

LESSONS LEARNED ABOUT DIGGING DEEP

Deep subexcavation is

widely used in the Denver area to reduce the risk of poor foundation and concrete flatwork performance caused by expansive soil and bedrock. My impression from speaking with builders is that performance of foundations and basement floors on "subex" sites has been predominantly good, with a few exceptions. We have learned a few lessons from the problematic sites:

➤ **The excavation bottom should** extend at least 5 feet outside the largest potential building footprint. The bottom of the subexcavated area should be surveyed and the building footprint compared with the survey. Be careful with lots where setback requirements push the house back (such as cul-de-sac lots). If new models are considered, check the excavation survey.

➤ **It is very important to break** down clay stone bedrock and clay soils during the fill processing so that water can penetrate the fill particles. Materials should be 3 inches or smaller in size, and mixed thoroughly with water.

➤ **Subexcavation works best on** large-scale grading projects. Some single lots have been subexcavated. A front-end loader is often used to excavate, process and compact the material. It is difficult to compact the fill along the edges and in corners of the excavation. A higher frequency of problems has been reported for such projects.

➤ **Subexcavation affects the flow** of surface water and ground water. On sloping sites, seepage from uphill lots may be forced to the surface or into excavations on downhill lots. Consider using interceptor drains for lower lots.



➤ **Clay fill placed during subexcavation can trap water**, which infiltrates foundation wall backfill and results in more frequent sump pumping. Use exterior foundation drains or provide a path for water to reach the interior drains. Areawide subdrain systems (below sanitary sewer mains) should be considered to provide a gravity outlet.

➤ **Surface drainage and irrigation practices are critical.** Excessive wetting can cause softening of the fill and settlement. Make sure surface drainage is directed away from foundations and off the site efficiently. Advise home buyers to control irrigation.

➤ **Subexcavated fill may dry on a vacant site and regain potential for future swell.** Our measurements imply this will likely affect the top 2 to 3 feet. Check fill moisture and swell on a site that has been dormant for two or more years.

If you have qualitative or quantitative performance measurements that show how the performance of foundations and concrete flatwork in subexcavated sites compares with sites developed with normal grading, I would appreciate hearing from you. ☺

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