

PROJECT No. 304498:
INVESTIGATION & DESIGN-BRIEF FOR KINGSTON MILLS LOCK No. 46

**OUTLINE SCOPE OF WORK FOR
GEOTECHNICAL INVESTIGATIONS**

Description of Structure and Purpose of Investigation

Lock 46 was originally a stone lock, and both original sandstone and limestone are still extant. Sometime in the early part of the 20th century, an extensive repair programme was undertaken at this lock and others. These repairs involve the use of un-reinforced concrete blocks sized the same as the original stones and laid like stones. These concrete blocks have been spalling at this and other sites for a number of years. Investigations of similar conditions at Jones Falls locks indicate the problems are mostly at the surface of the blocks, but that deeper than 6 to 8 inches the blocks are not too bad. We want to confirm this is also the case at Lock 46. We want to be able to prioritize repairs to this lock versus to other structures on the Rideau Canal. We want to see if water is leaking under the sills. To this end, we require a geotechnical investigation as follows.

Borehole Locations and Depth

BH No.	Location Description (also see Sketch & Photos)	Depth of Borehole
BH1	In first concrete block above the sluice exit (opening).	5 feet
BH2	About 1 foot to 18 inches above sill, about 2 feet back from the gate quoin.	5 feet
BH3	2/3 or more of the way down from summer waterline, pick a spot where concrete blocks are badly spalled	5 feet
BH4	Second concrete block down from repaired coping.	5 feet
BH5	In gate pocket, between 1/2 and 2/3 of the way down from summer waterline, pick an area where the concrete blocks are badly spalled	3 feet
BH6	In gate pocket, between 1/2 and 2/3 of the way down from summer waterline, pick an area where the concrete blocks are badly spalled	3 feet
BH7	Vertically down through sill, about the middle of the sill, about 1 foot into bedrock. Note: we expect bedrock to be right under the sill. If this is not the case, use a portion of the vertical drilling allowance to reach and confirm condition of bedrock.	estimated 8 feet
BH8	At or below summer waterline, pick a spot where concrete blocks are badly spalled	3 feet
BH9	Through badly spalled area below repaired concrete	5 feet
BH10	Through spalled area below repaired coping	3 feet
BH11	Through spalled sandstone 5 th row down from summer high water line and just upstream of access ladder near pillaster.	2 feet
Optional Vertical Drilling	An allowance for additional drilling if at the time of drilling it seems that problems warrant the additional work.	Up to 35 feet

Optional Horizontal Drilling	An allowance for additional drilling if at the time of drilling it seems that problems warrant the additional work.	Up to 15 feet
------------------------------	---	---------------

Please price the optional vertical and horizontal holes separately from the identified boreholes 1 through 11. Note that the optional work may or may not take place.

Assumption

Bedrock is located at the lock bottom.

Making Good

Fill all bore holes with non-shrink grout.

Laboratory Tests

1. Compressive strength - three tests. Take samples from boreholes 4, 7, and 9.
2. Alkali Aggregate Reactivity - two tests. Take samples from boreholes 11 and 7.

NOTE: Petrographic analysis is not required.

Report

Logs of all boreholes.

Rock quality numbers for recovered cores.

Colour pictures of all recovered cores (on CD-ROM would be ideal, but prints are also acceptable).

Make particular observations regarding the bond between the sill and bedrock from BH 7.

Figures Attached to this Terms of Reference

Reduced Scope Borehole Plan.bmp
 BH 1 & 2 - Upper Left Monolith.jpg
 BH 3 & 4 - Upper Right.jpg
 BH 5 & 11 - Lower Right.jpg
 BH 6 - Lower Left Gate Recess.jpg
 BH 7 - Lower Sill.jpg
 BH 8 & 9 - Lower Left Wing Wall.jpg
 BH 10 - Lower Right Wing Wall.jpg
 Rideau Lock Anatomy.jpg

Prepared by:

Kathleen Murphy, P. Eng.

December 15, 2004