

Memorandum

SHOREPLAN

To: Laurie Wills, P. Eng
Director, Public Works Division
The Corporation of the Town of Cobourg
Public Works Division
740 Division Street, Building #7
Cobourg, ON, K9A 0H6

From: Bridget Lane P. Eng.

Date: September 29, 2021

Re: Harbour Infrastructure Repairs
Fuel Dock Inspection Cobourg Harbour
Our File: 21-3500

Shoreplan Engineering Ltd. has reviewed the condition of the existing fuel dock on the north west side of Cobourg Harbour and prepared this memorandum detailing the findings of the inspection.

On September 17th 2021, Shoreplan, with the assistance of Dundee marine, completed an underwater inspection of the dockwalls on the north west side of the harbour where the fuel dock is currently located. Conditions during the dive were calm and clear, resulting in good visibility. On the day of the inspection the water level was approximately 74.8m IGLD as per the DFO gauge in Cobourg.

General Layout

This section of wall extends in a backwards L shape starting in front of the north corner of the Cobourg Marina building and extending north east for approximately 28m before turning north towards the north harbour seawall to which it eventually connects. The wall is a timber lagging and steel pile system composed of steel H piles with a profile approximately 255mm deep and a flange approximately 258mm wide. Square timber lagging approximately 190 mm high and deep are in place between the piles which are spaced approximately 3m apart. There is a steel cap running along the top of the wall and a timber deck on top of the cap that extends towards shore. The timber lagging has two drain holes per 3m length with filter cloth visible behind the drilled holes. A recent survey indicates that the top of the timber deck along the edge of the water is at elevation 75.8m. There is a fuel pump behind the east facing wall and a pump out behind the south facing wall.

Inspection Findings

During the dive it was noted that the timber lagging extends down to the lakebed along the south facing wall and north end of the east facing wall, however along the east facing wall, adjacent to the fuel pump, there is a gap at the base of the wall. The gap varies but is approximately 300 to 400mm high at its worst and extends towards the north wall with only a small gap, less than 50mm, at the north end. A board from the timber deck just to the north of the pump was lifted and it was noted that the earth fill behind the wall is missing in the area directly behind the wall. It is our opinion that it is being lost through the bottom of the wall where the timbers do not meet the lakebed.

An outlet pipe was noted 5m from the west end of the south facing dock. It consisted of a steel corrugated pipe approximately 1-2mm thick. It was noted that it was almost completely blocked with sediment making it hard to measure. The dive team estimated that this pipe was 1.0m in diameter. Another pipe was located 1.2m to the east. This pipe was concrete, approximately 12mm thick with an inside diameter of approximately 1.0m. It was in good condition, with no noted cracks, only a minimal amount of sediment on the bottom and a small gap around the edge of the pipe where it joins the timbers.

Rehabilitation Options

Repair options were investigated. The potential of replacing the timber lagging in the areas affected was examined, however there is much uncertainty in this option. The existing lagging would need to be removed and the area cleared to allow for new lagging to be installed. The current condition of the H piles and the design of the structure is limited to what could be seen during the inspection. Design drawings were not available and may not exist. The exact size and embedment of the piles is unknown. There was bracing visible at the top of the land side of the piles, however the condition of the buried sections and connection points are unknown. Given these uncertainties, there is a possibility that once the lagging is removed, the system will require further upgrades to achieve structural stability.

Given that there is a sheet pile wall solution for the north and east basin walls being implemented, we suggest a similar solution here. This would involve driving sheet piles in front of the existing timber lagging structure, removing the deck, installing anchors and filling to grade before replacing the deck. We would suggest adding a concrete cap along the water's edge to match the north and east walls. This option would allow for the deck to be raised above design high water level so that it does not flood during high water events. The current deck is below this elevation. A sketch of the proposed work can be seen in Figure 1.

An initial cost estimate has been prepared for this option based on the preliminary design for the north and east basin wall repairs. For the fuel dock wall, which is approximately 74m long, our initial construction estimate is \$560,000. This estimate does not include contingency, design fees or taxes.

Closing Comments

We trust that these comments will assist you in discussions as you develop your plans for the harbour. Should you have any questions or concerns please do not hesitate to contact the undersigned.

Regards,
Shoreplan Engineering Limited

A handwritten signature in black ink, appearing to read 'Bridget Lane'. The signature is fluid and cursive, with the first name 'Bridget' being more prominent than the last name 'Lane'.

Bridget Lane, P. Eng.

Site Photos

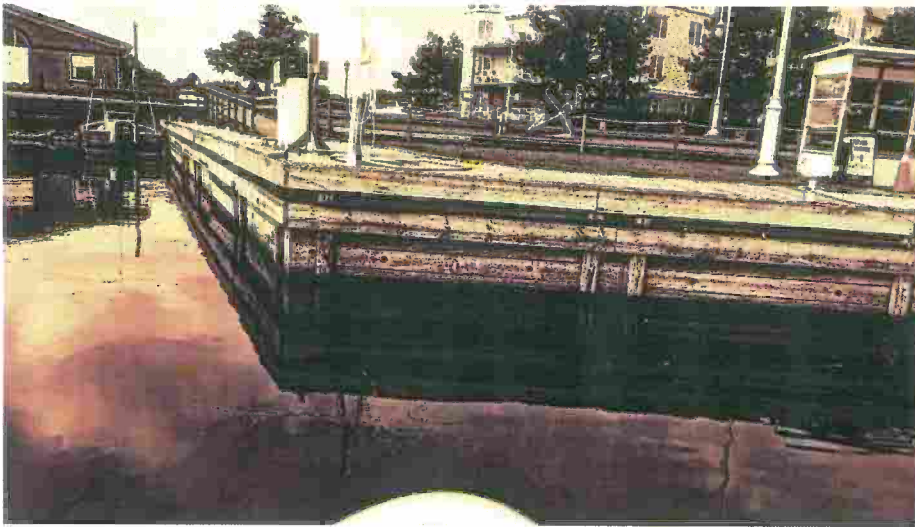


Photo 1 - Fuel Dock



Photo 2 - Gap at Bottom of East Facing Wall



Photo 3 - Board in Deck Lifted