



TECHNICAL FIELD REPORT

Regional District of Nanaimo, Recreation & Parks
830 West Island Highway
Parksville, BC
V9P 2X4

File: F3740.01
Date: September 7, 2016

ATTENTION: Mr. Mark Dobbs

PROJECT: LQR REGIONAL PARK – LITTLE QUALICUM RIVER BRIDGE,
QUALICUM, BC

SUBJECT: GEOTECHNICAL SITE OBSERVATIONS – BRIDGE
FOUNDATION ASSESSMENT

1. As requested, Lewkowich Engineering Associates Ltd. (LEA) observed the bearing conditions of the bridge foundations on August 19th, 2016, at the above noted project. This report is based on visual assessments and hand probing on site. The following is a brief summary of the observations made during the site visit and recommendations for the foundation improvements.
2. The site is located to northwest of Qualicum Beach and crosses the Little Qualicum River. The bridge currently has gated access through Corcan Road, and Melrose Road. The structure consists of two spans supported by concrete abutments on the east and west river banks, as well as a support pier within the river on the west side. We understand the remediated bridge will be used primarily for pedestrian, cyclist, service vehicle, and light emergency vehicle traffic.
3. Multiple areas of erosion and scouring were revealed during the site visit. The pier wall (4.6m long by 1.54m wide) was undermined approximately 0.2m deep and 0.6m horizontally from the east face beneath the downstream side of the pier. The upstream side of the pier was undermined 0.6m deep and 1.4m horizontally. The pier was bearing on a moist, grey, compact, medium to coarse grained sand with some gravel.
4. Scouring was also observed beneath the abutment on the east bank. This abutment appeared to be founded on unformed, concrete that was discharged onto underlying boulders. The concrete covered an area that extended approximately 2.0m north of the abutment to 7.3m south of the abutment, with a width of 2.5m west from the face of the abutment. Scour depths below the

concreted boulders ranged from approximately 0.1m to 0.4m. (See pictures below.)



Figure 1: Pier Wall

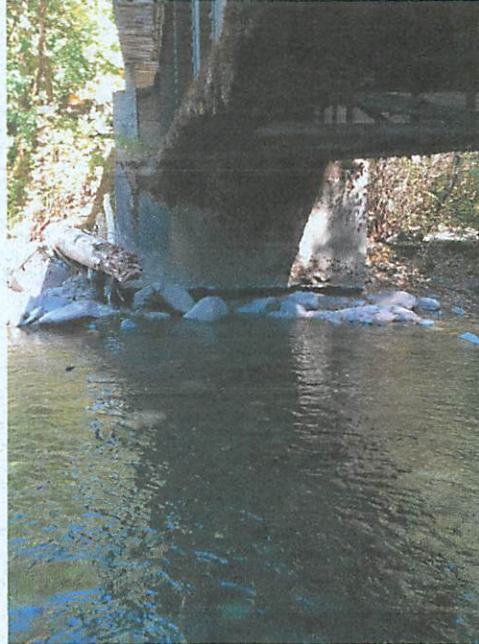


Figure 2: Pier Wall - East View

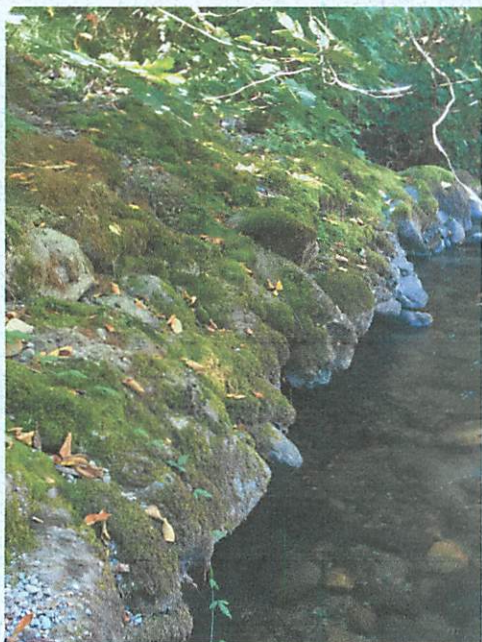


Figure 3: Concrete Covered Boulders Surrounding East Abutment

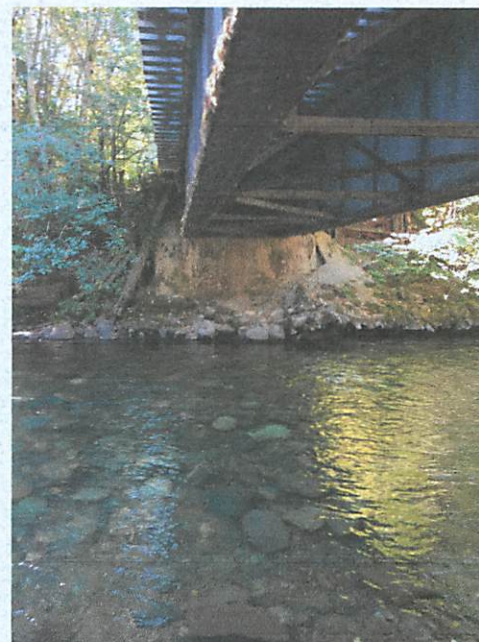


Figure 4: East Abutment

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5. The west abutment appeared to be founded on dense, brown, moist to damp, gravelly sand, with some cobbles, and trace to some silt. No scouring was observed beneath the west abutment.
6. Our preliminary estimate of design scour depth below the base of the pier is approximately 1.5m. This depth was approximated using methods outlined in *Method for Rapid Estimation of Scour at Highway Bridges Based on Limited Site Data* (Holnbeck & Parrett, 1997). Discharge and flow depth data was interpolated from hydrometric data recorded at station 08HB029, on the Little Qualicum River. Any foundation subject to scouring should be protected with adequately sized rip rap.
7. Foundation loads should be supported on a subgrade approved for use as a bearing stratum by our office. Non cohesive soils classified as dense or very dense sand or gravel may be assigned a Service Limit State (SLS) bearing capacity of 150kPa and an Ultimate Limit State (ULS) bearing capacity of 200kPa. This soil should be free of organics and consist of undisturbed native soil, as identified by a qualified geotechnical engineer.
8. Lewkowich Engineering Associates Ltd. appreciates the opportunity to be of service on this project. If you have any comments, or if we can be of further assistance, please contact us at your convenience.

Respectfully Yours,
Lewkowich Engineering Associates Ltd.

A handwritten signature in blue ink, appearing to read 'Sean Sanger', written over a light blue grid background.

Sean Sanger, EIT



Johannes Fischer, P.Eng