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

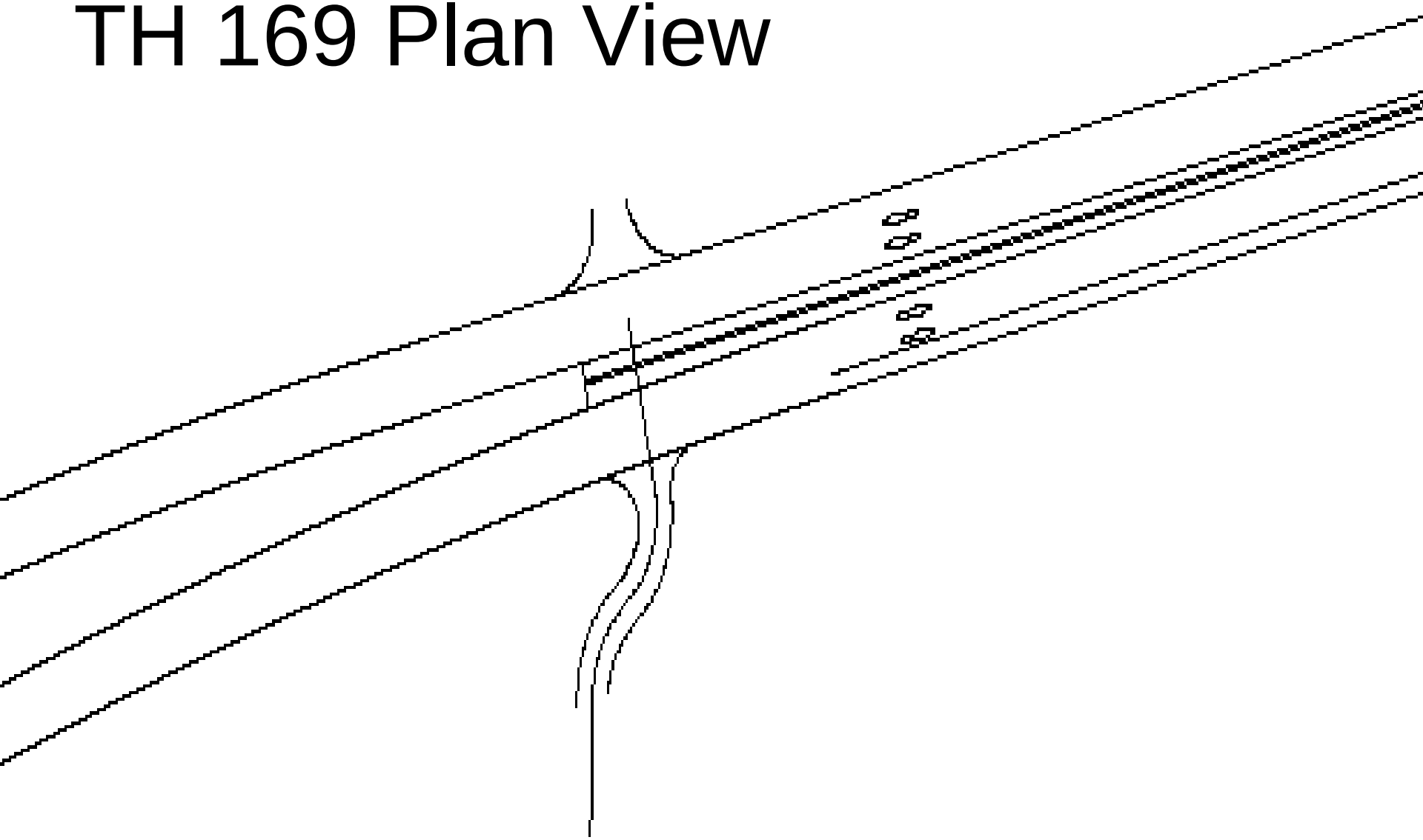
Design Problem No. 3 (Continued)

- 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)

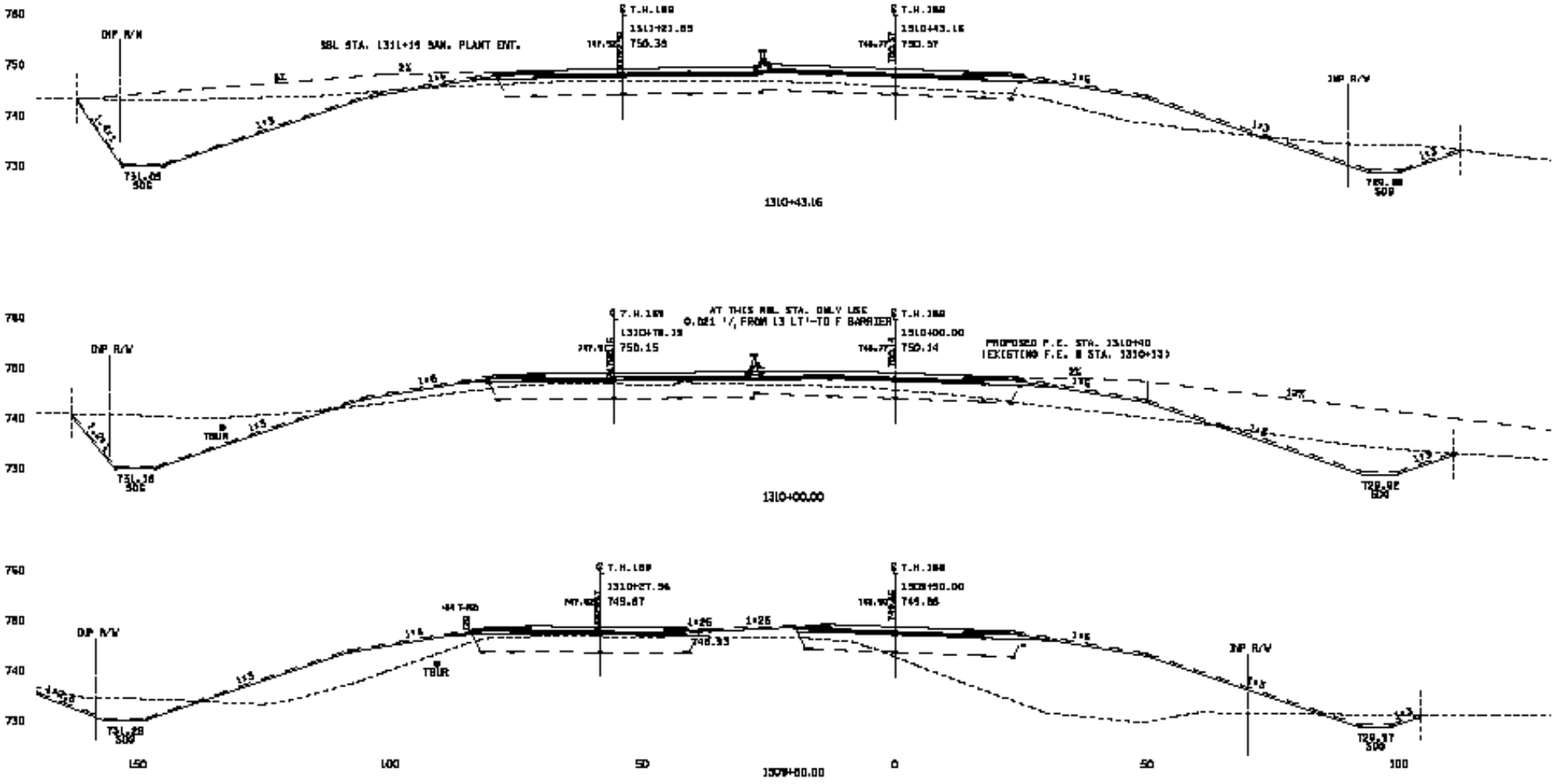
Design Problem No. 3 Question

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

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

Distance:	1663.3 ft	Mile Point:	78.685 RP
Latitude:	+44.4799347	Longitude:	-93.8871307
Heading:	181.0°	Grade-CS:	
District:	7	Co:	0
Name:	U169	DD:	D
FDiPost:	78.521	TDiPost:	78.187
SurveyDateTime:	05/14/2001 07:08		

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

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

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