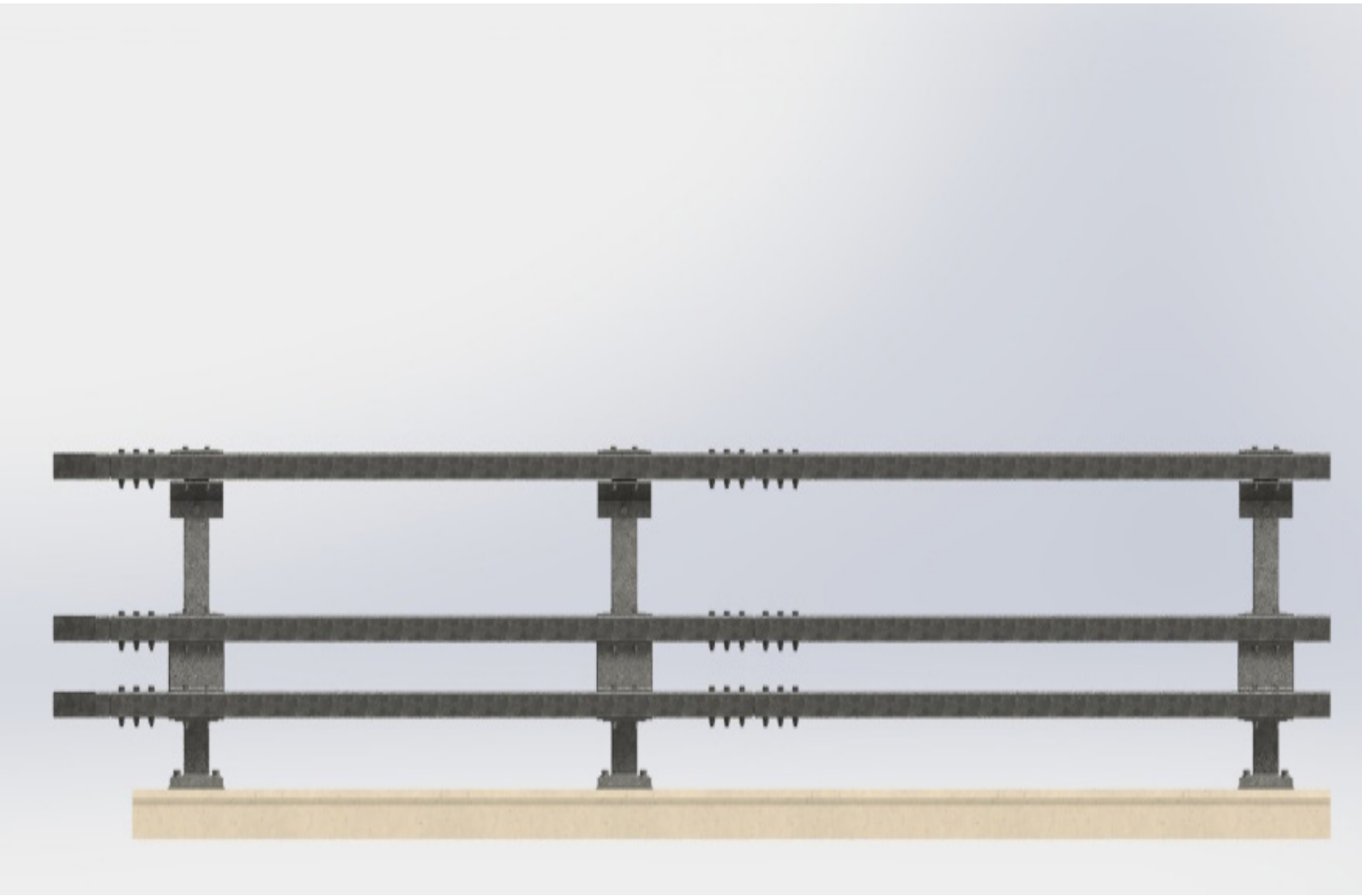
SAFEROAD



Manual for the Installation, Maintenance and Repair of SN2W1 / SNH2W4 Parapet System

Revision 2 2025

www.saferoad-rs.com/uk

Table of Contents

System Information

Product Information

The SN2W1 / SNH2W4 parapets are modular systems made of steel posts, rails, post to rail connectors and rail joints. These are bolted together with M16 galvanised fixings & held down with M20 Stainless Steel holding down bolts into approved cast-in / resin bonded anchors to create a permanent vehicle restraint system.
The standard SN2W1 parapet post spacings are = **3750mm**.
The SNH2W4 the standard post spacings are = **3000mm**

There is no statutory requirement to install safety fences or barriers but if they are provided risk assessments must show that they create no additional hazard.
The SN2W1 and SNH2W4 systems have been crash tested in accordance with **BS EN 1317-1:2010** and **BS EN 1317-2:2010**.

Containment Level	Test	Total Mass KG	Vehicle Type	Impact Speed KM/H	Impact Angle
N2	TB32	1500	Car	110	20 Degrees
	TB11	900	Car	100	20 Degrees
H2	TB11	900	Car	100	20 Degrees
	TB51	13000	Bus/HGV	70	20 Degrees

The values returned from the TB32, TB11 and TB51 tests were:-

Test	Containment Level	Working Width	Impact Severity
TB32	N2	W1	B
TB11	N2	W1	B
TB51	H2	W4	B

The minimum plinth dimensions shall be 450mm wide with a minimum up-stand at traffic face of 50mm and should not exceed 100mm.
When used on motorways and trunk roads it must conform to the current requirements of National Highways. Locations and usage will be determined by an appropriately qualified design engineer.
This manual does not include design criteria and is therefore to be used only to provide reference in the handling and installation of the Parapet components.

GENERAL ARRANGEMENT DRAWINGS

SN2W1 General Arrangement Drawings	SNH2W4 General Arrangement Drawings
SN2W1-GA-001 Rev 02 – 1m high	SNH2-GA-001 Rev 01 - 1m high
SN2W1-GA-002 Rev 01 – 1.25m high	SNH2-GA-002 Rev 01 - 1.25m high
SN2W1-GA-003 Rev 01 – 1.4m high	SNH2-GA-003 Rev 01 - 1.4m high
SN2W1-GA-004 Rev 01 - 1.5m high	SNH2-GA-004 Rev 01 - 1.5m high
SN2W1-GA-005 Rev 01 - 1.8m high	SNH2-GA-005 Rev 01 - 1.8m high
SN2W1-GA-C1 Rev 01 - Solid Infill	SNH2-GA-C1 Rev 01 - Solid Infill
SN2W1-GA-M1 Rev 01 - Mesh 3” x 1”	SNH2-GA-M1 Rev 01 - Mesh 3” x 1”
SN2W1-GA-M2 Rev 01 - Mesh 2” x 2”	SNH2-GA-M2 Rev 01 - Mesh 2” x 2”

SN2W1 / SNH2W4 System weights

1m high (without mesh) weight per metre = 52.26 kg/m
1.25m high (without mesh) weight per metre = 67.73 kg/m
1.4m high (without mesh) weight per metre = 68.50 kg/m
1.5m high (without mesh) weight per metre = 69.01 kg/m
1.8m high (without mesh) weight per metre = 84.73 kg/m

The system weights above may vary due to material, fabrication and protective finish but should be used as a guide for planning and design purposes.

POST CAPACITY

UNFACTORED MOMENT OF RESISTANCE OF POST

The unfactored moment of resistance of the posts at the underside of the post baseplate is **34.6kN**

CO-EXISTING SHEAR

The co-existing shear of the post is **63.3kN**

ULTIMATE SHEAR FORCE

The ultimate shear force of the post is **218.2 kN**

The bridge, retaining wall or structure shall be designed to withstand the above loadings.

ANCHORAGE CAPACITY PER BOLT

The anchor test load for SN2W1 / SNH2W4 parapets = **48.06kN**

APPROVED ANCHORAGE SYSTEMS

The anchorage systems below are approved for use for the installation of the SN2W1 / SNH2W4 Parapet system:

SSR-170 Cast in Cradle

SSR-120-TI Resin Bonded Anchor (SSR-CM25 Pourable Resin or SSR-VDP Glass Capsules)

SSR-135A-TI Resin Bonded Anchor (SSR-CM25 Pourable Resin or SSR-VDP Glass Capsules)

Requirements for Installation, Inspection and Repair

REQUIREMENTS TO INSTALL, INSPECT & REPAIR SN2W1 / SNH2W4 PARAPETS

Persons intending to install bridge Parapets on motorways and trunk roads must do so in line with the specifications laid out in the National Highways Sector Scheme 10B document. This will ensure compliance with National Highways requirement for Quality Management.

This course has been designed by Saferoad and registered with Lantra Awards and is compliant with National Highways Sector Scheme 10B. Those who successfully complete the course will be issued with a Lantra Awards Certificate of attendance to provide evidence of training in the installation of the Parapet systems.

To ensure that the installation, inspection & repair is both appropriate and adequate all installers must also be qualified to the standards laid out within the National Highways Sector Scheme document 10B.

All sector scheme documents are published by UKAS (United Kingdom Accreditation Service) and can be viewed on LANTRAS website www.lantra.co.uk

SYSTEM DRAWINGS

- Refer to General Arrangement Drawings at the end of this manual

OTHER INFORMATION REQUIRED

- Delivery instruction sheet – Site address & general details.
- Delivery Note – Record of components sent to site.
- Layout drawing – Site Specific layout drawing for parapet location.
- Parts list – list of all components required for the parapet.
- Erection check sheet – completed on site as a record of installation.

TOOLS REQUIRED FOR INSTALLATION

- Ratchet wrench and sockets
- Open jaw/ring spanners
- Drill, drill bits & taps
- Hammer / mallet
- Hand /Mechanical Saws
- Torque wrench
- Tape measure
- File

IF INSTALLING M20 RESIN FIXED ANCHORAGES A WET CORE DRILLING RIG AND CORE BITS WILL ALSO BE REQUIRED.

SN2W1 / SNH2W4
Parapet
Component Schedule

SN2W1 / SNH2W4 Component Schedule

Component	Dimensions	Weight
Impact Rail	120mm x 80mm x 7390mm Long	88KG
Post 1 metre high	120mm x 120mm x 993mm High	32.72KG
Post 1.25 metre high	120mm x 120mm x 1243mm High	37.17KG
Post 1.4 metre high	120mm x 120mm x 1393mm High	39.84KG
Post 1.5 metre high	120mm x 120mm x 1493mm High	41.63KG
Posts1.8 metre high	120mm x 120mm x 1793mm High	46.97KG
Standard Rail joint	68mm x 658mm x 460mm Long	5KG
Expansion Rail joint	68mm x 68mm x 505mm Long	7KG
Post bracket washer plate	200mm x 35mm x 3mm	205G
Rail to Post attachment bracket	Varies	350G
M20 s/s anchor bolts	M20 x 90mm	325G
M16 rail joint fixing	M16 x 110mm c/w Washers & Nut	255G
M16 post bracket to rail fixing	M16 x 120mm c/w Washers & Nut	260G
M16 post / bracket fixing	M16 x 35mm c/w Washers	105G
Mesh panel 3” x 1” x 10swg	915mm x 1806mm x 3.2mm	5.4KG
Mesh panel 2” x 2” x 10swg	915mm x 1832mm x 3.2mm	4.5KG
Cladding sheet	1000mm x 1000mm x 3mm	23.5KG

SN2W1 / SNH2W4 Parapet Component Schedule

As indicated in the chart on the previous page the weights of the posts and the rails may require the use of mechanical lifting equipment such as a lorry loader crane, forklift or an excavator to safely undertake the installation operation. When using these types of lifting equipment, there are separate regulations that must be followed to protect the health and safety of all personnel involved.

Lifting Operations Lifting Equipment Regulations (LOLER) 1998 says:-

All lifting operations must be properly planned, Supervised, and carried out safely by competent persons.

For all lifting operations specific training is required for persons to undertake a role within a lifting team and a lift plan must be in place, the lift plan sets out the operations to be undertaken and must identify the below:

- The lifting equipment being used, including the make and model, serial number or ID number, safe working load (SWL), and thorough examination certificate details.
- The lifting accessories required for the lifting operation including ID numbers and the method to be used to sling the loads
- The loads being lifted, this must include the dimensions and weights of the loads
- The lifting team personnel, information must include the name, their role, and training / competency card details
- Lifting operation details including the required radius and height of loads to be positioned.

If you have not received specific training in lifting operations, you must never undertake any role within a lifting team.

A lift plan can only be produced by a trained **Appointed Person** for lifting operations

SN2W1 / SNH2W4
Parapet
Component Identification

SN2W1 / SNH2W4 Component Identification

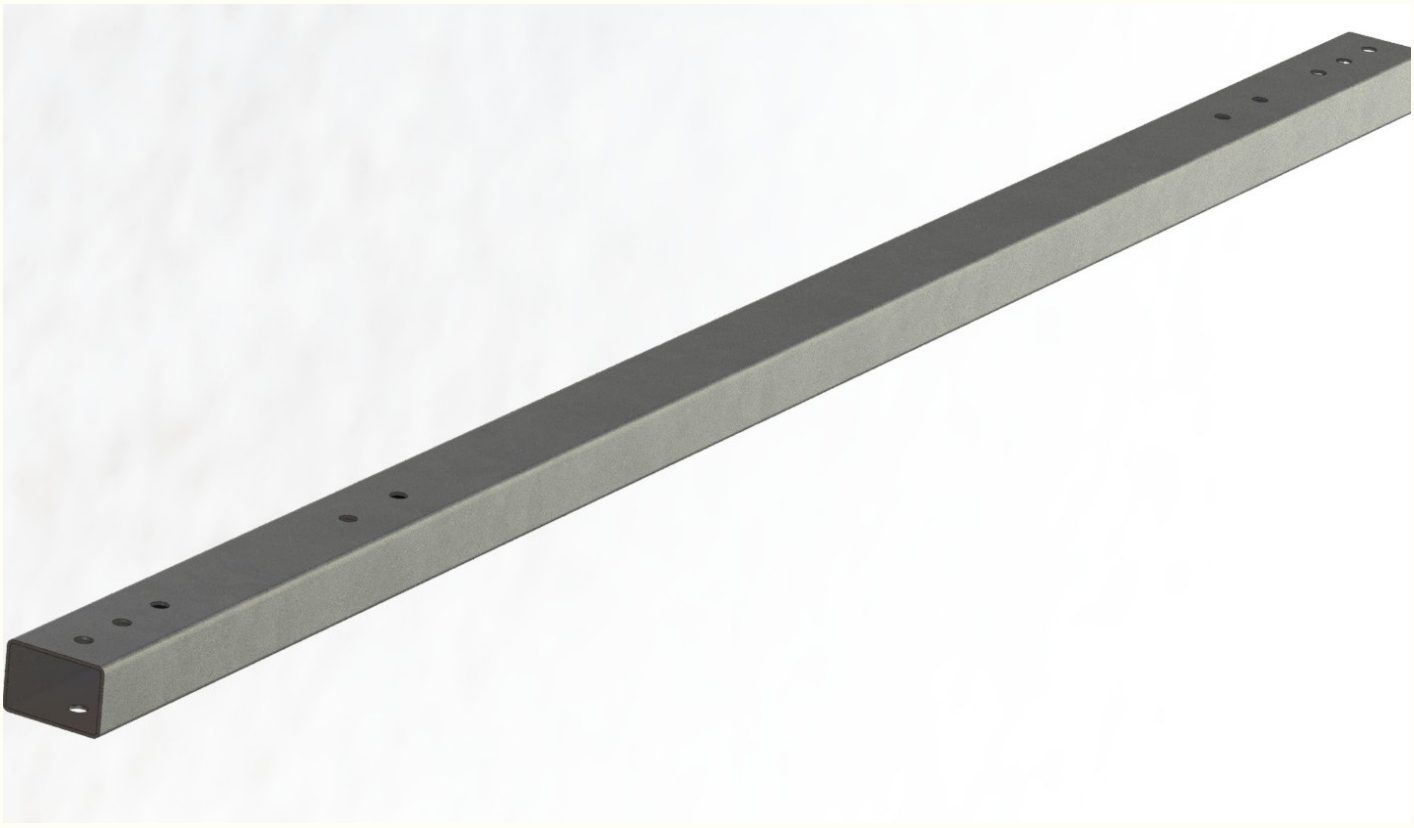
Parapet Post without Rail Brackets Fitted

SN2W1 / SNH2W4 Component Identification

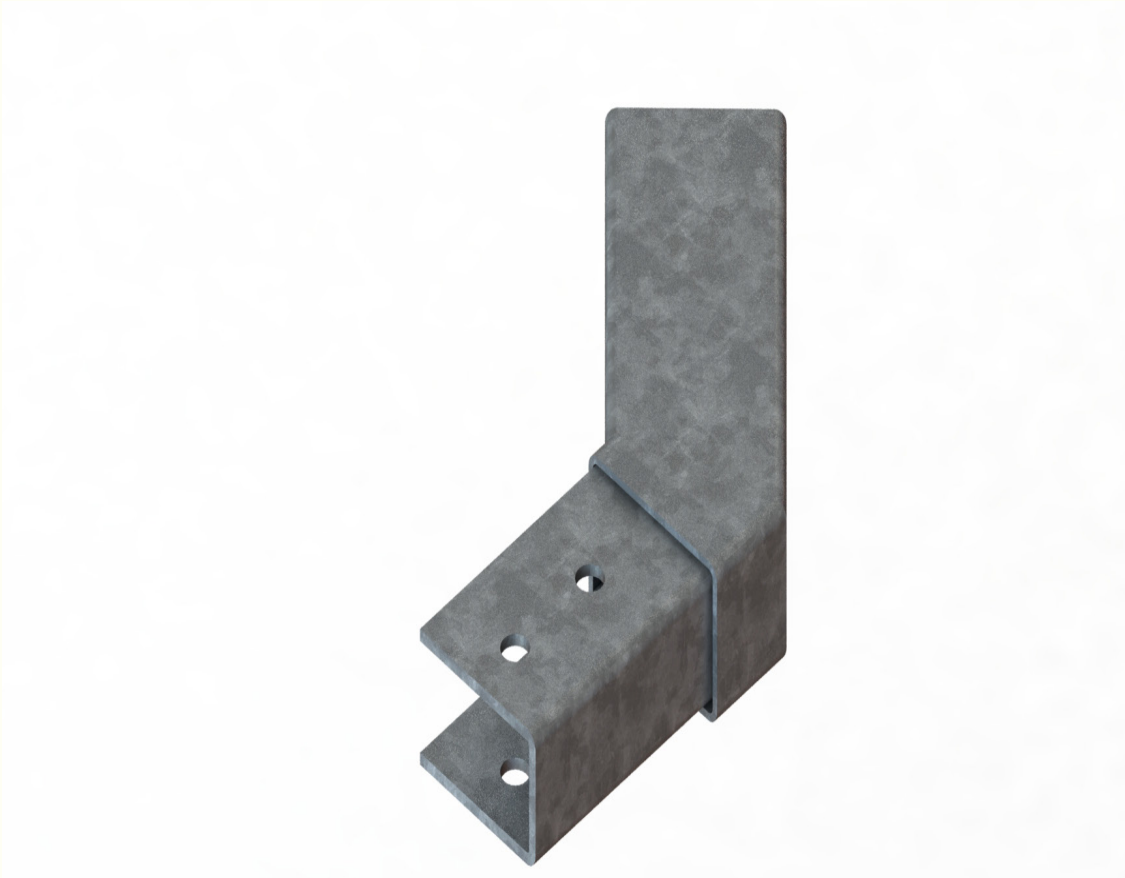
Parapet Post with Rail Brackets Fitted

SN2W1 / SNH2W4 Component Identification

Standard Rail



Bolted Flareback



SN2W1 / SNH2W4 Component Identification

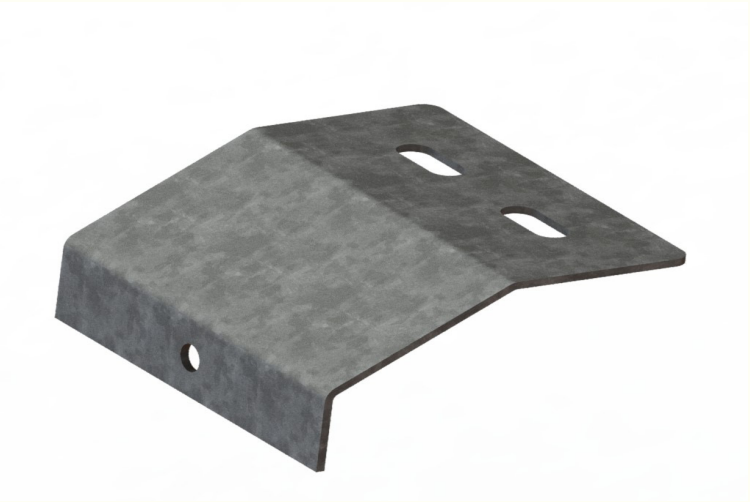
Standard Rail Joint

Rail Expansion Joint

SN2W1 / SNH2W4 Component Identification

Top Rail Top Bracket

Top Rail Bottom Bracket

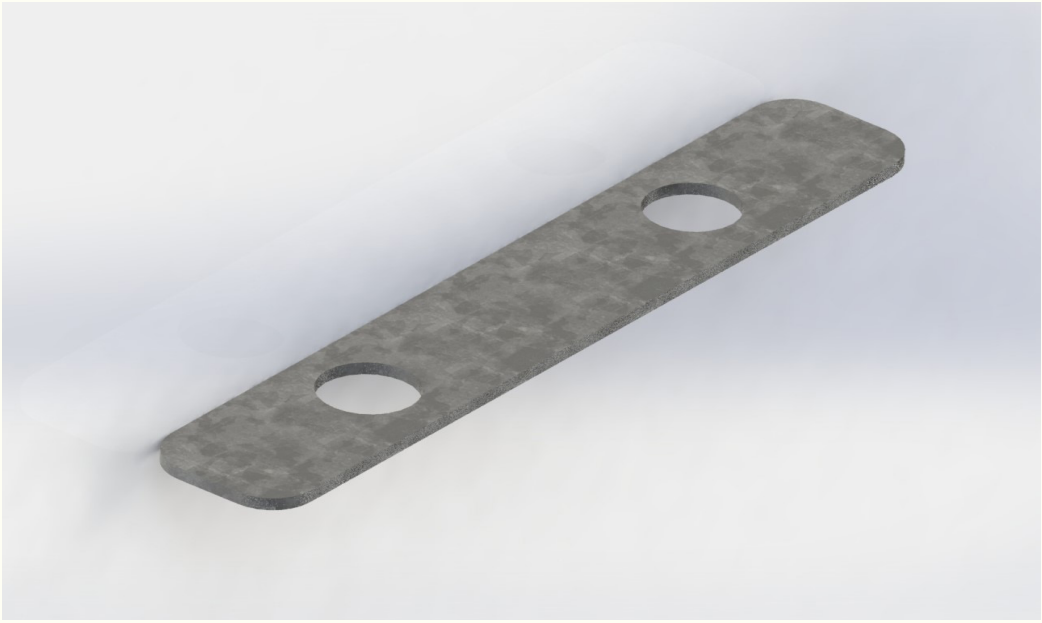


Lower Rail Bracket No 1

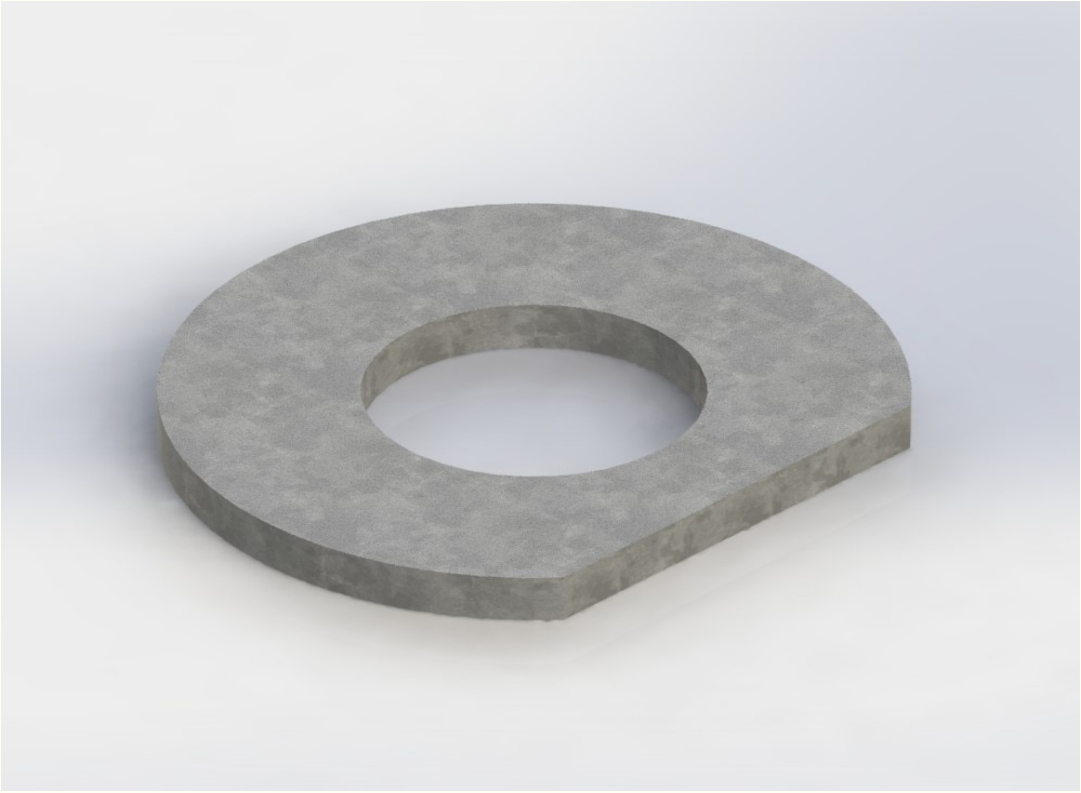
Lower Rail Bracket No 2

SN2W1 / SNH2W4 Component Identification

Washer Plate

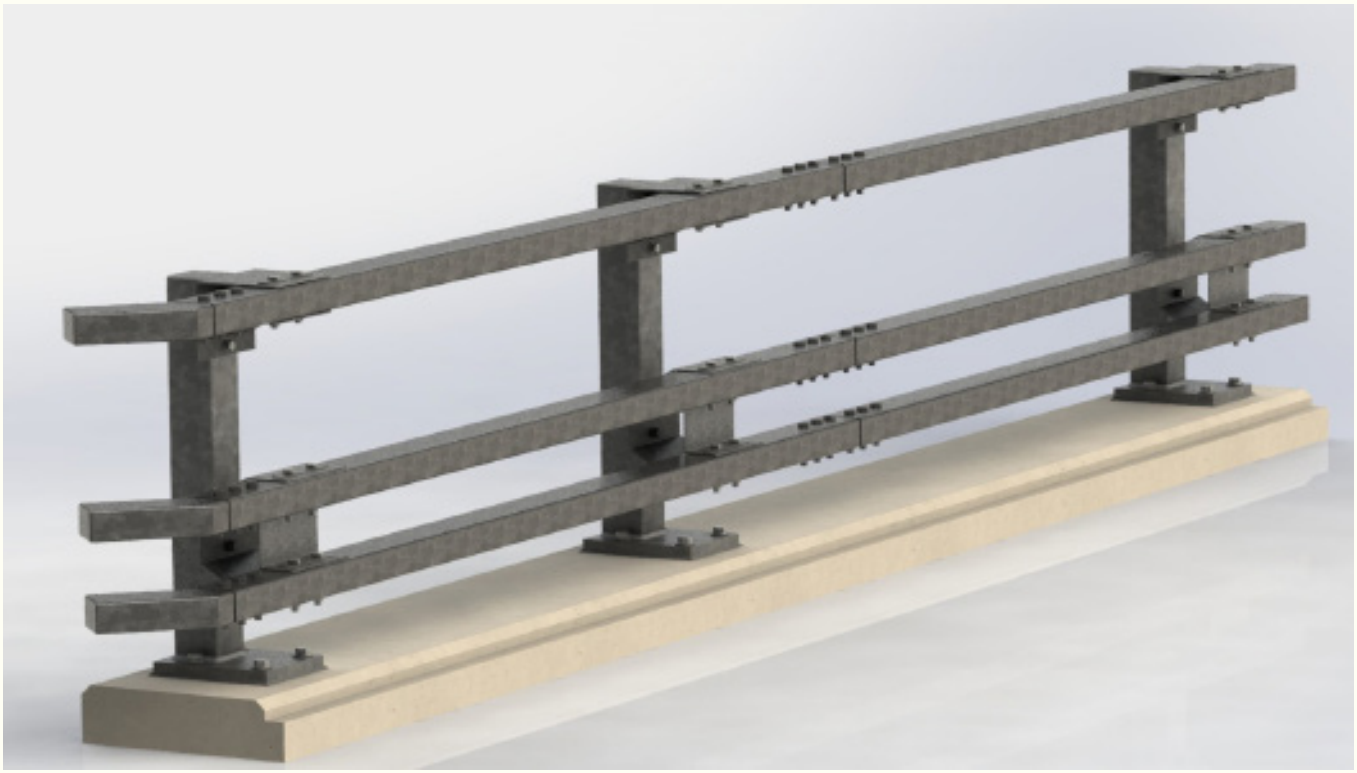


Notched Washer



SN2W1 / SNH2W4 Component Identification

Front view of Parapet with bolt-in flarebacks fitted



Rear view of Parapet with bolt-in flarebacks fitted

The images above are a 3D Model of what the Parapet will look like with the rails and flarebacks installed

Installation Process for the SN2W1 / SNH2W4 Parapet

Operation	Method	Tools Required	Fixings / Materials Required	Documents Required
CHECK ANCHOR POSITIONS	MEASURE DISTANCE BETWEEN ANCHOR POSITIONS TO CONFIRM AS BUILT DIMENSIONS.	TAPE MEASURE	NONE	LAYOUT DRAWING
PLACE POST ON ANCHORS	PLACE 20MM THICKNESS OF PACKERS IN CENTRE OF ANCHOR CLUSTER. PLACE 1 No S/S FLAT WASHER, 1 No NY-LON TOPHAT & 1 No GALV FLAT WASHER ONTO M20 FIXING. PLACE POST ONTO PACKERS & SCREW M20 FIXINGS INTO ANCHOR THROUGH BASEPLATE. PLUMB POST TO UPRIGHT POSITION TORQUE 70Nm (AFTER GROUTING) REPEAT AT ALL ANCHOR POSITIONS IF REQUESTED BY THE CLIENT, M20 SHEAR-HEAD BOLT TO BE IN REAR RIGHT ANCHORAGE POSITION.	WRENCH/SOCKET OR SPANNER TO SUIT M20 HEX SET. SPIRIT LEVEL	PARAPET POSTS FOR EACH PARAPET POST: 4 No M20 X 90 S/S HEX-SETS 3 No M20 X 90 S/S HEX-SETS AND 1 NO SHEAR HEAD BOLT IF REQUESTED 4 No M20 S/S FLAT WASHERS 4 No NYLON TOPHAT WASHERS 2 No M24 GALV FLAT WASHERS 2 No M24 GALV NOTCHED WASHERS (REAR BOLTS) PACKERS	LAYOUT DRAWING PARTS LIST
LAYOUT RAILS	DISTRIBUTE & LAY RAILS IN FRONT OF PARAPET POSTS RELATIVE TO THEIR FINAL POSITION.	NONE	PARAPET RAILS	LAYOUT DRAWING PARTS LIST

Operation	Method	Tools Required	Fixings / Materials Required	Documents Required
FIT POST TO RAIL BRACKETS TO POST	• INSERT 1No M16 X 35 HEX HEAD SET-SCREW WITH WASHERS THROUGH EACH BRACKET • FIX BRACKETS ONTO POST. **• TORQUE: TORQUE IS ACHIEVED WHEN THE SPRING WASHER IS FLAT.**	WRENCH / SOCKET OR SPANNER TO SUIT M16 HEX SET.	• PARAPET POST TO RAIL BRACKETS FOR EACH POST TO RAIL BRACKET: • 1 No M16 X 35 HEX HEAD SET-SCREWS GALV • 1 No M16 FLAT WASHER GALV • 1 No M16 SPRING WASHER GALV	LAYOUT DRAWING PARTS LIST
FIT RAILS TO POSTS	LIFT LOWER IMPACT RAIL INTO POSITION IN FRONT OF PARAPET POSTS. INSERT M16 x 120 FIXINGS VERTICALLY THROUGH THE WASHER PLATE, BRACKET NO 2, LOWER RAIL & BRACKET NO 1. LIFT MID RAIL INTO POSITION ON TOP OF SUPPORT BRACKET (BRACKET NO 2) SECURE FIXING WITH M16 HEX SET AND SPRING WASHER. TIGHTEN M16 HEX SET, **TORQUE IS ACHIEVED WHEN THE SPRING WASHER IS FLAT.** REPEAT FOR ALL POST TO RAIL CONNECTIONS.	WRENCH / SOCKET OR SPANNER TO SUIT M16 HEX SET.	PARAPET POSTS WITH ATTACHED POST TO RAIL BRACKETS PARAPET RAILS FOR EACH SET OF POST TO RAIL BRACKETS: 2 No M16 X 120 HEX HEAD SETSCREWS GALV 2 No WASHER PLATES GALV 2 No M16 SPRING WASHERS GALV	LAYOUT DRAWING PARTS LIST

Operation	Method	Tools Required	Fixings / Materials Required	Documents Required
PLACE & SECURE RAIL JOINT IN RAIL	INSERT RAIL JOINT INTO OPEN END OF RAIL. ALIGN HOLES IN RAIL JOINT WITH HOLES IN RAIL. PLACE M16 WASHER ON TO M16 X 110 SET-SCREW INSERT M16 SET SCREW THROUGH THE RAIL AND RAIL JOINT (HEAD AND WASHER ON TOP OF RAIL) PLACE 1 No M16 FLAT WASHER AND M16 SPRING WASHER AND NUT ONTO THE M16 x 110 SET SCREW ON THE UNDERSIDE OF THE RAIL TIGHTEN TO SECURE RAIL JOINT IN POSITION REPEAT FOR ALL 3 POSITIONS IN THE RAIL JOINT AND IN ALL RAILS. **TORQUE IS ACHIEVED WHEN THE SPRING WASHER IS FLAT.**	WRENCH/SOCKET OR SPANNER TO SUIT M16 HEX SET.	RAIL JOINT FOR EACH REQUIRED LOCATION FOR EACH RAIL JOINT: 6 No M16 X 110 HEX-HEAD SET-SCREWS GALV 12 No M16 FLAT WASHERS GALV 6 No M16 SPRING WASHERS GALV 6 No M16 GALV NUTS	LAYOUT DRAWING PARTS LIST

Operation	Method	Tools Required	Fixings / Materials Required	Documents Required
LINE & LEVEL PARAPET.	IDENTIFY POST LOCATIONS WHERE POSTS ARE TO BE RAISED OR LOWERED TO CORRECT PARAPET LEVEL. AT POST LOCATION, LOOSEN HOLDING DOWN FIXINGS & ADJUST PACKERS UNDER BASE PLATE TO CORRECT HEIGHT. TIGHTEN HOLDING DOWN FIXINGS, **TORQUE = 70Nm**(AFTER GROUTING) REPEAT AT THE REQUIRED POST LOCATIONS UNTIL THE PARAPET IS LEVEL. **GROUT SHOULD BE MIXED AND POURED AS PER MANUFACTURERS INSTRUCTIONS.** **GROUT BED TOLERANCE - 10MM MIN TO 30MM MAX**	SOCKET OR SPANNER TO SUIT M20 HEX SET. TORQUE WRENCH	PACKERS	
INSTALL MESH	LIFT PANEL INTO PLACE AND CLAMP TO PARAPET RAIL AS A TEMPORARY MEASURE. MARK RIVET LOCATIONS DRILL 4.9MM DIA HOLE AT EACH RIVET LOCATION. SECURE THE CLIP TO THE RAIL BY PLACING THE MESH CLIP OVER THE MESH & DRIVE THE RIVETS THROUGH THE CLIP AND RAIL. HIT THE RIVET PIN WITH A HAMMER UNTIL THE PIN IS FLUSH WITH THE HEAD OF THE RIVET. REPEAT ALL LOCATIONS	CLAMPS TAPE MEASURE DRILL WITH 4.9MM DRILL BIT. RIVET GUN,	MESH PANELS FOR EACH MESH PANEL: 11 NO HALF MESH CLIPS 11 NO 0627 DRIVE RIVETS (4.8 x 10mm)	LAYOUT DRAWING PARTS LIST

INSTALL SAFETY FENCE CONNECTOR PLATE				
Operation	**Method**	**Tools Required**	**Fixings / Materials Required**	**Documents Required**
FIT SAFETY FENCE CONNECTOR PLATE TO RAILS	PLACE SAFETY FENCE CONNECTOR PLATE ONTO ALL THREE RAILS IF PARAPET RAIL ENDS HAVE A FLARED END DETAIL, THESE WILL NEED TO BE REMOVED PRIOR TO INSTALLATION OF THE SAFETY FENCE CONNECTOR PLATE INSERT M16 FIXINGS AND TIGHTEN. TORQUE IS ACHIEVED WHEN THE SPRING WASHER IS FLAT	SOCKET OR SPANNER TO SUIT M16 HEX SET.	SFC plate. FOR EACH SFC PLATE: - 9 X M16 X 110 HEX HEAD GALV SETSCREWS. 18 X GALV FLAT WASHERS. 9 X GALV SPRING WASHERS. 9 X GALV NUTS.	LAYOUT DRAWINGS PARTS LIST

INSTALLATION OF PARAPET MESH				
Operation	**Method**	**Tool required**	**Fixings / Materials Required**	**Documents Required**
INSTALL MESH PANELS	PLACE MESH PANEL ON FACE OF RAILS MARK & DRILL 1st MESH CLIP POSITION THROUGH PARAPET RAIL SECURE CLIP TO RAIL BY PLACING MESH CLIP OVER MESH & DRIVE RIVETS THROUGH CLIP & RAIL. HIT RIVET PIN WITH HAMMER UNTIL PIN FLUSH WITH HEAD OF RIVET REPEAT UNTIL ALL ½ CLIPS AND RIVETS ARE FITTED TO PARAPET RAILS REPEAT AT ALL MESH PANEL POSITIONS	DRILL & 4.9MM DRILL BIT HAMMER	MESH PANELS FOR EACH MESH PANEL 11No ½ MESH CLIP 11No 0627 DRIVE RIVET	LAYOUT DRAWING PARTS LIST

Inspection of SN2W1 / SNH2W4 Parapet

Operation	Method	Tools Required	Documents Required
INSPECT PARAPET	INSPECT TO ENSURE THE FOLLOWING: ALL FIXINGS LOCATED & TIGHTENED. (M20 HOLDING DOWN FIXINGS TIGHTENED TO 70Nm) POSTS INSTALLED AT CORRECT POSITIONS. RAILS INSTALLED AT CORRECT POSITIONS. ALL RAIL JOINTS INSERTED AT CORRECT POSITIONS. MESH INSTALLED CORRECTLY AND SECURE COMPLETE INSPECTION CHECK SHEET WITH CLIENT	TORQUE WRENCH SOCKETS TO SUIT M16 and M20 FIXINGS.	LAYOUT DRAWING PARTS LIST ERECTION CHECK SHEET

Following an installation project for Parapets whether this is a new install or a repair to a damaged Parapet, an inspection must be completed by a trained and competent person to ensure that the Parapet has been installed in line with the manufacturer's specifications and NHSS 10B.

When completing this inspection, it is recommended that a representative of the client is present to witness the inspection. Inspection record forms such as the example shown on the next page can be used to keep a clear record of the inspection and can be signed by the installer and the client / main contractor who witnesses the inspection

SAFEROAD	Final Inspection of Parapet	GQF16-3
		Issue 2 July 24

Date:		Visit		of		Install Completed	Y	N
Client:								
Contract:								
Location:								
Parapet System:								

	Within Specification			
CHECKS	**Yes**	**No**	**N/A**	**COMMENTS**
Anchors				
Posts				
Rails and Joints				
System Height				
Fasteners				
Line and Level				
Grout pad thickness				
Holding down Bolts Torque				
Parapet Mesh Infill				
Parapet Solid Infill				
Parapet Cladding				
Parapet Copings				
Anti Access Panels				
Visual Inspection of galvanised/Painted finish				

I confirm that I have inspected the Parapet in the above location and confirm that the inspected work has been completed in accordance with specifications.

Saferoad Lead Installer or Supervisor	Main Contractor	Client
Name (Print):	Name (Print):	Name (Print):
Signature:	Signature:	Signature:
Date:	Date:	Date:

Saferoad UK Ltd and its subsidiary Saferoad VRS Ltd.
Concord House, Bessemer Way, Scunthorpe.
DN15 8XE
Tel: 01724 289119

Conformity, Maintenance & Repair of SN2W1 / SNH2W4 Parapets

General Information

Where maintenance or repairs are required to be carried out, the procedure for installation in the following paragraphs shall be followed unless otherwise stated:

• If not subjected to impact damage, special corrosion conditions such as a chemical spillage, vandalism, or theft of components, the Parapet requires very little maintenance.

• It is encouraged that the information contained in the following is regarded as the minimum level of attention that will be afforded the Parapet system.

Conformity

New works will be initially inspected to ensure the system has been installed to the correct specification and will be ‘signed off’ by the installer in accordance with National Highways Sector Scheme Document 10B.

The inspection will include the following:-

- All fasteners are tightened to the specified torque and random checks of torques have been made with a calibrated torque wrench.

- System heights, with an accepted tolerance of ± 30mm (+30 -0 for railways) are to be confirmed with the relevant drawings.

- Post spacing tolerances must not, however, become cumulative.

- Remove any old/unused fittings from fencing installations.

Repairing damaged galvanised coatings

- Damaged areas of galvanised protective coatings can be repaired by removing any rust from the steel and application of a 150-micron coat of zinc-enriched spray paint.

- This procedure complies with EN ISO 1461 2022 clause 6.3 and does not apply to components that are damaged or thinned in such a way as to affect their integrity should an impact occur. Damaged components should be replaced.

Routine Inspection

The parapet system will be subject to routine inspection in line with the maintaining or adopting bodies' schedules.
Should damage to the parapet be encountered – either caused by an errant vehicle or vandalism, Saferoad should be contacted to arrange a survey and recommend the correct repair procedure.

Repair

- The straightening of damaged components is not allowed, and such components will be required to be replaced. All fasteners in the area of the impact shall be replaced with new fasteners irrespective of their apparent condition.

- A check/inspection of the system, on either side of the area of Impact will be conducted to ascertain if further damage has resulted. If damage is seen, or suspected, then the area of repair should be extended to encompass this.

- Posts in this area should be inspected with the inclusion of the anchorage. If the anchor has failed or is suspected of having failed, a test must be conducted in accordance with the Anchor Testing Method & recorded to ascertain if anchor replacement is required.

General Arrangement Drawings SN2W1

General Arrangement Drawings SNH2W4

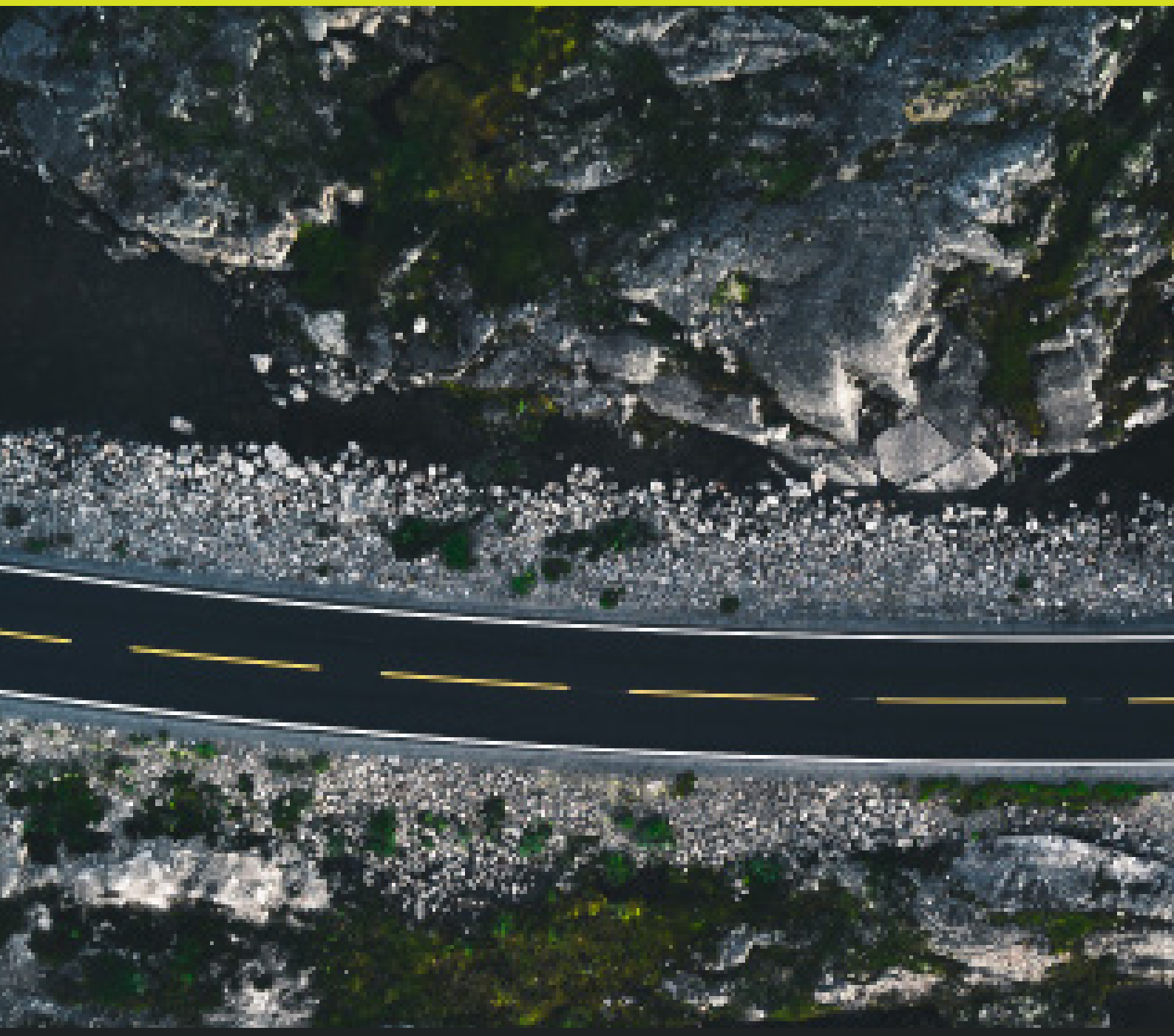
Saferoad UK Ltd are a leading supplier of Vehicle Restraint Systems, for information on our range of products or services please visit www.saferoad-rs.com/uk for more information or scan the QR codes below

Our Services

Training

Our Products

Contact Us



Saferoad UK Ltd
Concord House
Bessemer Way
Scunthorpe
DN15 8XE

Tel: 01724 289119
Email: enquiries@saferoad.co.uk