



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

February 2, 2022

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

In Reply Refer To:  
HSST-1/B-356

Mr. Adrian Bullock  
Highway Care Ltd  
Denne Court, 1<sup>st</sup> Floor, South Wing, Hengist Field,  
Oad Street, Borden, Sittingbourne, Kent. ME9 8FH.  
UK

Dear Mr. Bullock:

This letter is in response to your December 31, 2020 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 B-356 and is valid until a subsequent letter is issued by FHWA that expressly references this device.

### **Decision**

The following device is eligible within the length-of-need, with details provided in the form which is attached as an integral part of this letter:

- HighwayGuard – Quadguard Crash Cushion Transition

### **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' (AASHTO) 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 AASHTO's 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: HighwayGuard – Quadguard Crash Cushion Transition  
Type of system: Longitudinal Barrier  
Test Level: Test Level 3  
Testing conducted by: Holmes Solutions LP  
Date of request: December 31, 2020

FHWA concurs with the recommendation of the accredited crash testing laboratory on 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**

This eligibility letter is issued for the subject device as tested. Modifications made to the device are not covered by this letter. Any modifications to this device should be submitted to the user (i.e., state DOT) as per their requirements.

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 AASHTO's 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 B-356 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.
- This FHWA eligibility letter is not an expression of any Agency view, position, or determination of validity, scope, or ownership of any intellectual property rights to a specific device or design. Further, this letter does not impute any distribution or licensing rights to the requester. This FHWA eligibility letter determination is made based solely on the crash-testing information submitted by the requester. The FHWA reserves the right to review and revoke an earlier eligibility determination after receipt of subsequent information related to crash testing.

Sincerely,

A handwritten signature in blue ink that reads "Michael S. Griffith". The signature is written in a cursive style with a large, stylized "S" for the middle initial.

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:	31st December 2020	<input checked="" type="radio"/> New <input type="radio"/> Resubmission
	Name:	Adrian Bullock	
	Company:	Highway Care Ltd	
	Address:	Denne Court, 1st Floor, South Wing, Hengist Field, Oad Street, Borden, Sittingbourne, Kent. ME9 8FH.	
	Country:	UK	
	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.

**Device & Testing Criterion** - Enter from right to left starting with Test Level

!-!-!

System Type	Submission Type	Device Name / Variant	Testing Criterion	Test Level
'B': Rigid/Semi-Rigid Barriers (Roadside, Median, Bridge Railings)	<input checked="" type="radio"/> Physical Crash Testing <input type="radio"/> Engineering Analysis	HighwayGuard - Quadguard Crash cushion transition	AASHTO MASH	TL3

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.

**Individual or Organization responsible for the product:**

Contact Name:	Adrian Bullock	Same as Submitter <input checked="" type="checkbox"/>
Company Name:	Highway Care Ltd	Same as Submitter <input checked="" type="checkbox"/>
Address:	Denne Court, 1st Floor, South Wing, Hengist Field, Oad Street, Borden, Sittingbourne, Kent, ME9 8FH	Same as Submitter <input checked="" type="checkbox"/>
Country:	UK	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>Holmes Solutions LP completed all of the documented testing activities under a commercial contract with Highway Care. In accordance with the requirements of ISO 17025, all testing activities completed by Holmes Solutions LP were undertaken free from any undue commercial influence. For the completion of this testing service, Holmes Solutions LP received payment in the form of professional fees. The fees received for the testing activities were not linked to the technical performance of the product nor the outcome of the tests. Holmes Solutions LP does not have, nor ever had, any financial interest in Highway Care, and has no ownership of any of the products IP. Holmes Solutions LP does not receive any research funding (or other forms of research support) from Highway Care.</p>		

## PRODUCT DESCRIPTION

- New Hardware or Significant Modification
  Modification to Existing Hardware

The tested product is a short section of HighwayGuard barrier profile and accompanying panels and frame work which is used to transition between HighwayGuard steel barrier and the steel re-directive crash cushion. The crash cushion chosen for the testing for this submission was the QuadGuard M10.

The transition is made up of a short section of HighwayGuard profile mounted to a ground plate which is designed to be anchored to the ground between the end of the HighwayGuard Barrier wall and the crash cushion. There are side panels bolted to the Highway Guard and the crash cushion back up which are designed as a transition between the differing profiles of the HighwayGuard barrier and the crash cushion and to safely redirect any errant vehicle coming into contact with the system between the barrier wall and the crash cushion.

### CRASH TESTING

By signature below, the Engineer affiliated with the testing laboratory, agrees in support of this submission that all of the critical and relevant crash tests for this device listed above were conducted to meet the MASH test criteria. The Engineer has determined that no other crash tests are necessary to determine the device meets the MASH criteria.

Engineer Name:	Emerson Ryder	
Engineer Signature:	<b>Emerson Ryder</b>	Digitally signed by Emerson Ryder Date: 2020.12.09 08:19:02 +13'00'
Address:	7 Canterbury Street Hornby, Christchurch	Same as Submitter <input type="checkbox"/>
Country:	New Zealand	Same as Submitter <input type="checkbox"/>

A brief description of each crash test and its result:

Required Test Number	Narrative Description	Evaluation Results
3-10 (1100C)		Non-Relevant Test, not conducted
3-11 (2270P)		Non-Relevant Test, not conducted
3-20 (1100C)		Non-Critical, not conducted
3-21 (2270P)	<p>The transition successfully contained and redirected a 2270P test vehicle impacting the test article at 25.0 degrees in reverse direction with a velocity of 100.1 km/h. No debris or detached elements penetrated or showed potential to penetrate the occupant compartment. No fragments were distributed outside of the vehicle trajectory and therefore did not present any undue hazard to other traffic, pedestrians or work zone personnel.</p> <p>Occupant risk factors satisfied the test criteria and the vehicle exit trajectory remained within acceptable limits. Dynamic Deflection was 0.37 m(1.21ft.). Working Width was 1.22 m (4.0ft.)</p>	PASS

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:	Holmes Solutions LP	
Laboratory Signature:	<b>Emerson Ryder</b>	Digitally signed by Emerson Ryder Date: 2020.12.09 09:00:59 +13'00'
Address:	7 Canterbury Street Hornby Christchurch	Same as Submitter <input type="checkbox"/>
Country:	New Zealand	Same as Submitter <input type="checkbox"/>
Accreditation Certificate Number and Dates of current Accreditation period :	1022 ISO/IEC 17025:2017 Client Number 7559 July 2019 to October 2020	

Submitter Signature\*:



Submit Form

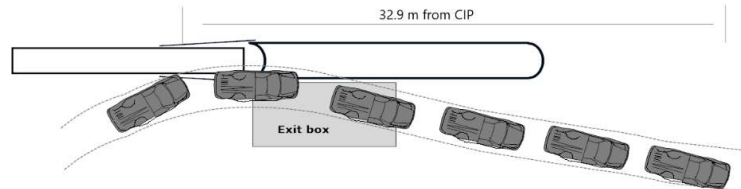
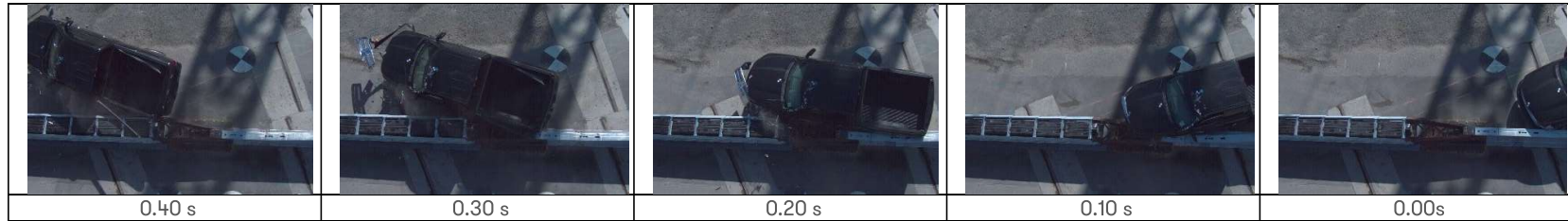
## ATTACHMENTS

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.

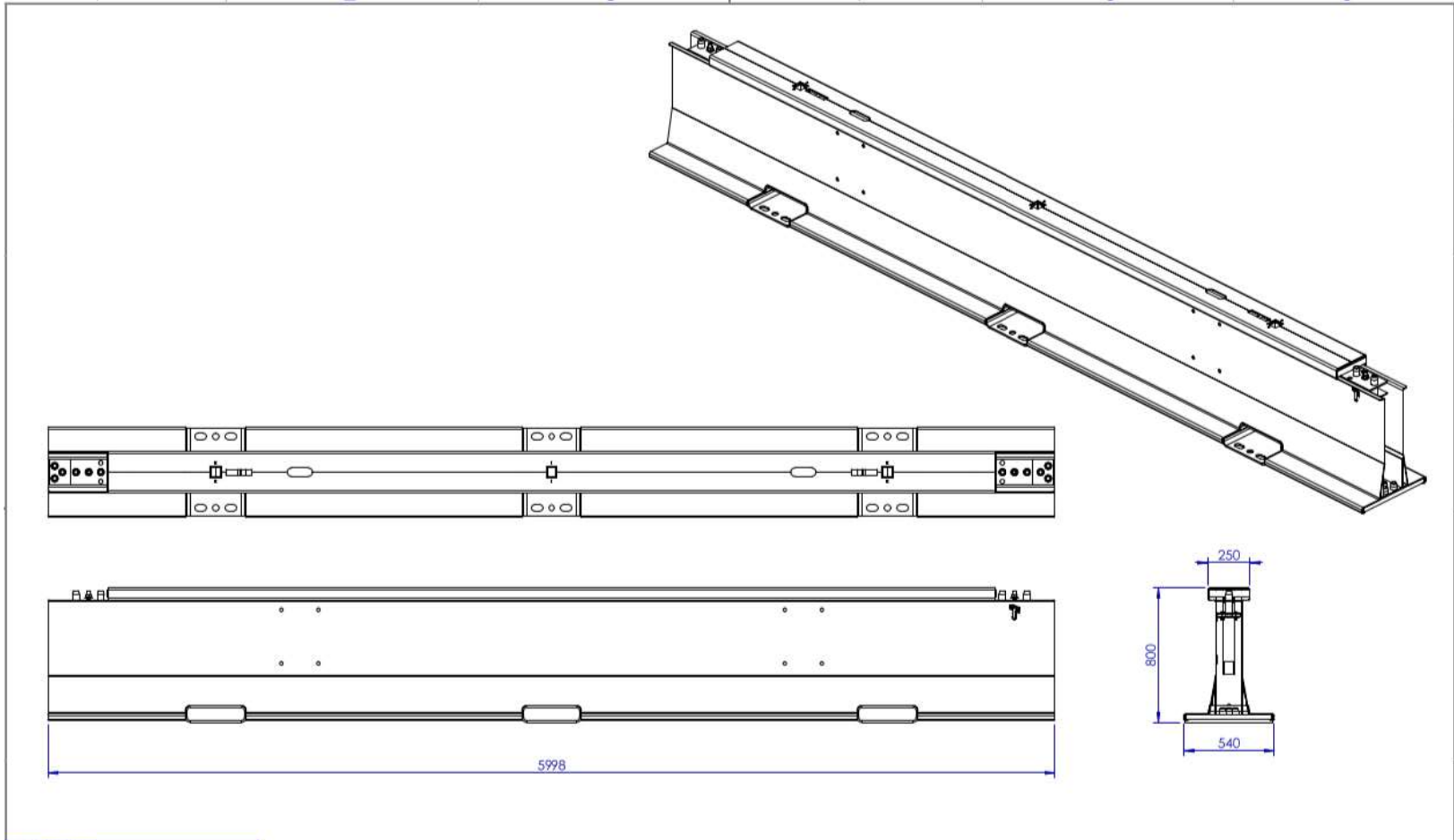
FHWA Official Business Only:

Eligibility Letter		Key Words
Number	Date	



<b>Test Article:</b>	Highway Care HighwayGuard Transition to QuadGuard M10 Crash Cushion	<b>Post Impact Vehicle Behaviour</b>	
<b>Total Length</b>	38.4 m approximately	Vehicle Stability	Good
<b>Key Elements - Barrier</b>	MASH TL3-21 (Reverse Impact)	Stopping Distance	32.9 m
Description	Steel Temporary Barrier System	<b>Vehicle Snagging</b>	None
Length of Barrier Installation	32.7 m length of need including Transition Length of 2.5 m (excludes QuadGuard M10)	<b>Vehicle Pocketing</b>	None
Height	0.80 m	<b>Occupant Impact Velocity (m/s)</b>	0.0973 seconds left side of interior
Length of Barrier Segments	5.998 m	Longitudinal	6.3
<b>Test Vehicle</b>		Lateral (optional)	-8.6
Designation	2270P	<b>Occupant Ride-down Deceleration</b>	
Make/Model	2011 Dodge Ram 1500 Quad Cab	X-direction (g)	-12.8 (0.0973 - 0.1073 seconds)
Dimensions (LxWxH)	5740 mm x 1990 mm x 1885 mm	Y-direction (g)	12.8 (0.2183 - 0.2283 seconds)
Curb Wt	2100.5 kg	THIV (optional) (m/s)	10.7
Test Inertial Wt	2254.0 kg	PHD (optional) (g)	16.7 (0.0944 - 0.1044 seconds)
Gross Static	2254.0 kg	ASI (optional)	1.73 (0.0448 - 0.0948 seconds)
<b>Impact Conditions</b>		<b>Test Article Damage</b>	Moderate
Speed	100.1 km /h	<b>Test Article Deflections</b>	
Angle	25.0 degrees	Dynamic	0.37m (1.21 ft.)
Impact Point	1.77 m Upstream of Transition Joint 5B and 6A	Permanent	0.13 m (0.43 ft.)
<b>Exit Conditions</b>		Working Width	1.22 m (4.00 ft.)
Exit Speed:	66 km/h	<b>Vehicle Damage Exterior</b>	
Exit Angle:	20.3°	VDS	11FL-4
<b>Test Number</b>	139719.3-21	CDC	11LFEE4
<b>Test Date</b>	09 September 2020	Maximum Deformation	180 mm



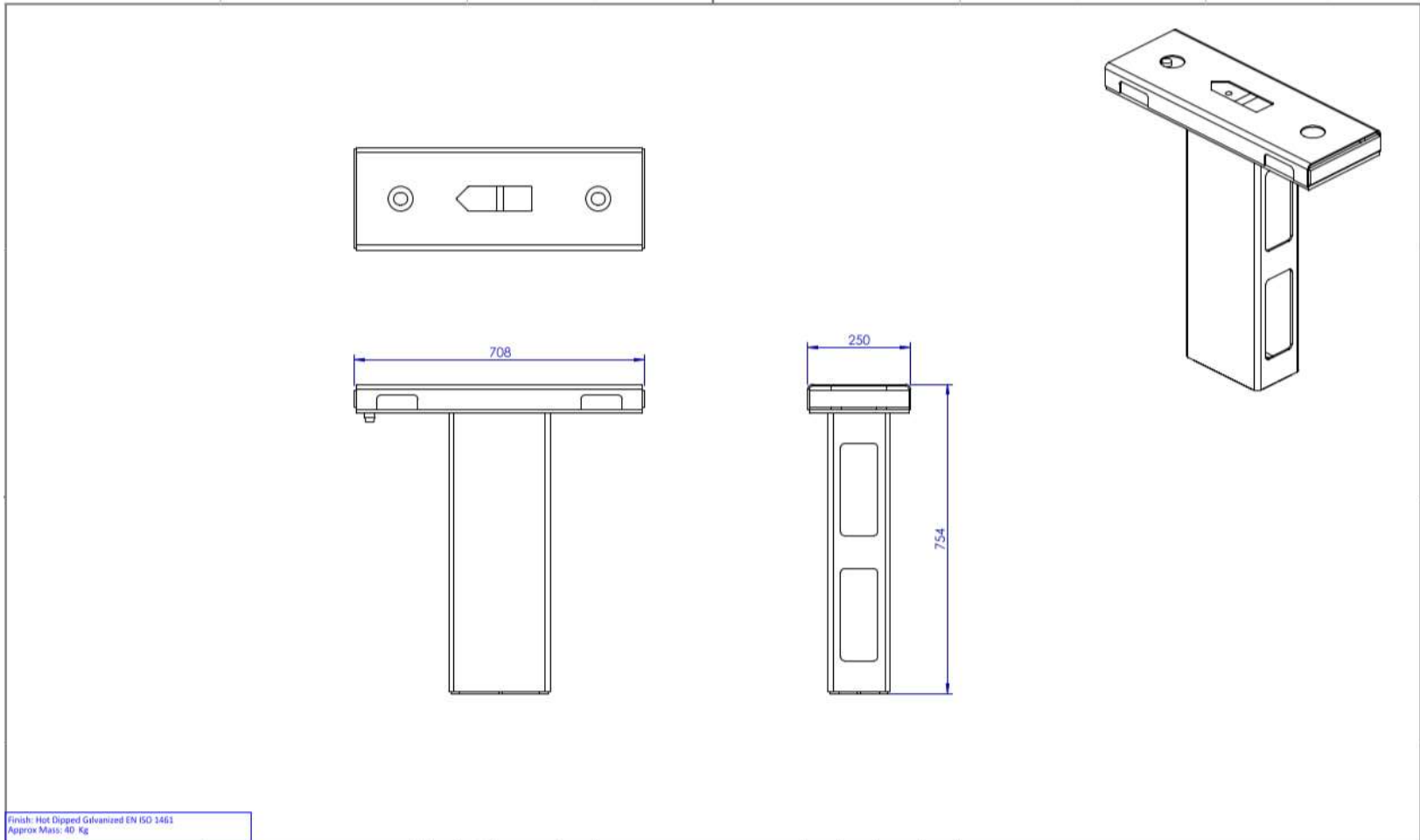


Approx Mass: 517 Kg

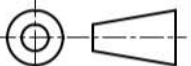

<p>Ensure drawing is the correct issue and release before using.</p>	<p><b>HIGHWAY CARE</b></p>	<p>Highway Care LTD The Highlands Delling Maidstone Kent ME14 3HT Tel. +44 (0) 1622 734215 www.highwaycare.co.uk</p> <p><i>The information herein is proprietary to Highway Care Ltd and shall not be disclosed, duplicated or used otherwise, without the express written approval of Highway Care Ltd.</i></p>	Rev.	Details.	Dwn.	Date.	Ch'k'd	App'd	Title					
			A	ECN 324	LH	12/11/18	ST	PD	HighwayGuard - 6m Barrier Assembly					
	B	ECN 374	LH	03/06/19	ST	PD	DWG No. <b>HG-10-01-ID</b>				ISO A4 Landscape	DO NOT SCALE	SCALE 1:30 ALL DIMENSIONS IN mm	
SHEET 1 OF 1										Revision	<b>B</b>	Status	Released	



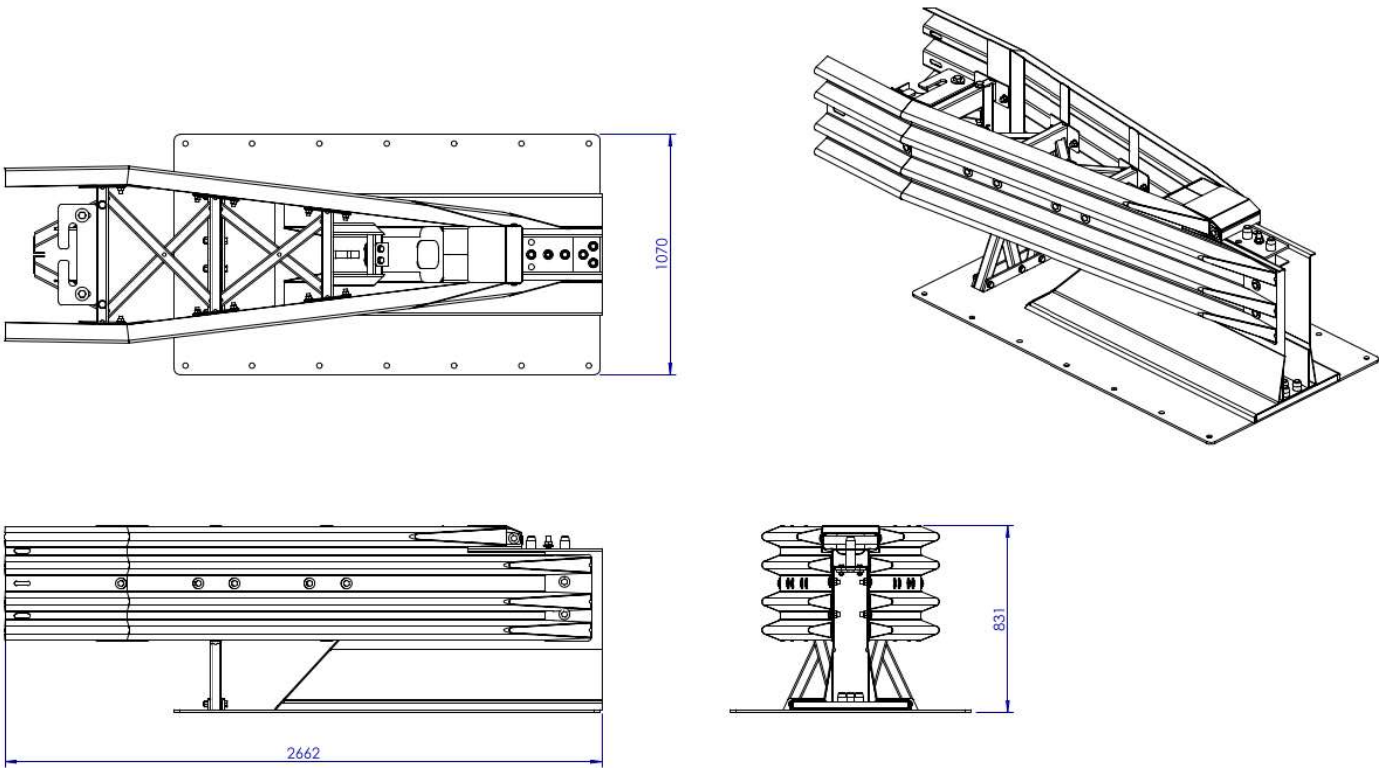




Finish: Hot Dipped Galvanized EN ISO 1461  
Approx Mass: 40 Kg

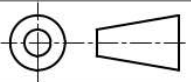
<p>Ensure drawing is the correct issue and release before using.</p> 	 <p><b>HIGHWAY CARE</b></p>	<p>Highway Care LTD The Highlands Delling Maidstone Kent ME14 3HT Tel: +44 (0) 1622 734215 <a href="http://www.highwaycare.co.uk">www.highwaycare.co.uk</a> <i>The information herein is proprietary to Highway Care Ltd and shall not be disclosed, duplicated or used otherwise, without the express written approval of Highway Care Ltd.</i></p>	<p>Rev. Details.</p>	<p>Dwn. Date. Ch'k'd App'd</p>	<p>Title</p>				
			<p>A ECN 324</p>	<p>LH 12/1/18 ST PD</p>	<p>HighwayGuard - T-Connection Fabrication</p>	<p>DWG No. <b>HG-20-02-ID</b></p>	<p>ISO A4 Landscape</p>	<p>DO NOT SCALE</p>	<p>SCALE 1:12 ALL DIMENSIONS IN mm</p>
			<p>SHEET 1 OF 1</p>		<p>Revision</p>	<p><b>A</b></p>	<p>Status</p>	<p>Released</p>	





Approx Mass: 486 Kg.

Ensure drawing is the correct issue and release before using.



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Rev.	Details.	Dwn.	Date.	Ch'k'd	App'd	Title
D	Drawing Release	LH	11/09/20	CP	PD	HighwayGuard Crash Cushion Transition - (S) Main Assembly

DWG No. <b>PR668-10-02-ID</b>	ISO A4 Landscape	DO NOT SCALE	SCALE 1:25 ALL DIMENSIONS IN mm
SHEET 1 OF 1	Revision	<b>D</b>	Status Released

