

GEOCRES No. 3014-40DIST. CR REGION \_\_\_\_\_W.P. No. 418-97-00CONT. No. 98-116

W. O. No. \_\_\_\_\_

STR. SITE No. \_\_\_\_\_

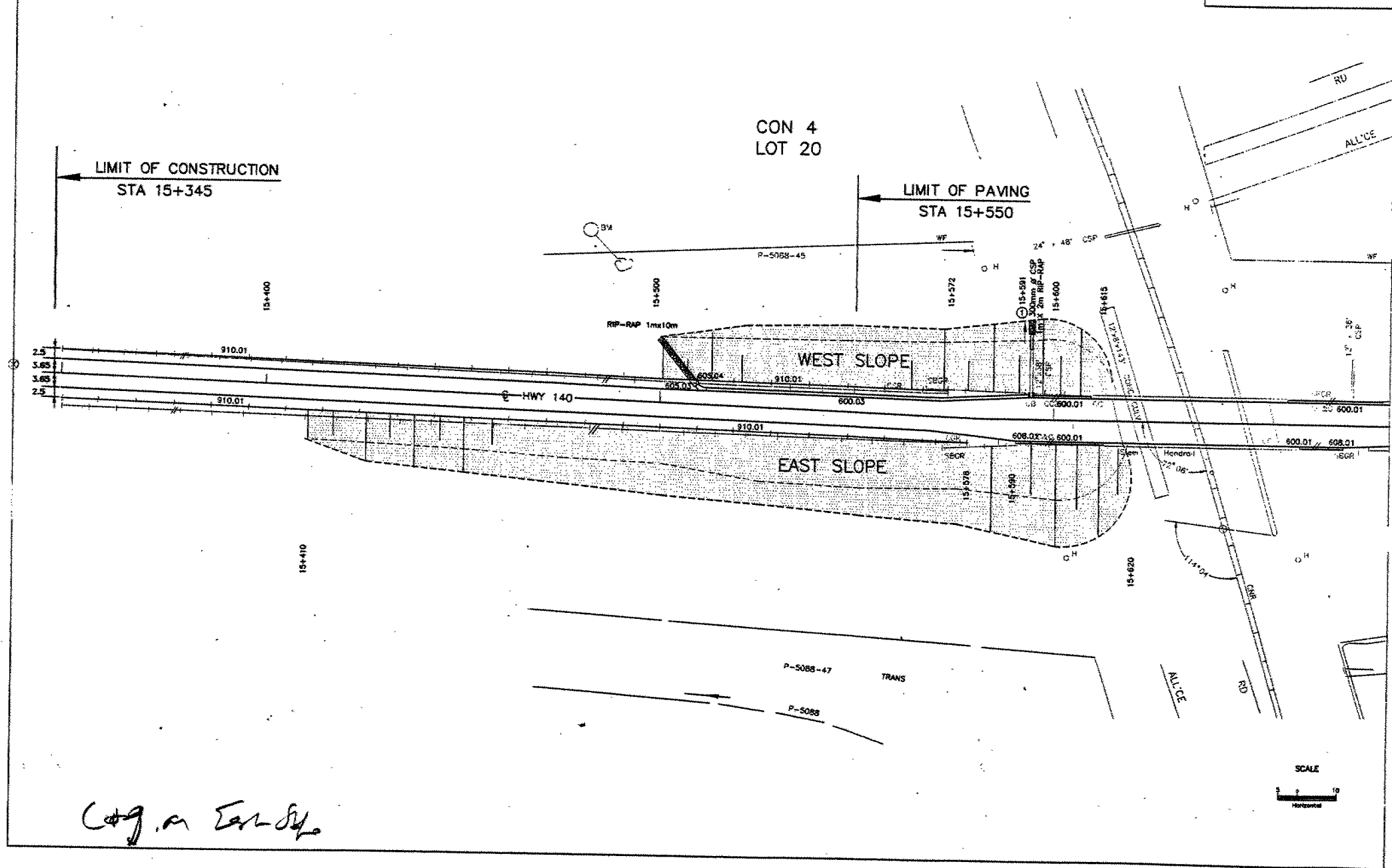
HWY. No. 140LOCATION CN Overpass  
Slope FailureNo of PAGES - 1

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OVERSIZE DRAWINGS TO BE INCLUDED WITH THIS REPORT. \_\_\_\_\_

REMARKS: \_\_\_\_\_  
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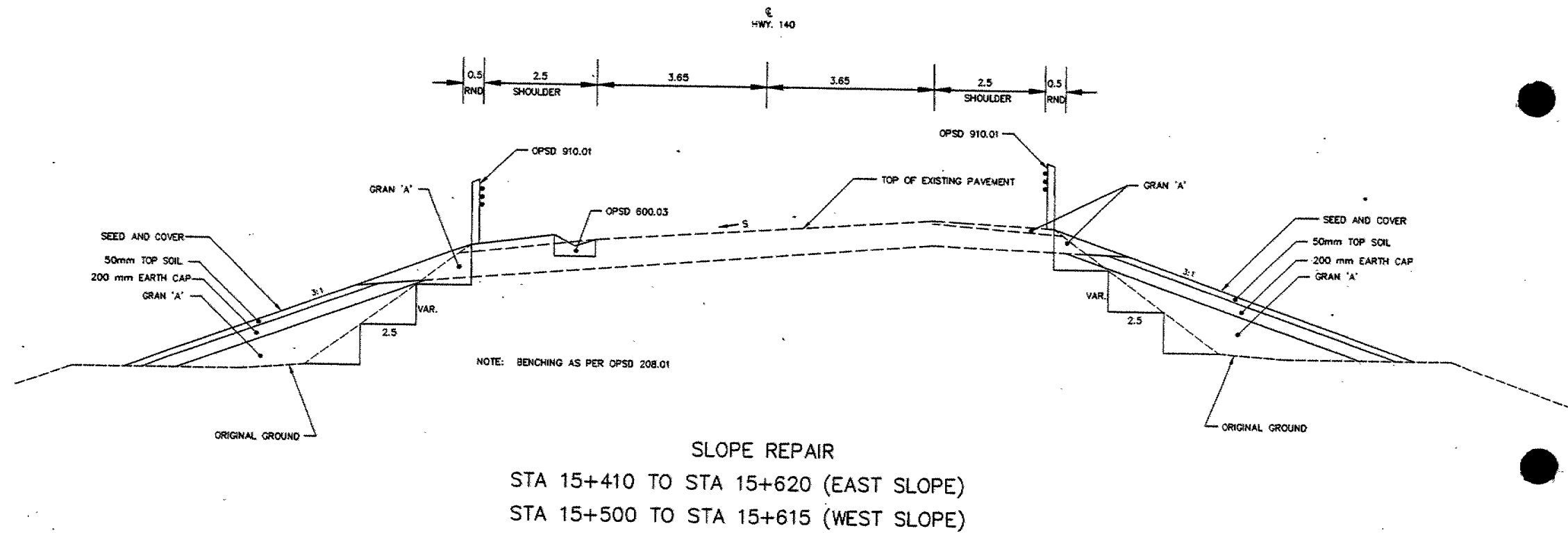
Rec'd July 27/11

ALL DIMENSIONS ARE IN METRES AND/OR MILLIMETRES UNLESS OTHERWISE SHOWN

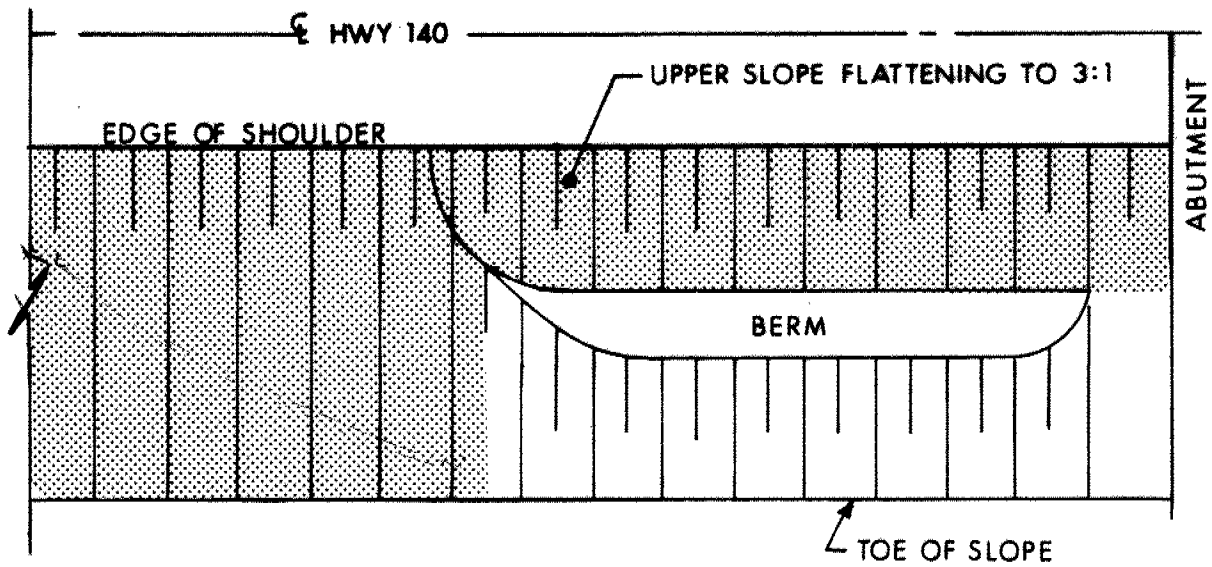
CONT No 98-116  
WP No 418-97-01

TYPICALS

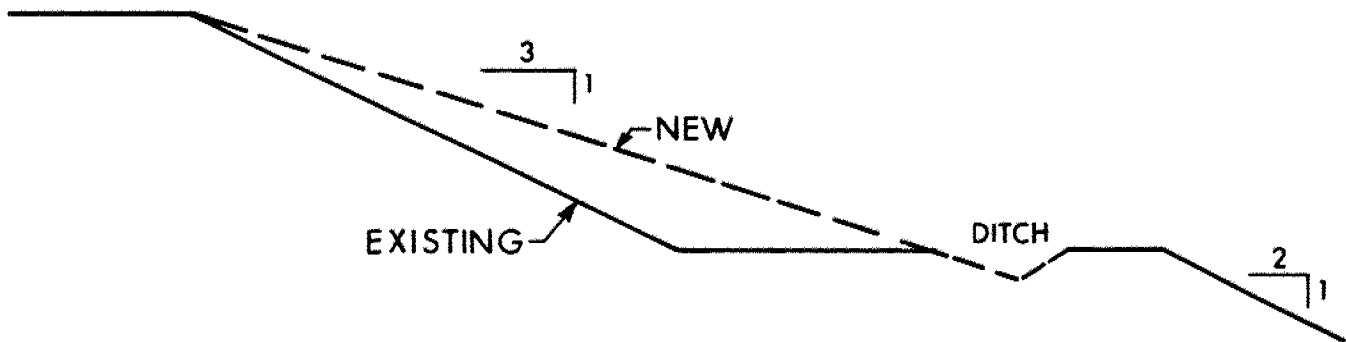
SHEET  
10



NOT TO SCALE



PLAN  
NTS

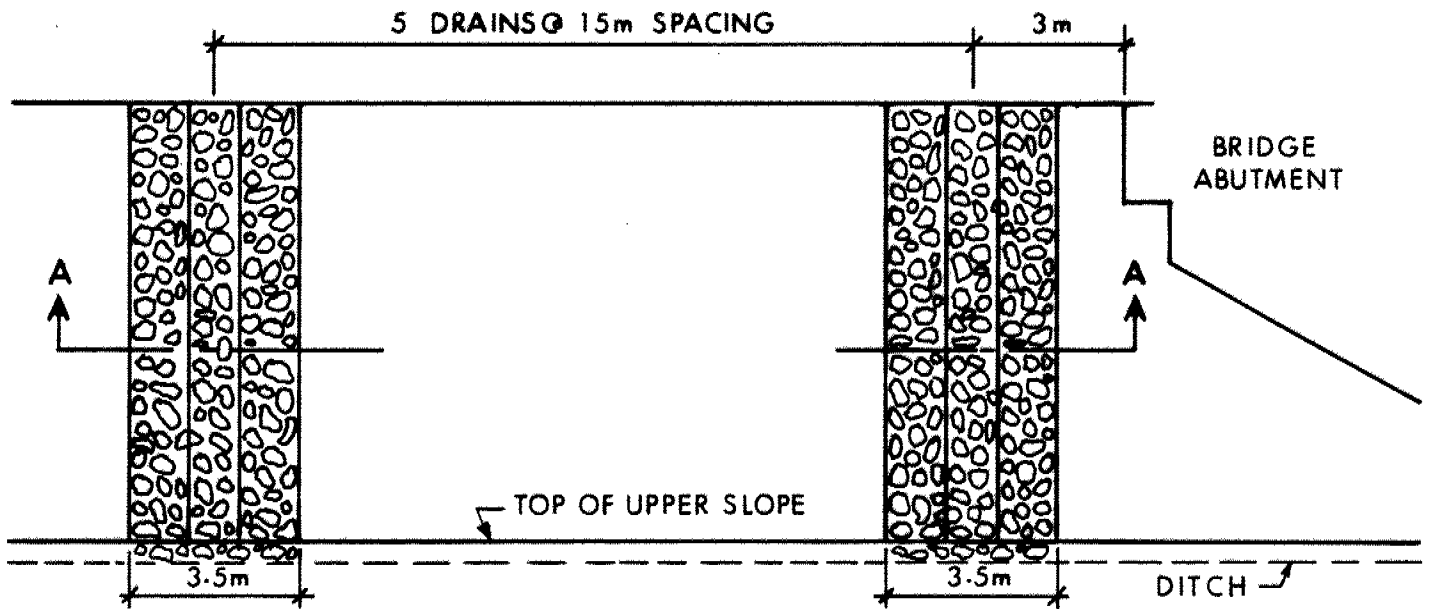


PROFILE  
NTS

NOTE:

- 1) REMOVE VEGETATION AND TOPSOIL
- 2) LEAVE IN PLACE EXISTING GRAVEL/CLEAR STONE
- 3) GRANULAR 'A' FILL TO BE USED FOR SLOPE FLATTENING

# SLOPE FLATTENING & TREATMENT HWY 140 & CN OVERPASS SE QUADRANT



**PLAN**  
NTS



**SECTION A-A**  
NTS

**SLOPE FLATTENING & TREATMENT**  
**HWY 140 & CN OVERPASS**  
**SE QUADRANT**

# MEMORANDUM



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To: M.D. Billings  
Head, Geotechnical Section  
Central Region

September 8, 1997

Attn: J. Vanbiesbrouck  
P.D.E.O.

From: Foundation Design Section  
Room 315, Central Bldg.

Tel: (416) 235-4333  
Fax: (416) 235-5240

Re: Slope Instability  
Highway 140 and CN Overpass  
Central Region

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This memo is prepared in response to your request for recommendations regarding the slope instabilities at the approaches to the CN overpass on Highway 140. A site visit was made on August 9, 1997. As mentioned in your request, the crest of the slope in the south-east quadrant shows evidence of movement in the tension cracks in the shoulder of the roadway and the tilting guide rail. At various locations along the embankments, large crevices (150 mm wide and 300 mm deep) were observed.

From the existing data at this site, it is apparent that the approach embankments have been an ongoing problem. Global stability is not a concern. It is the fill itself that is experiencing distress. Remedial measures have been carried out on the slopes in the past, from the construction of wider berms to the placement of granular blankets. It appears, from observations made during this latest site visit, the movements are confined to areas close to the top of the slope. Below the berms, no instabilities were identified.

The request for foundation recommendations included examining the possibility of flattening the slopes at the south approach, east side. This would provide the most economical solution. A stability check was made using a slope of 3H:1V. There is no stability concern if the slopes are flattened. It would be sufficient to reduce the slope for the portions of the embankment above the berm only. However, this alone may not eliminate the surficial movements of the slope.

It is further recommended to incorporate french drains along the face of the upper slope. These would take the form of armoured channels excavated to the frost penetration depth (1.2 m). They should be spaced at 10 m intervals and filled with rip-rap. A shallow ditch or toe drain should be constructed along the base of the upper slope to control the surface runoff that the french drains may create. Where the berm is eliminated due to the flattening of the slope, the armoured channels should extend to the base of the embankment. During construction, it is recommended that all vegetation and topsoil be removed prior to regrading the slopes to 3H:1V. The slopes should be re-vegetated as soon as possible to minimize erosion.

This solution will provide some relief to the ongoing slope instability. However, based on the past performance of the fill used on this project, it is not the ultimate solution. Ideally, the approach embankments should be reconstructed with proper engineered fill. This alternative would be expensive and require a detour or extensive roadway protection to achieve. If consideration is given to reconstructing the approaches, further recommendations will be provided.

If there any questions or comments, please advise.

Betty Bennett, P.Eng.  
Foundation Engineer

# of channels  
Vegetation proposed

$$\text{Stability Factor: } \frac{\gamma H_c}{c} = \frac{20(8m)}{50} = 3.2.$$

Contr 70-212

Height of Approaches 26'-32'

- 1971 - slope failure of south approach during construction
- incorporated 20' wide berms
  - organics & topsoil not removed during embankment construction
  - fill - silty clay of med to high plasticity

GEOCRES No. 302-45DIST. CH REGION \_\_\_\_\_

W.P. No. \_\_\_\_\_

CONT. No. \_\_\_\_\_

W. O. No. 97-11006

STR. SITE No. \_\_\_\_\_

HWY. No. 140LOCATION Slope InstabilityHwy. 140 & CN OverpassNo of PAGES -       

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OVERSIZE DRAWINGS TO BE INCLUDED WITH THIS REPORT. \_\_\_\_\_

REMARKS: \_\_\_\_\_

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