

memorandum



To: Mr. V. Boehnke,
Head, Structural Section,
Southwestern Region

Date: 81 03 11

ATTN: H.S. Bawcutt

From: Pavement and Foundation Design Section,
Room 313, Central Building

Re: Hwy #12, Interchange S.B.L.
Site 30-456B, W.P. 906-66-17
Hwy #400, District 5

As per your request dated 80-05-12 for a foundation investigation program to be carried out at the above mentioned site, this letter provides a brief description of the anticipated subsurface conditions together with detailed recommendations pertaining to the structure foundations and the related earthworks.

In late 1974 and early 1975, a complete investigation was carried and report issued by this Section for the Hwy 12 Overpass N.B.L. (W.P. 906-66-10) which was later constructed under Contract 77-25.

In our view, subsurface data obtained during this previous investigation and during construction operations are sufficient in scope to be extrapolated to cover the site of the S.B.L. structure; hence additional fieldwork was not deemed necessary.

No further report will be issued for this project except for the report and drawing required for contract purposes, which will be prepared upon receipt of the final structural drawings.

Subsurface Conditions

The predominate soil stratum underlying the N.B.L. site is a sensitive, soft to stiff silty clay to clay (CL-CH) ranging in thickness from 13 feet to 28.5 feet. Occasional seams and/or layers of silt to silty fine sand were encountered throughout.

Underlying the predominant cohesive deposit, competent bedrock, described as typically hard metamorphic gneiss with moderate fractures, can be expected to be encountered at an average elevation of 565.

During the original investigation ground water levels were found to range between elevations 586.5 and 591.5, indicating a perched water table in the cohesive stratum close to ground surface.

Detailed descriptions of soil types encountered, lab test results and individual Record of Borehole sheets are given in the Foundation Contract Report for the NBL Overpass structure (Contract 77-25).

RECOMMENDATIONS

Present planning calls for the completion of Hwy 400/12 interchange complex with the construction of the Hwy 400 S.B.L. Overpass structure and north approach embankment. A 3 span (50' - 95' - 50') structure with perched abutments, similar to the existing N.B. structure is contemplated, necessitating fill heights in the order of 24 ft. for the north approach.

In consideration of the soft, highly compressible nature of the underlying subsoils, spread footing-type foundations are not considered feasible at this site. The structure, both abutments and piers, should be founded on endbearing piles driven to refusal on competent bedrock. For design estimating purposes, steel 'H' section piles equipped with reinforced flange tips driven to bedrock (average estimated tip elevation of 565) can be designed for the maximum allowable compressive loading per pile section (i.e. 130 tons for a 12 HP 74).

A minimum earth cover of at least 6 ft. should be provided to the underside of the pile caps for frost protection purposes.

In order to insure the stability of the north approach embankment, minimize consolidation settlement, and eliminate the need for berms it is recommended that subexcavation of the soft clay beneath the approach embankment be carried out in a similar manner as per treatment of the existing south approaches and north approach for the N.B.L. Subexcavation of the soft clay material should be carried out in transverse strips, perpendicular to Hwy 400 N.B.L., not wider than 10 feet to a depth corresponding to elevation 578; backfilled and compacted immediately with select subgrade material. Recommended geometry of the excavation is as follows:

Transverse Limits

From the toe of the existing N.B.L. north approach embankment to the west limits of the S.B.L. embankment.

Longitudinal Limits

Excavate down from the north toe of the Hwy 12 embankment at a 2H:1V slope to elevation 578 and back to 50 feet behind the north abutment and then up at a 10H:1V transition slope. Compacted backfill should be carried 1 foot above prevailing groundwater level with S.S.M. whose maximum grain size is not greater than 3 inches.

In consideration of the relatively impervious nature of the cohesive subsoil , no dewatering problems are anticipated for pier pile cap excavations.

We trust the information provided is sufficient in scope for your requirements. Please feel free to contact this Section if further discussion is warranted.

Yours truly,

A handwritten signature in dark ink, appearing to read "Tom Kazmierowski". The signature is fluid and cursive, with a large initial "T" and "K".

Tom Kazmierowski,
Project Foundation Engineer

for

Ken Selby
Senior Foundations Engineer

c.c. - A.P. Watt
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