

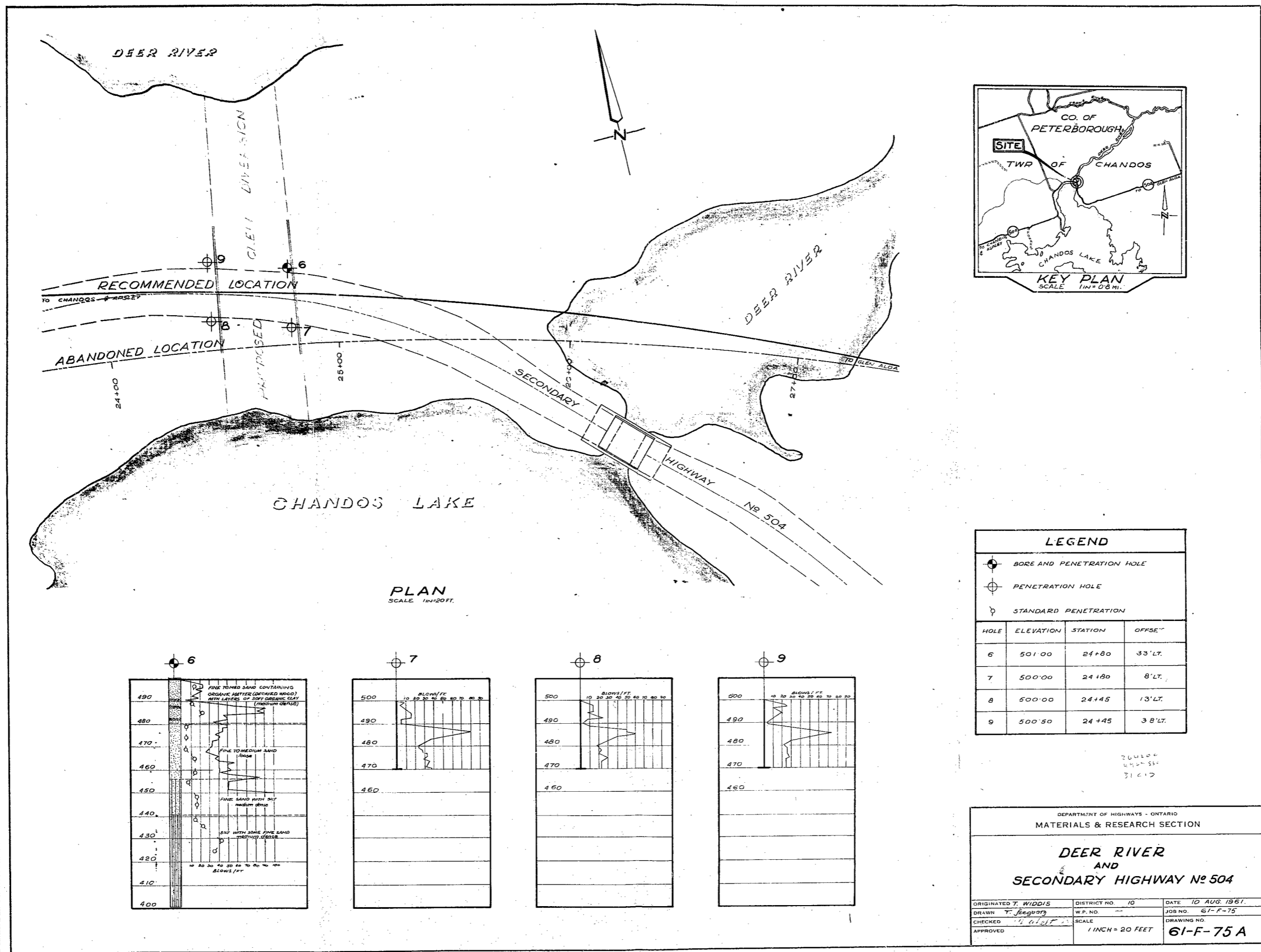
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61-F-75

#

SEC. HWY 504

DEER RIVER



Mr. A. M. Toye,  
Bridge Engineer.  
Materials & Research Section.  
Attention: Mr. S. McCombie.

August 8, 1961.  
D.H.O. INVESTIGATION.  
W.P. Nil      W.J. 61-F-75.

Re: Deer River Diversion and  
Secondary Highway #504,  
District #10.

In February of this year a soils investigation was carried out at the above bridge site where the proposed line 'D' of Hwy. 504 crosses Deer River. Due to the realignment of Hwy. 504 and the intention to straighten the Deer River channel a further soils investigation was carried out to determine the subsoil characteristics at the revised structure location some 180.0' to the west of the existing bridge. Accompanying this report is a plan showing the position of the boreholes and a graphical representation of the results of the field investigations.

The subsoil at the structure site is granular. It consists of a 15.0' layer of fine to medium sand containing organic matter in the form of decayed wood. An 'N' value of 24 has been chosen as representative of this material indicating that it has a relative density which is medium dense. Beneath this from 15.0 to 45.0 is a fine to medium loose grey sand. The 'N' values for this material vary from 6 at 16.0' to 16 at 41.0'. Layers of soft organic clay or silt up to 12" in thickness are found in both of these strata and their positions have been indicated on the Profile of B.H. 6 on plan 61-F-75A. Beneath the fine to medium grey sand is a stratum of grey silt containing some fine sand. This material was proven to a depth of 101.0'. The 'N' values increase progressively from 9 at 45.0' to 34 at 70.0'.

cont'd. /2 ...

From observations of the water level in the borehole at the time of the investigation the water level was estimated to be at elevation 495.50'.

It is intended that the future structure is to be a 15 x 12' twin box culvert with an invert level of 489.74 (or 1019.0 geodetic). This means that the footing elevation will be approximately 488.74. It is suggested that all organic material be removed for a depth of 2.0' below the proposed footing elevation and replaced with granular backfill thoroughly compacted. If this is done a design load of 0.5 T.S.F. may be used.

Due to the high position of the water table and the granular nature of the subsoil, dewatering will be a problem. The excavation may be kept dry by driving sheet piling and using a sump pump. In order to prevent quick conditions from developing at the base of the excavation the sheet piling should be driven to such an elevation that the tip of the sheeting should be as far below the base of the excavation as the water table is above it. The water table can easily be determined at the time of construction.

Report Prepared by: *W. F. Widdis*  
.....  
T. F. Widdis,  
Proj. Fdn. Engr.

Report Approved by: *A. G. Stermac*  
.....  
A. G. Stermac,  
Supv. Fdn. Engr.

TFW/tt

cc: Messrs. S. McCombie  
H. A. Tregaskes  
H. D. McMillan  
J. Ford  
C. R. Robertson  
J. Roy  
T. J. Kovich  
J. E. Gruspier  
C. Saint  
F. Norman  
A. Watt  
Foundations Office  
Gen. Files

APPENDIX I.

Mr. A. M. Toye,  
Bridge Engineer.  
Materials & Research Section,  
(Foundations Office).  
Attention: Mr. W. Hashizume.

October 3, 1961.

D.H.O. INVESTIGATION -  
W.J. 61-F-75.

Re: Hwy. 504 and Deer River Diversion,  
Twp. of Chandes, District No. 10.

This is to confirm that the safe design  
load of 0.5 T/sq.ft., as recommended for a twin box  
culvert in our report of August 1961, can be increased  
to 0.7 T/sq.ft. This increase will augment the settle-  
ment to approximately 2 inches.

A. G. Stermac,  
PRINCIPAL FOUNDATION ENGR.  
Per:

*T. F. Widdis*  
(T. F. Widdis,  
PROJECT FOUNDATION ENGR.)

TFW/Mdef

cc: Foundations Office ✓  
Gen. Files

61-F-765:

TIMBER PILE

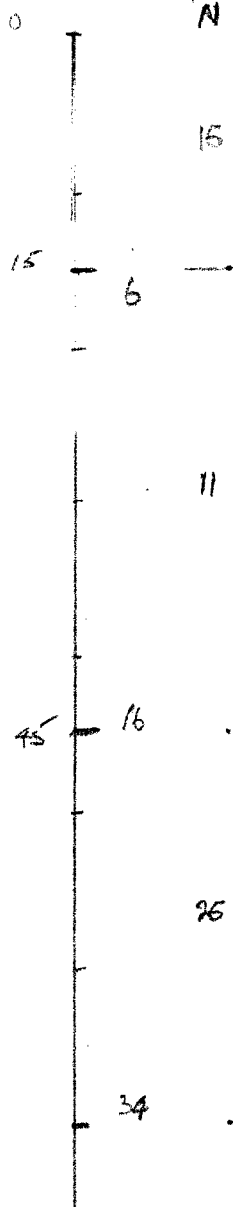
$\bar{N}$  AVERAGE.

$L = 40.0'$

END DIAM. = 8"

AVERAGE DIAM. = 9"

DEPTH BELOW GROUND LEVEL.



$$Q = \frac{\bar{N} \pi D L}{50} + 4 N_p A_p$$

1.  $L = 40$   $D = 9"$   $\bar{N} = 13$   $N_p = 11$   $D_p = 8"$

$$Q = \frac{13 \cdot \pi \cdot \left(\frac{9}{4}\right) \cdot 40}{50} + 4 \cdot 11 \cdot \frac{\pi \left(\frac{8}{4}\right)^2}{4}$$

$$= 84.50 + 13.9$$

$$= 38.40 \text{ TONS.}$$