

GUIDELINES FOR SELECTING PILE MINIMUM TIP ELEVATIONS

1. Piles should generally have minimum embedments in the following materials as noted:

| <u>Material and Density</u> | <u>Recommended Embedment</u> |
|----------------------------------|------------------------------|
| 15 to 20-blow count soil | 15± Feet |
| 40-50+ blow count soil | 10± Feet |
| Hard rock (requires pilot holes) | 5± Feet |

Note that these are guidelines only, and pile embedments may be increased or decreased depending on the specific situation. Pile embedments below the theoretical 500-year scour line may be slightly less than those shown as long as a minimum 1.0 factor of safety is achieved during the scour condition.

2. Once guideline #1 is met, if additional pile driving will be in dense to very dense soils requiring hard driving with little or no extra benefit to the foundation, do not set the tips deeper into these soils.
3. Once guideline #1 is met, if the piles can easily be driven deeper to a denser soil stratum, such as the case with H-piles in loose soil, it is ok, but not required, to set the tip elevations lower.
4. Piles must be a minimum of 10 feet long. Check elevations of bottom of caps, footings, retaining walls, etc. when setting minimum tips.
5. Piles should be set below any soft or loose soils that may settle under the load of the pile unless these soft soils are deep enough (at least 5 pile diameters) below the pile to not cause settlement problems.
6. Piles should be set safely below the theoretical scour line, and below soils that the engineer believes are readily scourable.
7. After your minimum tips are set, ask yourself if you would be satisfied if the piles were to stop at the minimum tip elevation (rather than at the estimated tip). If not, adjust your minimum tips.
8. When practical, round off tip elevations to the nearest 5-foot interval.
9. When practical, combine tip elevations with those of adjacent bents for ease of construction (especially useful for long bridges with many bents).