DPWH RESEARCH SYMPOSIUM 2021

Construction and Long-Term Performance of Interstate Constructed on EPS Geofoam

SALT LAKE 2002

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Advantages of Geofoam Technology for Accelerated Transportation Construction on Soft Ground Sites

- Rapid Embankment / Foundation Construction
  - Construction Time - Days to a Few Weeks
  - Elimination of Damaging Settlements
    - Adjacent structures and facilities
    - Buried utilities
  - Cost Savings
  - Easier Construction – Laborers + Technical Oversight
  - Less Traffic Impacts
  - Improved long-term settlement performance and safety

Traditional Construction – Surcharged Embankments

- Settlement record (1960s) – Salt Lake Valley
- 2 to 3 years settlement time
- Settlement amounts varied 1 to 2 m

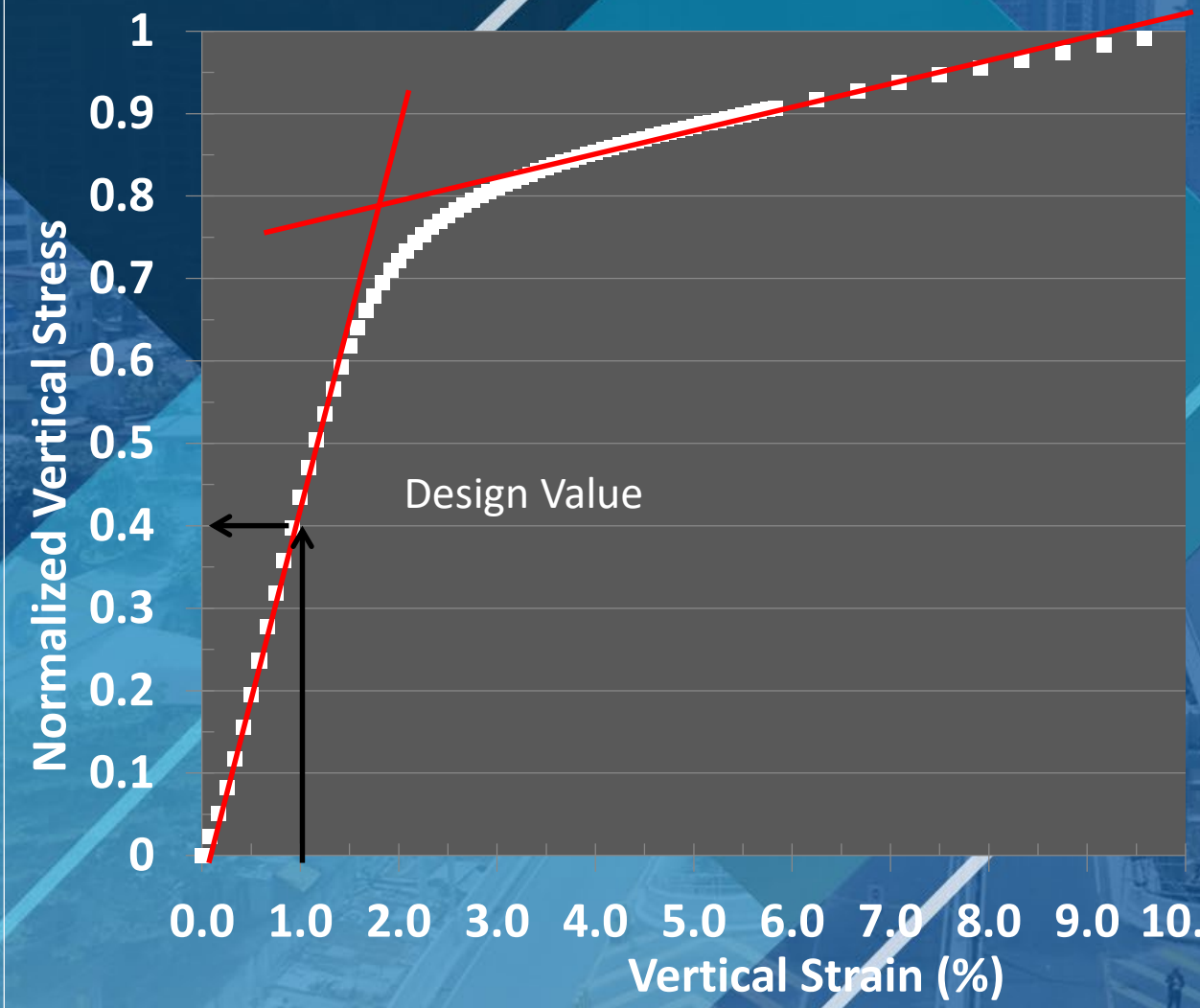
When Things Go Wrong

Settlement at S. University Ave. Provo, Utah

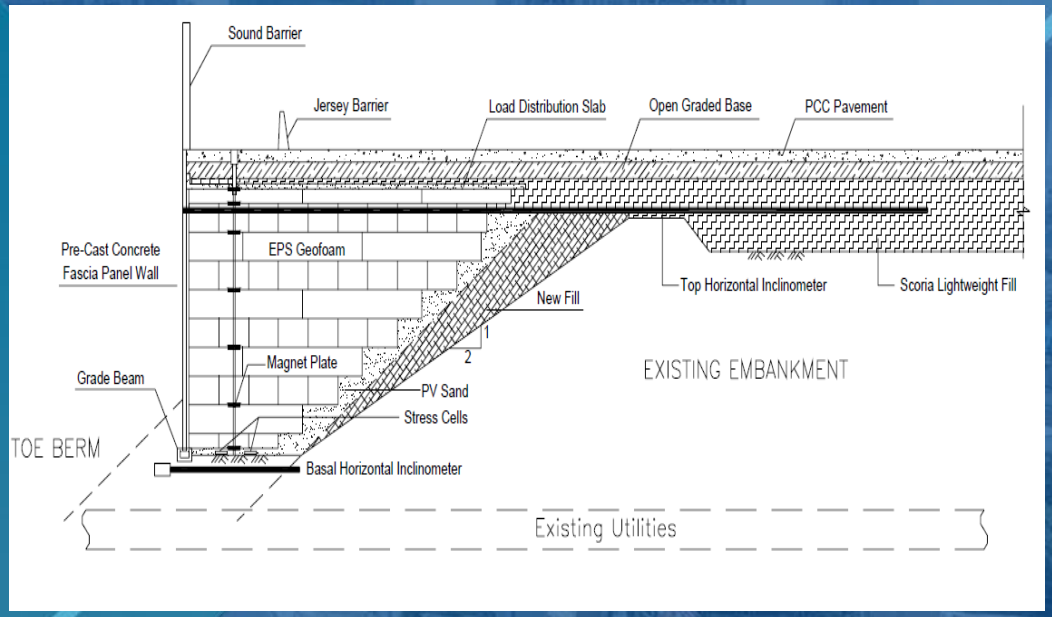
Original Construction PV Drains & Surcharging

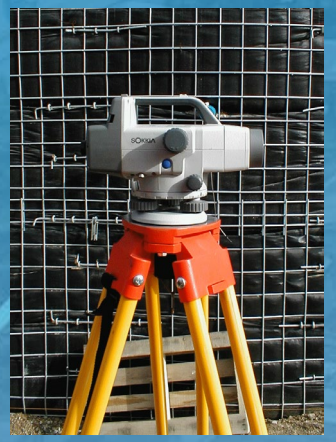
Approach Slab Settlement, Demolition And Replacement

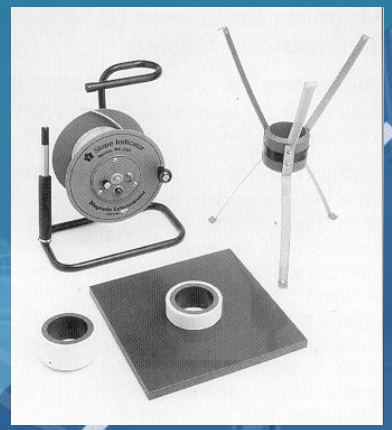
Design Considerations For Selecting EPS Blocks for Roadways



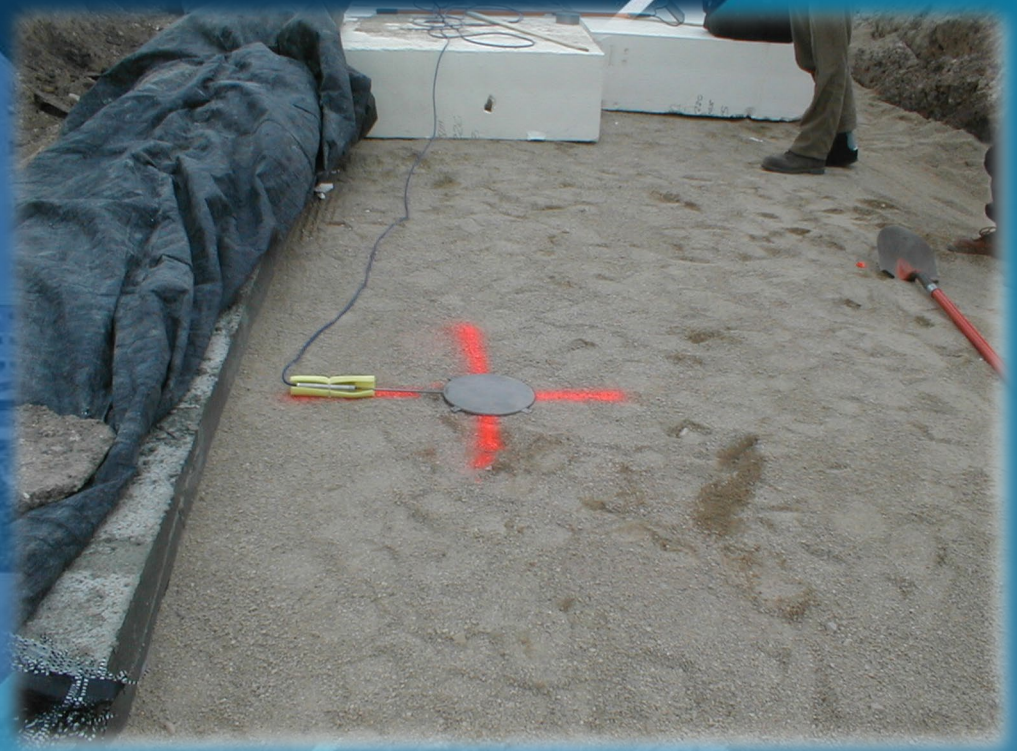
100 South Array – Monitoring and Instrumentation

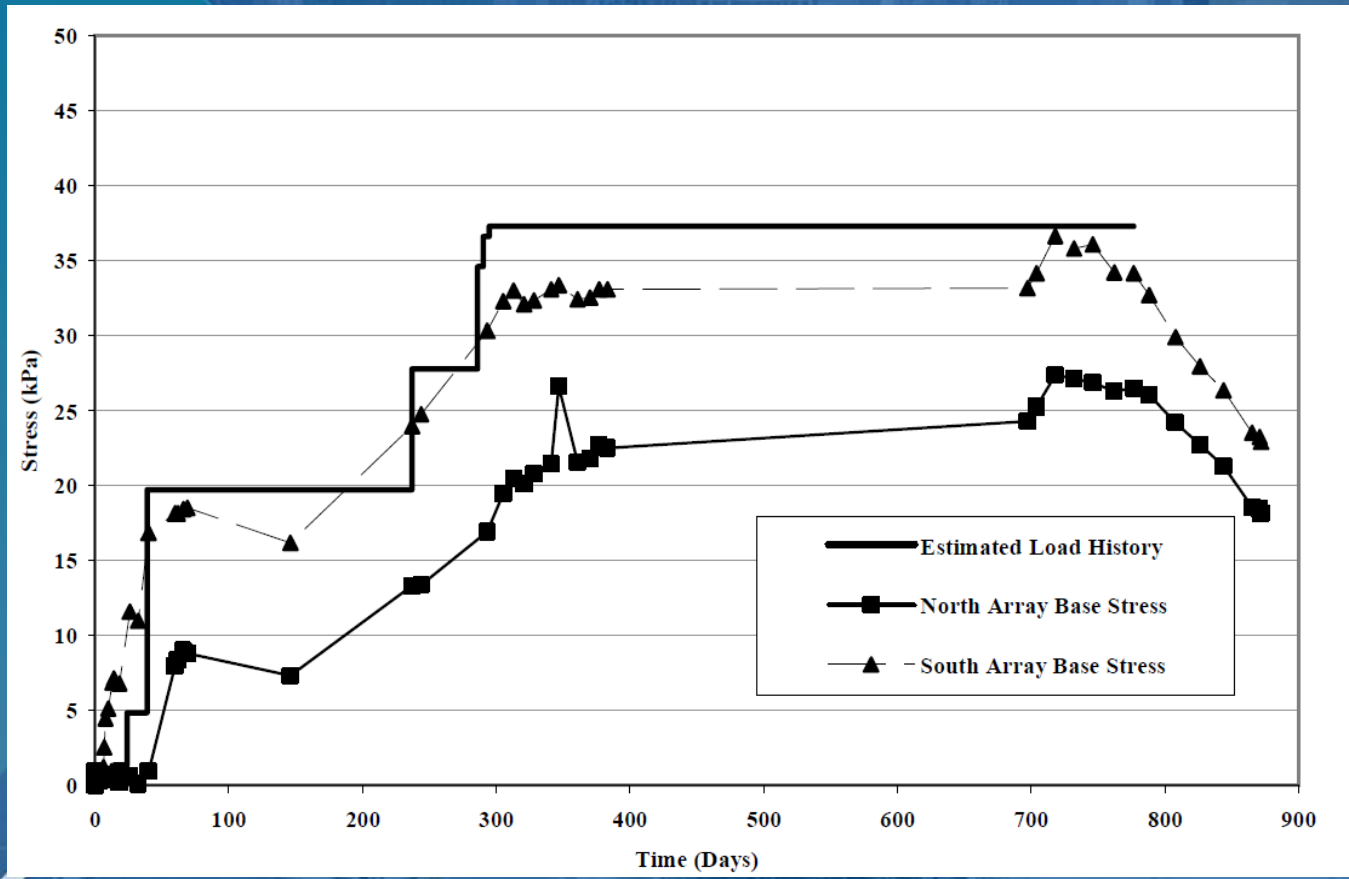




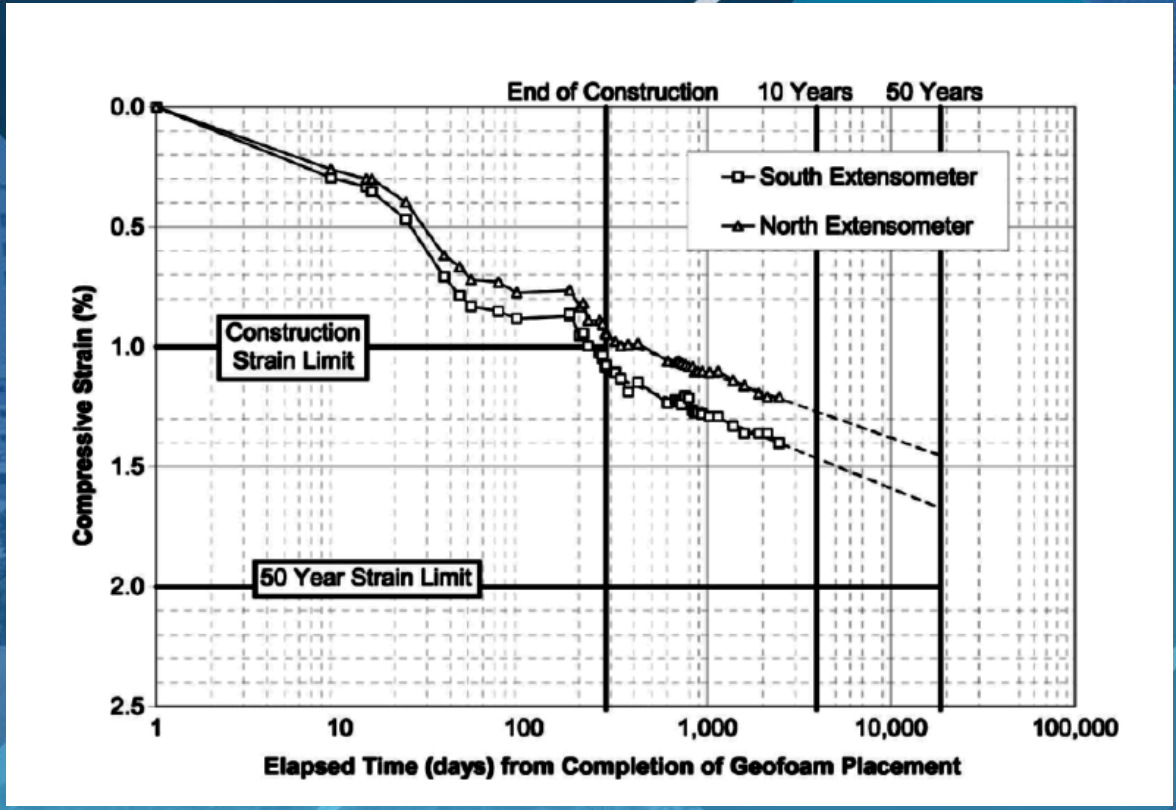


100 South Array (Load and Pressure Cells in Basal Sand)

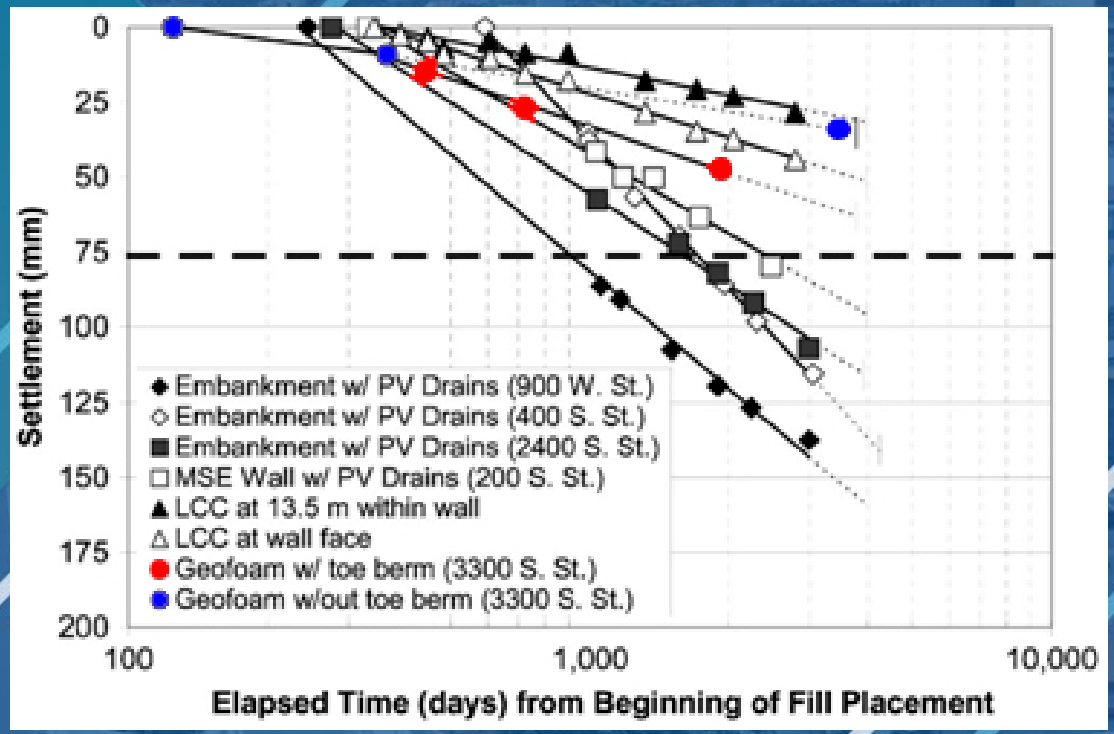




Overall Settlement Performance



100 South Array – 10 years monitoring



Geotechnology Comparison

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Conclusions

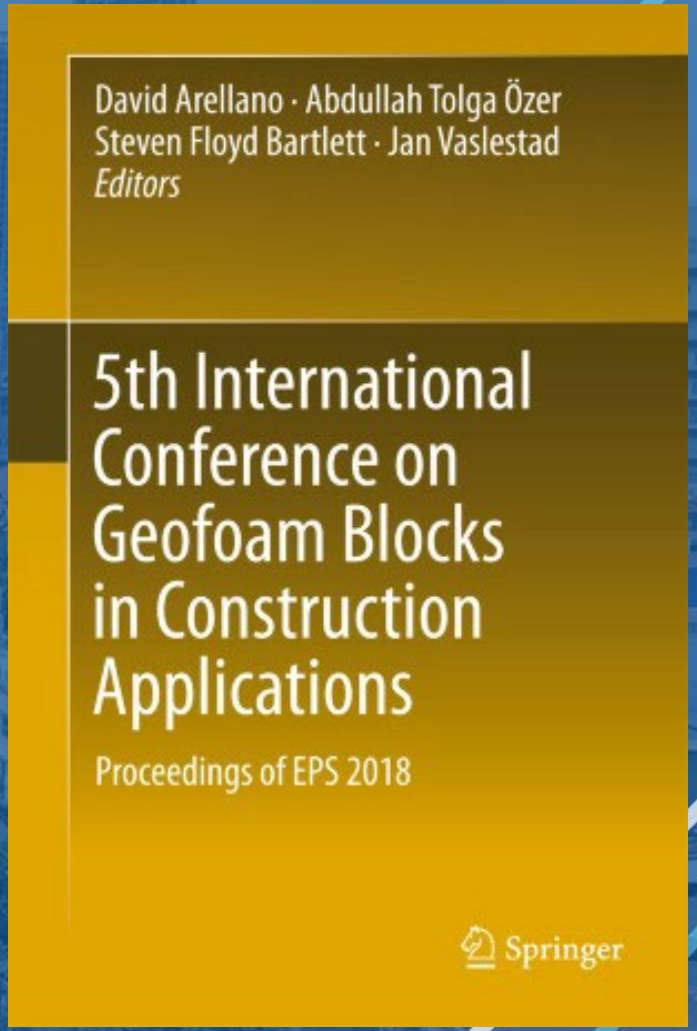
- For past 20 years, EPS geofoam has exhibited the best settlement performance of the technologies used on I-15.

- US Federal Highways Administration accepts geofoam as a proven technology.

- Compression, seating and inter-block gap closure of EPS produced about 1 percent vertical deformation during construction loading.

- Vertical pressure levels are in reasonable agreement with allowable design limits of about 30 kPa.

- I-15 EPS embankment has undergone about 0.2 to 0.4 percent creep deformation in a 10-year post construction period which is less than the design value.



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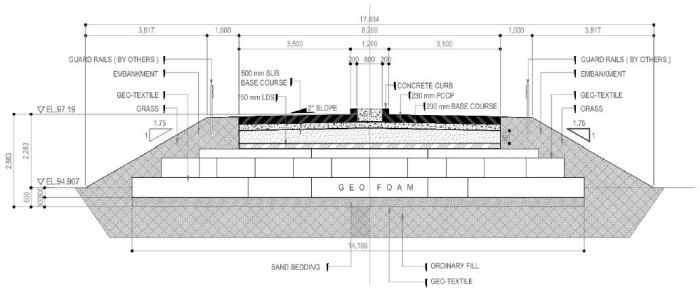
Binan – Sta. Rosa Access Road



Typical Cross Section

Scope: Embankment for New Access Road

Location: Mamplasan Near SM Sta. Rosa

Age: 10 years

Project Detail:

- Rice Field (Swampy Ground)
- 1.919 km
- 4 months Construction Duration

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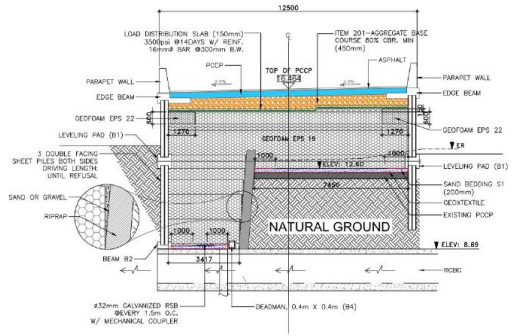
Skyway Extension Project – Sucat Alabang Viaduct Northbound Ramp



Typical Cross Section

Scope: Embankment on Ramps

Location: Alabang, Muntinlupa City

Age: 1 year

Project Detail:

- Lightweight Embankment on top of RCBC
- On Ramp In Fill
- 2 weeks Construction Duration of Geofoam

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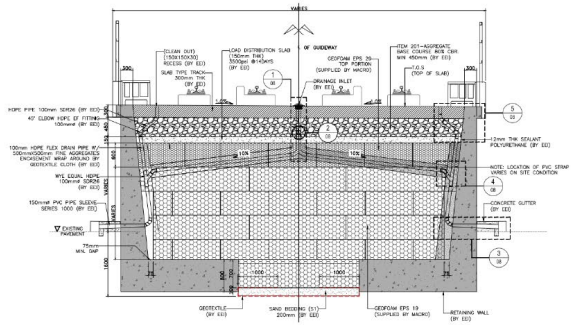
MRT 7- Settlement Area



Typical Cross Section

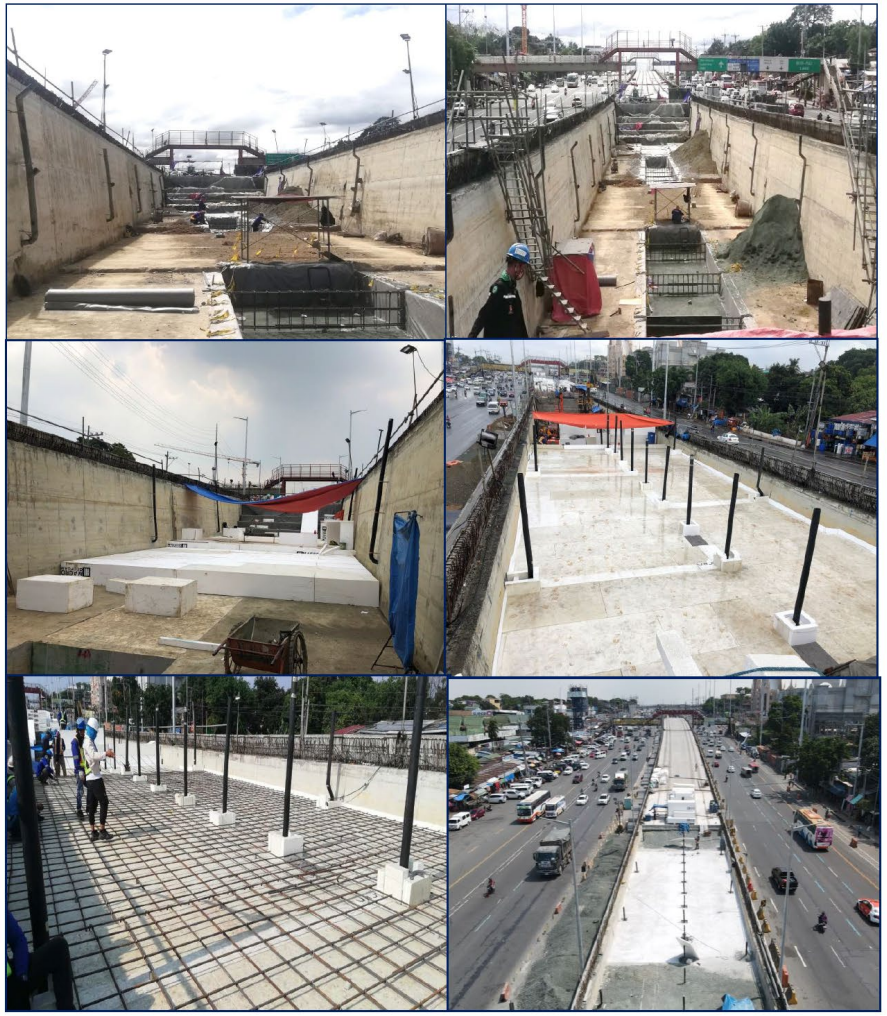
Scope: Soil Embankment Replacement

Location: Tandang Sora Quezon City

Age: 6 months

Project Detail:

- Lightweight Embankment to ease further settlement
- 75 meters
- 3 weeks Const. Duration of Geofoam



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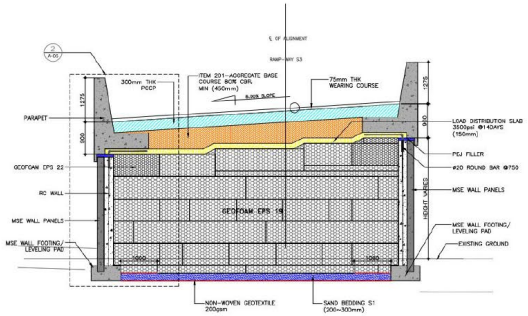
Metro Manila Skyway Stage 3 – Plaza Dilao Off Ramp



Typical Cross Section

Scope: Embankment on Ramps

Location: Quirino Ave. Paco, Manila

Age: 7 months

Project Detail:

- Lightweight Embankment
- 833 cum
- 5 days Const. Duration of Geofoam

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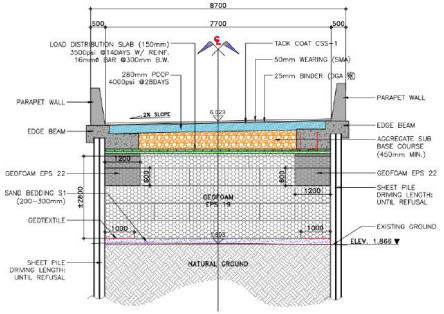
Metro Manila Skyway Stage 3 – Nagtahan On Ramp



Typical Cross Section

Scope: Embankment on Ramps

Location: Sta. Mesa, Manila

Age: 6 months

Project Detail:

- Lightweight Embankment
- 1,076 cum
- 4 days Const. Duration of Geofoam

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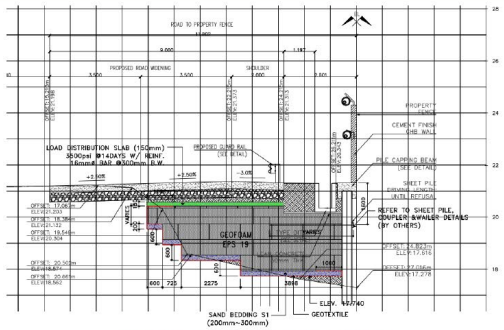
Alabang – Susana Heights Expressway Widening – Acceleration Lane



Typical Cross Section

Scope: Embankment Road Widening

Location: Alabang – Susana Heights

Age: Current

Project Detail:

- Lightweight Embankment
- 600 m