

INFORMATION HANDOUT

For Contract No. 01-0B3504

At 01-Hum-36-30.2

Identified by

Project ID 0112000119

MATERIALS INFORMATION

Geotechnical Design Recommendations, Maple Stabilization Project

Conceptual Temporary Site Access

Memorandum

*Flex your power!
Be energy efficient!*

To: NESAR FORMOLI
BRANCH CHIEF
North Region, Design Branch M2

Date: November 24, 2014

File: 01-HUM-36-PM 30.25
EA: 01-0B3501
EFIS ID: 0112000119
Storm Damage Repair

Attn: Kevin Canfield, Project Engineer

From: **DEPARTMENT OF TRANSPORTATION
DIVISION OF ENGINEERING SERVICES
OFFICE OF GEOTECHNICAL DESIGN NORTH BRANCH B**

Subject: Addendum to Geotechnical Design Recommendations, Maple Stabilization Project

The Office of Geotechnical Design North (OGDN) is providing this addendum to our recommendations dated April 25, 2013 for the proposed underdrains on State Route (SR) 36 at PM 30.25 in Humboldt County. The recommendations in this addendum supersede the recommendations provided in the April 25, 2013 Memorandum.

We recommend the following:

1. Construct the underdrain a minimum of four feet wide.
2. Omit the corrugated, fully perforated plastic pipe and terminal risers recommended in the April 25, 2013 Memorandum because the underdrain is to be constructed beneath pavement.
3. The bottom 4 feet of the underdrain trench should be constructed of Class 4 Permeable Material.
4. Filter Fabric Class A should be placed above the Class 4 Permeable Material.
5. The remainder of the trench should be constructed of Class 1 Permeable Material (Type B).
6. Overlay the Class 1 Permeable Material (Type B) with 1.6 feet of slurry cement backfill as shown on DD-1 of the plans.
7. The outlet for the underdrain should be 12 inches in diameter and be installed via auger boring.
8. The inlet of the outlet pipe should be perforated for a distance of 1.5 feet.

Roy Bibbens provided concurrence to use the Rock Underdrain NSSP 68-5 by email on November 14, 2014.

If you have any questions or require further assistance, please contact Dawn McGuire at (707) 441-3994 or Charlie Narwold at (707) 445-6036.



Dawn McGuire

Dawn McGuire, CEG, CHG
Engineering Geologist
Geotechnical Design North
Branch B



CN

Charlie Narwold, CEG
Senior Engineering Geologist
Geotechnical Design North
Branch B

c: THodgson, Geotechnical Archive

Memorandum

*Flex your power!
Be energy efficient!*

To: NESAR FORMOLI
BRANCH CHIEF
North Region, Design Branch M2

Date: April 25, 2013

File: 01-HUM-36-PM 30.25
EA: 01-0B3501
EFIS ID: 0112000119
Storm Damage Repair

Attn: Rosana Pea, Project Engineer

From: DEPARTMENT OF TRANSPORTATION
DIVISION OF ENGINEERING SERVICES
OFFICE OF GEOTECHNICAL DESIGN NORTH BRANCH B

Subject: Geotechnical Design Recommendations, Maple Stabilization Project

Introduction

The Office of Geotechnical Design North (OGDN) is providing geotechnical recommendations for the proposed underdrains on State Route (SR) 36 at PM 30.25, in Humboldt County (Figure 1). The roadway was damaged during significant rainfall in March 2011, such that the eastbound lane and the right-side shoulder failed, creating a “sink”. Photos and drawings of the deformation are shown in the Damage Assessment Form (DAF #15) under EA 01-0B350. The proposed repair was to construct a gabion or gravity wall, reconstruct the roadway, and place a 10-foot deep underdrain along the inboard ditch (DAF #15). The current plan is to construct underdrains and reconstruct the roadway. The locations of the proposed underdrains are shown on Figure 2.

The scope of work performed by OGDN included review of available maps, surface field investigations, and preparation of this memorandum. We performed no drilling and we have no subsurface information.

Field Investigations

Site investigations were performed by the Office of Geotechnical Design North Branch B during 2012. On September 13, 2012, we convened at the site for a field PDT meeting. We observed roadway deformation and discussed the length, depth, and location of the proposed underdrains, the location of underdrain outlets, and RSP at one of the proposed underdrain outlets. Due to the location of an archeological site on the left side of the roadway between PM 30.15 and PM 30.20, the underdrains may need to be placed beneath the westbound lane.

We observed two landslide scarps in the roadway, as shown on Figure 2. We observed tension cracks on a private access road below the scarp located between approximately Station 104+50 and Station 105+50.

Geology

The project site is underlain by *mélange* and broken formation of the Central Belt Franciscan Complex (Figure 3). The Central Belt *mélange* is described as predominantly penetratively sheared, locally tuffaceous, scaly meta-argillite with less abundant blocks of metasandstone. A block was observed along the cutslope. The adjacent Central Belt broken formation is described as bedded to massive, locally folded, rarely conglomeratic metasandstone and meta-argillite, with only minor amounts of highly sheared rocks.

Recommendations

We do not recommend over excavation of the existing hot mix asphalt (HMA) within the limits of the failures as part of the proposed repair.

Typical design details for deep underdrains are provided in Figure 4, and we recommend the following for the design of the proposed underdrains:

1. Construct a deep underdrain from approximately Station 106+25 to approximately Station 109+20, with an outlet at approximately Station 107 + 48. The underdrain should be 20 feet deep at the outlet. Consult with the project archeologist regarding the location of this underdrain with respect to center line; part of the underdrain may need to be constructed below the pavement.
2. Construct an underdrain from 105+60 draining into the ditch in the direction of PM 30.19. The depth of this underdrain will be controlled by the elevation of the outlet, which will be determined by D01 Hydraulics. Consult with the project archeologist regarding the location of this underdrain with respect to center line; part of the underdrain may need to be constructed below the pavement.
3. The excavations for the underdrains should slope a minimum of 5% toward the underdrain outlets.
4. The outlet pipe should slope a minimum of 2%.
5. The underdrains should be constructed with Class 1 Permeable Material - Type B.
6. Place corrugated, fully perforated, plastic pipe (minimum diameter of 8 inches) 6 inches above the bottom of the underdrain and connect to the outlet pipe.
7. The outlet pipe should be a minimum of 8 inches in diameter and be solid plastic pipe.

8. Terminal risers should be constructed at both ends of the proposed underdrain between Station 106+25 and Station 109+20 (see Section 68-2, 2010 Standard Plan for details), and at the eastern end of the underdrain proposed from 105+60 draining into the ditch in the direction of PM 30.19.
9. The width of the excavation must be a minimum of 2 feet.
10. If the underdrain is constructed beneath asphalt, place Class A filter fabric beneath the structural section on top of the permeable material.
11. If the underdrain is located beneath fill, the top of the underdrain should be designed in accordance with the "UNDER UNPAVED SHOULDER / DITCH" detail shown in Figure 4. Note the minimum 12 inch overlap of the RSP Fabric and Geomembrane is on all sides of the excavation.

Construction Considerations

1. We recommend beginning the excavations for the underdrains at the outlets.
2. Temporary shoring will be required to support the excavation for the proposed underdrain between Station 106+25 and Station 109+20
3. If non-rippable rock is encountered during excavation, the Office of Geotechnical Design North (Branch B) shall be contacted for additional recommendations.
4. The depth of excavation for the underdrain outlet at approximately Station 107+48 will exceed 20 feet on the right side of the roadway. For this reason, directional drilling will be required to install the underdrain outlet.
5. Expect difficult excavation conditions due to the presence of groundwater, cobbles and boulders.

The Office of Geotechnical Design North Branch B will provide an approved nonstandard Special Provision (nSSP) for the Geomembrane (Water Barrier).

We request that the Project Plans be submitted to the Office of Geotechnical Design North Branch B for review prior to final design.

If you have any questions or require further assistance, please contact Dawn McGuire at (707) 441-3994 or Charlie Narwold at (707) 445-6036.



Dawn McGuire

Dawn McGuire, CEG, CHG
Engineering Geologist
Geotechnical Design North
Branch B



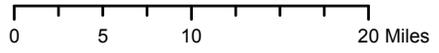
CN

Charlie Narwold, CEG
Senior Engineering Geologist
Geotechnical Design North
Branch B

FIGURES:

- | | |
|----------|------------------------|
| Figure 1 | Vicinity Map |
| Figure 2 | Location Plan Map |
| Figure 3 | Geologic Map |
| Figure 4 | Typical Design Details |

c: OGDN Project Folder



| | | |
|--|------------------------------|---------------------|
| Department of Transportation Division of Engineering Services Geotechnical Services Office of Geotechnical Design North- Branch B | EFIS ID:0112000119 | VICINITY MAP |
| | DATE: APRIL 2013 | |
| | Geotechnical Recommendations | FIGURE 1 |

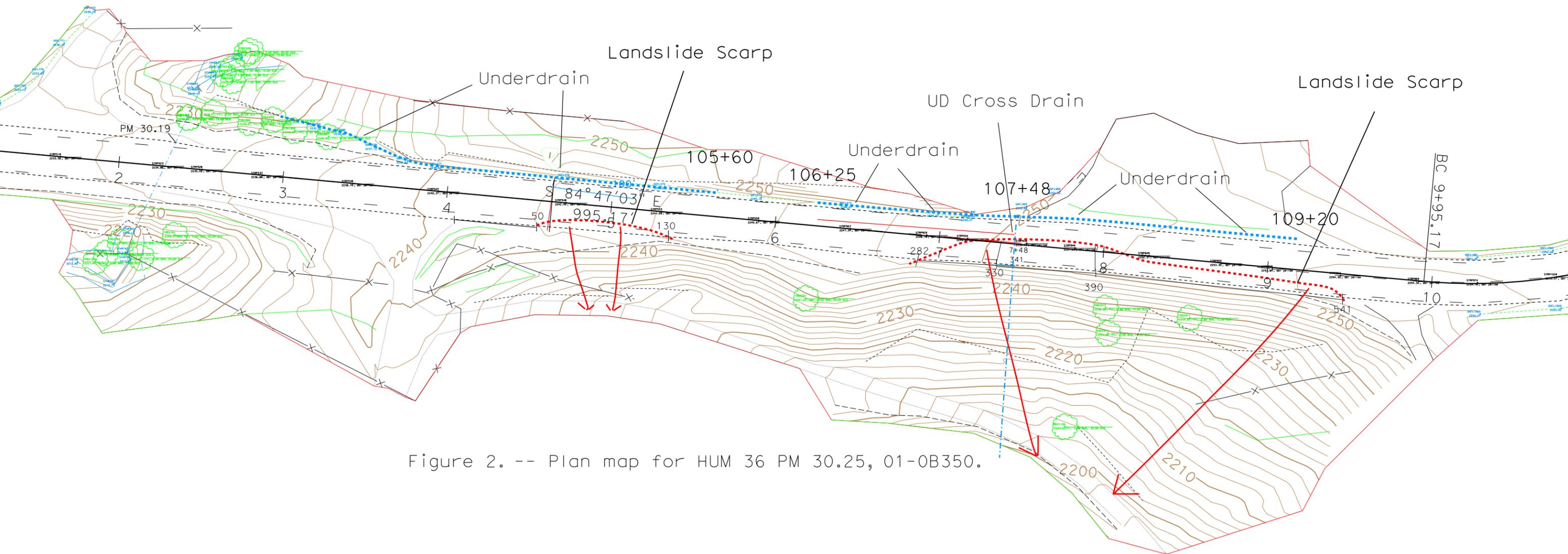
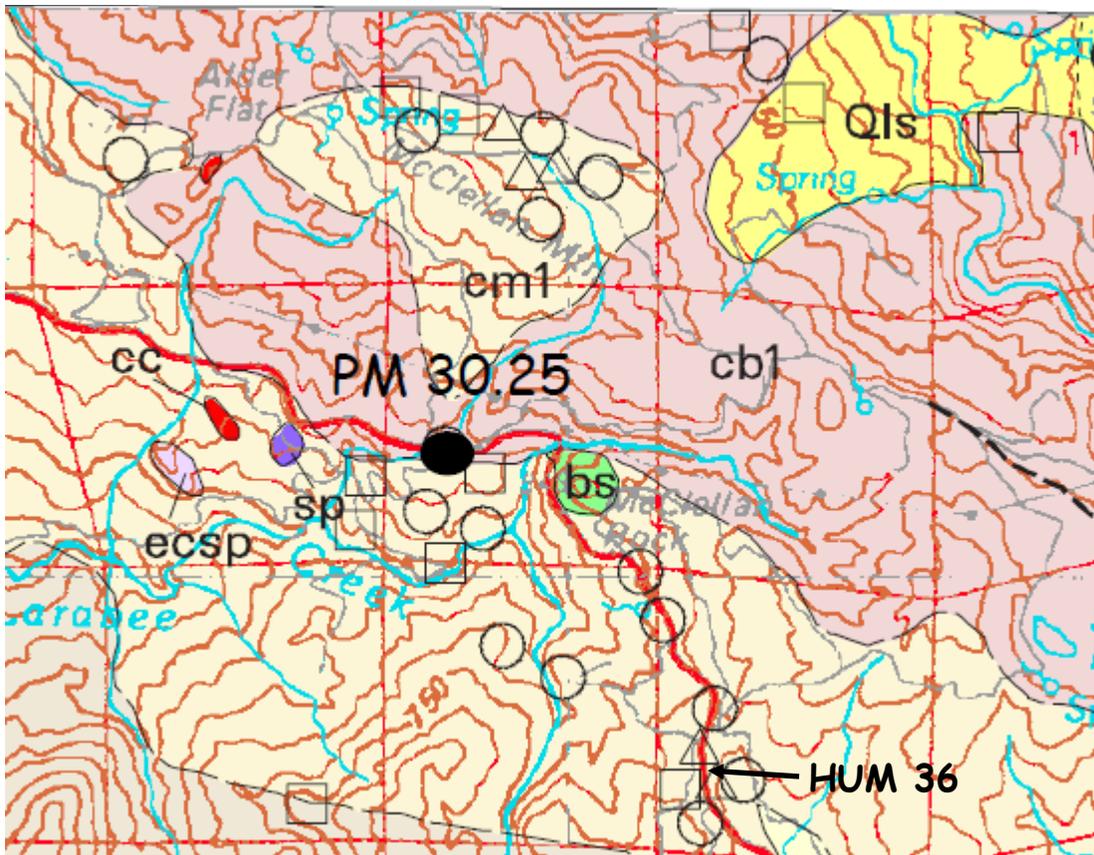


Figure 2. -- Plan map for HUM 36 PM 30.25, 01-0B350.



Quaternary Overlap Deposits

Qls, Quaternary landslide deposits

Coast Ranges Province, Franciscan Complex, Central belt:

Cm1, mélange, predominantly penetratively sheared, locally tuffaceous, scaly meta-argillite and less abundant blocks of metasandstone.

Cb1, broken formation, bedded to massive, locally folded, rarely conglomeratic metasandstone and meta-argillite, with minor amounts of highly sheared rocks.

sp, serpentinite

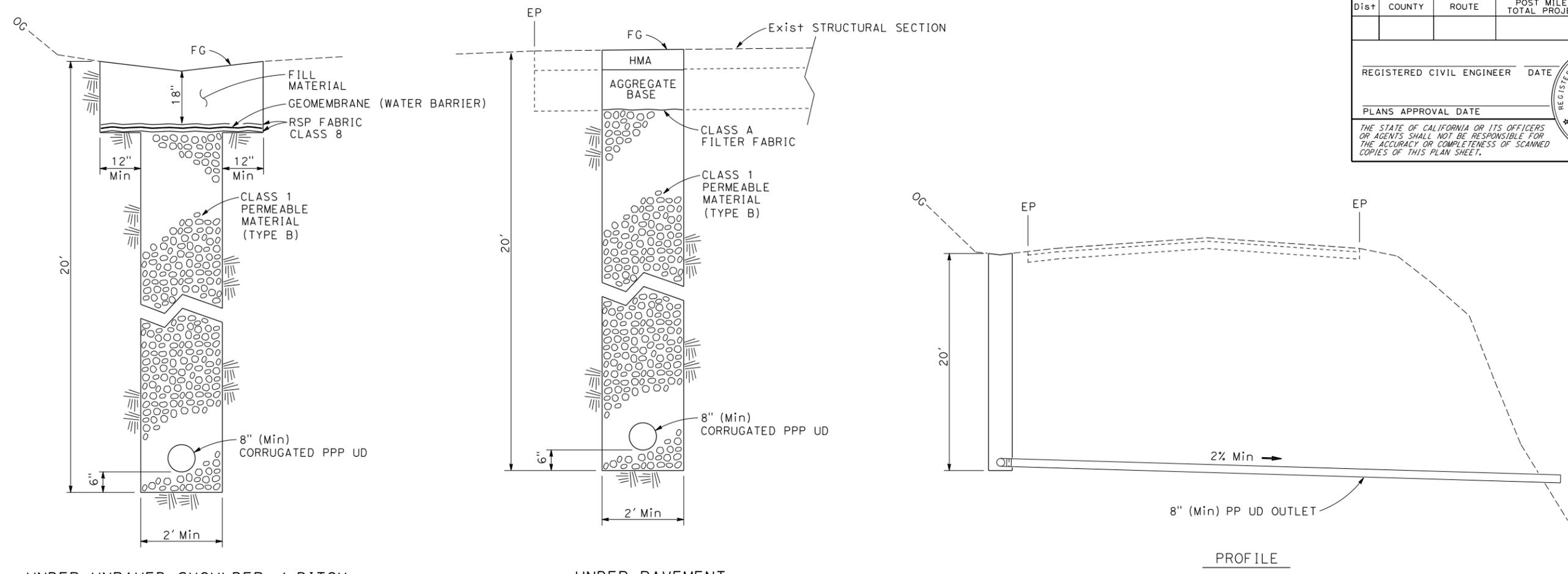
bs, basaltic rocks

ecsp, serpentinite mélange

cc, chert

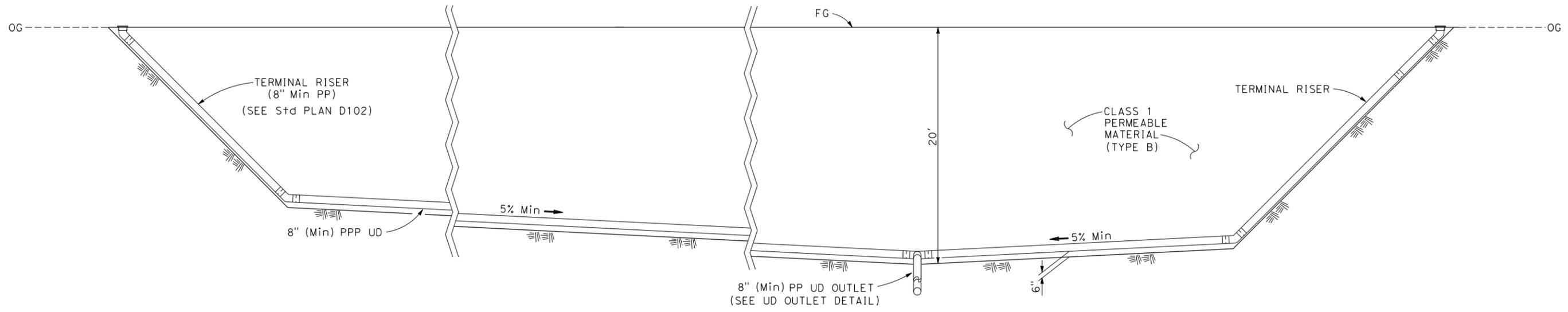
Figure 3. -- Geologic map showing the storm-damage location (01-0B350 at HUM 36 PM 30.25) (McLaughlin and others, 2000). The project site is located on the contact between two geologic units within the Central Belt of the Franciscan Complex: cm1 (mélange) and cb1 (broken formation).

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|---|--------|-------|--------------------------|-----------|--------------|
| | | | | | |
| REGISTERED CIVIL ENGINEER | | | DATE | | |
| PLANS APPROVAL DATE | | | | | |
| | | | | | |
| THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET. | | | | | |



DEEP UNDERDRAIN TYPICAL CROSS SECTIONS

UNDERDRAIN OUTLET DETAIL



DEEP UNDERDRAIN

Figure 4. -- Typical design details.

NO SCALE



STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans
 DESIGN
 FUNCTIONAL SUPERVISOR
 CALCULATED/DESIGNED BY
 CHECKED BY
 REVISOR BY
 DATE REVISOR
 x
 x
 x
 x
 x

BORDER LAST REVISED 4/24/2013

USERNAME => Down McGuire
DGN FILE => \$REQUEST

OGDN BRANCH B

PROJECT NUMBER

EFIS: 0112000119

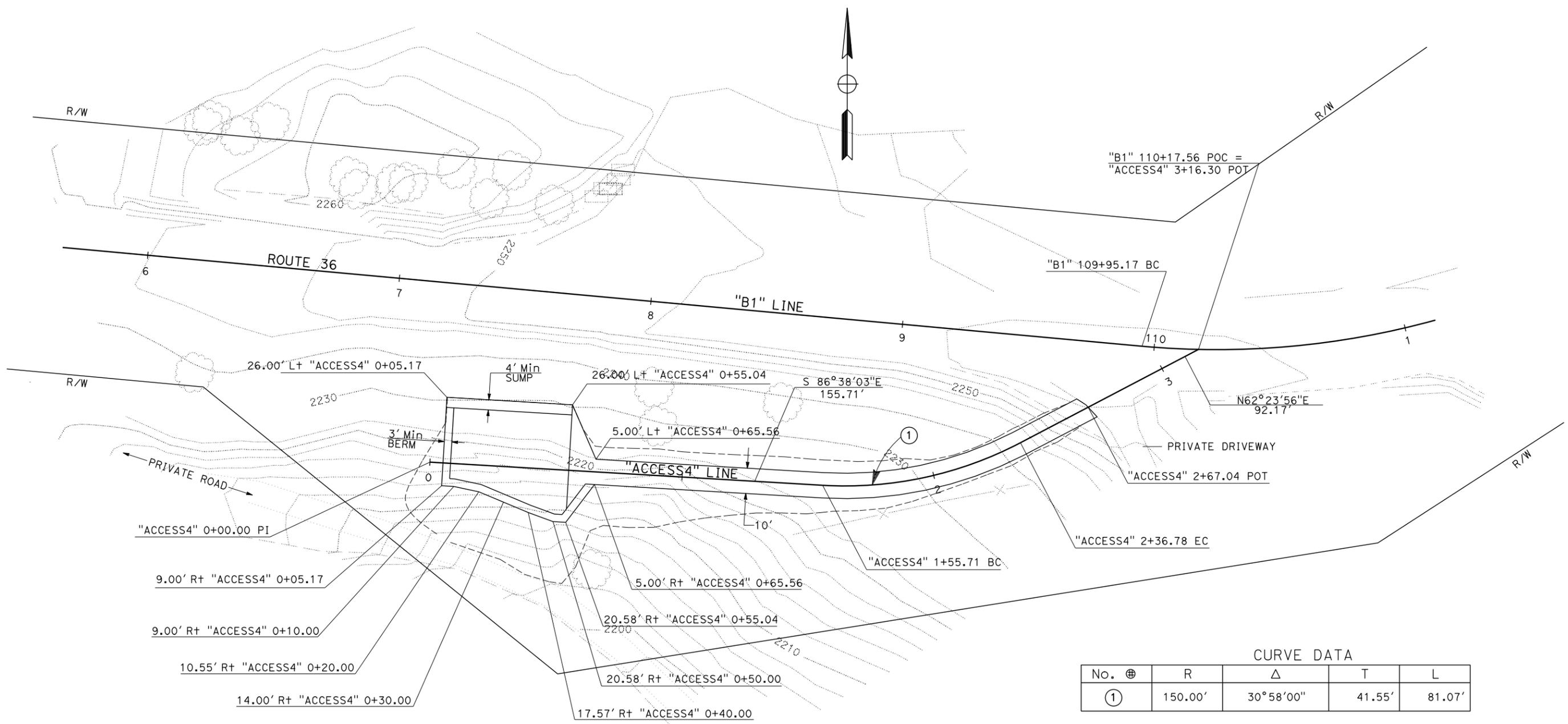
LAST REVISION: DATE PLOTTED => \$DATE
 00-00-00 TIME PLOTTED => \$TIME

**CONCEPTUAL
TEMPORARY SITE ACCESS**

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|------|--------|-------|--------------------------|-----------|--------------|
| 01 | Hum | 36 | 30.2 | | |

NOTES:

1. EXISTING UTILITY FACILITIES HAVE NOT BEEN INCLUDED ON THESE PLANS.



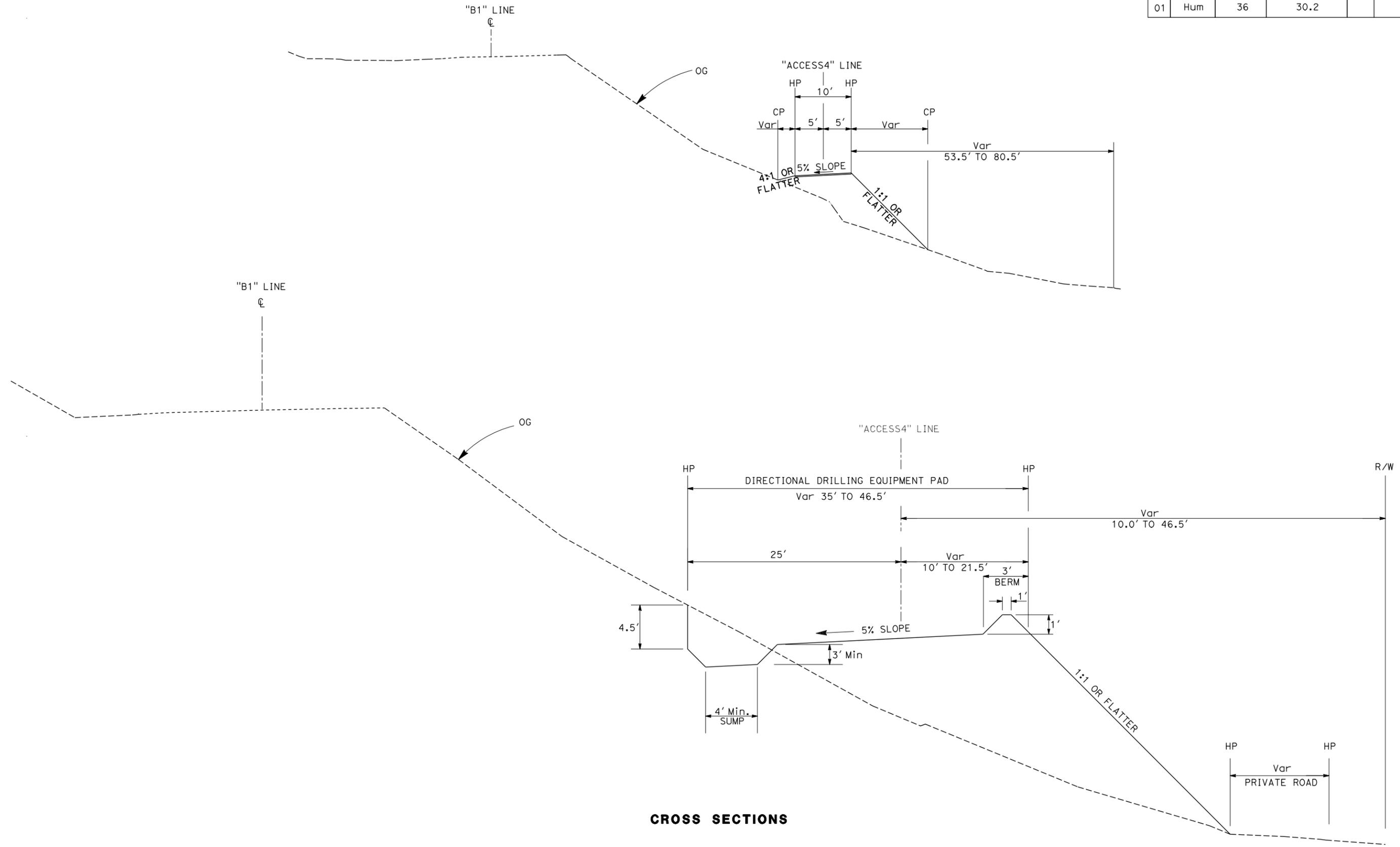
CONCEPTUAL - TEMPORARY SITE ACCESS

SHEET 1

NO SCALE

LAST REVISION: 00-00-00
 DATE PLOTTED => 06-OCT-2014
 TIME PLOTTED => 12:57

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|------|--------|-------|--------------------------|-----------|--------------|
| 01 | Hum | 36 | 30.2 | | |



CROSS SECTIONS

CONCEPTUAL - TEMPORARY SITE ACCESS

NOTES:

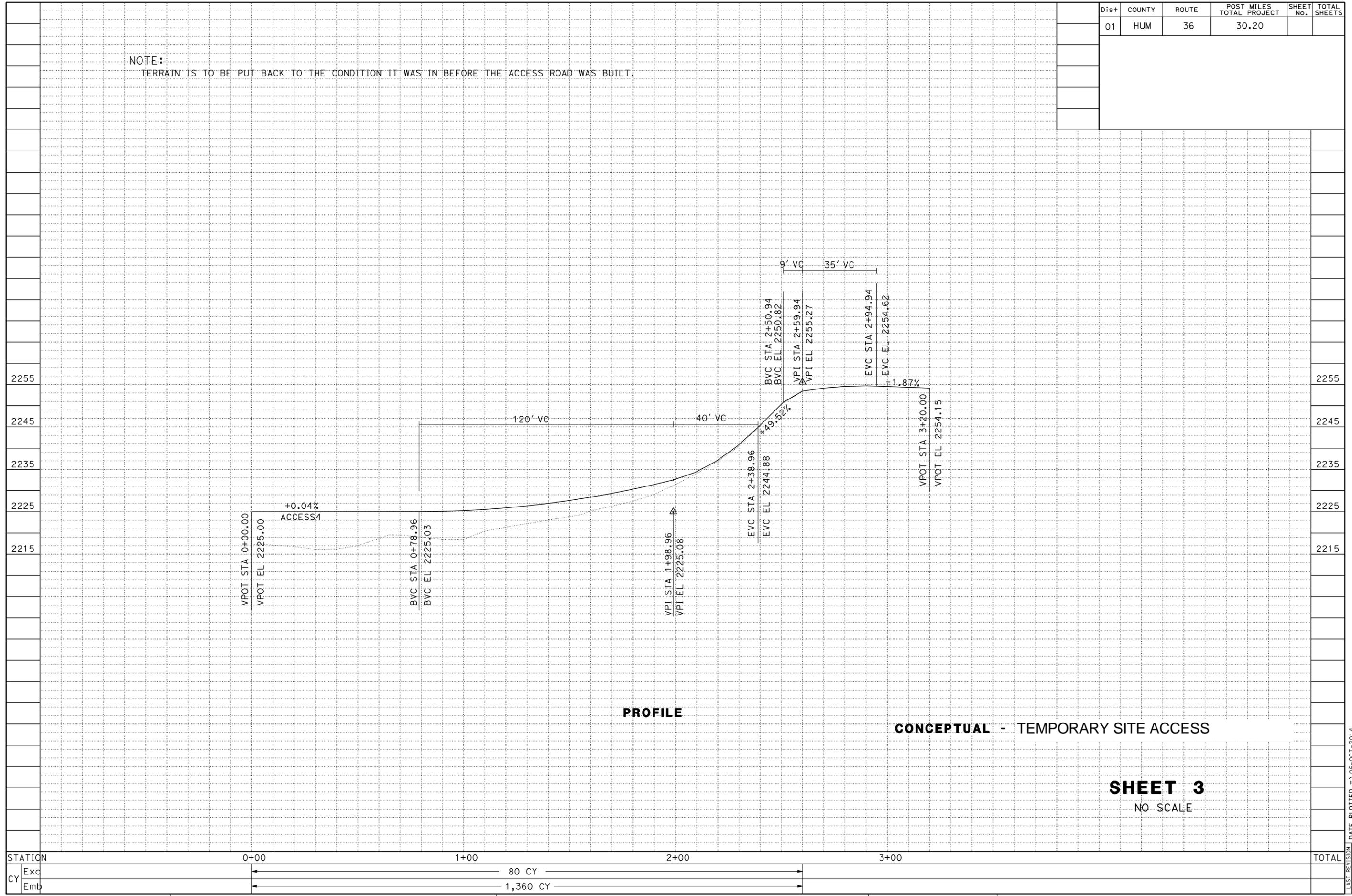
1. EXISTING UTILITY FACILITIES HAVE NOT BEEN INCLUDED ON THESE PLANS.

SHEET 2
NO SCALE

LAST REVISION 00-00-00
DATE PLOTTED => 06-OCT-2014
TIME PLOTTED => 12:58

| Dist | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET No. | TOTAL SHEETS |
|------|--------|-------|--------------------------|-----------|--------------|
| 01 | HUM | 36 | 30.20 | | |

NOTE:
TERRAIN IS TO BE PUT BACK TO THE CONDITION IT WAS IN BEFORE THE ACCESS ROAD WAS BUILT.



| STATION | 0+00 | 1+00 | 2+00 | 3+00 | TOTAL |
|---------|------|------|----------|------|-------|
| Exc | | | 80 CY | | |
| Emb | | | 1,360 CY | | |

SHEET 3
NO SCALE