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VIA EMAIL

TO: Aurele Gorneau, II, Maine Dept. of Transportation (MaineDOT)
Craig Sams, P.E., Childs Engineering Corp. (Childs)

CC: Jeff Tweedie, P.E., MaineDOT
Kitty Breskin, P.E., MaineDOT

FROM: Isabel V. (Be) Schonewald, P.E., Schonewald Engineering Associates, Inc. (SchonewaldEA)

DATE: February 3, 2014

PROJECT: 14-005

RE: Summary of Telephone Discussion
Subsurface Conditions
Eastport Breakwater 2013 Drilling Program
MaineDOT WIN 18436.00

At your request, I have prepared this memorandum to summarize the input that I provided during a conference call on Friday, January 31, 2014 regarding the subsurface conditions encountered during the 2013 Eastport breakwater geotechnical drilling program. Participants in the conference call included representatives of MaineDOT, Childs, PND Engineers, Inc. (PND), and SchonewaldEA. The discussion focused on specific comments that PND enumerated in an email to Childs that was dated January 28, 2014. I understand that PND is working with Childs to evaluate the use of spin fin™ piles for the breakwater replacement.

By way of background, SchonewaldEA retained Maine Test Borings to complete the 2013 drilling program. Be Schonewald coordinated, oversaw, and logged the subsurface explorations on a full-time basis. Borings were advanced using a barge-mounted standard exploration-type drill rig in an area noted for deep water, strong currents, and extreme tides, all of which can result in decreased efficiency of the drilling operation. I further note that SchonewaldEA did not author the report that is referred to in the PND comments.

PND Comment #1: "*Blow counts depicted on the logs and profile would indicate that we should be able to drive piles/SPIN FIN piles, however the text describes conditions that would indicated either the drill bit or driving casing resulted in refusal in boreholes 101, 103, 106, and 110. The report goes on to state that split spoon refusal occurred in some locations (102, 103, and 104) and that hard driving was found in borehole 105, 106, 107, 108, 109, and 110 (yet blow counts on the borehole are low enough we should be able to drive piles).*"

SchonewaldEA's input: In regards to drill casing or drill bit refusal, 2013 borings 101 and 110 were located in close proximity to the shoreline where bedrock is exposed. We understand that piles are not proposed in these locations. In 2013 boring 103, casing refusal was the result of a cobble being wedged inside of the HW (4-inch diameter) drill casing. In 2013 boring 106, boney material was noted below 45 ft. below ground surface (mudline) (BGS) and difficult drilling noted below 50 ft. BGS. Field notes do not suggest that nested cobbles and boulders were encountered. I believe the material likely consists of a relatively compacted sandy gravel glacial outwash.

Split-spoon refusals in 2013 borings 102, 103, and 104 were in close proximity to the top of bedrock; likely at or slightly into the weathered rock zone.

It is noted that in the interest of time, most of the deeper-water borings (2013 borings 104 through 109) were advanced by driving casing as deep as practicable (until the casing blow counts became excessive) before washing out the casing and sampling since it was time consuming to switch downhole tooling, particularly around high tide. As such, casing blow counts tend to increase near the bottom of each driving run. Although some of the casing blow counts are high, they do not necessarily indicate severe subsurface conditions.

PND Comment #2: "*The report does not indicate what size boulders were encountered*. ,,,"

SchonewaldEA's input: With the exception of the overburden soil encountered immediately above bedrock in a few of the 2013 borings, drilling behavior did not suggest that nested cobbles and boulders were typically present.

PND Comment #3A: "*A conglomerate layer is found directly above bedrock, as described and depicted in the profile,* ,,,"

SchonewaldEA's input: It is noted that a thin layer of weathered conglomerate rock was encountered only in 2013 borings 106 and 107. We note a significant exposure (ridge) of conglomerate rock on shore that runs from near the waterfront westerly past the Eastport schools towards the top of the hill.

PND Comment #3B: "*The profile borehole blow counts depict conditions that would indicate for the most part we should be able to install either pipe piles or SPIN FIN piles -- however it should also be noted one of these holes revealed fairly high blow counts (blow counts of 49 and 81).* ,,,"

SchonewaldEA's input: SPT N-values typically ranged from loose to (medium) dense. I concur that there were some higher N-values recorded as part of the Standard Penetration Tests performed. Specifically, outliers are noted in 2013 boring 104 at 40 to 42 ft. BGS where it is noted that a piece of gravel was pushed and in 105 at 45 to 47 ft. BGS where it is noted that the material was marginally cemented and there were pieces of basalt in the tip of the spoon. However, none of the SPT N-values were so high as to suggest refusal in the overburden materials.