

Foundations Investigations

Planning a major construction project like the Detroit River International Crossing (DRIC) requires a thorough understanding of soil conditions, groundwater conditions and depth to sound bedrock. This information is used to determine the strength of the underlying soil and rock and its ability to support foundations for bridges and retaining walls as well as utilities and the roadway itself. The DRIC study team has reviewed much of the available soils data provided from other investigations that have been completed in and around the Area of Continued Analysis over the years. The generation of Practical Alternatives for the crossing, plaza and access road has identified locations of bridges, retaining walls and other structures. One of the activities required to aid in the preliminary design of these features is foundations investigations.

Current aspects of the foundations program include:

- A) A deep drilling program in the vicinity of the new proposed international bridge crossing alternatives
- B) A conventional drilling program along the access road corridor.

A) Current Foundations Investigations Program for International Bridge Crossing

The first part of the foundations investigations program includes drilling 12 deep boreholes in the vicinity of Practical Alternative Crossing B and C alignments due to the existence of brine wells from historical salt mining activities in the area. Each borehole will be drilled to a depth of up to 500 m (1640 ft). The drilling program is being undertaken to better understand the effects of solution mining of salt deposits and to confirm the integrity of the underlying bedrock to support a new international bridge spanning the Detroit River. The drilling of boreholes is not proposed along Crossing A as this alignment is sufficiently removed from areas of solution mining. Drilling operations are currently underway. A similar drilling program is being undertaken on the U.S. side of the river.

The second part of the investigations includes geophysical and other testing that will be conducted within each borehole during drilling and prior to the installation of the borehole casings. Once drilling has been completed and the borehole casings installed, the ground between boreholes will be characterized using cross-hole seismic tomography. Seismic tomography is similar to a CAT scan where signals are sent through an object in different directions and the signals are compiled to construct a cross section of the object or, in this case, a land mass. The results of the cross-hole tomography survey will lead to the identification of anomalies that may exist between boreholes, as well as imaging of individual soil layers.

A Geoadvisory Group has been assembled to assist the study team in completing the foundations investigations program. The group is comprised of geotechnical experts from Canada and the United States. The results of the drilling program, including seismic tomography, will be reviewed by the group and will be used in the evaluation process for selecting the preferred alternative of the new international bridge crossing.

B) Foundations Investigations Program for the Access Road Practical Alternatives

This program, completed in November 2006, included drilling 24 boreholes along the access road corridor. The boreholes extended to a maximum depth of 35 m (114 ft). Most of the boreholes were located within existing road allowances, including Highway 3, Huron Church Road and E.C. Row Expressway. Boreholes along the corridor were required to provide additional information on existing soil types. This information was needed to provide preliminary structural design recommendations for various structural components for the access road Practical Alternatives. Structural components include walls, roof, floor slabs and footings for tunnels, retaining walls for depressed sections, and bridge abutments for overpasses and underpasses.

Existing Soil and Groundwater Conditions

The existing soils within the study limits generally consist of soft silty clay. West of the Huron Church Road and E.C. Row Expressway interchange, the soil conditions become progressively softer, and less favourable for conventional construction methods. A majority of the bedrock is comprised of limestone, ranging in depths of 20 m (65 ft) below

ground surface at the Detroit River, to 25 m (82 ft) at Ojibway Parkway and EC Row Expressway to 35 m (114 ft) at the existing terminus of Highway 401.

High groundwater conditions exist within the study limits, particularly near the Detroit River. Groundwater elevations range between 0.5 m to 6.0 m (1.6 to 19 ft) below the ground surface. Strategies for groundwater control will be required for all methods of construction.

Drill Rigs being used on Foundations Investigations Program for International Bridge Crossing



Cable Tool Rig on OPG Property, Nov 2006



Coring on Sterling Fuels Property, Nov 2006