



Environmental

Geotechnical

Building Sciences

Construction
Monitoring

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Locations

Peterborough
Kingston
Barrie
Oshawa

Laboratory

Peterborough



August 7, 2019

Township of Bonnechere Valley
49 Bonnechere Street East
Eganville, ON K0J 1T0

Attn: Bryan Martin, CAO

**Re: Boardwalk Construction Peer Review
Bonnechere River, Eganville, ON
Cambium Reference Number: 9394-001**

Dear Mr. Martin,

Cambium Inc. (Cambium) is pleased to provide the Township of Bonnechere Valley (Client) this letter regarding the requested peer review of the boardwalk and fishing dock being installed in Eganville, Ontario (Site). This assessment was required by the Client to verify design acceptability and any required design modifications due to events which have occurred during construction.

METHODOLOGY

Cambium completed a desktop study to assess all provided documentation in relation to the design and current phase of construction; specifically, a review of the Client provided design plans and photos. It is noted that two important items that documentation did not show were a geotechnical report for design and no grading plan for parking lot water drainage changes.

Cambium representatives attended the site on July 18, 2019 to complete a site investigation. This comprised a visual inspection of the constructed structures, including the installed helical piles, the native and engineered material present surrounding the installed structures, and adjacent land forms and structures.

FINDINGS

Upon visual inspection, it was observed that the installed helical piles met bedrock refusal at depths less than 1.2 m below the river bed; such depths are not adequate in providing the lateral support needed for the structure. It is



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understood that stone was placed around the helical piles in two separate attempts to compensate for the shallow bedrock depths. The area was first partially filled by 6 inch minus crushed limestone on native materials at an unknown depth. The 6 inch minus was covered by a geotextile, and overlain by a 6 to 12 inch round river stone fill. These stones proved too small, as they were washed away and the geotextile uplifted during the high flows in spring. Larger stones were then placed by the municipality; however, they are too large and allow for void space which compromises the lateral support of the helical piles. At the time of the site visit the piles at each location could be deflected horizontally by hand of spans up to 1 foot. The soil composition and stratigraphy of the river bank above bedrock were not observed and remain unknown. At the time of inspection, the water runoff from the parking lot naturally entered the river; however, the proposed design will disrupt this, causing drainage issues.

DISCUSSION AND RECOMMENDATIONS

Based on the aforementioned findings, it can be concluded that the existing state of the helical piles is not competent to support the proposed boardwalk. The placement of stone between the helical piles is not an adequate solution to provide the lateral support required for the piles; and the stone placement would also limit the potential for boat access. Cambium recommends that the existing piles be removed, as they will not be capable of providing a competent foundation for the proposed boardwalk. In addition, all the 6 inch minus and round river stone fill should also be removed as heavy flows in the spring will ultimately move that material downstream to the hydro power plant. Some of the larger round river stone could be left in place, but that could impact options for future development.

With the removal of the helical piles, it is recommended that the alternative design for the boardwalk include one of the following foundations:

- i. Gabion Baskets filled with large crushed stone
- ii. Concrete foundations
- iii. Steel piles socketed into the bedrock





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CLOSING

We trust that the information contained herein meets your needs at this time. If you have any questions or require clarification of any aspect of this submission, please do not hesitate to contact the undersigned at (705) 742-7900, extension 332.

Best regards,

CAMBIUM INC.

Bob Payne,
Senior Construction Specialist

Stuart Baird, M.Eng., P.Eng.
General Manager - Geotechnical

P:\9300 to 9399\9394-001 Township of Bonnechere Valley - Boardwalk Construction - Peer Review\Deliverables\Letter Reports\2019-07-30 LTR Boardwalk Review



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Photo 1: Boardwalk Helical piles installed in river bank only facing North

Photo 2: Boardwalk Helical piles installed in river bank only facing South





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Photo 3: River stone with geo-cloth added by Township to stabilize washout of 6" minus limestone placed during construction

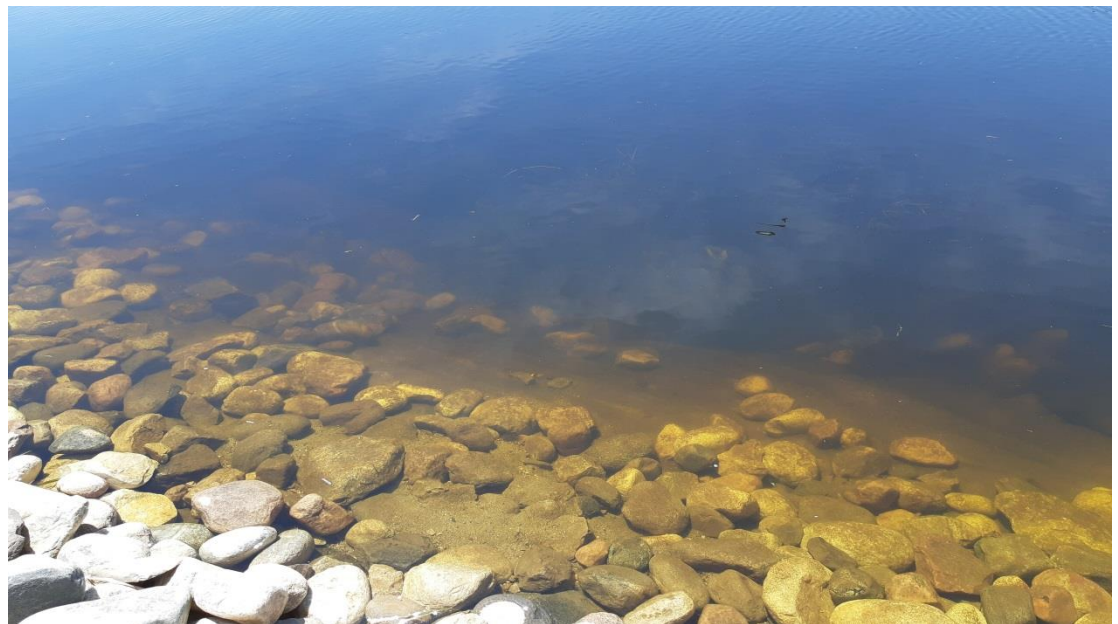


Photo 4: Steep slope embankment into river, materials placed are not stable





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Photo 5: Boat launch helical piles



Photo 6: Boat launch helical piles

