

memorandum

GEOCREP
No: 31F-172

Ontario

Tel: 3731

To: E.C. Lane
Head, Structural Section
Kingston

Date: 1988 12 20

Atten: A. Van Dalen

RE: Douglas Creek Culvert
6.4 km West of Former Hwy. 17
W.O. 88-46016, Site 29-155
Hwy. 60, District 9, Ottawa

This letter summarizes our telephone conversation dated December 16, 1988 at which time the observations of an inspection of the aforementioned culvert and the proposed scheme to remedy the situation were discussed. The comments and suggestions discussed are described below.

INSPECTION

An inspection of the culvert implemented by this Section on December 1, 1988, confirmed your observations of considerable translation and rotation of the south corner of the east culvert wall. Observation revealed the absence of weep holes along this section. Weep holes, of course are designed to provide channels for the release of hydrostatic pressure. Undermining of culvert footings were noticeable along various sections of both culvert walls. However, it was difficult to ascertain the presence of undermining in the south corner of the east culvert where the significant displacements have occurred because of the elevation of the Douglas Creek waters at that location. The possible coexistence of undermining and water at the footing base can result in not only excessive horizontal force exerted by the water and a potential "jacking" effect produced by the formation of ice, but the resisting forces could also be substantially reduced as a result of the absence of contact between the concrete footing and the bedrock founding material. Furthermore, voids between the footing and founding material can provide routes for potential corrosive attack on the dowels which produces further reduction of lateral resistance.

In addition, the sloping surcharge backfill appears to have been placed at an approximate 1H:1V slope rather than the standard 2H:1V. The steeper slope produces greater lateral earth pressures and it is unknown as to whether this was accounted for in the original design.

FIELD INVESTIGATION

As discussed, it is the intent of this section to carry out a field investigation prior to the submission of any recommendation that would arrest further movements. The purpose of the investigation is to:

.....2

- 1) Determine the characteristics of the backfill and bedrock by advancing boreholes behind the culvert wall.
- 2) Attempt to ascertain extent of undermining and provide recommendations for repair.

In view of the weather conditions that presently confront us and the fact that the investigation will entail mobilization on the steep fill slopes behind the culvert wall, the field investigation, as agreed in our telephone conversation would be implemented far more economically under improved climatic conditions in May, 1989. Although it is unlikely that a total collapse will develop within the deferred time period, it is recommended that the culvert wall and associated southeast retaining wall be monitored for displacement within this interim period. A summary of the monitoring records should be supplied to this Section.

If you have any questions regarding the above comments or require additional information, please do not hesitate to contact this office.



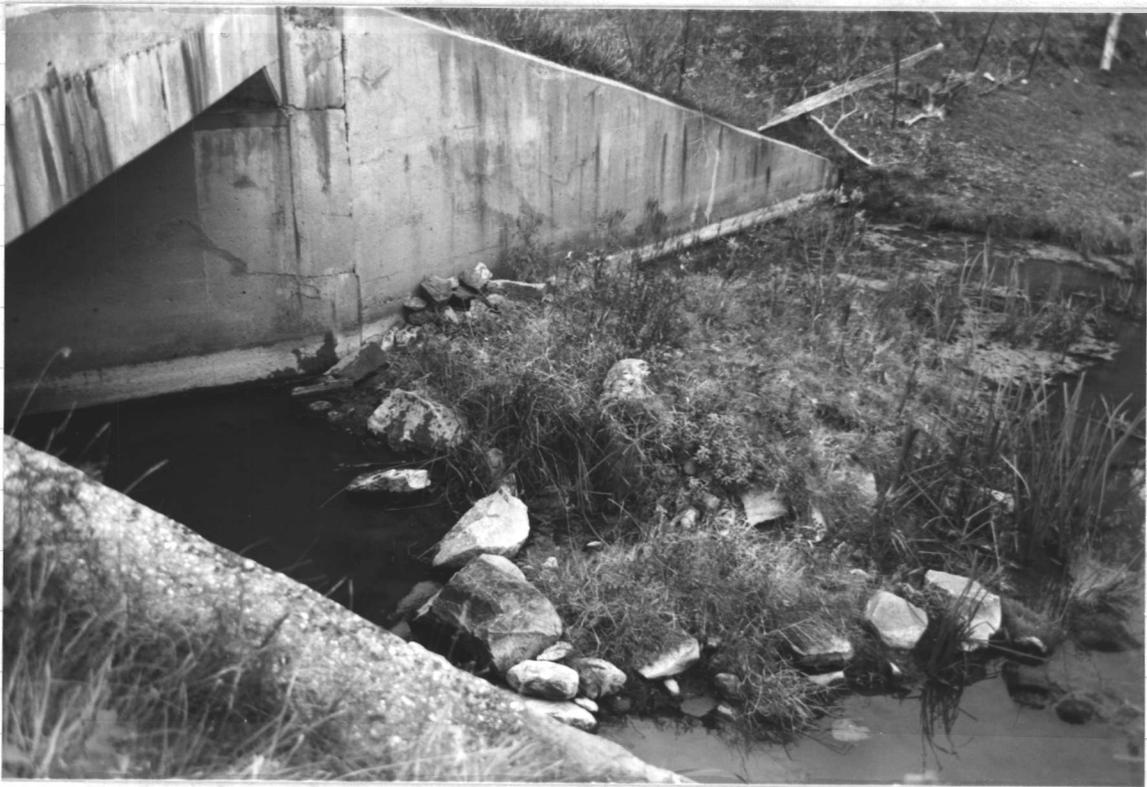
T. Sangiuliano, P. Eng.
Foundation Engineer

TS/mmj



SITE 29-155
DOUGLAS CREEK CULVERT
HIGHWAY 60

OCT. 1988

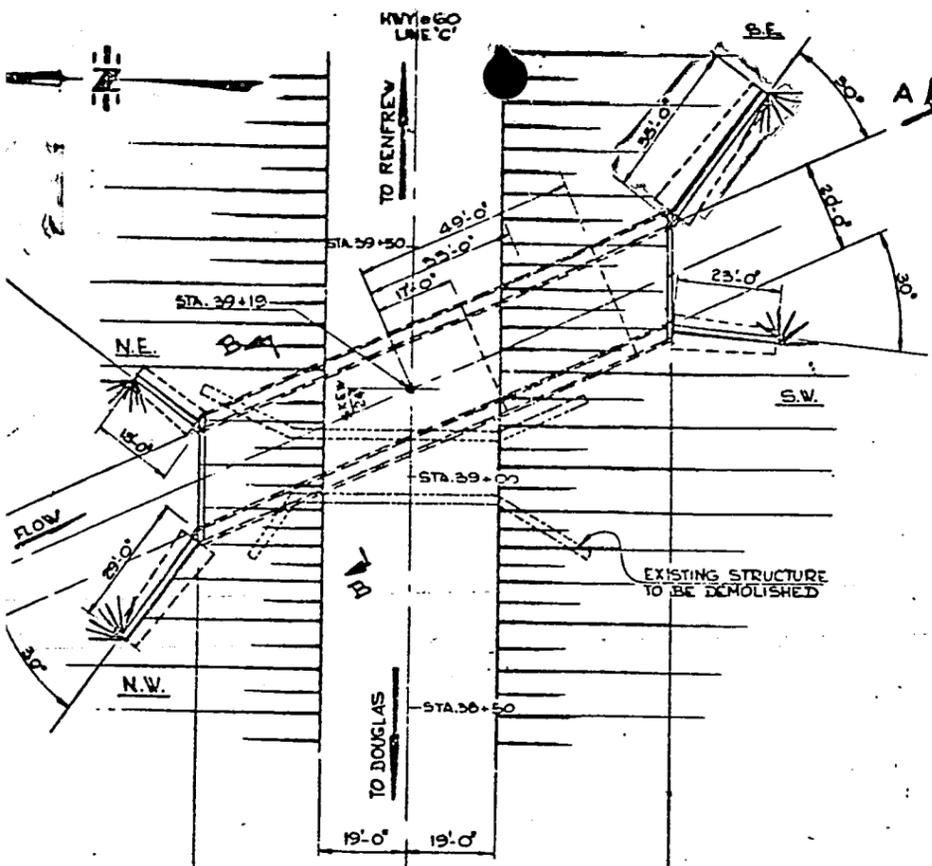


SITE 29-155
DOUGLAS CREEK CULVERT
OCT-1988

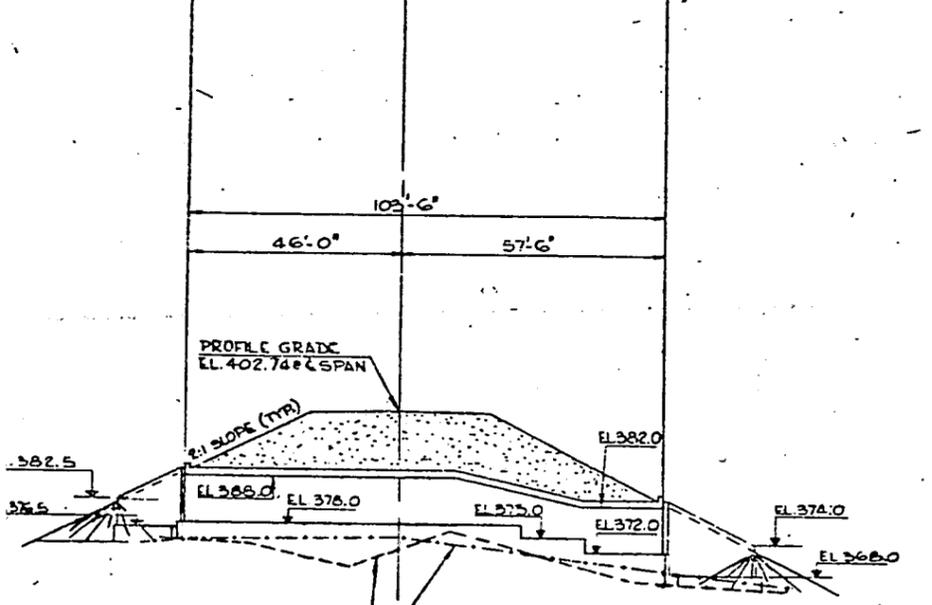


SITE 29-155
DOUGLAS CREEK CULVERT

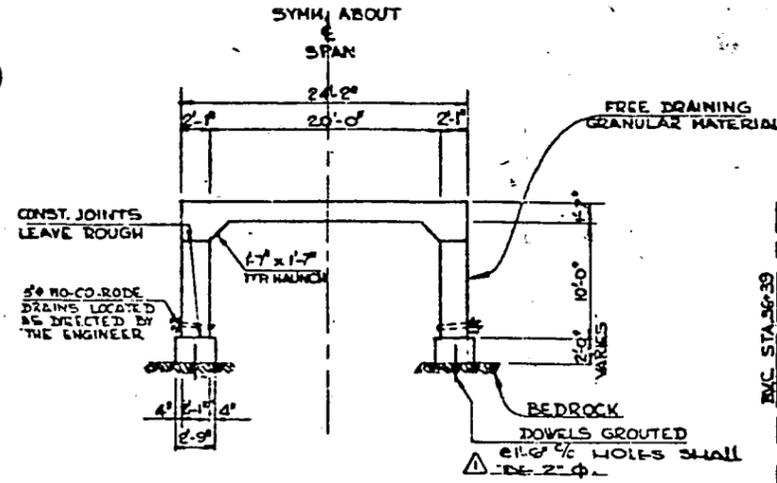
OCT. 1988



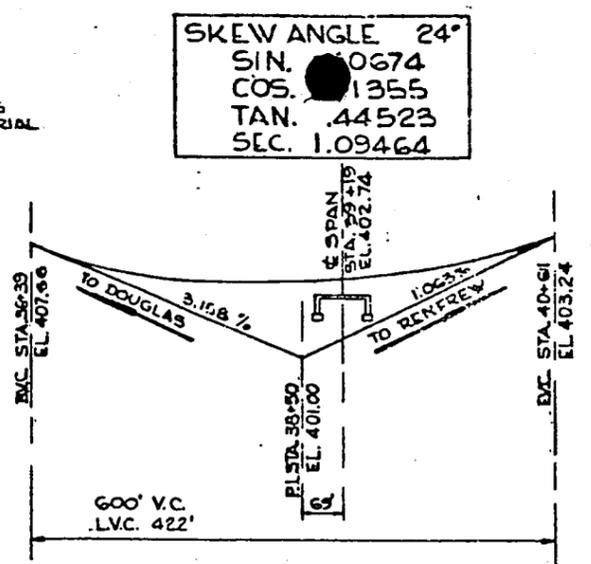
GENERAL PLAN
SCALE: 1" = 20'-0"



SECTION A-A
SCALE: 1" = 20'-0"

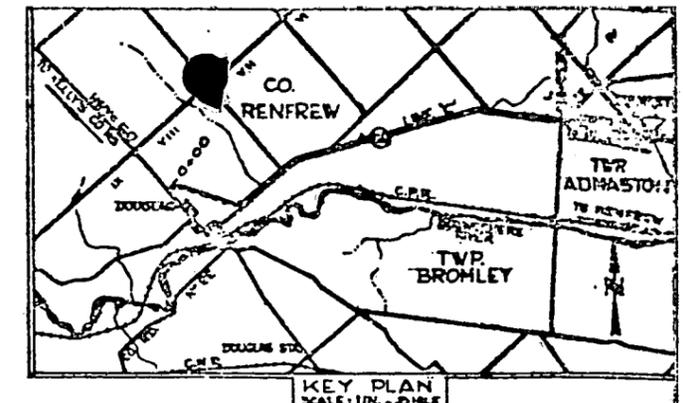


SECTION B-B
SCALE: 1/8" = 1'-0"



PROFILE GRADE
e & ROADWAY
N.T.S.

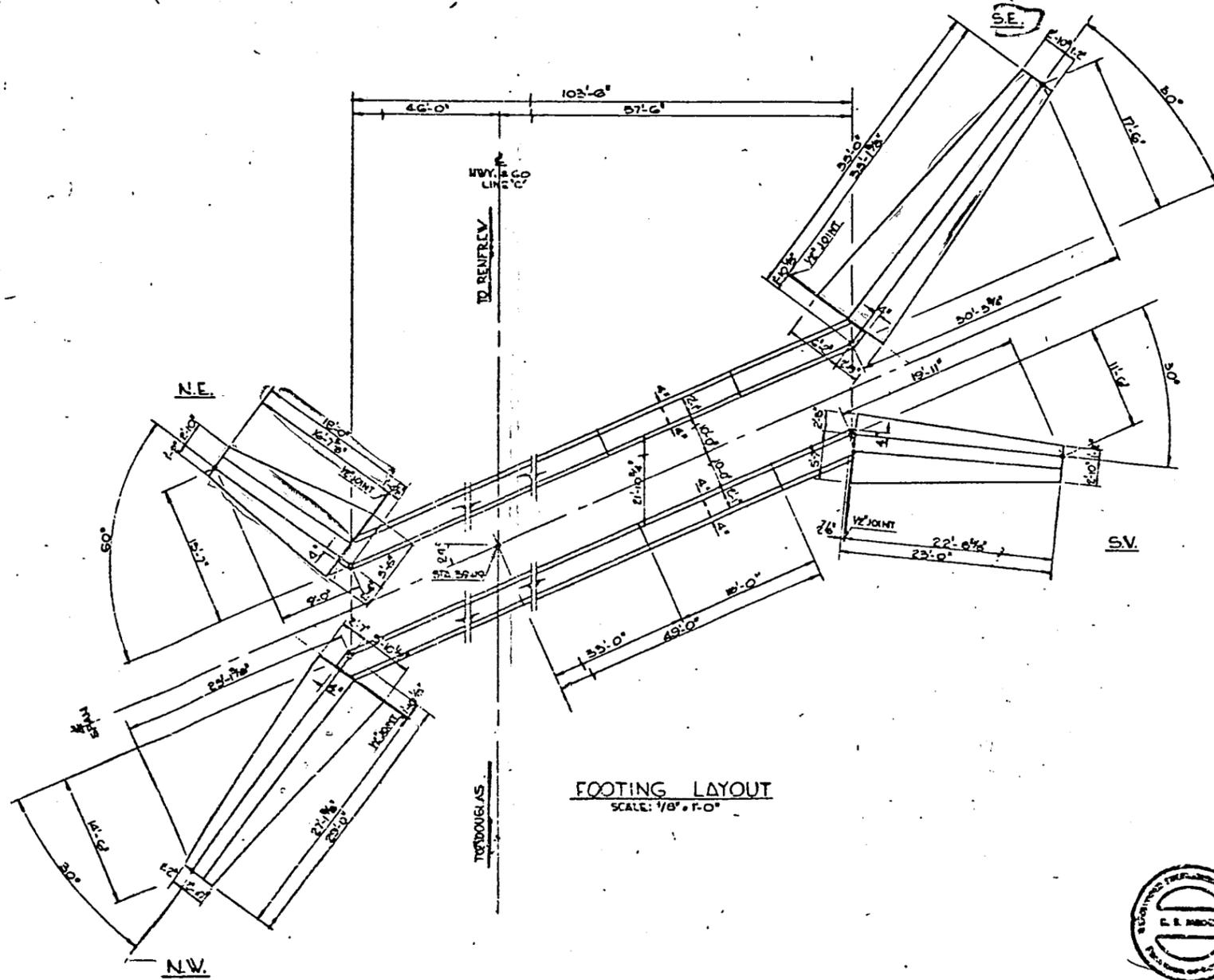
SKIEW ANGLE 24°
SIN. .40674
COS. .91355
TAN. .44523
SEC. 1.09464



KEY PLAN
SCALE: 1/4" = 1/2 MILE

LIST OF DRAWINGS	
D-5305-1	GENERAL PLAN & FOOTING LAYOUT
2	DETAILS OF CULVERT
3	RETAINING WALLS
4	REINFORCING STEEL SCHEDULE
5	DC

NOTES
TO THE ENGINEER
 CONCRETE WORK ON THIS STRUCTURE MUST NOT BE COMMENCED UNTIL MONUMENTS TO FIX CONTROL POINTS HAVE BEEN ERECTED AND CHECKED BY THE ENGINEER.
TO CONTRACTOR
 STRUCTURE TO BE BUILT IN ACCORDANCE WITH FOUR NOS. AND THE SPECIAL PROVISIONS EXTRA COPIES OF WHICH MAY BE OBTAINED FROM THE ENGINEER.
CONCRETE MIX:
 MIN. STRENGTH OF CONCRETE @ 28 DAYS: 3000 P.S.I.
 APPROVED ADMIXTURES SUPPLIED BY THE CONTRACTOR WILL BE ADDED TO ALL CONCRETE, AS SPECIFIED BY THE ENGINEER.
CLEAR COVER ON REINFORCING STEEL:
 1 1/2" BOTTOM OF SLAB 3' ELSEWHERE
CONSTRUCTION NOTES
 ALL EXPOSED EDGES TO BE CHAMFERED 1"x1", EXCEPT AS NOTED.
 ALL CONSTRUCTION JOINTS MUST BE APPROVED BY THE ENGINEER.
BORING DATA
 NO SOIL INVESTIGATION REPORT FOR THIS STRUCTURE EXISTS. BEDROCK PROFILES SHOWN ON THESE PLANS ARE BASED ON FIELD INVESTIGATIONS THE ACCURACY OF WHICH IS NOT GUARANTEED BY THE D.H.O.



FOOTING LAYOUT
SCALE: 1/8" = 1'-0"

REVISIONS	DATE	BY	DESCRIPTION

DEPARTMENT OF HIGHWAYS ONTARIO
 BRIDGE ENGINEER

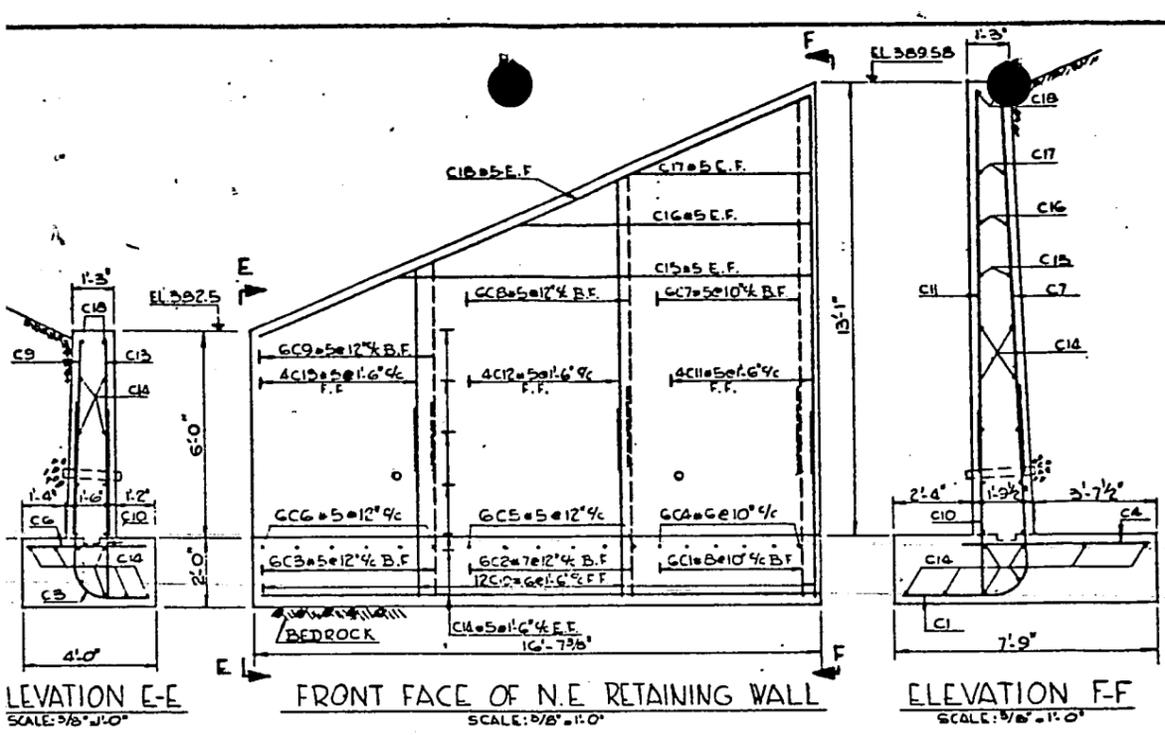
DOUGLAS CREEK CULVERT
 4 MILES WEST OF HIGHWAY 17

ONT'S HIGHWAY No. 60 DIST. No. 10
 CO. RENFREW STA. 39+19
 TWP. ADMASTON LOT 29 & 36 CON. IV

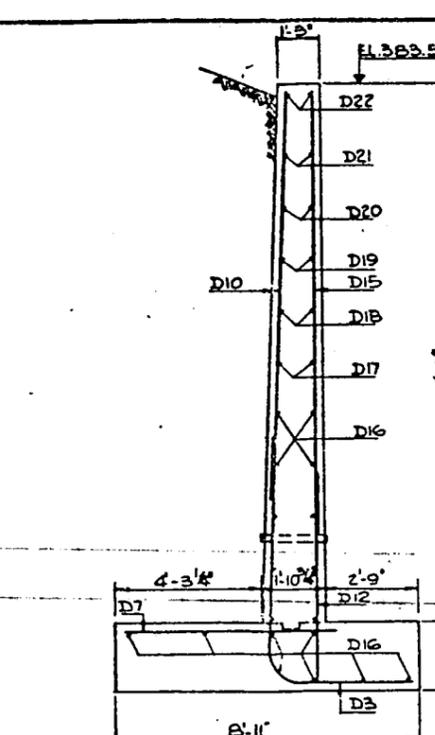
GENERAL PLAN & FOOTING LAYOUT

APPROVED: [Signature] DATE: OCT. 1963
 DRAWN: G.P. CHECKED: [Signature] CONTRACT: [Signature]
 DATE: OCT. 1963 DRAWING NO.: D-5305-1

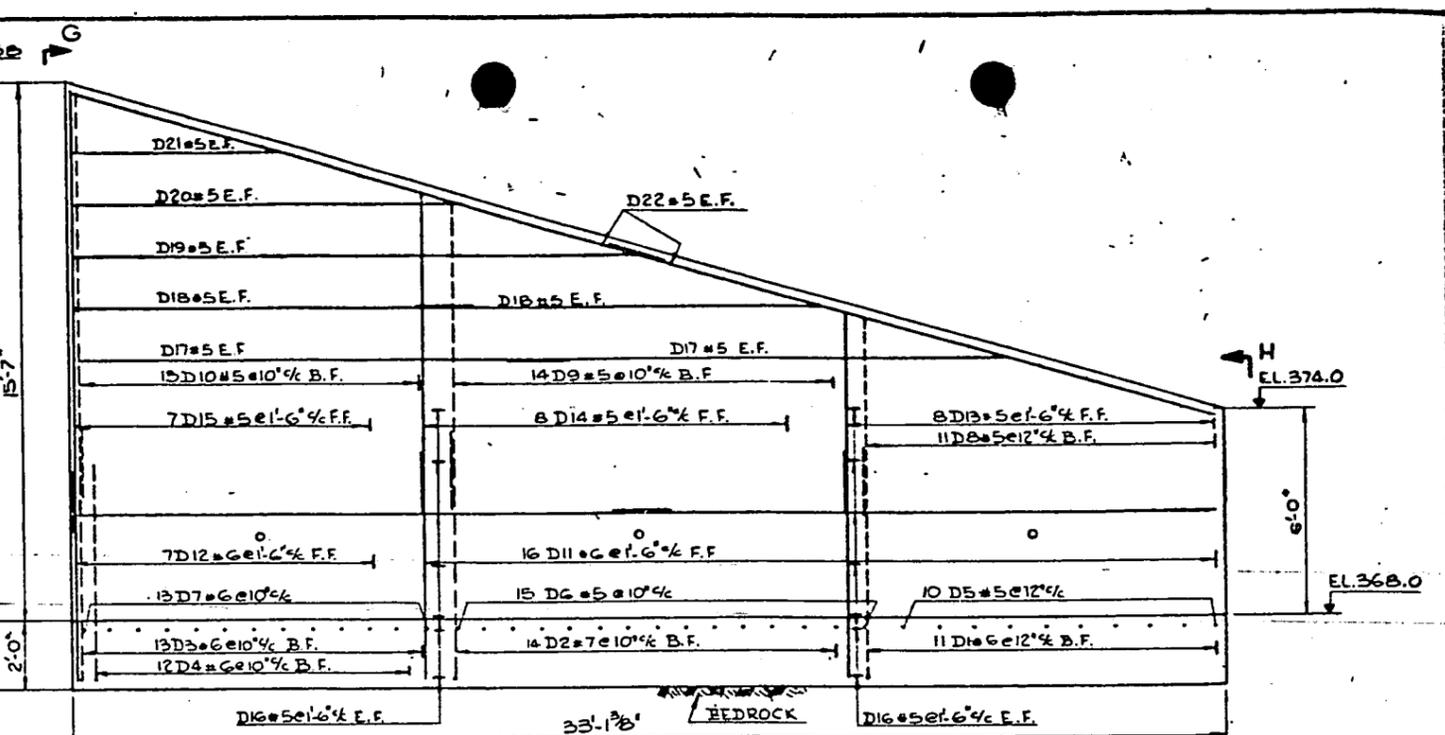




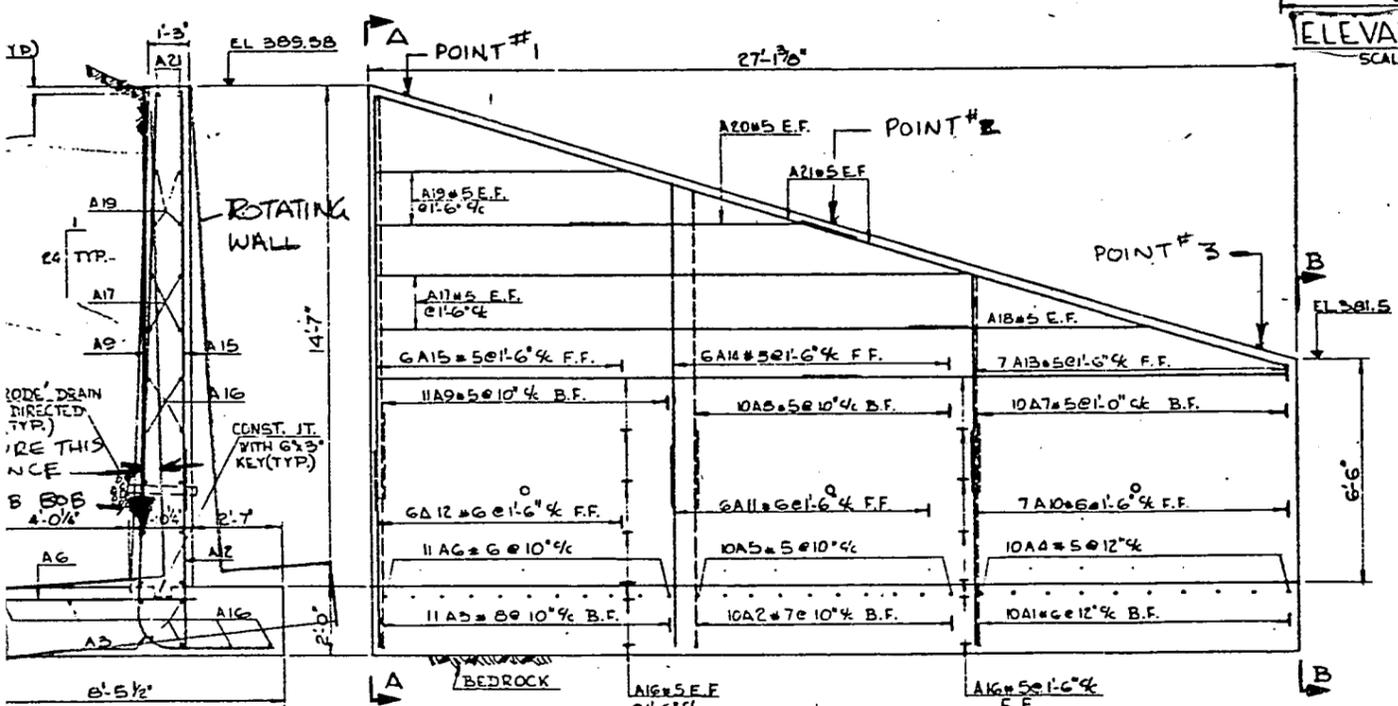
ELEVATION E-E
SCALE: 3/8" = 1'-0"



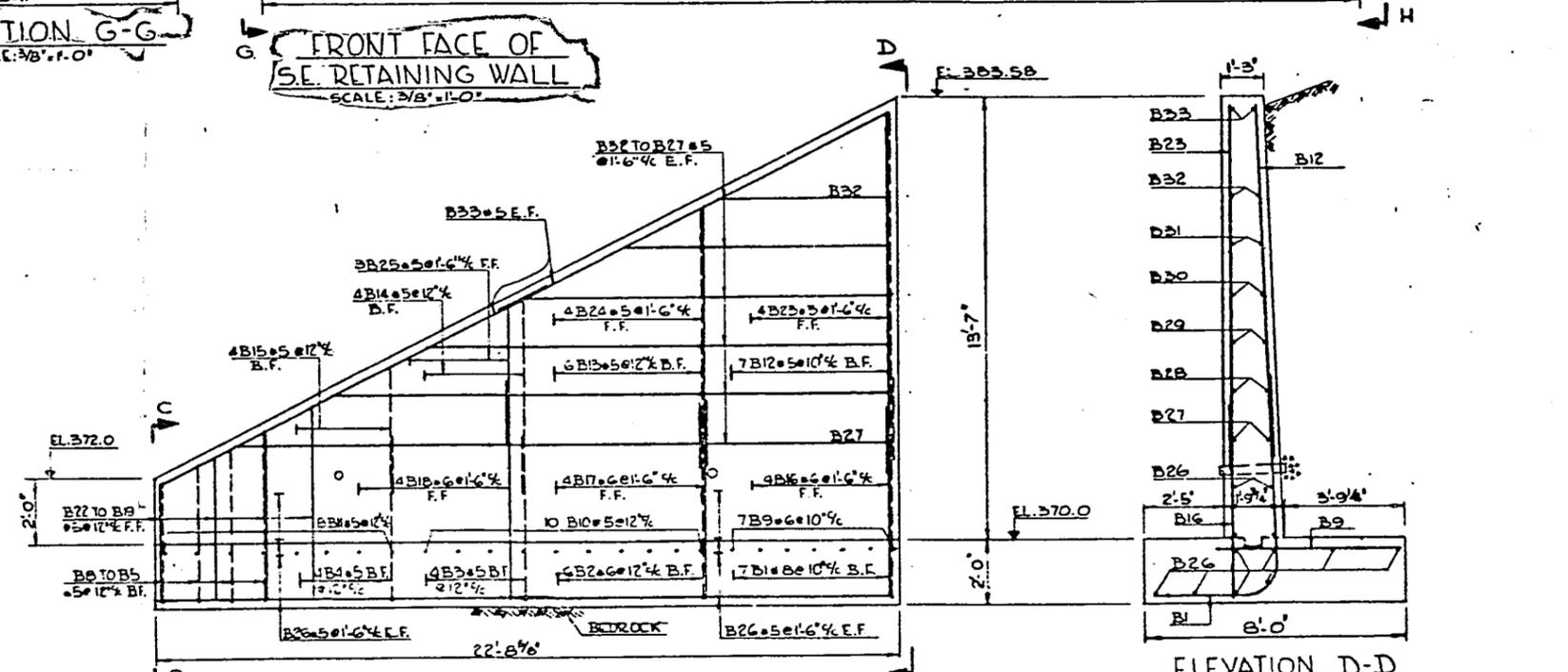
ELEVATION F-F
SCALE: 3/8" = 1'-0"



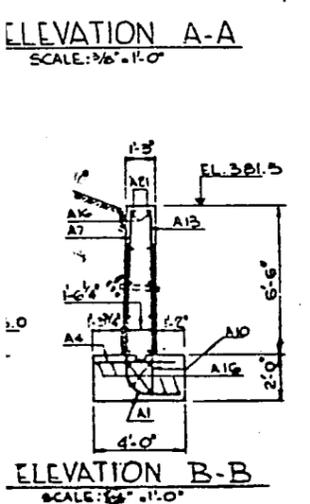
ELEVATION G-G
SCALE: 3/8" = 1'-0"



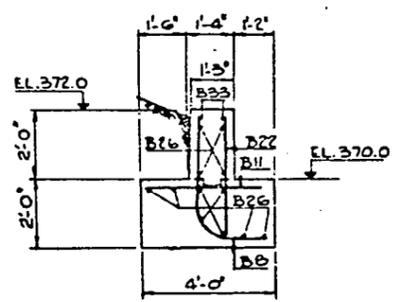
ELEVATION A-A
SCALE: 3/8" = 1'-0"



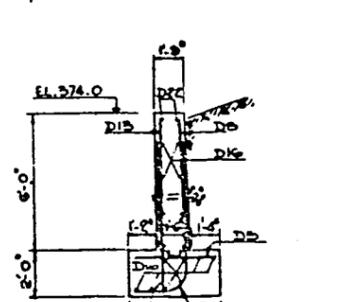
ELEVATION D-D
SCALE: 3/8" = 1'-0"



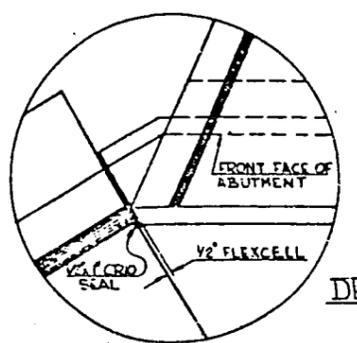
ELEVATION B-B
SCALE: 3/8" = 1'-0"



ELEVATION C-C
SCALE: 3/8" = 1'-0"



ELEVATION H-H
SCALE: 3/8" = 1'-0"



DETAIL OF JOINT
SCALE: 3/8" = 1'-0"

LEGEND
F.F. = FRONT FACE
B.F. = BACK FACE
E.F. = EACH FACE

REVISIONS	DATE	BY	DESCRIPTION

DEPARTMENT OF HIGHWAYS ONTARIO
ROAD DIVISION

DOUGLAS CREEK CULVERT
4 MILES WEST OF HWY 17

KNO'S HIGHWAY No. 60 DIST. No. 10
CO. RENEW
TWP. ADMASTON LOT 29 & 36 COIL. IV.

RETAINING WALLS

APPROVED: [Signature] DATE: 30-155

DESIGN	GP	CHECK	LSM	CONTRACT	
DRAWING	GP	CHECK	MSB		45-225
DATE	OCT. 1963	LOADING	H20-20	DRAWING NO.	D-5305-3