

LANSING POINT CONDOMINIUMS PARKING LOT GEOTECHNICAL

Because of frost heave, AM2 Geotechnical Inc. was retained by Condo Corp. 124 to conduct a geotechnical evaluation of the parking areas at the Lansing Point Condominiums. This fact sheet summarizes the results of the investigation and recommendations for Lansing Point residents.

1. Approximately 0.9 m of non-frost susceptible (NFS) granular soils are beneath the asphalt of the parking areas overlying native soils.
 - Native soils are frost susceptible on the western side of the lot and NFS on the eastern side, with the transition point between the buildings leading to most of the pavement distress observed being in the northwest corner of the lot.
 - Typical recommendations in Whitehorse recommend 1.7 m of NFS soil below asphalt and concrete to resist frost heave, and less NFS structure increases the risk of frost heave.
2. The granular backfill is saturated, where frost susceptible native soils are present.
 - The moisture conditions lead to frost heave during the winter months.
 - Surface water management using rock pits is providing additional groundwater input. However, the regional groundwater elevations have increased in the last few years.
 - There are no cost-effective means of cutting off groundwater flow into the lot.
 - Groundwater input from the highway right-of-way has some contribution to free moisture available to cause frost heave, but these conditions exist in the spring as the ground begins thawing and are not the primary cause of heave.
 - Highways and Public Works have committed to removing snow from the right of way each spring to mitigate surface water.
3. The frost heave cannot be mitigated without removing the asphalt and subexcavating all frost susceptible soils to 1.7 m below the ground surface or removing the asphalt and installing rigid board insulation 300 mm below the ground surface.
 - The area requiring subexcavation is primarily the parking area north of Building B, where evidence of frost heave in the form of cracks is evident. Areas without pavement cracking have sufficient NFS structure beneath them to resist frost heave.
4. Due to past frost heave issues with Building B and ongoing issues with parking areas, removing the rock pits and draining all surface runoff into City of Whitehorse storm infrastructure is recommended.
 - In the interim, the catch basins should be pumped out as needed to drain groundwater from the lot and not allow additional groundwater input from surface runoff.
 - Cracks in the pavement should also be sealed to reduce surface water penetration into the subsurface.
 - The catch basins could remain in the ground and sealed to prevent water from infiltrating the subsurface, and then piping ran between them and out to the street to tie into the City storm line.

5. The condo corp and owners could consider the “do nothing” option because the pavement appears to be in adequate condition for vehicle traffic, with little evidence of localized settlement from vehicle loads.
 - If the current negative effects of the frost heave are acceptable, conducting the recommended repairs could wait until pavement conditions are severe enough to warrant replacement.
 - The pavement structure lifespan is shortened, but the serviceability is contingent on the progression of frost heave and how it affects the asphalt and underlying granular structure. The current conditions could persist for years before worsening to the point of requiring asphalt replacement.
 - The asphalt should not be replaced without addressing the underlying conditions causing frost heave.