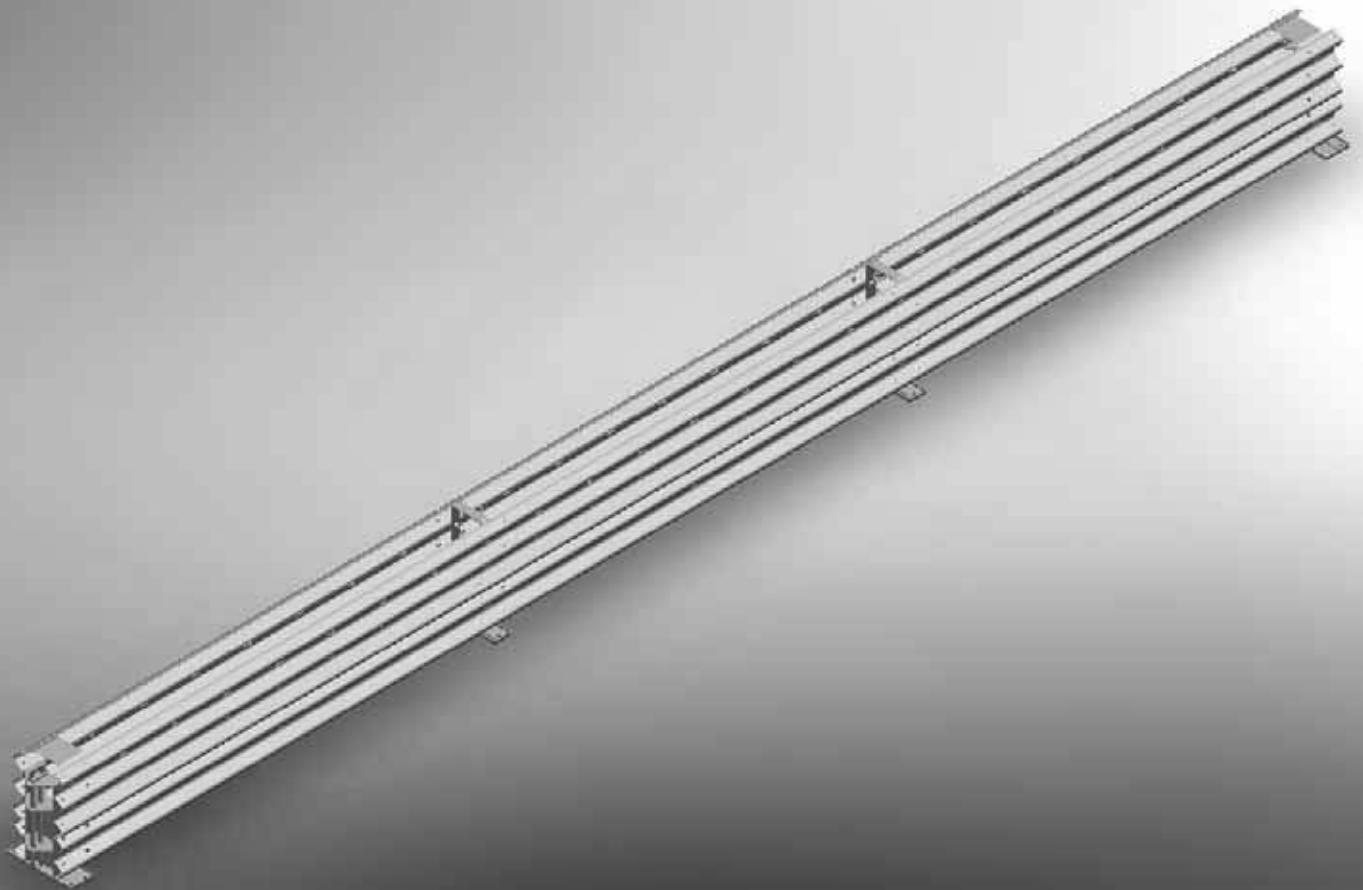


Installation Manual

Orion™ NCHRP 350 TL-3 Portable Steel Longitudinal Barrier



BARRIER SYSTEMS

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Installation Manual

ORION STEEL BARRIER SYSTEM

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Introduction

The **Orion**[™] TL-3 Steel Barrier can be assembled quickly and easily by a minimum of 2 personnel aided by some basic tools and machinery.

The objective of the **Orion**[™] Assembly Manual is to highlight step by step instructions for a safe and cost effective barrier assembly utilising the 'best practise' techniques refined during the R&D stages.

For the **Orion**[™] TL-3 Steel Barrier to perform during vehicle impacts it is extremely important that the instructions contained in this manual are understood and carried out accordingly by a qualified assembly crew. **Orion**[™] is a highly engineered safety device made up of a relatively small number of parts. Before assembling, ensure that one is familiar with the make up of the system.

Safety Statements

- All personnel should wear recommended safety clothing which include but are not limited to:
 - High visibility vests, steel capped footwear, protective eyewear, hearing protection, gloves etc.
- Only authorized trained personnel should operate any machinery. Where overhead machinery is used, care must be taken to avoid any overhead hazards.
- Guardrail panels are supplied stacked in bundles and extreme care must be taken when separating and manoeuvring into position.
- Particular care must be taken due to the weight of some components and safe techniques should be employed by all personnel. Approx weights:
 - Panels 67 kg (148 lbs) and 45 kg (99 lbs) respectively.
 - Frames 32 kg (71 lbs) and 26 kg (56 lbs) respectively, tray 28 kg (62 lbs).
- Assembly requires the assistance of machinery as some items are far in excess of that can be handled by a small assembly crew.
- Once fully assembled, the finished barrier units must be manoeuvred by suitable machinery and lifting devices using the built in lifting eyes.

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Getting Started

It is essential that **Orion**TM TL-3 steel barrier is assembled correctly. Please carefully read and understand the following instructions before installing.

Note: These instructions relate only to the installation of standard 11.7m (38'6") long **Orion**TM

Preparation

Before assembling **Orion**TM ensure that all components required for the system are on hand and have been identified. Given the overall length of the system and that lifting machinery is required to lift some components during assembly; an area approximately 20m x 6m (66' x 20') is required.

Ensure that the area is flat and hazard free and has access to either an air hose or compressor.

Tools Required

- 300mm (12") Adjustable Wrench
- Podger Bars and Hammer
- Wrench and 32mm (1 ¼") Socket
- Impact Gun and 32mm (1 ¼") Socket
- 6 wooden pallets or similar
- Looped lifting strap (min. 1 tonne rating)
- Air hose or compressor
- Crane hoist or similar



Note: The 11.7m (38'6") long **Orion**TM units weigh approx 900kg (1985 lbs) each, so lifting and maneuvering must be done by a crane hoist or similar. All lifting equipment used must be certified for use and in excess of the load weight encountered.

Components Required

- 1x End Frame Down
- 1x End Frame Up
- 2x Intermediate Frames
- 6x Thriebeam Panels
- 6x W-Beam Panels
- 3x Trays
- 2x Top End Bracket
- 166x M16 Splice Bolt & Nut (5/8 Guardrail Bolt)



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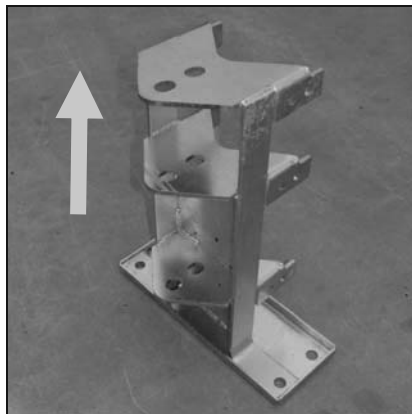
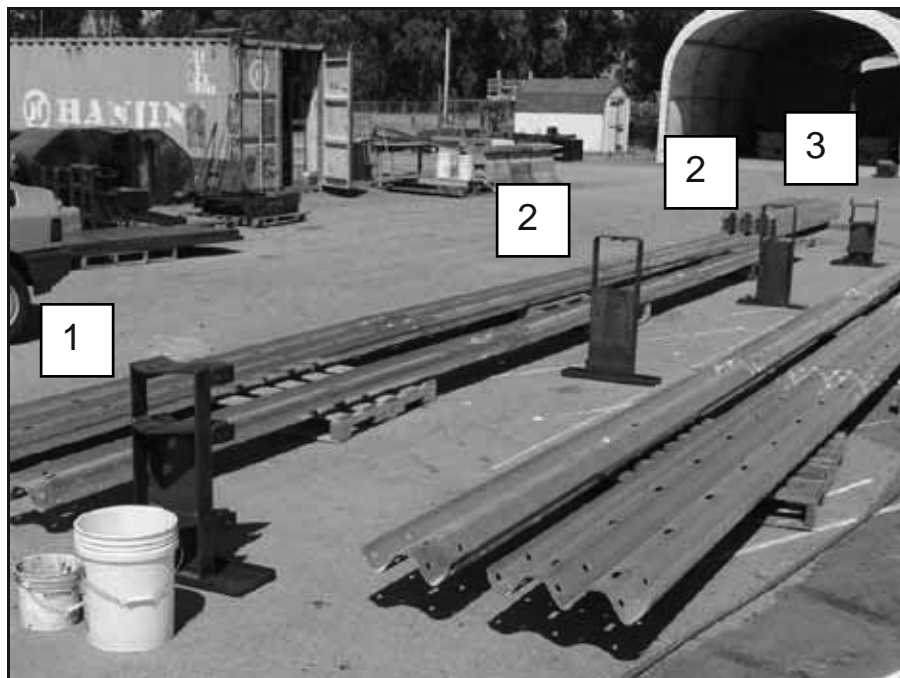
Step 1 – Frame Layout

Position the 4 frames at approximately 4m (13') spacing.

The 2 different end frames (up and down) have outward facing lugs. The 2 intermediate frames are the same and the lifting eye is always facing the middle for both frames.

1. End Frame Up
2. Intermediate Frame
3. End Frame Down

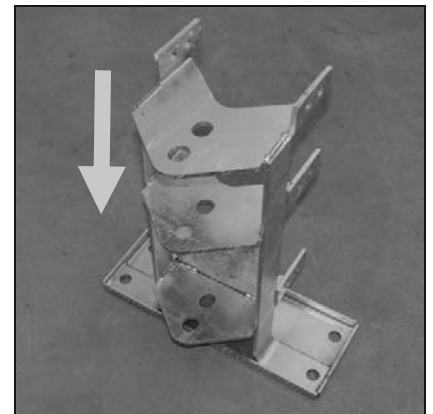
For further details on the *Orion*TM frames, consult the Appendix Drawing in this manual.



End Frame Up



Intermediate Frame



End Frame Down

Note: The end frames and panel lapping need to be consistently placed with the same orientation to guarantee the 'real' installations will be installed as intended.

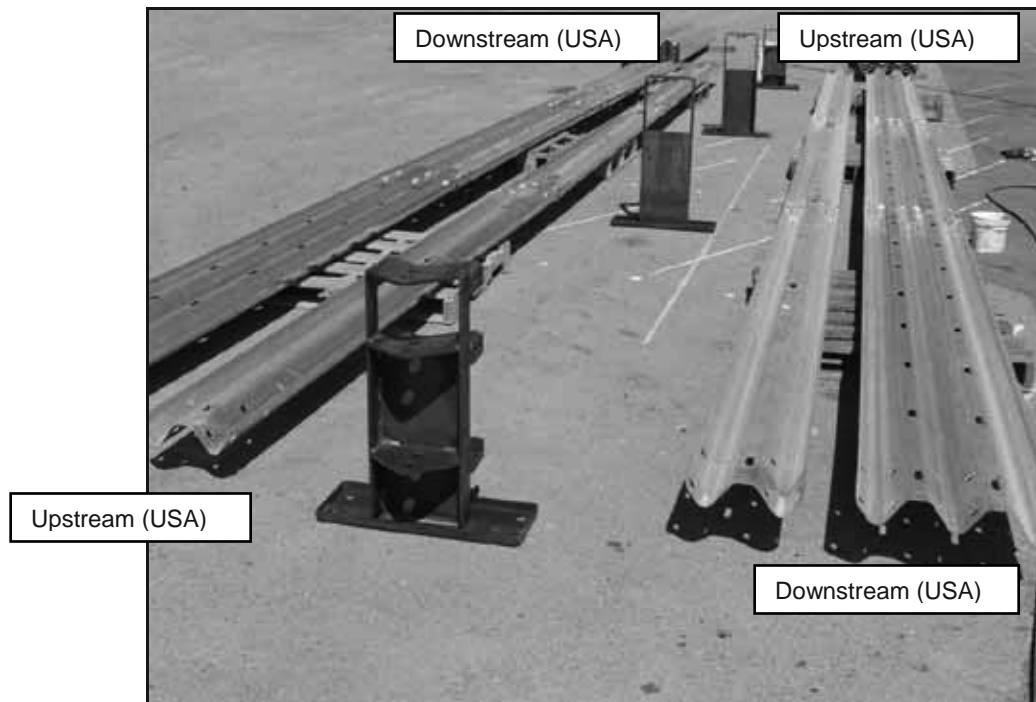
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Step 2 – Connecting the Guardrail Panels

Position the 6 thriebeam and 6 w-beam panels on either side of the frames. Always start by laying the 'upstream' panels so the lapping is the same direction as the traffic flow.

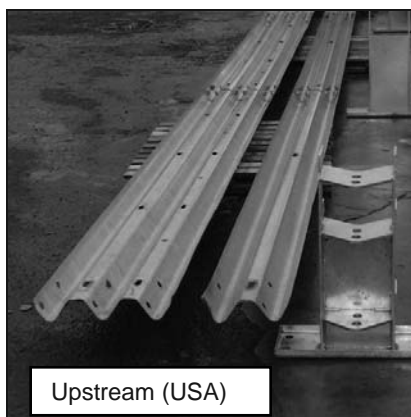
The lapping on either side will always be opposite.



At each splice join between the panels, connect the rails together using splice bolts.

Use a podger bar/s to assist lining up the holes. All holes must be populated.

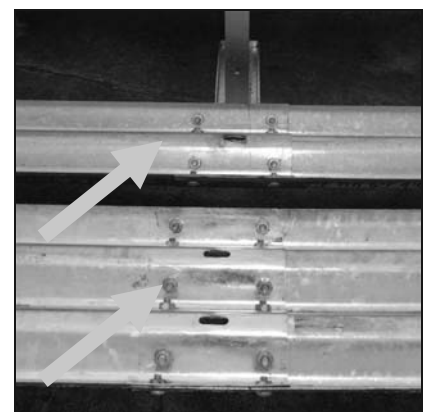
Note: Ensure the total combined length of w-beam and thriebeam are exactly the same.



Looking Downstream



Looking Upstream



Completed Spice Joins

Note: The nuts must be fully tight, using an impact gun is recommended. The required torque setting is 190 N-m (140 lbs-ft).

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Step 3 – Connecting the W-Beam Panels to the Frames

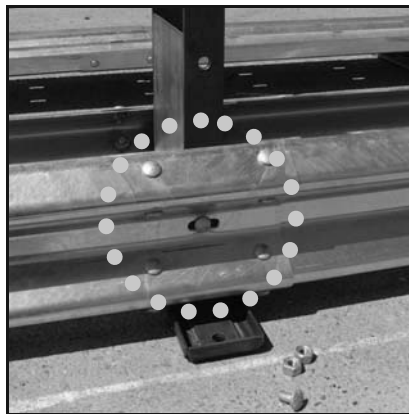
Starting with the spliced w-beam lengths, connect the 11.7m (38'6") panels to the corresponding frames.

The end frames require 2 bolts each while the intermediate frames only 1 each. Tighten with an impact gun and use a podger bar and hammer to aid with alignment.

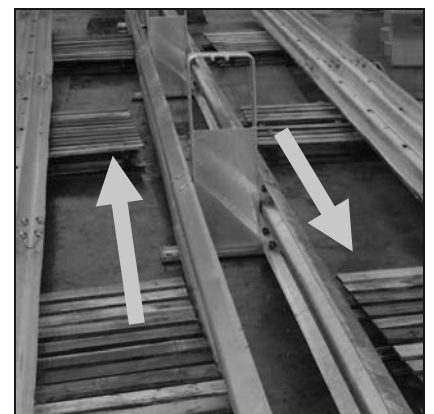
Helpful Hint: Only fully tighten nuts when both w-beam panels are attached to the frames.



2 Bolts into End Frame



1 Bolt into Intermediate Frame



Laps in either Direction

Note: The combined weight of the 11.7m (38'6") w-beam panels is approximately 135kg (297 lbs), make sure that safe lifting techniques are used to lift and hold in place while being connected to the frames.

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Step 4 – Connecting the first Thriebeam Panel to the Frames

Connect the 11.7m (38'6") thriebeam panels to the corresponding frames. Only one side in the first instance as the trays need to be fitted before the 2nd side is connected.

The end frames require 4 bolts each while the intermediate frames only 2 each. Tighten with an impact gun and use a podger bar and hammer to aid with alignment.

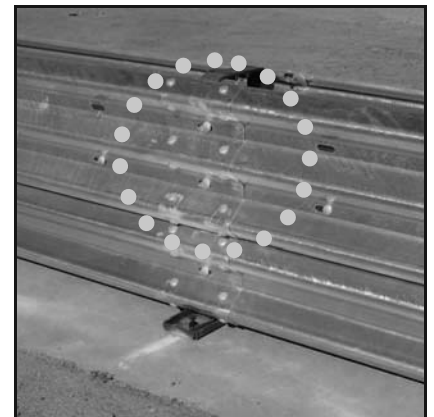
Helpful Hint: Only fully tighten nuts when all the thriebeam panels are attached to the frames.



4 Nuts at End Frame



4 Bolts into End Frame



2 Bolts into Intermediate Frame

Note: The combined weight of the 11.7m (38'6") thriebeam panels is approximately 201kg (444 lbs), make sure that safe lifting techniques are used to lift and hold in place while being connected to the frames.

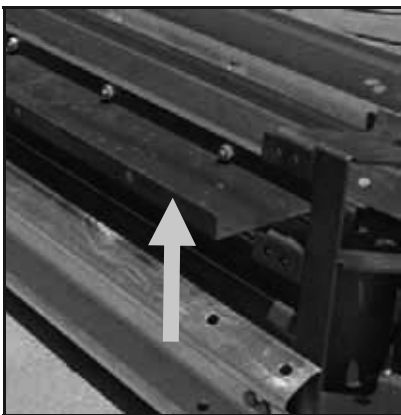
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Step 5 – Connecting the 3 Trays to the Thriebeam

Connect one side of the 3.45m (11'4") trays to the corresponding thriebeam panel. Only one side in the first instance as the second thriebeam panel is yet to be connected.

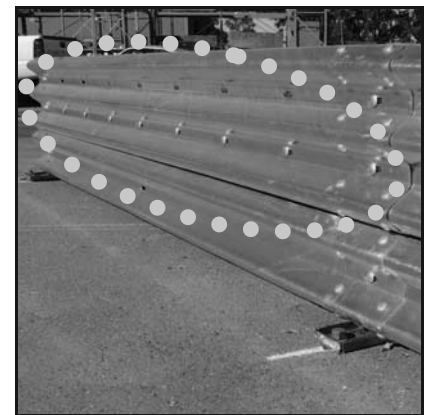
Each tray requires 7 bolts on each side and the tray must always be connected to the lower row of bolt holes in the thriebeam panel. The flanges of the tray always point up.



Tray Flanges Face Up



7 bolts per Flange per Tray



Lowest Bolt Holes in Panel

Note: The weight of each tray is approximately 28kg (62 lbs), make sure that safe lifting techniques are used to lift and hold in place while being connected to the panels.

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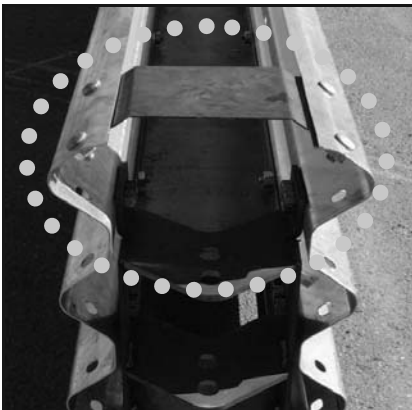
Step 6 – Connecting the Second Thriebeam Panel to the Frames

REPEAT step 4 & 5 to connect the second thriebeam panel to the frames and trays.

Step 7 – Connecting the 2 Top End Brackets

Using 4 bolts, connect each bracket to the last 4 bolt holes in the Thriebeam Panel at either end of the 11.7m (38'6") barrier. Position under the top edge of the panel.

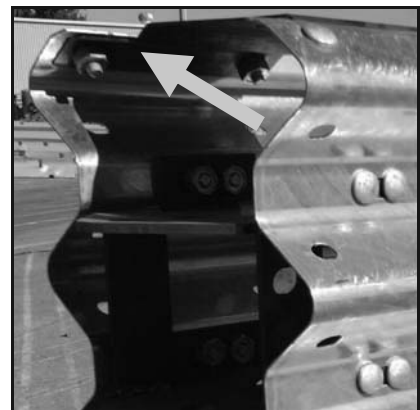
The notch end is positioned at the very end to allow the connecting pins to be installed. The 2 end bolts can not be reached using an impact gun so must be tightened with a wrench.



4 Bolts per Top End Bracket



Positioned under Thriebeam



Notch Faces Out

Note: Finished barrier units weigh approx 900kg (1985 lbs). Manoeuvre with suitable machinery and lifting devices using the built in lifting eyes on the intermediate frames.

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ASSEMBLY CHECKLIST FOR				
Orion™				
Batch				
Assembled By		Date		
Inspected By		Date		
			Y/N	
			N/A	
<ul style="list-style-type: none"> • The 3 Thriebeam Panels on each side are bolted together at each joint using 12 splice bolts. • The 3 W-Beam panels on each side are bolted together at each joint using 8 splice bolts. • The panels lap in the correct direction, from upstream to downstream. (sides will be opposite) • At either end an End Frame (1 up and 1 down) is bolted to all the panels using 12 bolts per frame. (lugs facing out) • The 2 Intermediate Frames are bolted to all panels using 6 bolts per frame. (lifting eyes facing each other) • A Tray is connected to the lowest row of holes in each Thriebeam panel using 14 bolts per Tray. (the flanges face up) • The Top End brackets are connected to the Thriebeam (under) at each end of the barrier using 4 bolts. (the notch faces out) • All bolts are tightened using an impact gun. (except the 2 end bolts attaching the Top End Plate which are spanner tight) Recommended torque required on all 8.8HT splice bolts is 190 N-m (140 lbs-ft). 				

Comments:

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Note:
Approx. total weight-900 kg.

ITEM NO.	DESCRIPTION	QTY
1	End Frame Down	1
2	End Frame Up	1
3	Intermediate Frame	2
4	Tray	3
5	Tribeam	6
6	W-beam	6
7	Top End Bracket	2
8	M16 Splice Bolt and Nut	166

Standard Tolerance

SCALE: 1:40

DRAWN BY	DATE	INIT.
APPRD BY	DATE	DJ

ORION for USA (isometric view)

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ARMORFLEX

SHEET 1 OF 2

DRAWING NUMBER 5-001d

REV.

CHANGES

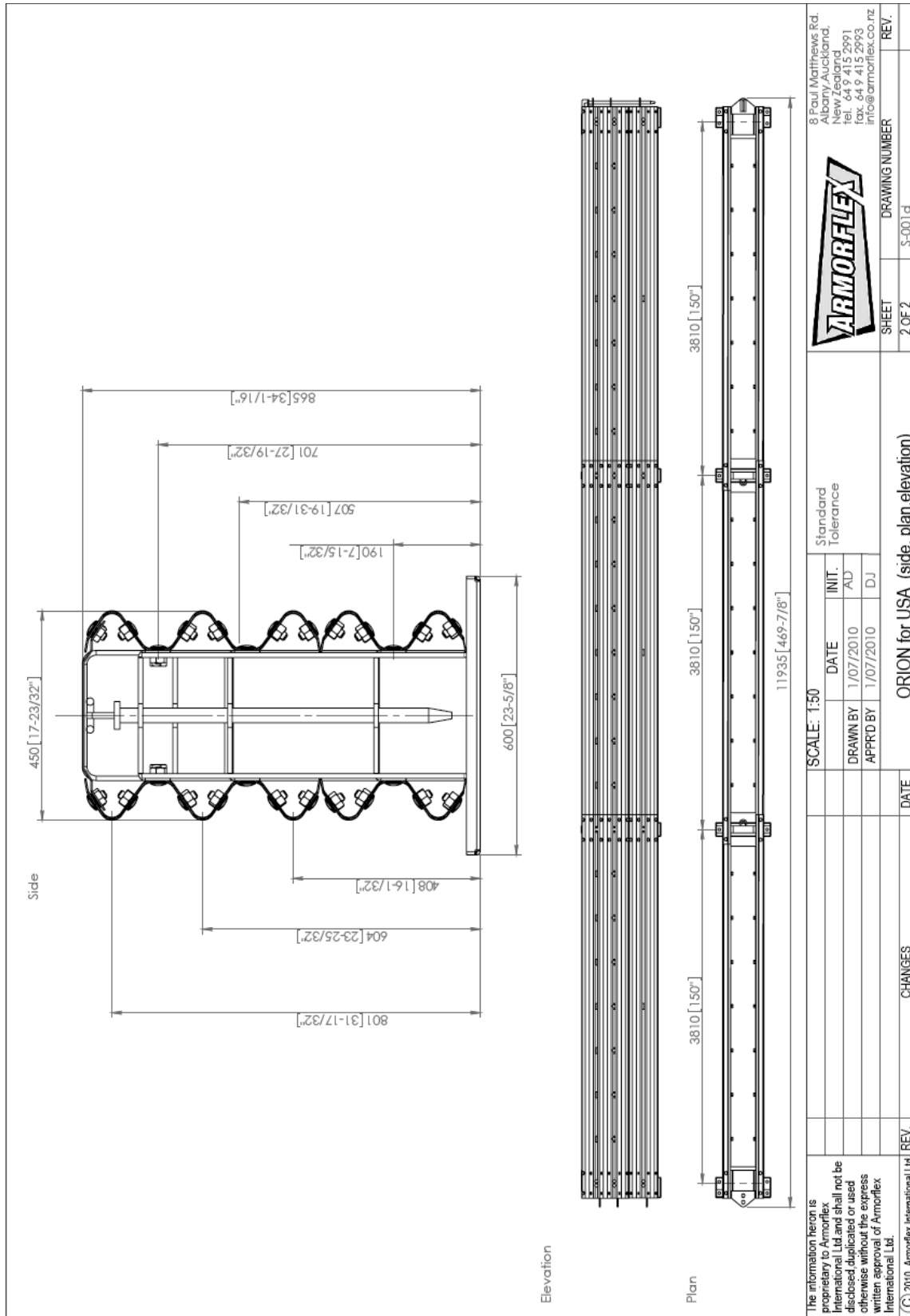
REV.	DATE

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Standard Tolerance

SCALE:	1:50
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DATE	1/07/2010

ORION for USA (side, plan, elevation)

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ARMORFLEX

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ORION™ – Plan and Elevation

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