March 27, 2003

HSA-10/B116

Ronald K. Faller, Ph.D., P.E.
Research Assistant Professor
Midwest Roadside Safety Facility
P.O. Box 880601
Lincoln, NE 68588-0601

Dear Dr. Faller:

In your letter dated October 24, 2002, you requested formal Federal Highway Administration acceptance of a Low Profile Bridge Rail tested to NCHRP Report 350 test level 2 (TL-2). Included with your letter were copies of the Midwest Roadside Safety Facility report dated August 20, 2002, entitled "Development of a Low-Profile Bridge Rail for Test Level 2 Applications", a VHS video tape documenting the compliance test, and a CD-ROM containing digital photographs, film footage and system drawings.

The tested rail was a 508-mm high reinforced concrete "curb" with a vertical back and a top width of 356 mm to a depth of 152 mm. This width was then transitioned back (on a 1:1 slope) to a 279-mm thickness, which then remained constant to the bridge deck. These dimensions (and reinforcing details) are shown in the enclosure to this letter. NCHRP Report 350 test 2-11 was run, with a 2000-kg pickup truck impacting the rail at 70 km/h and at an angle of 27.1 degrees. The vehicle was contained and redirected. Reported occupant impact velocity and ridedown accelerations were 6.6 m/s and 8.1 G's, respectively, both values being less than the preferred maximums suggested in NCHRP Report 350 guidelines. The roll angle of the truck was 36 degrees. Test 2-10 with the 820-kg car was deemed redundant based on previous tests with similar height barriers and I agree that that test can be waived in this instance.

The bridge rail described above can be considered an NCHRP Report 350 test level 2 (TL-2) design and used on the National Highway System at locations where anticipated impact speeds are in the 70-km/h range.

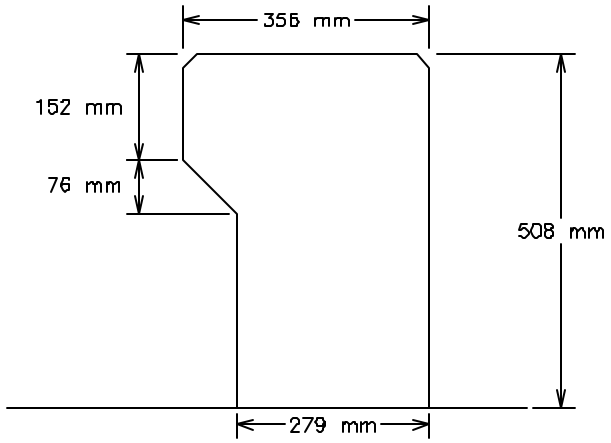
Although you did not request acceptance of a terminal for the TL-2 bridge rail in your letter, your research report recommended the use of a sloped concrete end treatment similar to one which has been previously accepted at TL-2 based on a series of full-scale crash tests. While that earlier design was deemed acceptable, the acceptance letter (CC-44, dated March 6, 1998) clearly stated that in several of the compliance tests, the impacting vehicles rode up onto the barrier proper or proceeded behind the terminal for distances exceeding 50 meters. While not desirable, these trajectories may be acceptable if the terrain behind the barrier is both clear of hazards (or workers) and is reasonably traversable. However, if a sloped terminal is installed immediately adjacent to a bridge, there is a good chance that an impacting vehicle may end up in or on whatever feature the structure crosses. Consequently, the sloped terminal should be used to introduce a bridge rail only when an appropriate length of barrier proper is installed along the roadway in advance of the structure itself.

Sincerely yours,

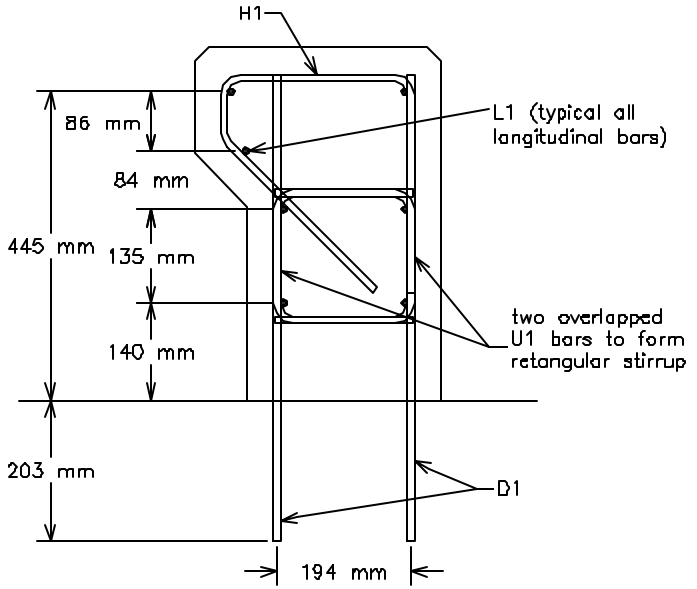
(original signed by Michael S. Griffith)

Michael S. Griffith
Acting Director, Office of Safety Design
Office of Safety

Enclosure

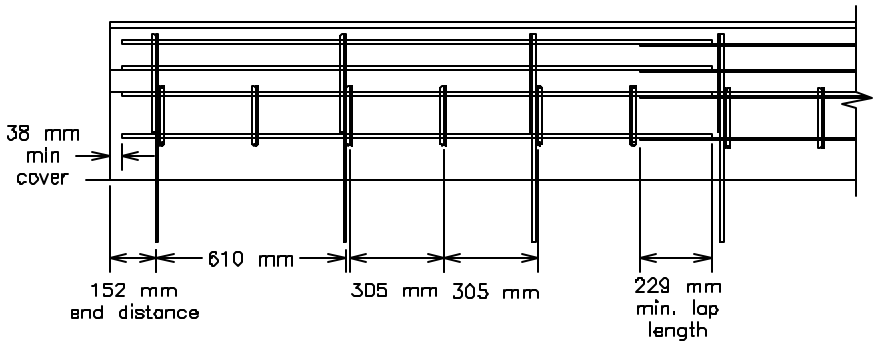


End View

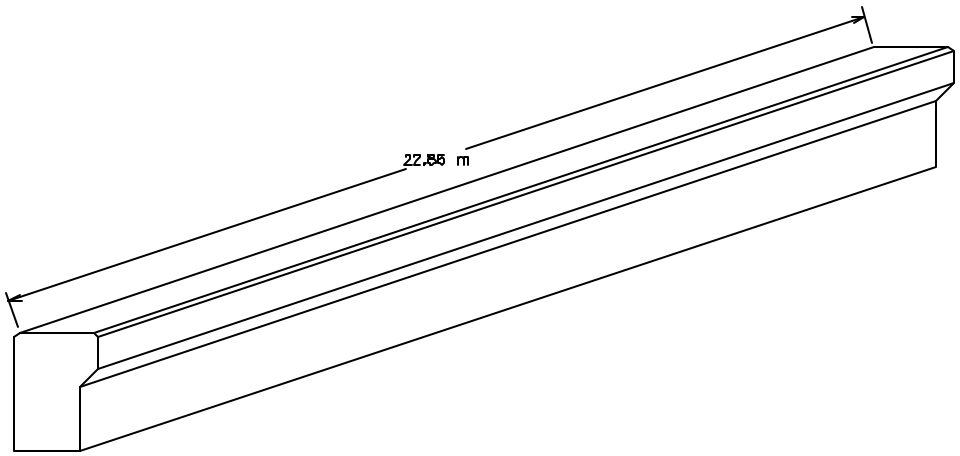


Rebar Details

NOTES:
(1) Use Grade 60 reinforcement.
(2) Use minimum concrete strength of f'c=4,500 psi.
(3) Use 1½" minimum cover.
(4) Use ¾" chamfer on top corners.
(5) Extra No. 3 bar place along sloped stirrup used for continuity near front face. (Position may be altered.)
(6) Minimum lap length for longitudinal bars is 9".
(7) Special reinforcement spacing at free ends or joints to be determined.



Rebar Longitudinal Details



Isometric Rail View

MwRSF Midwest Roadside Safety Facility		Low Profile Bridge Rail
DATE: 1/25/2001	Revised:	File Name: lawprofwall.dwg
BY: Eric A. Keller		
SCALE: none		Sheet 01 of 02