



## Port Hope Harbour Remediation Project Dock Wall Installation

CANADA



Port Hope Harbour - Left: Ganaraska River; Centre: Centre Pier (CP) and Approach Channel; Right: Turning Basin (TB) and Cameco Corporation (formerly Eldorado Nuclear Limited)

<b>Owner</b>	Canadian Nuclear Laboratories (CNL)
<b>Engineer</b>	Baird
<b>General contractor</b>	WSP E&I Limited
<b>Dates of work</b>	2021/12 2025/12

### Main figures

CP SSP Wall: (x253) pairs AZ19-700 SSP  
 CP Combination Wall: (x84) 660 mm dia. pipe pile and (x83) pair AZ14-770 SSP  
 TB Combination Wall: (x89) 762 mm dia. pipe pile and (x88) AZ19-700 double SSP "box piles"  
 Temporary Bracing: (x477) 244 mm dia. pipe pile



165 t crane situated on a sectional barge with 98 FT VTL, equipped with 35" dia. drill and 46" dia. cluster bit to install 30" pipe piles and AZ-19 700 double steel sheet piles.

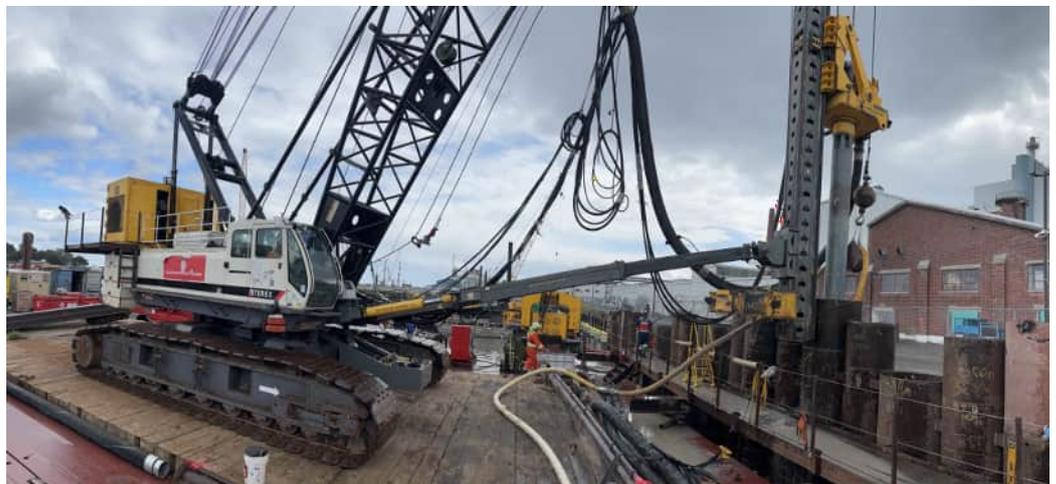
### Description

The Port Hope Harbour Remediation Project is one of many remediation efforts under the Port Hope Area Initiative. Low-level radioactive waste in the Port Hope Harbour is a result of past practices involving the refining of radium and uranium by a former federal Crown Corporation, Eldorado Nuclear Limited. The contaminated sediment at the bottom of the harbour will be dredged and the contaminated waste will be stored at the Long-Term Waste Management Facility in Port Hope. Ahead of dredging, the installation of temporary bracing of existing dock walls, and the installation of new dock walls is required.

Soletanche Bachy Canada's scope of work on the Port Hope Harbour consists of the installation of temporary bracing on existing dock walls, where required, and the installation of new dock walls where the walls are in a state of disrepair. This work will primarily be marine-based. The new dock walls are comprised of steel sheet piles and steel pipe piles between 610 mm and 762 mm in diameter, up to 45 FT long. These piles are installed with the use of vibratory hammers and Berminghammer's B9 diesel impact hammer, BRC-100, and BRC-35 reverse circulation drilling systems mounted on both vertical travel leads (VTL) and hanging leads. These new walls will be further secured with toe-pins and tie-rods. Where wall replacement is not required, pipe pile temporary bracing is to be installed, along with the replacement of existing tie-rods. Soletanche Bachy Canada also proposed, designed, and installed two land trestles - one primarily used for equipment and material loading, and the other to relieve the critical path and accelerate work in the unprotected areas of the harbour.



100 t crane situated on a sectional barge with 70 FT hanging leads for toe-pin drilling and installation.



46" pilot holes (for AZ19-700 double steel sheet piles) being drilled using the BRC-100 and VTL system.



## Port Hope Harbour Remediation Project Dock Wall Installation

CANADA



SBC's HSE coordinator at the Port Hope Harbour Project, Bruce MacKinnon, presented the 2023 CNL Safety Excellence Award.

The presence of low-level radiation on site poses additional risks and challenges to the team on site. All personnel were trained to be well-versed in the protocols associated with working in proximity to low-level radiation. Contaminated drill spoils and harbour water is something the team also has to contend with. Additional PPE is used, and measures are employed to mitigate the contamination of personnel working on the water. This involved ensuring the containment of drill spoils via enclosed moonpools and discharge bins. Careful planning and coordination with the radiation protection team on site is crucial to ensure safe, and efficient work in the field. Through strong collaboration, the SBC safety staff's coaching and mentoring of the field staff, and the team's excellent safety record and overall commitment to safe work practices, SBC was awarded the CNL Safety Excellence Award in 2023.

### Ground conditions

From the geotechnical investigation provided, overburden in the harbour consists of sand, silty sand, gravel, clayey silt, and organic silt. Bedrock is described to be highly weathered limestone containing sandy silt partings, shale, and siltstone interbeds.

Dredging of the harbour bottom occurs concurrently with dock wall installation work, introducing challenges with the absence of overburden. Due to the lack of overburden in the harbour, Soletanche Bachy Canada was unable to employ standalone falsework templates. It also proved difficult to maintain the position of crane barges with spuds during intensive pile driving operations, and high wind events.

Weathered limestone or fractured rock posed significant challenges. Fractured rock resulted in loss of air pressure, and unintended cave-ins in adjacent sockets due to communication during drilling activities. Fractured rock also caused the loss of grout and unintended placement of grout in adjacent sockets due to communication during toe-pin installation.

### Solution

For marine-based pile installation, SBC and Berminghammer designed and fabricated barge-mounted installation templates that were hydraulically operated to ensure the position and alignment of the new dock walls. To ensure the stability of the barge, additional bracing was used on a case-by-case basis.

To combat fractured rock during drilling, SBC made efforts to control the air pressure injected into the system, and carefully monitor the discharge hoses. Drilling and grouting sequencing were also considered to minimize communication between rock sockets. In particularly challenging areas of fractured rock, a grout accelerator (Celbex 653) was employed to great success.

### Sustainable development

One of the new combination walls is to be installed within close proximity of the Ganaraska River, a key route along the migration path of several fish species. An outer harbour work stoppage is in effect during spring and fall to allow for the undisturbed migration of fish up the Ganaraska River. To mitigate sound disturbance to marine wildlife, SBC proposed and employed a dual-line bubbler system for sound attenuation purposes. This allowed outer harbour work to continue during the fish migration season. Similar bubbler systems were used in the winter to agitate the surface of the water to prevent ice build-up in work areas.



Dual-line bubbler system deployed in conjunction with turbidity curtains to mitigate impacts to marine wildlife.



Underwater bubble diffusers (circled above) maintain ice-free conditions for in-water work.