

Technical Bulletin 09-004

Underpinning 101



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The standard of care for underpinning a structure is as follows:

1. *Restorative Underpinning* - Restorative underpinning is utilized when significant structural damage exists that requires lifting of the structure to re-level and/or close cracks in the walls.
2. *Bypass Underpinning* - Bypass underpinning is utilized when the presence of highly organic soils, plastic soils or other deteriorating soil conditions are present within the influence zone of the foundation.
3. *Preventative Underpinning* – Preventative underpinning is utilized when the presence of an active dropout or other significant near surface void found in the geotechnical testing is present. The underpinning for this method is meant to support the foundation in the event of loss of support under the existing foundation.
4. *Stability Underpinning* – Stability underpinning is due to a topographic condition in which there is active movement of a slope causing loss of support to the foundation. In this case underpinning provides support for the foundation in the event of a slope failure.

Underpins are placed at the following locations:

1. 2'-0" from outside corners
2. At re-entrant corners
3. Each side of windows and door openings
4. At girder locations
5. 6'-0" o/c.
6. 5'-0" o/c for interior slabs

3'-0" spreader beams are utilized in the following locations:

1. Each side of doors
2. Adjacent to windows 6'-0" or greater
3. Re-entrant corners
4. Frame bearing walls
5. Interior slabs

Always review SPT:

1. $N < 5$, WOH and WOR is considered unsupported. 10'-0" or greater unsupported lengths will require additional consideration for buckling and mechanical connection of joints.
2. Beware of shallow CH clay. This may require drilling and or sleeves.
3. Component bearing material is defined as End Bearing on Rock or:

Cohesionless Soils (Sands)	(N) Values above 30-35
Cohesive Soils (Clay)	(N) Values above 35-40

If bearing on Component Bearing, make sure that it does not have voids below it.
Component Bearing Material shall be below the level of ground water changes.