Detroit River
INTERNATIONAL CROSSING
S T U D Y

Cost and Constructability:
Construction Staging of Access Road Alternatives

Construction staging is defined as the steps the contractor will need to take during construction in order to build the access road. A plan for construction staging will need to be implemented to provide safe and efficient construction operations as well as to minimize community impacts during construction. The Detroit River International Crossing (DRIC) study team is assessing construction staging under the "Cost and Constructability" evaluation factor. The study team has been reviewing construction staging practices and applying their knowledge gained from other complex freeway construction projects to develop preliminary staging plans for the access road.

How the Analysis was Done

Staging approaches were developed by analyzing cross-sections and plans for the access road alternatives. The following key requirements were considered:

- Maintaining traffic within the existing corridor
- Minimizing disruption to local residents and businesses
- Providing a safe and large work zone for construction
- Completing the project within the project time frame of 2013.

A logical sequence of construction stages was developed for each access road alternative.

Findings to Date

Maintaining Traffic

The study team is committed to maintaining existing traffic on Highway 3/Huron Church Road during construction of the new access road. A minimum of four lanes of traffic will be maintained during construction. Access to and from all major crossing roads and all commercial and residential entrances will be maintained during construction.

Sequence of Construction

For each Practical Alternative, the access road is comprised of a freeway section (the Highway 401 extension) and the future service roads (Highway 3/Huron Church Road). The following is a typical sequence of construction for this type of infrastructure project:

Practical Alternatives 1A and 1B (at-grade or below-grade with one way service roads)

The first phase of construction would focus on the relocation of utilities and other municipal services. There are numerous utilities located within the corridor, including Hydro, Bell, Union Gas, cable television as well as municipal services such as watermains, storm sewers, municipal drains and sanitary sewers.

The next construction phase would focus on building the future service roads, the realignment of the existing municipal roadways (where necessary), and the construction of any temporary staging roads.

During this phase, traffic would remain primarily on the existing Highway 3/Huron Church Road with some routing onto localized temporary staging roads within the corridor.

The final phases of construction would focus on completing the new freeway itself. At-grade sections can be constructed using methods the public is familiar with that are typically used on 400-series highways throughout the province. Below-grade sections can be constructed by using excavation techniques suitable for urban areas. A variety of methods can be employed to minimize the overall property requirements of the project. During the final phases, traffic would be relocated onto the newly constructed service roads with some routing onto localized temporary staging roads within the corridor.

Practical Alternatives 2A and 2B (at-grade or below-grade with a parallel service road)

The construction staging sequence and methods for these Practical Alternatives are similar to those for Practical Alternatives 1A and 1B. However, the alignment for Practical Alternatives 2A and 2B is, for the most part, beside the existing roadway so there would be less utility relocation and realignment of roadways required to construct these alternatives. During construction, traffic would remain primarily on the existing Highway 3/Huron Church Road with some routing onto localized temporary staging roads within the corridor.

Practical Alternative 3 (end-to-end tunnel)

The first phase of construction would focus on the relocation of utilities and other municipal services. There are numerous utilities located within the corridor, including Hydro, Bell, Union Gas, cable television as well as municipal services such as watermains, storm sewers, municipal drains and sanitary sewers.

The tunnel box itself would be constructed in two stages. In each stage, the first sequence of tunnel construction would focus on the realignment of the existing roadways (where necessary) and temporary staging roads. During this phase, traffic would remain primarily on the existing Highway 3/Huron Church Road with some routing onto localized temporary staging roads within the corridor. The next phase of construction would focus on the construction of the tunnel structure itself using the cut and cover tunnel method. During this phase, traffic would be routed primarily onto temporary staging roads within the corridor.

Once construction of the tunnel structure is in place, remaining features such as ventilation systems, pumping stations, and power systems can be constructed, and the surface road network can be completed.

Duration of Construction

The below-grade and end-to-end tunnel alternatives pose the greatest risk to projected cost and schedule (with the tunnel posing the greatest risk) as they require significantly more complex construction than the at-grade alternatives. These alternatives, particularly the tunnel, require a more intense construction period than the at-grade alternatives. The overall schedule depends on equipment and labour availability, and further details of staging which would be determined in later phases of design.

Remaining Activities

A more detailed construction staging analysis will be completed as part of the next phase of work for the preferred access road alternative. This will be done to confirm overall constructability and possible sequencing of activities. Further detailed work on staging will be completed in the next phase following selection of the technically and environmentally preferred alternative.