



# **Geosynthetic Reinforced Soil (GRS) Abutment Project**

## **Route B over Bus. Loop 70 Columbia, MO**

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# MoDOT Project Team

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- Gabriel Schubert
- Tyler Lindsay
- Sarah Navarro
- Curt Simpson
- Jay Schroeder
- Darren Kemna
- Patricia Lemongelli
- Chuck Sullivan
- Kirsten Munck
- Others





# Discussion Topics

- Existing and New Structures
- Geosynthetic Reinforced Soil Abutment Design
- Bridge Construction
- Summary and Lessons learned





Looking South



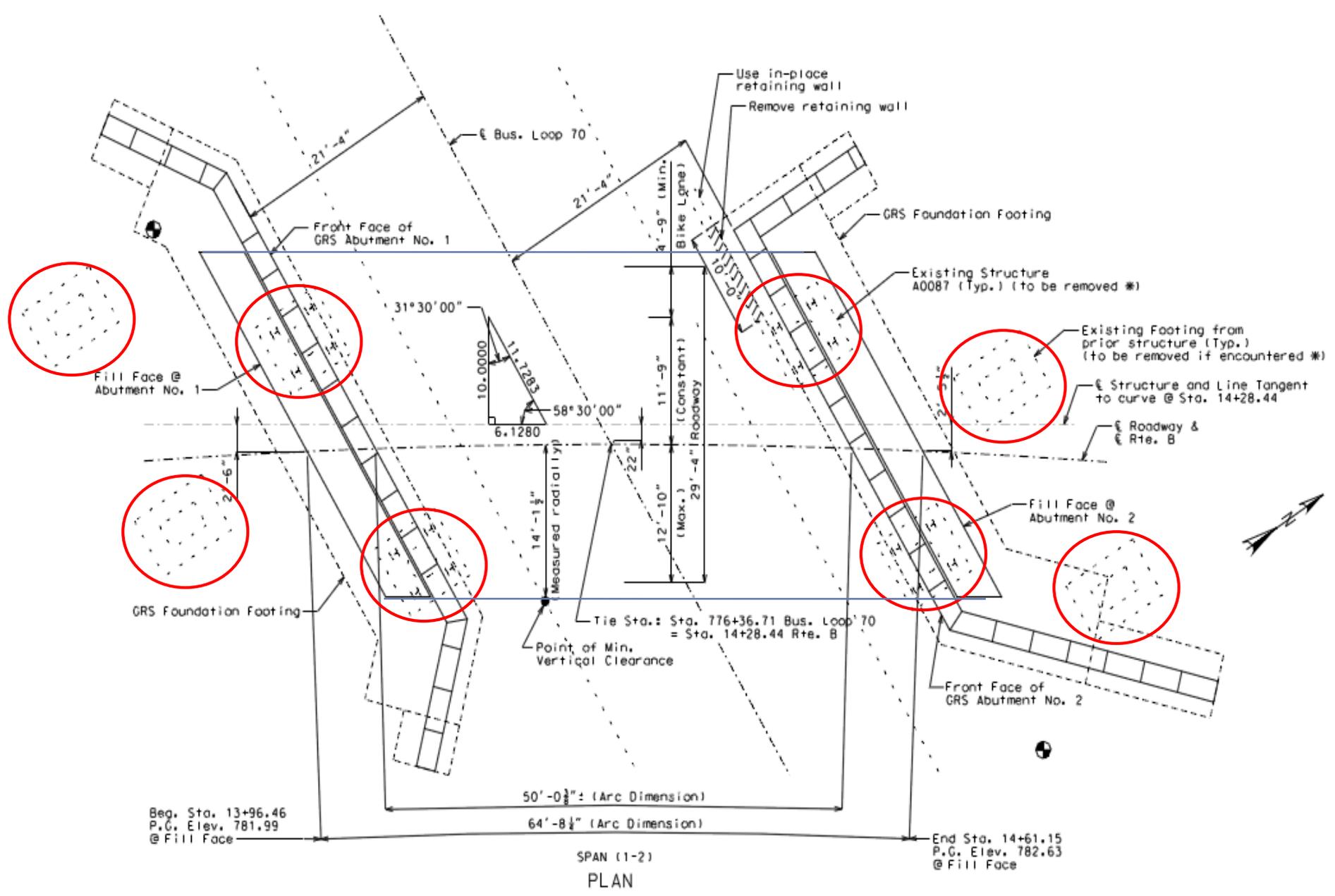
A0087 Boone B -

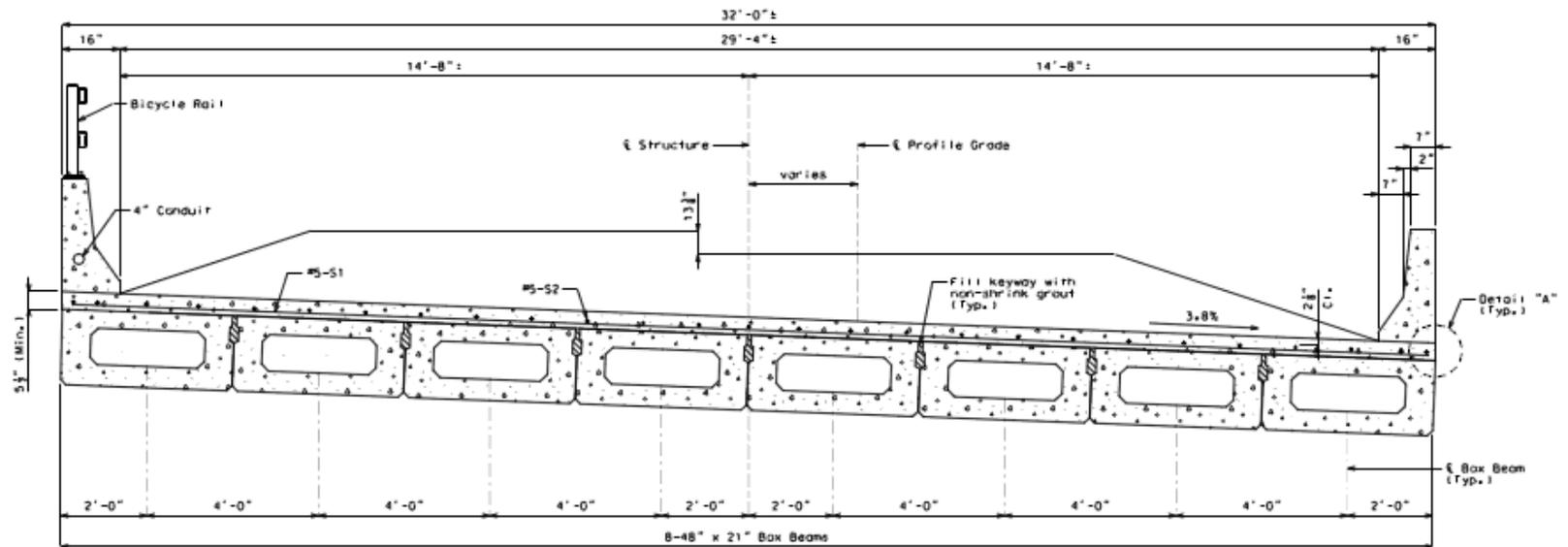
Looking North



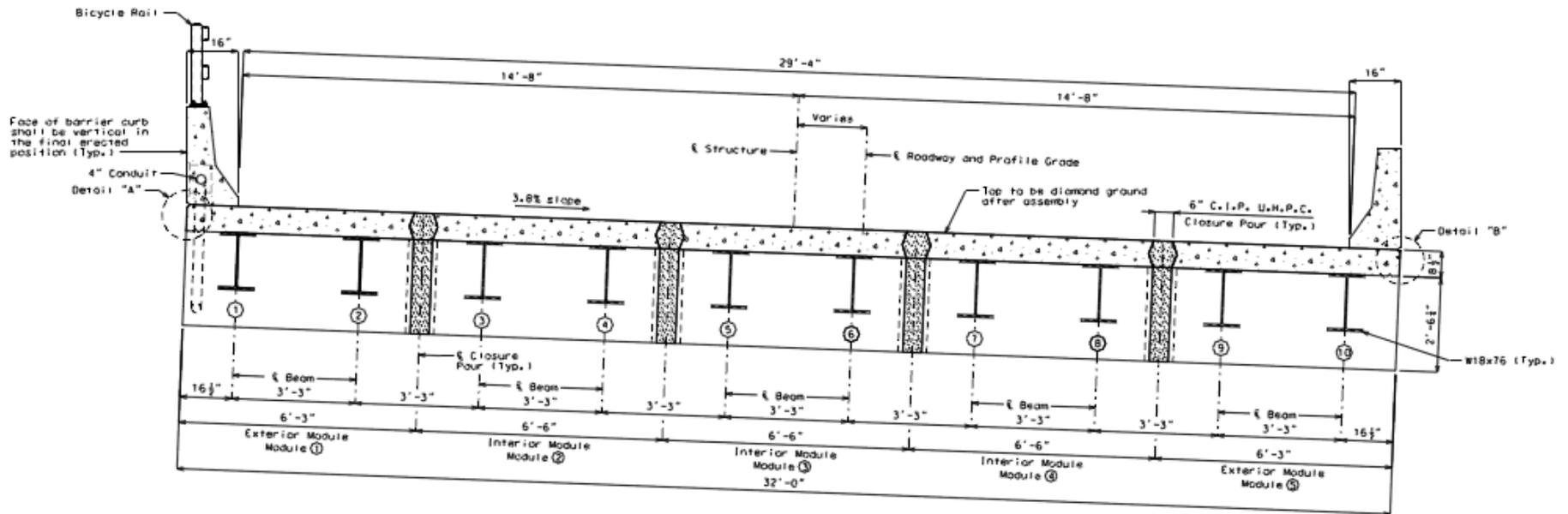
A0087 Boone B - looking south - 6/19/13







Concrete Alternate



Steel Alternate



South Abutment



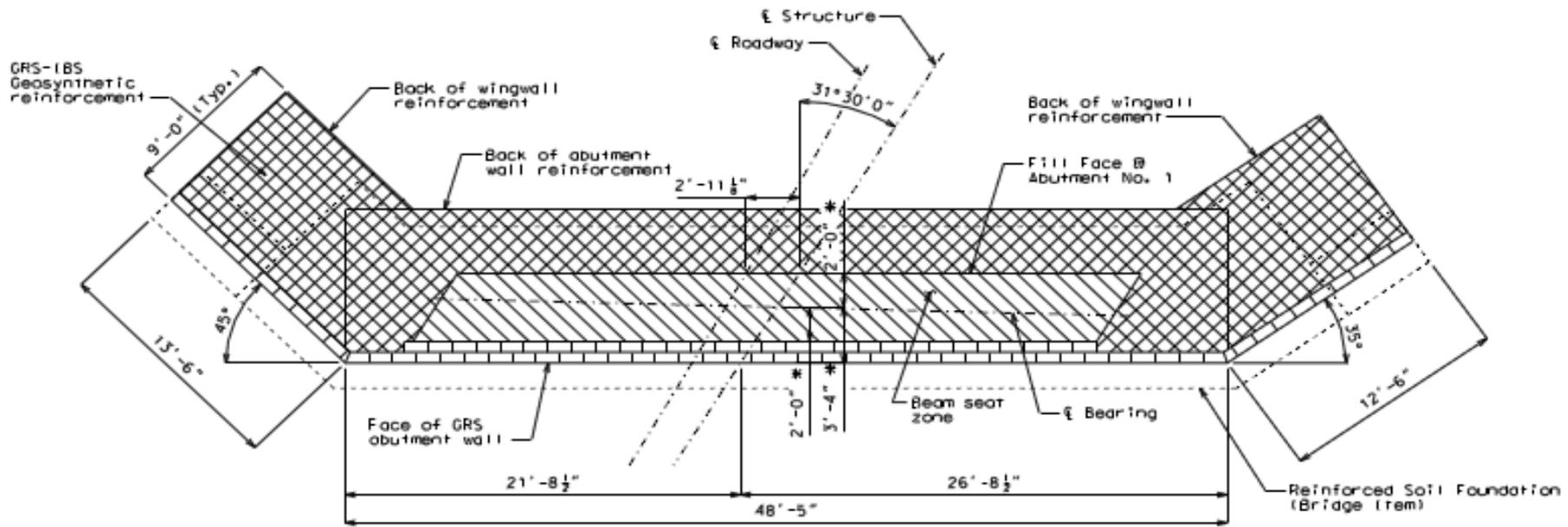
North Abutment



# GRS-IBS Abutment Design

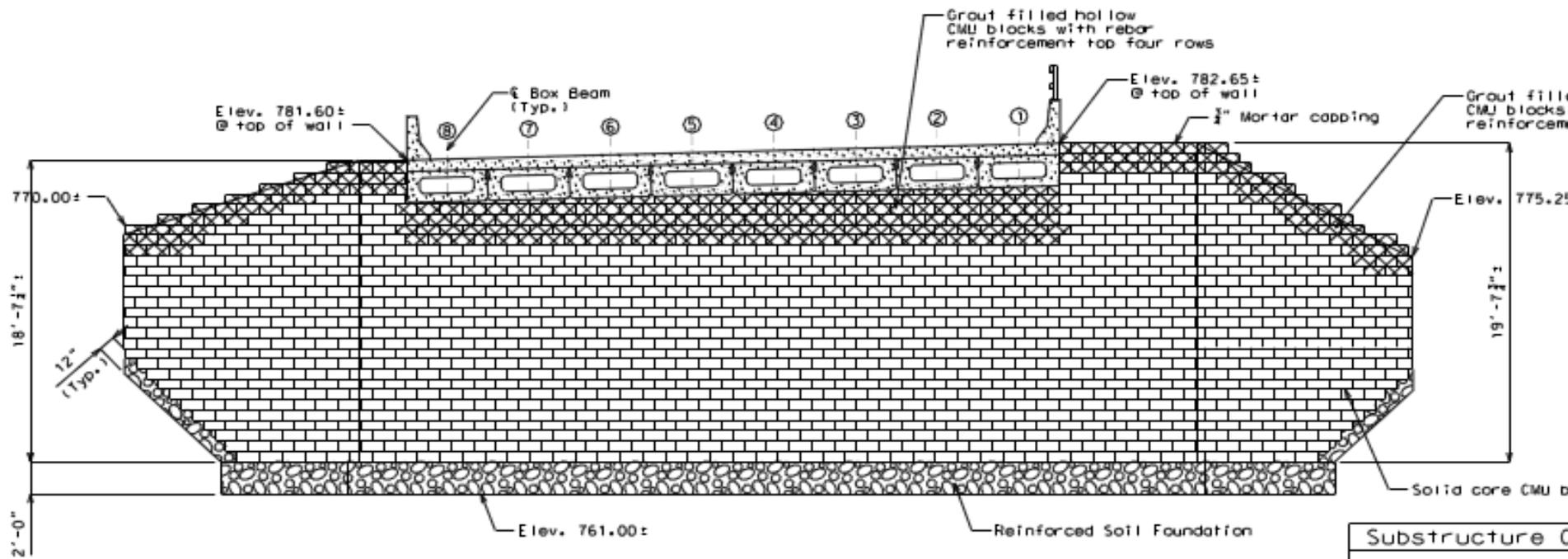
- Subsurface Exploration
- Design Reference Publication No. FHWA-HRT-11-026
- Design parameters and Job Special Provisions
- Freeze-Thaw requirements (ASTM C1262)
- Estimated soil settlement = 1.75" total (long-term 1.25")



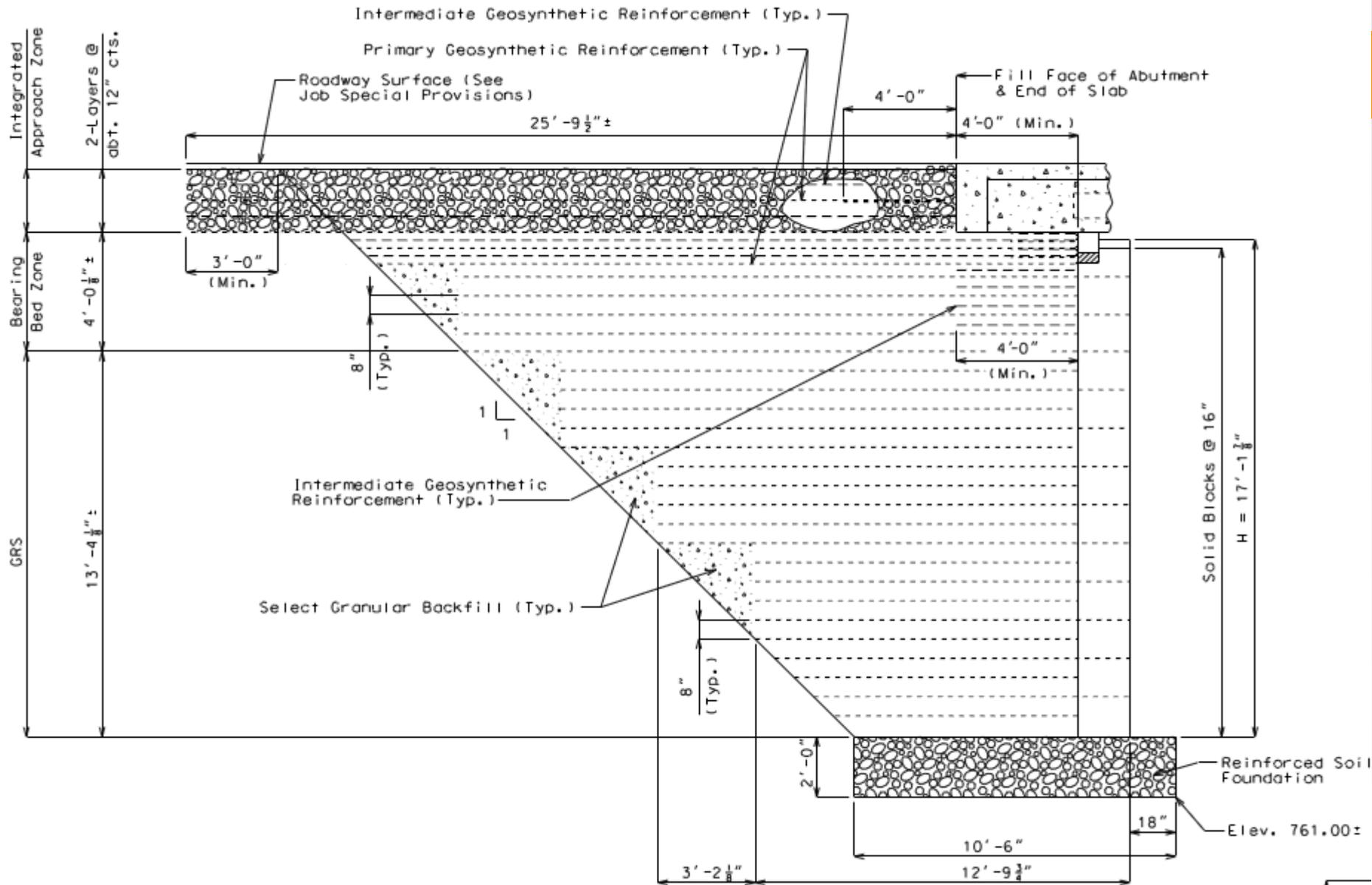


PLAN VIEW

\* Measured at E of Structure.



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SECTION THRU GRS-IBS



# Construction

- Value Engineer (VE) for a wet cast block
- Shop drawing of wall
- 95% backfill compaction
- Compaction Test Method





## Bridge Construction

- 20 hrs. for a bridge demolition
- 6 hrs. for a foundation



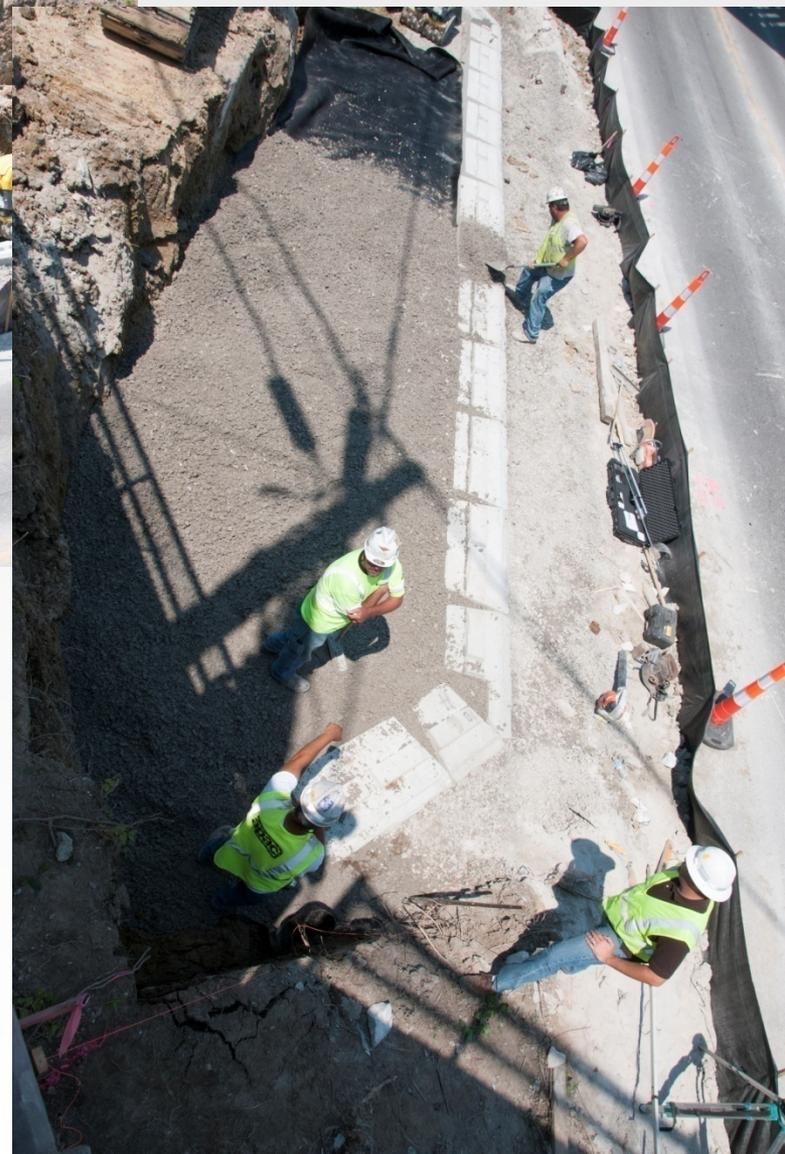


North Abutment

South Abutment

- 2 days for staging area and excavation.





## Production Rate

- 5 hrs. for each 8" layer (first 4 rows)
- 2.5 hrs. for each 8" layer (5<sup>th</sup> & 6<sup>th</sup> rows)
- 1.5 hrs. for each 8" layer (> 7<sup>th</sup> rows)



Placing and Leveling block.

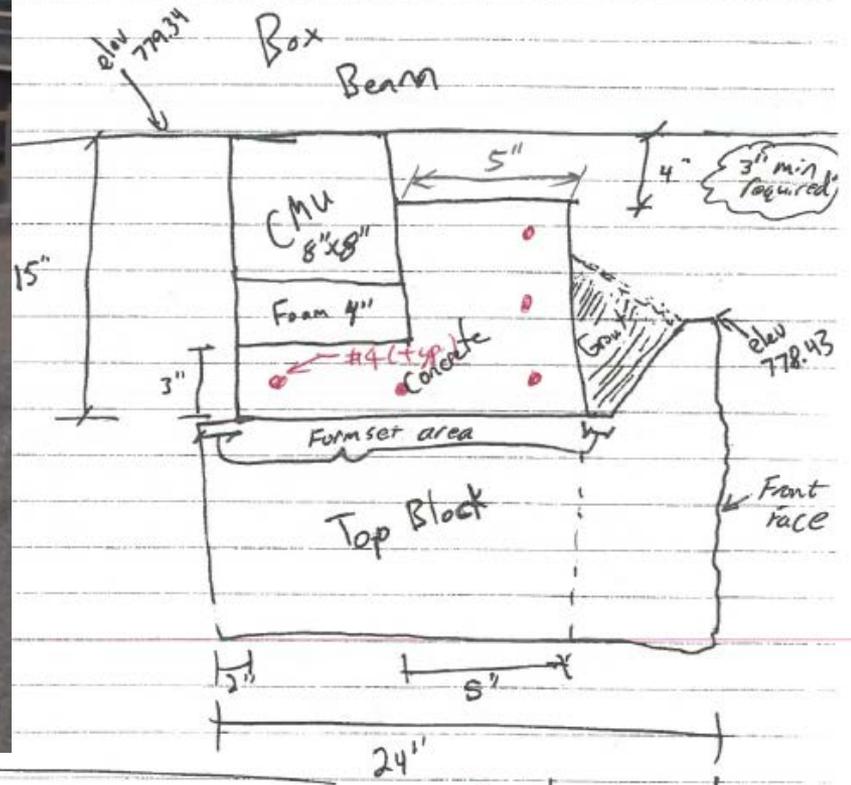


8/29/2014

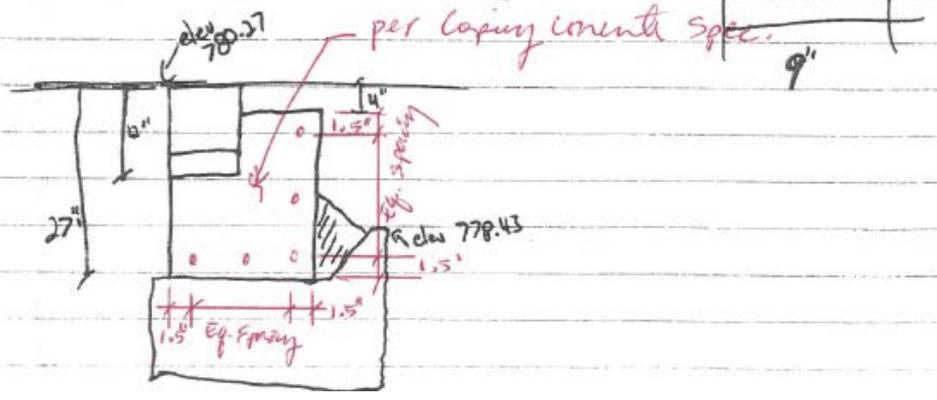


Coping on cap @ Abutment 1

July 30, 14.



Cast-in-place Coping





Placed PS Beams on August 11  
7 pm to 11 pm



8/29/2014



# Summary/Lessons Learned

- GRS-IBS Design Reference, FHWA-HRT-11-026
- Soil settlement + Final vertical clearance
- Fabric sheet orientation
- Backfill gradation to achieve a 95% compaction
- Compaction Test Method
- Dry cast CMU block does not meet freeze-thaw req.
- Wet case block used
- Pros:
  - Freeze-Thaw test is not required.
  - Wet cast block is more durable.
  - Fast construction time b/c one large block = six CMU blocks
  - Big roller compactor next to blocks was not a concern.
- Cons:
  - Lesser roadway opening
  - Not easy to remove and get it leveled.
  - Shop drawing should be required (PE seal not required)
  - Cast in place coping and detail are required.

