TH 7/Louisiana Ground Improvements

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Existing TH 7 Embankment

At-Grade Intersection (1980)
- Surcharge, w/Geotextile
- Muck Excavation
TH 7 & Louisiana Avenue Interchange

- Double-Span Bridge
- Entrance/Exit Ramps
- 3 Roundabouts
- Temporary Traffic Bypass
Soil Conditions

- **Fill**
  - Sandy, of variable quality, with urban debris
  - 6 to 30 ft thick

- **Swamp**
  - Peat, organic silt and clay
  - 3 to 20 ft thick
  - Depths 15 to 34 ft below existing ground

- **Outwash**
  - Sand, clean
  - Occasional cobbles and small boulders

- **Bedrock**
  - Platteville Limestone
  - 70 to 76 feet below existing ground
Environmental Impacts
Ground Improvements
West Approach
Column Supported Embankment
CSE Construction
CSE Construction
CSE Construction
West Approach

Column Supported Embankment

- 605 steel piles, HP12x53
- 70 to 75 ft long
- End bearing on Platteville
- 10 x 10 spacing
- 24" steel plate pile caps
- Non-woven geotextile
West Approach

Load Transfer Platform

4 ft thick
Reinforcement geotextile (1 layer)
Biaxial geogrid (3 layers)
Class 5 aggregate fill
CSE Construction
LTP Construction
CSE Instrumentation

Image courtesy of Braun Intertec
CSE Instrumentation
CSE Instrumentation
CSE Instrumentation
CSE Performance

Nest B – Load on pile caps
CSE Performance

Nest B - Earth pressure, bottom of LTP
CSE Performance

Nest B - Earth pressure, top of LTP
CSE Performance

Nests A and B - Groundwater response
West Approach Ramps

Embankment Surcharge

5 to 10 ft high
Reinforcement geotextile
Settlement: ~1 ½ to 2 ft
Surcharge Construction
Surcharge Instrumentation

Image courtesy of Braun Intertec
Surcharge Performance

NW Ramp - Settlement
Surcharge Performance

SW Ramp - Settlement
East Approach

Muck Excavation

Two traffic stages
Up to 35 ft depth
Temporary sheet pile
18 dewatering wells
Environmental oversight
Conclusions

Partial Load Transfer

- Insufficient strain in LTP
- Lack of settlement necessary to develop strain
- Preconsolidated swamp areas
- Load arching in underlying fill
- On-going load increase at pile caps
Conclusions

Instrumentation Effectiveness

Load cells
Earth pressure cells
Vibrating wire piezometers
Settlement plates
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