ANNEX 1 – FROST PROTECTION FOR FOOTINGS

East Ramp Restoration, Bldg 88

"See attached Memo from Paterson Group, dated November 5, 2013, for Frost Protection requirements for footings. All new footings require additional frost protection as described. The insulation type will be confirmed when bearing conditions are verified at time of excavation. For pricing assume HI-60 or Foamular 600 rigid insulation is required under footings and SM will be used for the extensions beyond the footing."

Memorandum prepared by Patterson Group Inc., November 5, 2013.

As requested, we have reviewed the frost protection requirements for the retaining wall footings to be constructed at the east entrance to Building 88. Based on the structural drawings, it would appear that the soil cover from finished ground surface to the underside of footing is of the order of 1.2 m. It is anticipated that the new footings will be constructed at approximately the same level as the underside of the existing barn foundation. It is our understanding that the shallow basement in the barn is heated.

For such foundations not exposed to heat on either side, it is typically recommended that a soil cover of at least 1.2m (or the equivalent combination of soil cover and rigid insulation) be provided. To supplement the 1.2 m of soil cover, it is recommended that the footing be constructed on 50mm thick rigid insulation. The insulation should extend at least 0.9 m past each edge of footing. In this "unheated" case, the bearing resistance or allowable bearing pressure available for footing design will be controlled by both soil conditions and the strength of insulation chosen. For example, HI-60 or Foamular 600 rigid insulation can be used for an allowable bearing pressure or bearing resistance at Serviceability Limit States (SLS) of up to 140 kPa, while HI-40 or Foamular 400 can be used for an allowable bearing pressure or bearing resistance at SLS of up to 90 kPa. SM or equivalent insulation can be used for horizontal extensions.

It should be noted that these recommendations are given based on assumed conditions and are required to be confirmed by review of conditions at the time of construction.