

GEOCRES No. 3014-40

DIST. CR REGION _____

W.P. No. 418-97-00

CONT. No. 98-116

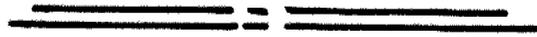
W. O. No. _____

STR. SITE No. _____

HWY. No. 140

LOCATION CW Overpass
Slope Failure

No of PAGES -



OVERSIZE DRAWINGS TO BE INCLUDED WITH THIS REPORT. _____

REMARKS: _____

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

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



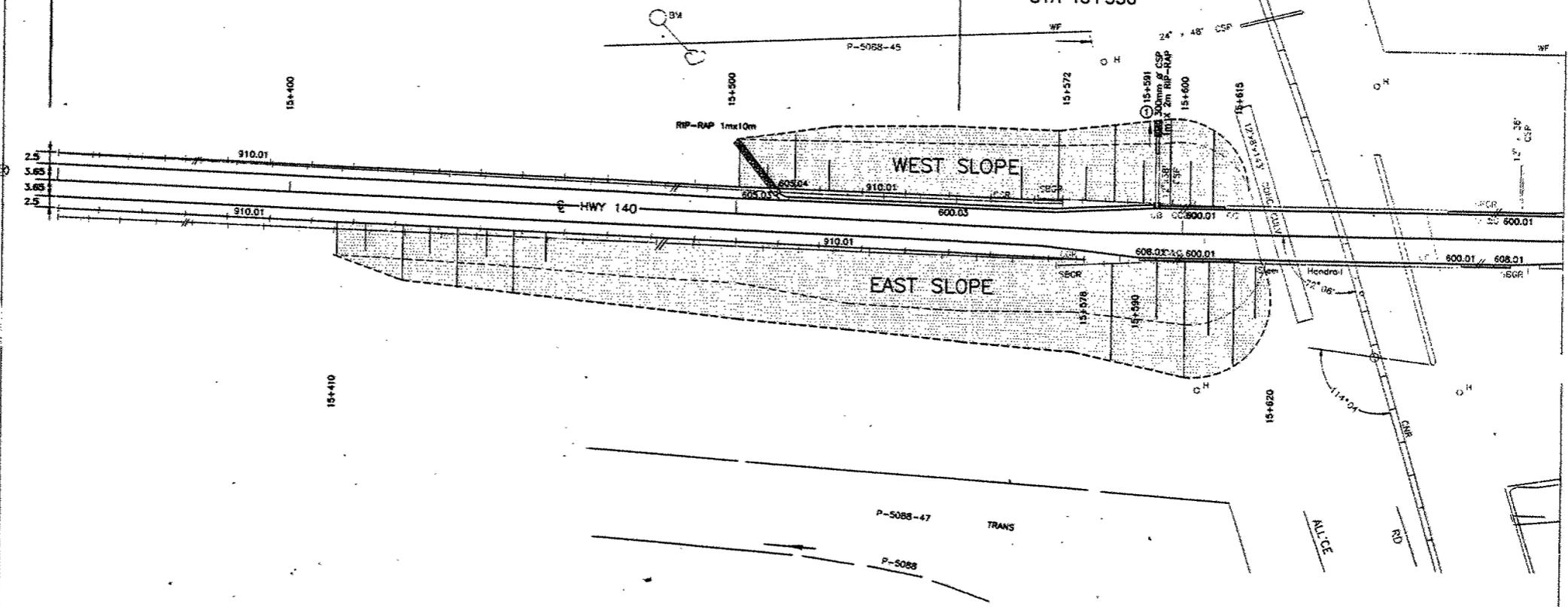
REMOVAL & NEW CONSTRUCTION
STA 15+330 TO STA 15+650
Survey: _____ Recheck: _____

SHEET
2

CON 4
LOT 20

LIMIT OF CONSTRUCTION
STA 15+345

LIMIT OF PAVING
STA 15+550



Chg. in Elev. etc.

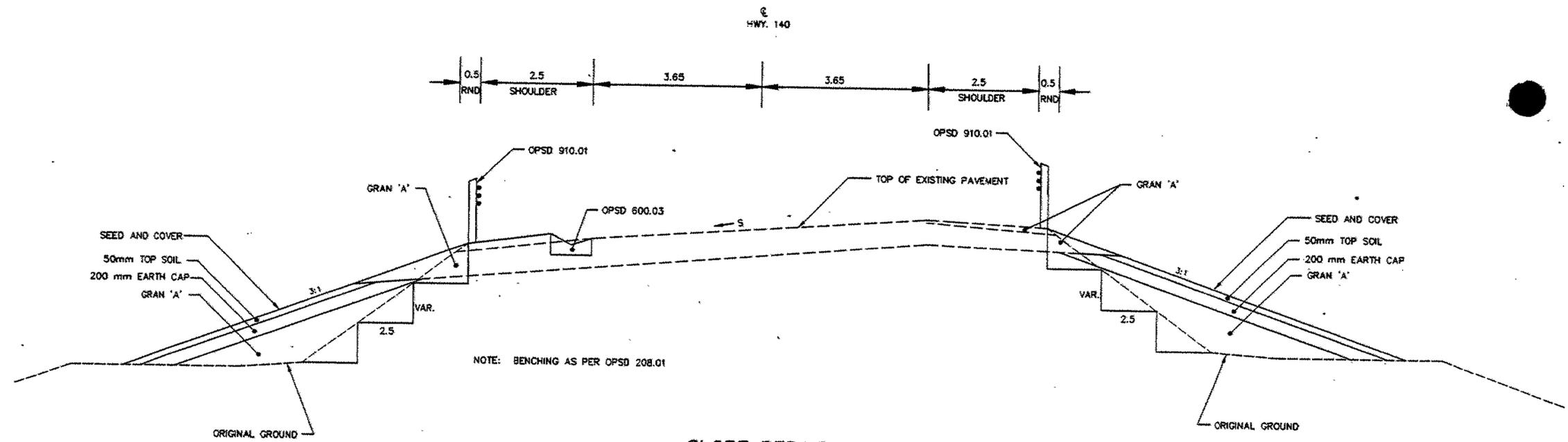
15+330
 15+340
 15+350
 15+360
 15+370
 15+380
 15+390
 15+400
 15+410
 15+420
 15+430
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 15+460
 15+470
 15+480
 15+490
 15+500
 15+510
 15+520
 15+530
 15+540
 15+550
 15+560
 15+570
 15+580
 15+590
 15+600
 15+610
 15+620
 15+630
 15+640
 15+650

Rec'd July 27/11

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

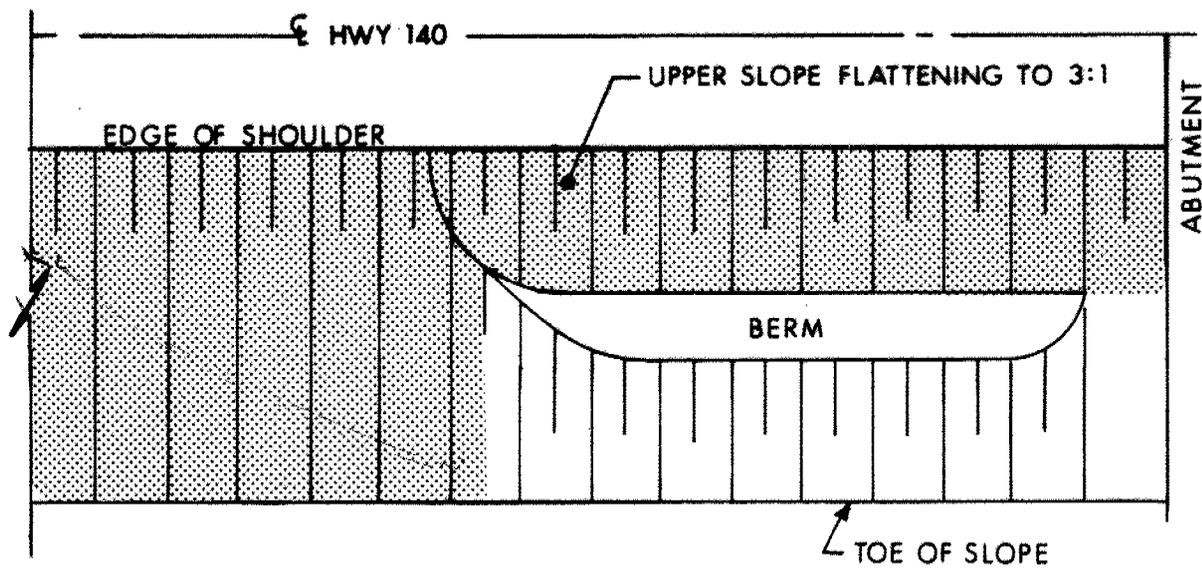
TYPICALS SHEET 10



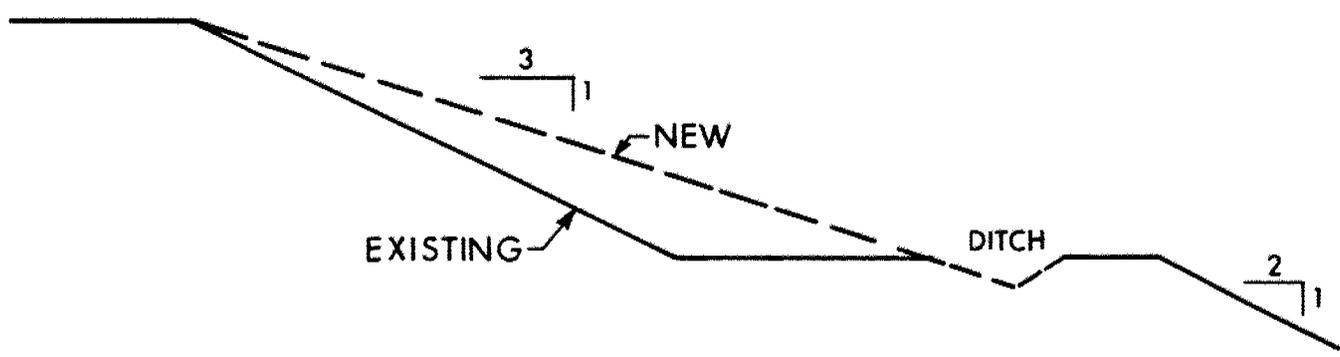
NOTE: BENCHING AS PER OPSD 208.01

SLOPE REPAIR
STA 15+410 TO STA 15+620 (EAST SLOPE)
STA 15+500 TO STA 15+615 (WEST SLOPE)

NOT TO SCALE



PLAN
NTS

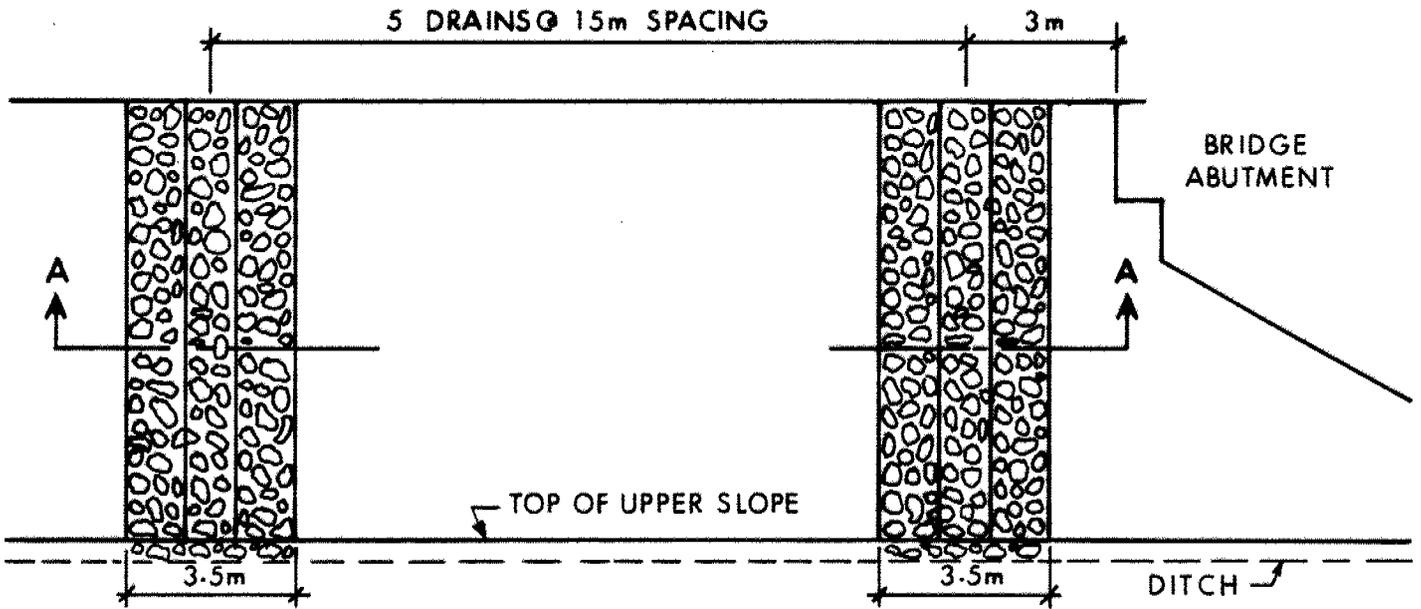


PROFILE
NTS

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



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

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

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

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

G.I-30 SEPT. 1976

GEOCREs No. 302-45

DIST. Ch REGION _____

W.P. No. _____

CONT. No. _____

W. O. No. 97-11006

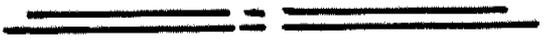
STR. SITE No. _____

HWY. No. 140

LOCATION Slope Instability

Hwy. 140 & CN Overpass

No of PAGES -



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