40 Day Bridge Replacement
A-1 Mountain Underpass

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Tad C. Niemyjski, PE
Lance Briley, PE
Ivan Tullao, PE

Introduction

Goal:

- Replace the existing bridge structure
- Limit construction to single construction season
  - A 40 day bridge closure period was selected
- Keep project limits within the existing right of way limits

The Old Bridge Structure

The Old Bridge

- Built in 1966
- 301’-8” Length – 4-Span Steel Bridge
- Spans Interstate I-40
- Elevation of about 7,300 ft. above MSL

Challenges to Bridge Replacement

- Short construction season
- Active Interstate 40 traffic
- Only access to the community

Challenges to Bridge Replacement

- Traffic Interchange Geometry
  - Right of Way
  - Railroad to the south
  - Clearance Zones along I-40

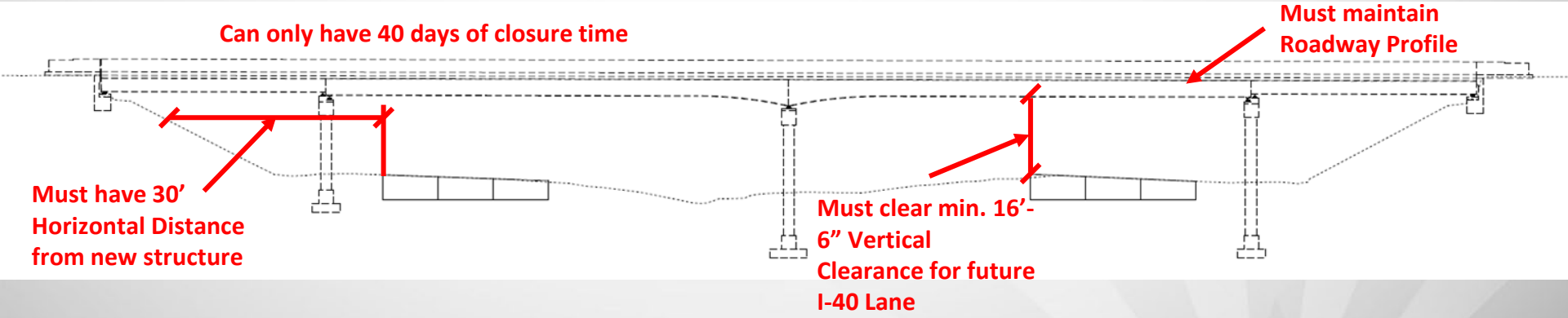

Google Earth
500 ft
N

Challenges to Bridge Replacement

- Bridge Geometry

  Multiple Geometrical, Structural and Budget/Time constraints found early during design

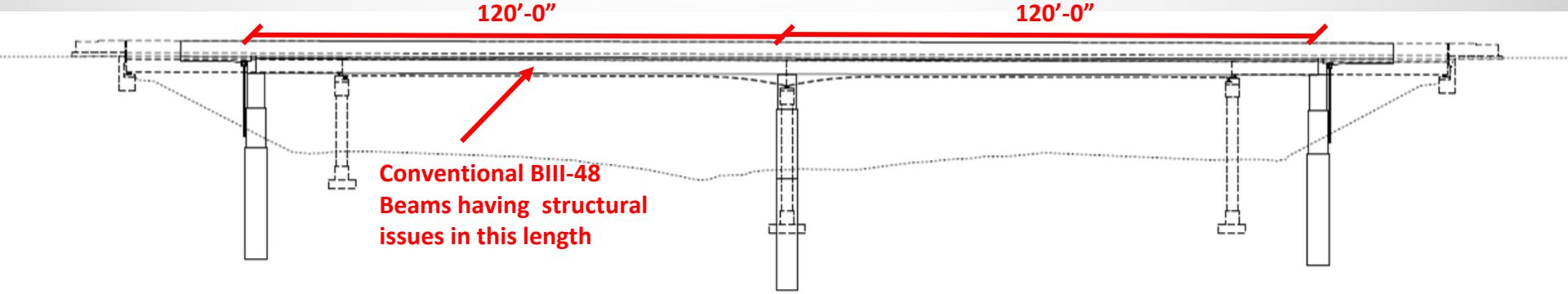
Constraints



The New Bridge must:

- Clear Vertical Clearance requirement for future I-40
- Not raise the vertical profile of the bridge
- Clear Horizontal Clearance requirement for current I-40 on outside shoulders
- Be made within 40-days

Initial Proposal



120 feet per span BIII-48 Straddle Bent Pier Bridge with PPC Deck

- Columns made before Bridge closure
- PPC deck was easy to cast and fast to cure but do not hold structural capacity
- 120 feet span length caused Superstructure issues
- Straddle Bents were very costly

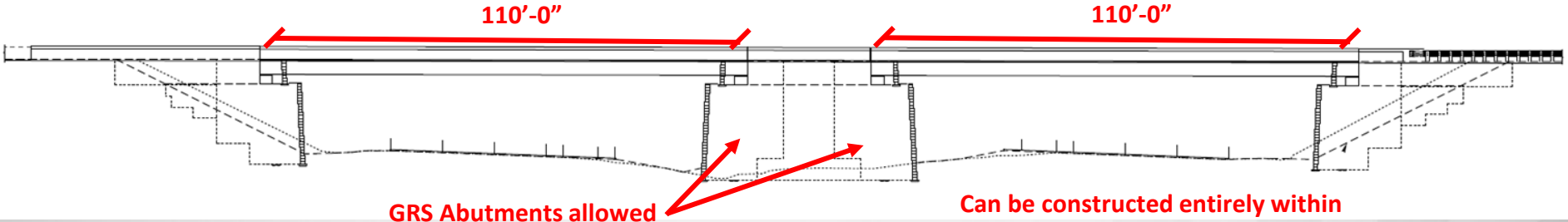
Previous GRS-IBS Project

Meteor City TI OP bridges

- Twin, single-span bridges to carry I-40 traffic over Meteor City Road
- Project was successful at minimizing bridge closure time

I-40 over Meteor City

Final Proposal



GRS IBS Island reduced the span length to 110’ and follows ADOT policy that GRS IBS bridges cannot be multispan.

GRS IBS Construction is quick and can fit the 40-day closure time

Construction

Construction Challenges

- Excavation of soft clayey soils under the median island and southernmost abutment
- Vertical alignment of the split face masonry block

Construction Challenges

- Missing geogrid reinforcement in GRS landscape wall
- Roughness of the masonry block units

Results of Construction

IMG_0068

Results of Construction

- The GRS-IBS and precast bridge structure elements made it possible to meet the 40 day replacement goal
- Use of PPC deck was critical to reduction of the construction phase

Lessons Learned

- The thickness of the geogrid was not accounted for during the design of wall elevations
- Running string line along the back of the blocks allowed for alignment of split face block

Lessons Learned

- Applying tension on geogrid prior to placement of reinforcing aggregate was essential
- Aggregate placement was important
  - Back of the wall towards the center maintained tension on geogrid

Lessons Learned

- Grinding of masonry blocks was necessary to maintain level course lines
- Placing asphalt pavement on the median island was a challenge

Questions?