

Coastal modeling and waterfront structural design on the shorelines of Great Lakes

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Outline

- Transition to the world of consulting
- Marine and Coastal Engineering
- Challenges
- Example projects
- State of the art tools, link with research

Background

- Riggs Engineering Ltd
 - 6+1 engineers, 1 technician, 1 admin
 - Marine, Coastal and Water Resources specialties
- Area of application
 - Waterways of the Great Lakes
- Clients
 - Public and private sector

Canada and United States



The Great Lakes



Dredging

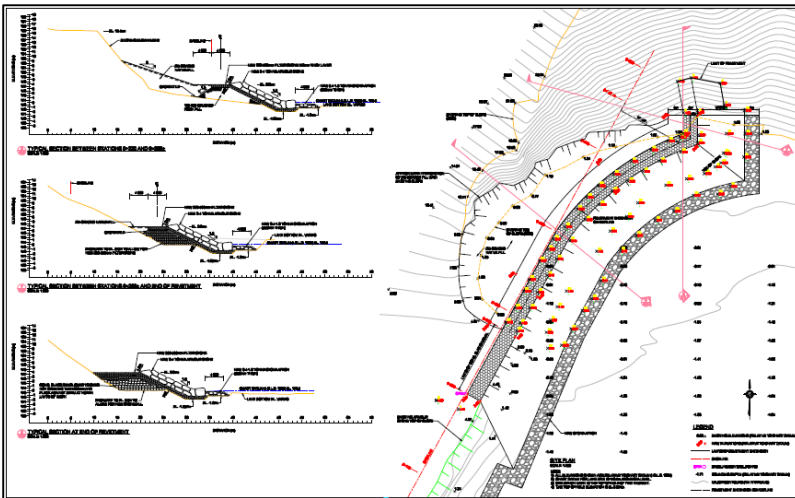
- Clam bucket
- Hydraulic pumps
- Trailing hopper suction dredges



Shore protection



Shoreline Erosion Protection, Elgin Water Plant, Port Stanley, ON



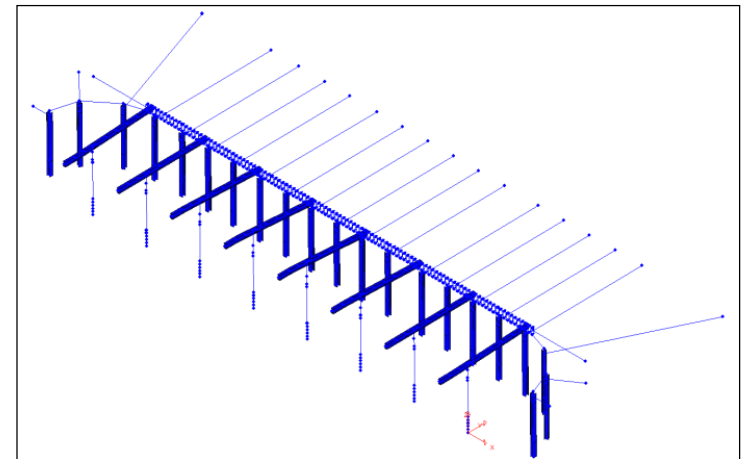
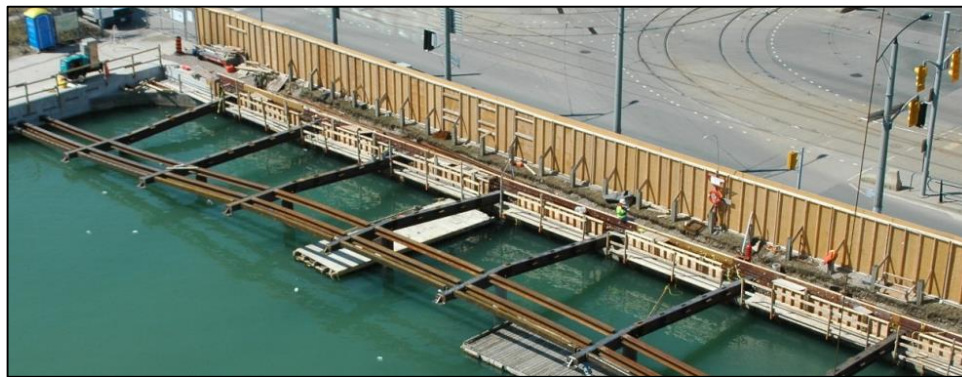
Port Stanley, Ontario



Innovative Waterfront Designs



Spadina Quay Wavedeck at Harbourfront, Toronto, ON

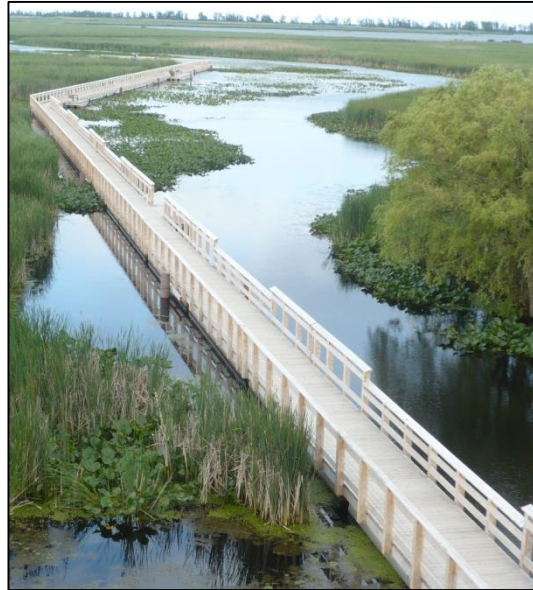


Marine walkways



**Town Wharf and Boardwalk
Rehabilitation, Tobermory, ON**

Floating boardwalks



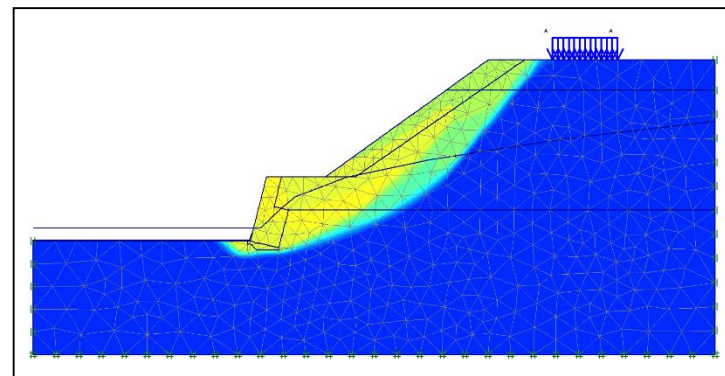
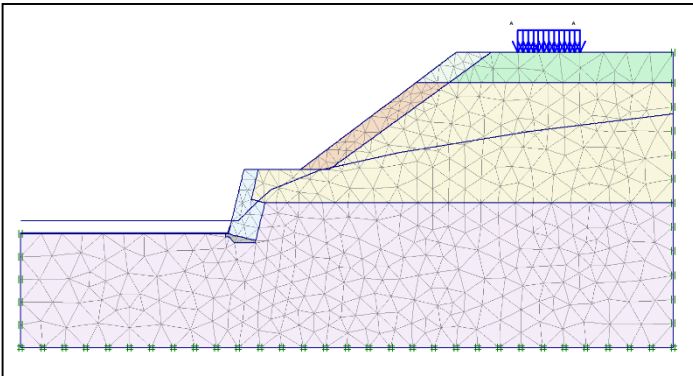
**Floating Boardwalk, Point Pelee National Park,
Leamington, ON**



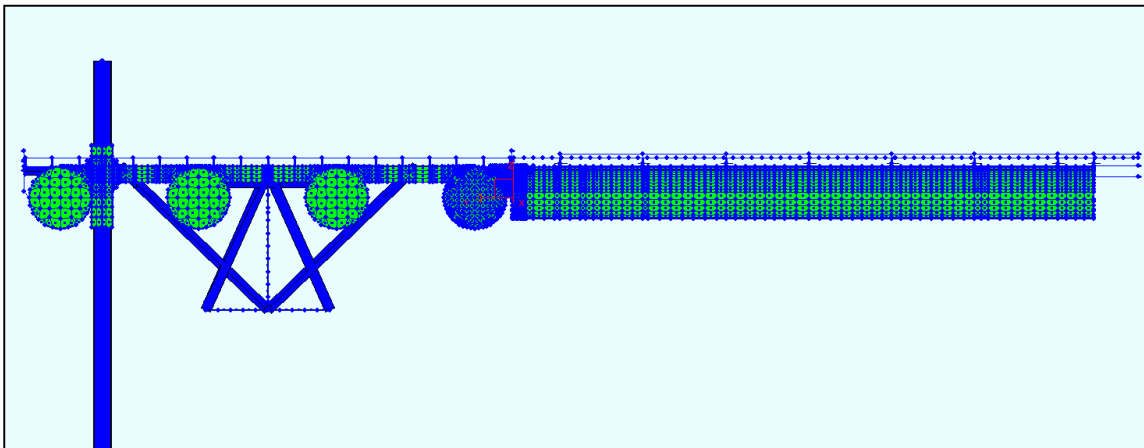
Bank stability



Slope Stability Analyses at Springbank Dam, London, ON



Floating dock design



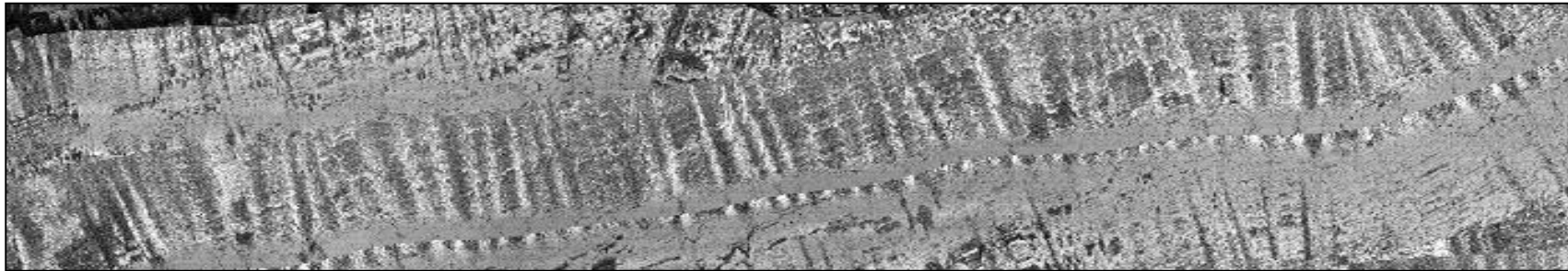
**Town Dock,
Penetanguishene, ON**

Commercial dock design

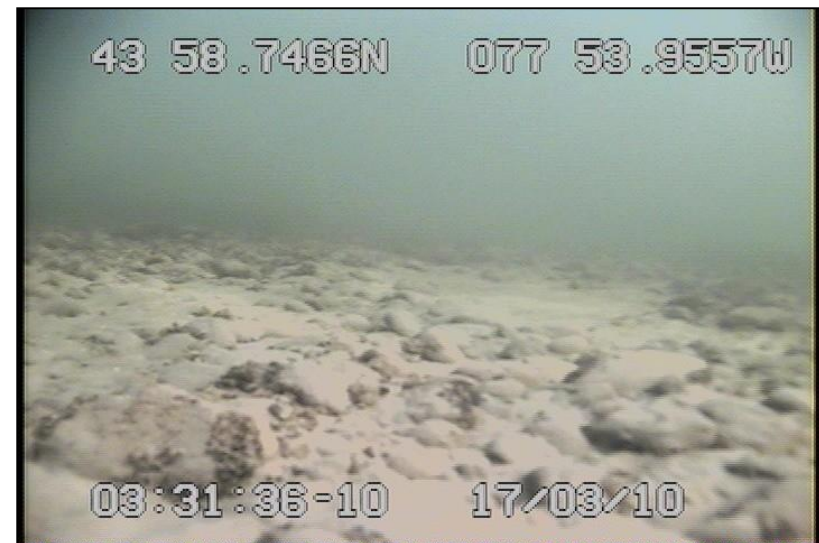
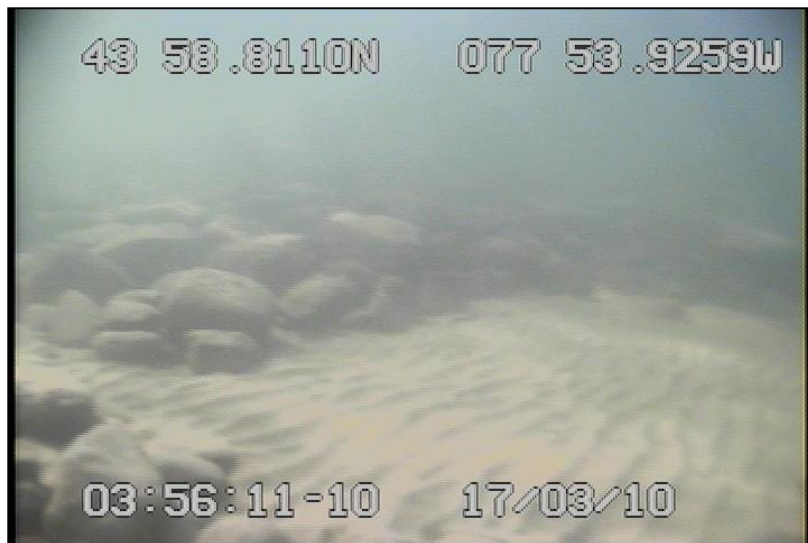


**Pier 22 Design and Construction, Hamilton Port Authority,
Hamilton, ON**

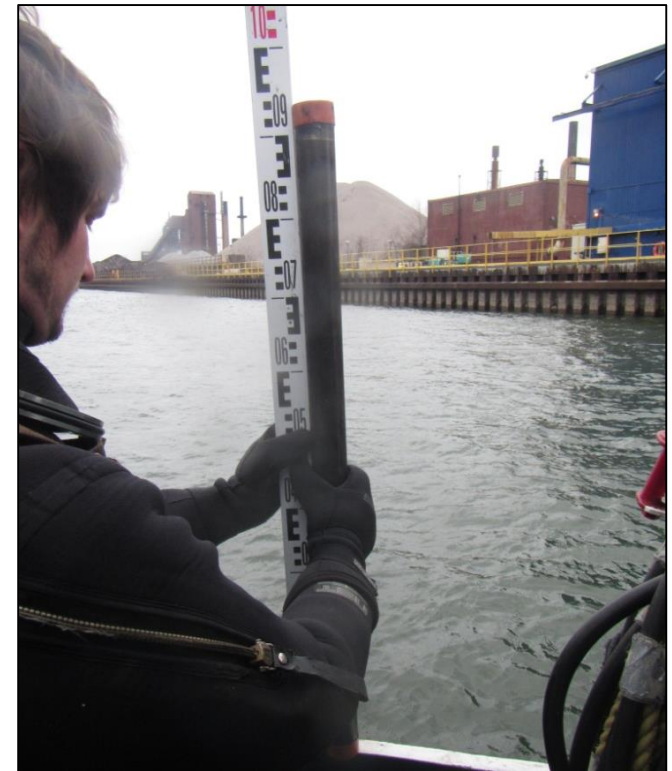
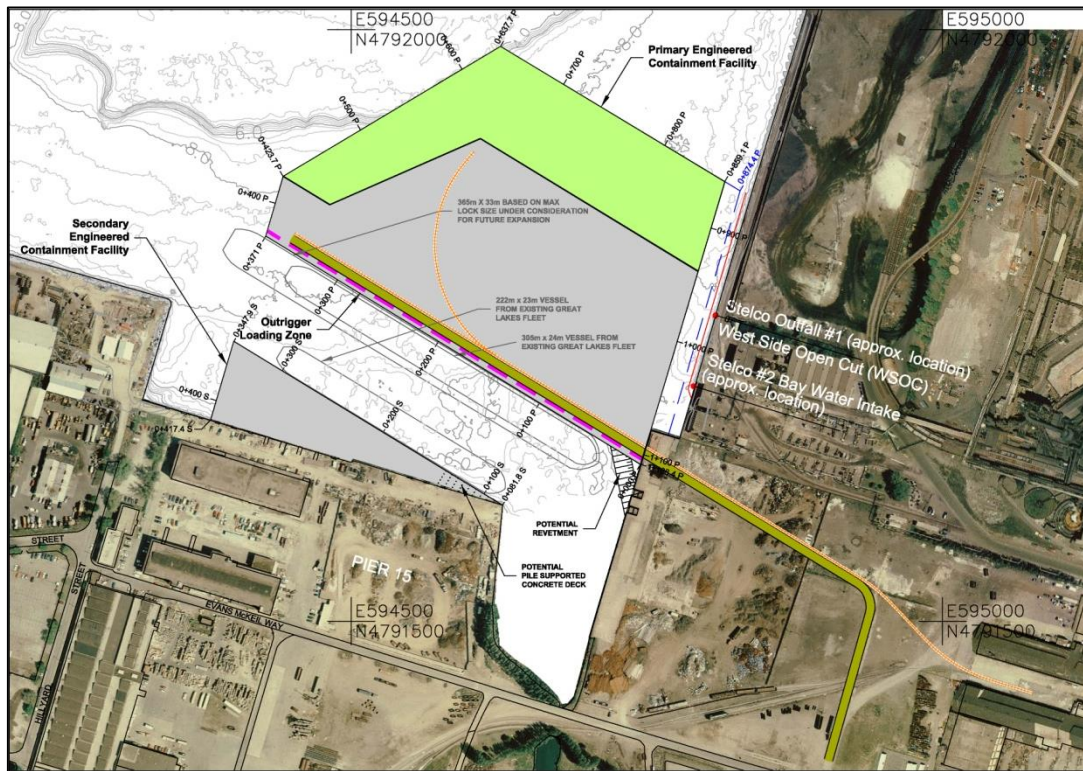
Underwater sensing & imagery



Depth Sounding, Sidescan Sonar and Underwater Imagery & Inspections



Special projects



Randle Reef Contaminated Sediment Assessment & Cleanup, Hamilton Harbour, Hamilton, ON

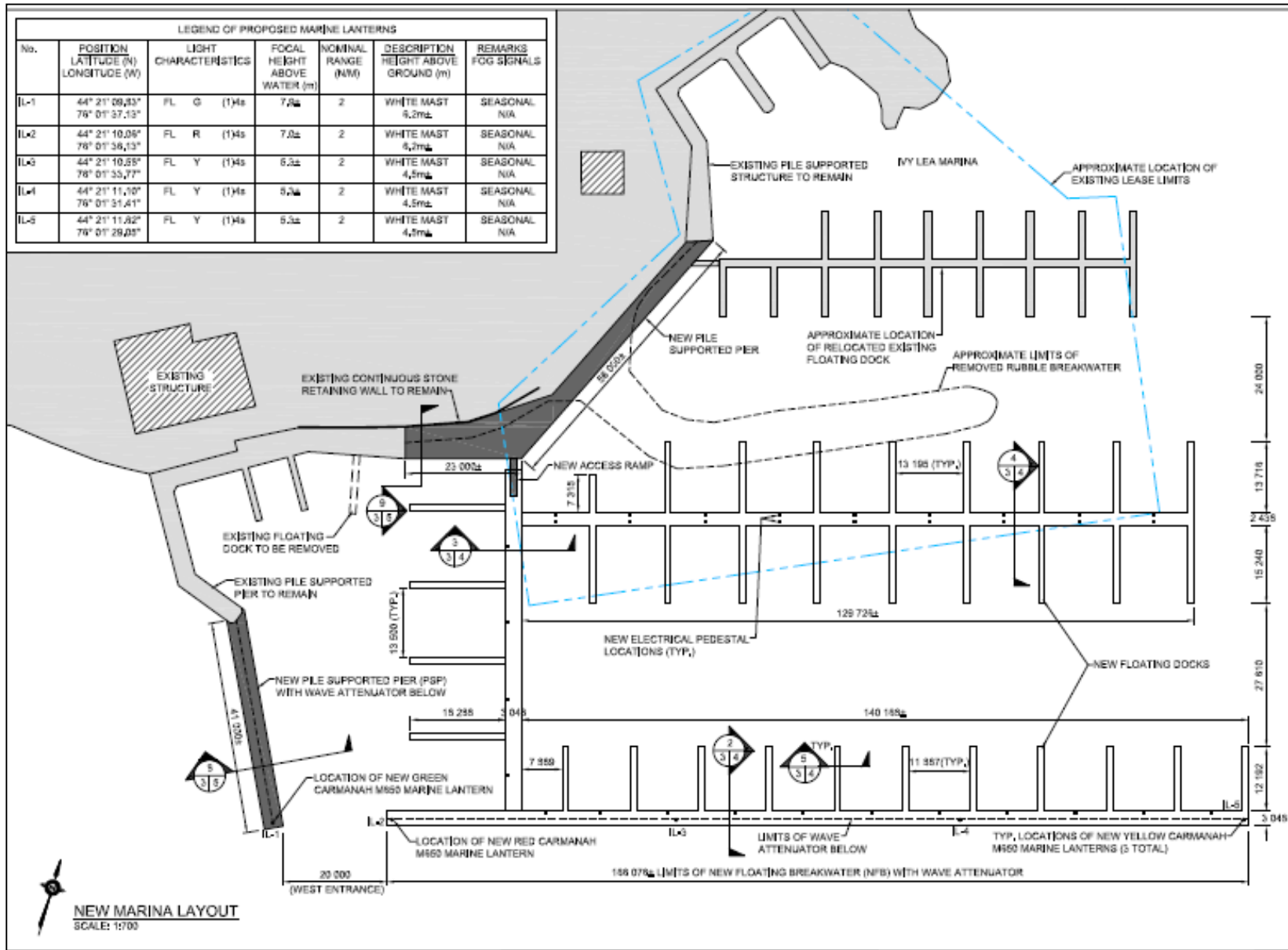
Special projects



Submarine Ojibwa to Marine Museum, Port Burwell, ON

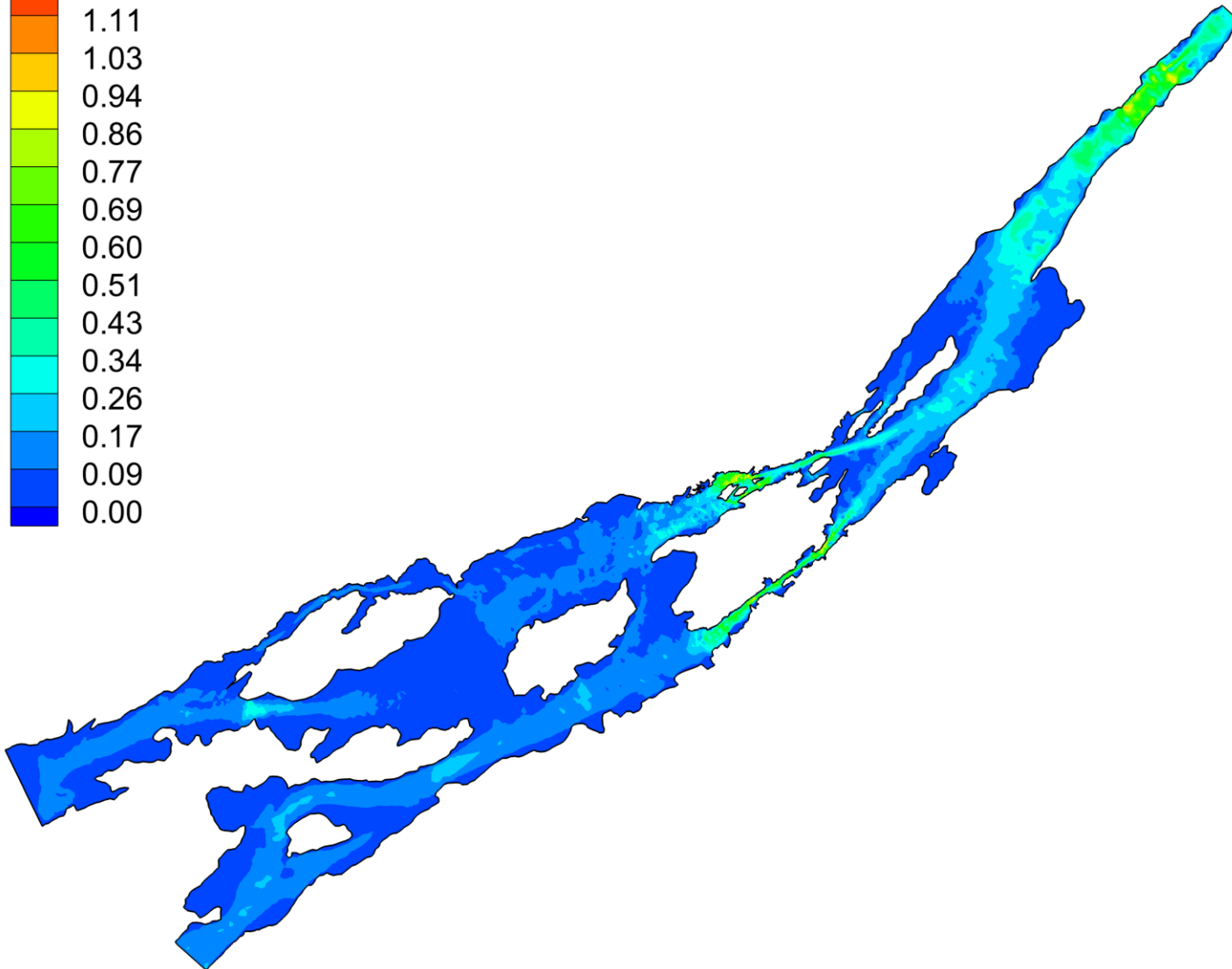
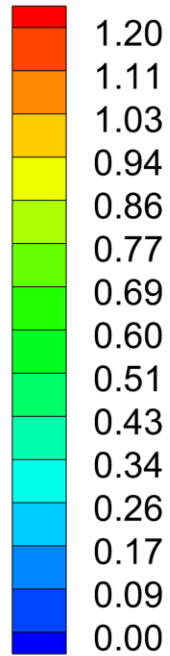


Ivy Lea Marina Design



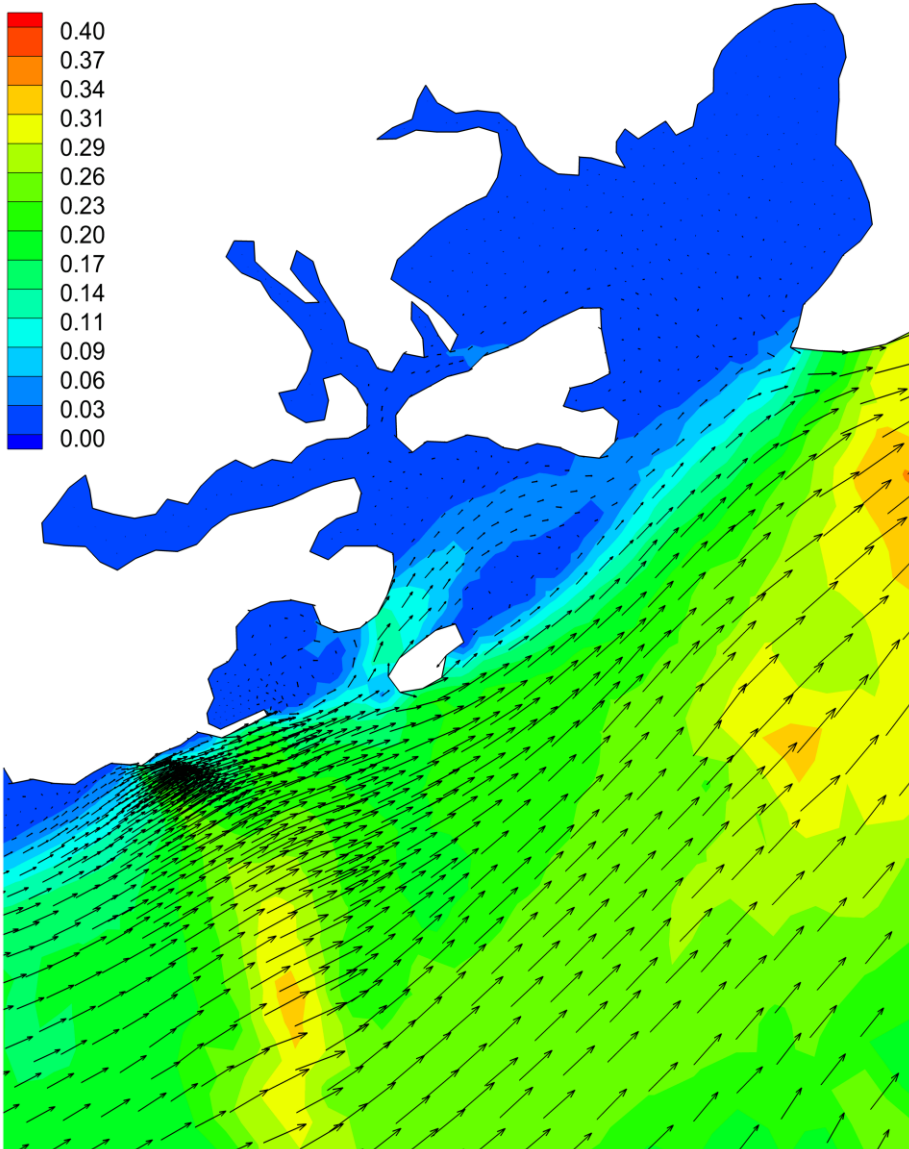
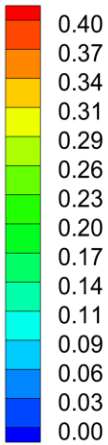
t2d model of the St. Lawrence

Velocity Magnitude

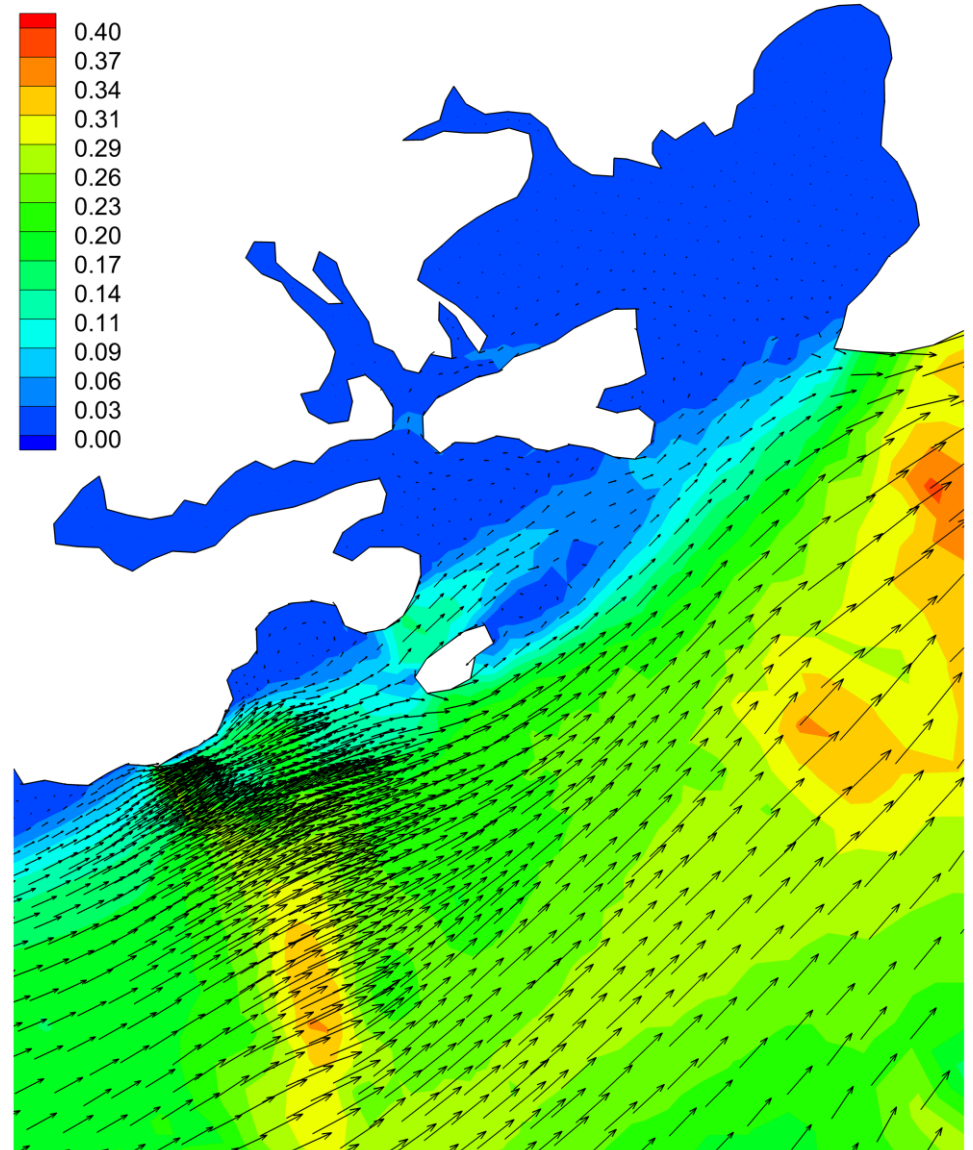
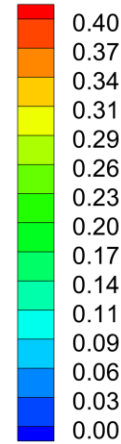


Existing and proposed vel

Velocity Magnitude

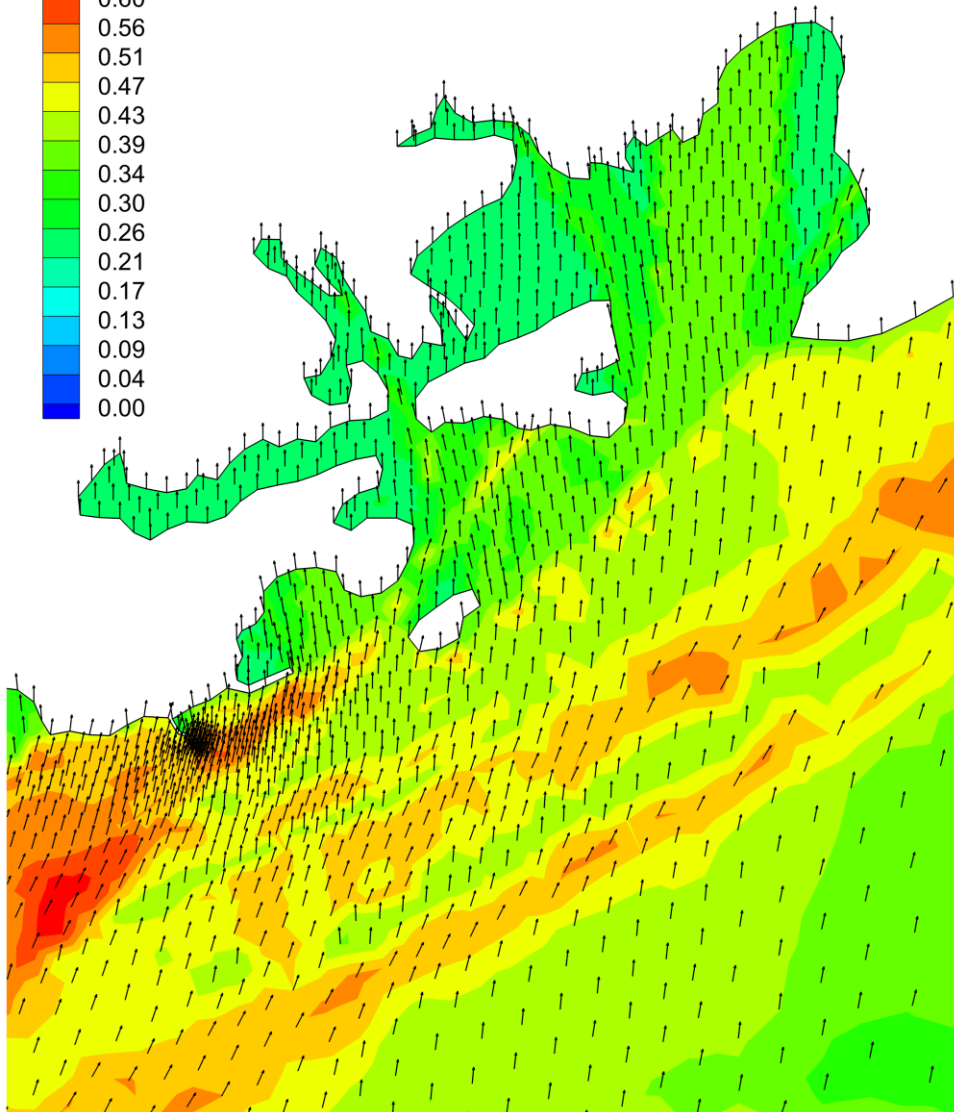
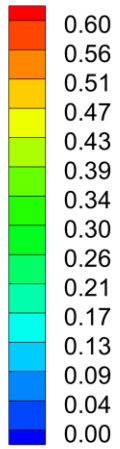


Velocity Magnitude

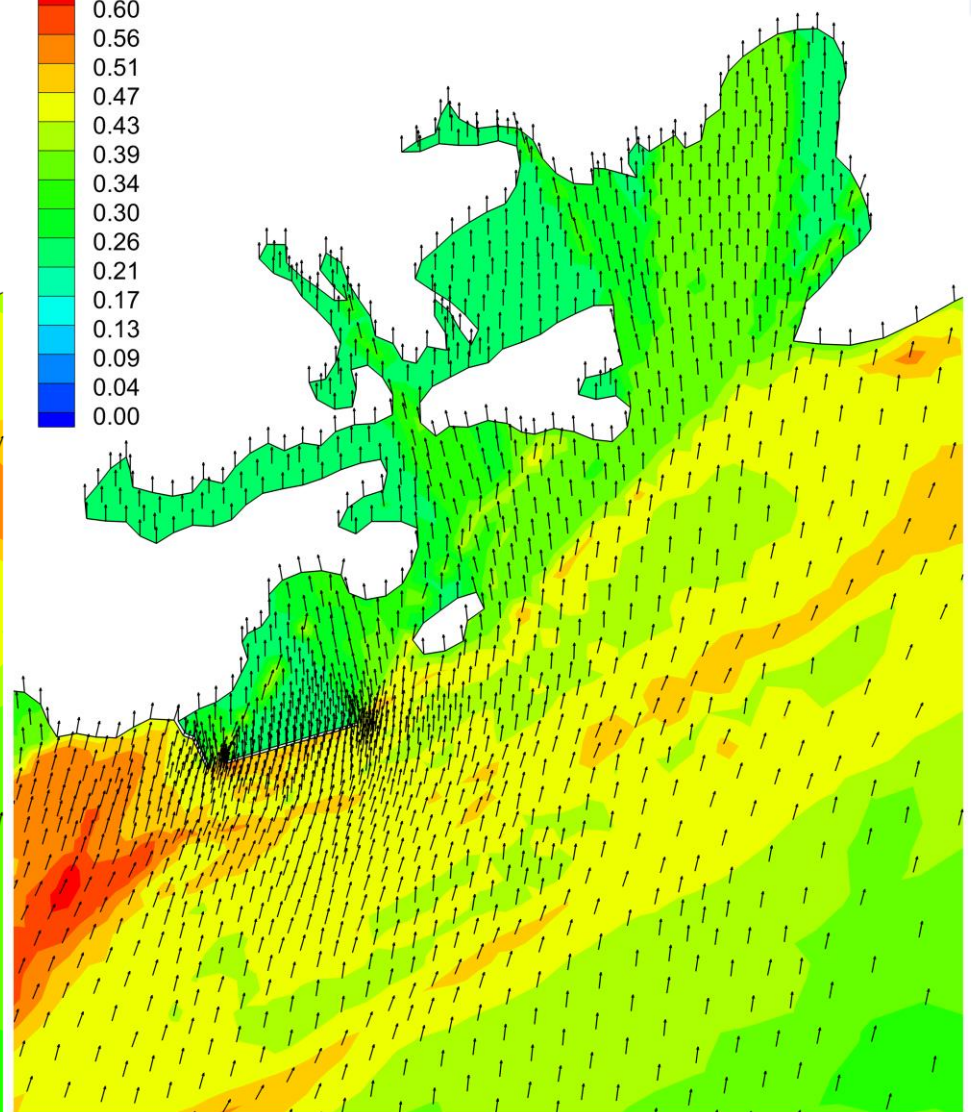
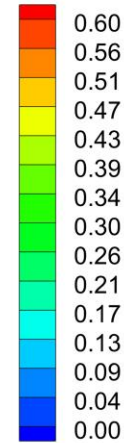


Existing and proposed Hm0

WAVE HEIGHT HM0 M

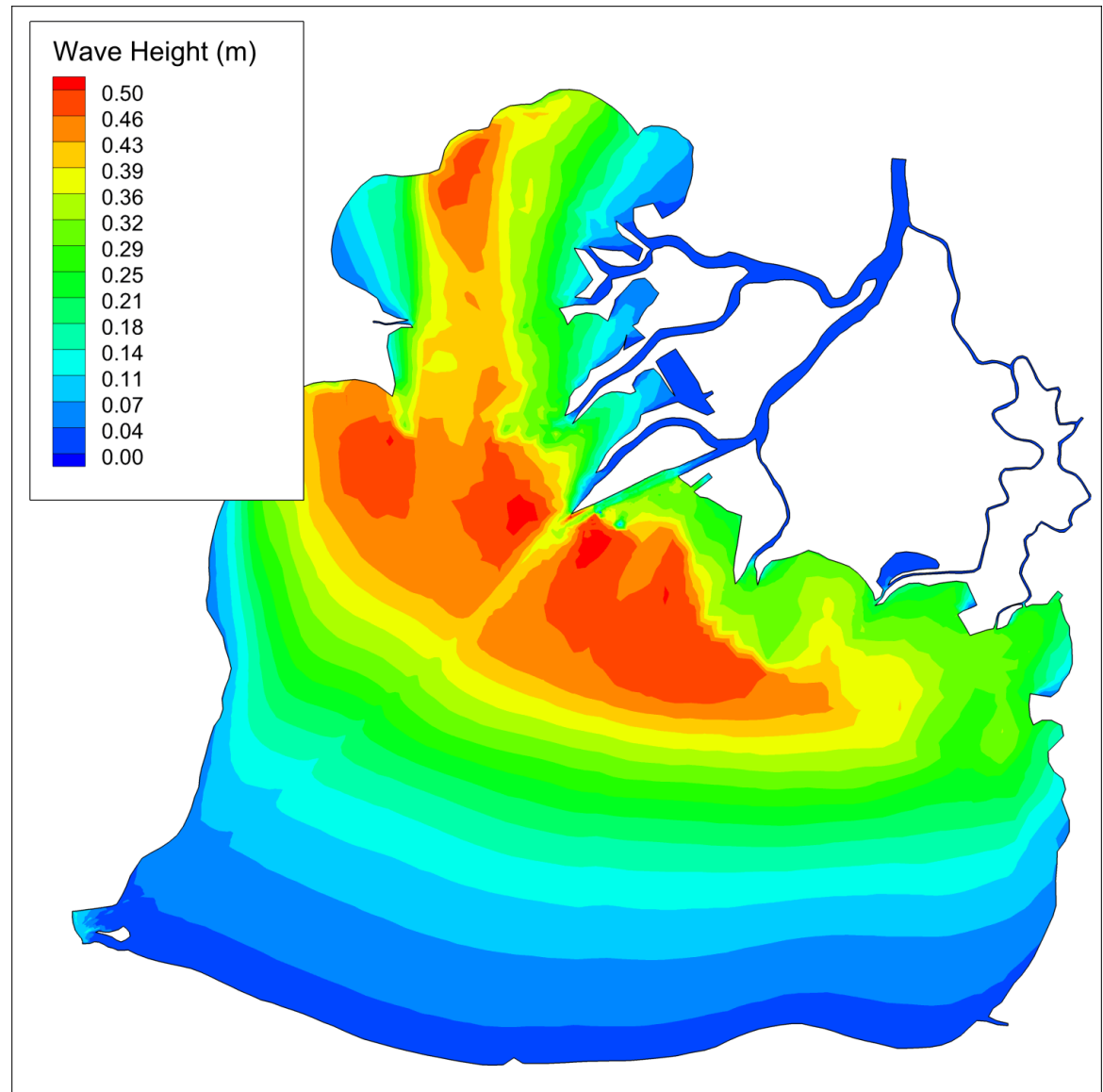


WAVE HEIGHT HM0 M

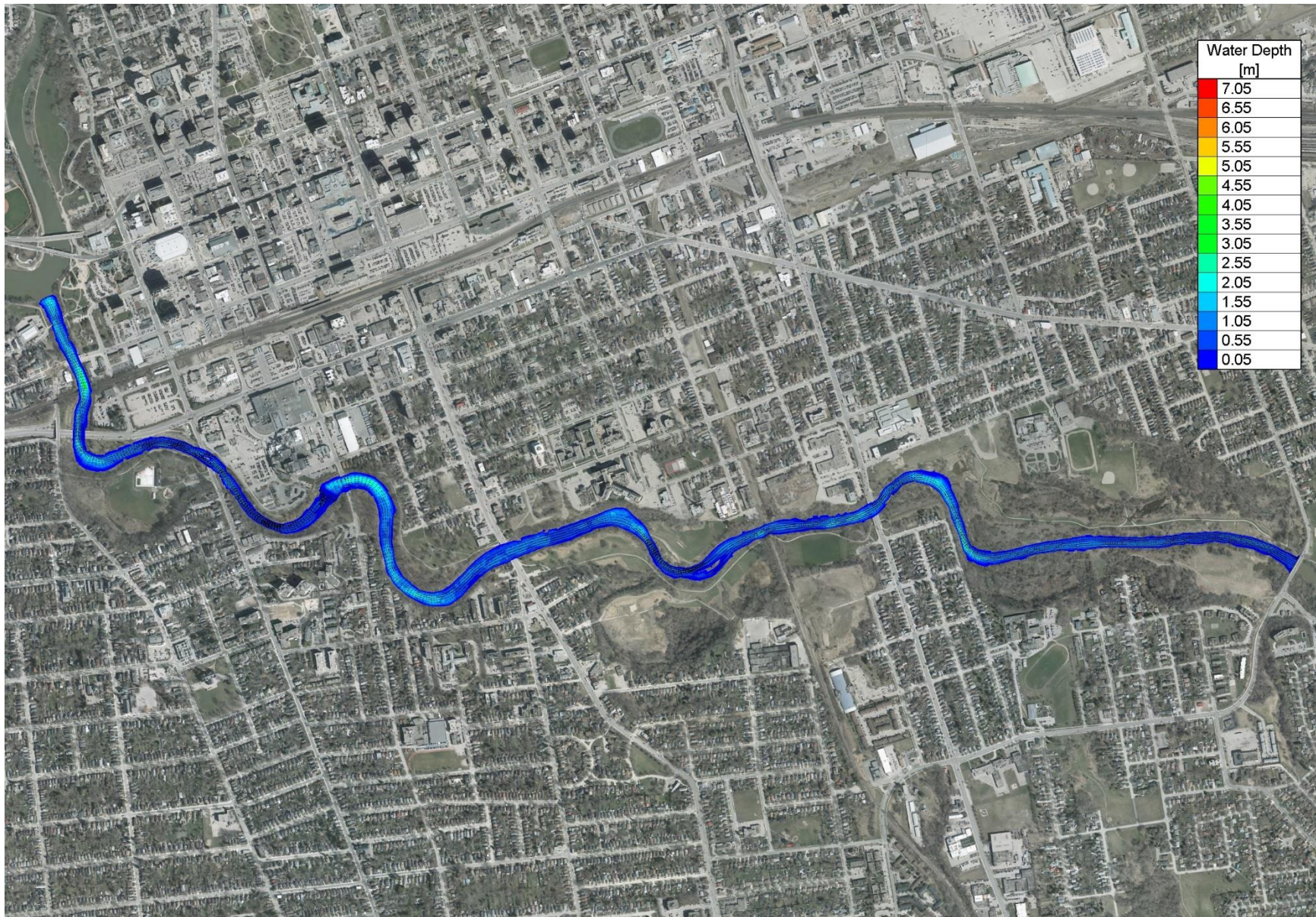


Wave current interaction

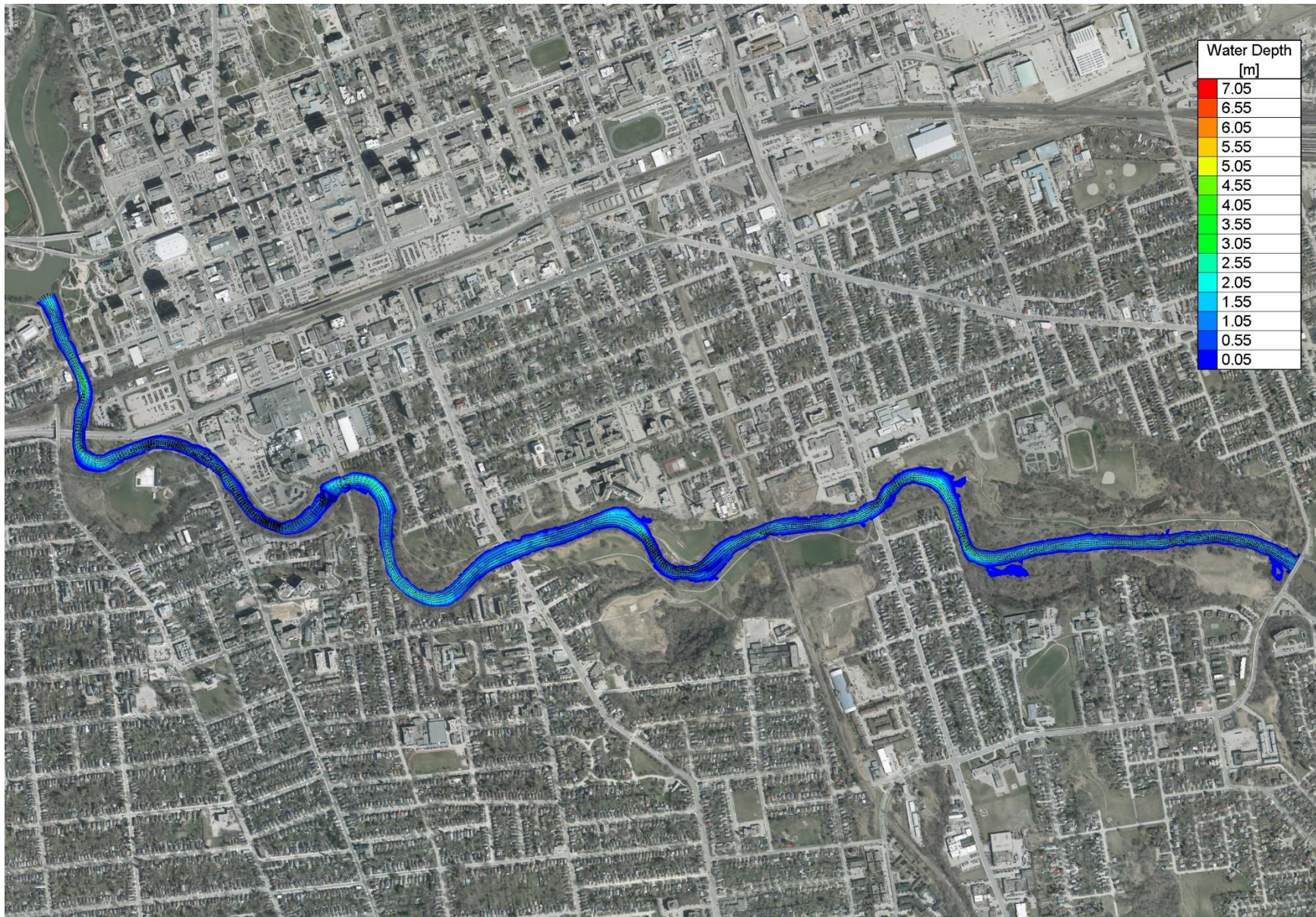
- SW winds
- Refraction of waves by river currents
- Coupled effects necessary to capture relevant processes



t2d model of Thames River



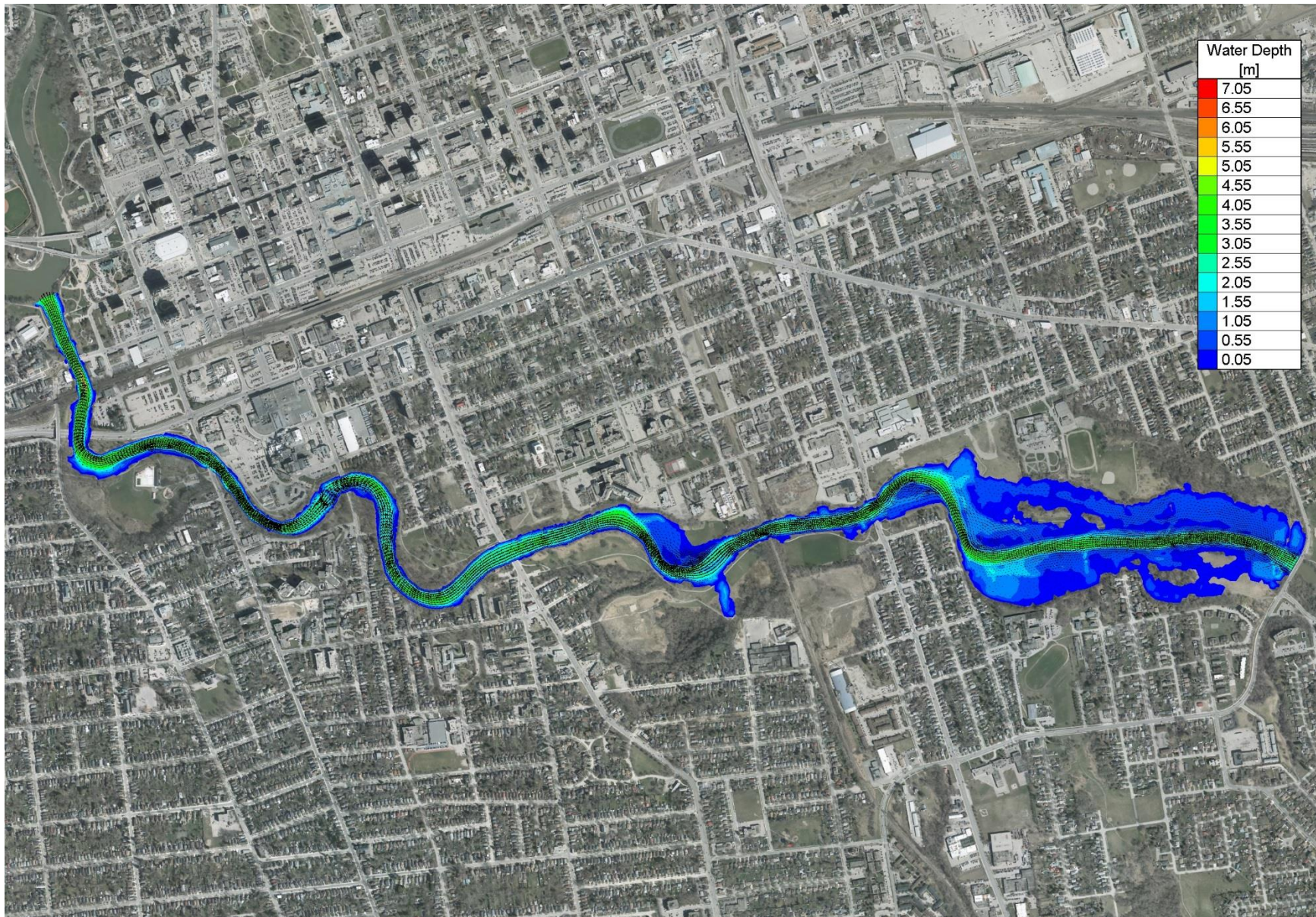
t2d model of Thames River



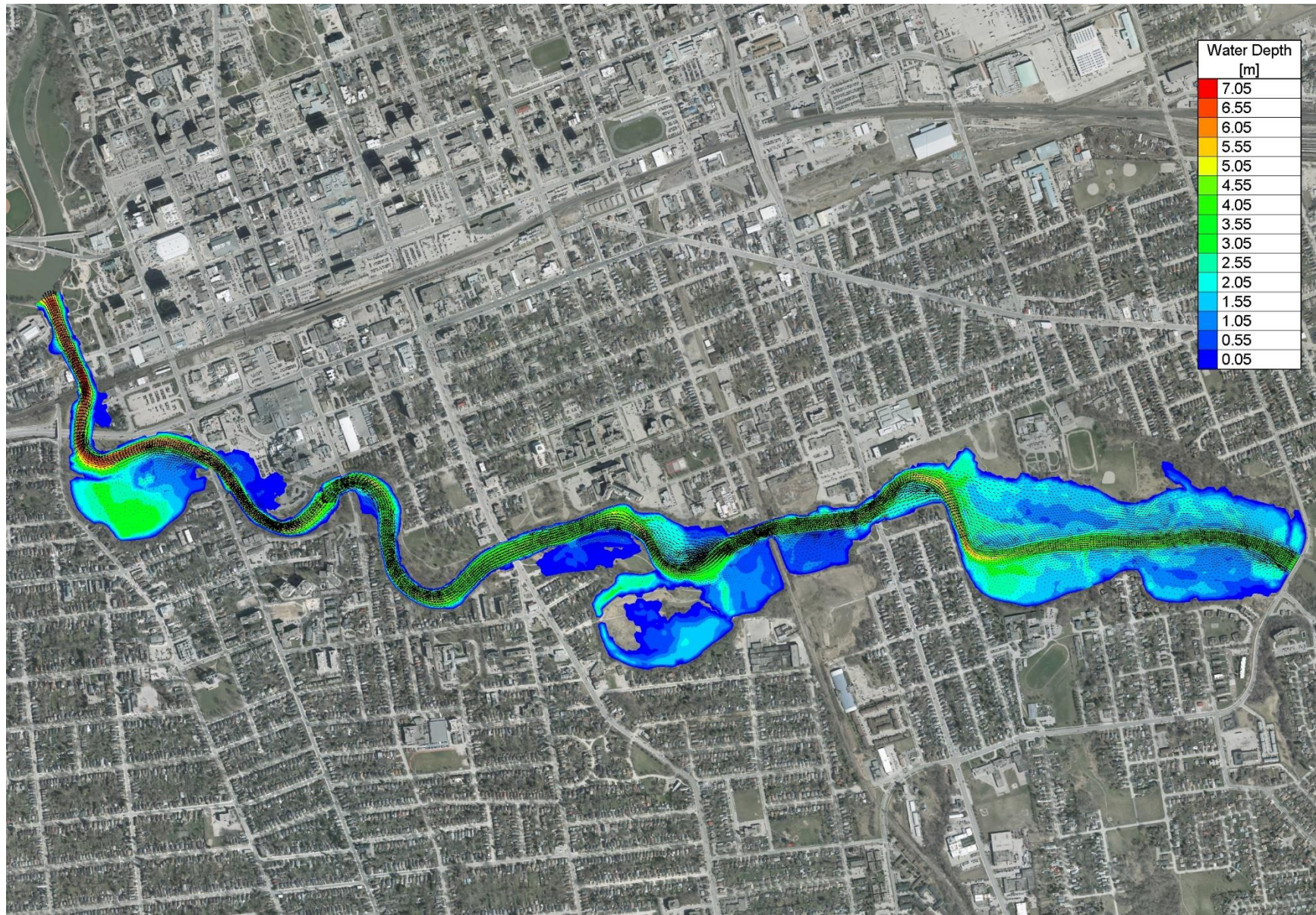
t2d model of Thames River



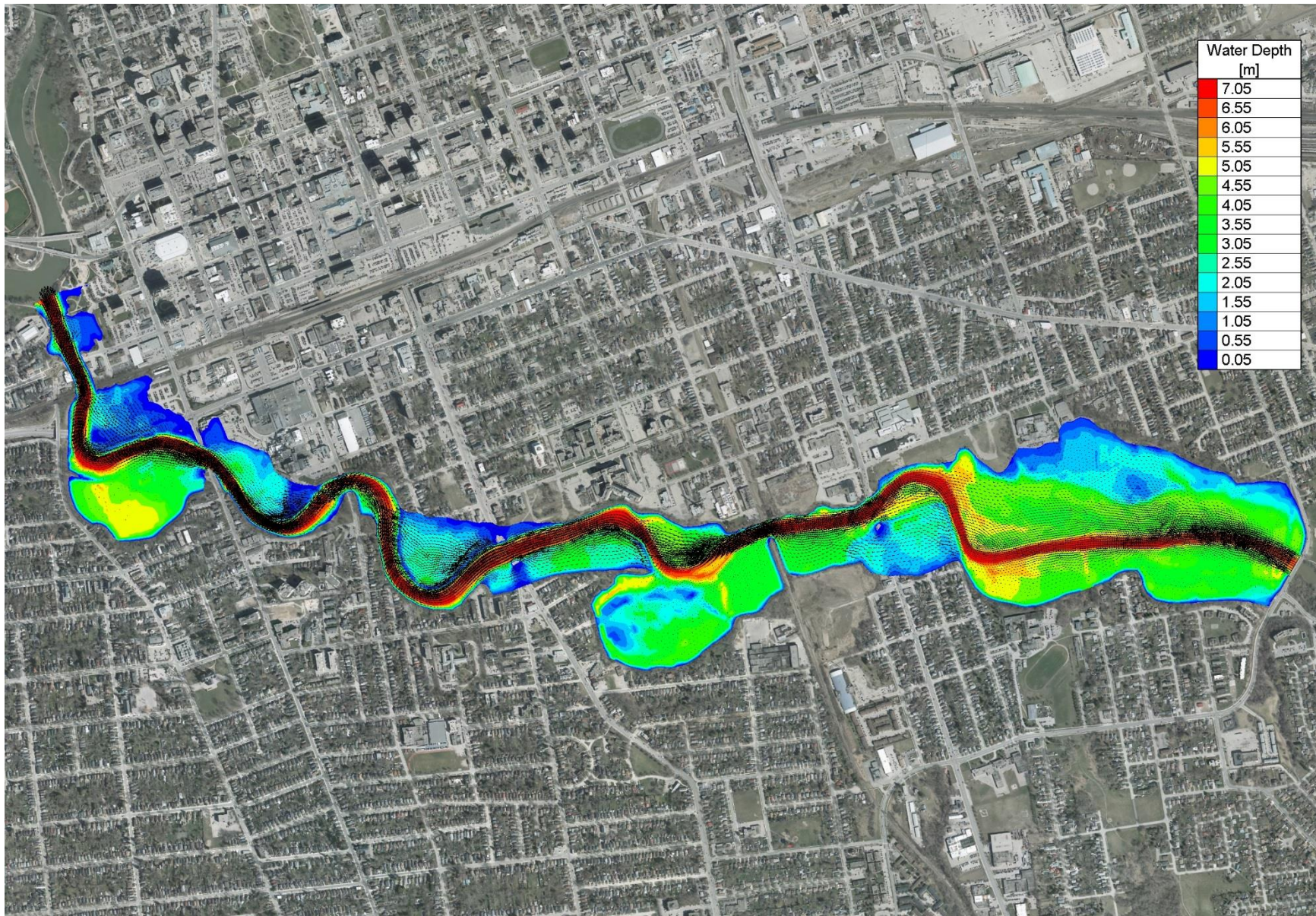
t2d model of Thames River



t2d model of Thames River



t2d model of Thames River



Questions

