



U.S. Department  
of Transportation  
**Federal Highway  
Administration**

1200 New Jersey Ave., SE  
Washington, D.C. 20590

April 15, 2016

In Reply Refer To:  
HSST-1/WZ-341

Mr. Miguel Vila  
PedRail Systems LLC  
P.O. Box 161095  
Miami, FL 33116-1095

Dear Mr. Vila:

This letter is in response to your February 8, 2016 request for the Federal Highway Administration (FHWA) to review a roadside safety device, hardware, or system for eligibility for reimbursement under the Federal-aid highway program. This FHWA letter of eligibility is assigned FHWA control number WZ-341 and is valid until a subsequent letter is issued by FHWA that expressly references this device.

**Decision**

The following devices are eligible, with details provided in the form which is attached as an integral part of this letter:

- PedRail Longitudinal Channelizer

**Scope of this Letter**

To be found eligible for Federal-aid funding, new roadside safety devices should meet the crash test and evaluation criteria contained in the American Association of State Highway and Transportation Officials' Manual for Assessing Safety Hardware (MASH). However, the FHWA, the Department of Transportation, and the United States Government do not regulate the manufacture of roadside safety devices. Eligibility for reimbursement under the Federal-aid highway program does not establish approval, certification or endorsement of the device for any particular purpose or use.

This letter is not a determination by the FHWA, the Department of Transportation, or the United States Government that a vehicle crash involving the device will result in any particular outcome, nor is it a guarantee of the in-service performance of this device. Proper manufacturing, installation, and maintenance are required in order for this device to function as tested.

This finding of eligibility is limited to the crashworthiness of the system and does not cover other structural features, nor conformity with the Manual on Uniform Traffic Control Devices.

### **Eligibility for Reimbursement**

Based solely on a review of crash test results and certifications submitted by the manufacturer, and the crash test laboratory, FHWA agrees that the device described herein meets the crash test and evaluation criteria of the American Association of State Highway and Transportation Officials' Manual for Assessing Safety Hardware (MASH). Therefore, the device is eligible for reimbursement under the Federal-aid highway program if installed under the range of tested conditions.

Name of system: PedRail Longitudinal Channelizer  
Type of system: Work Zone Traffic Control Device  
Test Level: MASH TL-2  
Testing conducted by: E-Tech Testing Services, Inc.  
Date of request: February 8, 2016  
Date initially acknowledged: February 22, 2016  
Date of completed package: March 18, 2016

FHWA concurs with the recommendation of the accredited crash testing laboratory as stated within the attached form.

### **Full Description of the Eligible Device**

The device and supporting documentation, including reports of the crash tests or other testing done, videos of any crash testing, and/or drawings of the device, are described in the attached form.

### **Notice**

If a manufacturer makes any modification to any of their roadside safety hardware that has an existing eligibility letter from FHWA, the manufacturer must notify FHWA of such modification with a request for continued eligibility for reimbursement. The notice of all modifications to a device must be accompanied by:

- Significant modifications – For these modifications, crash test results must be submitted with accompanying documentation and videos.
- Non-signification modifications – For these modifications, a statement from the crash test laboratory on the potential effect of the modification on the ability of the device to meet the relevant crash test criteria.

FHWA's determination of continued eligibility for the modified hardware will be based on whether the modified hardware will continue to meet the relevant crash test criteria.

You are expected to supply potential users with sufficient information on design, installation and maintenance requirements to ensure proper performance.

You are expected to certify to potential users that the hardware furnished has the same chemistry, mechanical properties, and geometry as that submitted for review, and that it will meet the test and evaluation criteria of the MASH.

Issuance of this letter does not convey property rights of any sort or any exclusive privilege. This letter is based on the premise that information and reports submitted by you are accurate and correct. We reserve the right to modify or revoke this letter if: (1) there are any inaccuracies in the information submitted in support of your request for this letter, (2) the qualification testing was flawed, (3) in-service performance or other information reveals safety problems, (4) the system is significantly different from the version that was crash tested, or (5) any other information indicates that the letter was issued in error or otherwise does not reflect full and complete information about the crashworthiness of the system.

### Standard Provisions

- To prevent misunderstanding by others, this letter of eligibility designated as FHWA control number WZ-341 shall not be reproduced except in full. This letter and the test documentation upon which it is based are public information. All such letters and documentation may be reviewed upon request.
- This letter shall not be construed as authorization or consent by the FHWA to use, manufacture, or sell any patented system for which the applicant is not the patent holder.
- If the subject device is a patented product it may be considered to be proprietary. If proprietary systems are specified by a highway agency for use on Federal-aid projects: (a) they must be supplied through competitive bidding with equally suitable unpatented items; (b) the highway agency must certify that they are essential for synchronization with the existing highway facilities or that no equally suitable alternative exists; or (c) they must be used for research or for a distinctive type of construction on relatively short sections of road for experimental purposes. Our regulations concerning proprietary products are contained in Title 23, Code of Federal Regulations, Section 635.411.

Sincerely yours,



Michael S. Griffith  
Director, Office of Safety Technologies  
Office of Safety

Enclosures

## Request for Federal Aid Reimbursement Eligibility of Highway Safety Hardware

<b>Submitter</b>	Date of Request:	March 16, 2016	<input type="radio"/> New <input checked="" type="radio"/> Resubmission
	Name:	MIGUEL VILA	
	Company:	PEDRAIL SYSTEMS LLC	
	Address:	PO BOX 161095 MIAMI, FL 33116-1095	
	Country:	USA	
To:	Michael S. Griffith, Director FHWA, Office of Safety Technologies		

I request the following devices be considered eligible for reimbursement under the Federal-aid highway program.

System Type	Submission Type	Device Name / Variant	Testing Criterion	Test Level
'WZ': Crash Worthy Work Zone Traffic Control Devices	<input checked="" type="radio"/> Physical Crash Testing <input type="radio"/> Engineering Analysis	Pedrail Longitudinal Channelizing Device	AASHTO MASH	TL2

By submitting this request for review and evaluation by the Federal Highway Administration, I certify that the product(s) was (were) tested in conformity with the AASHTO Manual for Assessing Safety Hardware and that the evaluation results meet the appropriate evaluation criteria in the MASH.

Identification of the individual or organization responsible for the product:

Contact Name:	MIGUEL VILA	Same as Submitter <input checked="" type="checkbox"/>
Company Name:	PEDRAIL SYSTEMS LLC	Same as Submitter <input checked="" type="checkbox"/>
Address:	PO BOX 161095 MIAMI, FL 33116-1095	Same as Submitter <input checked="" type="checkbox"/>
Country:	USA	Same as Submitter <input checked="" type="checkbox"/>
Enter below all disclosures of financial interests as required by the FHWA 'Federal-Aid Reimbursement Eligibility Process for Safety Hardware Devices' document.		
<p>The Pedrail Longitudinal Channelizing Device technology is the commercial embodiment of intellectual property that is Patent Pending. Pedrail does not pay royalties for sales of the Longitudinal Channelizing Device. The Pedrail Longitudinal Channelizing Device was designed and developed by engineers at Pedrail. Pedrail sponsored certain crash tests of the Pedrail Longitudinal Channelizing Device; such tests were conducted by E-Tech Testing Services, an independent, wholly-owned subsidiary of Trinity Highway. Pedrail paid E-TECH for the crash testing services provided and no other financial interests exist.</p>		

## PRODUCT DESCRIPTION

<input checked="" type="radio"/> New Hardware or Significant Modification	<input type="radio"/> Modification to Existing Hardware	
<p>The PedRail Longitudinal Channelizer is a work zone traffic control device used to regulate and guide pedestrians through the construction area in a safe and proper manner. Similarly it acts as a longitudinal channelizer to provide clear visual indication of the intended path of the vehicles traveling through the work zone.</p> <p>A PedRail Longitudinal Channelizer module consists of a 30 lb (13.6 kg) section manufactured from galvanized steel with a removable 6 lb (2.7 kg) pivoting base (not including the 35 lb (15.9 kg) sand bags used for ballast). Each module was fitted with two 5/8" x 8" x 72" plastic barricade panels which can be configured with various delineation patterns. Adjacent modules couple together using a pair of 3 in long A307 1/2 in diameter bolts that are welded to the structure.</p> <p>The individual modules can be linked together to form rows that can be shaped to any layout. The PedRail is ADA and MUTCD compliant.</p>		

## CRASH TESTING

A brief description of each crash test and its result:

Required Test Number	Narrative Description	Evaluation Results
2-90 (1100C)	<p>The crash test matrix specified by Pedrail consisted of MASH Test 2-90 with the 1100C small car impacting the test article midspan (L/2) at 43 mi/h (70 km/h). MASH evaluation guidelines suggest a critical impact angle (CIA) be determined for the impact test. A 25 deg impact angle was chosen. A straight array of ten Pedrail modules were impacted at the midpoint of the 5th of ten modules. The test was run on December 9, 2015 using a gold 2009 Kia Rio.</p> <p>The 1100C vehicle bumper impacted the installation at the midpoint of the 5th section to fully interact with the coupling between the 5th and 6th sections. The driver's side bumper initially contacted the test installation. The connecting pins between the 5th and 6th sections immediately detached. The 5th and 6th sections swung open as the vehicle passed through. The driver's rear wheel contacted the 5th section and punctured the sidewall causing the tire to deflate rapidly. The 5th section detached completely and came to rest 7 ft (2.1 m) downstream and 14 ft (4.3 m) offset towards the non-traffic side from the point of impact. The 6th section also detached completely and came to rest 46 ft (14 m) downstream and 7 ft (2.1 m) offset towards the non-traffic side from the point of impact. The first four sections slid forward approximately 3 ft (0.9) towards the point of impact then tipped over towards the non-traffic side. The 7th, 8th, 9th and 10th sections displaced in various directions but remained upright.</p> <p>The vehicle brakes were applied after the test vehicle was no longer in contact with the test article. The vehicle partially ascended an earth berm then rolled back down to the final rest position 118 ft (36 m) downstream and 71 ft (22 m) offset to the non-traffic side of the initial point of contact.</p>	PASS

Required Test Number	Narrative Description	Evaluation Results
2-91 (1100C)	<p>Test 91 is designed to evaluate the behavior of the devices during high speed tests, using the 2270P pickup. This test is generally recognized as the less critical test for lighter and shorter test articles and, depending on results and device/vehicle geometry, it may be unnecessary to perform Test 91 (2270P). As there was no evidence of vehicle instability or occupant compartment intrusion in the results of Test 2-90 above, Test 2-91 was elected not to be conducted.</p> <p>Additionally, the test article did not engage the vehicle's undercarriage thus eliminating the possibility of floorboard deformation/penetration. Based on a thorough review of the test article design and the data gathered from Test 2-90, PedRail Systems and E-TECH Testing Services agreed that conducting Test 2-91 was not necessary. As the 2270P's hood height exceeds the overall height of the PedRail Longitudinal Barrier sections, the probability of occupant compartment intrusion via the windshield or sides (i.e. doors and side windows) are negligible. A further review of the possible floorboard deformation/penetration was conducted and we concluded that the pivoting foot may pass under the 2270P's undercarriage but the pivoting foot, positioned in any orientation, is several inches shorter than the clearance distance between the 2270P's floorboard at the ground thus eliminating the possibility of an interference issue. Images demonstrating the floorboard clearance are available upon request. Based on the reasoning above, we conclude that conducting Test 2-91 would be uneventful and inconsequential.</p>	Non-Critical, not conducted

Full Scale Crash Testing was done in compliance with MASH by the following accredited crash test laboratory (cite the laboratory's accreditation status as noted in the crash test reports.):

Laboratory Name:	E-Tech Testing Services, Inc.	
Laboratory Signature:	<b>Paul Kruse</b>	Digitally signed by Paul Kruse Date: 2016.03.18 05:54:04 -07'00'
Address:	3617B Cincinnati Ave, Rocklin, CA 95765	Same as Submitter <input type="checkbox"/>
Country:	United States	Same as Submitter <input type="checkbox"/>
Accreditation Certificate Number and Dates of current Accreditation period :	A2LA Certificate# 0989.01, valid November 20, 2015 to November 30, 2017	

Submitter Signature\*: **Miguel Vila** Digitally signed by Miguel Vila  
DN: cn=Miguel Vila, o=Pedrail Systems LLC,  
ou,email=miguel@pedrailystems.com,  
c=US  
Date: 2016.03.18 19:40:09 -04'00'

Submit Form

## ATTACHMENTS

Attach to this form:

- 1) Additional disclosures of related financial interest as indicated above.
- 2) A copy of the full test report, video, and a Test Data Summary Sheet for each test conducted in support of this request.
- 3) A drawing or drawings of the device(s) that conform to the Task Force-13 Drawing Specifications [[Hardware Guide Drawing Standards](#)]. For proprietary products, a single isometric line drawing is usually acceptable to illustrate the product, with detailed specifications, intended use, and contact information provided on the reverse. Additional drawings (not in TF-13 format) showing details that are relevant to understanding the dimensions and performance of the device should also be submitted to facilitate our review.

FHWA Official Business Only:

Eligibility Letter		AASHTO TF13	
Number	Date	Designator	Key Words
WZ-341	April 15, 2016		Longitudinal Channelizer

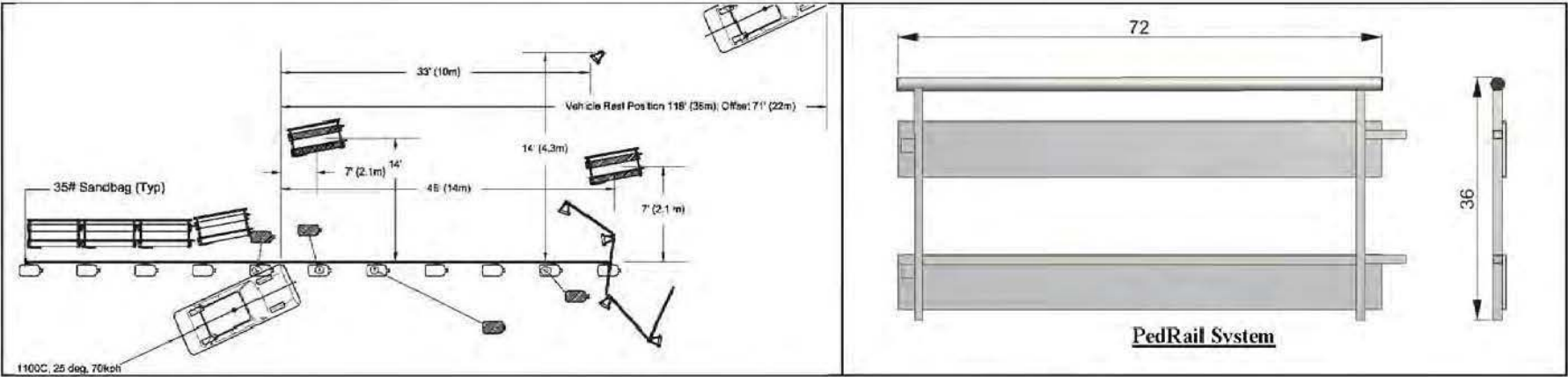
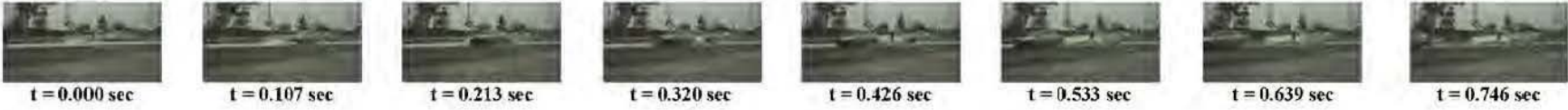


Figure 1 - Summary of Results – PedRail Test 80-0116-001

**General Information**

Test Agency ..... E-TECH Testing Services, Inc.  
 Test Designation ..... MASH Test 2-90  
 Test No ..... 80-0116-001  
 Date ..... 12/9/2015

**Test Article**

Type ..... PedRail Systems, LLC  
 PedRail Pedestrian Channelizer  
 Installation Details ..... (10) 6ft sections in a straight array freestanding on concrete  
 Material and Key ..... 36 in tall x 72 in wide galvanized steel with plastic panels  
 Elements ..... plastic panels  
 Foundation Type ..... Concrete, clean and dry  
 and Condition

**Test Vehicle**

Type ..... Production Model  
 Designation ..... 1100C  
 Model ..... 2009 Kia Rio  
 Curb ..... 2388 lb  
 Test Inertial ..... 2444 lb  
 Dummy ..... 165 lb  
 Gross Static ..... 2609 lb

**Impact Conditions**

Speed ..... 44.3 mi/h  
 Angle (deg) ..... 25  
 Impact Severity ..... 160.3 ft-kip

**Occupant Risk Values (absolute values)**

Impact Velocity  
 Longitudinal ..... 6.9 ft/s  
 Lateral ..... 3.0 ft/s  
 Ridedown Acceleration  
 Longitudinal ..... 0.5 G  
 Lateral ..... 0.9 G

**EN Values**

THIV ..... 8.3 km/h  
 PHD ..... 0.9 G  
 ASI ..... 0.2

**Vehicle Stability**

Max. Roll ..... 5 deg  
 Max. Pitch ..... -1 deg  
 Max. Yaw ..... -6 deg

**Vehicle Damage**

Exterior  
 VDS ..... FL-1  
 CDC ..... 11FLLW1  
 Interior  
 VCDI ..... AS0000000  
 Maximum Deformation ..... Negligible





**E-TECH Testing Services**  
3617B Cincinnati Avenue A Trinity Highway  
Rocklin, CA 95765 Products Company  
Phone: 916-644-9102  
Fax: 916-645-3653

March 16, 2016

Pedrail Systems  
PO Box 161095  
Miami, FL 33166-1095

Attn: Miguel Vila

Ref: E-TECH Test No. 80-0116-001 (Longitudinal Channelizer)

Subj: Testing Clarifications

Dear Mr. Vila:

On December 9, 2015, E-TECH Testing Services conducted E-TECH Test No. 80-0116-001 on your Longitudinal Channelizer product. MASH Test 2-90 was conducted on a 10 segment, freestanding, straight array ballasted with sandbags. The purpose of this letter is to clarify various topics relating the referenced crash test.

Critical Impact Angle - The selection of the Critical Impact Angle (CIA) for MASH Test 2-90 was chosen to represent the steepest angle to ensure the greatest interaction between the 1100C's front bumper and the vertical structures of the 4th and 5th sections. Since each section is relatively lightweight, we ensured the test article was subjected to the worst case loadings to demonstrate vehicle trajectory were within MASH specified criteria. If a shallower impact angle were used, it is possible that the connection between the 4th and 5th sections will release and the test article will swing out of the vehicle's path without full test article engagement.

MASH Test 2-91 - Based on a thorough review of the test article design and the data gathered from Test 2-90, PedRail Systems and E-TECH Testing Services agreed that conducting Test 2-91 was not necessary. As the 2270P's hood height exceeds the overall height of the PedRail Longitudinal Barrier sections, the probability of occupant compartment intrusion via the windshield or sides (i.e. doors and side windows) are negligible. A further review of the possible floorboard deformation/penetration was conducted and we concluded that the pivoting foot may pass under the 2270P's undercarriage but the pivoting foot, positioned in any orientation, is several inches shorter than the clearance distance between the 2270P's floorboard at the ground thus eliminating the possibility of an interference issue. Images demonstrating the floorboard clearance are available upon request. Based on the reasoning above, we conclude that conducting Test 2-91 would be uneventful and inconsequential.

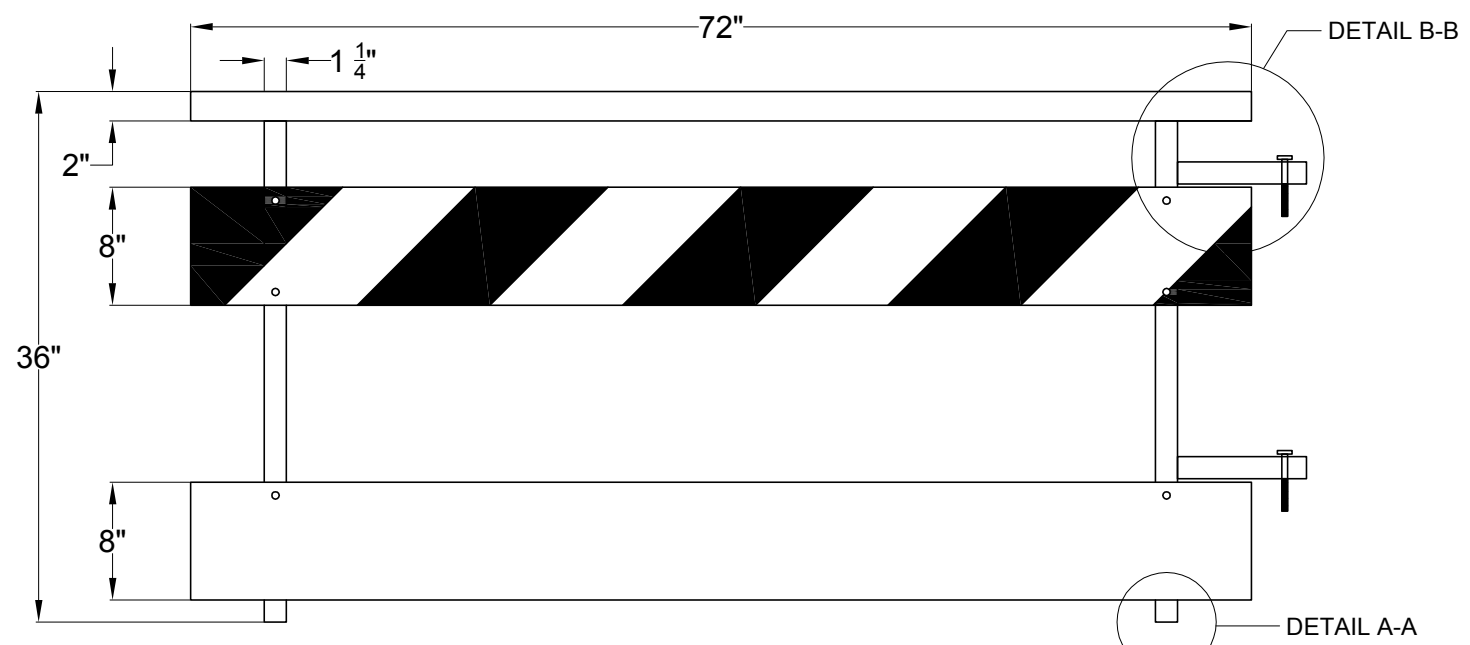
Please feel free to contact me directly if there are additional questions and/or comments regarding these judgments.

Best regards,

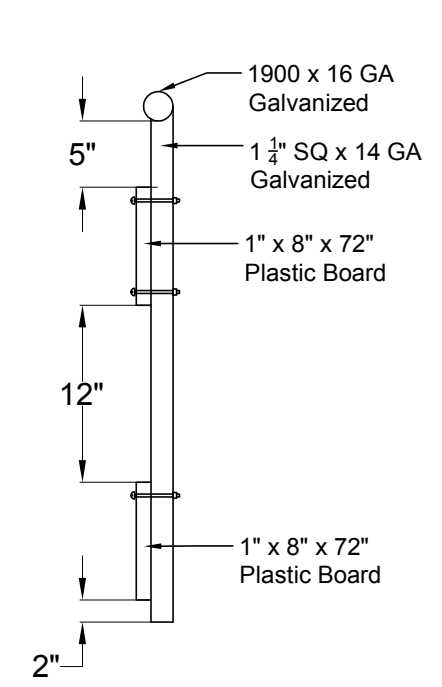
Paul L. Kruse, PE  
E-TECH Manager  
paul.kruse@trin.net



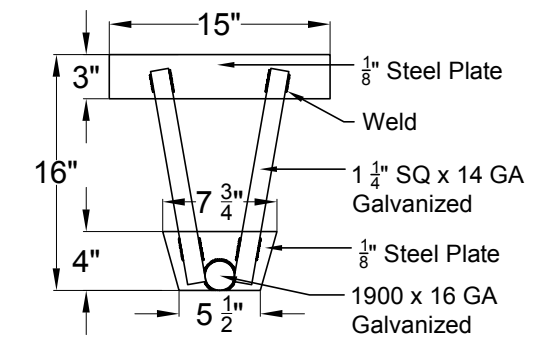




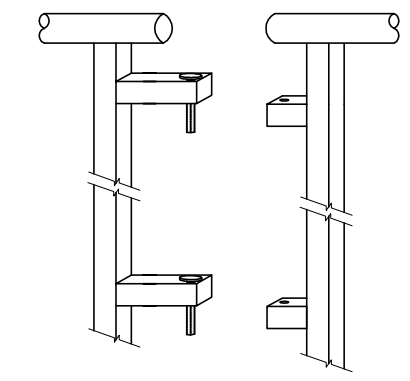
FRONT VIEW



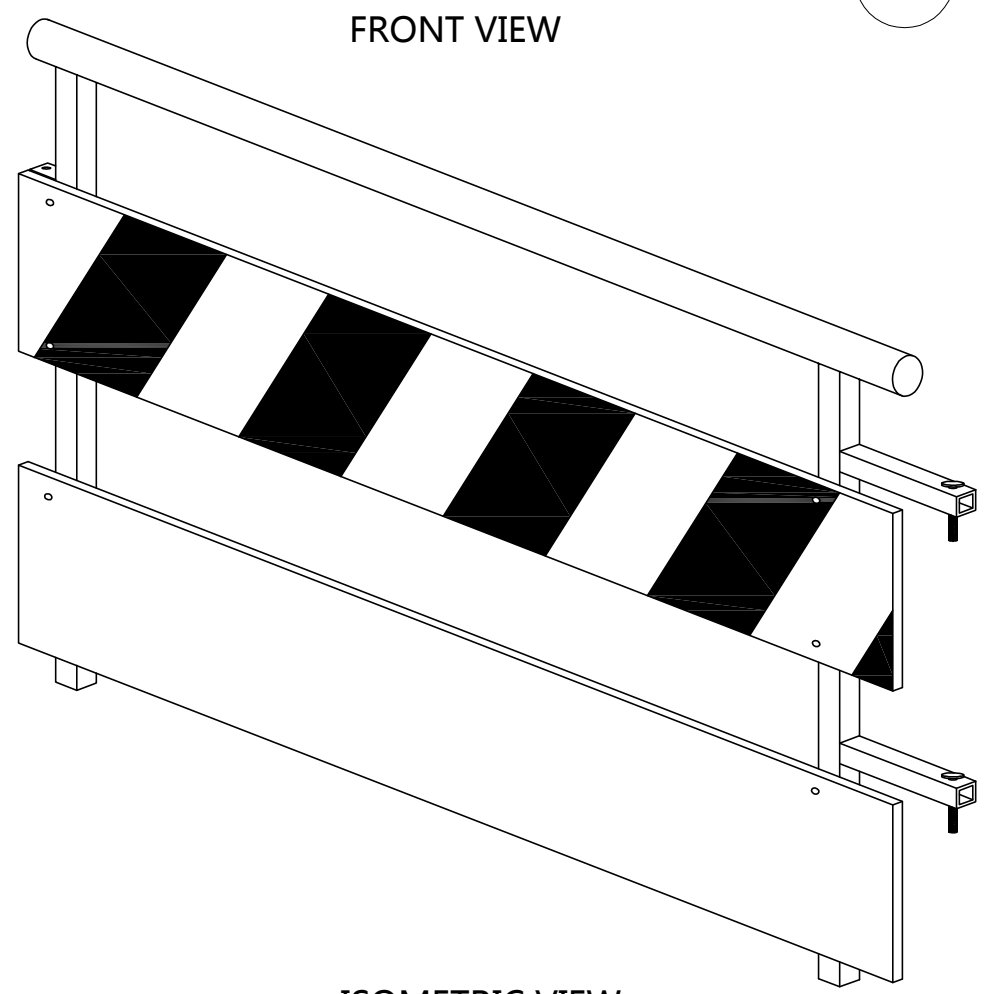
PROFILE VIEW



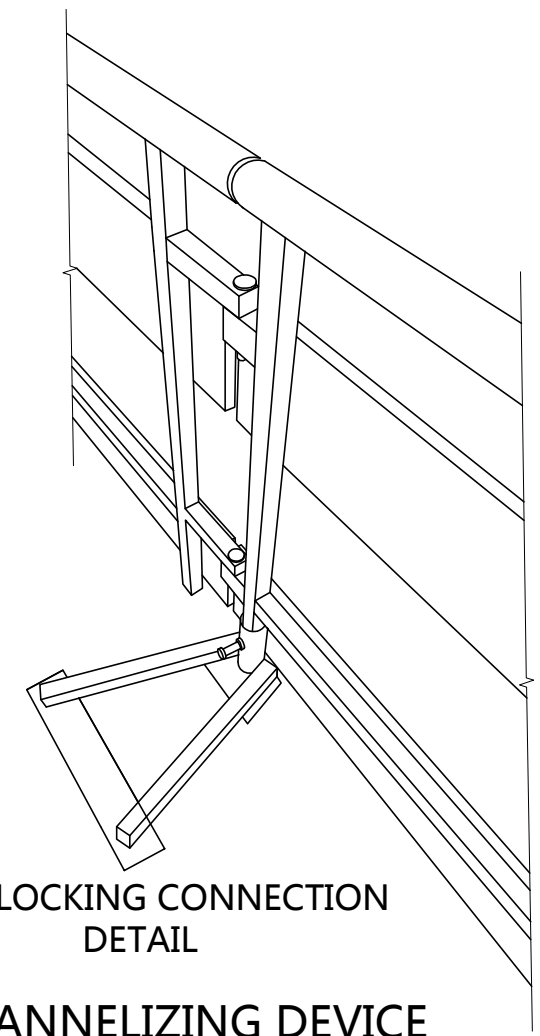
DETAIL A-A  
PIVOTING FOOT



DETAIL B-B  
INTERLOCKING  
CONNECTION



ISOMETRIC VIEW



INTERLOCKING CONNECTION  
DETAIL

PEDESTRIAN LONGITUDINAL CHANNELIZING DEVICE  
BY PEDRAIL SYSTEMS