

## **GRS-IBS Lessons Learned**

- The front facing of the abutment was gravity stacked with 8-inch concrete masonry blocks on a 2 degree wall batter. The contractor suggested using heavier solid concrete block facing in the future. Although the concrete masonry blocks may be the low cost material, they tended to shift out of alignment during compaction of the backfill material. They also can be easily damaged from impact of heavy equipment operations or vandalism.
- The abutment height was relatively tall to accommodate the vertical clearance needed for the railroad. This created a large GRS-IBS abutment footprint, adding cost to constructing the abutments and wing walls. In this case, there was still substantial savings using GRS-IBS abutments over conventional abutment and wing wall construction using reinforced concrete. However future projects with smaller abutment heights may realize even more cost savings of abutment construction, with estimated savings of 25% to 60%.
- A geotechnical investigation is required similar to other bridges to verify the subgrade can support the GRS system, and to design for adequate safety factors for global stability and sliding. The required bearing pressure capacity of the subgrade is 4,000 psf allowable stress.
- GRS-IBS backfill requires a friction angle no less than 38-degrees. This requires a special big box shear test with a 12X12 box versus a 2x2 box. The material can be tested at the University of Wisconsin-Madison or the FHWA in Washington D.C. Using backfill with angular material will help improve friction angle, will result in better design parameters, better stability, and will require less geosynthetic reinforcement.