PORT LANDS ACCELERATION INITIATIVE

Appendix 8
Infrastructure Investment Required to Enable Port Lands Development

Rendering of River Park South by Michael Van Valkenburgh Associates courtesy of Waterfront Toronto

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1. Introduction

The Port Lands is a particularly challenging site to develop, in comparison to other potential sites in the City of Toronto and the Greater Toronto Area (GTA), because it:

i. currently lies within a flood zone;

ii. is a brownfield site, needing extensive environmental remediation;

iii. is located in an area with poor ground conditions for building;

iv. lacks development-enabling infrastructure – for the most part, existing roads and services are old and/or inadequate to support more intense development; and

v. is poorly tied into the City's road, transit, and wastewater collection networks.

A key input to the work of the Port Lands Acceleration Initiative (PLAI) is an understanding of the required order-of-magnitude investment in development-enabling infrastructure and public amenities. Such investments can be grouped into three main categories:

i. local (neighbourhood-scale) infrastructure[1];

ii. major infrastructure, including: collector roads and ancillary services, trunk water and wastewater services, bridge structures, public transit facilities, marine structures, major parks,open space, and public realm improvements; and

iii. flood protection infrastructure, a unique requirement for large-scale development in the Port Lands.

In support of the PLAI, indicative cost estimates have been prepared for the local, major, and unique infrastructure required to facilitate full build-out of the Port Lands precincts located north of the Ship Channel, including the Quays (Precincts E1 and E3), the River North and River South Precincts (Precincts E2 and E4, also collectively labeled the Lower Don Lands), the Film Studio District (Precinct F), and Lakeshore South (Precinct G). The East Port Precinct (Precinct L), which straddles the eastern end of the Ship Channel, has been excluded from the study area. Refer to Figure 1 for a map showing the boundaries of these precincts. (Note that some of the required flood protection infrastructure extends

[1] Local infrastructure is normally paid for by a subdivision developer. It typically includes such things as neighbourhood roads and parks, and the water distribution and wastewater collection lines to which building services are directly connected.

beyond the boundaries shown). The estimated infrastructure costs, together with the forecast revenues, provide the foundation for a financial analysis of development potential and funding/financing options.

Figure 1: Port Lands Precincts

The cost estimating process has taken into account Waterfront Toronto's experience in designing, securing approvals for, and constructing enabling infrastructure for development of the West Don Lands and East Bayfront. It also reflects Waterfront Toronto's established and publicly-endorsed goals for waterfront revitalization – in contrast to routine re-development – including:

i. design excellence

   a. achieving a "special quality" of place through coordinated development; and

   b. fostering excellence and coherence of architecture and urban design, ensuring a built environment of appropriate scale and character to yield a waterfront of real consequence;

ii. sustainable development

   a. designing to reduce water use and contribute to improved lake water quality (e.g., through stormwater quality treatment prior to discharge);

   b. safely and effectively managing "brownfield" sites;

   c. maximizing use of renewable and recycled materials;

   d. emphasizing alternative transportation options: public transit, walking, and cycling;

   e. promoting energy efficiency and reliance on renewable energy sources;

   f. increasing the amount of public open space and recreational space; and

   g. including restoration and enhancement of aquatic and terrestrial habitat and expanding the tree canopy;

iii. enhanced public access to the waterfront; and

iv. the creation of model communities to be emulated elsewhere in the City.

2. Cost Estimating Process, Scope and Limitations

The cost estimates in this report are generally based on limited site investigation data and very preliminary design information or extrapolation of designs from on-going waterfront development. Except where otherwise noted, estimates are "all inclusive" of hard construction costs, soft costs, and contingencies, and are presented in 2012 dollars, without provision for escalation, notwithstanding the fact that full build-out is expected to take decades. The exact mix, location, timing, and sequencing of Port Lands development remains uncertain. The area is too big and the roll-out of development still too ill-defined to allow revitalization of the Port Lands to fit the traditional definition of a project.

Although this report presents cost data in the form of single point estimates, it is important to understand that such estimates are only indicative, representing *one possible outcome,* which will change depending upon the many circumstances and risk events that affect project costs. These circumstances and risk or opportunity events (including transformational opportunities such as hosting an Olympics or World's Fair) are neither directly controllable nor absolutely quantifiable. In the early stages of developing a concept for revitalization, before detailed site investigation and design have commenced, and when many strategic and policy decisions still must be made, there is a very wide range of potential outcomes. As shown in Figure 2, the range will narrow as specific development proposals are tabled and design proceeds – in short, as better information becomes available on which to base estimates. Some potential risks may be realized, while others are eliminated. The final cost will only be known once revitalization of the Port Lands is complete.

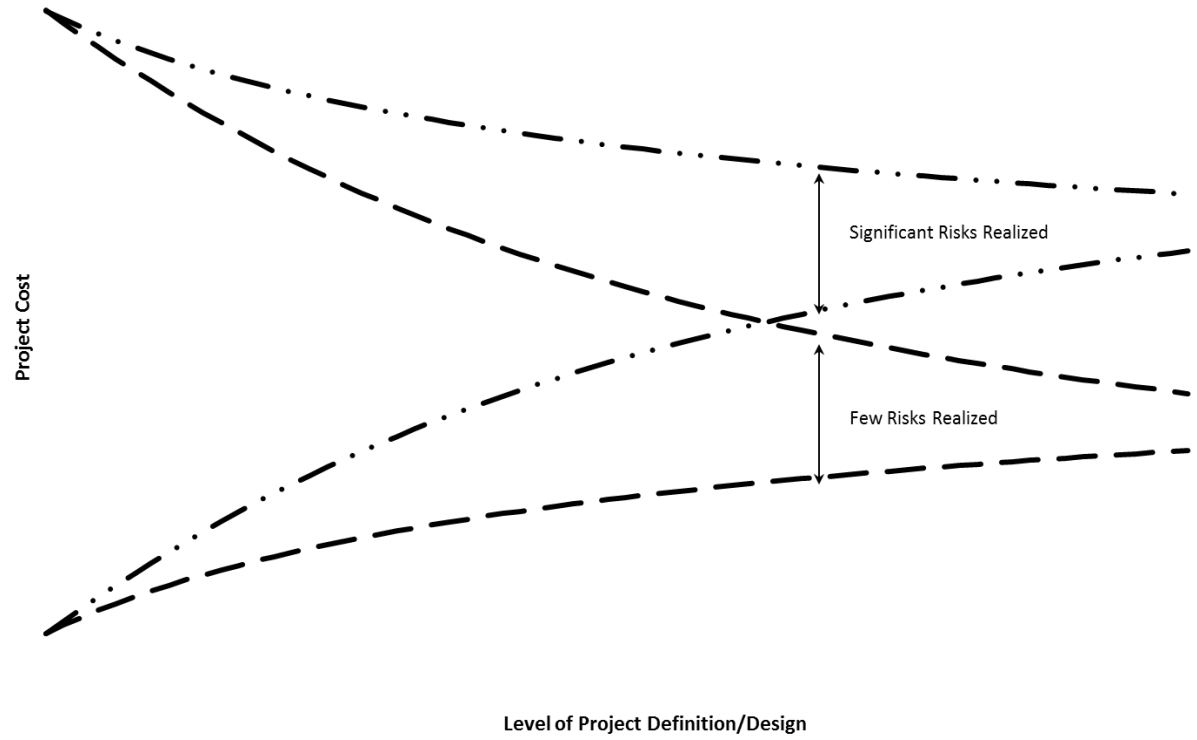

Figure 2: Range of Probable Cost vs. Level of Project Definition/Design

Organizational/decision-making complexity due to involvement of more than one governing body; relationship complexity arising from need to achieve and maintain stakeholder and public cooperation; regulatory complexity and regulation change over time; the level of effort required to minimize construction disruptions in an urban setting; and susceptibility to "scope creep" are just some of the factors that historically have driven up early stage cost estimates for large-scale infrastructure projects. Port Lands revitalization is unlikely to be immune to such pressures.

Ideally, the estimate presentation format would show a *range* of probable costs, but undertaking the necessary analysis requires a much more intense exercise than could be accommodated within the time and budgetary constraints on this study set by Toronto City Council. More importantly, the current level of definition would likely yield such a wide range of probable cost that the effort would be of limited benefit[2]. It is, however, possible to obtain an indication of how a difference in the assumed

[2] Once design concepts are developed somewhat further, and a target implementation timetable established, a cost risk assessment could be undertaken that would provide valuable information for decision-makers and the public. Such an analysis could also be structured to better quantify the benefits and costs of a phased approach.

infrastructure costs might affect the business case for developing the Port Lands by performing sensitivity analysis on the development financial model. The sensitivity analysis would examine the impact of over- or under-estimating the cost by a factor of 25% (or some other amount).

The exact requirements for enabling infrastructure will depend upon the specific development proposals that may be submitted and the negotiations that occur between the proponents and the City through the approvals process. The infrastructure requirements set out in this report, and the accompanying cost estimates, represent an attempt to balance the objectives of making Port Lands development financially feasible and of ensuring that City policies are addressed and that the high standards for waterfront development expected by the public are maintained.

3. Cost Estimate Source Material

The composite costs presented in this report are based on amalgamating information and cost estimates from multiple sources, including:

i. Port Lands Development Plan Heavy Civil Constructability Review: Final Report dated April 20, 2012, prepared by Aecon Construction and Materials Limited (refer to Attachment II);

ii. unit cost build-ups for roads and services, prepared for Waterfront Toronto in March 2012 by Hanscomb Limited (refer to Attachments III through VI);

iii. cost estimates prepared by Hanscomb Consultants (2008 through 2011) to support the Don Mouth Naturalization and Port Lands Flood Protection Environmental Assessment (DMNP EA);

iv. data from recent tenders for upgrading comparable dockwall installations, provided by Parsons Brinkerhoff Halsall, a member of the planningAlliance consultant team;

v. data on typical infrastructure unit costs provided by the Sernas Group, a member of the planningAlliance consultant team;

vi. Waterfront Sanitary Master Plan EA, prepared for Toronto Water by XCG Consultants; and

vii. Waterfront Toronto cost data for completed projects in the East Bayfront and West Don Lands.

Additional data sources were used for cost benchmarking purposes.

4. Methodology and Assumptions

4.1 Flood Protection and Naturalization Costs

The Don Mouth Naturalization and Port Lands Flood Protection Environmental Assessment (DMNP EA) was a key piece of an integrated design process aimed at meeting naturalization and city-building objectives concurrently with solving a flood protection problem. The Lower Don Lands Infrastructure Master Plan and Keating Channel Precinct Environmental Study Report was the second major product of this integrated process.

In parallel with this work, a cost estimate was prepared, which covered flood protection, naturalization, and selected, but not comprehensive, city-building (related major infrastructure) elements, including both core and discretionary items. The cost estimate was based on assuming that: (1) an integrated construction program would deliver other major development-enabling infrastructure together with flood protection works; and (2) sequencing would be driven by construction considerations (e.g., efficiency of construction operations, limiting requirements for temporary facilities, and minimizing overall construction costs). Some infrastructure was included because of geographic proximity to the outlets, although it was not a required element of the EA Preferred Alternative for approval purposes. This estimate – $634 million in 2011[3] dollars – came to be perceived as the cost of implementing flood protection.

The $634 million figure consisted of $501 million in estimated construction costs plus approximately 27% in allowances and contingencies. Soft costs such as design, permitting, environmental oversight, and legal fees (estimated to total approximately $67 million in 2011 dollars) were excluded. Negotiations with affected stakeholders subsequently led to a modified version of the EA preferred alternative, in which the promontories were removed. As there was no corresponding update to the estimate, a clear baseline for further cost comparisons is lacking.

As part of the PLAI, Aecon Construction and Materials Limited carried out a constructability review and study of alternative excavation and construction methods for the new river valley and greenway/spillway and for constructing the bridges and utility crossings. Aecon's Port Lands Development Plan Heavy Civil Constructability Review: Final Report, dated April 20, 2012 (appended as Attachment I to this report), provided comparative pricing for the re-aligned flood protection and naturalization alternatives 2, 4W, and 4WS as they existed in the February-March 2012 time frame. At the time, 4WS re-aligned featured reduced lakefill (the promontories had been removed, but some lakefilling was still anticipated around Essroc and Cousins Quays), use of the existing Polson (Marine Terminal 35) slip as an interim outlet for the new primary channel, and an eastward shift of the greenway/spillway. Since then, the configuration of 4WS re-aligned has continued to evolve in response to public and stakeholder feedback, therefore earthwork quantities may differ somewhat from those assumed as the basis for Aecon's estimate. As the sediment management area and its associated bridges as well as the assumed spans for the road and transit bridges crossing the new primary channel and floodplain have not been affected by the additional modifications to 4WS re-aligned, the differential in overall cost would be minor. The costs associated with naturalization have been and continue to be handled through allowances, as exact locations for and details of naturalized areas were unavailable for pricing by Aecon.

[3] *The 4.8% year-over-year construction cost escalation rate reported by Statistics Canada for the Greater Toronto Region would add a further $30M to last year's construction cost estimate – in today's dollars, this would be a $664 million project.*

The Aecon study examined the potential for construction cost savings within the context of a comprehensive multi-year contract to construct the flood protection infrastructure and the Keating Channel crossings and to complete substantial dockwall rehabilitation, but this strategy alone was not enough to close the cost-revenue gap. In order to better match infrastructure investment to potential development revenues, a phased approach to implementing flood protection was proposed. A 25% premium was applied to the original Aecon estimate so as to account for the following impacts of breaking the work into five phases:

i. additional mobilization/demobilization, permitting, and overhead costs;

ii. reduced economies of scale and fewer incentives to negotiate innovative approaches with regulatory authorities (e.g., the investment of effort needed to obtain approval for less conventional groundwater management techniques may not be warranted for projects below a certain size or construction value);

iii. loss of sequencing efficiencies considered in pricing a single large contract (e.g., it will eventually be necessary to tie in the new Commissioners Street bridge over the greenway/spillway to the previously raised Don Roadway, while the original estimate assumes that bridges will all be constructed first, minimizing the effort required to accomplish tie-ins); and

iv. potential additional staging/maintenance of access/temporary works costs associated with working in a more developed setting (particularly an issue for Phase 3 and onward).

In addition to these general considerations, specific temporary infrastructure is required, which will result in throw-away construction costs. Major items of temporary infrastructure include the:

i. Commissioners Street temporary at-grade crossing; and

ii. construction of extra-wide (200 metres) greenway/spillway needed for Flood Protection Phase 2.

Table 1 summarizes the assumptions made about the specific elements of flood protection infrastructure that must be in place in order to enable development of each Precinct. Note that there is potential to negotiate a cost sharing arrangement with Hydro One for the relocation of the utility bridge over the Don River forming part of Flood Protection Phase 2, but this is not reflected in the current cost estimate.

TABLE 1: PORT LANDS INFRASTRUCTURE INCORPORATED IN COST ESTIMATES, GROUPED BY DEVELOPMENT PRECINCT

Infrastructure Category	Cousins and Polson Quays (Precincts E1 & E3)	Film Studio District (Precinct F)	Lower Don Lands: River North & River South (Precincts E2 & E4) (FBO)	Lakeshore South (Precinct G) (FBO)	Additional Requirements (not development area-specific) (FBO)	Keating Channel West (Precinct A) Precedent Elements
FLOOD PROTECTION	▪ greenway/spillway, inclusive of associated modifications to ship channel dock wall (for related wetland construction, see the "Public Realm and Green Space" category under Major Infrastructure) ▪ temporary Commissioners Street at-grade crossing of greenway/spillway	▪ Sediment Management area, including embankment fill to raise Don Roadway north of Lakeshore Blvd. ▪ lengthen Lakeshore Blvd. and rail crossings of Don River ▪ remove and replace utility bridge crossing Don River	▪ primary channel and floodplain connecting Keating Channel through northern portion of spillway and across Lower Don Lands to east end of existing slip between Cousins and Polson Quays ▪ vehicular bridges crossing the primary channel and floodplain at Cherry Street and Commissioners Street ▪ allowances for protective treatment of water/ wastewater services and utilities at river valley crossings ▪ upstream and downstream weirs at Keating Channel	▪ no further requirements beyond Flood Protection elements required for Film Studio District (Precinct F)	▪ naturalization of the north side of Polson Quay ▪ naturalization of the south side of Polson Quay	▪ NOTE: Precedent Infrastructure, where required, is assumed an external, rather than a Port Lands cost. As such, it is generally assumed to be paid for by others, instead of Port Lands development interests. It has been included in the full build-out (FBO) costs for the sake of completeness, but has been excluded from the costs input to the Master Developer Pro-forma ▪ no further requirements beyond implementation of West Don Lands flood protection features (hydraulic improvements to CN Rail bridge over the Don River and functional completion of the Flood Protection Landform on the west bank)
MAJOR INFRASTRUCTURE						
Collector Roads and Ancillary Works	▪ Cherry Street re-alignment (Keating Channel to Ship Channel) (for related lakefill around Essroc Quay, see the "Public Realm and Green Space" category under Major Infrastructure)	▪ Lakeshore Boulevard re-alignment (Cherry Street to Don River) ▪ undergrounding of Hydro One transmission line along Don Roadway and Commissioners Street ▪ raising and re-construction of Don Roadway from Lakeshore Boulevard to Commissioners Street and extension to Ship Channel, to serve both transportation and flood protection functions ▪ Commissioners Street	▪ Commissioners Street re-construction (from re-aligned Cherry Street to bridge over greenway/spillway)	▪ Commissioners Street re-construction (Carlaw Avenue to Leslie Street)	▪ not applicable	▪ Cherry Street re-alignment (railway corridor to Keating Channel) ▪ Queens Quay extension (Small Street to re-aligned Cherry Street) ▪ Parliament Slip Land Reclamation as required to suit Queens Quay extension

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		re-construction (Don Roadway to Carlaw Avenue) ▪ Carlaw Avenue re-construction (Lakeshore Blvd. to Commissioners Street)				
		Additional road re-construction to accommodate full build-out of precinct: ▪ Bouchette Street (Lakeshore Boulevard to Ship Channel) ▪ Carlaw Ave. extension (Commissioners Street to Ship Channel)				
Trunk Water and Wastewater Services	▪ extension of 400 mm watermain beneath Keating Channel and south along Cherry Street to Polson Quay, including allowance for protective treatment at channel crossing ▪ temporary sewage pumping stations (one per Quay) ▪ new trunk sewer main along Cherry Street (connecting Polson Quay initially to the existing Commissioners Street Sanitary Sewer) ▪ allowance for rehabilitation/upgrading of existing Commissioners Street Sewer between Cherry Street and the Don Roadway to allow for interim servicing of the Quays	▪ new trunk sanitary (gravity) sewer incorporated in the Commissioners Street ROW from the Don Roadway to Carlaw Ave. ▪ extension of existing trunk sanitary sewer southward within the Carlaw Ave. ROW, from north of Lakeshore Blvd. to Commissioners Street (to convey wastewater collected from the Port Lands to the City's mid-level interceptor sewer) ▪ allowance for connecting segment(s) of 400 mm watermain (location and exact length unspecified)	▪ new trunk sanitary (gravity) sewer incorporated in the Commissioners Street ROW from Cherry Street to the Don Roadway, including the required crossing below the greenway/spillway	▪ new trunk sanitary (gravity) sewer incorporated in the Commissioners Street ROW from Carlaw Ave. to Leslie Street	▪ not applicable	▪ 400 mm watermain connection to existing main at Cherry and Mill Streets
Bridge Structures	▪ new Cherry Street Vehicular Bridge over the Keating Channel (to accommodate re-aligned Cherry Street)	▪ none required	▪ causeway across south end of greenway/spillway	▪ none required	▪ not applicable	▪ none required

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Transit Facilities	▪ Cherry Street transit bridge over Keating Channel ▪ allowance for unspecified temporary modifications/ upgrades to Cherry Street ROW, north of the Ship Channel, to support interim BRT solution ▪ Cherry Street bridge across future river channel/ floodplain and conversion of BRT lanes to accommodate LRT, including installation of TTC LRT track and electrical power supply (allocated to Precincts E2/E4 under the full build-out scenario, but assumed pre-built in the third decade of development [Years 20-30], hence treated as a late Precinct E1/E3 cost in the 30 Year Master Development Pro-forma.)	▪ new Lakeshore Blvd. transit bridge over Don River ▪ allowance for unspecified temporary modifications/ upgrades to Lakeshore Blvd. ROW, east of Cherry Street, Don Roadway ROW, and Commissioners Street ROW (between the Don Roadway and Carlaw Avenue), to support interim BRT solution ▪ conversion of BRT lanes to accommodate LRT, including installation of TTC LRT track and electrical power supply , and construction of turning loop in the vicinity of Commissioners Street and Carlaw Avenue	▪ Commissioners Street transit bridge across spillway ▪ installation of TTC LRT track and electrical power supply within reconstructed Commissioners Street ROW between re-aligned Cherry Street and Don Roadway ▪ Cherry Street transit bridge across river channel/ floodplain and conversion of Cherry Street BRT lanes to accommodate LRT, including installation of TTC LRT track and electrical power supply (assumed pre-built in the third decade of development [Years 20-30], hence allocated to Precincts E1/E3 for purposes of the 30-year Master Development Pro-forma)	▪ installation of TTC LRT track and electrical power supply along Commissioners Street (from Carlaw Avenue to Leslie Street)	▪ not applicable	▪ allowance for unspecified temporary modifications/ upgrades to Queens Quay ROW to support interim BRT solution
Marine Structures	▪ rehabilitation/upgrading of dockwalls proposed to remain	▪ rehabilitation/upgrading of existing dockwalls bordering Ship Channel and Turning Basin (rehabilitation of Ship Channel dockwalls east of Bouchette Street assumed required for FBO only)	▪ rehabilitation/upgrading of existing dockwalls bordering Keating Channel and Ship Channel	▪ rehabilitation/upgrading of existing dockwall bordering Turning Basin	▪ not applicable	▪ none required to support development south of Keating Channel

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Infrastructure Category	Cousins and Polson Quays (Precincts E1 & E3)	Film Studio District (Precinct F)	Lower Don Lands: River North & River South (Precincts E2 & E4) (FBO)	Lakeshore South (Precinct G) (FBO)	Additional Requirements (not development area-specific) (FBO)	Keating Channel West (Precinct A) Precedent Elements
Public Realm and Green Space	▪ armouring and lakefill around Essroc Quay (provides base for Promontory Park and for new Cherry Street vehicular bridge across Keating Channel) ▪ Promontory Park (including Pedestrian Bridge connection to Trinity Street) ▪ Don Valley Trail Pedestrian Bridge over Keating Channel ▪ naturalized wetland within greenway/spillway ▪ Water's Edge Promenade at non-naturalized edges of Cousins and Polson Quays	▪ Water's Edge Promenade bordering Ship Channel and Turning Basin (Water's Edge Promenade East of Bouchette Street assumed required for FBO only)	▪ Water's Edge Promenade bordering Keating Channel and Ship Channel ▪ development of major parkland in unspecified location (design revisions subsequent to the financial analysis work may combine portions of this with Promontory Park)	▪ Water's Edge Promenade bordering Turning Basin	▪ not applicable	▪ none required to support development south of Keating Channel
LOCAL INFRASTRUCTURE	▪ allowance for site clearing, typical local infrastructure, utilities, and local park costs based on developable area	▪ allowance for site clearing, typical local infrastructure, utilities, and local park costs based on developable area	▪ allowance for site clearing, typical local infrastructure, utilities, and local park costs based on developable area	▪ allowance for unspecified infill infrastructure costs	▪ not applicable	▪ none required to support development south of Keating Channel

Notes:

(1) The infrastructure associated with the River North and River South Precincts (Precincts E2 & E4), the Lakeshore South Precinct (Precinct G), and the non-area-specific infrastructure are required for full build out of the Port Lands north of the Ship Channel. Neither the infrastructure in these locations, nor the specific infrastructure elements associated with the Film Studio District that are marked "full build out" or FBO, will likely be required to accommodate the forecast 30-year development demand, so they have been excluded from the estimated costs used as inputs for the Master Development Pro-forma, unless noted otherwise.

(2) Allowances for environmental clean-up costs are built into the cost estimates for any elements of work that may incorporate over-excavation, soil cleaning, or disposal of impacted or hazardous soils.

The current estimates for the proposed crossings of the new primary channel and floodplain at Commissioners Street and Cherry Street are based on MTO-standard pre-cast girder bridges, rather than the cast-in-place voided deck suggested by general arrangement drawings prepared in conjunction with the EA. No allowance has been made for aesthetic treatments, although this may be desirable given the high visibility of these bridges in the finished landscape.

The earlier development plan called for utilidors (in the form of cast-in-place concrete culverts constructed six to seven metres below existing grade) at proposed utility crossings of the primary channel/flood plain and the greenway/spillway, in order to provide ease of access for any future maintenance or repair. The size and depth of the culverts, coupled with the requirement that they be designed to resist both settlement and flotation forces, resulted in very costly structures. Consequently, the overall cost estimates allow only for the installation of protective sleeves under the river bed, with a hardened protective barrier incorporated in the river bed, in order to prevent future scour or inadvertent excavation damage to the services.

Long-term maintenance of the flood protection function will require significant investment in equipment for on-going sediment and debris management, such as debris booms, a hydraulic dredge, and hydrocyclones. For the purposes of the PLAI, it has been assumed that the acquisition costs for this equipment will be built into the operating costs for sediment and debris management, rather than being considered elements of the capital cost for permanent flood protection works.

4.2 Major Infrastructure Costs

The assumed major infrastructure requirements for each Precinct are summarized by category in Table 1. The list of investments is comprehensive, in that it includes all anticipated works required to achieve full build out of the Port Lands, without regard for implementation timing. Not all costs are expected to be incurred within the 30 year time horizon utilized for the development financial model (described in the Summary Report on Port Lands Development Demand and Revenue Projections, Economic Analysis, and Financing Options, prepared by Cushman and Wakefield Limited Valuation and Advisory). Additional infrastructure works required to accommodate development in the Film Studio District (Precinct F) beyond 2041 are labeled FBO to indicate that they are needed only to achieve full build out. Investments in infrastructure to support large-scale development (as opposed to scattered interim projects) in the River North, River South, and Lakeshore South Precincts (Precincts E2, E4, and G) are not anticipated within the first 30 years.

Environmental clean-up costs are built into the unit costs for any elements of work that may incorporate over-excavation, soil cleaning, or disposal of impacted or hazardous soils. It has been assumed that all excavated soils will be hauled to a privately-owned and operated Soil Recycling Facility (SRF) located in the Port Lands, south of the ship channel, where it will be sorted, and if necessary, treated to remove contaminants to the extent possible. A treatment cost of $10 per cubic metre has been assumed. On average, 10% of the excavated soils will not be successfully treatable and will require disposal at an

approved landfill. Of this, 0.5% will be classified as hazardous, and will therefore be subject to increased haulage and disposal costs. The treated material will be loaded at the SRF and returned for use as a fill material, provided that it is geo-technically suitable. It is assumed that excess or geo-technically unsuitable soils can be accommodated within Lake Ontario Park, such that haulage will be minimized and tipping fees will be avoided.

Note that some form of local solution has been assumed for the Stormwater Quality Management Facilities, hence this category has been excluded from the list of major infrastructure costs.

4.2.1 Collector Roads and Ancillary Services

It has been assumed that the collector roads within the Port Lands will be rebuilt along their current alignments, with the exception of Cherry Street, which will move westward. Since design has yet to be undertaken, unit cost estimates were developed by Hanscomb (refer to Attachments III through V, inclusive) based on precedent road cross-sections from elsewhere in the designated waterfront area (DWA). Where applicable, the precedents generally conform to the cross sections included in the Lower Don Lands planning documents. In the absence of detailed site investigation, ground conditions were also assumed to be similar to those encountered elsewhere in the DWA. Table 2 lists the roads for which cost estimates are required and the applicable precedents.

Table 2: Precedent Road Cross-Sections[4]

Type	ROW Width	Precedent	Applies to:
1	38 m*	Queens Quay (East Bayfront)	NOT USED
2	32.5 m*	Cherry Street (West Don Lands)	Cherry Street (railway corridor to ship channel); Commissioners Street (Cherry Street to Leslie Street); Don Roadway/Don Roadway extension to ship channel; Leslie Street (Lakeshore Blvd. to Commissioners Street)
3	25 m	Mill Street (West Don Lands)	Bouchette Street; Carlaw Avenue/ Carlaw Avenue extension to ship channel)
4	18 m	Street "F" (West Don Lands)	Local streets only

* includes provision for dedicated transit lanes

The key difference between the precedent installations and the cross sections assumed for the Port Lands is that the latter must tie in with the raised grades proposed throughout the Port Lands, therefore excavation and fill requirements will vary based on the difference between the current and final surface

[4] Actual ROW widths shown in the final versions of the development plans prepared for the Port Lands Acceleration Initiative (PLAI) may vary somewhat from those assumed for cost estimating purposes.

elevations. Hanscomb's unit cost estimates take into account this modification to the precedent road designs. Taking advantage of the requirement for raised grades provides an opportunity for reduced excavation and dewatering costs.

The typical road cross sections incorporate underground services and utilities, including: watermains, storm and sanitary sewer mains, electrical and communications duct banks, and appurtenances. Streetscaping to waterfront standards (i.e., those standards established for the West Don Lands and East Bayfront) has also been included in the unit costs. To reduce throw-away costs and the impacts of road closures, road reconstruction is assumed to occur in conjunction with scheduled installation of trunk water and wastewater services, wherever possible, even if not immediately required to accommodate adjacent development.

The raised Don Roadway between Lakeshore Boulevard and the Ship Channel must serve both transportation and flood protection functions, therefore its design will be subject to additional constraints. The cost estimate, however, is based on an unmodified precedent cross-section (i.e., one that includes the full range of underground services), which it may or may not be possible to accommodate. It has been assumed that adjacent development in the Film Studio Precinct proceeds on a schedule that allows for the raising of development site grades at the same time as the Don Roadway and Commissioners Street (just east of the Don Roadway) are being reconstructed, so that the Don Roadway does not need to be detailed as a flood protection landform with an impermeable core.

In order to accommodate the reconstruction of the Don Roadway and Commissioners Street (west of Carlaw), the existing Hydro One transmission towers will need to be relocated underground. An allowance has been carried for this work, but the amount has not been recently re-confirmed with Hydro One, hence it is high speculative. There is also potential to negotiate a cost sharing arrangement with Hydro One, but this is not reflected in the current cost estimate.

The unit costs for local infrastructure (refer to Section 4.3) include: clearing, stripping and stockpiling soils, and pre-loading where required. It is assumed that these activities will take place across an entire precinct or sub-precinct at the start of construction, hence they have not been considered in developing the unit costs for major roads.

4.2.2 Trunk Water and Wastewater Services

The cost estimates assume that the ultimate trunk sanitary sewer layout is substantially the same as the Preliminary Preferred Alternative (Alternative 2B) of Toronto Water's Waterfront Sanitary Master Plan EA, with the exception of shifting the Villiers Street segment south to Commissioners Street), and that all trunk sanitary sewers will be gravity sewers having inverts approximately as shown in the EA. Among the perceived advantages of EA Alternative 2B are relatively low capital cost and adaptability to changing development conditions.

At full build-out, it is assumed that a trunk watermain will loop from the existing main in the vicinity of Cherry and Mill Streets under the Keating Channel, down Cherry Street, east along Commissioners Street, and north along Leslie Street to connect back into the existing city water network. In the early years of development, new trunk watermains will only be required along Cherry Street.

It has also been assumed that existing watermains of appropriate capacity are available to support much of the proposed early development in the Film Studio District (Precinct F), and that the area-based allocations for local infrastructure will for the most part cover the cost of any required connections and extensions. A further $500,000 allowance has been added to deal with potential gaps.

4.2.3 Bridge Structures

A high-level estimate for the replacement Cherry Street vehicular bridge over the Keating Channel was prepared by Aecon Construction and Materials. Since this bridge will provide a focal point for the entrance to the Port Lands, the estimate assumes a design with arched superstructures on simple concrete foundations, which provides a minimum 3.0 metres of navigational clearance. Approaches to the bridge will add a considerable amount of fill to the area and provisions in the form of surcharging, wick drains, and a six month wait time will be necessary to reduce long term settlement.

4.2.4 Public Transit Facilities

The Keating Channel Precinct ESR notes that: “the City’s Official Plan has a strong pro-transit vision to move more people more efficiently, while minimizing environmental impacts. Improved Light Rail Transit (LRT) Service is a fundamental element in the Lower Don Lands EA Study’s Preferred Design.” The main components of the transit service depicted in the ESR are: (1) an extension of the proposed Cherry Street LRT line through the West Don Lands into the Port Lands; and (2) an extension of the proposed LRT line originating at Union Station and running east-west along Queens Quay through the East Bayfront and Keating Channel Precincts. At the Cherry Street/Queens Quay intersection, provision is made for the Queens Quay LRT to turn north and south along Cherry Street. Within the Port Lands, east-west transit is accommodated on Villiers and Commissioners Streets.

The need for an enlarged underpass below the railway corridor to accommodate transit (light rail vehicles), pedestrians, and cyclists presents a costly barrier to extending the soon-to-be-constructed Cherry Street LRT further south into the Port Lands, and hence a barrier to the financial feasibility of Port Lands development. Both the Cherry Street portal expansion and the extension of the Cherry Street LRT line have been excluded from the cost estimates for enabling infrastructure, in favour of relying exclusively on a transit line originating on Queens Quay for the forseeable future.

The desire to accommodate accelerated development in the Film Studio Precinct in advance of developing the Lower Don Lands (east of Cherry Street) creates a requirement for additional transit infrastructure, which was not shown on earlier plans. For pricing purposes, the assumption is that the Queens Quay BRT/LRT will continue along Lakeshore Boulevard (in its current or revised location),

turning south onto the reconstructed Don Roadway, and continuing on to Commissioners Street, where it will initially turn east. This route is a notional addition to the transit network and its physical feasibility has not been investigated (e.g., it may be necessary to modify portions of the Gardiner sub-structure in order to mitigate conflicts).

A transit implementation study is currently under way for the East Bayfront, the objective of which is to recommend a mid-term transit solution to service the East Bayfront Precinct, in the absence of sufficient funding to begin construction of the approved LRT-based transit solution. While the form of transit adopted for the Port Lands at any point in time must be consistent with the transit solution for the East Bayfront, the outcome of the East Bayfront study is not yet known.

Lacking better information about the proposed sequence and timing for rolling out higher-order transit in the East Bayfront, we have assumed, for estimating purposes, that provision of bus-based transit along Queens Quay in a dedicated right-of-way will adequately serve the first 20 years of development expected on the Quays and in the Film Studio District, and that an upgrade to LRT transit in the same dedicated right-of-way will be necessary and feasible in the 20 to 30 year time horizon. In order to prevent bottlenecks, it has been assumed that transit bridges across the Don River and the Keating Channel will be constructed as part of the BRT implementation package. These assumptions are not intended to pre-judge the results of the on-going study of interim transit options for East Bayfront.

Following the model used in estimating and budgeting for LRT installations in the West Don Lands and East Bayfront the costs for constructing the entire right-of-way, inclusive of the dedicated transit lanes and the track base, are treated as road infrastructure costs. Transit costs are limited to the LRT tracks and electrical (traction) power supply and distribution systems, which are typically installed and/or commissioned by the Toronto Transit Commission (TTC). Bridges for the use of transit vehicles are also categorized as transit costs. Unit costs for transit track and electrical installations have been based on a combination of recent estimates for similar installations prepared by the TTC and Hanscomb Limited.

4.2.5 Marine Structures

The existing dock walls in the Port Lands and along the Keating Channel are constructed from a variety of different materials and incorporate different configurations of tiebacks and coping beams, resulting in over 20 distinct wall cross sections. The state of repair varies, with the majority of dock walls in fair to poor condition. Most segments that are not already in need of rehabilitation will likely require repair within the expected development time horizon.

The cost estimates for dock wall repair and upgrading are based on a broadly-applicable encapsulation repair detail incorporating sheet piling to the lake bottom just in front of the existing walls and toe pins to lock the sheet piling into position. Unit (per metre) costs for this detail were provided by Parsons Brinkerhoff Halsall, a member of the planningAlliance consultant team, based on tender for a recent, comparable dock wall rehabilitation project.

Applying this assumed repair detail and unit cost across the board can be expected to yield somewhat conservative results. The unit cost would be reduced where a relatively thick layer of sound sand or other competent material is available, because the requirement for toe pins would be eliminated where the sheet piling can penetrate far enough into the lake bottom. In areas where the existing walls are in good condition, more economical repair details, which use concrete lagging to encapsulate the upper portion of the walls (the "splash zone") where deterioration occurs. The flood protection cost estimates include the cost of installing a stone revetment within the Keating Channel, which would reduce the extent of additional dock wall repair required in conjunction with developing the River North and River South Precincts (Precincts E2 and E4).

4.2.6 Major Parks, Open Spaces, and Public Realm Improvements

Given the proximity of the site to the water's edge, there is a strong desire for public access and for destination parks and open spaces, which will be used by and will benefit the wider public, along with area residents. It is assumed that continuous treed promenades of a design similar to those already in use in the Dockside area of East Bayfront will be constructed along the water's edge, in step with adjacent development. The estimated cost of these promenades is based on actual construction cost data from East Bayfront.

The area-based cost estimate for local parks incorporated in the composite local infrastructure cost (refer to Section 4.3) was also used as a basis for estimating major park development costs. This unit cost was validated by comparing it to the actual cost of constructing Don River Park (exclusive of the underlying flood protection landform), which was similar.

4.3 Local Infrastructure Costs

A per hectare cost for local roads and services was established by taking a sample street and block plan for a section of the Lower Don Lands, assuming 25 metre wide principal and 18 metre wide side streets, calculating the total cost of the underground services, roads, and streetscaping based on typical cross sections, and dividing by the gross developable area. (Refer to Attachment VI for the calculation). Allowances for stormwater quality management (based on the costs for providing approximately 650 m^3 of storage per hectare, oil and grit separation facilities, and ultraviolet (UV) treatment of all run-off) and local parks (at 5% of the developable area) were then added. The allowance for stormwater quality management could be applied to an alternate "green" solution rather than end-of-pipe treatment. No allowance was made for the upfront capital cost of hydro supply, as this was assumed to be offset by future revenues.

Note that the sample plan featured single loaded perimeter roads on all sides of the development area (high road density), yielding a fairly conservative unit cost. For precincts where collector roads could effectively substitute for some of the local roads that would otherwise be required, a reduced per hectare cost was used to calculate the total cost of local infrastructure. Lakeshore South (Precinct G) has

been treated as a special case – an allowance has been included for the provision of infill infrastructure as required.

Costs for clearing and stripping the site (inclusive of development areas and adjacent public open spaces except for the river/floodplain), stockpiling soils, and pre-loading where required to deal with compressible soils have been accounted for separately. In Precinct E2, where prior site investigations indicate that more extensive environmental remediation will likely be required, an allowance has been included to address the potential costs.

4.4 Cost Estimate Summary

Table 3 summarizes the estimated costs of the infrastructure required to achieve full build-out of the Port Lands precincts north of the ship channel, ordered in the sequence by which they are opened up for development through the phased implementation of flood protection. The initial investment required to commence development of a given precinct may be less. All amounts shown in Table 3 include a 40% factor on the base construction cost estimate to allow for soft costs and contingencies and all amounts are expressed in millions of $2012. These costs are of course hypothetical, in that construction will necessarily extend beyond the end of this year, even without considering funding constraints, and the $2012 estimate will therefore be subject to escalation. For additional details regarding the breakdown of these costs, refer to Attachment I.

Table 3: Summary of Estimated Infrastructure Costs for Port Lands Revitalization ($2012)

	Cousins & Polson Quays (FP Phase 1/ Precincts E1 & E3)	Film Studio Precinct (FP Phase 2/ Precinct F)	Lower Don Lands (FP Phase 3/ Precincts E2&E4)	River Mouth Naturalization (FP Phases 4 & 5)	Balance of Port Lands North of Ship Channel (Precinct G)	Total
Flood Protection	$67	$114	$262	$15	$0	**$456**
Major Infrastructure	$267	$226	$178	$0	$72	**$743**
Transit Infrastructure	$26	$82	$70	$0	$20	**$198**
Local Infrastructure	$89	$194	$200	$0	$20	**$503**
Total Investment for Full Build Out	**$447**	**$616**	**$710**	**$15**	**$112**	**$1,900**

5. Differentiating Factors

Higher-than-average investment in infrastructure will be required to develop the Port Lands because of:

i. poor ground conditions
   a. high water table;
   b. settlement problems associated with location over a former marsh;
   c. poor quality fill material used to create the site; and
   d. significant depth to bedrock;

ii. brownfield status, requiring
   a. treatment and disposal of impacted soils;
   b. soil and groundwater remediation; and
   c. separation and capping requirements.

Other factors driving higher costs than might be expected for traditional development projects include:

i. right-of-way designs for collector roads that allow for safely accommodating increased pedestrian and bicycle traffic associated with the waterfront location, and higher-order public transit (on designated roads), in addition to cars;

ii. upgraded streetscaping elements[5], particularly on main thoroughfares and connecting routes to major waterfront parks, such as:

   a. pavers in lieu of concrete sidewalks;

   b. street pavers at intersections;

   c. grates and brick pavers at tree pits;

   d. precast concrete planters, shrubs, and grasses; and

   e. specially-designed street lighting.

iii. measures required to establish a robust street tree canopy (oversized boulevard trees; reduced tree spacing; use of silva cells and irrigation systems to promote tree survival and growth).

While there is room for value engineering during the detailed design and approvals phase, this is unlikely to generate the magnitude of savings necessary to alter the business case.

6. Cost Benchmarks

A comparison between the construction costs for a typical 18 metre wide ROW built to City of Toronto standards on a non-brownfield site with reasonably competent soils (i.e., conditions that allow for the use of flexible pavement) and those for a similar ROW located at the waterfront suggests that an uplift factor of at least 130% is needed to allow for the special circumstances of waterfront construction. In $2009, the standard ROW cost less than $10,000 per metre while the upgraded ROW on a brownfield site cost nearly $20,000. Approximately two thirds of the cost differential could be attributed to dealing with weak, environmentally compromised soils, which required over-excavation, additional geotextile bedding, fully restrained joints on underground piping, extra dewatering, and hydrostatic lift prevention. The remaining one third of the cost differential related to the enhanced public realm design, including: improved lighting, trees planted in silva cells and supplied with irrigation, use of pavers, and granite curbs.

7. Sources of Estimate Risk and Uncertainty

As outlined in Section 2, future cost estimates for this work will vary from those presented in this report, driven by a wide spectrum of opportunities, risks, and uncertainties associated with technical, environmental, socio-economic, political and other factors, including:

[5] These examples are taken from the West Don Lands and the East Bayfront

i. the form and sequencing of development;

ii. real estate market conditions and the competitive landscape;

iii. transformational (or "catalytic" development impacts); and

iv. development proposal-specific factors.

A comprehensive list of opportunities, risks, and uncertainties is beyond the scope of this report. Example risks and uncertainties and potential opportunities that may affect flood protection and naturalization costs include:

i. final design of stabilization measures, based on detailed hydraulic analysis;

ii. environmental requirements included in accepted Risk Assessment/Risk Management (RA/RM) Plan, such as the form and extent of barriers to contaminated groundwater migration, and the extent of over-excavation required to accommodate such barriers;

iii. final sediment management strategy and location/configuration of slurry conveyance piping;

iv. final design of wetland areas, including selection of plant species;

v. requirements for handling of water generated by construction operations;

vi. sequencing of construction and schedule integration with adjacent major infrastructure construction and development (balancing excavation and fill requirements on a phase-by-phase basis may provide an opportunity to reduce soil disposal costs);

vii. potential to charge tipping fees for fill from construction sites outside the Port Lands (opportunity to offset costs);

viii. modifications to/removal of the Gardiner Expressway (may provide an opportunity to reduce costs); and

ix. accommodation of specific Toronto Water and utility requirements for maintenance access to infrastructure that passes below new flood protection features.

Example opportunities, risks, and uncertainties that may decrease or increase assumed major infrastructure costs include, but are by no means limited to the:

i. outcome/recommendations of East Bayfront Transit implementation study;

ii. results of further feasibility investigation of the potential Lakeshore East (Cherry Street to Don Roadway) transit route;

iii. final recommendations of City-initiated EAs, such as the Waterfront Sanitary Master Plan EA;

iv. potential economies of scale arising from the design of joint facilities that can also serve other development areas adjacent to the Port Lands;

v. degree to which re-use of existing infrastructure is feasible and the timing of new infrastructure investments to suit evolving development plans;

vi. outcome of cost sharing negotiations with Hydro One, with respect to the relocation of existing distribution infrastructure;

vii. impacts of mitigating potential utility conflicts (which have not been considered in developing the high level cost estimates);

viii. impact of compressible soils on detailing of underground services; and

ix. potential for implementation of passive infrastructure strategies.

List of Attachments:

Attachment I: Summary of Port Lands Infrastructure Costs by Precinct at Full Build-out ($2012)

Attachment II: Port Lands Development Plan Heavy Civil Constructability Review (Final Report dated April 20, 2012, prepared by Aecon Construction and Materials Limited)

Attachment III: Hard Surfaces Type 2, 32.5 Meters Wide (Unit Cost Calculation prepared by Hanscomb Limited)

Attachment IV: Hard Surfaces Type 3, 25 Meters Wide (Unit Cost Calculation prepared by Hanscomb Limited)

Attachment V: Hard Surfaces Type 4, 18 Meters Wide (Local) (Unit Cost Calculation prepared by Hanscomb Limited)

Attachment VI: Composite Local Infrastructure Cost (Unit Cost Calculation prepared by Hanscomb Limited)

attachment i:

summary of port lands infrastructure costs by precinct at full build-out ($2012)

Attachment I: Summary of Costs at Full Build-out of Precinct ($2012, Rounded)

Infrastructure Elements	Cousins Quay & Polson Quay (Precincts E1+E3, The "Quays")	River North & River South (Precincts E2+E4, The "Lower Don Lands")	Film Studio District (Precinct F)	River Mouth Naturalization	Lakeshore South (Precinct G,"Balance of Port Lands N. of Ship Channel")	TOTAL
Flood Protection Infrastructure (Note 1)	$ 65,000,000	$ 262,000,000	$ 114,000,000	$ 15,000,000	$ -	**$ 456,000,000**
Collector Roads & Ancillary Works	$ 28,900,000	$ 28,200,000	$ 156,000,000	$ -	$ 40,100,000	**$ 253,200,000**
Trunk Water Distribution & Wastewater Collection	$ 6,200,000	$ 10,500,000	$ 11,300,000	$ -	$ 5,900,000	**$ 33,900,000**
Bridge Structures	$ 26,300,000	$ 30,000,000		$ -	$ -	**$ 56,300,000**
Temporary Works (excl. Transit-related)	$ 4,500,000	$ -	$ -	$ -	$ -	**$ 4,500,000**
Sub-total Hard Services (excluding Transit)	$ 65,900,000	$ 68,700,000	$ 167,300,000	$ -	$ 46,000,000	**$ 347,900,000**
Dockwall Rehabilitation/Upgrade	$ 23,900,000	$ 47,600,000	$ 16,900,000	$ -	$ 11,100,000	**$ 99,500,000**
Parks, Trails & Water's Edge Promenade (Note 2)	$ 106,000,000	$ 62,400,000	$ 41,000,000	$ -	$ 14,900,000	**$ 224,300,000**
Sub-total Major Infrastructure (excl. Transit)	$ 195,800,000	$ 178,700,000	$ 225,200,000	$ -	$ 72,000,000	**$ 671,700,000**
BRT/LRT Transit	$ 26,000,000	$ 69,700,000	$ 82,000,000	$ -	$ 20,000,000	**$ 197,700,000**
North of Keating Precedent Elements (Note 3)	$ 71,200,000	$ -	$ -	$ -	$ -	**$ 71,200,000**
Total Major Infrastructure	**$ 221,800,000**	**$ 248,400,000**	**$ 307,200,000**	**$ -**	**$ 92,000,000**	**$ 869,400,000**
Local Infrastructure	$ 89,000,000	$ 200,000,000	$ 194,000,000	$ -	$ 20,000,000	$ 503,000,000
GRAND TOTAL (Full Build Out)	**$ 447,000,000**	**$ 710,400,000**	**$ 615,200,000**	**$ 15,000,000**	**$ 112,000,000**	**$ 1,899,600,000**
Assumed Total Infrastructure Investment Required to Support 30 Year Development Demand (Note 4)	$ 428,000,000	$ -	$ 489,000,000	$ -	$ -	$ 917,000,000

Note 1: An allowance intended to cover the majority of naturalization costs has been incorporated in the cost estimate for Flood Protection Infrastructure.

Note 2: An additional allowance of $7.0 million for wetland construction has been incorporated in the cost estimate for Parks, Trails, and Water's Edge Promenade.

Note 3: North of Keating Precedent Elements are connecting elements of infrastructure, which run north of the Keating Channel through a future development area. These costs are not considered strictly Port Lands development costs, and have therefore been largely excluded from the Port Lands Master Developer Pro-Forma.

Note 4: The upgrade of the Cherry Street transit line from BRT to LRT technology has been allocated to Precinct E2/E4 for the full build-out scenario. For the purposes of the Port Lands Master Developer Pro-Forma, it has instead been assumed that the upgrade to LRT technology occurs some time between Years 20 and 30, even in the absence of development in Precincts E2/E4. Therefore, the upgrade costs have been re-allocated to Precincts E1/E3 for the pro-forma calculation.

attachment ii:

port lands development
heavy civil constructability review

Port Lands Development Plan

Heavy Civil Constructability Review

April 20, 2012

Final Report

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APPENDICES

1. EXECUTIVE SUMMARY

Waterfront Toronto selected Aecon Construction of Materials Limited to carry out a Constructability Review and Method Study of the Proposed Port Lands Developments Plan. The major areas of study included the methods of excavation of the future Don River, the construction of several bridges crossing the Don River and the Keating Channel, and proposed utilidors crossing the Don River. Also the study includes a review of the Dock Wall study prepared by Riggs and Associates dated June 2010 and the amalgamation of that work into the overall price requirements and schedule of the current plan.

This report provides comments on construction methods, design alternatives, project schedule and costing for Alternative 4WS Re-aligned (Feb 28 2012 Rev 1). Pricing summaries were also prepared for Alternative 4W Re-aligned (Feb 10 2012 Rev 2) and Alternative 2 Re-aligned Feb 10 2012 Rev 2).

The pricing of the three alternatives has been summarized in Table 1 of this Executive Summary.

Table 1 ***Pricing Summary***

ALTERNATIVE	CIVIL GRADING WORKS	STRUCTURAL ELEMENTS	DOCK WALL MODIFICATION	TOTAL
4WS Re-aligned	$ 120,554,400	$ 241,006,600	$ 33,759,500	**$ 395,320,500**
4W Re-aligned	$ 87,166,900	$ 181,462,500	$ 59,555,000	**$ 328,184,400**
2 Re-aligned	$ 122,566,000	$ 91,988,700	$ 43,145,000	**$ 257,699,700**

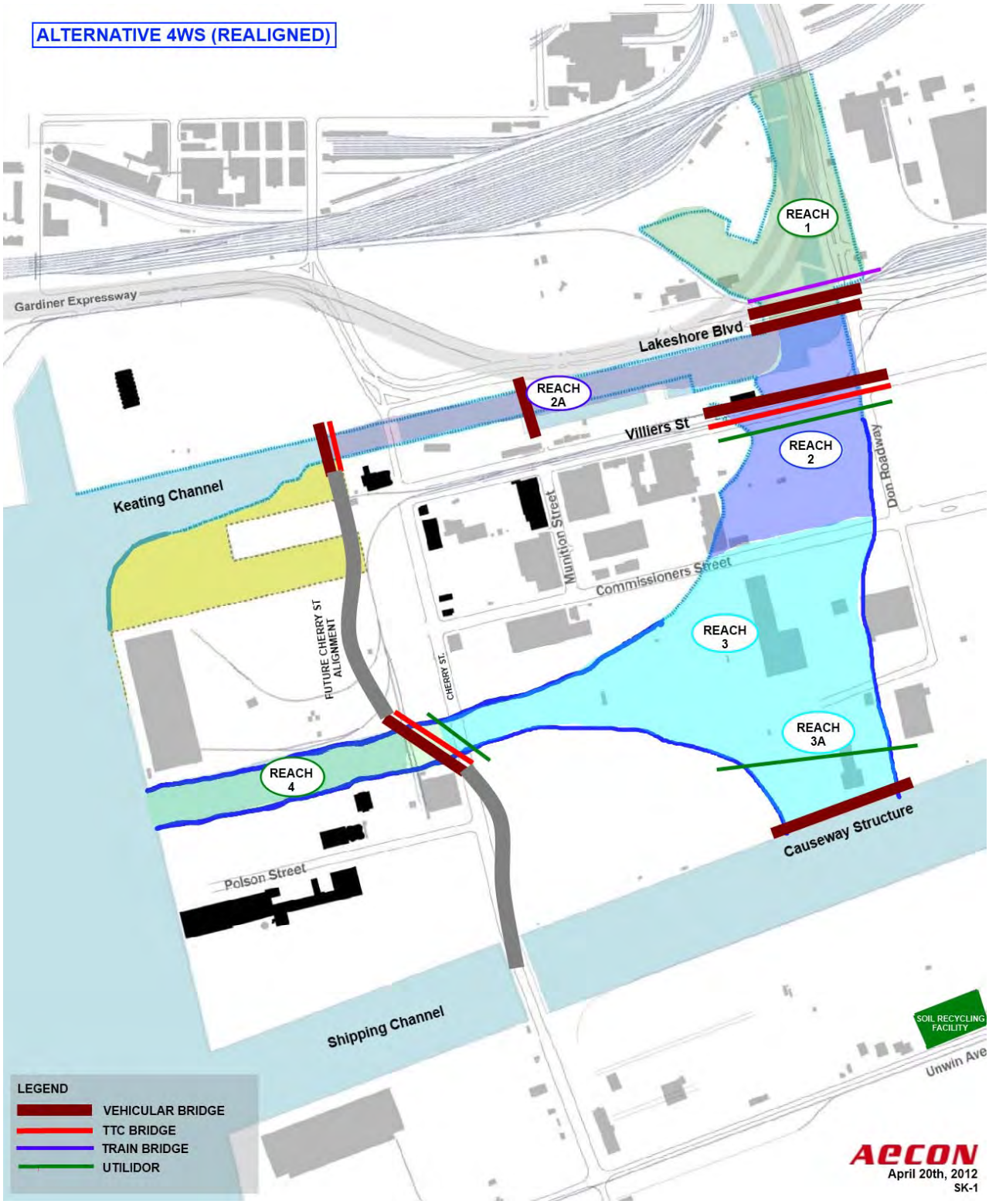
The Development Plan has undergone many iterations and this study is based upon a plan which has the re-routed Don River connecting to the East end of the Polson Quay / Marine Terminal 35 Slip and includes an overflow channel connecting to the north wall of the Ship Channel. The area of fill has been reduced and will not extend into the inner harbour.

A cost estimate was generated using first principals for elements of the work which were clearly defined and for those elements which were less well defined, historical data representing equivalent elements was used.

A detailed schedule of the entire development based on Alternative 4WS Re-aligned was prepared and it was incorporated into the costing exercise. The costs are based on a 2012 construction start and the pricing was escalated to represent proposed duration of the project.

The elements referenced in the text of the report refer to Alternative 4WS Re-aligned and are presented schematically on Sketch SK-1.

Under Section 5 – Points for Further Study in Detailed Design, a number of potential design changes have been suggested which, if found acceptable by the designers, would provide considerable savings to the project.


ALTERNATIVE 4WS (REALIGNED)
Gardiner Expressway
Lakeshore Blvd
Villiers St
Keating Channel
Munition Street
Commissioners Street
Don Roadway
FUTURE CHERRY ST ALIGNMENT
CHERRY ST.
REACH 1
REACH 2A
REACH 2
REACH 3
REACH 3A
REACH 4
Causeway Structure
Polson Street
Shipping Channel
SOIL RECYCLING FACILITY
Unwin Ave
LEGEND
VEHICULAR BRIDGE
TTC BRIDGE
TRAIN BRIDGE
UTILIDOR
AECON
April 20th, 2012
SK-1

2. METHOD STATEMENT – ALTERNATIVE 4WS RE-ALIGNED

2.1 RIVER CONSTRUCTION

2.1.1 Don River Excavation Reach 2 – 3 – 4

The reaches which cross existing land, namely 2, 3 and 4 can be excavated using standard excavators loading into trucks. The first 1.5 metres of excavation will be above the water table, while the balance of the excavation will be below the water table. We do not feel it will be necessary to dewater the excavation and the relatively flat bottom of the excavation will permit the excavators to prepare the river bottom. The use of dredging equipment was considered, but the additional expense and massive amount of water which would have to be handled made this alternative far less attractive.

The excavated material will be allowed to drain as much as is practical at the excavation site and then will be transported by truck to a temporary settling basin. The settling basin will be located in the open portions of the site on Port Authority lands. The soils will be allowed to drain as required and subsequently re-loaded and hauled to the Soil Recycling Facility (SRF) on Unwin Avenue for treatment. The SRF is under contract directly with Waterfront Toronto. The free water will be collected, sediments will be removed, and subject to testing, the water returned to its source. Alternatively the water may be disposed in a local sanitary sewer for treatment.

The treated material will be loaded at the SRF and returned to site for use as fill material. If there is not sufficient room on the site for all the material, an area at Lake Ontario Park on Unwin Ave will make use of the balance of the fill.

All material will therefore remain in close proximity to the site and will follow a haul route along Cherry Street and Unwin Avenue and will return to the site along the same route. As an alternative it is possible that some material will be hauled along Lake Shore Boulevard east to Leslie Street and south to Tommy Thompson Park.

Provisions are included during the period of excavation for an environmental inspector. Should material be detected which is hazardous, or cannot be managed at the SRF, alternative disposal solutions will have to be sought, including possibly hauling the material to the Niagara Peninsula or Sarnia. The disposal costs will depend on the nature of the soils and provisions in the budget must be made to cover this possibility. Currently the budget contains an allowance of $11,000,000.00 which represents approximately 7% of excavated material.

The reports call for a “barrier” to effectively block the flow of contaminated water from below the river infiltrating into the actual river. To satisfy this requirement, we have made provision, for 50% of the river bed, to install a bentonite based material which will seal the river bottom. Following the advice provided by the Waterfront Engineering team the product “Aquablok” (www.aquablokinfo.com) has been incorporated into the pricing schedule. The use of this material will require a sub-excavation of the river channel to a depth of 0.5 metres. The in-situ barrier will be approximately 100mm and will require

approximately 400mm of armouring (typically gravel or rock). The sub-excavated material will be treated in the same fashion as the bulk excavation.

This excavation will not be connected to either the Lake or the Don River until it is complete, and therefore we anticipate that there will be no Fisheries restriction in working between March 31st and July 1st.

2.1.2 Don River Excavation Reach 1

Reach 1 comprises two sections. The ground based excavation on the west bank and beneath the Lake Shore bridge widenings will be constructed in a similar manner as Reaches 2, 3 and 4 as previously detailed. The material will be hauled to the SRF, west along Lake Shore, south on Cherry, and east on Unwin. The material will be drained in the same fashion and the water treated accordingly.

There is a requirement to build a sediment trap on the location of the existing Don River. The excavation will be carried out by dredging. A pipeline will transport the material in a liquid form (80 to 90% water) to a settling basin to be constructed on an open space within the owner's lands. The water will be allowed to drain and the remaining material transported to the SRF for treatment. The free water will be collected, sediments will be removed, and subject to testing, the water returned to its source. Alternatively the water may be disposed in a local sanitary sewer for treatment.

The treated soils will be returned to the site and used as fill.

The excavation will be within the waters of the Don River, and therefore, due to Fisheries restrictions, works will not be permitted to occur between March 31st and July 1st.

2.1.3 Keating Channel Excavation Reach 2A

All excavation within the Keating Channel will be carried out by dredging. The requirement is to lower the existing channel bottom and to backfill the Dock Walls with stone to provide a structural support for the existing walls.

The excavation will be carried out by dredging. A pipeline will transport the material in a liquid form (80 to 90% water) to a settling basin to be constructed on an open space within the owner's lands. The water will be allowed to drain and the remaining material transported to the SRF for treatment. The free water will be collected, sediments will be removed, and subject to testing, the water returned to its source. Alternatively the water may be disposed in a local sanitary sewer for treatment.

The treated soils will be returned to the site and used as fill.

As an alternative, the dredge material may be placed in a bottom dumping scow and hauled to Tommy Thompson Park for disposal. This method may largely be dependent upon the overall project schedule, the progress of new bridge structures and the final navigational clearance provided.

If the new fixed bridge over the Keating Channel at Cherry Street is completed prior to the dredging works, it may preclude the use of this disposal technique.

The excavation will be within the waters of Lake Ontario and the Don River, and therefore due to Fisheries restrictions we will not be permitted to work between March 31st and July 1st.

2.2 STRUCTURES

2.2.1 Don River Crossing Structures - Cherry Street and Commissioners Street

The General Arrangement provided for the Cherry St structures suggests a cast in-place voided deck with numerous piers as the proposed method of construction. We are recommending a pre-cast girder bridge which will require fewer piers. The profile of the superstructure will be greater but this can be offset by higher approach embankments. The embankments will have small longitudinal retaining walls to effectively keep their width to a minimum. The net result will be savings in overall cost. We are also recommending a similar structure for the new Commissioner's Street crossing.

These structures may require Navigational as well as hydraulic clearances. The approaches to the TTC structures must have a slope not exceeding 1.5%. All these factors must be considered when designing the most effective General Arrangement.

The Causeway structure is proposed to be constructed with box beam girders and we are not recommending any changes in this arrangement.

All these structures including the adjoining TTC crossings should be constructed prior to the excavation of the river channel. This will permit the construction to be completed from the existing grade and will be the most economical. The channel excavation will be scheduled to follow the construction of these structures.

The pier and abutment foundations will be constructed using driven H-piles. The concrete will extend below the water table. These excavations will be completed within steel sheet cofferdams with concrete foundations installed in the dry. Since this is an expensive operation, any effort to minimize the number of piers and extend the spans will reduce the overall cost.

The embankments, subject to detailed design, may require embankment surcharging to minimize future settlements. The use of wick drains will greatly reduce the length of time required to complete the embankment settlement and thus improve the overall schedule.

2.2.2 Lake Shore Boulevard and CN Bridge Extensions over the Don River

2.2.2.1 Step 1 CN Bridge Structure

The CN rail bridge as currently detailed is to be extended by 3 spans while maintaining traffic. This is a spur line which we have assumed will have limited amount of traffic. We have therefore planned the construction with the intention of providing for intermittent rail traffic.

We have planned on lifting tracks to construct the piers and abutments and returning them to their position on a temporary trestle as required. This technique is slow and tedious. As an alternative the documents refer to the possibility of closing the track to rail traffic while the Gardiner expressway columns are relocated to permit the re-construction of Lake Shore Boulevard to the west. If a full track closure is permitted considerable savings could be achieved.

The foundation construction for this bridge will be complicated in that the piers of the new bridge have to be constructed adjacent to the piers of the existing Gardiner Expressway. Sheet piling will be required to provide scour protection to the new piers and abutment. A structural steel deck will be installed with minimum disruption to train traffic.

2.2.2.2 Step 2 WB Lake Shore Boulevard Structure

The traffic on the westbound Lake Shore Boulevard will be reduced to one lane and will be diverted to the eastbound Lake Shore Boulevard Bridge for the duration of construction of the WBL structure (one full construction season).

The piers and west abutment for the new bridge will have to be constructed in very restricted quarters below the existing Gardiner Expressway. In order to construct the foundation specialized piling equipment is required to drive the H-pile foundation and to drive steel sheet piling to provide future scour protection. The equipment is available locally and the method, although complicated, is feasible.

The deck is proposed to be constructed using standard pre-cast box girders with a concrete topping. This is a standard economical form of construction. At the contractor's option the soil beneath the new structure may be excavated prior to installing the box girders.

2.2.2.3 Step 3 EB Lake Shore Boulevard Structure

The traffic on the eastbound Lake Shore will be reduced to one lane and will be diverted to the new westbound Lake Shore Boulevard Bridge for the duration of construction of the EBL structure (one full construction season).

The Eastbound bridge will follow the same procedure as detailed for the WBL but due to the configuration of the Gardiner expressway above the EBL, more headroom is available.

2.2.3 Cherry Street over the Keating Channel – Short Option (Per E.A. Master Plan)

The Cherry Street road and TTC structures are designed to be focal points for the entrance to the proposed development. The bridges are designed with arched superstructures spanning 38 metres across the full width of the Keating Channel.

Piled foundations will be constructed within steel sheet cofferdams. Simple concrete abutments will support the arch structure. The bridge will be designed to provide a minimum 3.0 metres navigational clearance.

The new Dock wall on the south abutment will form a portion of the temporary cofferdam and will have to be designed accordingly.

Approaches to the bridge will add a considerable amount of fill to the area and provisions in the form of surcharging, wick drains and a six (6) month wait time will be necessary to reduce long term settlement.

The TTC bridge approach embankment will have to maintain the 1.5% maximum slope.

2.2.4 Munition Street over the Keating Channel

The Munition Street bridge is designed with the same features as the Cherry Street Bridge. The bridge is somewhat more complex due to its proximity to the Gardiner Expressway and to the current location of Lake Shore Boulevard. It may be expedient to defer this bridge until the Lake Shore is relocated.

2.2.5 Utilidors

Currently the development plan calls for the construction of three utilidors crossing the proposed Don River Valley at Cherry Street, Villiers Street and North of The Causeway structure. The details show a submerged concrete culvert with the services attached to the walls of the structure. There is some concern with running wet services in the same space as dry. Consequently, as suggested we have made provision for twin culverts running in separate trenches to permit the separation of services.

The proposal is for a culvert which is constructed approximately 6 to 7 metres below the existing ground and running 250 metres across the valley. The culverts will have to be designed to counter both settlement and flotation forces. The excavation will have to be completed in a sheet piled cofferdam and dewatered with pumping.

In order to maintain dry utilidors it will be necessary to cast-in-place the culvert. A pre-cast culvert will be less expensive but would not likely provide sufficient water tightness under the conditions.

We suggest that a number of alternate utilidor solutions be studied:

- Replace two separate culverts at each location with a single culvert with a full height partition between the cells.
- Investigate running the utilities between the beams of the river crossing bridges. It may be possible to isolate the sidewalk structure from the Traffic structure to minimize the vibration concerns.
- Use directional drilling to install the services. Lay a flexible precast concrete barrier in the river bottom above the utilities to protect them from scour and dredging.

2.2.6 Weir Construction

2.2.6.1 Upstream Collapsible Weir

The Upstream weir will be constructed after the completion of the CN Bridge extension, but before the excavation of the river Channel. Consequently the structure which ties into the new bridge pier may be constructed from the ground surface down.

The structure will be founded on H-piles and the concrete will have to extend below the bottom of the river bed. Steel sheet piling will be used to provide permanent scour protection and will extend down to rock in order to provide a working area which can be dewatered.

The concrete spillway will be designed to support a collapsible bladder which will support the upper weir. The bladder will collapse when the water level reaches a specific elevation and will permit a portion of the Don River to flow down the Keating Channel.

2.2.6.2 Downstream Fixed Weir

The downstream weir is a 150 metre long fixed elevation weir which will allow the Don River to flow into the Keating Channel when the river elevation exceeds 76.5 metres.

The structure will be founded on H-piles and the concrete will have to extend below the bottom of the river bed. Steel piling will be used to provide permanent scour protection and will extend down to rock in order to provide a working area which can be dewatered.

This north half of the structure will have to be constructed from marine based equipment in the Keating Channel. The south half of the structure can be constructed from ground based equipment prior to the flooding of Reach 2.

2.2.7 Dock Walls

The report prepared by Riggs Engineering was used as the basis for our approach. Based on the overall Development's Program, each wall was evaluated to allow us to determine if it was necessary to replace a wall, remove a wall or simply rebuild concrete portions and upgrade the supporting anchorage features.

As described below, this analysis has provided us with a budget. The budget must also be evaluated based on the future Architectural requirements of the project and future staging requirements.

- Keating Channel North Wall – The channel wall face will be backfilled with stone. Allowance has been made to replace the top portion of the wall and upgrade the supporting structure.
- Keating Channel South Wall – The Channel wall face will be backfilled with stone for its entire length. A complete new wall will be provided for 484 metres to

accommodate the revised channel configuration. Repairs will be applied to the superstructure for the remaining 250 metres of the existing wall.

- Essroc – The superstructure will be removed and replaced for 60 metres and for the balance of the wall, the top portion of the wall which is to be buried will be removed – 483 metres.
- Marine Terminal Quay – Remove the top of the north wall. Under the current Development Proposal the remaining walls will remain exposed and an allowance has been made to replace these walls.
- Polson / Marine Terminal Slip – The East end of the slip will be modified to accommodate the new Don River mouth. On the assumption the balance of the slip will be modified in the ultimate build out, allowance has been made to repair 1094 metres of dock superstructure.
- Ship Channel – the entire length of the north wall is scheduled for replacement. Therefore 507 metres of wall will be replaced excluding the overflow outfall area, which will be constructed at the same time.

3. PRICING SUMMARY

A detailed pricing summary is provided in Appendix A which was calculated using a first principal approach where sufficient data was available. When sufficient detail was not provided an elemental approach was used.

Civil type items such as earthworks and backfill were based on a numerical takeoff and detailed pricing was carried out. Structures were compared to a current library of recent projects and estimates and elemental calculations were made. For all structures, cost increases were required to accommodate the major dewatering efforts which will be required.

The following is a list of the included pricing parameters:

- The project is priced in 2012 dollars with further allowance for escalation for those items which will extend to 2016.
- It is assumed the project will be tendered as detailed. Sufficient site overheads have been included to accommodate the schedule.
- The Environmental authorities will permit the contractor to return the water generated from its operations to the source after best efforts to remove sediments. Alternatively the city of Toronto will allow the water to be disposed of free of charge.
- An allowance of $10.00 per cubic metre has been allowed to reimburse the SRF for their operations. Waterfront Toronto will revise the overall estimate to reflect the actual amount bearing in mind that all material delivered to the SRF will be picked up from the SRF and returned to the Development Site for re-use.
- An allowance for normal Contractor's Insurance and Bonds has been included.
- An allowance has been made for the disposal of hazardous material which should be vetted by the environmental specialists.
- An allowance has been included to modify services crossing the Keating Channel which will be impacted by the excavation of Alternatives 4W and 2. Engineering design will be required to confirm pricing.
- An allowance has been made to raise the General grade of the site by 1.2 metres. It is assumed that the material will be provided free from on-going excavations taking place in the city.

The following is a list of exclusions:

- No allowance has been made for building or bridge demolition
- Utility relocations
- Utility Installation to service the development
- Roadworks
- Architectural Streetscapes

- Valley Landscaping and naturalization
- Final grading of the valley lands to support naturalization
- Armouring of the river valley walls
- Architectural or Engineering design Fees
- Permits
- No work included for the reconstruction of the Lake Shore Boulevard, Cherry St north of the Keating Channel or the Cherry Street Portal
- Footbridges
- No provision has been made for a 1.5 metre sub-excavation. We have allowed, as per the original concept for an average of 0.45 metres of sub-excavation and backfill with a granular substrate material.
- Bridges crossing the Shipping Channel.
- No provision has been made in Alternatives 4W Re-aligned or 2 Re-aligned to construct a downstream weir. This requirement is subject to detailed design.

4. SCHEDULE

A detailed project schedule for Alternative 4WS Re-aligned has been prepared and is provided in Appendix B. We have assumed a spring 2012 start and determined that the completion would be summer of 2016 – approximately four and a half years.

The program is based generally on completing the structures in advance of the grading operations but maintaining a steady flow of material to the SRF once the operations begin.

5. POINTS FOR FURTHER STUDY IN DETAILED DESIGN

During the process a number of concepts were discussed which could provide savings to the overall project. In order to properly price these concepts, input is required from the designers and engineers as to their individual worthiness. The following is a list of concepts which might be considered further.

- Currently the pricing exercise is making allowance for two individual box culverts (utilidors) to carry municipal and private services under the future river bed. It is proposed to provide a single box culvert with a dividing wall to separate the non-compatible services. Potential Savings Alternative 4WS – $4.5 million * 3 locations = $13.5 million
- Services could be installed in protective sleeves which are installed under the river bed. The sleeves could be installed in close proximity to each other with a hardened protective barrier installed in the river bed, to prevent future scour or inadvertent excavation of the services. Potential Savings Alternative 4WS – $7.0 million * 3 locations = $21.0 million
- Services could be hung under the bridge deck in the cavity formed by the bridge girders. The pedestrian portion of the bridge could be isolated from the main bridge structure and be used for this purpose, thus eliminating most of the potential vibrations which would otherwise be imparted to the services. Potential Savings Alternative 4WS – $9.0 million * 3 locations = $27.0 million

6. DISCUSSION

The successful implementation of this project will depend on the overall Project Plan. To that point it is important that all of the planned Infrastructure Works north of the Keating channel are integrated into the program for the Development works south of the Keating Channel. We have found that on a number of occasions the interaction of the proposed intersection improvements at Lake Shore Boulevard and the Cherry St will have a direct impact on and timing on the works scheduled in this brief. This issue will also have an impact on the extension of the bridges over the Don River and may have a major impact on the final project schedule.

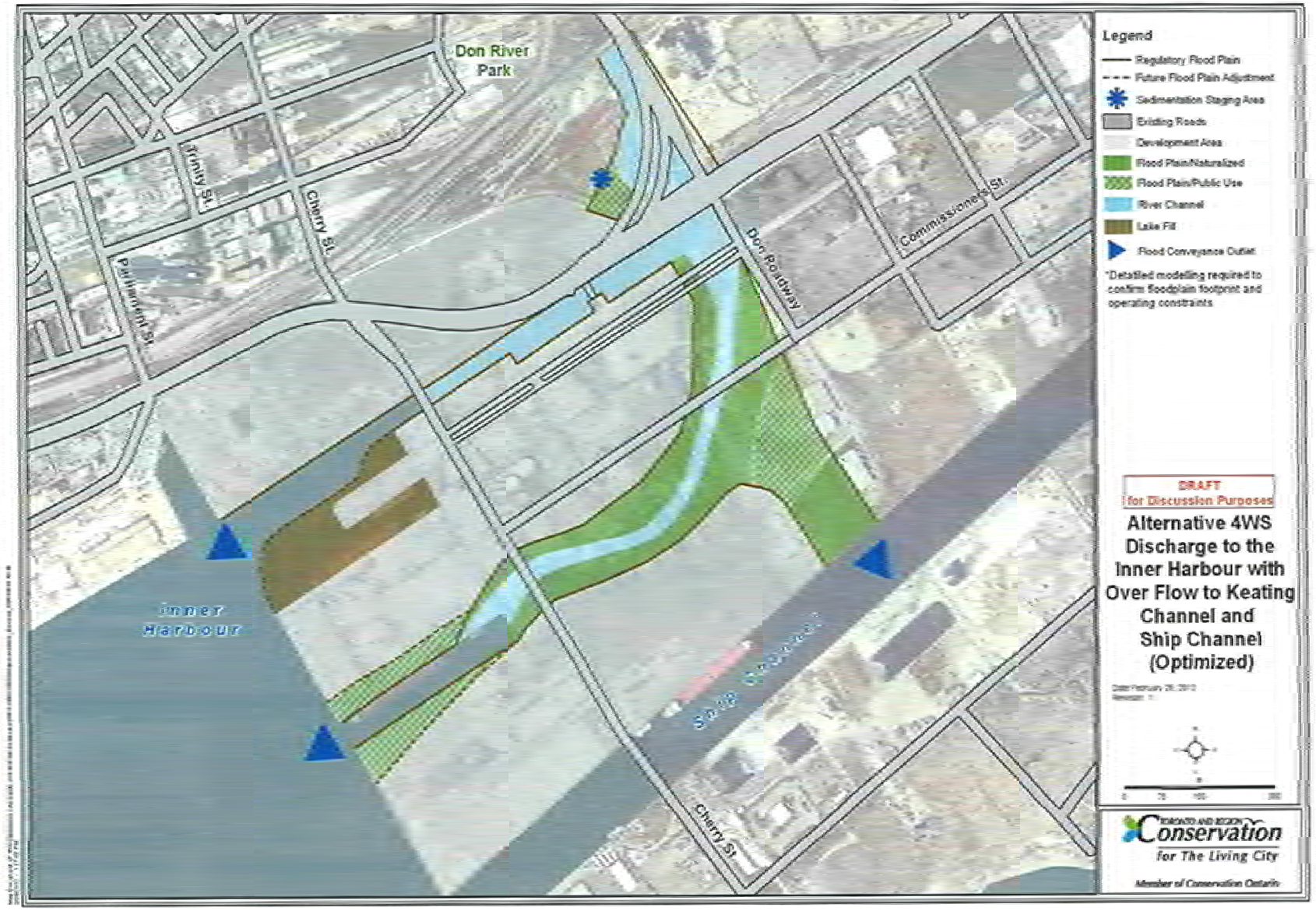
This report has been based on very preliminary information. The cost analysis should be reviewed on an ongoing basis as the detailed design develops. Reviewing agencies will also have a major impact on the overall project cost, and their requirements should be included in the total estimate.

APPENDIX A

PRICING SUMMARY

ALTERNATIVE 4WS RE-ALIGNED

Alternative 4WS (Realigned)



Pricing Summary

Option 4WS Re-aligned

Sorted by Reach

Step 1	**Placement of Promintory Fill Material**					
5	Construct a perimeter Rock fill Dike	450	M	20,300.00	9,135,000.00	
10	Deliver & Place Reclaimed Earth from SRF	500,000	M3	15.00	7,500,000.00	
15	Silt Curtain Installation	500	M	269.00	134,500.00	
	Sub-Total Step 1					**16,769,500.00**
Step 2	**Reach 3a**					
20	Sheet Pile Retaing wall Adjacent to Spillway East & West	1,400	M2	1,400.00	1,960,000.00	
25	Causeway Structure	3,370	M2	4,500.00	15,165,000.00	
30	Remove Wharf to Shipping Channel Invert	215	M	1,400.00	301,000.00	
35	Excavate Overlfow outfall	10,000	M3	30.00	300,000.00	
40	Line Outfall spillway RipRap	8,400	M3	101.00	848,400.00	
45	Excavate Reach 3A	105,000	M3	25.00	2,625,000.00	
50	Treatment of Contaminated water	1	Each	1,000,000.00	1,000,000.00	
55	Construct Causeway Approach Fill	20,000	EA	15.00	300,000.00	
60	Approach fill surcharge / wick drains	1	EA	303,000.00	303,000.00	
	Sub-Total Reach 3A					**22,802,400.00**
Step 3	**Reach 4**					
65	Cherry Street Road Structure over Don River 4 lanes	3,800	M2	5,500.00	20,900,000.00	
70	Cherry Street TTC Structure 2 lanes	2,028	M2	6,200.00	12,573,600.00	
75	Cherry Street Utilidor Sewer & Water	250	M	37,000.00	9,250,000.00	
80	Cherry Street Utilidor Hydro Communication & Gas	250	M	37,000.00	9,250,000.00	
85	Remove and reinforcement of the Polson St End Quay	70	M	13,000.00	910,000.00	
90	Excavate Reach 4 in the wet	45,000	M3	22.00	990,000.00	
95	Treatment of Contaminated water	1	Each	350,000.00	350,000.00	
96	Construct a perimeter Rock fill Dike	100	M	20,300.00	2,030,000.00	
97	Deliver & Place Reclaimed Earth from SRF	170,000	M3	15.00	2,550,000.00	
98	Silt Curtain Installation	500	M	269.00	134,500.00	
100	Placement of a subbase Barrier Allow 50% of Area	12,000	M2	98.00	1,176,000.00	
105	Placement of River invert Material 400 mm thick	10,000	M3	113.00	1,130,000.00	

110	Construct Cherry St Approach Fill	20,000	M3	15.00	300,000.00	
115	Approach fill surcharge / wick drains	1	EA	418,000.00	418,000.00	
	Sub-Total Reach 4					**61,962,100.00**
Step 4	**Reach 3**					
120	Reach 3 Utilidor Sewer & Water	250	M	37,000.00	9,250,000.00	
125	Reach 3 Utilidor Hydro Communication & Gas	250	M	37,000.00	9,250,000.00	
130	Excavate Reach 3 in the wet	265,000	M3	22.00	5,830,000.00	
135	Treatment of Contaminated water	1	Each	1,800,000.00	1,800,000.00	
140	Placement of a subbase Barrier Allow 50% of Area	17,500	M2	98.00	1,715,000.00	
145	Placement of River invert Material 400 mm thick	14,000	M3	113.00	1,582,000.00	
	Sub-Total Reach 3					**29,427,000.00**
Step 5	**Reach 2**					
150	Commisioners St - Road Structure 4 lanes	4,012	M2	5,300.00	21,263,600.00	
155	Commissioners St TTC Structure 2 lanes	2,142	M2	6,100.00	13,066,200.00	
160	Commissioner St Utilidor Sewer & Water	250	M	37,000.00	9,250,000.00	
165	Commissioner St Utilidor Hydro Communication & Gas	250	M	37,000.00	9,250,000.00	
170	Excavate Reach 2 in the wet	130,000	M3	23.00	2,990,000.00	
175	Treatment of Contaminated water	1	Each	930,000.00	930,000.00	
180	Placement of a subbase Barrier Allow 50% of Area	12,000	M2	98.00	1,176,000.00	
185	Placement of River invert Material 400 mm thick	10,000	M3	113.00	1,130,000.00	
190	Placement of Dykes along Reach 2 & 3	48,000	M3	5.00	240,000.00	
195	Construct Commissioner Approach Fill	20,000	M3	15.00	300,000.00	
200	Approach fill surcharge / wick drains	1	EA	418,000.00	418,000.00	
	Sub-Total Reach 2					**60,013,800.00**
Step 6	**Reach 1**					
205	Extend Rail Spur Bridge 3 spans to the West	720	M2	22,000.00	15,840,000.00	
210	Construct Collapsable Weir	70	M	142,000.00	9,940,000.00	
215	Detour Lakeshore WBL onto EBL	1	EA	379,000.00	379,000.00	
220	Extend WBL Lakesore by 3 Spans	942	M2	7,800.00	7,347,600.00	
225	Detour Lakeshore EBL onto WBL	1	EA	379,000.00	379,000.00	
230	Extend EBL Lakesore by 3 Spans	942	M2	7,800.00	7,347,600.00	
235	Don Roadway Embankment Fill	50,000	M3	5.00	250,000.00	
240	Construction of Sediment Trap by dredging	40,000	M3	74.00	2,960,000.00	
245	Treatment of Contaminated water Dredgeate	1	Each	850,000.00	850,000.00	

250	Excavate & Regrade the west bank	155,000	M3	24.00	3,720,000.00	
255	Treatment of Contaminated water	1	Each	1,200,000.00	1,200,000.00	
260	Debris Management Area	1	Each	6,160,000.00	6,160,000.00	
265	Placement of a subbase Barrier Allow 50% of Area	25,000	M2	98.00	2,450,000.00	
270	Placement of River invert Material 400 mm thick	20,000	EA	113.00	2,260,000.00	
275	Connect Don River to Realigned Don River	1	EA	340,000.00	340,000.00	
280	Construct Downstream weir	1	EA	8,010,000.00	8,010,000.00	
	Sub-Total Reach 1					**69,433,200.00**
Step 7	**Reach 2A**					
285	Extend South Dock Wall @ Cherry St Reach 2A	75	M	26,200.00	1,965,000.00	
290	Cherry St Bridge road Arched Short option - over KC	1,000	M2	15,000.00	15,000,000.00	
295	Cherry St Bridge Rail Arched - over KC	770	M2	15,000.00	11,550,000.00	
300	Extend Dock Wall Munition St North	230	M	26,000.00	5,980,000.00	
305	Munition St Bridge - over KC	1,100	M2	14,400.00	15,840,000.00	
310	Dredge Channel	138,000	M3	72.00	9,936,000.00	
315	Treatment of Contaminated water	1	Each	1,800,000.00	1,800,000.00	
320	Place Stone Revetment	105,000	M3	102.00	10,710,000.00	
	Sub-Total Reach 2a					**72,781,000.00**
	Dock Wall Repair and Replacement					
325	Replace Parliament Street Slip Wall - not required	-	M			
330	Repairs to Dock Walls KC North side	764	M	8,000.00	6,112,000.00	
335	Repairs to Dock Walls KC South side	734	M	8,000.00	5,872,000.00	
340	Repairs/ remove top of Essroc Walls	543	M	3,500.00	1,900,500.00	
345	Repairs / remove top Marine Quay Walls	300	M	3,500.00	1,050,000.00	
346	Replace Marine Quay Walls	145	M	23,000.00	3,335,000.00	
350	Remove top Polson Quay Walls	1,094	M	3,500.00	3,829,000.00	
355	Repairs to Ship channel Walls	507	M	23,000.00	11,661,000.00	
	Sub-total Dock Wall Repair and Replacement					**33,759,500.00**
	General Items					
360	SRF Charges Remediate for re-use on-site	946,000	M3	10.00	9,460,000.00	
365	Placement of Balance of Reclaimed Earth	276,000	Each	12.00	3,312,000.00	
370	Removal Hazardous Material allowance	1	Each	11,000,000.00	11,000,000.00	

375	Retaining walls TTC Bridges - Allowance	1	Each	1,000,000.00	1,000,000.00	
380	Place 1.2m of fill over Developable Lands 1000m * 500m * 1.2m	600,000	m3	6.00	3,600,000.00	
	Sub-total General Items					**28,372,000.00**

Grand Total - Option 4WS Re-aligned	**395,320,500.00**

Pricing Summary

Option 4WS Re-aligned

Sorted by Element

Civil Grading Works

Promintory					
5	Construct a perimeter Rock fill Dike	450	M	20,300.00	9,135,000.00
10	Deliver & Place Reclaimed Earth from SRF	500,000	M3	15.00	7,500,000.00
15	Silt Curtain Installation	500	M	269.00	134,500.00
Reach 3A					
30	Remove Wharf to Shipping Channel Invert	215	M	1,400.00	301,000.00
35	Excavate Overlfow outfall	10,000	M3	30.00	300,000.00
40	Line Outfall spillway RipRap	8,400	M3	101.00	848,400.00
45	Excavate Reach 3A	105,000	M3	25.00	2,625,000.00
50	Treatment of Contaminated water	1	Each	1,000,000.00	1,000,000.00
55	Construct Causeway Approach Fill	20,000	EA	15.00	300,000.00
60	Approach fill surcharge / wick drains	1	EA	303,000.00	303,000.00
Reach 4					
85	Remove and reinforcement of the Polson St End Quay	70	M	13,000.00	910,000.00
90	Excavate Reach 4 in the wet	45,000	M3	22.00	990,000.00
95	Treatment of Contaminated water	1	Each	350,000.00	350,000.00
96	Construct a perimeter Rock fill Dike	100	M	20,300.00	2,030,000.00
97	Deliver & Place Reclaimed Earth from SRF	170,000	M3	15.00	2,550,000.00
98	Silt Curtain Installation	500	M	269.00	134,500.00
100	Placement of a subbase Barrier Allow 50% of Area	12,000	M2	98.00	1,176,000.00
105	Placement of River invert Material 400 mm thick	10,000	M3	113.00	1,130,000.00
110	Construct Cherry St Approach Fill	20,000	M3	15.00	300,000.00
115	Approach fill surcharge / wick drains	1	EA	418,000.00	418,000.00
Reach 3					
130	Excavate Reach 3 in the wet	265,000	M3	22.00	5,830,000.00
135	Treatment of Contaminated water	1	Each	1,800,000.00	1,800,000.00
140	Placement of a subbase Barrier Allow 50% of Area	17,500	M2	98.00	1,715,000.00
145	Placement of River invert Material 400 mm thick	14,000	M3	113.00	1,582,000.00

Portlands Development Plan
Heavy Civil Constructability Report

Pricing Summary

Reach 2					
170	Excavate Reach 2 in the wet	130,000	M3	23.00	2,990,000.00
175	Treatment of Contaminated water	1	Each	930,000.00	930,000.00
180	Placement of a subbase Barrier Allow 50% of Area	12,000	M2	98.00	1,176,000.00
185	Placement of River invert Material 400 mm thick	10,000	M3	113.00	1,130,000.00
190	Placement of Dykes along Reach 2 & 3	48,000	M3	5.00	240,000.00
195	Construct Commissioner Approach Fill	20,000	M3	15.00	300,000.00
200	Approach fill surcharge / wick drains	1	EA	418,000.00	418,000.00
Reach 1					
235	Don Roadway Embankment Fill	50,000	M3	5.00	250,000.00
240	Construction of Sediment Trap by dredging	40,000	M3	74.00	2,960,000.00
245	Treatment of Contaminated water Dredgeate	1	Each	850,000.00	850,000.00
250	Excavate & Regrade the west bank	155,000	M3	24.00	3,720,000.00
255	Treatment of Contaminated water	1	Each	1,200,000.00	1,200,000.00
260	Debris Management Area	1	Each	6,160,000.00	6,160,000.00
265	Placement of a subbase Barrier Allow 50% of Area	25,000	M2	98.00	2,450,000.00
270	Placement of River invert Material 400 mm thick	20,000	EA	113.00	2,260,000.00
275	Connect Don River to Realigned Don River	1	EA	340,000.00	340,000.00
Reach 2A					
310	Dredge Channel	138,000	M3	72.00	9,936,000.00
315	Treatment of Contaminated water	1	Each	1,800,000.00	1,800,000.00
320	Place Stone Revetment	105,000	M3	102.00	10,710,000.00
General Items					
360	SRF Charges Remediate for re-use on-site	946,000	M3	10.00	9,460,000.00
365	Placement of Balance of Reclaimed Earth	276,000	Each	12.00	3,312,000.00
370	Removal Hazardous Material allowance	1	Each	11,000,000.00	11,000,000.00
380	Place 1.2m of fill over Developable Lands 1000m * 500m * 1.2	600,000	m3	6.00	3,600,000.00
	Sub Total Civil Grading Element				**120,554,400.00**

Portlands Development Plan
Heavy Civil Constructability Report

Pricing Summary

Structural Elements

Reach 3A					
20	Sheet Pile Retaing wall Adjacent to Spillway East & West	1,400	M2	1,400.00	1,960,000.00
25	Causeway Structure	3,370	M2	4,500.00	15,165,000.00
Reach 4					
65	Cherry Street Road Structure over Don River 4 lanes	3,800	M2	5,500.00	20,900,000.00
70	Cherry Street TTC Structure 2 lanes	2,028	M2	6,200.00	12,573,600.00
75	Cherry Street Utilidor Sewer & Water	250	M	37,000.00	9,250,000.00
80	Cherry Street Utilidor Hydro Communication & Gas	250	M	37,000.00	9,250,000.00
Reach 3					
120	Reach 3 Utilidor Sewer & Water	250	M	37,000.00	9,250,000.00
125	Reach 3 Utilidor Hydro Communication & Gas	250	M	37,000.00	9,250,000.00
Reach 2					
150	Commisioners St - Road Structure 4 lanes	4,012	M2	5,300.00	21,263,600.00
155	Commissioners St TTC Structure 2 lanes	2,142	M2	6,100.00	13,066,200.00
160	Commissioner St Utilidor Sewer & Water	250	M	37,000.00	9,250,000.00
165	Commissioner St Utilidor Hydro Communication & Gas	250	M	37,000.00	9,250,000.00
Reach 1					
205	Extend Rail Spur Bridge 3 spans to the West	720	M2	22,000.00	15,840,000.00
210	Construct Collapsable Weir	70	M	142,000.00	9,940,000.00
215	Detour Lakeshore WBL onto EBL	1	EA	379,000.00	379,000.00
220	Extend WBL Lakesore by 3 Spans	942	M2	7,800.00	7,347,600.00
225	Detour Lakeshore EBL onto WBL	1	EA	379,000.00	379,000.00
230	Extend EBL Lakesore by 3 Spans	942	M2	7,800.00	7,347,600.00
280	Construct Downstream weir	1	EA	8,010,000.00	8,010,000.00

Pricing Summary

Reach 2A

285	Extend South Dock Wall @ Cherry St	75	M	26,200.00	1,965,000.00	
290	Cherry St Bridge road Arched Short option over KC	1,000	M2	15,000.00	15,000,000.00	
295	Cherry St Bridge Rail Arched Over KC	770	M2	15,000.00	11,550,000.00	
300	Extend Dock Wall Munition St North	230	M	26,000.00	5,980,000.00	
305	Munition St Bridge - over KC	1,100	EA	14,400.00	15,840,000.00	
375	Retaining walls TTC Bridges - Allowance	1	Each	1,000,000.00	1,000,000.00	
	Sub Total Structural Elements					**241,006,600.00**
	Dock Wall Repair and Replacement					
325	Replace Parliament Street Slip Wall - not required	-	M			
330	Repairs to Dock Walls KC North side	764	M	8,000.00	6,112,000.00	
335	Repairs to Dock Walls KC South side	734	M	8,000.00	5,872,000.00	
340	Repairs/ remove top of Essroc Walls	543	M	3,500.00	1,900,500.00	
345	Repairs / remove top Marine Quay Walls	300	M	3,500.00	1,050,000.00	
346	Replace Marine Quay Walls	145	M	23,000.00	3,335,000.00	
350	Remove top Polson Quay Walls	1,094	M	3,500.00	3,829,000.00	
355	Repairs to Ship Channel Walls	507	M	23,000.00	11,661,000.00	
	Sub-total Dock Wall Repair and Replacement					**33,759,500.00**
	Grand Total - Option 4WS Re-aligned					**395,320,500.00**

APPENDIX B

PRICING SUMMARY

ALTERNATIVE 4W RE-ALIGNED

Alternative 4W (Realigned)

Pricing Summary

Option 4W Re-aligned

Sorted by Reach

Step 1	**Reach 3a**				
20	Sheet Pile Retaing wall Adjacent to Spillway East & West	1,400	M2	1,400.00	1,960,000.00
25	Causeway Structure	3,370	M2	4,500.00	15,165,000.00
30	Reach 3 Utilidor Sewer & Water	250	M	37,000.00	9,250,000.00
35	Reach 3 Utilidor Hydro Communication & Gas	250	M	37,000.00	9,250,000.00
40	Remove Wharf to Shipping Channel Invert	215	M	1,400.00	301,000.00
45	Excavate Overlfow outfall	10,000	M3	30.00	300,000.00
50	Line Outfall spillway RipRap	8,400	M3	101.00	848,400.00
55	Excavate Reach 3A	105,000	M3	25.00	2,625,000.00
60	Treatment of Contaminated water	1	Each	1,000,000.00	1,000,000.00
65	Construct Causeway Approach Fill	20,000	EA	15.00	300,000.00
70	Approach fill surcharge / wick drains	1	EA	303,000.00	303,000.00
	Sub-Total Reach 3A				**41,302,400.00**
Step 2	**Reach 2**				
100	Commisioners St - Road Structure 4 lanes	4,012	M2	5,300.00	21,263,600.00
105	Commissioners St TTC Structure 2 lanes	2,142	M2	6,100.00	13,066,200.00
110	Commissioner St Utilidor Sewer & Water	250	M	37,000.00	9,250,000.00
115	Commissioner St Utilidor Hydro Communication & Gas	250	M	37,000.00	9,250,000.00
120	Cherry St Bridge road Girder Bridge - over KC	6,325	M2	5,500.00	34,787,500.00
125	Cherry St Bridge Rail Arched - over KC	2,500	M2	6,100.00	15,250,000.00
130	Approach fill surcharge / wick drains	2	EA	418,000.00	836,000.00
135	Construct Commissioner Approach Fill	20,000	M3	15.00	300,000.00
140	Construct Cherry st over Keating Channel Approach Fill	20,000	M3	15.00	300,000.00
145	Excavate Reach 2 in the wet	250,000	M3	23.00	5,750,000.00
150	Treatment of Contaminated water	1	Each	1,700,000.00	1,700,000.00
155	Placement of a subbase Barrier Allow 50% of Area	15,000	M2	98.00	1,470,000.00
160	Placement of River invert Material 400 mm thick	12,000	M3	113.00	1,356,000.00
165	Dredge Channel	50,000	M3	72.00	3,600,000.00
170	Treatment of Contaminated water	1	Each	600,000.00	600,000.00
175	Place Stone Revetment Along KC North Wall West End	25,000	M3	102.00	2,550,000.00

	Placement of Don River Fill Material					
180	Construct a perimeter Rock fill Dike	300	M	20,300.00	6,090,000.00	
185	Crushed Stone B/fill at entrance of Don river to Reach 2	45,000	m3	113.00	5,085,000.00	
190	Deliver & Place Reclaimed Earth from SRF	365,000	M3	15.00	5,475,000.00	
193	Deliver & Place Material from Off site Excavations	265,000	m3	6.00	1,590,000.00	
195	Silt Curtain Installation	500	M	269.00	134,500.00	
	Sub-Total Reach 2					**139,703,800.00**
Step 3	**Reach 1**					
200	Extend Rail Spur Bridge 3 spans to the West	720	M2	22,000.00	15,840,000.00	
205	Construct Collapsable Weir	70	M	142,000.00	9,940,000.00	
210	Detour Lakeshore WBL onto EBL	1	EA	379,000.00	379,000.00	
215	Extend WBL Lakesore by 3 Spans	942	M2	7,800.00	7,347,600.00	
220	Detour Lakeshore EBL onto WBL	1	EA	379,000.00	379,000.00	
225	Extend EBL Lakesore by 3 Spans	942	M2	7,800.00	7,347,600.00	
230	Don Roadway Embankment Fill	50,000	M3	5.00	250,000.00	
235	Construction of Sediment Trap by dredging	40,000	M3	74.00	2,960,000.00	
240	Treatment of Contaminated water Dredgeate	1	Each	850,000.00	850,000.00	
245	Excavate & Regrade the west bank	155,000	M3	24.00	3,720,000.00	
250	Treatment of Contaminated water	1	Each	1,200,000.00	1,200,000.00	
255	Debris Management Area	1	Each	6,160,000.00	6,160,000.00	
260	Placement of a subbase Barrier Allow 50% of Area	25,000	M2	98.00	2,450,000.00	
265	Placement of River invert Material 400 mm thick	20,000	EA	113.00	2,260,000.00	
270	Connect Don River to Realigned Don River	1	EA	340,000.00	340,000.00	
275	Construct Downstream Weir - Requirement to be confirmed by design team					
	Sub-Total Reach 1					**61,423,200.00**
	Dock Wall Repair and Replacement					
300	Replace Parliament Street Slip Wall - not required	-	M		-	
305	Repairs to Dock Walls KC North side	764	M	8,000.00	6,112,000.00	
310	Remove to Dock Walls KC South side	734	M	5,000.00	3,670,000.00	
315	Repairs/ remove top of Essroc Walls	543	M	5,000.00	2,715,000.00	
320	Replace Marine Quay Walls	300	M	23,000.00	6,900,000.00	
325	Replace Marine Quay Walls	145	M	23,000.00	3,335,000.00	
330	Replace Polson Quay Walls	1,094	M	23,000.00	25,162,000.00	

335	Replace Ship Channel Walls	507	M	23,000.00	11,661,000.00	
	Sub-total Dock Wall Repair and Replacement					**59,555,000.00**
	General Items					
340	SRF Charges Remediate for re-use on-site	660,000	M3	10.00	6,600,000.00	
345	Placement of Balance of Reclaimed Earth	-	Each	12.00	-	
350	Removal Hazardous Material allowance	1	Each	11,000,000.00	11,000,000.00	
355	Retaining walls TTC Bridges - Allowance	1	Each	1,000,000.00	1,000,000.00	
360	Modification to Utilities Crossing Existing Keating C - Allowance	1	Each	4,000,000.00	4,000,000.00	
365	Place 1.2m of fill over Developable Lands 1000m * 500m * 1.2m	600,000	m3	6.00	3,600,000.00	
	Sub-total General Items					**26,200,000.00**
	Grand Total - Option 4W Re-aligned					**328,184,400.00**

Pricing Summary

Option 4W Re-aligned

Sorted by Element

Civil Grading Works

Reach 3A

45	Excavate Overlfow outfall	10,000	M3	30.00	300,000.00
50	Line Outfall spillway RipRap	8,400	M3	101.00	848,400.00
55	Excavate Reach 3A	105,000	M3	25.00	2,625,000.00
60	Treatment of Contaminated water	1	Each	1,000,000.00	1,000,000.00
65	Construct Causeway Approach Fill	20,000	EA	15.00	300,000.00
70	Approach fill surcharge / wick drains	1	EA	303,000.00	303,000.00

Reach 2

145	Excavate Reach 2 in the wet	250,000	M3	23.00	5,750,000.00
150	Treatment of Contaminated water	1	Each	1,700,000.00	1,700,000.00
155	Placement of a subbase Barrier Allow 50% of Area	15,000	M2	98.00	1,470,000.00
160	Placement of River invert Material 400 mm thick	12,000	M3	113.00	1,356,000.00
165	Dredge Channel	50,000	M3	72.00	3,600,000.00
170	Treatment of Contaminated water	1	Each	600,000.00	600,000.00
175	Place Stone Revetment Along KC North Wall West End	25,000	M3	102.00	2,550,000.00

Placement of Don River Fill Material

180	Construct a perimeter Rock fill Dike	300	M	20,300.00	6,090,000.00
185	Crushed Stone B/fill at entrance of Don river to Reach 2	45,000	m3	113.00	5,085,000.00
190	Deliver & Place Reclaimed Earth from SRF	365,000	M3	15.00	5,475,000.00
193	Deliver & Place Material from Off site Excavations	265,000	m3	6.00	1,590,000.00
195	Silt Curtain Installation	500	M	269.00	134,500.00

Pricing Summary

Reach 1

230	Don Roadway Embankment Fill	50,000	M3	5.00	250,000.00
235	Construction of Sediment Trap by dredging	40,000	M3	74.00	2,960,000.00
240	Treatment of Contaminated water Dredgeate	1	Each	850,000.00	850,000.00
245	Excavate & Regrade the west bank	155,000	M3	24.00	3,720,000.00
250	Treatment of Contaminated water	1	Each	1,200,000.00	1,200,000.00
255	Debris Management Area	1	Each	6,160,000.00	6,160,000.00
260	Placement of a subbase Barrier Allow 50% of Area	25,000	M2	98.00	2,450,000.00
265	Placement of River invert Material 400 mm thick	20,000	EA	113.00	2,260,000.00
270	Connect Don River to Realigned Don River	1	EA	340,000.00	340,000.00

General Items

340	SRF Charges Remediate for re-use on-site	660,000	M3	10.00	6,600,000.00
345	Placement of Balance of Reclaimed Earth	-	Each	12.00	-
350	Removal Hazardous Material allowance	1	Each	11,000,000.00	11,000,000.00
355	Retaining walls TTC Bridges - Allowance	1	Each	1,000,000.00	1,000,000.00
360	Modification to Utilities Crossing Existing Keating C - Allowan	1	Each	4,000,000.00	4,000,000.00
365	Place 1.2m of fill over Developable Lands 1000m * 500m * 1.	600,000	m3	6.00	3,600,000.00

Sub Total Civil Grading Element **87,166,900.00**

Structural Elements

Reach 3A

20	Sheet Pile Retaing wall Adjacent to Spillway East & West	1,400	M2	1,400.00	1,960,000.00
25	Causeway Structure	3,370	M2	4,500.00	15,165,000.00
30	Reach 3 Utilidor Sewer & Water	250	M	37,000.00	9,250,000.00
35	Reach 3 Utilidor Hydro Communication & Gas	250	M	37,000.00	9,250,000.00
40	Remove Wharf to Shipping Channel Invert	215	M	1,400.00	301,000.00

Pricing Summary

Reach 2

100	Commisioners St - Road Structure 4 lanes	4,012	M2	5,300.00	21,263,600.00
105	Commissioners St TTC Structure 2 lanes	2,142	M2	6,100.00	13,066,200.00
110	Commissioner St Utilidor Sewer & Water	250	M	37,000.00	9,250,000.00
115	Commissioner St Utilidor Hydro Communication & Gas	250	M	37,000.00	9,250,000.00
120	Cherry St Bridge road Girder Bridge - over KC	6,325	M2	5,500.00	34,787,500.00
125	Cherry St Bridge Rail Arched - over KC	2,500	M2	6,100.00	15,250,000.00
130	Approach fill surcharge / wick drains	2	EA	418,000.00	836,000.00
135	Construct Commissioner Approach Fill	20,000	M3	15.00	300,000.00
140	Construct Cherry st over Keating Channel Approach Fill	20,000	M3	15.00	300,000.00
275	Construct Downstream Weir - Requirement to be confirmed by design team				

Reach 1

200	Extend Rail Spur Bridge 3 spans to the West	720	M2	22,000.00	15,840,000.00
205	Construct Collapsable Weir	70	M	142,000.00	9,940,000.00
210	Detour Lakeshore WBL onto EBL	1	EA	379,000.00	379,000.00
215	Extend WBL Lakesore by 3 Spans	942	M2	7,800.00	7,347,600.00
220	Detour Lakeshore EBL onto WBL	1	EA	379,000.00	379,000.00
225	Extend EBL Lakesore by 3 Spans	942	M2	7,800.00	7,347,600.00

Sub Total Structural Elements **181,462,500.00**

Dock Wall Repair and Replacement

300	Replace Parliament Street Slip Wall - not required	-	M		-
305	Repairs to Dock Walls KC North side	764	M	8,000.00	6,112,000.00
310	Remove to Dock Walls KC South side	734	M	5,000.00	3,670,000.00
315	Repairs/ remove top of Essroc Walls	543	M	5,000.00	2,715,000.00
320	Replace Marine Quay Walls	300	M	23,000.00	6,900,000.00
325	Replace Marine Quay Walls	145	M	23,000.00	3,335,000.00
330	Replace Polson Quay Walls	1,094	M	23,000.00	25,162,000.00
335	Replace Ship Channel Walls	507	M	23,000.00	11,661,000.00

Sub-total Dock Wall Repair and Replacement **59,555,000.00**

Grand Total - Option 4W Re-aligned **328,184,400.00**

APPENDIX C

PRICING SUMMARY

ALTERNATIVE 2 RE-ALIGNED

Alternative 2 (Realigned)

Pricing Summary

Option 2 Re-aligned

Sorted by Reach

Step 1	**Reach 2**				
120	Temporary support of South Wall Keating Channel	1	LS	10,000,000.00	10,000,000.00
125	Cherry St Bridge road Girder Bridge - over KC	6,325	M2	5,500.00	34,787,500.00
130	Cherry St Bridge Rail Arched - over KC	2,500	M2	6,100.00	15,250,000.00
135	Approach fill surcharge / wick drains	1	EA	418,000.00	418,000.00
140	Construct Cherry st over Keating Channel Approach Fill	20,000	M3	15.00	300,000.00
145	Excavate Reach 2 in the wet	500,000	M3	35.00	17,500,000.00
150	Treatment of Contaminated water	1	Each	3,000,000.00	3,000,000.00
155	Placement of a subbase Barrier Allow 50% of Area	30,000	M2	98.00	2,940,000.00
160	Placement of River invert Material 400 mm thick	24,000	M3	113.00	2,712,000.00
165	Dredge Channel	150,000	M3	72.00	10,800,000.00
170	Treatment of Contaminated water	1	Each	1,800,000.00	1,800,000.00
175	Place Stone Revetment Along KC North Wall West End	50,000	M3	102.00	5,100,000.00
	Placement of Don River Fill Material				
180	Construct a perimeter Rock fill Dike	300	M	20,300.00	6,090,000.00
185	Crushed Stone B/fill at entrance of Don river to Reach 2	45,000	m3	113.00	5,085,000.00
190	Deliver & Place Reclaimed Earth from SRF	200,000	M3	15.00	3,000,000.00
193	Deliver & Place Material from Off site Excavations	-	m3	6.00	-
195	Silt Curtain Installation	1,000	M	269.00	269,000.00
	Sub-Total Reach 2				**119,051,500.00**
Step 2	**Reach 1**				
200	Extend Rail Spur Bridge 3 spans to the West	720	M2	22,000.00	15,840,000.00
205	Construct Collapsable Weir	70	M	142,000.00	9,940,000.00
210	Detour Lakeshore WBL onto EBL	1	EA	379,000.00	379,000.00
215	Extend WBL Lakesore by 3 Spans	942	M2	7,800.00	7,347,600.00
220	Detour Lakeshore EBL onto WBL	1	EA	379,000.00	379,000.00
225	Extend EBL Lakesore by 3 Spans	942	M2	7,800.00	7,347,600.00
230	Don Roadway Embankment Fill	50,000	M3	5.00	250,000.00

235	Construction of Sediment Trap by dredging	40,000	M3	74.00	2,960,000.00	
240	Treatment of Contaminated water Dredgeate	1	Each	850,000.00	850,000.00	
245	Excavate & Regrade the west bank	155,000	M3	24.00	3,720,000.00	
250	Treatment of Contaminated water	1	Each	1,200,000.00	1,200,000.00	
255	Debris Management Area	1	Each	6,160,000.00	6,160,000.00	
260	Placement of a subbase Barrier Allow 50% of Area	25,000	M2	98.00	2,450,000.00	
265	Placement of River invert Material 400 mm thick	20,000	EA	113.00	2,260,000.00	
270	Connect Don River to Realigned Don River	1	EA	340,000.00	340,000.00	
275	Construct Downstream Weir - Requirement to be confirmed by design team					
	Sub-Total Reach 1					**61,423,200.00**
	Dock Wall Repair and Replacement					
300	Replace Parliament Street Slip Wall - not required	-	M		-	
305	Repairs to Dock Walls KC North side	764	M	8,000.00	6,112,000.00	
310	Removal Dock Walls KC South side	734	M	5,000.00	3,670,000.00	
315	Repairs/ remove top of Essroc Walls	543	M	5,000.00	2,715,000.00	
320	Replace top Marine Quay Walls	300	M	23,000.00	6,900,000.00	
325	Replace top Marine Quay Walls	145	M	23,000.00	3,335,000.00	
330	Remove top Polson Quay Walls	1,094	M	8,000.00	8,752,000.00	
335	Replace Ship Channel Walls	507	M	23,000.00	11,661,000.00	
	Sub-total Dock Wall Repair and Replacement					**43,145,000.00**
	General Items					
340	SRF Charges Remediate for re-use on-site	845,000	M3	10.00	8,450,000.00	
345	Placement of Balance of Reclaimed Earth	645,000	Each	12.00	7,740,000.00	
350	Removal Hazardous Material allowance	1	Each	11,000,000.00	11,000,000.00	
355	Retaining walls TTC Bridges - Allowance	1	Each	1,000,000.00	1,000,000.00	
360	Modification to Utilities Crossing Existing Keating C - Allowa	1	Each	4,000,000.00	4,000,000.00	
365	Place 1.2m of fill over Developable Lands 1200m * 500m * 1 less aomunt included with line 345	75,000	m3	6.00	450,000.00	
370	Backfill Polson Slip	240,000	m3	6.00	1,440,000.00	
	Sub-total General Items					**34,080,000.00**
	Grand Total - Option 2 Re-aligned					**257,699,700.00**

Pricing Summary

Option 2 Re-aligned

Sorted by Element

Civil Grading Works

Reach 2

120	Temporary support of South Wall Keating Channel	1	LS	10,000,000.00	10,000,000.00
145	Excavate Reach 2 in the wet	500,000	M3	35.00	17,500,000.00
150	Treatment of Contaminated water	1	Each	3,000,000.00	3,000,000.00
155	Placement of a subbase Barrier Allow 50% of Area	30,000	M2	98.00	2,940,000.00
160	Placement of River invert Material 400 mm thick	24,000	M3	113.00	2,712,000.00
165	Dredge Channel	150,000	M3	72.00	10,800,000.00
170	Treatment of Contaminated water	1	Each	1,800,000.00	1,800,000.00
175	Place Stone Revetment Along KC North Wall West End	50,000	M3	102.00	5,100,000.00

Placement of Don River Fill Material

180	Construct a perimeter Rock fill Dike	300	M	20,300.00	6,090,000.00
185	Crushed Stone B/fill at entrance of Don river to Reach 2	45,000	m3	113.00	5,085,000.00
190	Deliver & Place Reclaimed Earth from SRF	200,000	M3	15.00	3,000,000.00
193	Deliver & Place Material from Off site Excavations	-	m3	6.00	-
195	Silt Curtain Installation	1,000	M	269.00	269,000.00

Reach 1

230	Don Roadway Embankment Fill	50,000	M3	5.00	250,000.00
235	Construction of Sediment Trap by dredging	40,000	M3	74.00	2,960,000.00
240	Treatment of Contaminated water Dredgeate	1	Each	850,000.00	850,000.00
245	Excavate & Regrade the west bank	155,000	M3	24.00	3,720,000.00
250	Treatment of Contaminated water	1	Each	1,200,000.00	1,200,000.00
255	Debris Management Area	1	Each	6,160,000.00	6,160,000.00
260	Placement of a subbase Barrier Allow 50% of Area	25,000	M2	98.00	2,450,000.00
265	Placement of River invert Material 400 mm thick	20,000	EA	113.00	2,260,000.00
270	Connect Don River to Realigned Don River	1	EA	340,000.00	340,000.00

General Items

340	SRF Charges Remediate for re-use on-site	845,000	M3	10.00	8,450,000.00
345	Placement of Balance of Reclaimed Earth	645,000	Each	12.00	7,740,000.00
350	Removal Hazardous Material allowance	1	Each	11,000,000.00	11,000,000.00
355	Retaining walls TTC Bridges - Allowance	1	Each	1,000,000.00	1,000,000.00
360	Modification to Utilities Crossing Existing Keating C - Allow	1	Each	4,000,000.00	4,000,000.00
365	Place 1.2m of fill over Developable Lands 1200m * 500m * less aomunt included with line 345	75,000	m3	6.00	450,000.00
370	Backfill Polson Slip	240,000	m3	6.00	1,440,000.00

Sub Total Civil Grading Element **122,566,000.00**

Structural Elements

Reach 2

125	Cherry St Bridge road Girder Bridge - over KC	6,325	M2	5,500.00	34,787,500.00
130	Cherry St Bridge Rail Arched - over KC	2,500	M2	6,100.00	15,250,000.00
135	Approach fill surcharge / wick drains	1	EA	418,000.00	418,000.00
140	Construct Cherry st over Keating Channel Approach Fill	20,000	M3	15.00	300,000.00
275	Construct Downstream Weir - Requirement to be confirmed by design team				

Reach 1

200	Extend Rail Spur Bridge 3 spans to the West	720	M2	22,000.00	15,840,000.00
205	Construct Collapsable Weir	70	M	142,000.00	9,940,000.00
210	Detour Lakeshore WBL onto EBL	1	EA	379,000.00	379,000.00
215	Extend WBL Lakesore by 3 Spans	942	M2	7,800.00	7,347,600.00
220	Detour Lakeshore EBL onto WBL	1	EA	379,000.00	379,000.00
225	Extend EBL Lakesore by 3 Spans	942	M2	7,800.00	7,347,600.00

Sub Total Structural Elements **91,988,700.00**

Dock Wall Repair and Replacement

300	Replace Parliament Street Slip Wall - not required	-	M		-
305	Repairs to Dock Walls KC North side	764	M	8,000.00	6,112,000.00
310	Removal Dock Walls KC South side	734	M	5,000.00	3,670,000.00
315	Repairs/ remove top of Essroc Walls	543	M	5,000.00	2,715,000.00

320	Replace top Marine Quay Walls	300	M	23,000.00	6,900,000.00	
325	Replace top Marine Quay Walls	145	M	23,000.00	3,335,000.00	
330	Remove top Polson Quay Walls	1,094	M	8,000.00	8,752,000.00	
335	Replace Ship Channel Walls	507	M	23,000.00	11,661,000.00	
	Sub-total Dock Wall Repair and Replacement					**43,145,000.00**

Grand Total - Option 2 Re-aligned	**257,699,700.00**

APPENDIX D

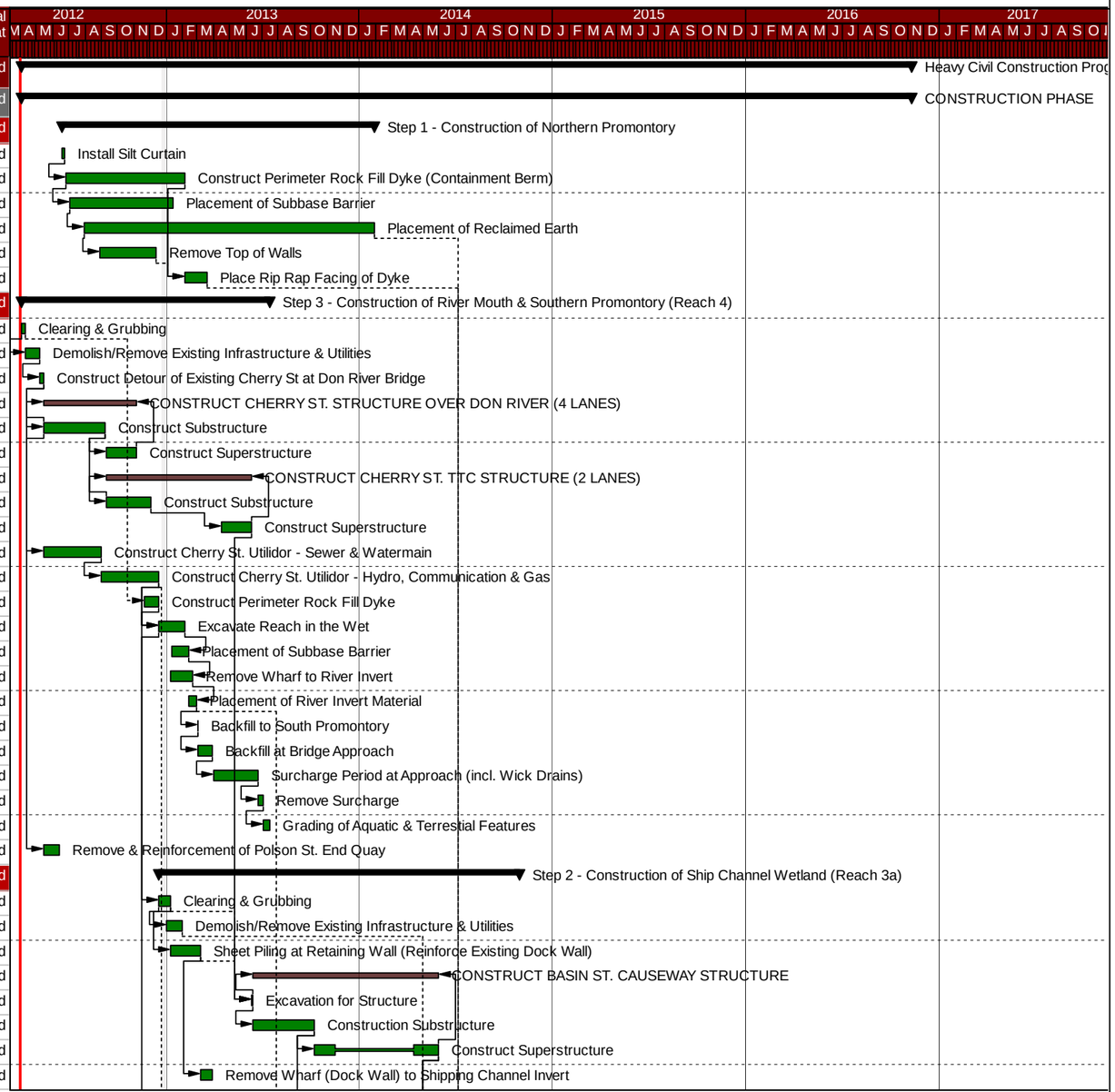
SCHEDULE

ALTERNATIVE 4WS RE-ALIGNED

HEAVY CIVIL CONSTRUCTABILITY ADVISORY SERVICES FOR PORT LANDS DEVELOPMENT PLAN

PROPOSED PROJECT SCHEDULE FOR ALTERNATIVE 4WS (REALIGNED)

Activity ID	Activity Name	Orig Dur	Qty	UOM	Start	Finish	Total Float
Heavy Civil Construction Program		1149d			02-Apr-12	10-Nov-16	0d
CONSTRUCTION PHASE		1149d			02-Apr-12	10-Nov-16	0d
Step 1 - Construction of Northern Promontory		400d			18-Jun-12	30-Jan-14	177d
STEP10000	Install Silt Curtain	5d	500	m	18-Jun-12	22-Jun-12	162d
STEP11000	Construct Perimeter Rock Fill Dyke (Containment Berm)	150d	450	m	25-Jun-12	04-Feb-13	162d
STEP12000	Placement of Subbase Barrier	130d	50,000	m2	03-Jul-12	14-Jan-13	162d
STEP13000	Placement of Reclaimed Earth	370d	370,000	m3	31-Jul-12	30-Jan-14	177d
STEP14000	Remove Top of Walls	75d	950	m	29-Aug-12	13-Dec-12	422d
STEP15000	Place Rip Rap Facing of Dyke	30d	450	m	05-Feb-13	19-Mar-13	392d
Step 3 - Construction of River Mouth & Southern Promontory (Reach 4)		320d			02-Apr-12	16-Jul-13	829d
STEP30000	Clearing & Grubbing	5d	1	LS	02-Apr-12	09-Apr-12	201d
STEP30050	Demolish/Remove Existing Infrastructure & Utilities	20d			10-Apr-12	07-May-12	201d
STEP30100	Construct Detour of Existing Cherry St at Don River Bridge	5d			08-May-12	14-May-12	201d
STEP31000	CONSTRUCT CHERRY ST. STRUCTURE OVER DON RIVER (4 LANES)	120d	3,800	m2	15-May-12	05-Nov-12	596d
STEP31050	Construct Substructure	80d			15-May-12	07-Sep-12	201d
STEP31150	Construct Superstructure	40d			10-Sep-12	05-Nov-12	596d
STEP32000	CONSTRUCT CHERRY ST. TTC STRUCTURE (2 LANES)	88d	2,028	m2	10-Sep-12	10-Jun-13	116d
STEP32050	Construct Substructure	60d			10-Sep-12	03-Dec-12	201d
STEP32150	Construct Superstructure	40d			15-Apr-13	10-Jun-13	116d
STEP33000	Construct Cherry St. Utilidor - Sewer & Watermain	75d	250	m	15-May-12	30-Aug-12	279d
STEP33500	Construct Cherry St. Utilidor - Hydro, Communication & Gas	75d	250	m	31-Aug-12	17-Dec-12	279d
STEP34000	Construct Perimeter Rock Fill Dyke	20d	450	m	20-Nov-12	17-Dec-12	279d
STEP34500	Excavate Reach in the Wet	30d	30,000	m3	18-Dec-12	06-Feb-13	279d
STEP35000	Placement of Subbase Barrier	24d	12,000	m2	11-Jan-13	13-Feb-13	520d
STEP35500	Remove Wharf to River Invert	30d	580	m	10-Jan-13	21-Feb-13	520d
STEP36000	Placement of River Invert Material	10d	10,000	m3	14-Feb-13	28-Feb-13	520d
STEP36500	Backfill to South Promontory	0d	0	m3	01-Mar-13	01-Mar-13	829d
STEP37000	Backfill at Bridge Approach	20d	20,000	m3	01-Mar-13	28-Mar-13	829d
STEP37500	Surcharge Period at Approach (incl. Wick Drains)	60d			01-Apr-13	24-Jun-13	829d
STEP37550	Remove Surcharge	5d	5,000	m3	25-Jun-13	02-Jul-13	829d
STEP38000	Grading of Aquatic & Terrestial Features	10d			03-Jul-13	16-Jul-13	829d
STEP38050	Remove & Reinforcement of Polson St. End Quay	20d	70	m	15-May-12	12-Jun-12	1099d
Step 2 - Construction of Ship Channel Wetland (Reach 3a)		461d			18-Dec-12	30-Oct-14	508d
STEP20000	Clearing & Grubbing	10d			18-Dec-12	09-Jan-13	279d
STEP20050	Demolish/Remove Existing Infrastructure & Utilities	20d	1	LS	03-Jan-13	30-Jan-13	839d
STEP21000	Sheet Piling at Retaining Wall (Reinforce Existing Dock Wall)	40d	1,400	m2	10-Jan-13	07-Mar-13	279d
STEP22000	CONSTRUCT BASIN ST. CAUSEWAY STRUCTURE	140d	3,370	m2	14-Jun-13	30-May-14	116d
STEP22025	Excavation for Structure	3d			11-Jun-13	13-Jun-13	214d
STEP22050	Construction Substructure	80d			14-Jun-13	08-Oct-13	214d
STEP22250	Construct Superstructure	60d			09-Oct-13	30-May-14	116d
STEP23000	Remove Wharf (Dock Wall) to Shipping Channel Invert	15d	215	m	08-Mar-13	28-Mar-13	904d



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AECON PROJECT ID: 3109_01

PROJECT START DATE: 02-Apr-12
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DATA DATE: 01-Apr-12

WATERFRONTToronto

SUBMITTED BY: AECON CONSTRUCTION AND MATERIALS LIMITED
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20-Apr-12	Revisions for Alternative 4WS Realigned Option		

HEAVY CIVIL CONSTRUCTABILITY ADVISORY SERVICES FOR PORT LANDS DEVELOPMENT PLAN

PROPOSED PROJECT SCHEDULE FOR ALTERNATIVE 4WS (REALIGNED)

Activity ID	Activity Name	Orig Dur	Qty	UOM	Start	Finish	Total Float
STEP24000	Excavate Overflow Outfall	15d	10,000	m3	02-Jun-14	20-Jun-14	508d
STEP25000	Line Outfall Spillway Rip Rap	40d	8,400	m3	23-Jun-14	19-Aug-14	508d
STEP26000	Excavate Reach	40d	60,000	m3	20-Aug-14	16-Oct-14	508d
STEP27000	Create/Fine Grade Wet Land Areas	10d			17-Oct-14	30-Oct-14	508d
STEP28000	Construct Causeway Approach Fill	20d	20,000		09-Oct-13	06-Nov-13	686d
STEP29000	Surcharge Period at Bridge Approach (incl. Wick Drains)	60d			07-Nov-13	06-Feb-14	686d
STEP29050	Remove Surcharge	5d	5,000	m3	07-Feb-14	13-Feb-14	686d
Step 4a - Construction of Reach 3		315d			11-Dec-12	25-Mar-14	644d
STEP40000	Clearing & Grubbing	15d	1	LS	11-Dec-12	09-Jan-13	360d
STEP40050	Demolish/Remove Existing Infrastructure & Utilities	20d			18-Dec-12	23-Jan-13	360d
STEP40100	Construct Reach 3 St. Utilidor - Sewer & Watermain	75d	250	m	24-Jan-13	10-May-13	360d
STEP40200	Construct Reach 3 Utilidor - Sewer & Watermain	75d	250	m	13-May-13	28-Aug-13	360d
STEP40300	Excavate Reach in the Wet	115d	180,000	m3	29-Aug-13	18-Feb-14	395d
STEP40400	Placement of Subbase Barrier	45d	17,500	m2	16-Dec-13	25-Feb-14	644d
STEP40500	Placement of River Invert Material	60d	14,000	m3	02-Dec-13	04-Mar-14	644d
STEP40600	Grading of Aquatic & Terrestial Features	5d			05-Mar-14	11-Mar-14	644d
STEP40700	Remove Cherry St. Plug	10d	20,000	m3	12-Mar-14	25-Mar-14	644d
Step 4b - Construction of Reach 2		550d			29-Aug-13	13-Nov-15	249d
STEP45000	Clearing & Grubbing	10d	1	LS	26-Mar-14	08-Apr-14	644d
STEP45050	Demolish/Remove Existing Infrastructure & Utilities	10d			02-Apr-14	15-Apr-14	644d
STEP45100	Detour Existing Commissioner St at Bridge	5d			26-May-14	30-May-14	144d
STEP46000	CONSTRUCT COMMISSIONER ST. STRUCTURE (4 Lanes)	120d	4,012	m2	02-Jun-14	23-Apr-15	285d
STEP46100	Construct Substructure	80d			02-Jun-14	24-Sep-14	144d
STEP46450	Construct Superstructure	40d			25-Sep-14	23-Apr-15	285d
STEP46950	Complete Commissioner St. Bridge	0d				23-Apr-15	390d
STEP47000	CONSTRUCT COMMISSIONER ST. TTC STRUCTURE (2 Lanes)	76d	2,142	m2	25-Sep-14	15-Jun-15	65d
STEP47050	Construct Substructure	60d			25-Sep-14	18-Dec-14	144d
STEP47100	Construct Superstructure	40d			20-Apr-15	15-Jun-15	65d
STEP48200	Construct Commissioner St. Utilidor - Wet Services	75d	250	m	29-Aug-13	13-Dec-13	360d
STEP48300	Construct Commissioner St. Utilidor - Dry Services	75d	250	m	16-Dec-13	08-Apr-14	360d
STEP48400	Excavate Reach in the Wet	85d	130,000	m3	16-Jun-15	16-Oct-15	65d
STEP48500	Placement of Subbase Barrier	35d	12,000	m2	03-Sep-15	23-Oct-15	65d
STEP48600	Placement of River Invert Material	45d	10,000	m3	27-Aug-15	30-Oct-15	65d
STEP48700	Placement of Dykes along Reach 2 & 3	50d	48,000	m3	03-Sep-15	13-Nov-15	65d
STEP48800	Construct Commissioner St. Approach Fill	20d	20,000	m3	21-Nov-14	18-Dec-14	398d
STEP48900	Surcharge Period at Bridge Approach (incl. Wick Drains)	60d			19-Dec-14	20-Mar-15	398d
STEP48950	Remove Surcharge	5d	5,000	m3	23-Mar-15	27-Mar-15	403d
STEP49000	Grading of Aquatic & Terrestial Features	10d			19-Oct-15	30-Oct-15	254d
STEP49500	Remove Commissioner St. Plug	5d			02-Nov-15	06-Nov-15	254d
Step 5 - Construction of Reach 1		1031d			18-Jun-12	09-Aug-16	65d
STEP50000	Install River Protection U/S of Rail Bridge	30d			18-Jun-12	30-Jul-12	52d
STEP50500	Extend Rail Spur Bridge 3 New Spans to West	100d	720	m2	31-Jul-12	20-Dec-12	52d

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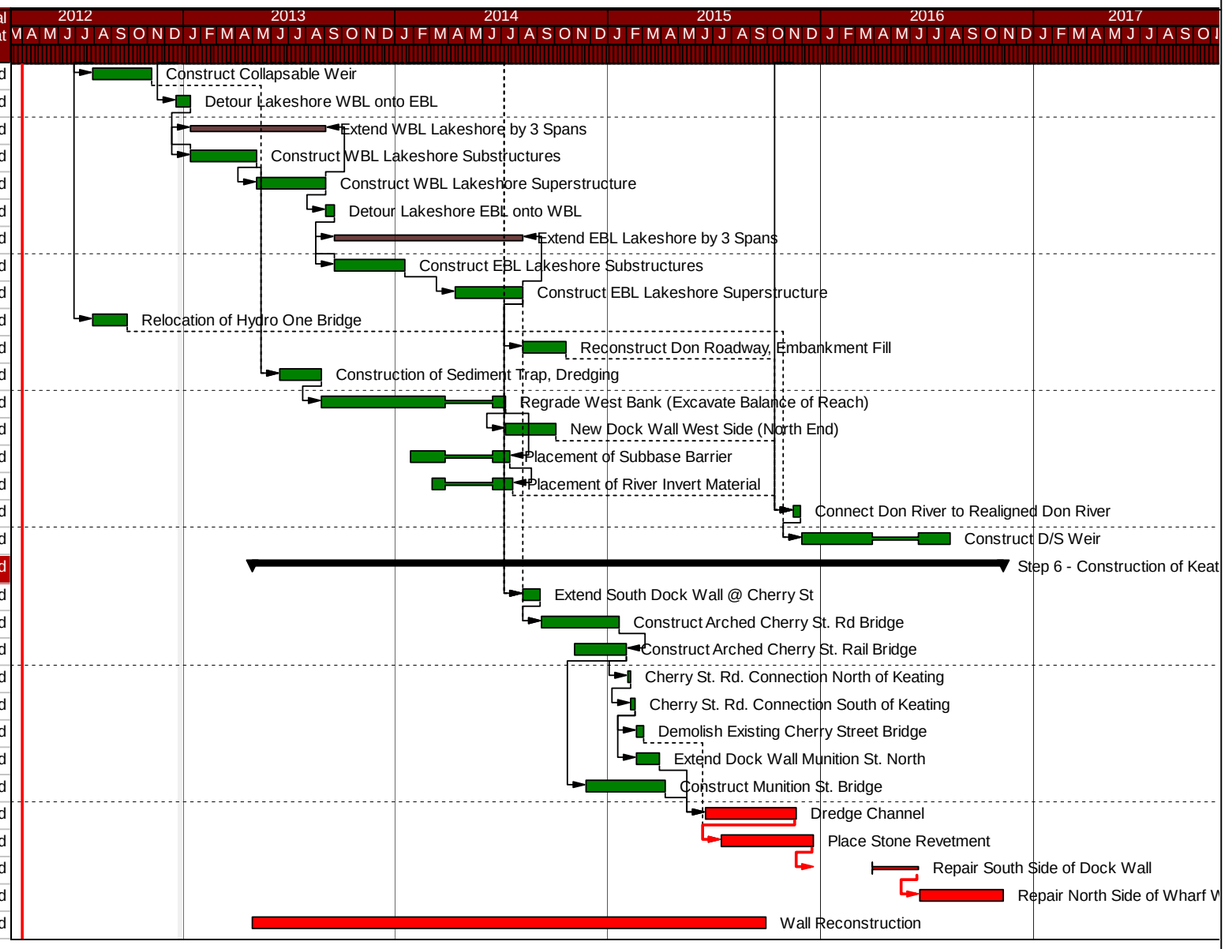
PROPOSED PROJECT SCHEDULE FOR ALTERNATIVE 4WS (REALIGNED)

Activity ID	Activity Name	Orig Dur	Qty	UOM	Start	Finish	Total Float
STEP51000	Construct Collapsable Weir	70d	70	m	31-Jul-12	08-Nov-12	382d
STEP51500	Detour Lakeshore WBL onto EBL	10d			21-Dec-12	14-Jan-13	52d
STEP52000	Extend WBL Lakeshore by 3 Spans	160d	942	m2	15-Jan-13	03-Sep-13	52d
STEP52050	Construct WBL Lakeshore Substructures	80d			15-Jan-13	08-May-13	52d
STEP52150	Construct WBL Lakeshore Superstructure	80d			09-May-13	03-Sep-13	52d
STEP52900	Detour Lakeshore EBL onto WBL	10d			04-Sep-13	17-Sep-13	107d
STEP53000	Extend EBL Lakeshore by 3 Spans	220d	942	m2	18-Sep-13	07-Aug-14	47d
STEP53050	Construct EBL Lakeshore Substructures	80d			18-Sep-13	16-Jan-14	107d
STEP53150	Construct EBL Lakeshore Superstructure	80d			14-Apr-14	07-Aug-14	47d
STEP54000	Relocation of Hydro One Bridge	40d			31-Jul-12	26-Sep-12	852d
STEP54500	Reconstruct Don Roadway, Embankment Fill	50d	50,000	m3	08-Aug-14	20-Oct-14	332d
STEP55000	Construction of Sediment Trap, Dredging	50d	40,000	m3	17-Jun-13	27-Aug-13	290d
STEP55500	Regrade West Bank (Excavate Balance of Reach)	160d	155,000	m3	28-Aug-13	08-Jul-14	290d
STEP56000	New Dock Wall West Side (North End)	60d		m	09-Jul-14	02-Oct-14	290d
STEP56050	Placement of Subbase Barrier	65d	25,000	m2	27-Jan-14	15-Jul-14	340d
STEP56500	Placement of River Invert Material	45d	10,000	m3	04-Mar-14	22-Jul-14	340d
STEP57000	Connect Don River to Realigned Don River	10d			16-Nov-15	27-Nov-15	65d
STEP57500	Construct D/S Weir	120d			30-Nov-15	09-Aug-16	65d
Step 6 - Construction of Keating Channel (Reach 2a)		882d			01-May-13	10-Nov-16	0d
STEP60000	Extend South Dock Wall @ Cherry St	20d	75	m	08-Aug-14	05-Sep-14	47d
STEP60100	Construct Arched Cherry St. Rd Bridge	90d	1,000	m2	08-Sep-14	19-Jan-15	47d
STEP60200	Construct Arched Cherry St. Rail Bridge	60d	770	m2	04-Nov-14	02-Feb-15	47d
STEP60300	Cherry St. Rd. Connection North of Keating	5d			03-Feb-15	09-Feb-15	52d
STEP60400	Cherry St. Rd. Connection South of Keating	5d			10-Feb-15	17-Feb-15	52d
STEP60500	Demolish Existing Cherry Street Bridge	10d			18-Feb-15	03-Mar-15	92d
STEP60600	Extend Dock Wall Munition St. North	30d	230	m	18-Feb-15	31-Mar-15	52d
STEP60700	Construct Munition St. Bridge	90d			25-Nov-14	08-Apr-15	47d
STEP60800	Dredge Channel	110d	110,000	m3	16-Jun-15	20-Nov-15	0d
STEP60900	Place Stone Revetment	110d	105,000	m3	15-Jul-15	18-Dec-15	0d
STEP61000	Repair South Side of Dock Wall	70d	650	m	21-Dec-15	17-Jun-16	0d
STEP61100	Repair North Side of Wharf Wall	100d	1,100	m	20-Jun-16	10-Nov-16	0d
STEP61150	Wall Reconstruction	600d			01-May-13*	28-Sep-15	0d



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attachment iii:

unit cost calculation for
hard surfaces type 2, 32.5 meters wide

Hard Surfaces Type 2, 32.5 metres wide (South of Keating Channel)

Rate per metre	**1,000**	**m**	**$34,235.06**	**$34,235,062**
Rate per square metre	32,500	m2	$1,053.39	$34,235,062

Hard Surfaces Type 2, 32.5 metres wide (South of Keating Channel)

Protective over existing soil conditions

	Enter Values	
Stripped off	**0.300**	m
Protective layer	**1.500**	m
Slope to either side, assume 1 to 3	**3.0**	
HL8 (HS) asphalt		m
HL1 asphalt		m

Length	Width	Depth	**Rate / m2**	**Rate /m (1000 m)**
1,000.00	32.50		**$34.64**	**$1,125.76**

Quantity	Unit	Rate	Amount
			$1,125,756
Assumes clean fill fro other sites			
Protective over existing soil conditions	58,500.00 m3	5.00	292,500
Sloping sides (both sides)	9,720.00 m3	5.00	48,600
Sod sides	11,384 m2	3.00	34,152
Preloaded , Remove and Grade	200.00%		750,504

Hard Surfaces Type 2, 32.5 metres wide (South of Keating Channel)

ROADWAY

	Enter Values	
Slab on Grade thickness	**0.250**	m
Granular Bed thickness	**0.150**	m
Sub-base thickness, 200mm	**0.200**	m
HL8 (HS) asphalt	**0.050**	m
HL1 asphalt	**0.040**	m

	Length	Width	Depth	Rate / m2	Rate / 1000 m
Road Type 2, 12.8 metres wide	1,000.00	12.80		**$134.30**	**$1,719.04**
	Quantity	Unit	Rate	Amount	
				$1,719,040	
Granular B sub-base, 200mm thick	2,560	m3	38.00	97,280	
Granular A base, 150mm thick	1,920	m3	50.00	96,000	
Concrete, 32 Mpa, C2	3,200	m3	220.00	704,000	
Edgeform, 250mm high	2,000	m	66.23	132,458	
Rebar, 25 kg/m3	80,000	kg	2.80	224,000	
Construction Joint	1,830	m	10.00	18,304	
Finish concrete surface	12,800	m2	5.52	70,644	
50mm HL8 (HS) asphalt	12,800	m2	13.00	166,400	
40mm HL1 asphalt	12,800	m2	14.00	179,200	
Line painting	2,300	m	6.00	13,800	
				0	
Factor	0.00%			0	

Hard Surfaces Type 2, 32.5 metres wide (South of Keating Channel)

TRANSIT

	Enter Values	
Concrete surface lift	**0.175**	m
Concrete infill lift	**0.225**	m
Slab on Grade thickness	**0.280**	m
Granular A Bed thickness	**0.150**	m
Sub-base thickness	**0.450**	m

	Length	Width	Depth	Rate / m2	Rate / 1000 m
Transit Street Cars, 6.8 metres wide	1,000.00	6.80		**$495.38**	**$3,368.61**
	Quantity	Unit	Rate	Amount	
				$3,368,613	

Granular B sub-base, 450mm thick (preloaded)	3,060	m3	38.00	116,280
Granular A base, 150mm thick	1,020	m3	50.00	51,000
Base slab:Concrete, 32 Mpa, C2	1,904	m3	220.00	418,880
Edgeform, 280mm high	560	m2	100.00	56,000
Header form, 280mm high at 50m o.c.	38	m2	100.00	3,808
Rebar, 40 kg/m3	76,160	kg	2.80	213,248
Construction Joint	972	m	1.00	972
Finish concrete surface	6,800	m2	5.00	34,000
Concrete infill lift, 32 Mpa, C2	1,530	m3	220.00	336,600
Edgeform, 225mm high	450	m2	100.00	45,000
Header form, 225mm high at 50m o.c.	31	m2	100.00	3,060
Rebar, 40 kg/m3	61,200	kg	2.80	171,360
Construction Joint	972	m	1.00	972
Finish concrete surface	6,800	m2	5.00	34,000
Concrete surface lift, 32 Mpa, C2	1,190	m3	220.00	261,800
Edgeform, 175mm high	350	m2	100.00	35,000
Header form, 175mm high at 50m o.c.	24	m2	100.00	2,380
Rebar, 40 kg/m3	47,600	kg	2.80	133,280
Construction Joint	972	m	1.00	972
Finish concrete surface	6,800	m2	5.00	34,000
300mm high granite curb	1,000	m	450.00	450,000
Concrete paving	6,800	m2	120.00	816,000
100mm high concrete curb (total ht, 680mm)	2,000	m	75.00	150,000
				0
Factor	0.00%			0

Hard Surfaces Type 2, 32.5 metres wide (South of Keating Channel)

MEDIAN between Roadway and Transit

	Enter Values	
Slab on Grade thickness	**0.000**	m
Granular Bed thickness	**0.150**	m
Sub-base thickness, 200 + 240mm	**0.440**	m
HL8 (HS) asphalt	**0.000**	m
HL1 asphalt	**0.000**	m
Top soil	**0.100**	m
Sod		m

	Length	Width	Depth	Rate / m2	Rate / 1000 m
MEDIAN between Roadway and Transit,	1,000.00	2.90		**$34.72**	**$100.69**
	Quantity	Unit	Rate	Amount	
				$100,688	

Granular B sub-base, 440mm thick	1,276	m3	38.00	48,488
Granular A base, 150mm thick	435	m3	50.00	21,750
Concrete, 32 Mpa, C2	0	m3	220.00	0
Edgeform, 0mm high		m	66.23	0
Header form, 0mm high at 50m o.c.		m	66.23	0
Rebar, 25 kg/m3		kg	2.80	0
Construction Joint		m	10.00	0
Finish concrete surface		m2	5.52	0
0mm HL8 (HS) asphalt		m2	13.00	0
0mm HL1 asphalt		m2	14.00	0
100mm Top soil	290	m3	60.00	17,400
Sod	2,900	m2	4.50	13,050
Factor	0.00%			0

Hard Surfaces Type 2, 32.5 metres wide (South of Keating Channel)

SIDEWALKS, 5 metres wide to each side

	Enter Values	
Slab on Grade thickness	**0.100**	m
Granular Bed thickness	**0.100**	m
Sub-base thickness, 200+ 50 + 150 + 90mm	**0.490**	m

	Length	Width	Depth	Rate / m2	Rate / 1000 m
Sidewalk to both sides, 5 metres wide, e	2,000.00	5.00		**$650.60**	**$6,506.00**
			Without Curb	$635.60 / m2	$6,356.00
	Quantity	Unit	Rate	Amount	
				$6,506,000	
Granular B sub-base, 490mm thick	4,900	m3	38.00	186,200	
Granular A base, 100mm thick	1,000	m3	50.00	50,000	
Concrete, 32 Mpa, C2	1,000	m3	220.00	220,000	
Edgeform, 100mm high	4,000	m	55.00	220,000	
Header form, 100mm high at 50m o.c.	0	m	55.00	0	
Reinforcing fibre based on concrete volur	1,000	m3	8.00	8,000	
Construction Joint	1,430	m	10.00	14,300	
Finish concrete surface	10,000	m2	9.00	90,000	
Pattern finish allowance	10,000	m2	0.50	5,000	
100mm high concrete curb (total ht, 490mm)	2,000	m	75.00	150,000	
Silva cell (2500mm wide), 4 cells deep to both sides, assumed required	5,000	m2	1,000.00	5,000,000	
Trees, assume spaced 8 metres apart on both sides	250	No.	1,500.00	375,000	
Tree gratings	250	No.	750.00	187,500	
				0	
Factor	0.00%			0	

Hard Surfaces Type 2, 32.5 metres wide (South of Keating Channel)

MECHANICAL SERVICES

	Enter Values	
Storm	**0.750**	m
Excavation depth	**3.750**	m
Side Clearance	**1.500**	m
Bottom clearance	**1.500**	m
Geotextile height	**3.750**	m
Geotextile girth	**12.000**	m

	Length	Width	Depth	Rate / m2	Rate / 1000 m
Storm, 3.75 metres wide	1,000.00	3.75		**$1,718.71**	**$6,445.15**

	Quantity	Unit	Rate	Amount
				$6,445,152
Assume earth retained by steel piles	9,500	m2	500.00	4,750,000
Excavation & stockpile for remediation	14,063	m3	8.00	112,504
Allowance to cart away, clean and return to site	14,063.00	m3	20.00	281,260.00
750mm Storm	1,000	m	680.00	680,000
Backfill with clean material	13,621	m	28.00	381,388
Geotextile	12,000	m2	20.00	240,000
Factor	0.00%			0

	Enter Values	
Sanitary	**0.300**	m
Excavation depth	**2.800**	m
Side Clearance	**1.500**	m
Bottom clearance	**1.500**	m
Geotextile height	**2.800**	m
Geotextile girth	**9.200**	m

	Length	Width	Depth	Rate / m2	Rate / 1000 m
Sanitary, 3.3 metres wide	1,000.00	3.30		**$533.17**	**$1,759.45**

	Quantity	Unit	Rate	Amount
				$1,759,452
Assume earth retained by box structure	7,600	m2	100.00	760,000
Excavation & stockpile for remediation	9,240	m3	8.00	73,920
Allowance to cart away, clean and return to site	9,240.00	m3	20.00	184,800.00
300mm Sanitary	1,000	m	300.00	300,000
Backfill with clean material	9,169	m3	28.00	256,732
Geotextile	9,200	m2	20.00	184,000
Factor	0.00%			0

Hard Surfaces Type 2, 32.5 metres wide (South of Keating Channel)

	Enter Values	
Water	**0.300**	m
Excavation depth	**0.800**	m
Side Clearance	**1.500**	m
Bottom clearance	**0.500**	m
Geotextile height	**1.550**	
Geotextile girth	**6.400**	m

	Length	Width	Depth	Rate / m2	Rate / 1000 m
Water, 3.3 metres wide	1,000.00	3.30		**$274.50**	**$905.86**
	Quantity	Unit	Rate	Amount	
				$905,861	
Assume earth retained by box structure	3,600.00	m2	100.00	360,000	
Excavation & stockpile for remediation	2,640.00	m3	8.00	21,120	
Allowance to cart away, clean and return to site	2,640.00	m3	20.00	52,800.00	
300mm Water	1,000.00	m	400.00	400,000	
Backfill with clean material	2,569.31	m3	28.00	71,941	
Geotextile, assume not required	0.00	Nil	0.00	0	
Factor	0.00%			0	

STORMWATER MANAGEMENT

Catch Basins		
Spacing	**50.000**	m
Number	**20**	
Stormceptors		
Spacing	**500.000**	m
Number	**2**	
Manholes		
Spacing	**50.000**	m
Number	**20**	

	Length	Width	Depth	Rate / m2	Rate / 1000 m
	1,000.00	3.00		**$770.00**	**$2,310.00**
	Quantity	Unit	Rate	Amount	
				$2,310,000	
Catch basin allowance	20	No.	3,500.00	70,000	
Stormwater Management	1,000	m	1,950.00	1,950,000	
Manholes, allowances	20	No.	8,500.00	170,000	
Outlets	20	No.	6,000.00	120,000	
Factor	0.00%			0	

Hard Surfaces Type 2, 32.5 metres wide (South of Keating Channel)

ELECTRICAL SERVICES

	Enter Values	
Lighting		
Spacing	30.000	m
Number	34	

	Length	Width	Depth	Rate / m2	Rate / 1000 m
	1,000.00			#DIV/0!	$2,274.00
	Quantity	Unit	Rate	Amount	
				$2,274,000	
Toroonto Service Electric Service - duct bak allowance	1,000	m	1,700.00	1,700,000	
Lighting standard to both sides	68	No.	5,500.00	374,000	
Traffic Signals, Allowance					
4-way intersection	2	No.	100,000.00	200,000	
Factor	0.00%			0	

Hard Surfaces Type 2, 32.5 metres wide (South of Keating Channel)

TRANSIT WORK

Provide for TTC

	Length	Width	Depth	**Rate / m2**	**Rate / 1000 m**
	1,000.00			**#DIV/0!**	**$60.00**
	Quantity	Unit	Rate	Amount	
				$60,000	
"Passenger platform" (2.5 m x 10 m) at stop, 1 stop per 500 metres (2 locs. per stop)	4	No.	11,500.00	46,000	
Provide railings at each location	4	No.	3,500.00	14,000	
Shelters, assume provided by others	0	Nil	0.00	0	
Factor	0.00%			0	

TTC's Scope of Work

	Length	Width	Depth	**Rate / m2**	**Rate / 1000 m**
	1,000.00			**#DIV/0!**	**$7,660.50**
	Quantity	Unit	Rate	Amount	
				$7,660,500	
Power distribution installation	1,000	m	2,210.00	2,210,000	
Transit control installation	1	Allow	24,200.00	24,200	
Lighting installation	1	Allow	386,300.00	386,300	
Audible signals 92 (2 stops (2 locs.) per 500m)	4	No.	100,000.00	400,000	
Track installation	1,000	m	4,640.00	4,640,000.00	
Factor	0.00%			0.00	

attachment iv:

unit cost calculation for hard surfaces type 3, 25 meters wide

Hard Surfaces Type 3, 25 metres wide (South of Keating)

Rate per metre	**1,000**	**m**	**$18,953.62**	**$18,953,623.46**
Rate per square metre	25,000	m2	$758.14	$18,953,623.46

Hard Surfaces Type 3, 25 metres wide (South of Keating)

Protective over existing soil conditions

	Enter Values	
Stripped off	**0.300**	m
Protective layer	**1.500**	m
Slope to either side, assume 1 to 3	**3.0**	
HL8 (HS) asphalt		m
HL1 asphalt		m

Length	Width	Depth	**Rate / m2**	**Rate /m (1000 m)**
1,000.00	25.00		**$36.93**	**$923.26**

Quantity	Unit	Rate	Amount
			$923,256.00
Assumes clean fill fro other sites			
Protective over existing soil conditions	45,000 m3	5.00	225,000
Sloping sides (both sides)	9,720 m3	5.00	48,600
Sod sides	11,384 m2	3.00	34,152
Preloaded , Remove and Grade	200.00%		615,504

Hard Surfaces Type 3, 25 metres wide (South of Keating)

ROADWAY

	Enter Values	
Slab on Grade thickness	**0.200**	m
Granular Bed thickness	**0.150**	m
Sub-base thickness, 200mm + 50mm	**0.250**	m
HL8 (HS) asphalt	**0.050**	m
HL1 asphalt	**0.040**	m

	Length	Width	Depth	Rate / m2	Rate / 1000 m
Road Type 3, 10 metres wide	1,000.00	10.00		**$128.02**	**$1,280.22**

Quantity	Unit	Rate	Amount
			$1,280,218.79

	Quantity	Unit	Rate	Amount
Granular B sub-base, 250mm thick	2,500	m3	38.00	95,000
Granular A base, 150mm thick	1,500	m3	50.00	75,000
Concrete, 32 Mpa, C2	2,000	m3	220.00	440,000
Edgeform, 200mm high	2,000	m	66.23	132,458
Rebar, 25 kg/m3	50,000	kg	2.80	140,000
Construction Joint	1,430	m	10.00	14,300
Finish concrete surface	10,000	m2	5.52	55,191
50mm HL8 (HS) asphalt	10,000	m2	13.00	130,000
40mm HL1 asphalt	10,000	m2	14.00	140,000
Line painting	2,300	m	6.00	13,800
				0
Waste	2.50%			31,225

	Enter Values	
Parking Lane		
Slab on Grade thickness	**0.290**	m
Granular Bed thickness	**0.210**	m
Sub-base thickness, 200mm	**0.190**	m
HL8 (HS) asphalt		m
HL1 asphalt		m

	Length	Width	Depth	Rate / m2	Rate / 1000 m
Parking Lane, 4.8 metres wide	1,000.00	4.80		**$189.33**	**$908.78**

Quantity	Unit	Rate	Amount
			$908,780.90

	Quantity	Unit	Rate	Amount
Granular B sub-base, 190mm thick	912	m3	38.00	34,656
Granular A base, 210mm thick	1,008	m3	50.00	50,400
Concrete, 32 Mpa, C2	1,392	m3	220.00	306,240
Edgeform, 290mm high	2,000	m	66.23	132,458
Header form, 290mm high at 50m o.c.	96	m	66.23	6,358
Rebar, 25 kg/m3	34,800	kg	2.80	97,440
Construction Joint	686	m	10.00	6,864
Finish concrete surface	4,800	m2	8.00	38,400
150mm - 0.3m wide concrete strip, both s	2,000	m	100.00	200,000
Line painting	2,300	m	6.00	13,800
				0
Waste	2.50%			22,165

Hard Surfaces Type 3, 25 metres wide (South of Keating)

SIDEWALKS, 2.65 metres wide TO EACH SIDE

	Enter Values	
Slab on Grade thickness	**0.100**	m
Granular Bed thickness	**0.100**	m
Sub-base thickness, 200+ 50 + 150 + 90mm	**0.490**	m

	Length	Width	Depth	Rate / m2	Rate / 1000 m
Sidewalk to both sides, each 2.65 metres wide	2,000.00	2.65		**$101.33**	**$537.05**
			Without Curb Rate	$101.33	$537.05
	Quantity	Unit		Amount	
				$537,053.88	
Granular B sub-base, 490mm thick (pre-loaded)	2,597	m3	38.00	98,686	
Granular A base, 100mm thick	530	m3	50.00	26,500	
Concrete, 32 Mpa, C2	530	m3	220.00	116,600	
Edgeform, 100mm high	4,000	m	55.00	220,000	
Header form, 100mm high at 50m o.c.	0	m	55.00	0	
Reinforcing fibre based on concrete volur	530	m3	8.00	4,240	
Construction Joint	758	m	10.00	7,579	
Finish concrete surface	5,300	m2	9.00	47,700	
Pattern finish allowance	5,300	m2	0.50	2,650	
Concrete curb	0	Nil	0.00	0	
				0	
Waste	2.50%			13,099	

Hard Surfaces Type 3, 25 metres wide (South of Keating)

Planting Zone (both sides)

	Enter Values	
Slab on Grade thickness	**0.000**	m
Granular Bed thickness	**0.000**	m
Sub-base thickness	**0.590**	m
HL8 (HS) asphalt	**0.000**	m
HL1 asphalt	**0.000**	m
Top soil	**0.100**	m
Sod		m

	Length	Width	Depth	Rate / m2	Rate / 1000 m
Planting Zone (both sides), 1.85 metres	2,000.00	1.85		**$643.20**	**$2,379.85**
	Quantity	Unit	Rate	Amount	
				$2,379,849.10	
Granular B sub-base, 590mm thick	2,183	m3	38.00	82,954	
Granular A base, 0mm thick	0	Nil	0.00	0	
100mm Top soil	370	m3	60.00	22,200	
Sod	3,700	m2	4.50	16,650	
Silva cell to both sides, 2 rows deep	3,700	m2	500.00	1,850,000	
Trees, assume spaced 10 metres apart on both sides	200	No.	1,500.00	300,000	
Tree gratings	200	No.	250.00	50,000	
Waste	2.50%			58,045	

Hard Surfaces Type 3, 25 metres wide (South of Keating)

MECHANICAL SERVICES

	Enter Values	
Storm	**0.750**	m
Excavation depth	**3.750**	m
Side Clearance	**1.500**	m
Bottom clearance	**1.500**	m
Geotextile height	**3.750**	m
Geotextile girth	**12.000**	m

	Length	Width	Depth	Rate / m2	Rate / 1000 m
Storm, 3.75 metres wide	1,000.00	3.75		**$1,718.71**	**$6,445.15**

	Quantity	Unit	Rate	Amount
				$6,445,152
Assume earth retained by steel piles	9,500	m2	500.00	4,750,000
Excavation & stockpile for remediation	14,063	m3	8.00	112,504
Allowance to cart away, clean and return to site	14,063.00	m3	20.00	281,260.00
750mm Storm	1,000	m	680.00	680,000
Backfill with clean material	13,621	m	28.00	381,388
Geotextile	12,000	m2	20.00	240,000
Factor	0.00%			0

	Enter Values	
Sanitary	**0.300**	m
Excavation depth	**2.800**	m
Side Clearance	**1.500**	m
Bottom clearance	**1.500**	m
Geotextile height	**2.800**	m
Geotextile girth	**9.200**	m

	Length	Width	Depth	Rate / m2	Rate / 1000 m
Sanitary, 3.3 metres wide	1,000.00	3.30		**$533.17**	**$1,759.45**

	Quantity	Unit	Rate	Amount
				$1,759,452
Assume earth retained by box structure	7,600	m2	100.00	760,000
Excavation & stockpile for remediation	9,240	m3	8.00	73,920
Allowance to cart away, clean and return to site	9,240.00	m3	20.00	184,800.00
300mm Sanitary	1,000	m	300.00	300,000
Backfill with clean material	9,169	m3	28.00	256,732
Geotextile	9,200	m2	20.00	184,000
Factor	0.00%			0

Hard Surfaces Type 3, 25 metres wide (South of Keating)

	Enter Values	
Water	**0.300**	m
Excavation depth	**0.800**	m
Side Clearance	**1.500**	m
Bottom clearance	**0.500**	m
Geotextile height	**1.550**	
Geotextile girth	**6.400**	m

	Length	Width	Depth	Rate / m2	Rate / 1000 m
Water, 3.3 metres wide	1,000.00	3.30		**$274.50**	**$905.86**
	Quantity	Unit	Rate	Amount	
				$905,861	
Assume earth retained by box structure	3,600	m2	100.00	360,000	
Excavation & stockpile for remediation	2,640	m3	8.00	21,120	
Allowance to cart away, clean and return to site	2,640.00	m3	20.00	52,800.00	
300mm Water	1,000	m	400.00	400,000	
Backfill with clean material	2,569	m3	28.00	71,941	
Geotextile, assume not required	0	Nil	0.00	0	
Factor	0.00%			0	

STORMWATER MANAGEMENT

Catch Basins		
Spacing	**50.000**	m
Number	**20**	
Manholes		
Spacing	**50.000**	m
Number	**20**	

	Length	Width	Depth	Rate / m2	Rate / 1000 m
	1,000.00	3.00		**$580.00**	**$1,740.00**
	Quantity	Unit	Rate	Amount	
				$1,740,000	
Catch basin allowance	20	No.	3,500.00	70,000	
Stormwater Management	1,000	m	1,500.00	1,500,000	
Manholes, allowances	20	No.	8,500.00	170,000	
Outlets	0	Nil	0.00	0	
Factor	0.00%			0	

Hard Surfaces Type 3, 25 metres wide (South of Keating)

ELECTRICAL SERVICES

	Enter Values	
Lighting		
Spacing	30.000	m
Number	34	

	Length	Width	Depth	Rate / m2	Rate / 1000 m
	1,000.00			#DIV/0!	$2,074.00
	Quantity	Unit	Rate	Amount	
				$2,074,000	
Toroonto Service Electric Service - duct bak allowance	1,000	m	1,700.00	1,700,000	
Lighting standard to both sides	68	No.	5,500.00	374,000	
Traffic Signals, Allowance					
4-way intersection	0	Nil	0.00	0	
Factor	0.00%			0	

attachment v:

unit cost calculation for hard surfaces type 4, 18 meters wide

Hard Surfaces Type 4, 18 metres wide (LOCAL) (South of Keating Channel)

Rate per metre	**1,000**	**m**	**$16,987.47**	**$16,987,469.28**
Rate per square metre	18,000	m2	$943.75	$16,987,469.28

Hard Surfaces Type 4, 18 metres wide (LOCAL) (South of Keating Channel)

Protective over existing soil conditions

	Enter Values	
Stripped off	**0.300**	m
Protective layer	**1.500**	m
Slope to either side, assume 1 to 3	**3.0**	
HL8 (HS) asphalt		m
HL1 asphalt		m

	Length	Width	Depth	Rate / m2	Rate /m (1000 m)
Road Type 2, 18 metres wide	1,000.00	18.00		**$40.79**	**$734.26**
	Quantity	Unit	Rate	Amount	
				$734,256	
Assumes clean fill from other sites					
Protective over existing soil conditions	32,400	m3	5.00	162,000.00	
Sloping sides (both sides)	9,720	m3	5.00	48,600.00	
Sod sides	11,384	m2	3.00	34,152	
Waste & Preloaded	200.00%			489,504.00	

ROADWAY

	Enter Values	
Slab on Grade thickness	**0.200**	m
Granular Bed thickness	**0.150**	m
Sub-base thickness, 200mm + 50mm	**0.250**	m
HL8 (HS) asphalt	**0.050**	m
HL1 asphalt	**0.040**	m

	Length	Width	Depth	Rate / m2	Rate / 1000 m
Road Type 4, 8.5 metres wide	1,000.00	8.50		**$127.48**	**$1,083.58**
	Quantity	Unit	Rate	Amount	
				$1,083,583	
Granular B sub-base, 250mm thick	2,125	m3	38.00	80,750	
Granular A base, 150mm thick	1,275	m3	50.00	63,750	
Concrete, 32 Mpa, C2	1,700	m3	220.00	374,000	
Edgeform, 200mm high	2,000	m	66.23	132,458	
Rebar, 25 kg/m3	42,500	kg	2.80	119,000	
Construction Joint	1,216	m	10.00	12,155	
Finish concrete surface	8,500	m2	5.52	46,912	
50mm HL8 (HS) asphalt	8,500	m2	13.00	110,500	
40mm HL1 asphalt	8,500	m2	14.00	119,000	
Line painting	2,300	m	6.00	13,800	
				0	
Waste				0	

Hard Surfaces Type 4, 18 metres wide (LOCAL) (South of Keating Channel)

SIDEWALKS, 2.55 metres wide TO EACH SIDE

	Enter Values	
Slab on Grade thickness	**0.100**	m
Granular Bed thickness	**0.100**	m
Sub-base thickness, 200+ 50 + 150 + 90mm	**0.490**	m

	Length	Width	Depth	Rate / m2	Rate / 1000 m
Sidewalk to both sides, 2.55 metres wide	2,000.00	2.55		**$153.43**	**$782.49**
			Without Curb	$100.49	$512.49
	Quantity	Unit	Rate	Amount	
				$782,485	
Granular B sub-base, 490mm thick (pre-loaded)	2,499	m3	38.00	94,962	
Granular A base, 100mm thick	510	m3	50.00	25,500	
Concrete, 32 Mpa, C2	510	m3	220.00	112,200	
Edgeform, 100mm high	4,000	m	55.00	220,000	
Header form, 100mm high at 50m o.c.	0	m	55.00	0	
Reinforcing fibre based on concrete volur	510	m3	8.00	4,080	
Construction Joint	729	m	10.00	7,293	
Finish concrete surface	5,100	m2	9.00	45,900	
Pattern finish allowance	5,100	m2	0.50	2,550	
Concrete curb and gutter	2,000	Nil	135.00	270,000	
				0	
Waste				0	

Hard Surfaces Type 4, 18 metres wide (LOCAL) (South of Keating Channel)

Planting Zone, 2 metres wide to both sides

	Enter Values	
Slab on Grade thickness	**0.000**	m
Granular Bed thickness	**0.000**	m
Sub-base thickness	**0.590**	m
HL8 (HS) asphalt	**0.000**	m
HL1 asphalt	**0.000**	m
Top soil	**0.100**	m
Sod		m

	Length	Width	Depth	Rate / m2	Rate / 1000 m
Planting Zone, 2 metres wide to both sides, 2 metres wide	2,000.00	2.00		**$495.42**	**$1,981.68**
	Quantity	Unit	Rate	Amount	
				$1,981,680	
Granular B sub-base, 590mm thick (pre-loaded)	2,360	m3	38.00	89,680	
Granular A base, 0mm thick	0	m3	50.00	0	
100mm Top soil	400	m3	60.00	24,000	
Sod	4,000	m2	4.50	18,000	
Silva cell to both sides, 4 rows deep	2,000	m2	750.00	1,500,000	
Trees, assume spaced 10 metres apart on both sides	200	No.	1,500.00	300,000	
Tree gratings	200	No.	250.00	50,000	
Waste				0	

Hard Surfaces Type 4, 18 metres wide (LOCAL) (South of Keating Channel)

MECHANICAL SERVICES

	Enter Values	
Storm	**0.750**	m
Excavation depth	**3.750**	m
Side Clearance	**1.500**	m
Bottom clearance	**1.500**	m
Geotextile height	**3.750**	m
Geotextile girth	**12.000**	m

	Length	Width	Depth	Rate / m2	Rate / 1000 m
Storm, 3.75 metres wide	1,000.00	3.75		**$1,718.71**	**$6,445.15**

	Quantity	Unit	Rate	Amount
				$6,445,152
Assume earth retained by steel piles	9,500	m2	500.00	4,750,000
Excavation & stockpile for remediation	14,063	m3	8.00	112,504
Allowance to cart away, clean and return to site	14,063.00	m3	20.00	281,260.00
750mm Storm	1,000	m	680.00	680,000
Backfill with clean material	13,621	m	28.00	381,388
Geotextile	12,000	m2	20.00	240,000
Factor	0.00%			0

	Enter Values	
Sanitary	**0.300**	m
Excavation depth	**2.800**	m
Side Clearance	**1.500**	m
Bottom clearance	**1.500**	m
Geotextile height	**2.800**	m
Geotextile girth	**9.200**	m

	Length	Width	Depth	Rate / m2	Rate / 1000 m
Sanitary, 3.3 metres wide	1,000.00	3.30		**$533.17**	**$1,759.45**

	Quantity	Unit	Rate	Amount
				$1,759,452
Assume earth retained by box structure	7,600	m2	100.00	760,000
Excavation & stockpile for remediation	9,240	m3	8.00	73,920
Allowance to cart away, clean and return to site	9,240.00	m3	20.00	184,800.00
300mm Sanitary	1,000	m	300.00	300,000
Backfill with clean material	9,169	m3	28.00	256,732
Geotextile	9,200	m2	20.00	184,000
Factor	0.00%			0

Hard Surfaces Type 4, 18 metres wide (LOCAL) (South of Keating Channel)

	Enter Values	
Water	**0.300**	m
Excavation depth	**0.800**	m
Side Clearance	**1.500**	m
Bottom clearance	**0.500**	m
Geotextile height	**1.550**	
Geotextile girth	**6.400**	m

	Length	Width	Depth	Rate / m2	Rate / 1000 m
Water, 3.3 metres wide	1,000.00	3.30		**$274.50**	**$905.86**
	Quantity	Unit	Rate	Amount	
				$905,861	
Assume earth retained by box structure	3,600	m2	100.00	360,000	
Excavation & stockpile for remediation	2,640	m3	8.00	21,120	
Allowance to cart away, clean and return to site	2,640.00	m3	20.00	52,800.00	
300mm Water	1,000	m	400.00	400,000	
Backfill with clean material	2,569	m3	28.00	71,941	
Geotextile, assume not required	0	Nil	0.00	0	
Factor	0.00%			0	

STORMWATER MANAGEMENT

Catch Basins		
Spacing	**50.000**	m
Number	**20**	
Manholes		
Spacing	**50.000**	m
Number	**20**	

	Length	Width	Depth	Rate / m2	Rate / 1000 m
	1,000.00	3.00		**$440.00**	**$1,320.00**
	Quantity	Unit	Rate	Amount	
				$1,320,000	
Catch basin allowance	20	No.	3,500.00	70,000	
Stormwater Management	1,000	m	1,080.00	1,080,000	
Manholes, allowances	20	No.	8,500.00	170,000	
Outlets	0	Nil	0.00	0	
Factor	0.00%			0	

Hard Surfaces Type 4, 18 metres wide (LOCAL) (South of Keating Channel)

ELECTRICAL SERVICES

	Enter Values	
Lighting		
Spacing	40.000	m
Number	25	

	Length	Width	Depth	Rate / m2	Rate / 1000 m
	1,000.00			#DIV/0!	$1,975.00
	Quantity	Unit	Rate	Amount	
				$1,975,000	
Toroonto Service Electric Service - duct bak allowance	1,000	m	1,700.00	1,700,000	
Lighting standard to both sides	50	No.	5,500.00	275,000	
Traffic Signals, Allowance					
4-way intersection	0	Nil		0	
Factor	0.00%			0	

attachment vi:

composite local infrastructure cost

WATERFRONT TORONTO: PORT LANDS
TORONTO, ONTARIO

Date: 23 March, 2012

COMPOSITE LOCAL INFRASTRUCTURE COST

Site Area	33.55	Acres	43,560	sf
Site Area	13.58	Hectares	4,046.86	m2

A parcel with an area of 33.55 acres (south of the Keating Channel in the Port Lands proper, incorporates 590 m of Type 3 road & services & 2470 m of Type 4 road & services.

Type 3 road	590	m	18,955	11,183,450
Type 4 road	2,470	m	16,990	41,965,300
	3,060	m	17,369	$53,148,750

Local Infrastructure Cost: $3,915,000 per hectare

Excludes:

1.) Parks
2.) Services to local development divisoni.
3.) Stripping off 300mm of the top surface.

Includes.

1.) Services as provided in cost build-ups to respective ROWs.