

GEOCRES No. 41J-36DIST. 18 REGION W.P. No. 941-64-00CONT. No. W. O. No. STR. SITE No. HWY. No. 561LOCATION BRUCE MINESPATROL YARDNo. of PAGES - 1=====
OVERSIZE DRAWINGS TO BE INCLUDED WITH THIS REPORT. REMARKS:

file #18, General

Mr. C.M. Smith
Head, Geotechnical Section
Northwestern Region
Thunder Bay

Soil Mechanics Section
Engineering Materials Office
Room 315, Central Building

78 09 28

Re: Foundation Investigation Report for
W.P. 941-64-00, Hwy. 561
Bruce Mines Patrol Yard
District 18, Sault Ste. Marie

Enclosed are 3 copies of the above report prepared by Dominion
Soil Investigation Inc. at our request under addendum to
Consultant Agreement No. 4243-9078-23 for W.P. 19-76-03.
The findings of the Consultant and the recommendations based
on those findings are acceptable to us and may be used for
your detailed design work.

Original Signed by C. MIRZA

C. Mirza
Head
Soil Mechanics Section

CM/gb

Enclosures

cc: D.A. Jarvis (2)
W.A. Stewart
I.P. Chadwick
J. Smrcka
G.A. Wrong
B.J. Giroux
R.S. Pillar
R. Hore (Ministry of the Environment)

D.W. Fry)
N. Maluzinsky)
J. Anderson) memo only
G. Sloan)

Files ✓

41 J-36
GEOCRES No.

DOMINION SOIL INVESTIGATION INC.

CONSULTING ENGINEERS

TORONTO KITCHENER LONDON WINDSOR THUNDER BAY SARNIA



DOMINION SOIL INVESTIGATION INC.

CONSULTING SOIL & FOUNDATION ENGINEERS

104 CROCKFORD BLVD., SCARBOROUGH, ONTARIO, CANADA, M1R 3C6

(416) 751-6565

41J-36A

GEOCRES No.

SOIL INVESTIGATION
PROPOSED SAND DOME
BRUCE MINES-PATROL YARD
HIGHWAY 561, W.P.941-64-00

Ref. No. 78-6-20A

September 1978

Prepared for:
Ministry of Transportation
and Communications

DISTRIBUTION:

15 copies - Ministry of Transportation and Communications
2 copies - Dominion Soil Investigation Inc. (Toronto)
1 copy - Dominion Soil Investigation Inc. (Thunder Bay)



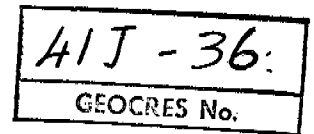
DOMINION SOIL INVESTIGATION INC.

CONSULTING SOIL & FOUNDATION ENGINEERS

104 CROCKFORD BLVD., SCARBOROUGH, ONTARIO, CANADA, M1R 3C6

(416) 751-6565

September 26, 1978



Ref. No. 78-6-20A

Ministry of Transportation
and Communications
Soil Mechanics Section
Engineering Materials Office
Room 315
Central Building
1201 Wilson Avenue
DOWNSVIEW, Ontario
M3M 1J8

Attention: Mr. C. Mirza, P.Eng.
Head, Soil Mechanics Section

Re: Soil Investigation
Proposed Sand Dome
Bruce Mines-Patrol Yard
Highway 561, W.P.941-64-00

Dear Sirs:

At your request, we have investigated the subsurface conditions in the area of a proposed sand dome at the MTC Patrol Yard near Bruce Mines. The findings of the investigation, together with the results of our analysis and conclusions, are presented in this letter report.

The Project

We understand that the proposed sand dome will be 30 ft. high and will be located east of the existing paved area.

.../...



The purpose of the investigation was to determine the subsurface conditions and to comment on the stability of the proposed sandpile.

Subsurface Conditions

The investigation consisted of an exploratory borehole located approximately at the centre of the proposed sand dome. The location of the borehole in relation to the south-east corner of the existing paved area is shown on Enclosure No. 1 attached.

The borehole was extended to refusal and the overburden to this depth was sampled at 2.5 ft. intervals by the Standard Penetration test method. Adjacent to the borehole, approximately 5 ft. to the north, a second borehole was drilled in which continuous vane tests were performed between a depth of 3 and 10 ft. below the ground surface. The results of the borings and field tests are shown on the Record of the Borehole (Enclosure No. 2).

The borehole indicates that below 3 ft. of silty sand fill the site is underlain by stiff silty clay. Standard Penetration tests indicate 'N'-values between 9 and 12 blows per foot. In-situ vane tests gave undrained shear strength values ranging between 2200 and 3700 pounds per square foot with an average value of about 3000 pounds per square foot. The liquid limit of the clay is 44%, the plastic limit is 18%, and the plasticity index is 26. The natural moisture content ranges between 22 and 35%.

.../...

The clay extends to a depth of 10 ft. where dense, clayey sand till was encountered. The borehole met refusal 11 ft. below the ground surface and it is believed that this level indicates the surface of the bedrock.

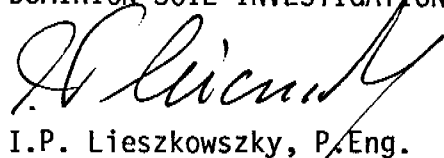
The water level in the borehole was measured 10 ft. below the ground surface.

Discussion of the Results

Information made available to us by the Ministry suggests that the sand dome will be conical in shape. Assuming that the angle of repose of the sand is 30 degrees, the diameter of the 30 ft. high sand dome will be about 100 ft.

Taking 120 p.c.f. as the average bulk density of the sand, the maximum vertical stress under the centre of the sand cone will be about 3600 p.s.f. and about 900 p.s.f. under the perimeter of the dome. The maximum shear stress was estimated to be about 1100 p.s.f. From a comparison of these values with the available shear strength of the soil, which was measured to be ranging between 2200 and 3700 p.s.f., it is our opinion that there is an adequate safety factor against both general and local shear failure of the soil. From the above it can be concluded that the proposed sand dome will be stable and it can be constructed as proposed.

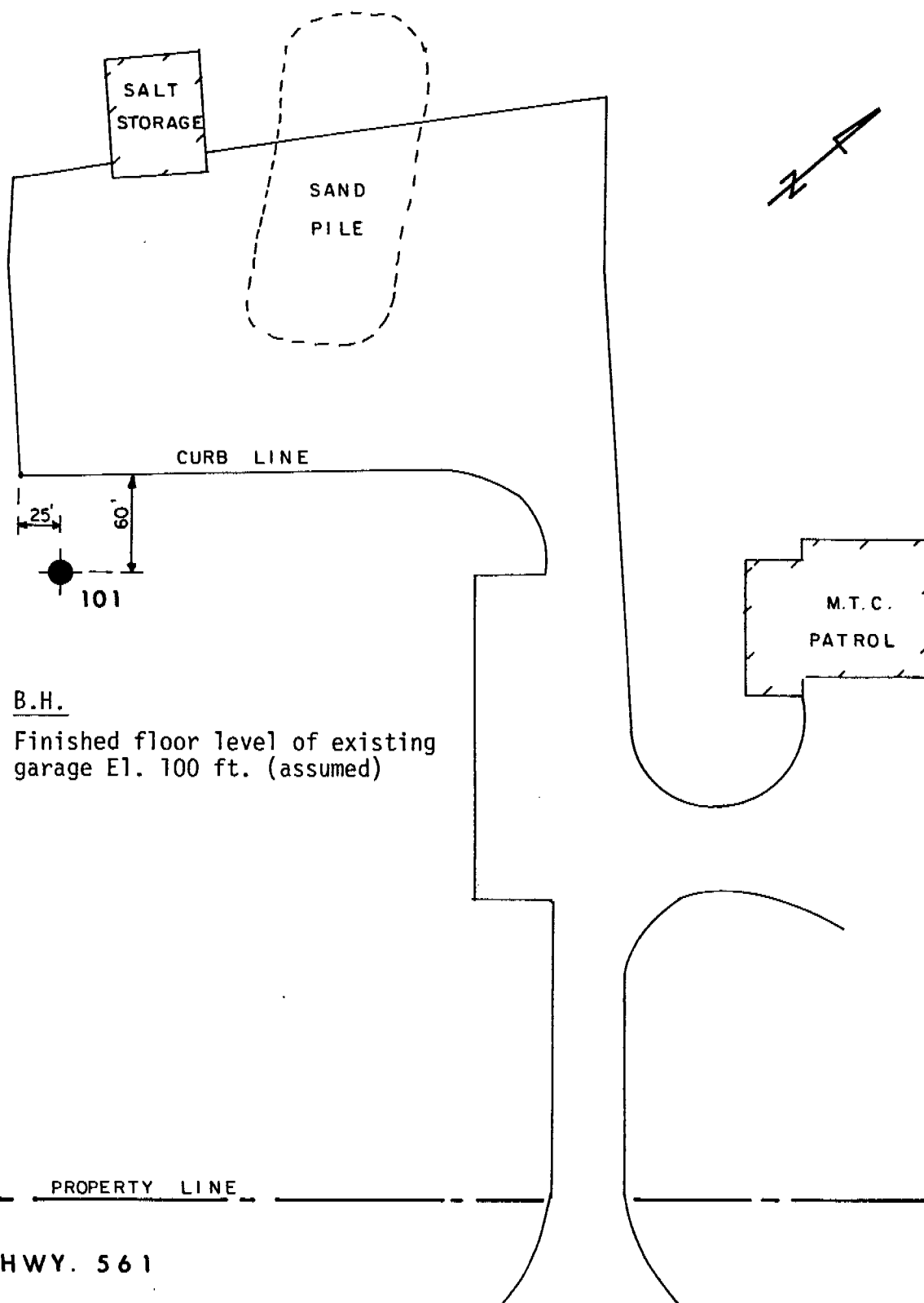
Yours very truly,
DOMINION SOIL INVESTIGATION INC.


I.P. Lieszkowsky, P.Eng.

IPL:esp



Prep. By F. L.



B.H.

Finished floor level of existing
garage El. 100 ft. (assumed)

BOREHOLE LOCATION PLAN



RECORD OF BOREHOLE No 101

W P 941 - 64 - 00 LOCATION BRUCE MINES PATROL YARD, HWY. 561 (SEE PLAN) ORIGINATED BY D.C.
DIST 18 HWY 561 BOREHOLE TYPE AUGERING, HOLLOW STEM 3 1/4" I.D. COMPILED BY D.C.
DATUM LOCAL DATE AUGUST 18, 1978 CHECKED BY I.P.I.

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT			PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			'N' VALUES	20	40					
97.1	GROUND SURFACE													
0.0 94.1	Silty Sand FILL													
3.0	Stiff Silty CLAY		1	SS	9									
	some Sand		2	SS	9									
87.1			3	SS	12									
10.0 80.1	Dense Clayey Sand TILL		4	SS	5075									
11.0	REFUSAL AT 11 FT. POSSIBLY BEDROCK													Note: Vane tests were taken in a separate borehole approx. 5 Ft. north of borehole 101

OFFICE REPORT ON SOIL EXPLORATION

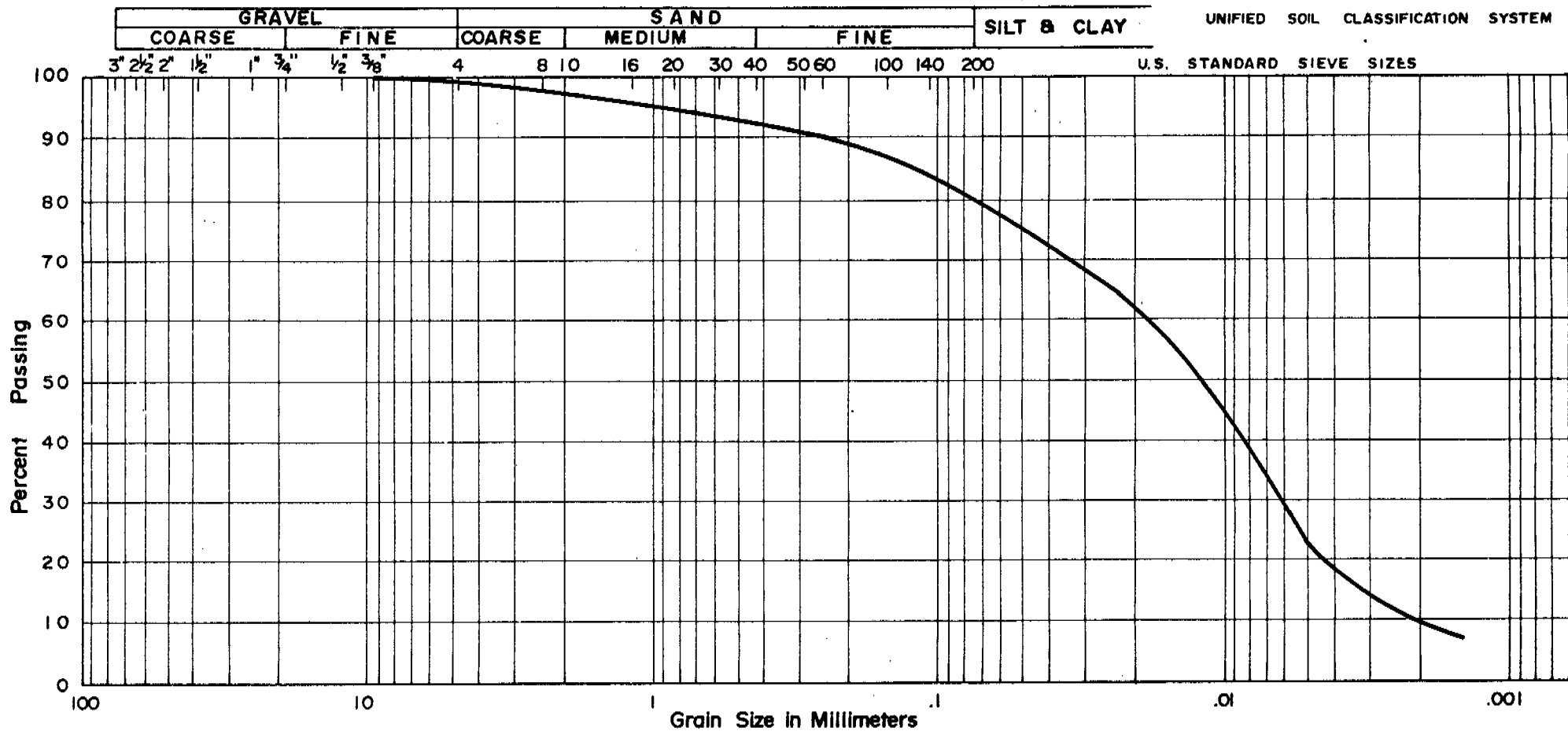
+3, x5: Numbers refer to
Sensitivity

20
15
10
5
(%) STRAIN AT FAILURE

DOMINION SOIL INVESTIGATION INC.

GRAIN SIZE DISTRIBUTION

OUR REFERENCE No 78-6-20



PROJECT: PATROL YARD
 LOCATION: HWY. 561 - BRUCE MINES
 BOREHOLE No: 101
 SAMPLE No: 3
 DEPTH: 8'
 ELEVATION: 89.1'

COEFFICIENT OF UNIFORMITY:
 COEFFICIENT OF CURVATURE:

Classification of Sample and Group Symbol:
CLAYEY SILT
 some sand

PLASTIC PROPERTIES

LIQUID LIMIT	% = 44.0
PLASTIC LIMIT	% = 18.0
PLASTICITY INDEX	% = 26.0
MOISTURE CONTENT	% = 22.0

ENCLOSURE No 3