Design Problem No. 3

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Design Problem No. 3

- TH 169 criteria
  - Rural 4-lane divided highway
  - Depressed median
  - ADT = 13,900
  - Design speed = 70 mph
  - Posted speed = 65 mph

Design Problem No. 3 (Continued)

- Bridge replacement scheduled for 2006
- Bridge length = 1,100’
- CMB separates NB and SB traffic
- North end bridge, CMB ties into existing CMB
- South end bridge, CMB terminates (depressed median)

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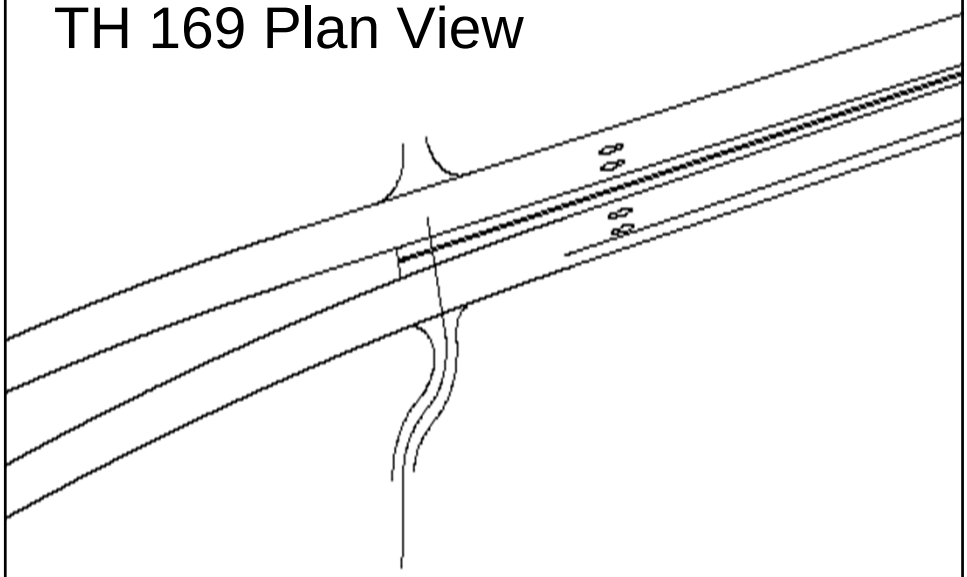
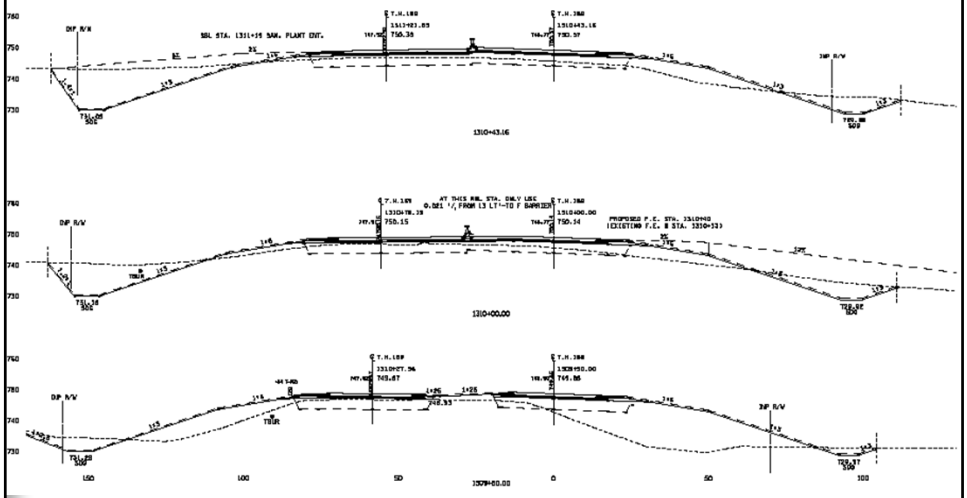
Design Problem No. 3 Question

- Which barrier system would work best between the CMB attenuator and the depressed median section meeting clear zone requirements?

TH 169 Plan View



TH 169 Cross Sections



Distance: 3147.8 ft
Latitude:+44.4731255
Heading: 180.1°
District: 7
Name: U169
FDiPost: 78.187
Mile Point: 78.071 RP
Longitude:-93.8943176
Grade-CS:
Co: 0
DD: D
TDiPost: 77.520

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Distance: 327.3 ft
Latitude:+44.4790077
Heading: 180.0°
District: 7
Name: U169
FDiPost: 78.187
SurveyDateTime: 05/14/2001 07:08
Mile Point: 78.605 RP
Longitude:-93.8881149
Grade-CS:
Co: 0
DD: D
TDiPost: 77.520

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Barrier Options for Depressed Medians

- Cable Median Barrier
  - Normally limited to 5:1 side slopes or flatter
  - Recent testing has demonstrated some problems with 6:1 slopes when barrier placed 3-10 ft. from ditch bottom - barrier performance acceptable when placed at ditch bottom
  - Double barrier option can be used when steeper side slopes, but barriers must be placed 10 or more ft from ditch bottom
  - Crash experience has shown that cable barriers do allow some penetrations

Barrier Options for Depressed Medians

- W-beam/Thrie-beam Median Barrier
  - Acceptable for 8:1 slopes or flatter
  - Easily transitioned to concrete median barrier
- Concrete Barrier Extended Along Shoulder
  - Costly
  - High barrier accident frequency

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Cable-Concrete Median Barrier Transition

- Transition Concrete to W-beam Median Barrier
  - Add backside railing to standard approach guardrail transition
  - Transition to median barrier instead of W-beam guardrail
- Cable to W-beam Transition – Option 1 – Preferred
  - Separate Median Barrier into 2 guardrails at standard flare rate
  - Flare departure side guardrail until it is 8 ft. from face of approach side guardrail
  - Utilize cable to W-beam transition on approach side
  - Install downstream terminal on departure side

Cable-Concrete Median Barrier Transition

- Cable to W-beam Transition – Option 2 for Narrow Median
  - Install FLEAT-MT
  - Extend flared section of FLEAT-MT until 4’ flare achieved
  - Utilize breakaway steel posts in extension
  - Install Cable to W-beam transition to FLEAT-MT
  - This option not crash tested, but only available solution for narrow medians

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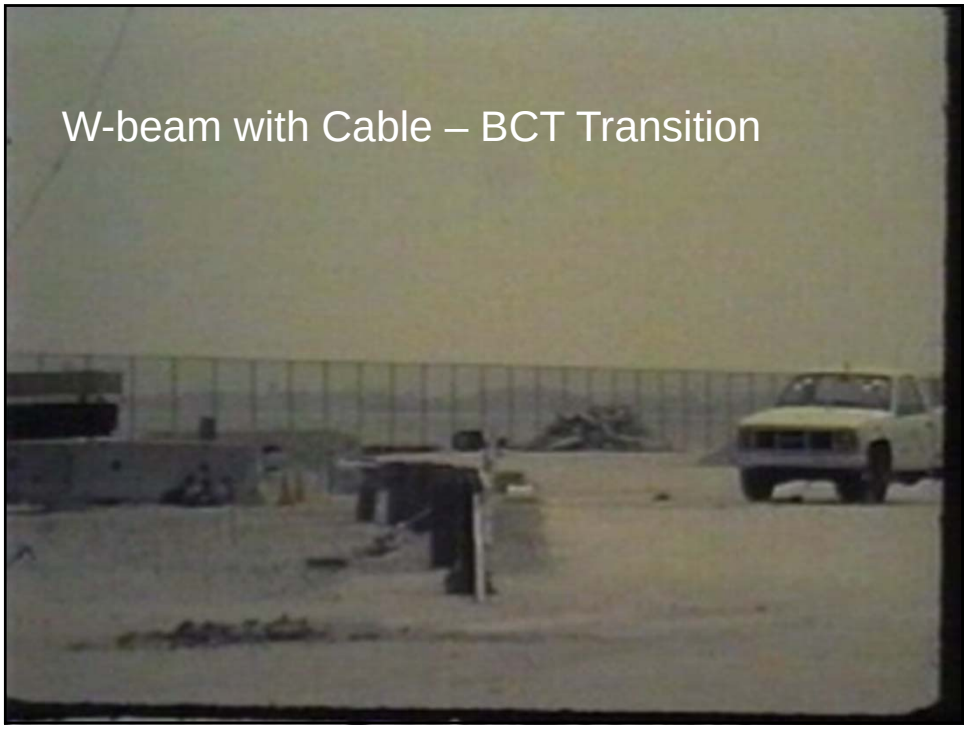
W-beam with Cable – BCT Transition

W-beam with Cable – BCT Transition



W-beam with Cable – FLEAT

W-beam with Cable – FLEAT

FLEAT-MT

FLEAT-MT