U.S. Department
of Transportation
Federal Highway
Administration

400 Seventh St., S.W.
Washington, D.C. 20590

May 26, 2005

In Reply Refer To: HSA-10/B-135

Ronald K. Faller, Ph.D., P.E.
Research Assistant Professor
Midwest Roadside Safety Facility (MwRSF)
University of Nebraska-Lincoln
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P.O. Box 880529
Lincoln, Nebraska 68588-0529

Dear Dr. Faller:

In your March 28 letter, you requested formal Federal Highway Administration acceptance of a timber rub-rail developed to shield a noise wall used by the Minnesota Department of Transportation (MnDOT). To support your request, you also sent me copies of the Midwest Roadside Safety Facility's March 8 test report entitled "Design and Evaluation of Minnesota's Timber Rub-Rail for Noise Barriers" and digital videos of the test you conducted.

The rub-rail and spacer block design consisted of treated glulam timber made from Southern Pine. The rail element was 13.5-in. high x 8.75-in. deep with a top mounting height of 30 in. The spacer blocks were 9-in. wide x 6-in. deep x 13.5 in. high and bolted on 8-ft. centers to the 12-in. x 18-in. reinforced concrete posts that formed the framework for the noise barrier. The reinforced concrete posts were 16-ft long and utilized a 6-ft embedment depth. Enclosure 1 provides drawings of the test installation. I assume that anyone interested in obtaining complete system drawings that include the connection hardware and mounting details and specifications can request them directly from MnDOT. You conducted the NCHRP Report 350 test 3-11 (MNTR-1) and reported that all Report 350 evaluation criteria were met. Based on these test results, summarized in Enclosure 2, I agree that this design, when used with MnDOT's noise wall or with a design structurally and geometrically similar, can be used on the National Highway System as a test level 3 barrier, assuming it is introduced outside the minimum clear zone for the highway facility or its approach end is adequately shielded from traffic.

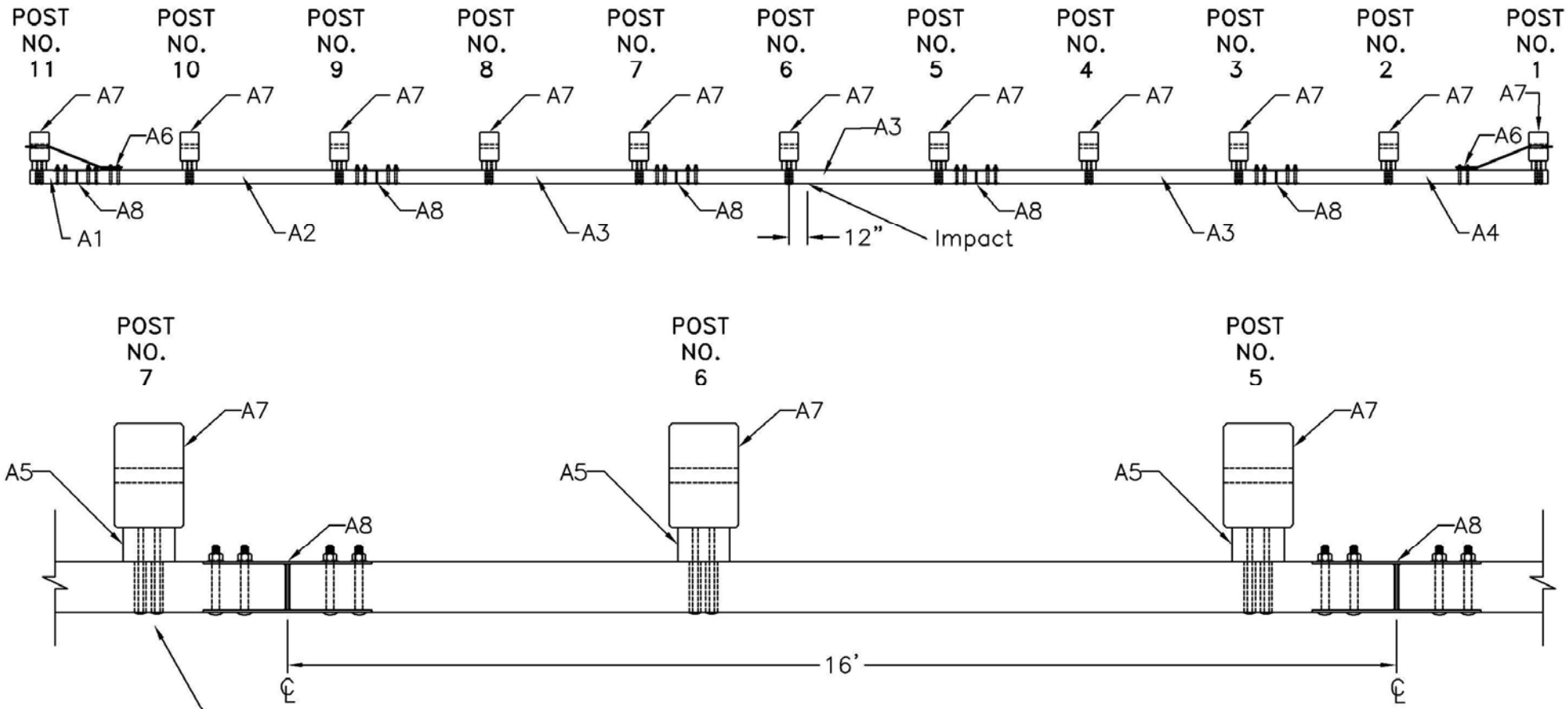
I noted that the crash test was conducted without the noise wall panels installed on the posts. Since these horizontal panels are fabricated from small timber planking, they were not believed to degrade the system's safety performance. Staff members have suggested that installing the

timber rail on steel posts driven directly in front of the concrete noise wall columns (but not physically attached to them), would simplify construction and provide some additional overhang distance before vehicular contact with the columns would occur. This modified design would allow more flexibility in the lateral placement of the timber noise wall panels as well since there appears to be little likelihood that panels recessed beyond the traffic face of the concrete columns would pose a spearing problem.

Sincerely yours,

John R. Baxter, P.E.
Director, Office of Safety Design
Office of Safety

2 Enclosures



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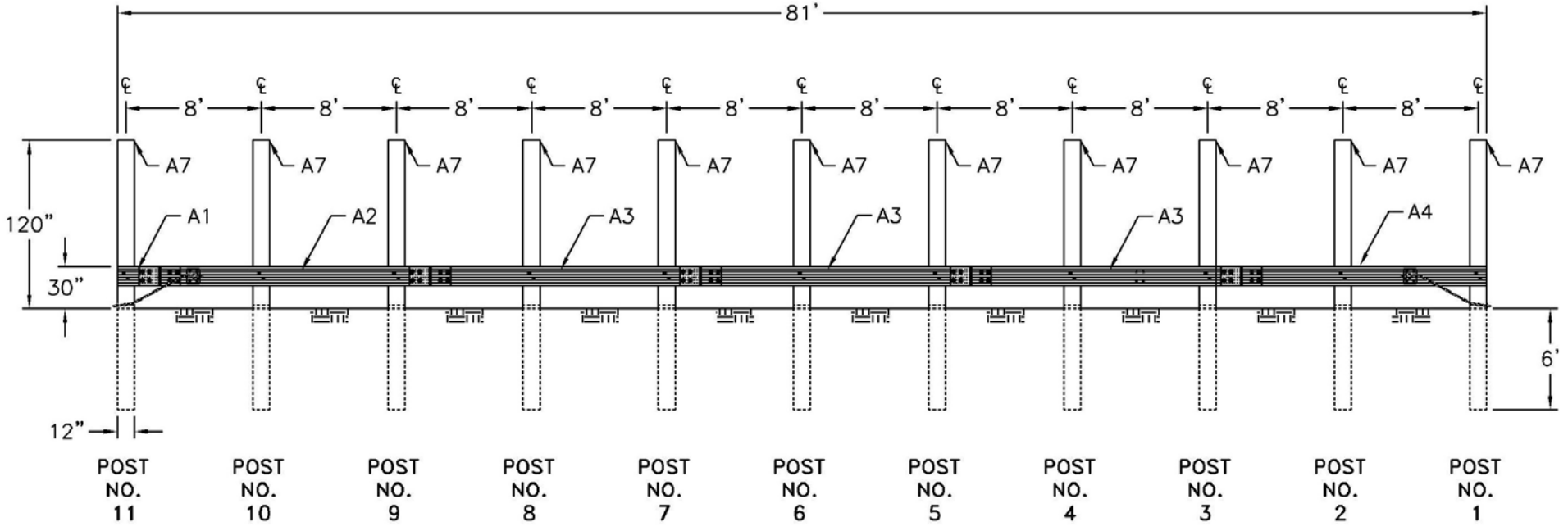
MNDOT NOISE WALL
TIMBER RAIL

TEST INSTALLATION
PLAN VIEW

Sheet: 2 of 11
Date: 10/25/2004
By: DLK/GEP
Drawing Name: MNTR-1 R8.dwg
Scale: 1=100
Rev: JRR/KAP



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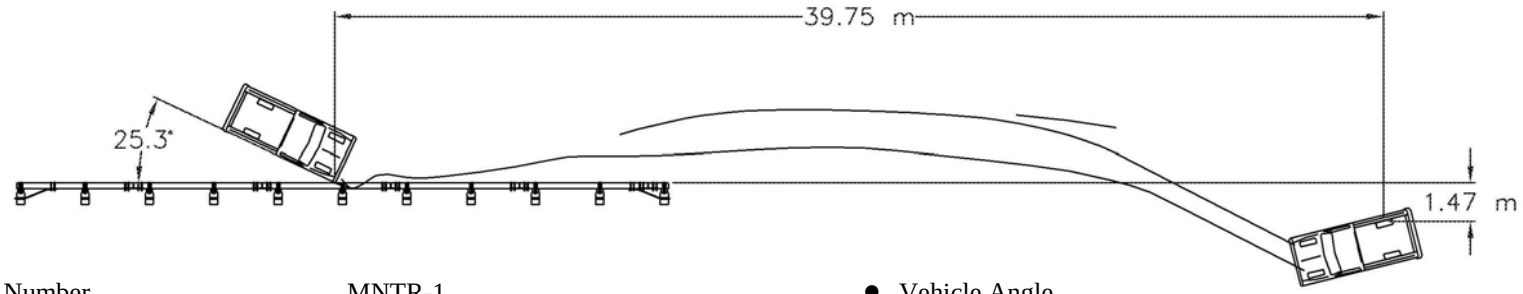
MNDOT NOISE WALL
TIMBER RAIL

TEST INSTALLATION
ELEVATION VIEW

Sheet: 1 of 11
Date: 10/25/2004
By: DLK/GEP
Drawing Name: MNTR-1 R8.dwg
Scale: None
Rev: JRR/KAP

0.000 sec 0.054 sec 0.118 sec 0.222 sec 0.362 sec



- Test Number MNTR-1
- Date 7/16/04
- Appurtenance . . . . . Minnesota's Timber Rub Rail for Noise Barriers
- Total Length . . . . . 24.86 m
- Glulam Wood Rail
  - Material . . . . . Southern Pine, Combination No. 48
  - Dimensions . . . . . 343 mm x 222 mm by 24.86 m long
  - Top Mounting Height . . . . . 762 mm
- Post Nos. 1-11
  - Material . . . . . Concrete
  - Dimensions . . . . . 305 mm x 457 mm by 4,877 mm long
  - Embedment Depth . . . . . 1,829 mm
  - Spacing . . . . . 2,438 mm
- Wood Spacer Blocks Nos. 1-11
  - Material . . . . . Southern Pine, Combination No. 48
  - Dimensions . . . . . 229 mm x 152 mm by 343 mm long
- Vehicle Model . . . . . 1999 GMC 2500 ¾-ton pickup
  - Curb . . . . . 1,981 kg
  - Test Inertial . . . . . 1,989 kg
  - Gross Static . . . . . 1,989 kg
- Vehicle Speed
  - Impact . . . . . 99.4 km/h
  - Exit . . . . . 57.4 km/h
- Vehicle Angle
  - Impact . . . . . 25.3 deg
  - Exit . . . . . 4.1 deg
- Vehicle Snagging . . . . . Minor
- Vehicle Pocketing . . . . . None
- Vehicle Stability . . . . . Satisfactory
- Occupant Ridedown Deceleration (10 msec avg.)
  - Longitudinal . . . . . 8.45 g's < 20 g's
  - Lateral (not required) . . . . . 9.76 g's
- Occupant Impact Velocity
  - Longitudinal . . . . . 8.97 m/s < 12 m/s
  - Lateral (not required) . . . . . 6.81 m/s
- PHD . . . . . 10.27 g's
- THIV . . . . . 11.59 m/s
- Vehicle Damage . . . . . Moderate
  - TAD[4] 1-RFQ-6
  - SAE[5] 1-FZEW5
- Vehicle Stopping Distance . . . . . 39.75 m downstream 1.47 m laterally behind
- Barrier Damage . . . . . Minimal
- Maximum Rail Deflections
  - Permanent Set . . . . . 55 mm
  - Dynamic . . . . . 92 mm
- Working Width . . . . . 1,133 mm

Figure 22. Summary of Test Results and Sequential Photographs, Test MNTR-1