

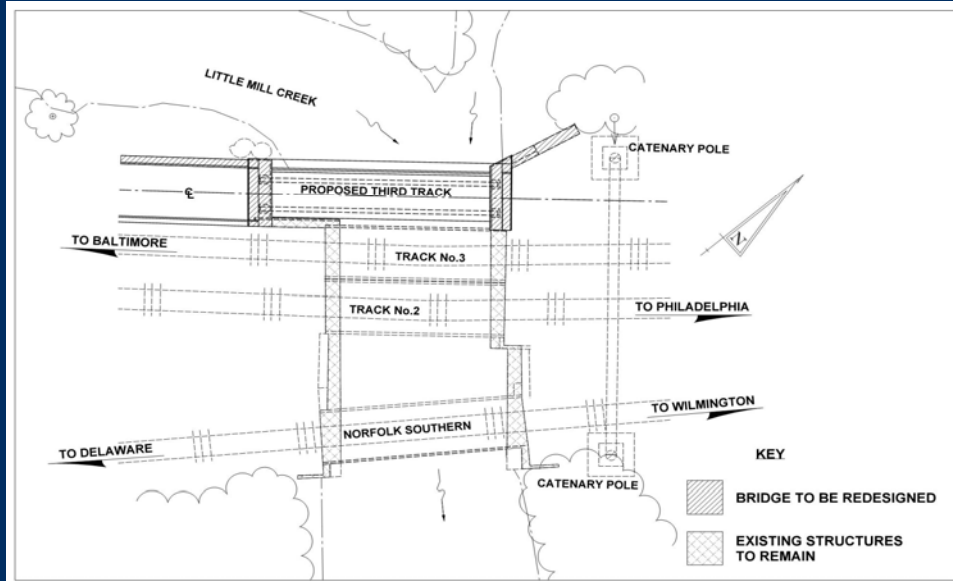
Tied-Back Micropile SOE to Support Active Rail Loads

Wilmington, Delaware

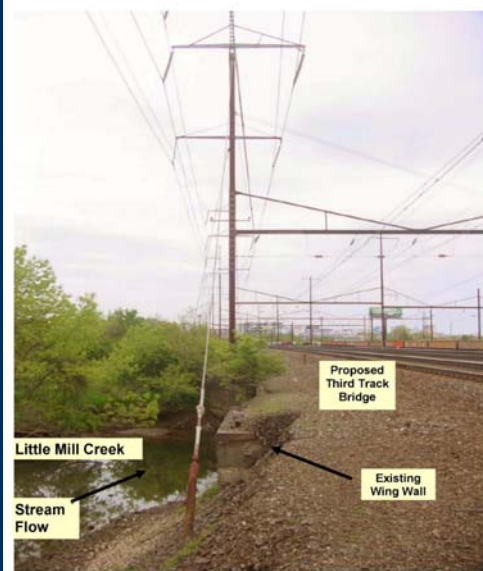


Site Plan





1929 As-Built Plan

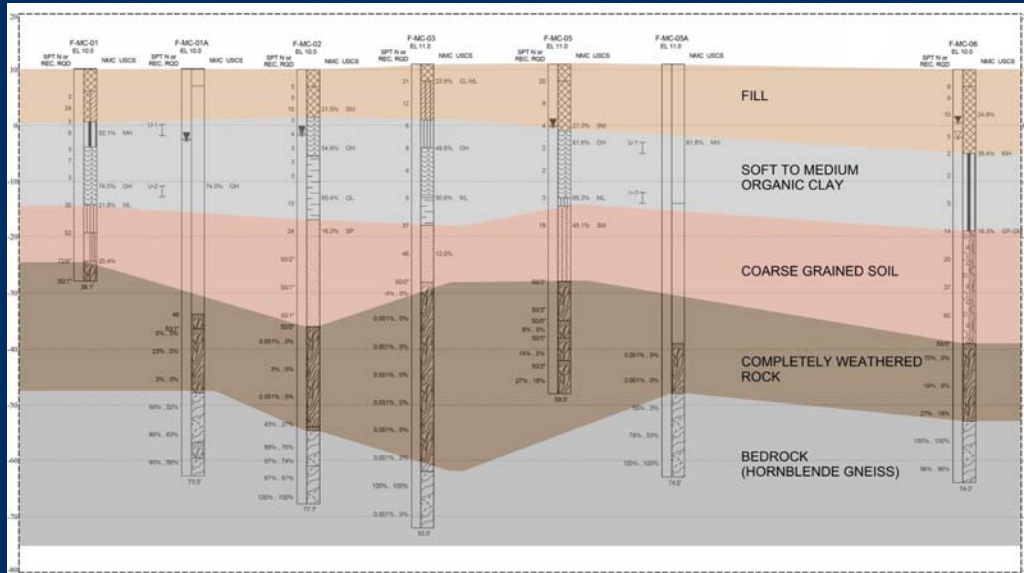


DTC - NEC Commuter Rail Improvements
Little Mill Creek Crossing (Looking North)



DTC - NEC Commuter Rail Improvements
Little Mill Creek Crossing (Looking South)





Soil Profile



Construction Limitations

❑ Railroad ROW Northeast Corridor

- Construction within 2.5-ft of existing active high speed Amtrak mainline.
- Hotspot due to curvature in track alignment
- All equipment higher than top of rail and within 14-ft of center line of track cannot be left on site.

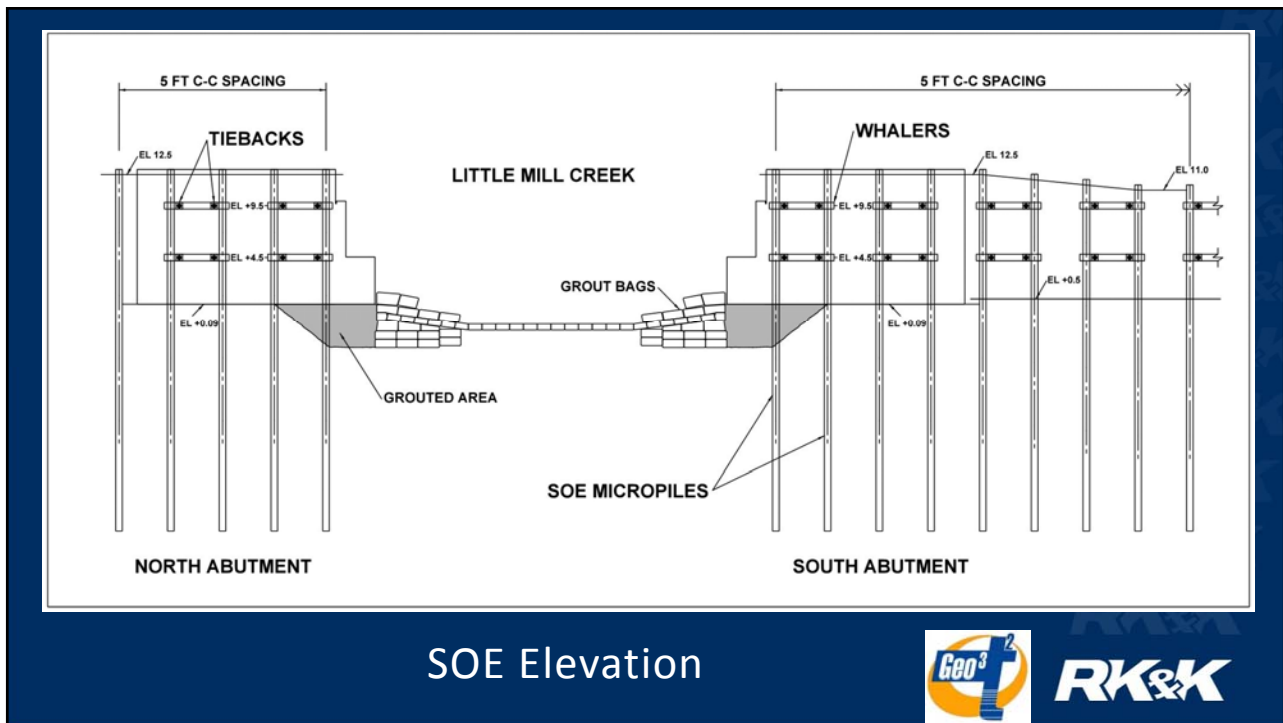
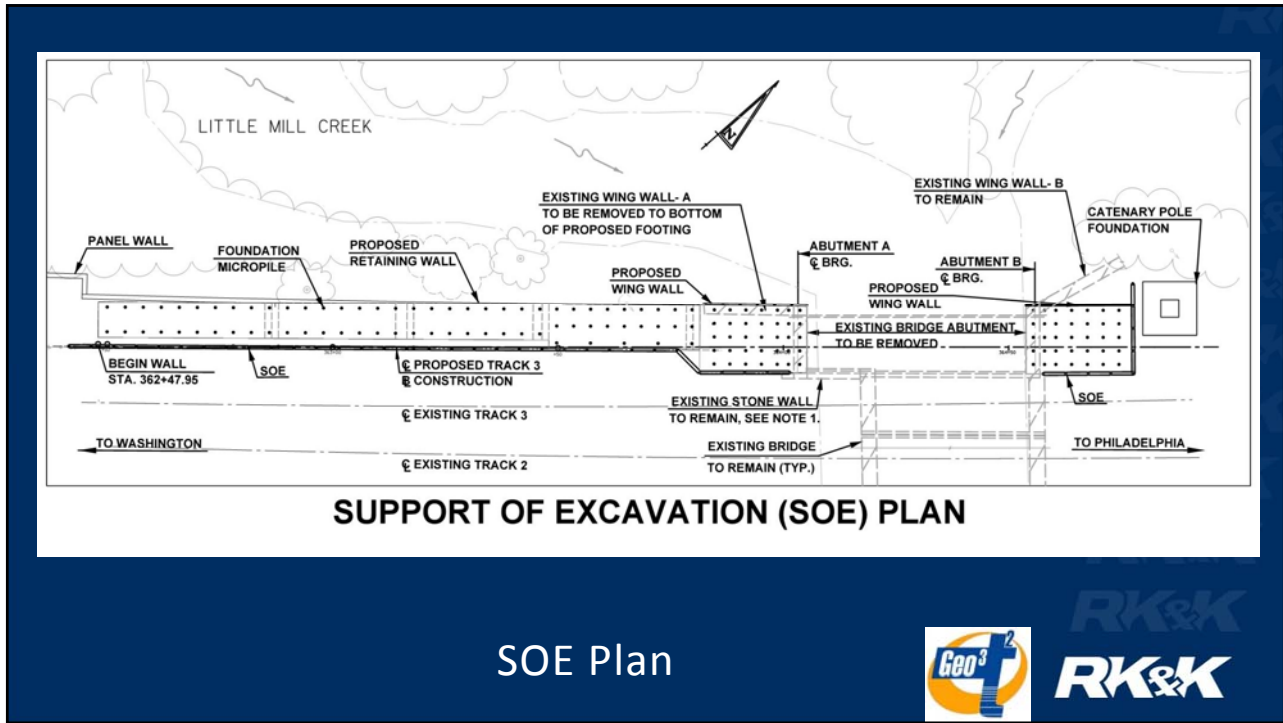
❑ Limited Work hours

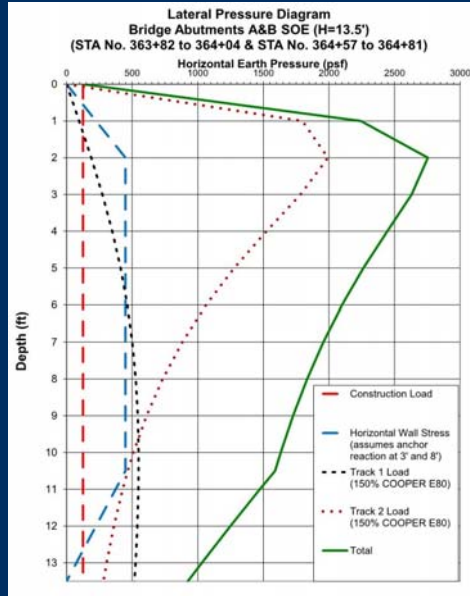
- Working hours between 11:00pm to 4:30am.
- Occasional 55-hr work windows during weekends.

❑ Limited Overhead Clearance

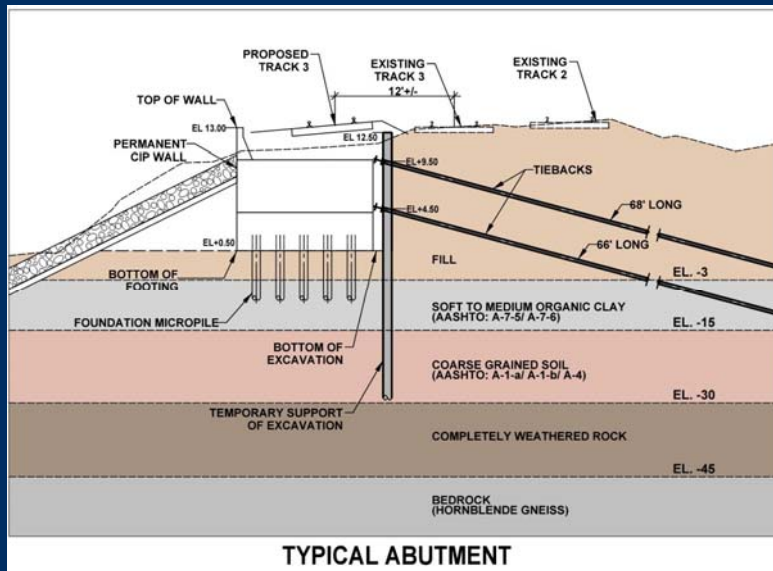
- Catenary lines and high voltage transmission lines parallel to track.
- Overhead clearance of Catenary Lines is about 22-ft above top of rail





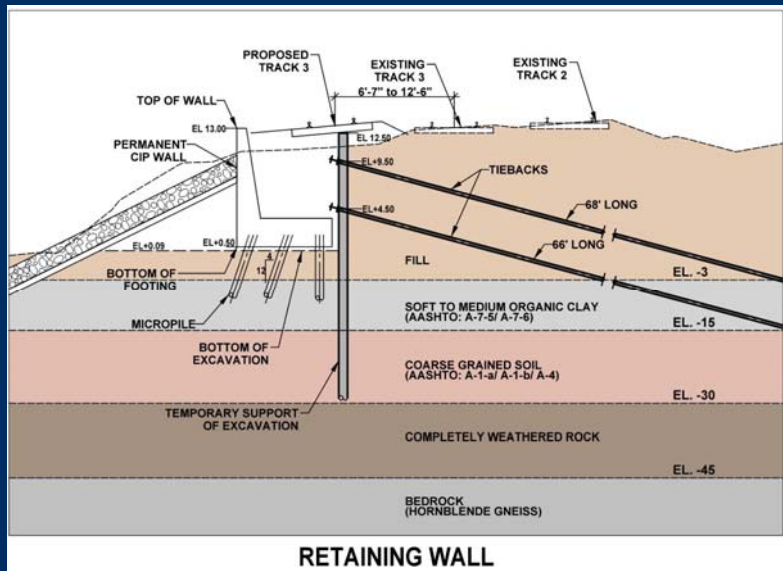


Design Lateral Earth Pressure



Abutment





RETAINING WALL

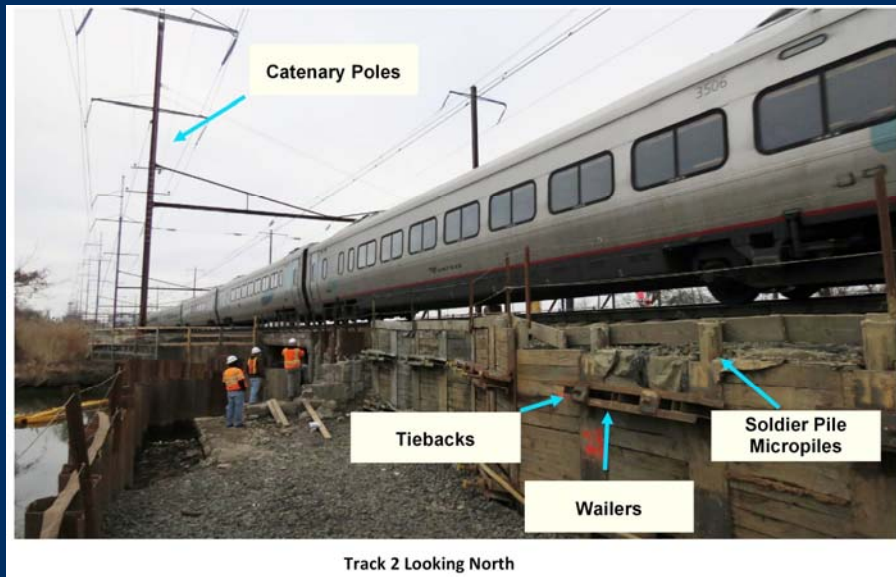
South Retaining Wall



Track 2 Looking North

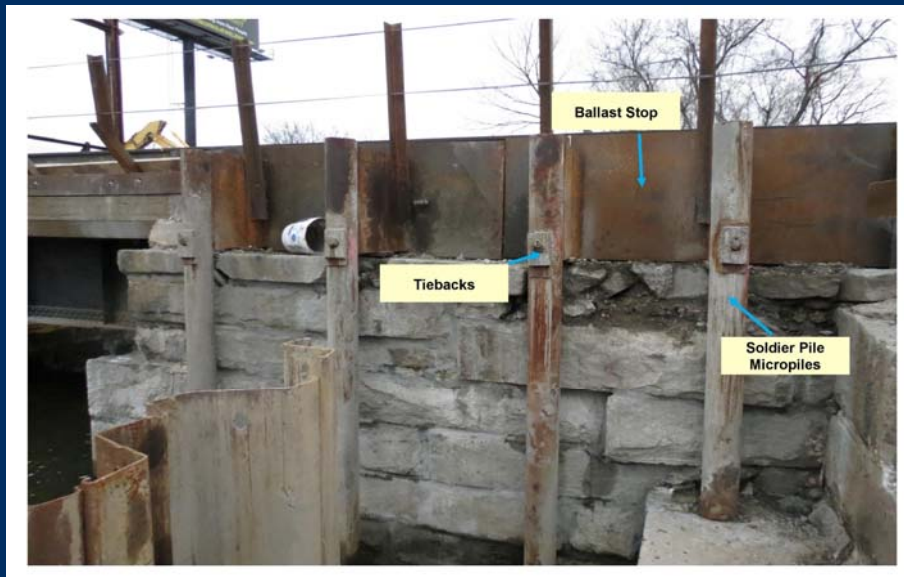
SOE for South Retaining Wall





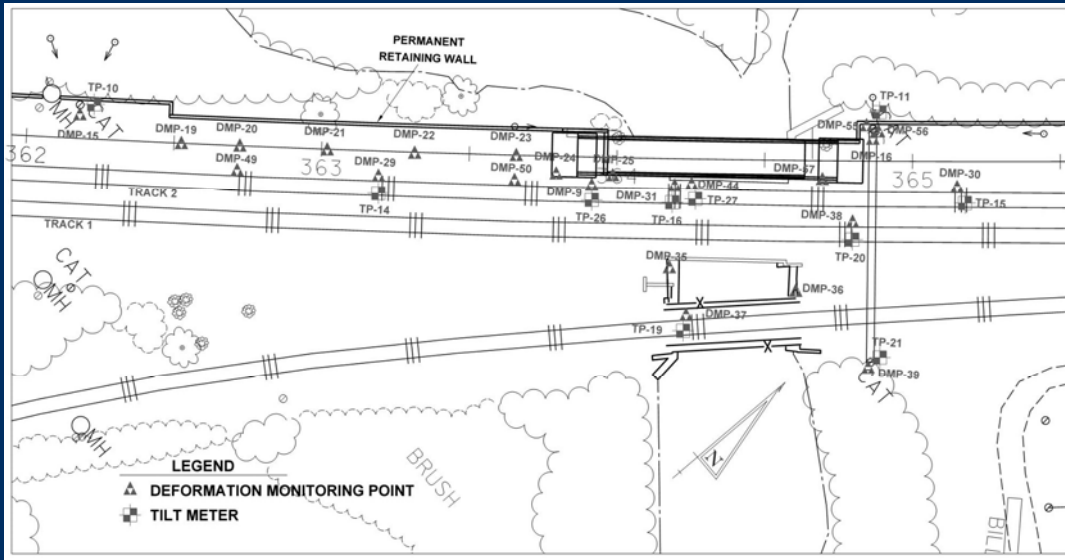
Track 2 Looking North

SOE for South Abutment

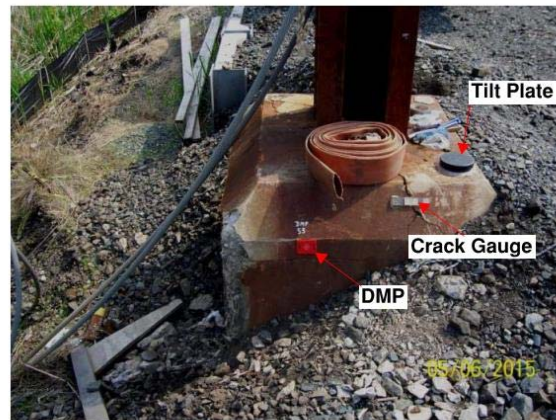
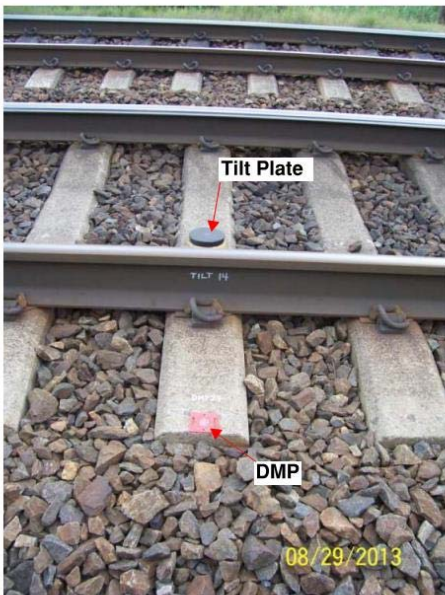


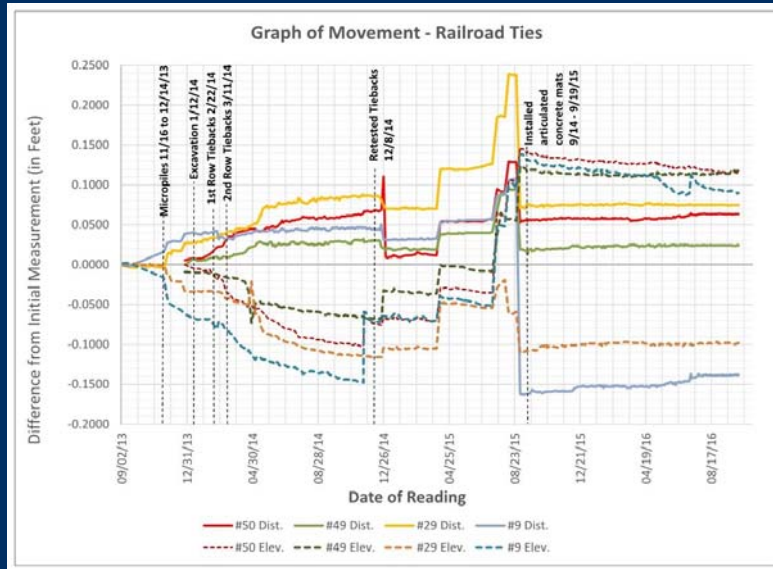
Ballast Stop



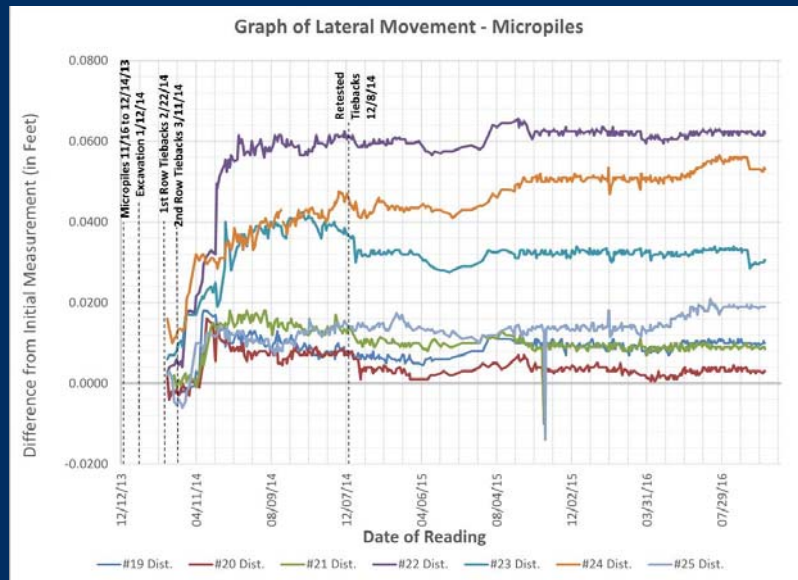


Instrumentation Plan





Railroad Ties DMP Data



SOE Micropiles DMP Data



Conclusions

☐ SOE using Micropiles as Soldier Piles

- Micropiles can be installed in Low overhead clearance and limited access condition.
- Properly designed with tiebacks micropiles can support significant lateral loads.
- Composite section with multiple circular casing to provide adequate section modulus to resist bending moment.



Conclusions (contd...)

☐ SOE System Stiffness and Deflection

- Deflection of the system is a function of the stiffness of the system.
- The soldier pile spacing and tieback spacing is critical for limiting deflections.
- Tieback spacing is limited to about 4-ft due to constructability and overlapping influence zones.

☐ Construction Flexibility

- Installation and locations can be very flexible.
- Customized to accommodate changing or uncertain subsurface conditions.
- Customized for inaccurate as-build drawings of existing structures or unexpected subsurface conditions.

