Cleveland Innerbelt

A Geotechnical Perspective

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Ohio Department of Transportation
Corridor Overview

- Seven Construction Contract Groups (CCG’s).
- CCG1 - Constructs New Westbound I-90 Bridge.
- CCG2 – Demolishes Existing Bridge and Constructs New Eastbound I-90 Bridge.
CCG1 WB Project Location
Contract Award

$287,400,000.00

September 09, 2010
By The Numbers

- $287,400,000
- 13 Retaining Walls
- 7 New Bridges
- 40,000,000 Pounds of Structural Steel
- 300,000 Cubic Yards of Earth
- 70,000 Cubic Yards of Structural Concrete
- 2,600 Feet of 66” Drilled Shafts
- 20 Miles of Piling
- HP 18X204 Largest Piles Ever Used
Main Viaduct
View of New Bridge
Geotech Subcommittee

- Scope Section 9
- Exploration Program
- Soil Profile
- West Slope Mitigation
Section 9: Geotechnical

• Outlined West Slope history and stabilization
• Supplemental explorations
• Design requirements
  o Report requirements
  o Instrumentation
  o Vibration monitoring
  o Settlement monitoring
Soil Explorations
Soil Explorations

Alluvial Deposits
Very-Loose to Medium-Dense Sands & Silts
Very-Soft to Medium-Stiff Silty Clay & Clay

Lacustrine Deposits
Medium-Stiff to Very-Stiff Silty Clays

Glacial Till
Dense to Very-Dense Sandy Silt
Very-Stiff to Hard Clayey Silt

Ohio Devonian Shale Bedrock

20-55’ Thick
55-100’ Thick
25-65’ Thick
160-185’ Deep
Big Piles, Lots of Piles

• Open Ended Pipe Piles – ATC #11
  • 24”, 48”, 72”
• Friction Piles
• End Bearing Piles – Standard Shapes
  • HP 14x89, HP 14x117
• BIG PILES
History of Big Piles

- Origin
- Development of Shape
- Industry Acceptance
- Other Projects
# Big Piles

<table>
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<th></th>
<th>Area (in²)</th>
<th>Ixx (in⁴)</th>
<th>Iyy (in⁴)</th>
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![Image of a pile with specifications HP 10x42]
## Pile Depths

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Defining Refusal

• Max Factored Axial Load 1917 kips
• Vibratory Hammer, Diesel Impact Hammer
• Max Mobilized by D80-42 = 1420 to 1530 kips
• Apple can mobilize 2900 kips
High Strain Dynamic Testing

- GRL Apple IV
- 80 kip
- 9 ft max drop

ASTM Designation: D 4945 – 08
Pier 5

08/02/2011 08:41
Pier 8
Pier 9
Pier 10

Photo by Stuart Pearl
Pier 13
View from Gateway
Managing Geotechnical Complications
West Slope
West Slope
West Slope Drainage

STEP 5 - EXCAVATION

EXISTING GROUND
6.5% NORMAL
PROPOSED GRADING
FUTURE TOWPATH TRAIL
3:1 NORMAL
EX. TRENCH WITH 6" PERF. CONDUIT
EX. 6" SOLID WALL LATERAL DRAIN
1. GEOTEXTILE
2. DRAINAGE BLANKET
3. CONDUIT
4. DRAINAGE BLANKET
5. TOE DRAIN
6. CONDUIT
7. 2' PROPOSED GRADING 20:1 NORMAL

DETAIL
Pier 11 Temporary Shoring
Pier 11 Temporary Shoring
MSE Walls
Bulkhead
Project Updates

- www.innerbelt.org
- Twitter: @ODOT_Innerbelt
- Facebook: Cleveland's Innerbelt Bridge
Thank You!