



**WATERFRONT**Toronto

# **Port Lands Flood Protection and Enabling Infrastructure Due Diligence Presentation**




## **Waterfront Toronto Board of Directors**

Toronto, Ontario

October 25, 2016

# Don River Flood Protection



-  Flood Plain
-  Flood Protected
-  Flood Protection Landform

# The Project: The Port Lands Flood Protection Project



## Unique and Unprecedented:

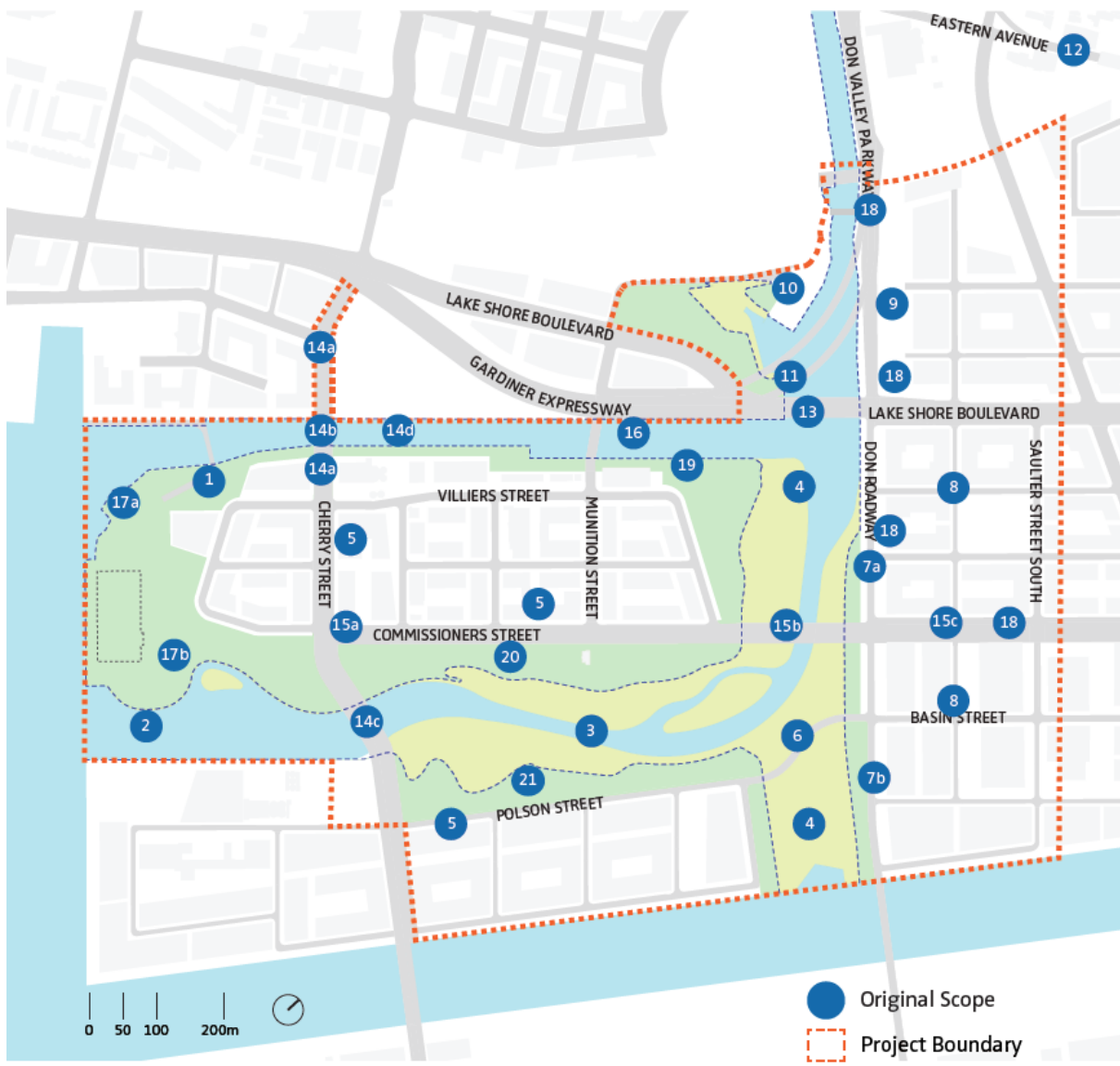
- River Mouth concept as flood protection
- No established regulatory approval process for creating a river in brownfield



# Project Scope: Individual Components

## Legend

- 1 Essroc Quay Lakefilling
- 2 Polson Slip Naturalization
- 3 River Valley System
- 4 Don Greenway (Spillway & Wetland)
- 5 Site Wide Municipal Infrastructure
- 6 Basin Street Bridge
- 7a Don Roadway North
- 7b Don Roadway South
- 8 Don Roadway Valley Wall Feature
- 9 First Gulf/Unilever Site Flood Protection Land Form
- 10 Sediment and Debris Management Area
- 11 Flow Control Weirs
- 12 Eastern Ave. Flood Protection
- 13 Lake Shore Road & Rail Bridge Modifications
- 14a Cherry Street Re-alignment
- 14b Cherry Street Bridge North
- 14c Cherry Street Bridge South
- 14d Old Cherry Street Bridge Demolition
- 15a Commissioners Street West to New Cherry Street
- 15b Commissioners Street Bridge
- 15c Commissioners Street East to Saulter Street
- 16 Keating Channel Modifications
- 17a Promontory Park North
- 17b Promontory Park South
- 18 Hydro One Integration
- 19 Villiers Island Grading
- 20 River Park North
- 21 River Park South



● Original Scope  
 - - - Project Boundary

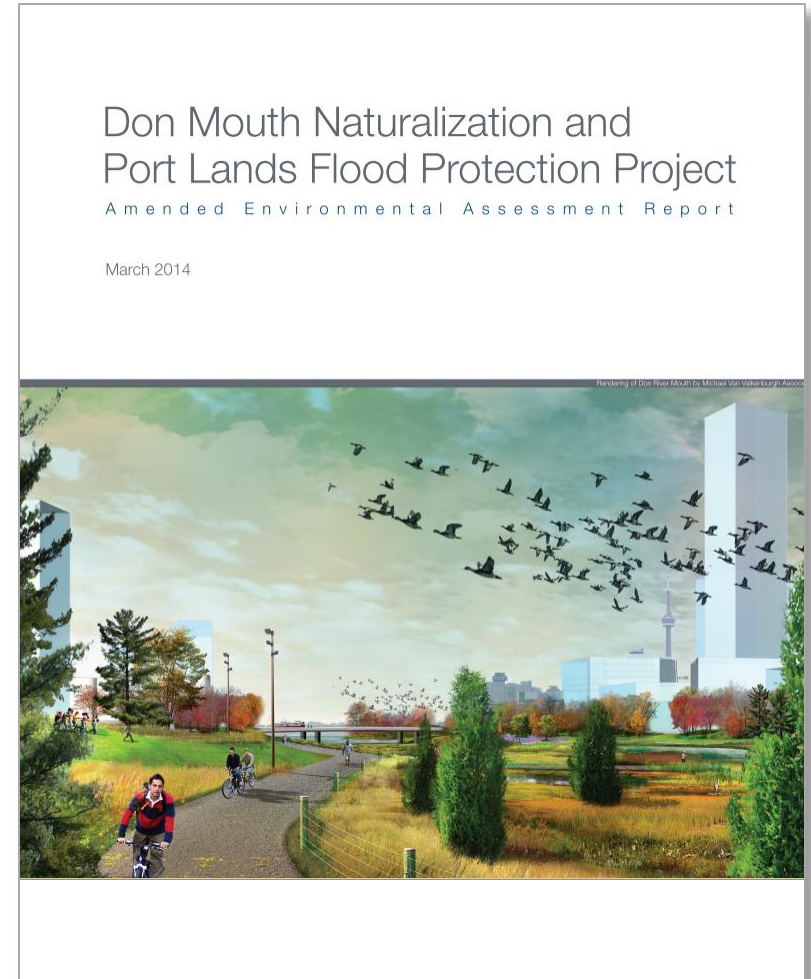
# The Port Lands Flood Protection Project: Before Due Diligence

## Project includes:

- Basic design
- Limited soil and geotechnical info
- Nature of needed infrastructure
- Rough project timeline
- Economic benefits
- Seven-year construction period

## Overall need to address common issues for large public infrastructure projects:

- Scope creep
- Risk-based contingency setting
- Insufficient site characterization



# Due Diligence: Deliverables

- **Conceptual designs** allowed for better understanding of unknown conditions
  - Informed how the project will be constructed and implications for the cost, schedule and risk
- **Refined Project scope** to better balance flood protection and development-enabling infrastructure
- **Updated construction cost estimate** based on the concept design and refined project scope
- **Updated project schedule** that includes design, regulatory and environmental approvals and construction
- **Risk Register** comprehensive list of potential risks and opportunities,
- **Probabilistic risk simulation model** developed using updated schedule, cost and risk register
  - Identified the probability of the project meeting its cost and schedule goals, informed decision-making on schedule, cost and contingencies

Achieves an exceptional level of due diligence for large public infrastructure project

# Due Diligence: Key Findings

**Cost Estimate:** \$1.25 billion

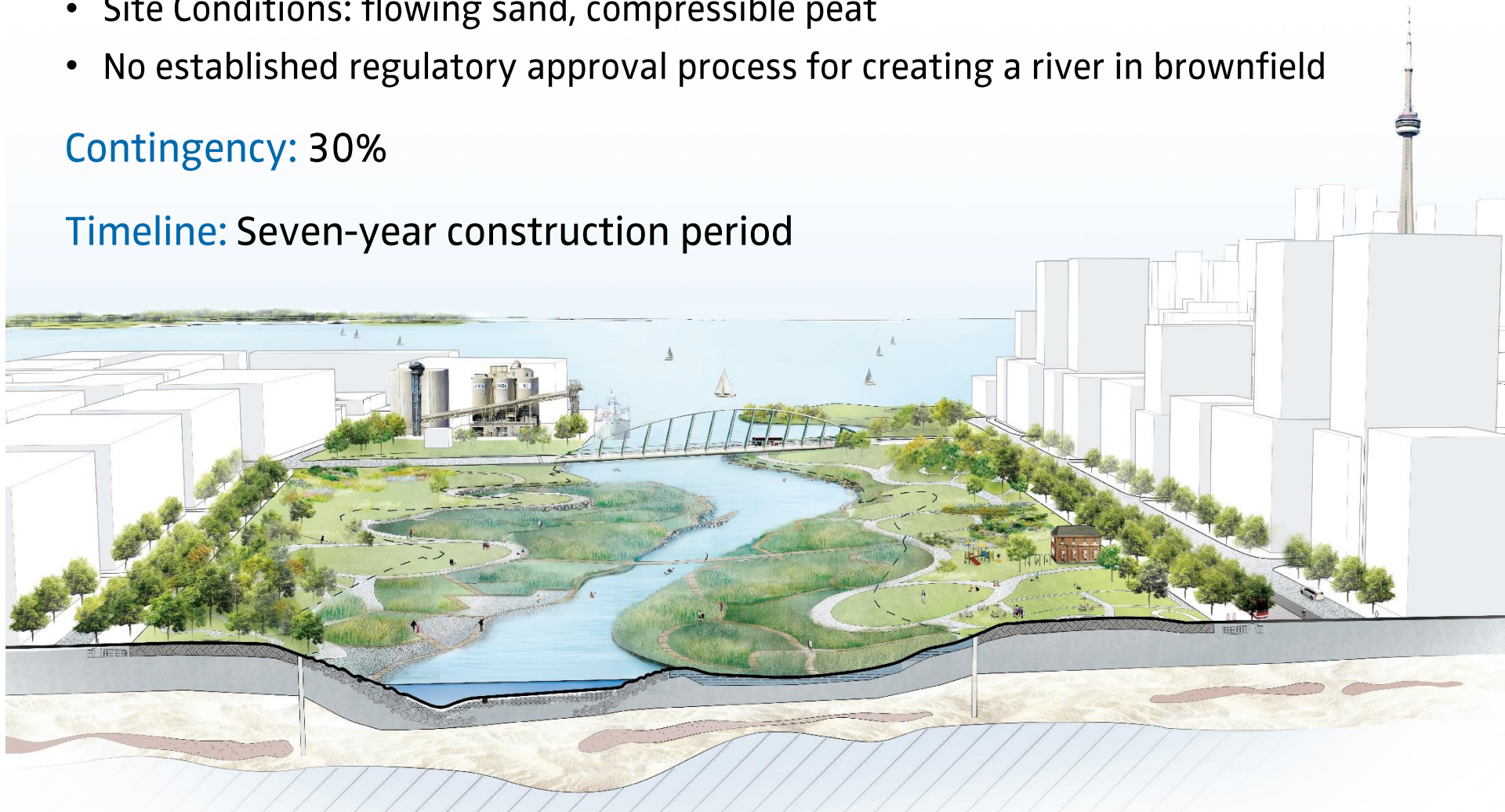
**Probability of completion within \$1.25 billion:** 90%

**Major Risks/Cost Drivers:**

- Site Conditions: flowing sand, compressible peat
- No established regulatory approval process for creating a river in brownfield

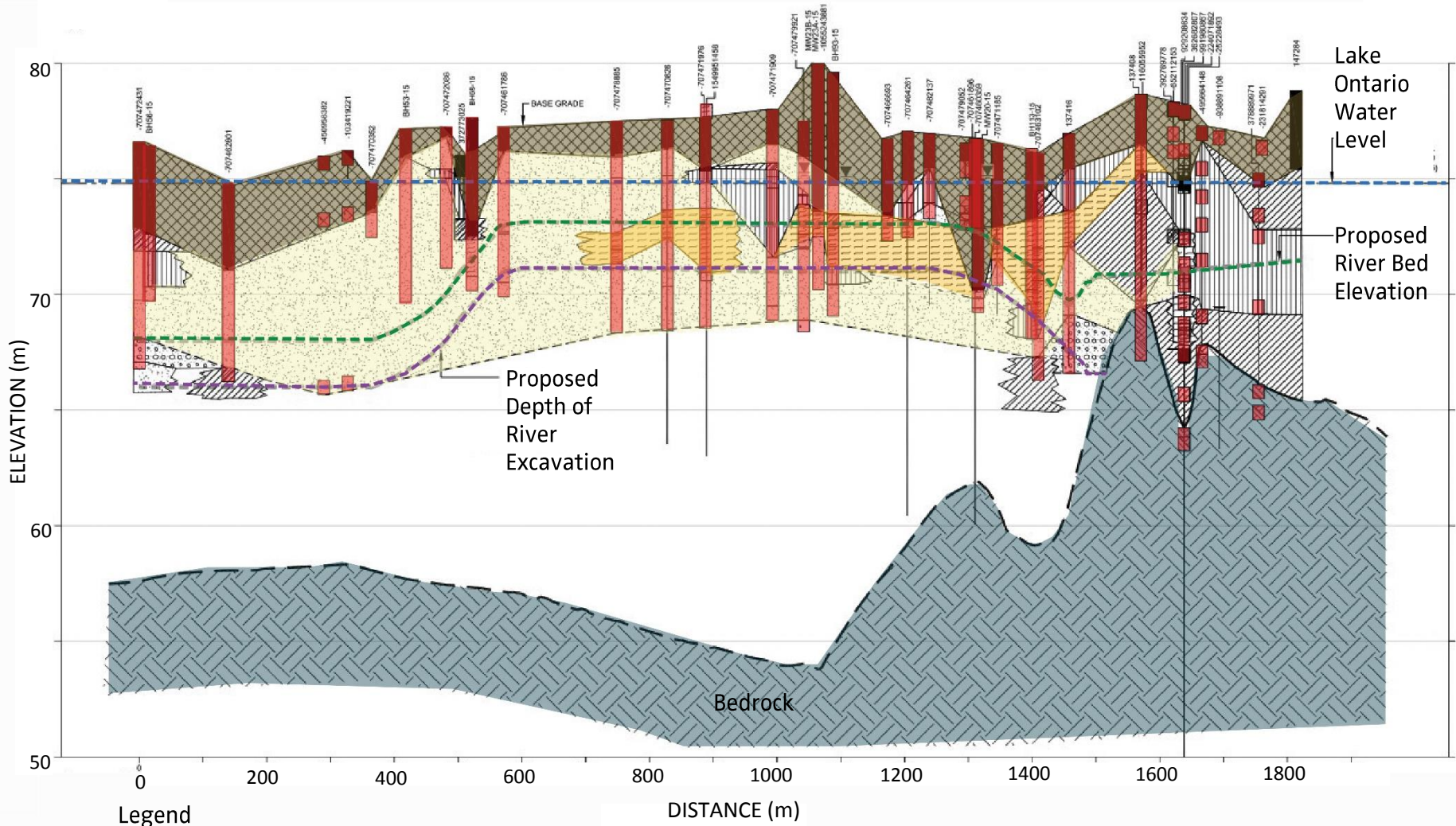
**Contingency:** 30%

**Timeline:** Seven-year construction period












# Due Diligence Findings: Site Conditions/Soils

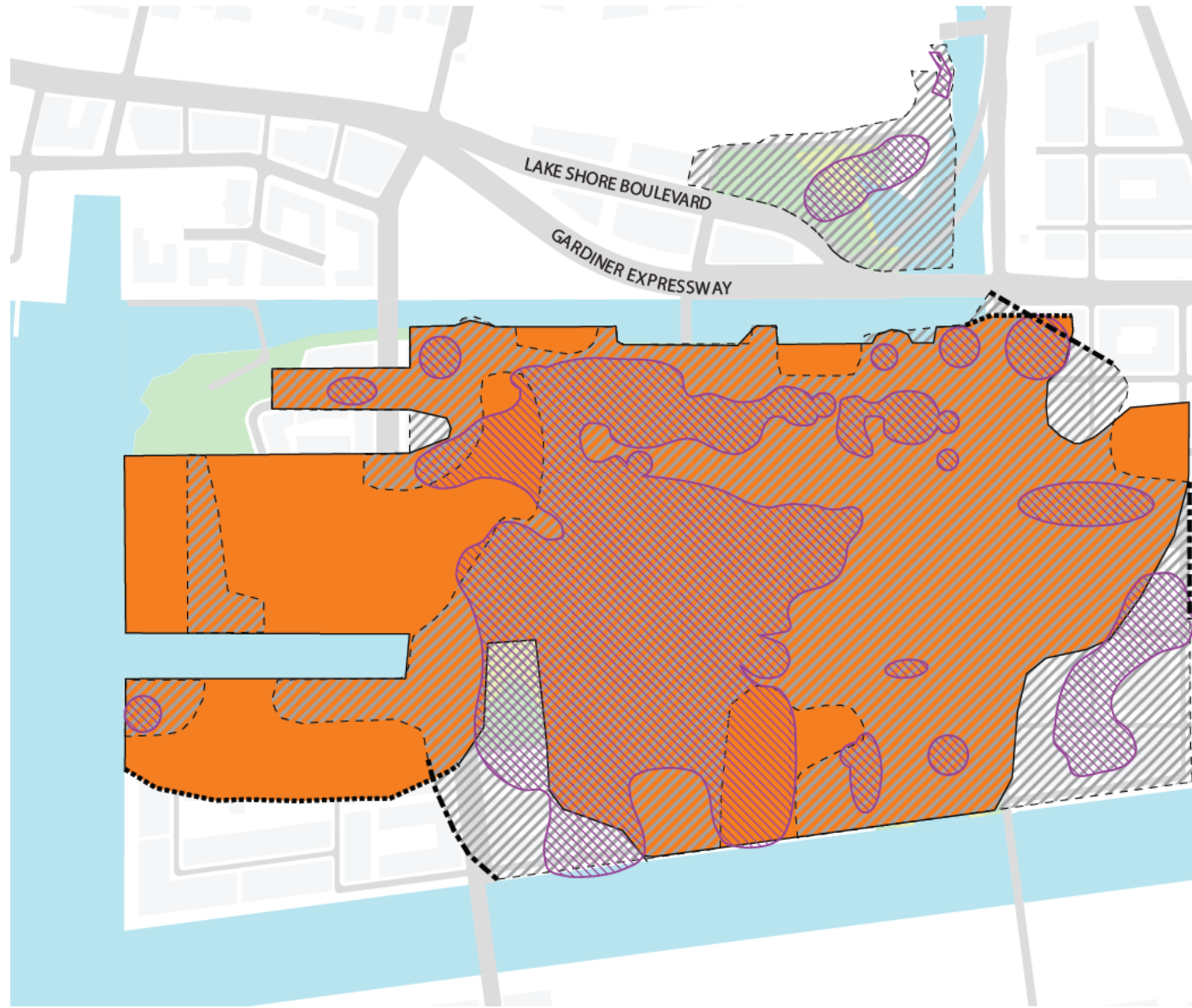




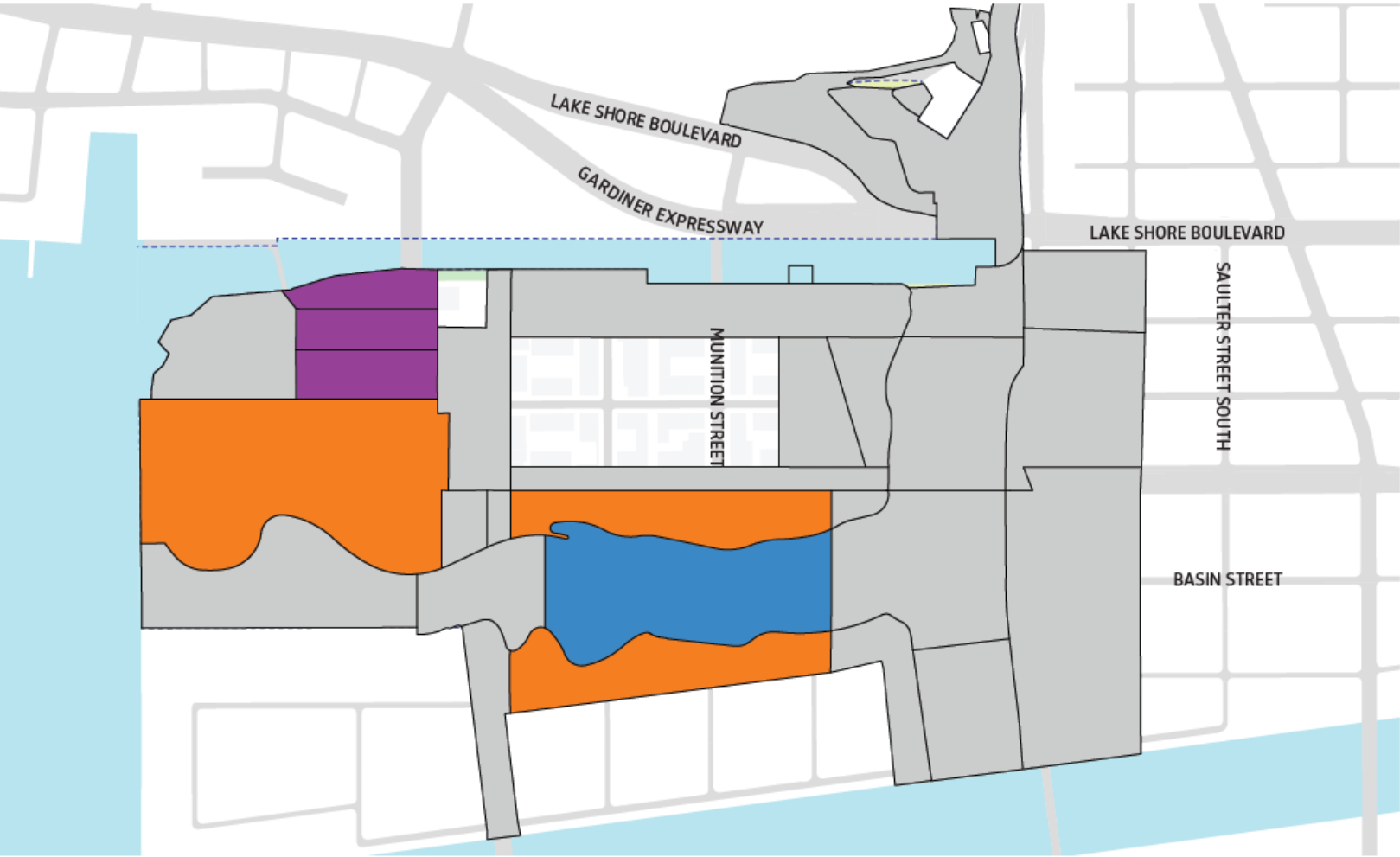
# Due Diligence Findings: Soil & Water Contamination Profile

## Legend

-  Zone affected by Surface Contamination
-  Surface Contamination Extent
-  Surface Contamination Extent Unknown
-  Zone affected by Sub-surface Contamination
-  Sub-surface Contamination Extent
-  Sub-surface Contamination Extent Unknown
-  Zone affected by Significant Contamination

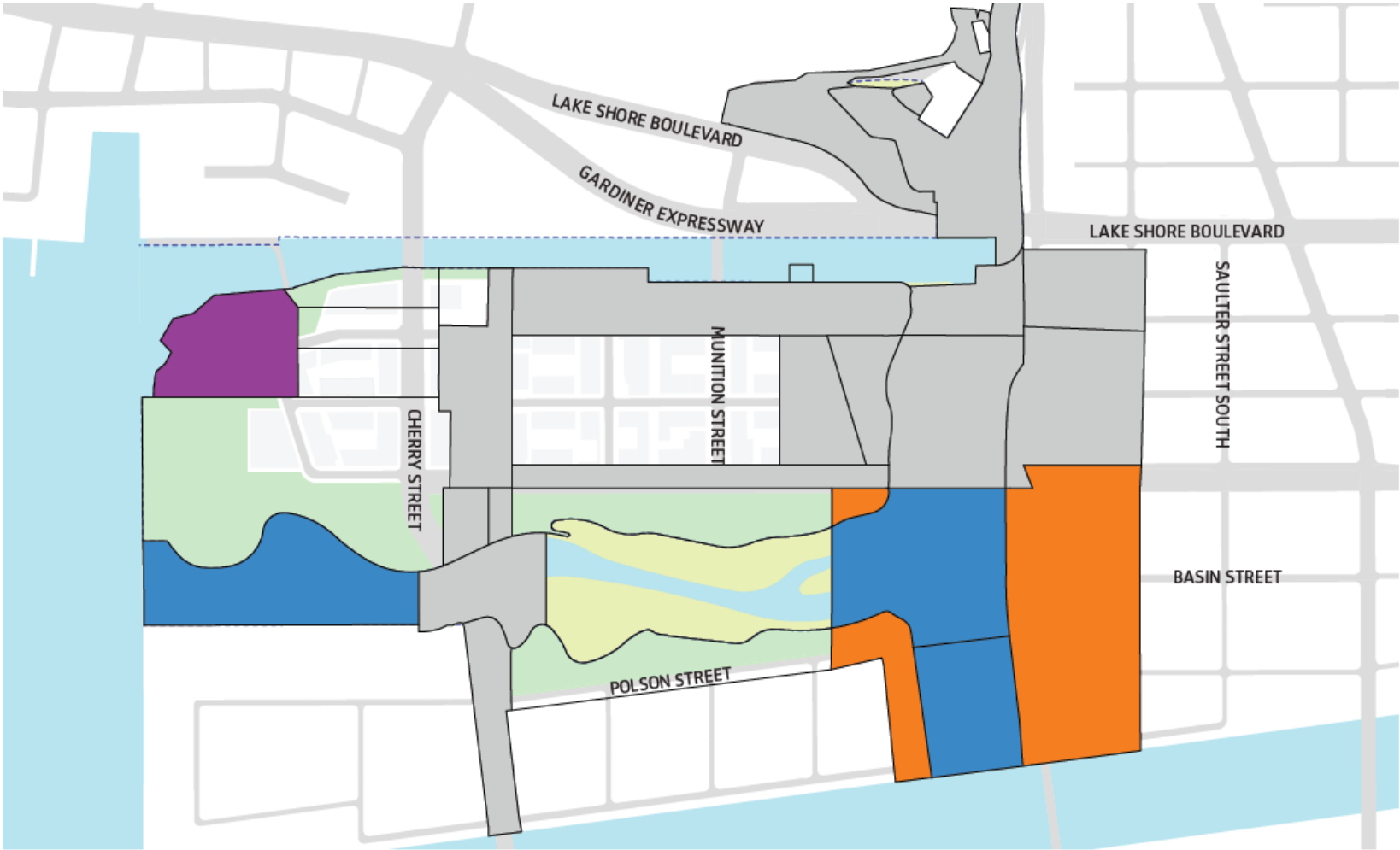


# Due Diligence Findings: Excavation & Fill Sequencing, Stage 1



- Legend
- Area to Cut
  - Area to Fill
  - RA/RM Cut Area to Fill
  - Area to be Constructed

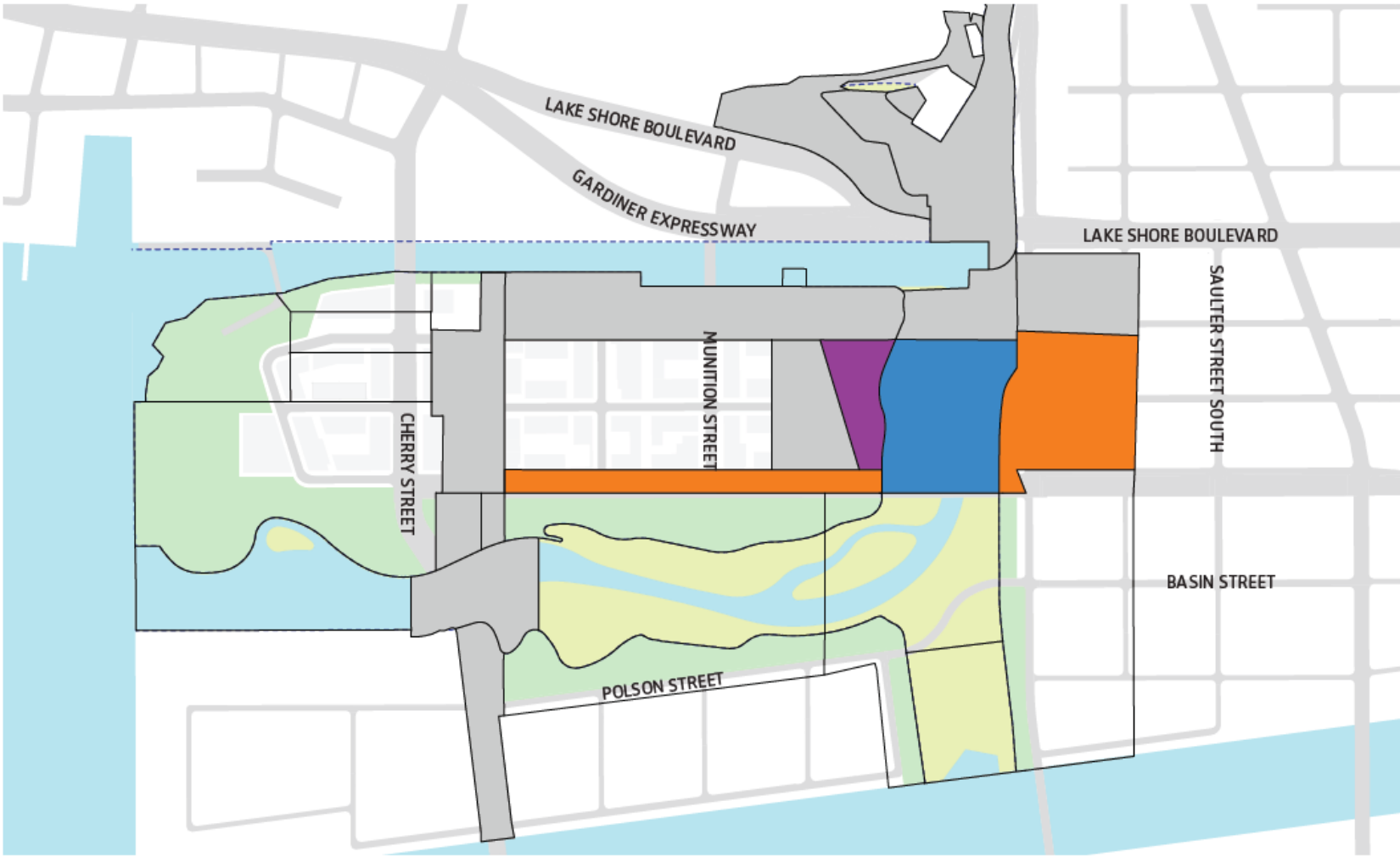
# Due Diligence Findings: Excavation & Fill Sequencing, Stage 2



- Legend
- Area to Cut
  - Area to Fill
  - RA/RM Cut Area to Fill
  - Area to be Constructed



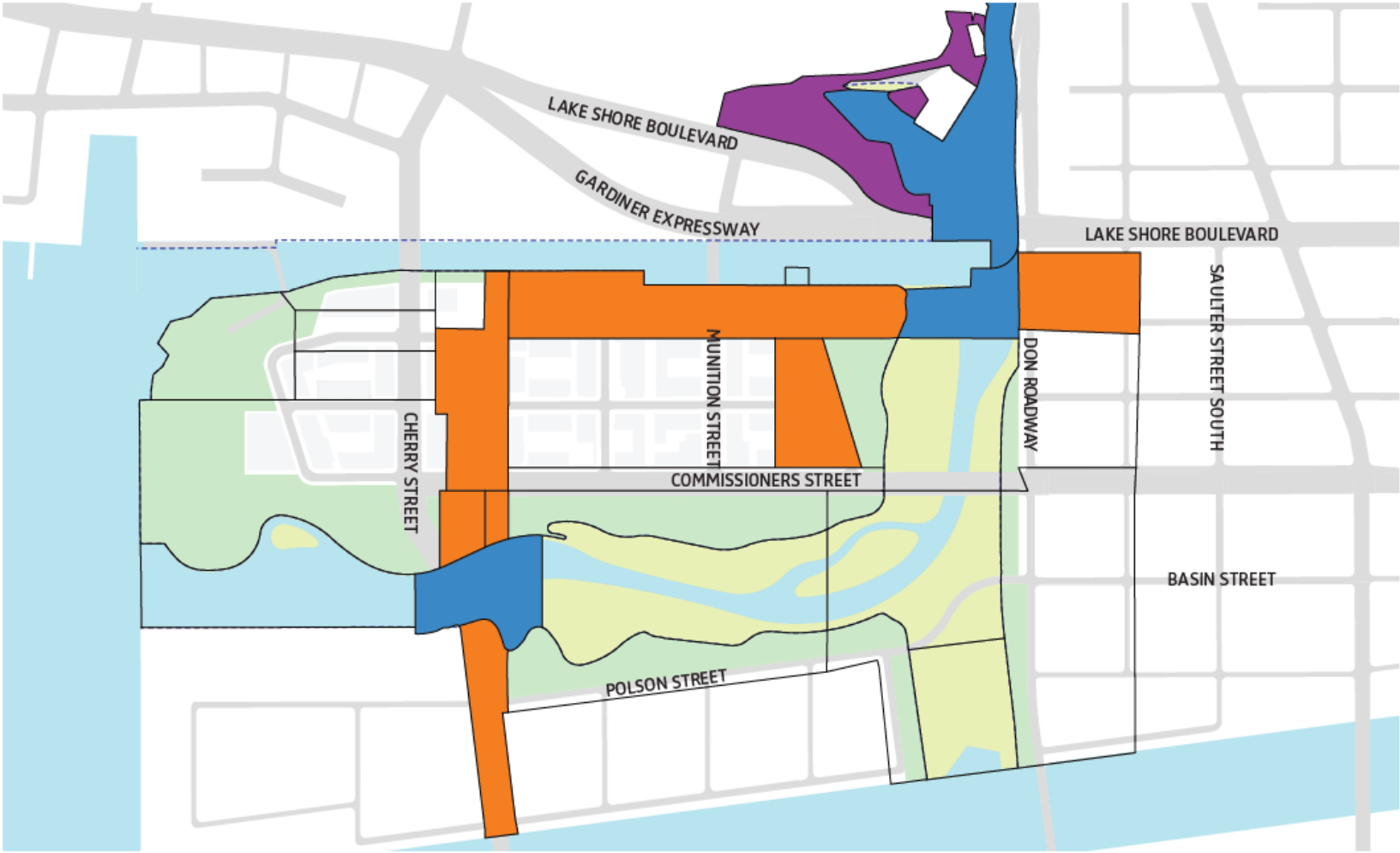
# Due Diligence Findings: Excavation & Fill Sequencing, Stage 3



### Legend

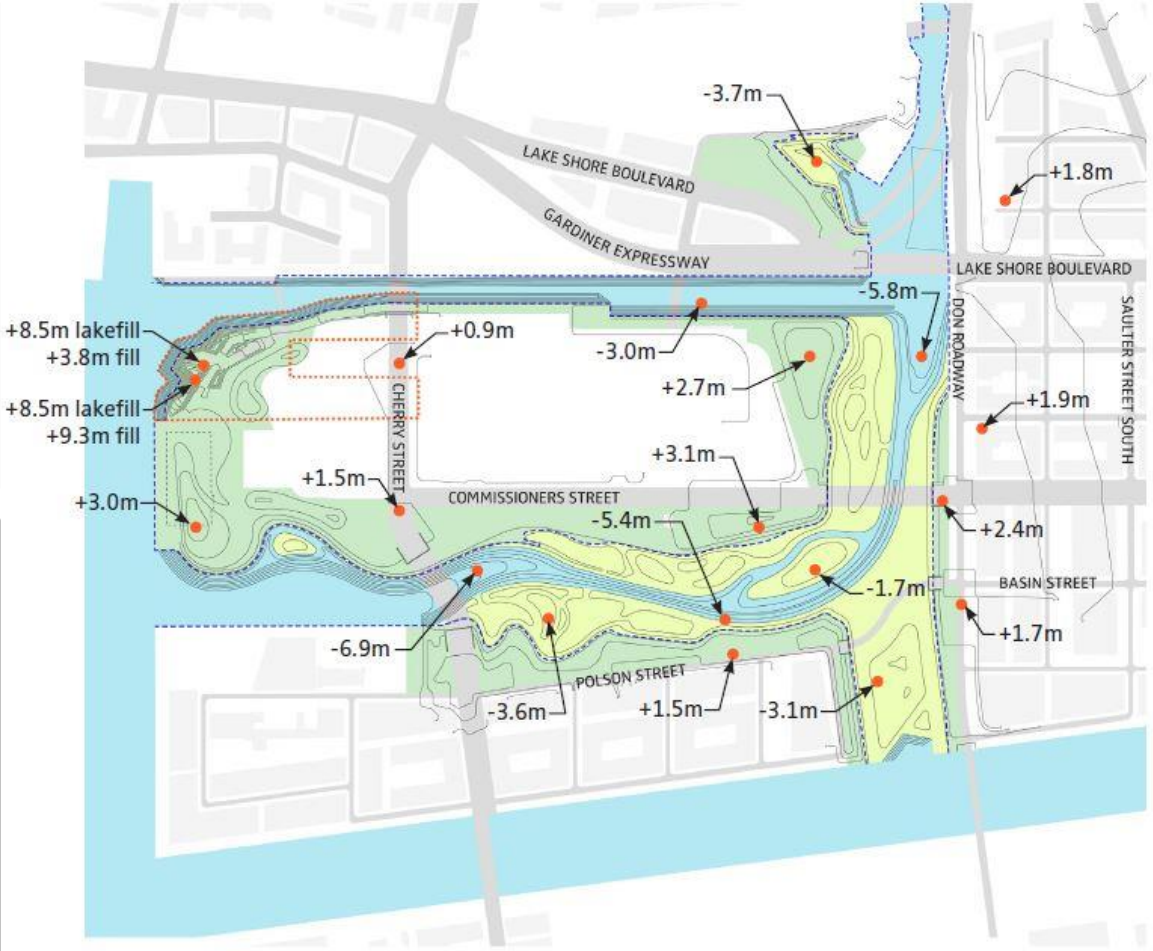
- Area to Cut
- Area to Fill
- RA/RM Cut Area to Fill
- Area to be Constructed

# Due Diligence Findings: Excavation & Fill Sequencing, Stage 4



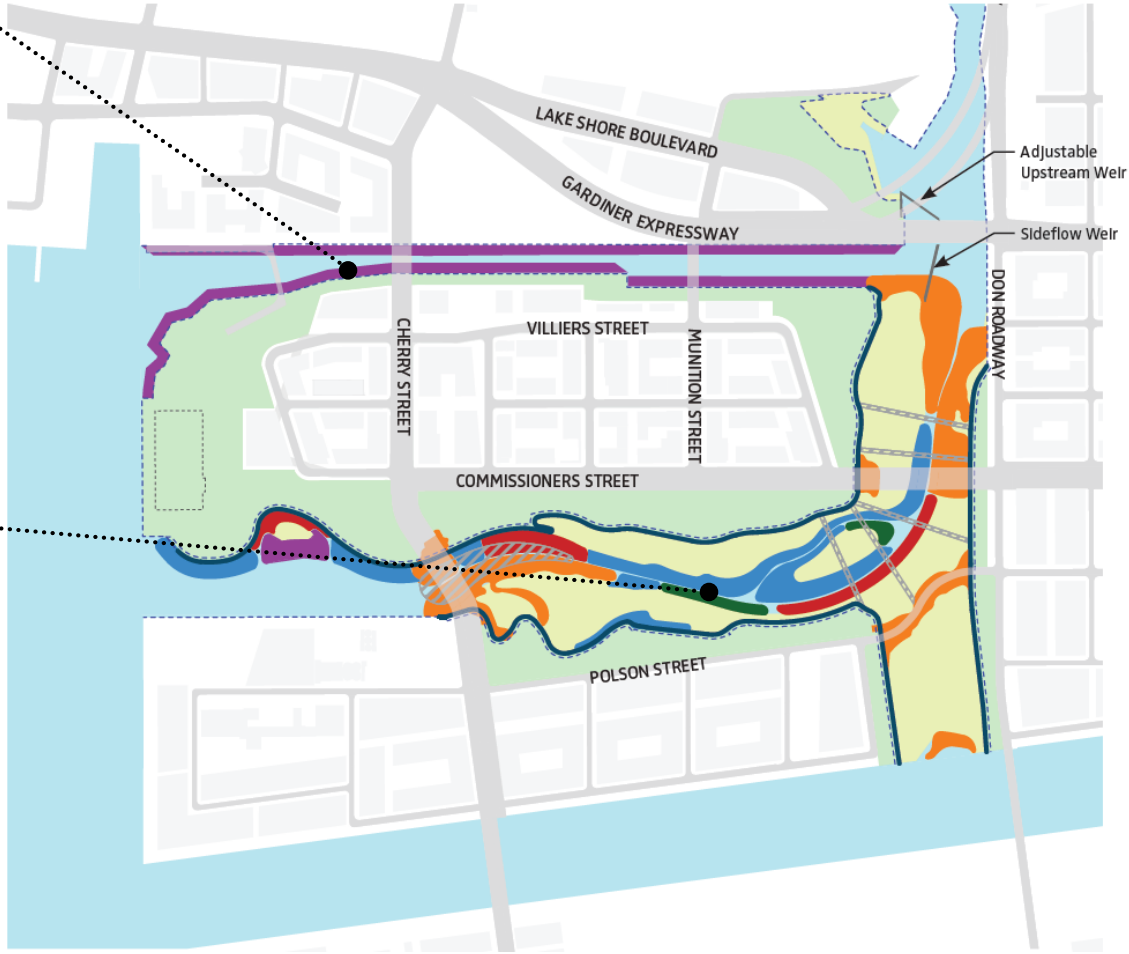
- Legend
- Area to Cut
  - Area to Fill
  - RA/RM Cut Area to Fill
  - Area to be Constructed

# Due Diligence Findings: Site Grading




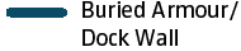



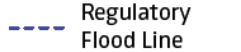






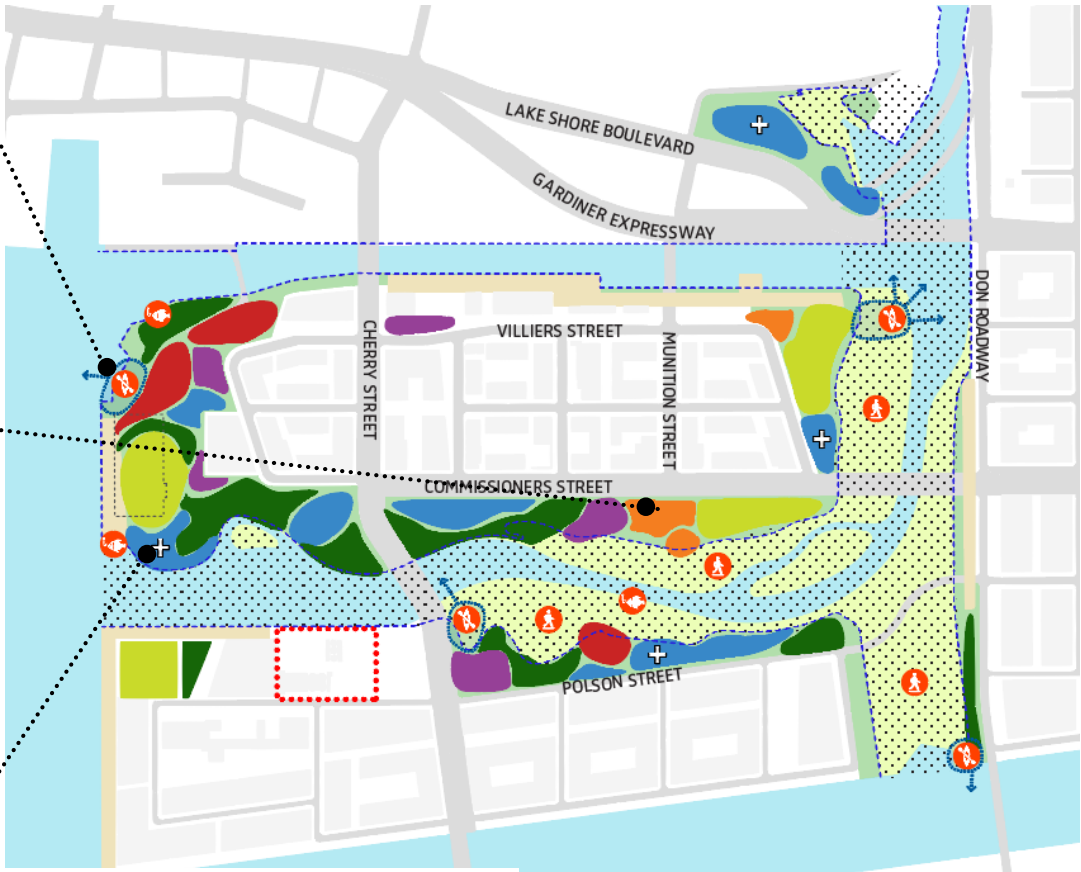
# Due Diligence Findings: Flood Protection Components



**Legend**

-  Bioengineered Bank \*
-  Gravel Bank
-  Parkland
-  Buried Armour/ Dock Wall
-  Buried Grade Control Structure
-  Large Wood Stabilization \*\*\*
-  Floodplain
-  Regulatory Flood Line
-  Exposed Armour \*\*
-  Rocky Harbor Edge

# Due Diligence Findings: Wetland Habitat and Park Components

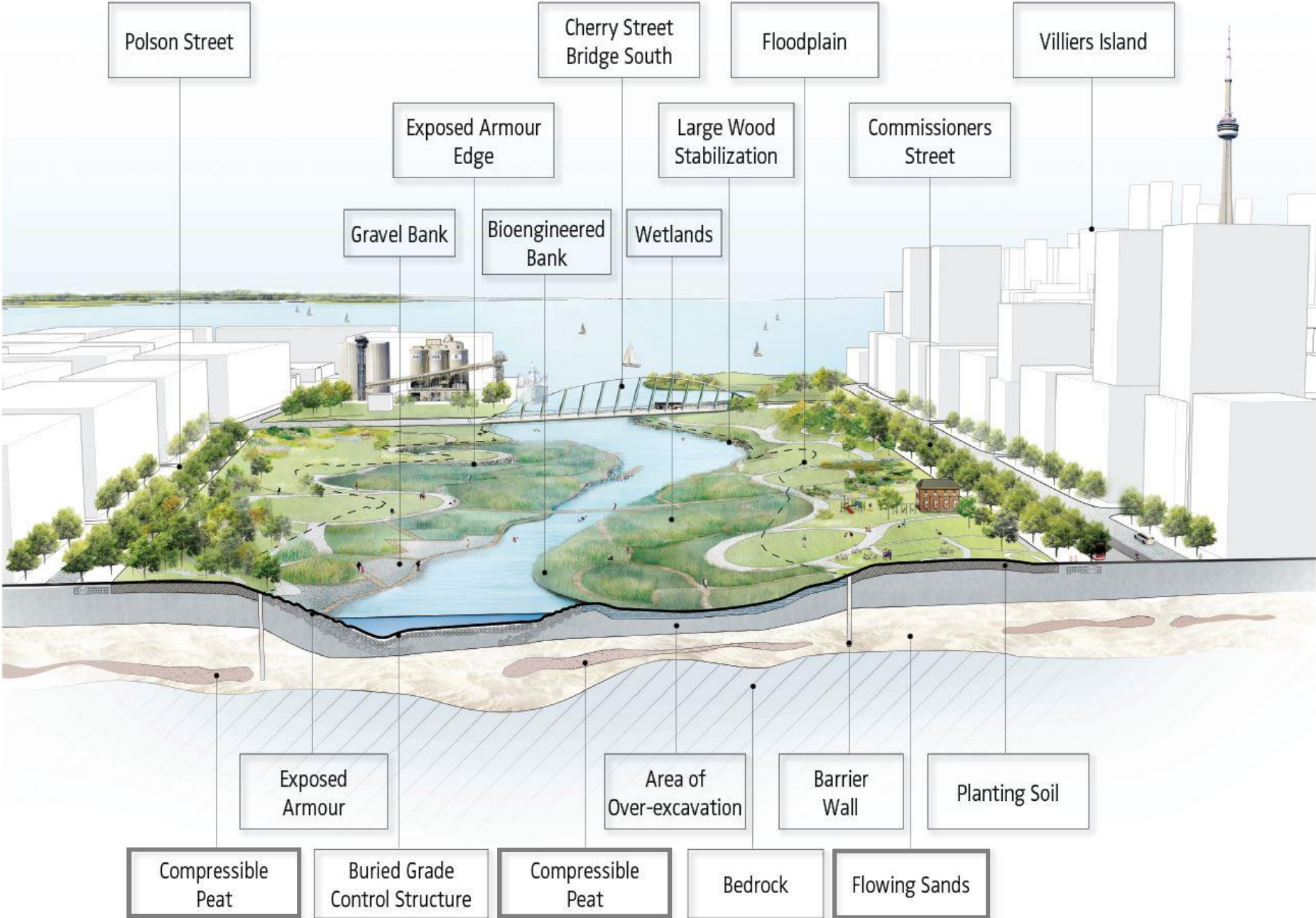


**Legend**

- River Valley + Wetlands
- Wooded Upland
- Passive Use Lawn
- Active Recreation
- Water Access
- Esplanade
- Playground
- Public Gardens
- Event Space
- Prospect / Overlook
- Other Parkland
- Floodplain
- Private Land
- Regulatory Flood Line
- Trail
- Small Boat Launch
- Fishing Area



# Due Diligence Findings: Flood Protection, Wetland Habitat and Park Components





# Due Diligence Findings: Bridges and Roads



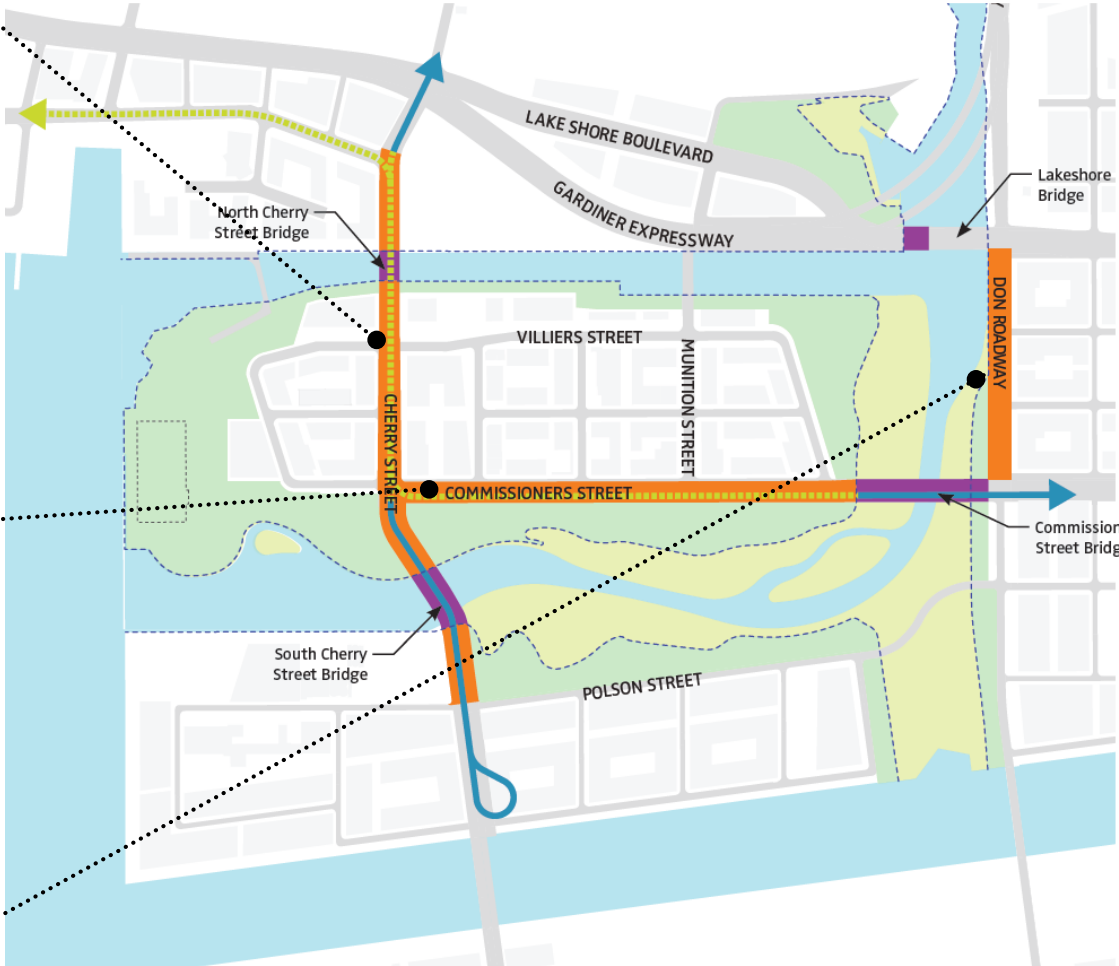
New Cherry Street



Commissioners Street



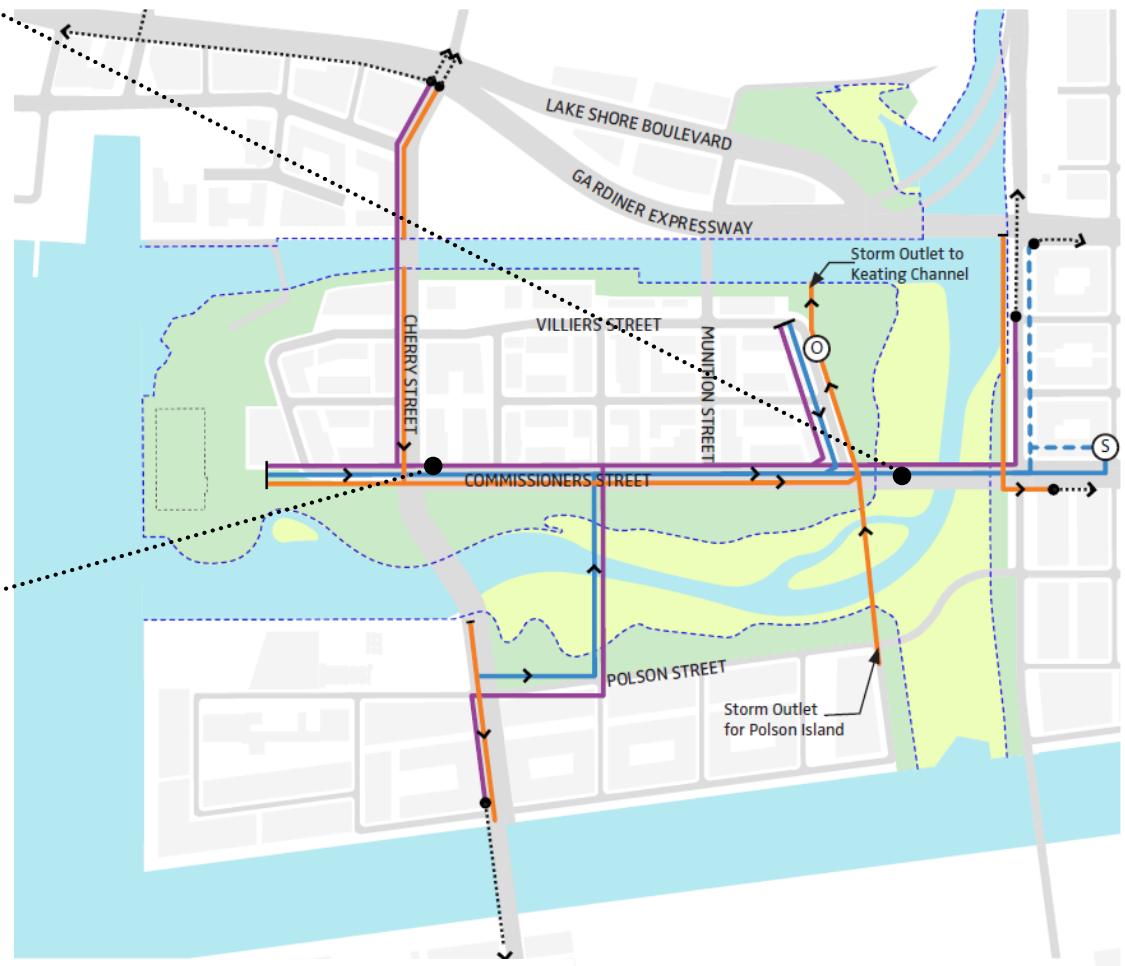
Don Roadway



### Legend

- Proposed Roads
- Proposed Bridges
- Bridges (not in scope)
- Interim BRT (Future LRT Route, not in scope)
- Regulatory Flood Line
- Bus Route (in mixed traffic)

# Due Diligence Findings: New and Replacement Services



- Legend**
- Connect to Existing Infrastructure
  - Force main to Existing Sewer
  - Storm Sewer
  - Regulatory Flood Line
  - Gravity-Flow Sewer
  - Sanitary Pump Station
  - Proposed Water Main
  - BFF Outlet Shaft

# Due Diligence Findings: Project Scope and Cost Estimate

Original Cost Estimate (\$YoE): \$975 million

- Key finding that shaped revised cost estimate
  - Site Conditions: flowing sand, compressible peat = additional soil excavation, soil/groundwater treatment
  - Escalation/Inflation

- Re-evaluated Project Scope
  - Three new components identified
  - Three components deferred
  - Scope reductions

Current Cost Estimate (\$YoE): \$1.25 billion

Includes:

- Contingency
- Design Allowance
- Indirect Contractor Costs
- Soft costs (legal, approvals, engineering)
- Non-recoverable HST

		Estimated Cost (YoE \$millions)				
		Recommended Scope	Original Scope	Variance	Explanation	
1	2	\$ 125	\$ 90	\$ 35	Refined design of lakefill and naturalized river mouth; more complex construction requirements.	
3	4	\$ 486	\$ 128	\$ 358	Refined earthwork methodology/quantity and cost assumptions and environmental management requirements.	
5		\$ 102	\$ 36	\$ 66	Municipal services originally carried with roads is now broken out separately, actual network design have replaced previous allowances.	
6		-	\$ 37	\$ (37)		
7a	7b	\$ 7	\$ 63	\$ (56)	South portion deferred. Current estimate breaks out costs for municipal services and Hydro One infrastructure modifications elsewhere. See items 5 & 18.	
8		\$ 27	\$ 12	\$ 15	Refined design	
9		\$ 5	\$ 5	\$ 0		
10		\$ 78	\$ 53	\$ 25	Refined design	
11		\$ 38	\$ 38	\$ 0		
12		\$ 5	\$ 5	\$ 0		
13		\$ 19	\$ 71	\$ (52)	Dimensions reduced from prior assumptions. Proposed Gardiner/Lake Shore reconfiguration has eliminated need for the rail bridge modifications.	
14a		\$ 22	\$ 62	\$ (40)	Current estimate breaks out costs for municipal services elsewhere. See item 5. Improvements deferred south of Poison Street.	
14b		\$ 55	\$ 32	\$ 23	Revised pricing assumptions and additional design information.	
14c		\$ 42	\$ 42	\$ 0		
14d		\$ 4	\$ 13	\$ (9)	Reduced extent of dockwall work related to demolition.	
15a		\$ 18	\$ 40	\$ (22)	Current estimate breaks out costs for municipal services elsewhere. See item 5.	
15b		\$ 43	\$ 54	\$ (11)	Revised pricing assumptions and additional design information.	
15c		\$ 7	\$ 60	\$ (53)	Current estimate breaks out costs for municipal services and Hydro One infrastructure modifications elsewhere. See items 5 & 18.	
16		\$ 35	\$ 50	\$ (15)	Duplicate scope eliminated.	
17a	17b	\$ 42	\$ 63	\$ (21)	Refined design and park programming. Full landscaping limited to south end of park.	
18		\$ 12	\$ 21	\$ (9)	Reduced scope of work assumed required specifically to enable flood protection. Note: original estimate also included supplementary allowances for modifications to Hydro One assets in items 7a & 15c.	
19		\$ 28	-	\$ 28	New scope required to achieve complete flood protection without reliance on adjacent development progress.	
20		\$ 23	-	\$ 23	Partially replaces deferred (north) portion of Promontory Park.	
21		\$ 27	-	\$ 27	Partially replaces deferred (north) portion of Promontory Park.	
<b>Total</b>		<b>\$ 1,250</b>	<b>\$ 975</b>	<b>\$ 275</b>		

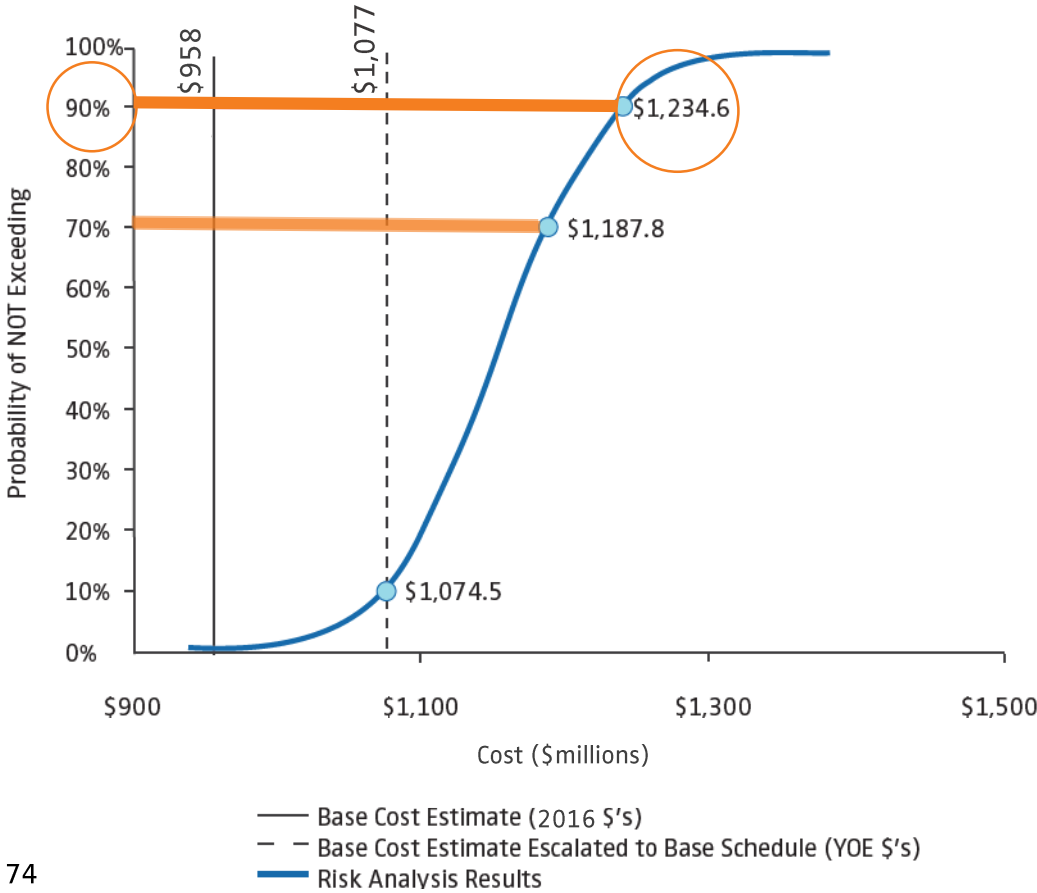
Due Diligence Report, Page 83



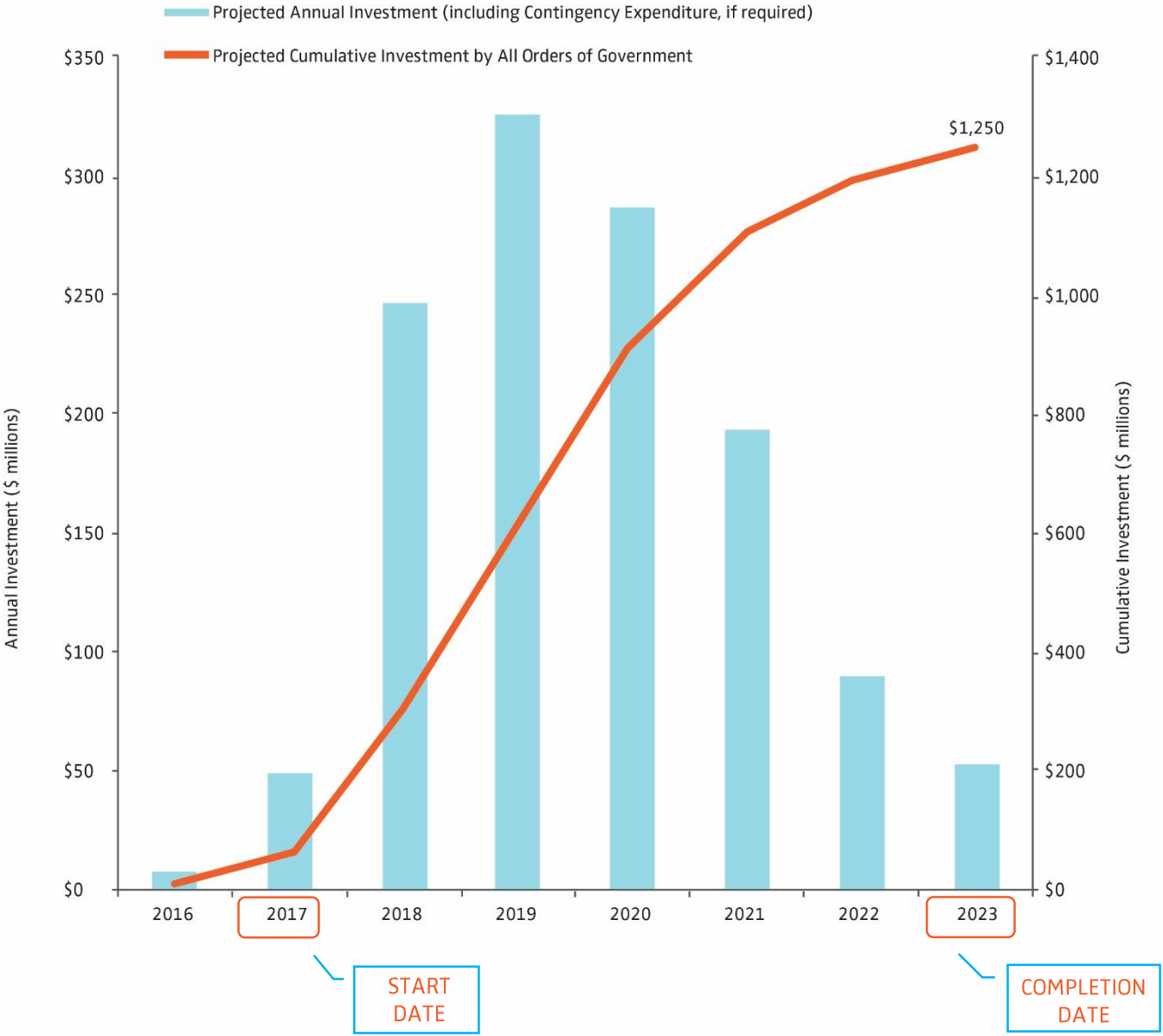
# Due Diligence Findings: Cost Estimate + Risk Modelling

## Risk Simulation Modelling Inputs:

- Base cost estimate (\$2016) including construction costs, soft costs
- Base Project Schedule, which assumes everything goes as planned
- Project Risks (from Risk Register)



# Due Diligence Findings: Annual and Cumulative Costs



# Due Diligence Key Findings: Construction Coordination



**Legend**

- 1 Don River Metrolinx Rail Bridge Widening/Lengthening
- 2 GO Transit Electrification
- 3 Don Rail Yard Expansion
- 4a Gardiner Expressway East Hybrid 3 Implementation
- 4b Gardiner Expressway-Don Valley Parkway Ramp Demolition
- 4c Lake Shore Boulevard Realignment
- 5 Gardiner East Linear Public Space
- 6 First Gulf/Unilever Site
- 7 The Don River and Central Waterfront Project



Reviewed broad range of delivery options, including potential for a public-private partnership (P3) approach

## Key considerations:

- Risk transfer limited owing to soil and groundwater issues
- No established environmental regulatory approval process
- Achieving design excellence
- Preserving flexibility to respond to changing project environment and logistical requirements

## Conclusion: unique project needs custom delivery solution

- Developed comprehensive procurement principles
- Principles will be applied to determine appropriate approach for each project component

- Unprecedented Project
- Important to Peer Review
- Independent review by qualified organizations
- Examine Report's adequacy and accuracy

## Port Lands Flood Protection and Enabling Infrastructure Due Diligence Report

Toronto, Ontario

October 20, 2016



Due Diligence Report, Page 112

## Rijkswaterstaat (The Netherlands Ministry of Infrastructure and Environment):

- \$1.25 billion sufficient to deliver Project
- Contingency matched similar projects
- Excavation of the river valley, soil handling and filling will drive construction phasing
- Project can be completed in 2023
- Project's identified risks well documented and comparable with its projects
- Scale and complexity of managing soil in the Project is exceptional; risk of unknown soil characteristics will remain significant





## Kiewit:

- Project components that pose the greatest risks: poor subsurface conditions, confirming the regulatory requirements with respect to soil contaminants, associated Risk Management Measures
- Recommend develop a Ground Improvement Plan to improve the strength of the soils/subsurface conditions
- Due Diligence work was appropriately detailed



# The Port Lands Flood Protection Project



Questions?