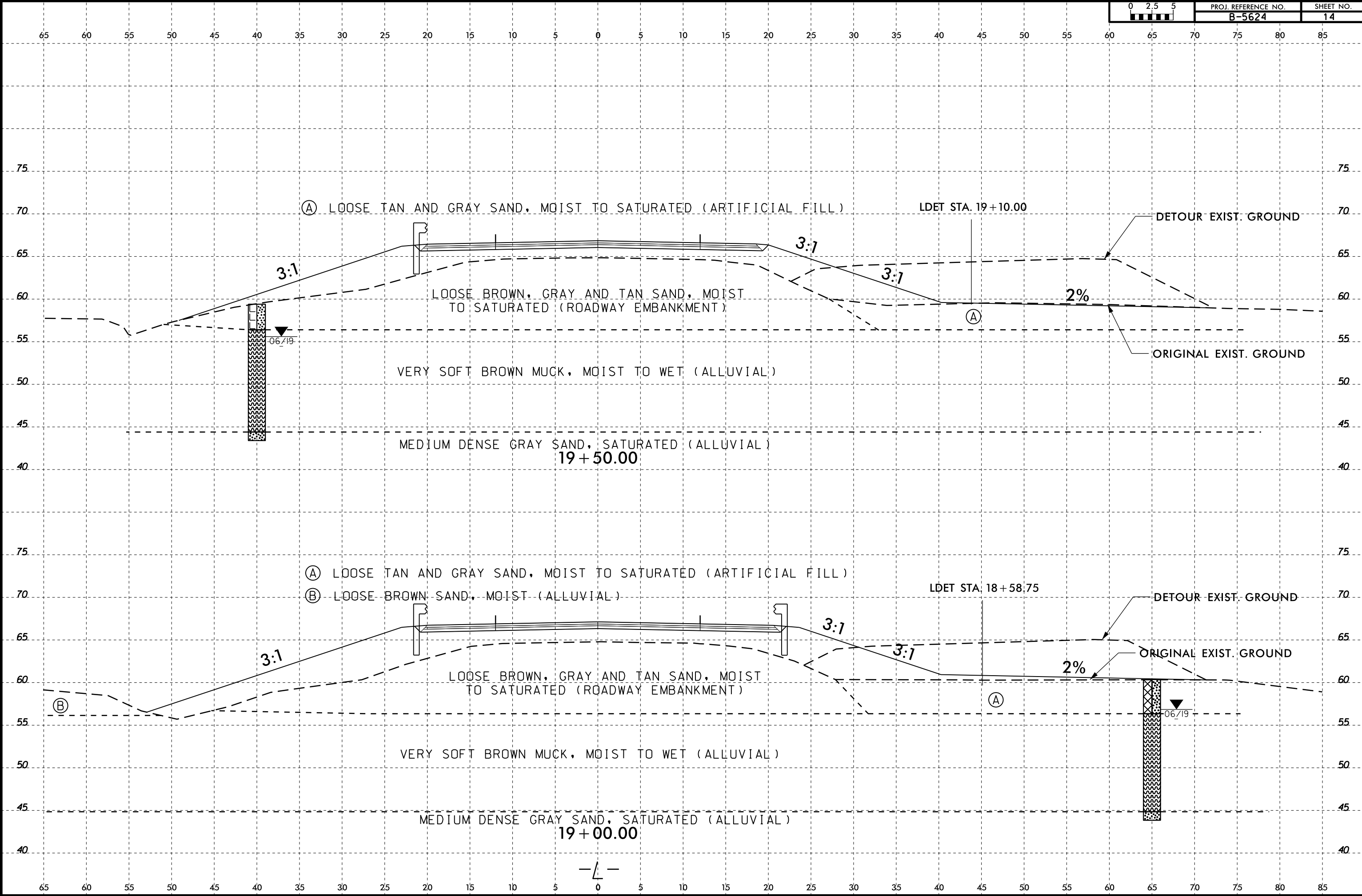
17+80.88

LDET STA. 17+08.19

17+50.00

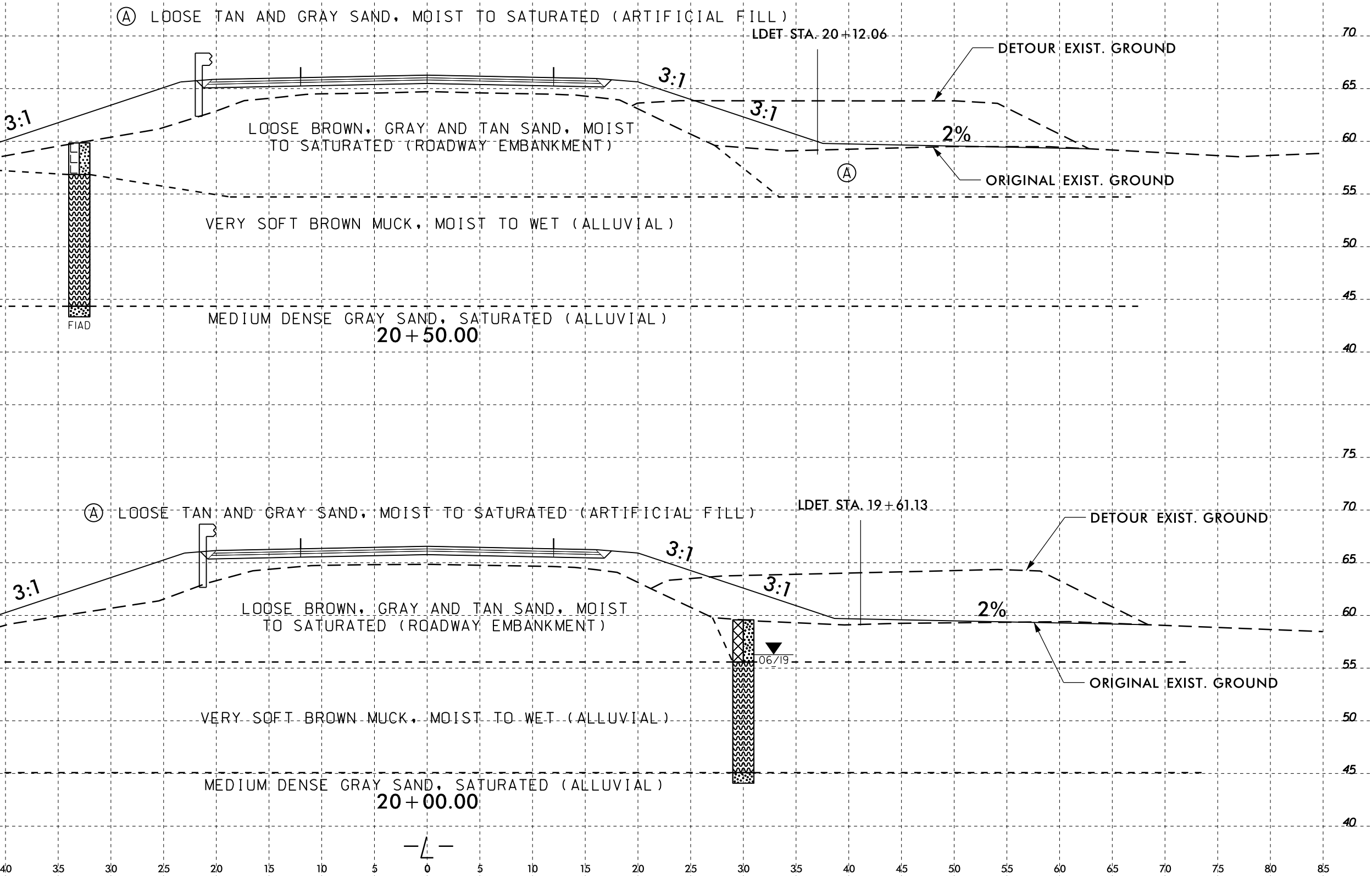




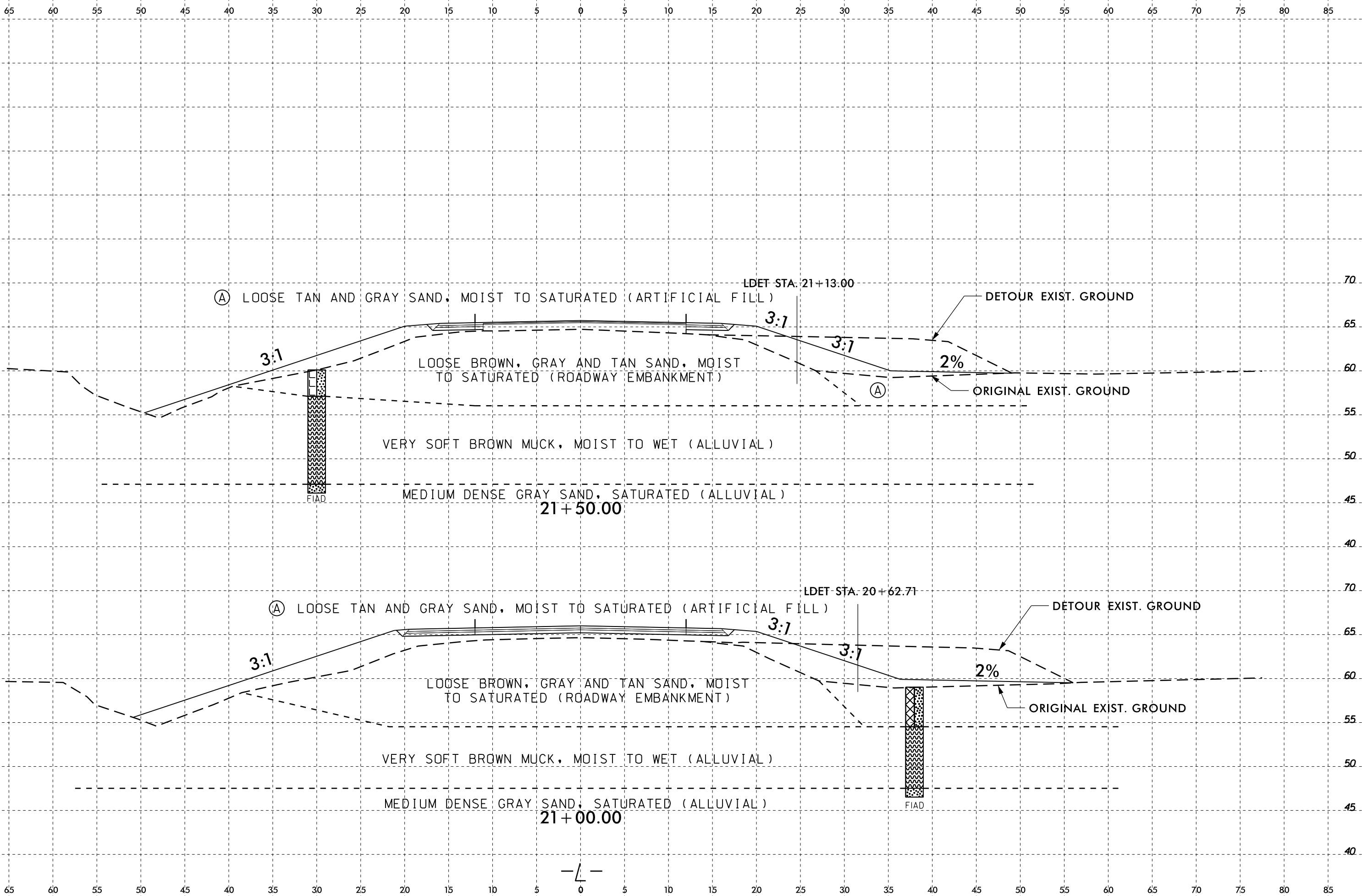


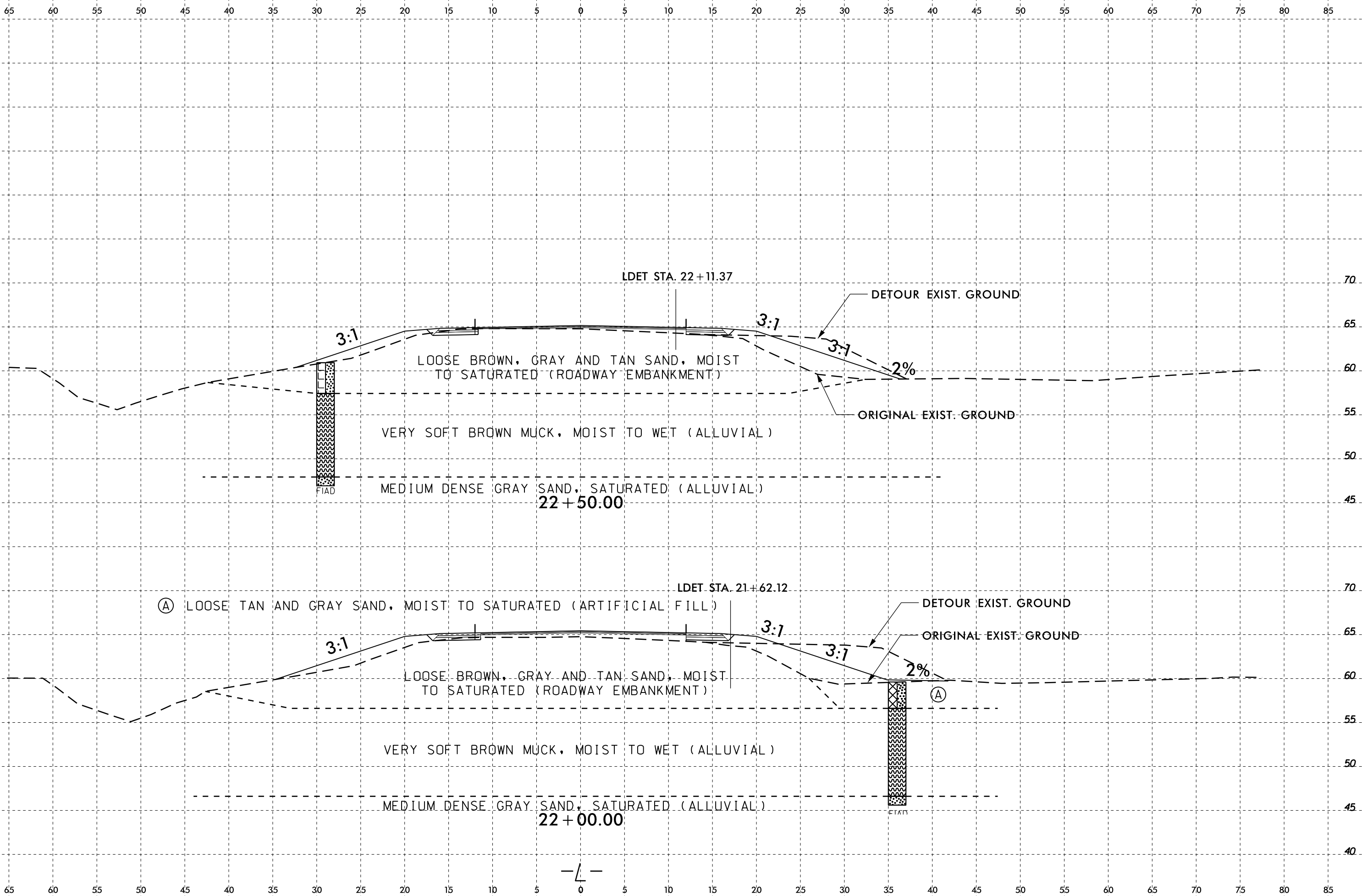
### VANE SHEAR TESTS

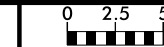
| STATION | OFFSET | DEPTH | SR (psf) |
|---------|--------|-------|----------|
| 20+50   | 37' LT | 3.5   | 146      |
| 20+50   | 37' LT | 4.0   | 292      |
| 20+50   | 37' LT | 4.5   | 1086     |
| 20+50   | 37' LT | 5.0   | 313      |
| 20+50   | 37' LT | 5.5   | MAX      |
| 20+50   | 37' LT | 6.0   | 292      |
| 20+50   | 37' LT | 6.5   | 376      |
| 20+50   | 37' LT | 7.0   | 418      |
| 20+50   | 37' LT | 7.5   | 731      |
| 20+50   | 37' LT | 8.0   | 209      |
| 20+50   | 37' LT | 8.5   | 856      |
| 20+50   | 37' LT | 9.0   | 251      |
| 20+50   | 37' LT | 9.5   | 501      |
| 20+50   | 37' LT | 10.0  | 710      |
| 20+50   | 37' LT | 10.5  | 1002     |
| 20+50   | 37' LT | 11.0  | 459      |
| 20+50   | 37' LT | 11.5  | 376      |
| 20+50   | 37' LT | 12.0  | 856      |
| 20+50   | 37' LT | 12.5  | 1253     |
| 20+50   | 37' LT | 13.0  | 251      |
| 20+50   | 37' LT | 13.5  | 292      |
| 20+50   | 37' LT | 14.0  | 501      |
| 20+50   | 37' LT | 14.5  | 459      |
| 20+50   | 37' LT | 15.0  | 376      |











65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85

80 80

75 75

70 70

65 65

60 60

55 55

50 50

45 45

75 75

70 70

65 65

60 60

55 55

50 50

65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85

END GRADE/BEGIN OVERLAY  
STA. 23+50.00

LDET STA. 23+10.68

DETOUR EXIST. GROUND

ORIGINAL EXIST. GROUND

3:1

3:1

LOOSE BROWN, GRAY AND TAN SAND, MOIST TO SATURATED (ROADWAY EMBANKMENT)

VERY SOFT BROWN MUCK, MOIST TO WET (ALLUVIAL)

MEDIUM DENSE GRAY SAND, SATURATED (ALLUVIAL)

23+50.00

FIAD

FIAD

LDET STA. 22+60.92

DETOUR EXIST. GROUND

ORIGINAL EXIST. GROUND

3:1

3:1

LOOSE BROWN, GRAY AND TAN SAND, MOIST TO SATURATED (ROADWAY EMBANKMENT)

VERY SOFT BROWN MUCK, MOIST TO WET (ALLUVIAL)

MEDIUM DENSE GRAY SAND, SATURATED (ALLUVIAL)

23+00.00

FIAD

