

Comparative Analysis of Bridge vs. Culverts

(Continued from page 3)

shoring, and dewatering) of the bridge extension option would be confined to a relatively small area compared to the culvert option. Due to the smaller work area associated with the construction of the proposed abutment, the track diversion (which is required for constructing the culverts) is not needed for the construction of the bridge extension option.

At PIC #3, several comments were received indicating a strong preference for a bridge extension structure with a pedestrian walkway attached to the new bridge abutment under the railway embankment. Due to its length and more confined nature, the culvert was perceived as an imposing structure, and concerns were expressed regarding personal safety while accessing the culvert. The bridge extension option provides an open access route, with improved sightlines and pedestrian visibility.

A detailed comparison of the preliminary costs that were determined for the construction of the bridge extension option versus the culvert option resulted in essentially the same cost.

Upon final analysis, the new bridge span represents the better solution to provide additional hydraulic capacity under the CN railway embankment and has been selected as a major flood protection works component of the preferred alternative.

Next Steps

- Jan. 17, 2005** Notice of Filing Document for Review.
- Feb. 21, 2005** End of 30 day public review of Environmental Study Report (ESR) for LDRW Project Class EA .
- Feb. 21, 2005** Submission of CEAA Environmental Screening Report for LDRW Project .
- Spring 2005** Revisions and Final Approval of Class EA ESR and CEAA Environmental Screening Report for LDRW Project.

Contact Us:

Lower Don River West Remedial Flood Protection Project
Web site: http://www.trca.on.ca/water_protection/lower_don_ea

or

<http://www.towaterfront.ca>

Notice of Filing Document for Review

The TRCA has now completed the Environmental Study Report (ESR) for the **Lower Don River West Remedial Flood Protection Project**. The ESR has been prepared in accordance with the Class Environmental Assessment for Remedial Flood and Erosion Control Projects, approved for projects of this type. Funding and support to carry-out this ESR was provided by the levels of government through the Toronto Waterfront Revitalization Corporation (TWRC).

Interested persons are invited to review this document at the following locations:

TRCA Head Office, TWRC Head Office, Toronto City Hall (City Clerks Secretariat), Toronto Metro Hall (Urban Affairs Reference Library)

Copies are also available for download at:

http://www.trca.on.ca/water_protection/lower_don_ea/default.asp?load=whatsnew

and

<http://www.towaterfront.ca>

You may provide written comments to the TRCA head office (address located below) within 30 calendar days from the date of this notice.

Subject to comments received as a result of this study and the receipt of necessary approvals and funding, the TRCA intends to proceed with the construction of this project. If any individual feels that serious environmental concerns remain unresolved after consulting with TRCA staff, it is their right to request that the project be subject to a Part II Order by the Minister of the Environment. Part II Order requests must be received by the Minister, with a copy to the TRCA, at the following address within 30 calendar days following the date of this Notice:

Minister of the Environment
135 St. Clair Avenue West, 15th Floor
Toronto, Ontario, M4V 1P5

Attention: Alex Blasko
Toronto and Region Conservation
5 Shoreham Drive
Toronto ON M3N 1S4
Phone: 416-661-6600 ext. 5280
Fax: 416-667-6278
E-mail: ablasko@trca.on.ca

Lower Don River West Remedial Flood Protection Project

LOWER DON RIVER WEST NEWS

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Edition Four

PIC#3 Summary — Sept. 21, 2004

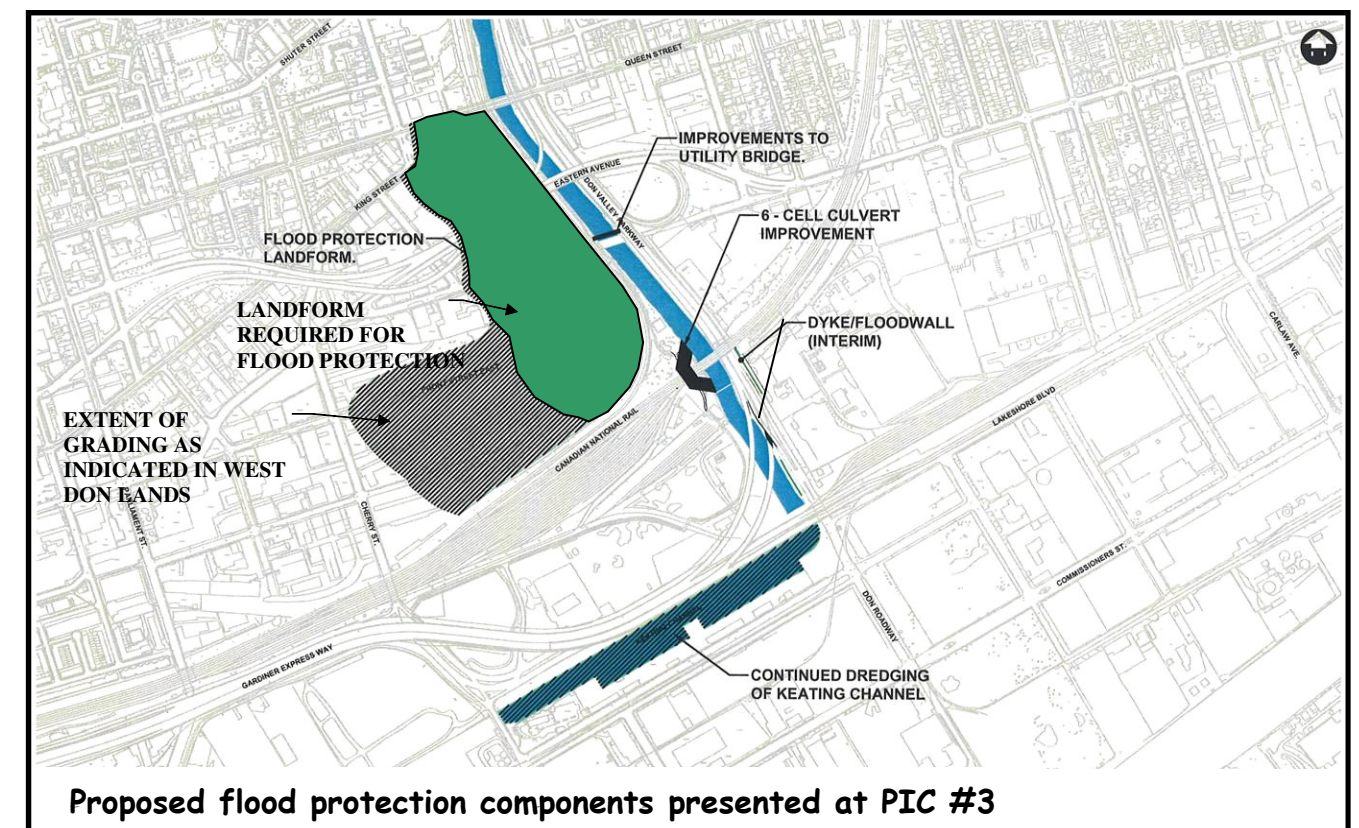
The proposed concept for the Lower Don River West Remedial Flood Protection Project (LDRW Project) was presented to the public at the third Public Information Centre held on September 21, 2004. This concept was composed of:

- A flood protection landform (previously referred to as a berm) located 40 metres from the west bank of the Don River and extended from Queen Street in the north to CN's east-west oriented railway embankment in the south (Kingston Line)
- Six culverts, stacked in two rows of three, that increased the hydraulic capacity under CN's Kingston Line;
- Two low-lying dykes and a retaining wall along the east side of the Don River, south of CN's Kingston Line which

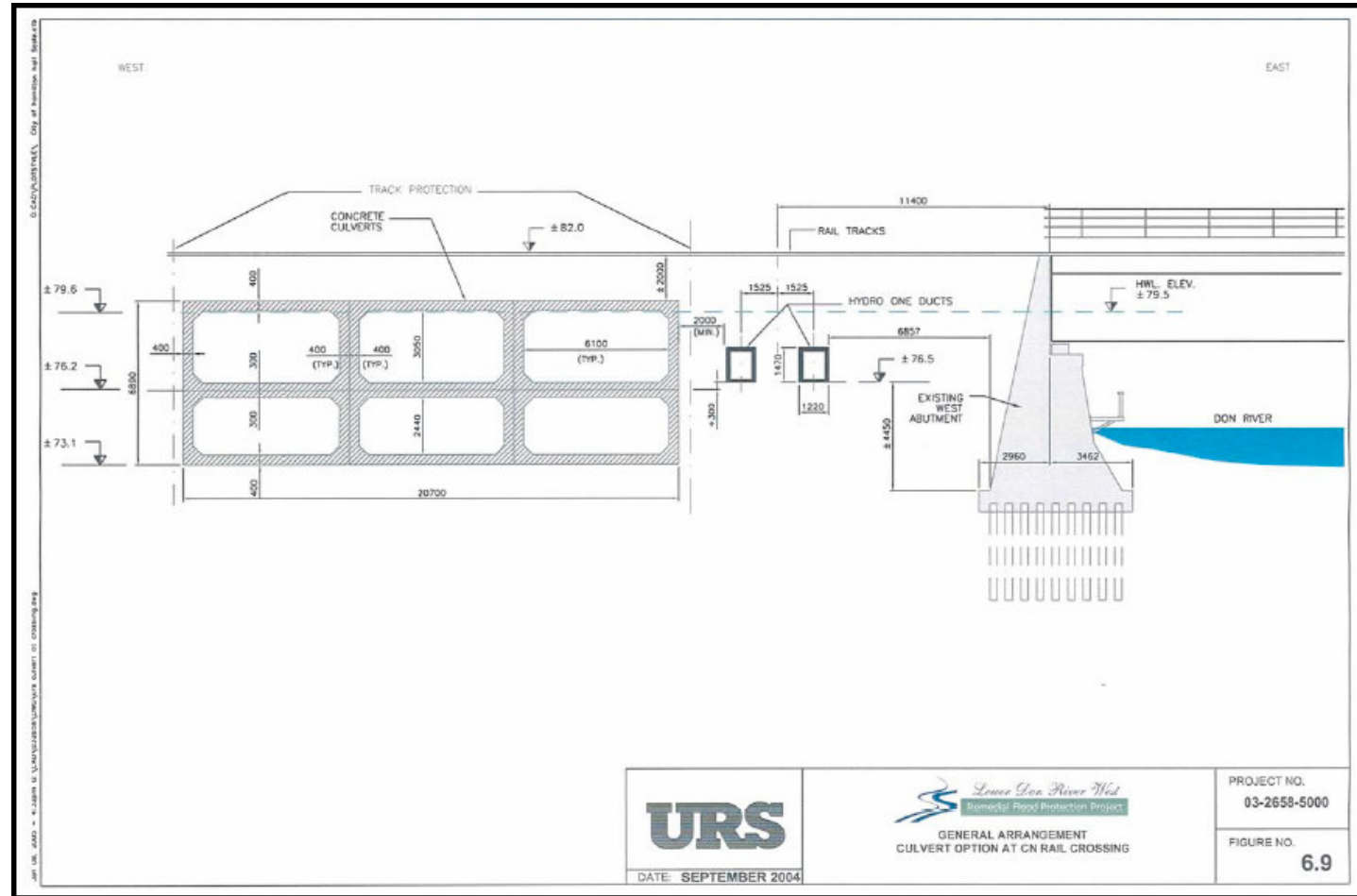
ensured that flooding did not increase south of the tracks following construction of the flood protection landform and culverts;

- Minor modifications to the Enbridge Gas utility bridge at Eastern Avenue; and
- Continued dredging of the Keating Channel as per the requirements under the Keating Channel EA (Acres, 1983).

Overall, support was expressed for the preferred alternative, though a number of questions were raised following the presentations. Questions primarily focused on opportunities to naturalize the mouth of the Don, vegetation restrictions on the flood protection landform, hydraulic modeling results, floodplain characteristics, costs and timing of implementation, and park aesthetics and pedestrian safety related to the proposed culverts.



Proposed flood protection components presented at PIC #3



Proposed culvert alignment under CN's Kingston Line originally presented at PIC #3

Opportunity to Refine Preferred Alternative

As part of the development of the conceptual design for the remedial flood protection project, a re-assessment was carried out for all individual flood protection component works.

A significant outcome of this project review was the need to confirm a major constraint affecting the opportunities available for providing additional hydraulic capacity through the CN Rail embankment. Previous studies indicated that the presence of Hydro One Networks' underground electrical ducts at this location significantly constrained the type of structures that could feasibly be constructed to provide additional hydraulic capacity due to the prohibitive cost associated with any realignment or relocation of the electrical ducts.

The majority of these prohibitive costs related to the perceived need to establish two back-up systems to maintain power transmission while the existing ducts were relocated. Given this fiscal constraint, culverts were deemed to provide the best solution to provide for the required additional hydraulic capacity

through the railway embankment.

Discussions were pursued with Hydro One Networks regarding this item, and subsequent investigations by Hydro One resulted in a significant reduction in the original cost estimate for the relocation works. Hydro One's investigation determined that relocation of the existing electrical ducts could be conducted without installing the two costly back-up power transmission systems. This significant reduction in relocation costs provided TRCA with the opportunity to examine alternative methods (i.e. a new bridge span) to provide for additional hydraulic capacity through the railway embankment, other than the proposed culverts.

Functional designs for both the culvert and bridge options, including additional geotechnical and geo-environmental analysis of the railway embankment's underlying soil and groundwater conditions, were developed in order to conduct a detailed analysis of the two alternative methods to provide for additional hydraulic capacity through the railway embankment.

The results of the analysis indicate that the new bridge span provides a better solution functionally, environmentally and aesthetically, with lower risk and at essentially the same cost as the culverts.

Components of New Bridge Span and Comparative Analysis

The increased hydraulic capacity that is required at the CN Rail embankment can be achieved by widening the waterway opening of the existing bridge. This would be accomplished by converting the existing west abutment to a bridge pier, and constructing an adjoining span and abutment. The configuration and details of this option are shown below.

The required works will also include two concrete ducts on the west side of the proposed abutment to carry the Hydro One Networks cables that are currently contained in the two ducts that extend through the embankment. The required width of the additional span was determined to be 21.3 m.

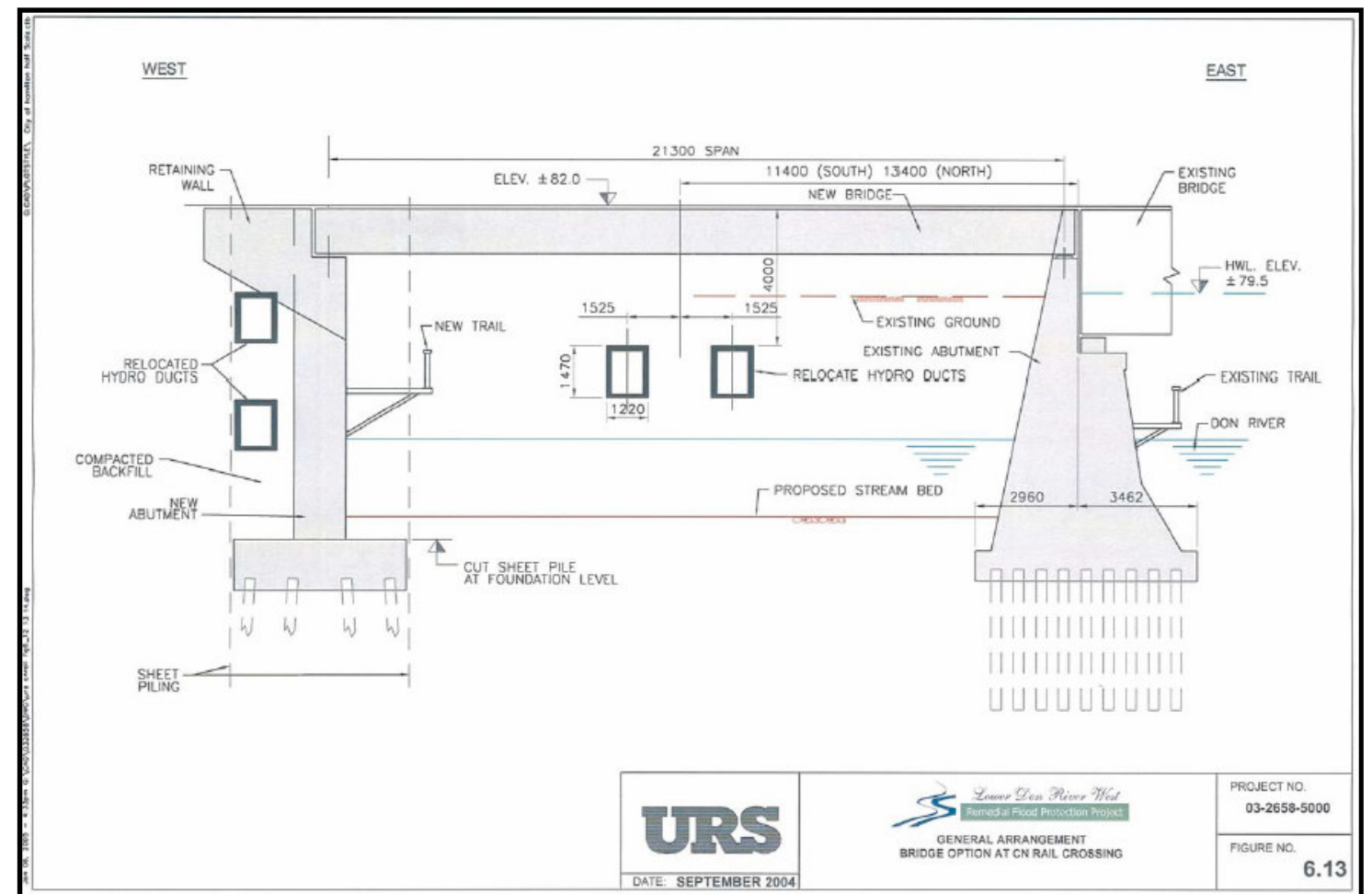
A comparison between the culvert and bridge option was conducted for the following variables: natural environment, hydraulic capacity and risk of failure, engineering complexity, public aesthetics and safety, and cost.

The bridge extension option would create a more natural river bed, as opposed to the concrete bottom of the culvert, and as such the bridge option would provide conditions that are more conducive to the establishment of higher quality fish habitat.

The proposed span for the bridge extension option would provide a waterway opening of over 127 m², which is approximately 25% greater than that afforded by the culvert option. Together with its significantly shorter wetted perimeter as compared to the culvert option, the bridge extension option becomes a much more efficient structure and significantly exceeds the capacity of the culvert structure.

In regard to risk of failure, both options can provide the required hydraulic capacity to achieve flood protection to the Regulatory Flood level. The culvert structure, however, by virtue of the numerous cell side-walls would be more susceptible to blockage by large floating debris.

There is more engineering confidence associated with the construction of an additional bridge span than for the construction of the culverts. Construction (including excavation,



Refined Preferred Alternative Method — Proposed bridge span under CN's Kingston Line