



The Use of Permanent and Temporary MSE Construction Methods in Part-Width Construction

A Case Study: M-59 Under Crooks Road

March 21, 2012



M-59 Under Crooks Road, Rochester Hills, MI Oakland County

- Design/Build Project: Dan's Excavating, Inc. and Wade Trim Associates
- Existing bridge was 4-span, 2-lane bridge
- New bridge is 2-span, 4-lane with two 12-foot walks
- Crooks Road traffic had to be maintained, requiring part-width construction at bridge and approaches

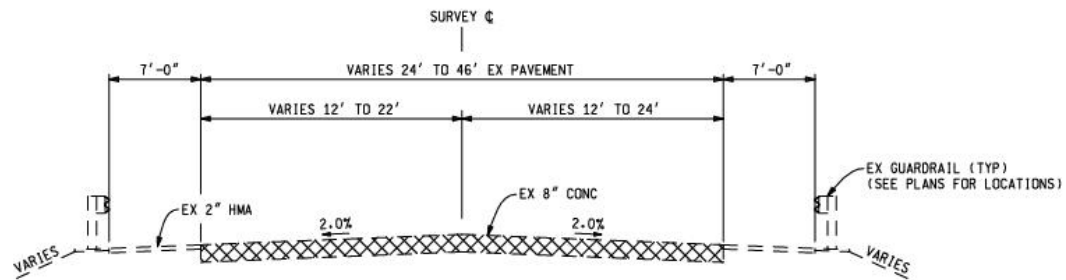
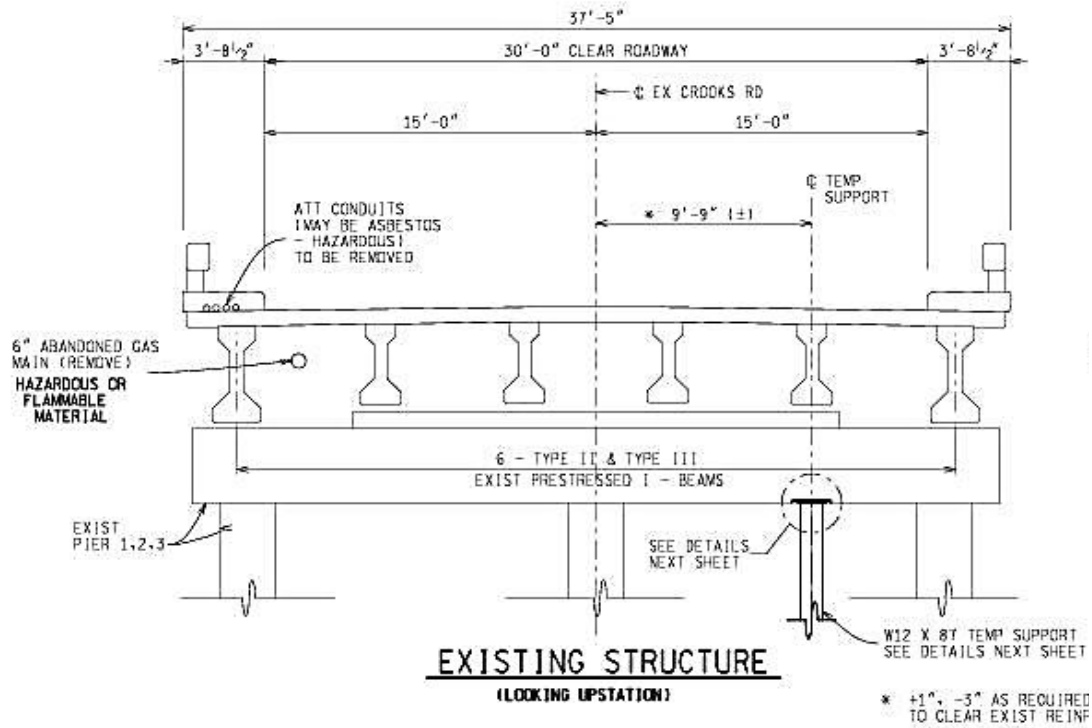
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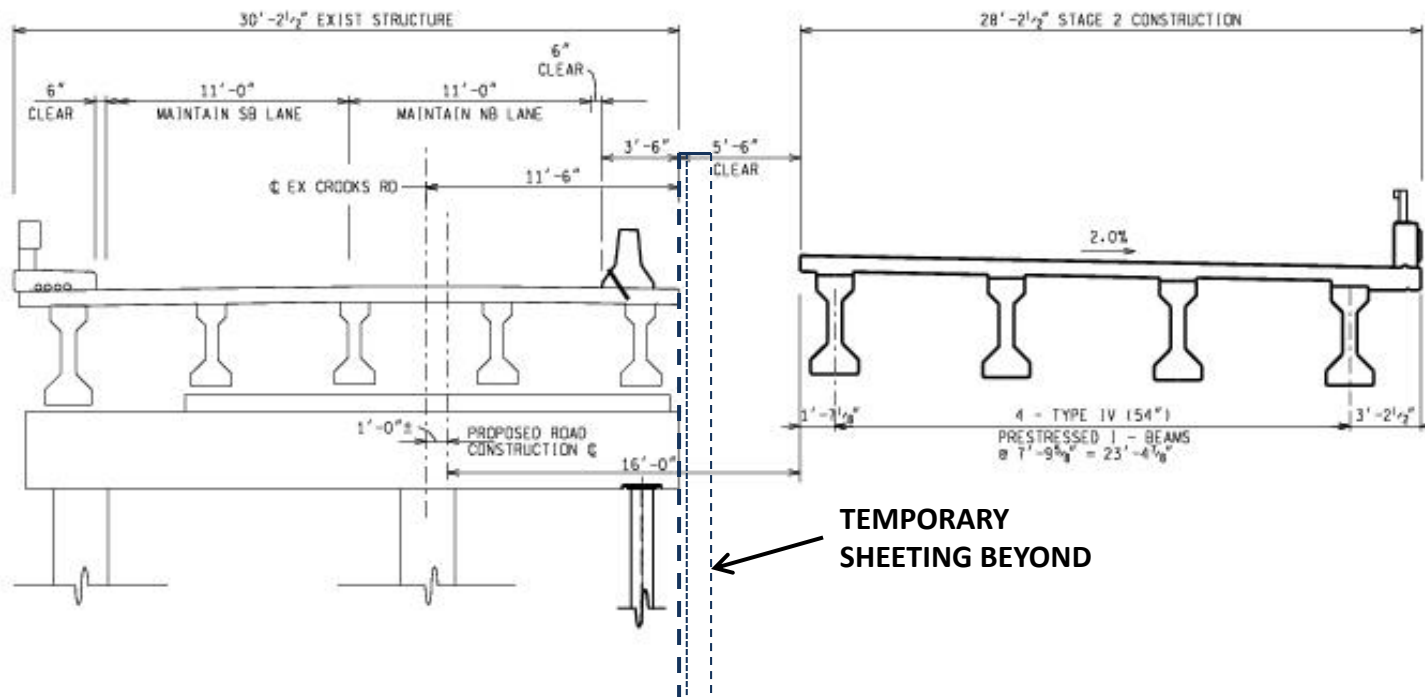
MSE: Mechanically Stabilized Earth

An engineered fill constructed of steel straps, steel mesh or geosynthetic reinforcing alternating with layers of granular fill. Precast concrete facing panels or wire mesh provide finish and/or protection for reinforced soil mass.

Contractor Reasoning for Choosing MSE

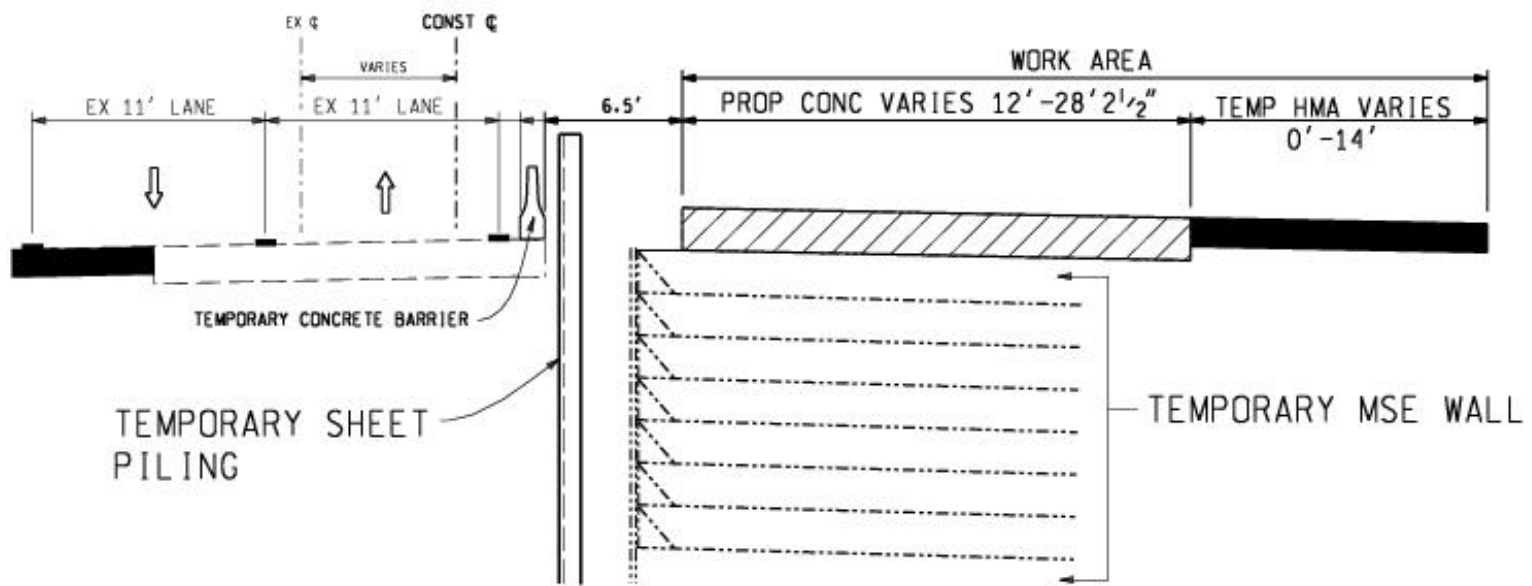
- MSE configured bridge saved +/- 2% on bridge cost
- MSE wall does not require deep excavation
- Quick construction – once excavated, backfilling in short time
- Crew utilization – doubling up of work activities





STAGE 2 CONSTRUCTION





STAGE 2 AT APPROACHES

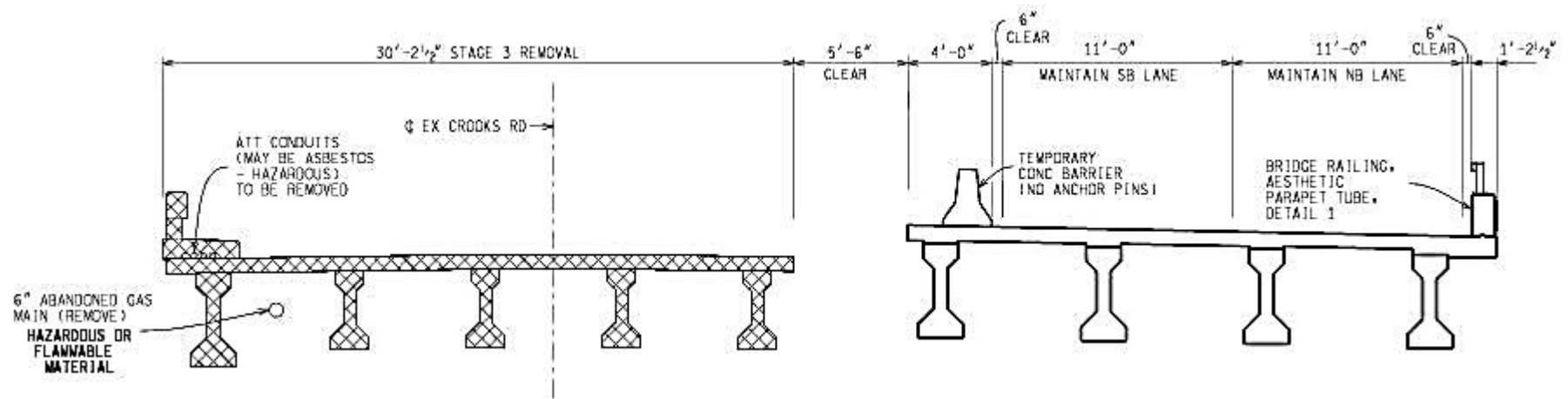




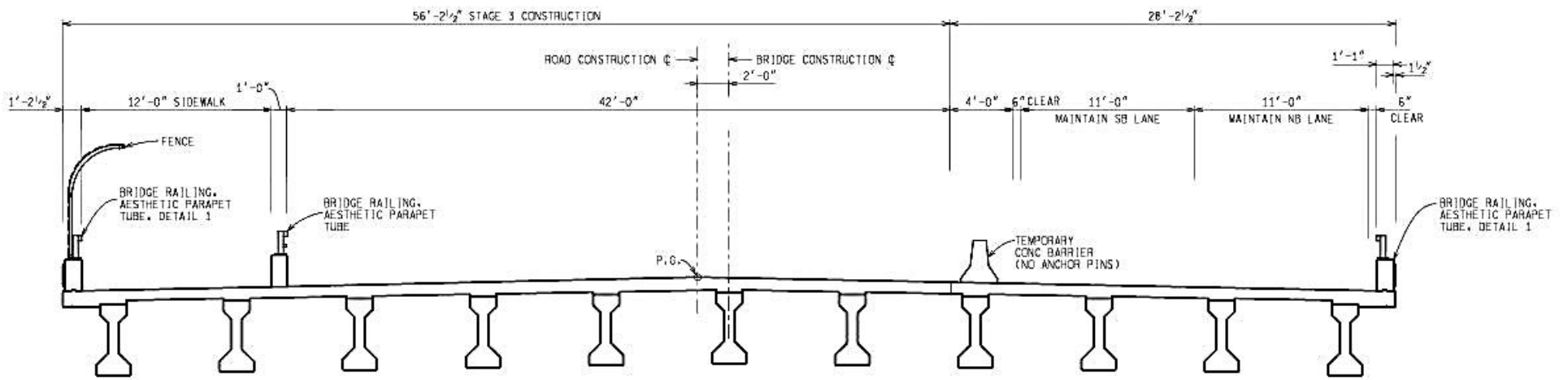
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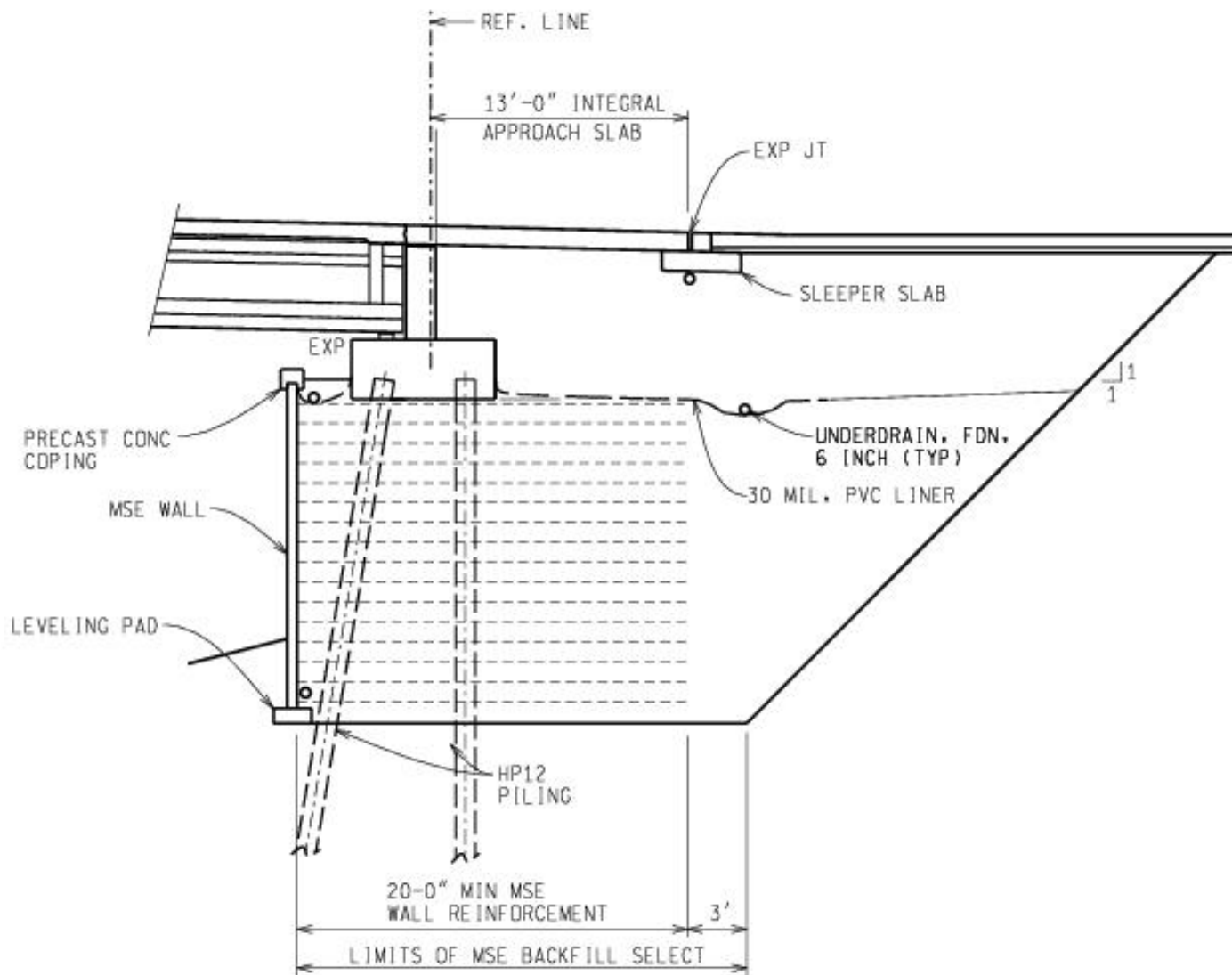
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STAGE 3 - REMOVAL



STAGE 3 – CONSTRUCTION



TYPICAL ABUTMENT/MSE WALL SECTION









Pros and Cons of MSE Wall

- More rapid construction
 - Open excavations are of shorter time frame for safety
 - No time needed for concrete curing
- Cost is comparable to Cast-in-Place Concrete
 - \$27-\$45/sft for MSE versus \$30-\$75/sft for CIP Concrete
- Piling is typically required to support abutment behind MSE wall
- Longer beam spans plus more deck area

Acknowledgements

- Dan's Excavating
- G2 Consulting Group
- URS for use of their construction photographs.

• **QUESTIONS ??**