

## Over-Excavation of Foundations

Shallow footing foundations be installed in over-excavated areas and backfilled with non-frost susceptible (NFS) gravel pads over permafrost. Slab-on-grade foundations can also be installed in over-excavated areas and backfilled with NFS gravel pads, provided insulation and cooling methods are implemented to protect the permafrost. The labor and material costs of excavating and backfilling tend to be higher than other methods. Additionally, the increased disturbance of the subsurface thermal regime due to excavation increases the risk of permafrost degradation during and after construction. For pile foundations, height adjustment mechanisms can be integrated into the foundation to account for differential settling of the piles. Shallow footing foundations on over-excavated building sites depend primarily on the end bearing of the footing on the permafrost to support the load, thus the size and depth of the footing bearing surface depend on the building loads and the permafrost temperature.

For foundations in subarctic regions, soil may be excavated above the permafrost table rather than to or below the permafrost table. In this case, the footings need to be sized to account for weaker subsurface soils that may be caused by degrading permafrost.





