Earth Retention in Challenging Ground and Community Conditions in Aspen, CO

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Background

- Existing 1,800 SF Historic Residence (preserved)
- 100’ x 80’ Lot (0.18 Acre)
- Located 3 blocks from downtown ski lift
Vision

- Preservation & Restoration of Historic Home
- 2 Story Addition
Vision

- Winter and Summer Vacation Home
Vision

- Maximize Square Footage of Residence within property footprint
Vision

- Addition of above ground pool
Vision

• Views of slopes
Vision

- Subterranean Basket Ball Court
- Lap Pool
- Workout facility

- Night Time Dance Floor
- DJ Booth
Construction

• Existing Home Moved off Site for Construction
• 40 Foot Deep Excavation for Subterranean Structure
Site Restrictions

- Small site
- 40 foot deep excavation
- Local regulations prohibit the use of tieback anchors
Site Soils

- Dense matrix of sand, gravel, cobbles and boulders
Earth Retention System

• Soldier Pile & Wood Lagging System
• Internally Braced Excavation
Soldier Pile Installation Challenges

• Conventional drilled shaft techniques
  – Large equipment on small site
  – Casing needed through cohesionless soils
  – Low production rates through cobbles and boulders
Soldier Pile Drilling

- Selection of Pipe Piles in lieu of conventional Wide Flange Beams
- Install casing to maintain hole stability
- Utilize casing as soldier pile
Soldier Pile Drilling

- Installation with smaller overburden drill rig
- Same equipment utilized for micropile installation
Pipe Soldier Piles & Wood Lagging
Excavation

- Conventional excavation equipment in upper 15 feet
- Soil hoisted at depths below 15 feet
Internal Bracing

• Minimize bracing interferences to facilitate basement construction
  – Large spans desired
  – Open areas for hoisting access
  – Limited access for bracing installation
Steel Bracing Installation

- Limited access required hoisting with excavation equipment
Steel Bracing

- Walers and Struts sized to maximize clear spans within excavation
Bracing

Up to 25 feet between struts
Bracing
Bracing
Bracing
Thank You