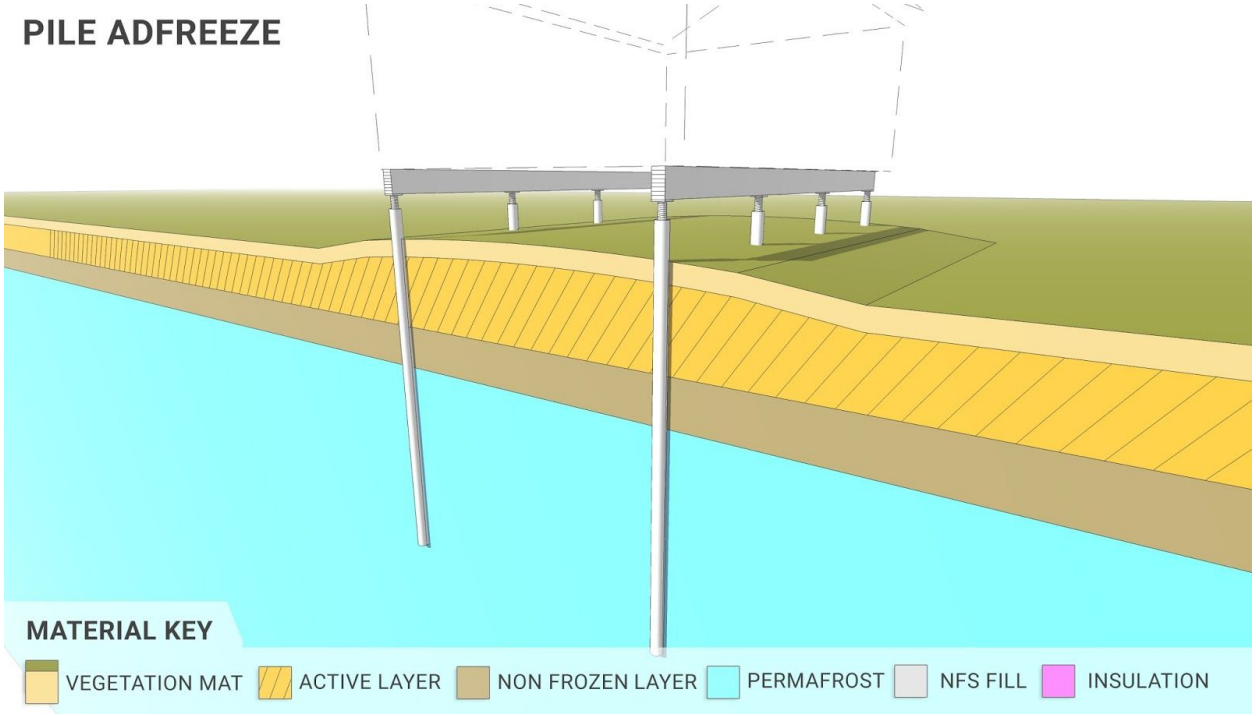
Elevated Foundations

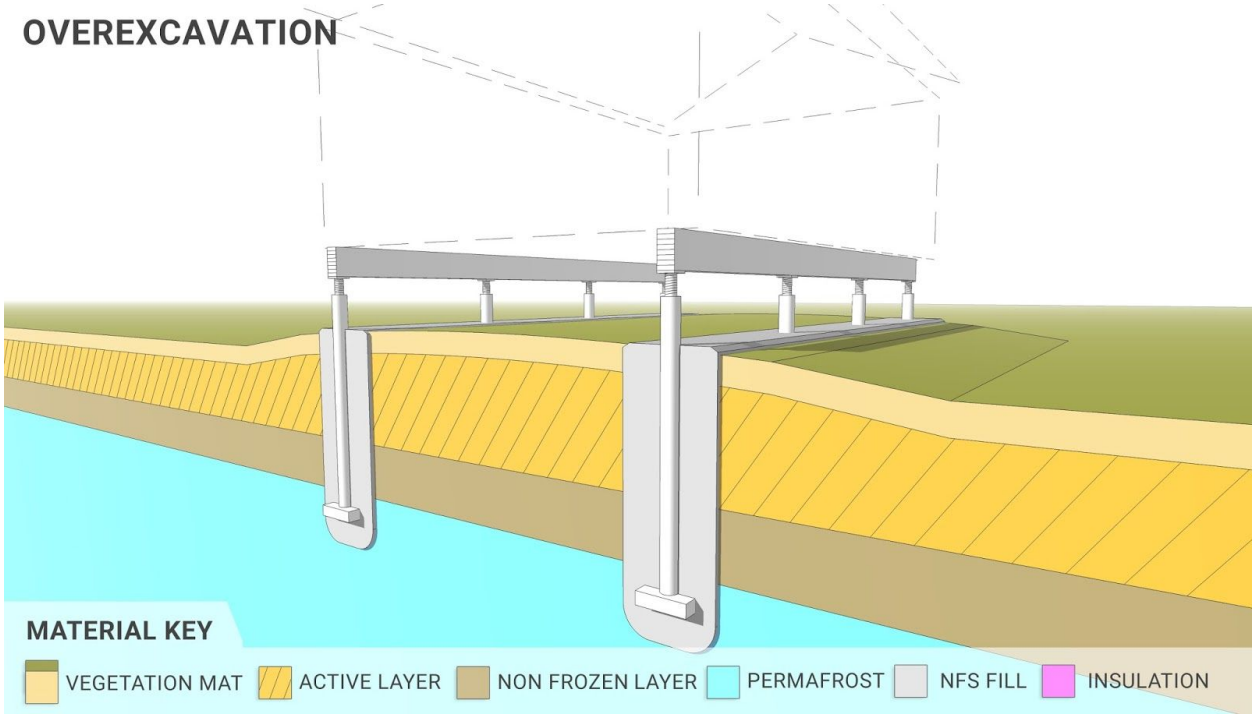
Elevated foundations are designed to keep the foundation subsurface frozen by two methods: protecting the footprint from snow and shading the footprint from the sun. During the winter, the snow cover on the ground acts as a thermal blanket and retains subsurface ground heat. By using the structure itself to protect the ground from snow accumulation directly under the building footprint, the ground surface is exposed to the arctic and subarctic cold air temperatures, thus cooling the subsurface. During snow-free seasons, the structure acts to shade the footprint from the warming effects of the sun, and aids in cooling the subsurface.

Types of elevated foundations can include adfreeze piles, end-bearing piles, and elevated shallow foundations with ventilation. Each of these foundation types require the underlying supporting/bearing layers to remain permanently frozen. This design decouples the heat of the building envelope from the ground. This design is one of the most widely employed, effective, and economical means of maintaining a stable thermal regime. For pile foundations, height adjustment mechanisms can be integrated into the foundation to account for differential settling of the piles. For buildings that rely on crawlspace ventilation to maintain cold ground temperatures, the bottom floor of the structure should be well-insulated and airtight in structures with an air break beneath the floor because cold floors may lead occupants to close up the airspace and risk heating the ground. If snow blocks the airspace, it also blocks the ventilation. Therefore, the airspace must be tall enough to allow for draft even with the amount of snow expected in that location.

PILE ADFREEZE



OVEREXCAVATION



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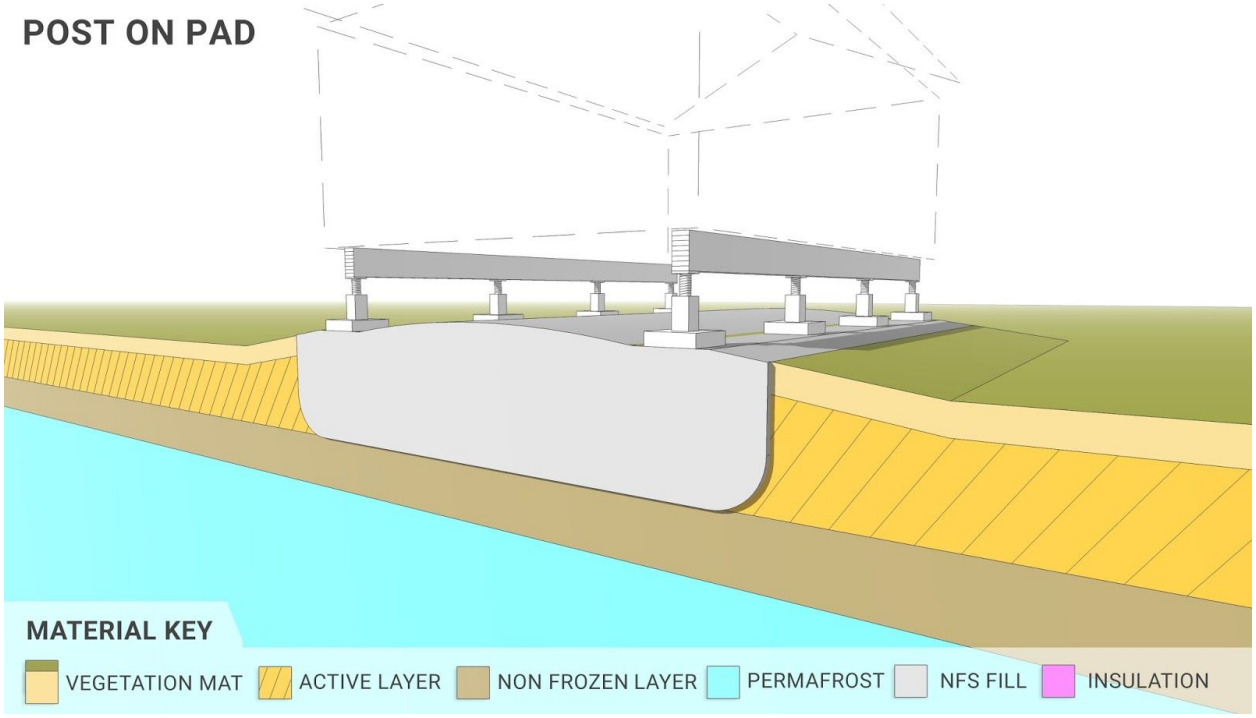

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