VALTIR

NOVUS™ 100

PRODUCT MANUAL

PN 119616

November 2024

NOVUS™ 100

The NOVUS™ 100 system has been tested pursuant to American Association of State Highway and Transportation Officials (AASHTO) Manual for Assessing Safety Hardware (MASH) specifications. The NOVUS™ 100 system has been submitted for Federal-aid reimbursement eligibility on the National Highway System to the Federal Highway Administration (FHWA).

Product Manual

VALTIR

15601 Dallas Parkway
Suite 525
Addison, Texas 75001

The local highway authority, distributors, owners, contractors, lessors, and lessees are RESPONSIBLE for the assembly, maintenance, and repair of the NOVUS™ 100 system. Failure to fulfill these RESPONSIBILITIES with respect to the proper assembly, maintenance, and repair of the NOVUS™ 100 system could result in serious injury and/or death.

These instructions are for standard assembly specified by the appropriate highway authority. In the event the specified system assembly, maintenance, or repair would require a deviation from standard assembly parameters, contact a Valtir representative.

This manual must be available to the worker(s) overseeing and/or assembling the product at all times. For additional copies, contact Valtir at (888) 323-6374 or visit www.Valtir.com.

The instructions contained in the manual supersede all previous information and manuals. All information, illustrations, and specifications in this manual are based on the latest NOVUS™ 100 system information available to Valtir at the time of printing. Valtir reserves the right to make changes at any time. Please contact Valtir to confirm that you are referring to the most current instructions.

PN. 119616
Revision A | November 2024

TABLE OF CONTENTS

PN. 119616
Revision A | November 2024

Customer Service Contacts

Valtir is committed to the highest level of customer service. Feedback regarding the NOVUS™ 100 system assembly procedures, supporting documentation, and performance is always welcome. Additional information can be obtained from the contacts below:

Valtir

Telephone:

(888) 323-6374 (USA)
+1 214 589 8140 (International)

Internet:

www.Valtir.com/contact

Abbreviations and Definitions

AASHTO . . . . American Association of State Highway and Transportation Officials

FHWA. . . . . Federal Highway Administration

MASH. . . . . Manual for Assessing Safety Hardware

MUTCD . . . . . Manual on Uniform Traffic Control Devices

PPE. . . . . Personal Protective Equipment

Safety Symbols

This section describes safety symbols that may appear in this product manual. Read this manual for complete safety, assembly, operating, maintenance, repair, and service information.

Indicates Danger or Warning. Failure to read and follow this warning could result in serious injury or death to the workers and/or bystanders.

Indicates Caution or High Importance. Failure to follow this warning can result in improper performance, failure of operation, to serious injury or death in the event of a vehicle impact with the system.

Indicates Notifications or Reference. These denote important items but will not cause system damage or serious injury.

Indicates importance of reading instructions. Failure to follow all steps can result in improper performance, system failure, and/or serious injury or death in the event of a vehicle impact with the system.

PN. 119616
Revision A | November 2024

Safety Rules for Installation

This manual must be kept in a location where it is readily available to persons who are skilled and experienced in the proper installation, maintenance, or repair of the NOVUS™ 100 system. Additional copies of this manual are available from Valtir. Please contact Valtir if you have any questions concerning the information in this manual.

It is the responsibility of the installer to use proper safety precautions when operating power equipment and when moving heavy equipment or system components. Hand, eye, foot, and back protection is recommended.

Ensure that all of the Danger, Warning, Caution, and Important statements within this product manual are completely followed. Failure to follow this warning could result in serious injury or death in the event of a collision.

Important Introductory Notes

Proper installation of the NOVUS™ 100 is critical to achieve performance. The NOVUS™ 100 has been submitted for eligibility to the FHWA per AASHTO MASH criteria. These instructions should be read in their entirety and understood before installing the system. These instructions are to be used only in conjunction with the installation of the system as specified by the applicable highway authority. If you need additional information, or have questions about the system, please contact Valtir's Customer Service Department. This product must be installed in the location specified by the appropriate highway authority. If there are deviations, alterations, or departures from the installation protocol specified in this manual, the device may not perform as tested.

DO NOT use any component part that has not been specified and/or approved for this system during assembly or repair.

This product has been specified for use by the appropriate highway authority and has been provided to that user who has unique knowledge of how this system is to be assembled. No person should be permitted to assist in the assembly, maintenance, or repair of this system that does not possess the unique knowledge described herein. These instructions are intended for an individual qualified to both read and accurately interpret them as written. These instructions are intended only for an individual experience and skilled in the assembly of highway products that are specified and selected by the highway authority. A manufacturer's drawing package will be supplied by Valtir upon request. Each system will be supplied with a specific drawing package unique to that system. Such drawings take precedence over information in this manual and shall be studied thoroughly by a qualified individual who is skilled in interpreting them before the start of any product assembly.

PN. 119616
Revision A | November 2024

Limitations and Warnings

Valtir, in compliance with AASHTO MASH, contracts with ISO 17025 A2LA accredited testing laboratories to perform crash tests, evaluate tests, and submit the test results to the FHWA for review.

The NOVUS™ 100 System was tested to MASH-2nd Edition (2016), with 2020 Errata TL-3 criteria and may be used in Test Level 3 applications.

These tests typically evaluate product performance defined by MASH involving specific vehicles on roadways, lightweight cars (approximately 2,420 lb [1,100 kg]), midweight cars (approximately 3,300 lb [1,500 kg]) and full size pickup trucks (approximately 5,000 lb [2,270 kg]) at 62 mph [100 kph].

The NOVUS™100 System is tested pursuant to the test matrix criteria of MASH as designated by AASHTO and FHWA.

The FHWA/AASHTO tests are not intended to represent the performance of systems when impacted by every vehicle type or in every impact condition existing on the roadway.

Every departure from the roadway is a unique event.

Valtir expressly disclaims any warranty or liability for injury or damage to persons or property resulting from any impact, collision or harmful contact with its products, other vehicles, or nearby hazards or objects by any vehicle, object or person, whether or not the products were assembled in consultation with Valtir or by third parties.

The NOVUS™ 100 is intended to be installed and maintained in accordance with specific state and federal guidelines. Valtir offers a reflective delineator panel and has reflective tape for the NOVUS™ 100. However, the material is only intended to supplement delineation required by the US Department of Transportation's MUTCD or local jurisdiction. The appropriate highway authority approved engineer should be careful to properly select, assemble, and maintain the product. Careful evaluation of site layout, traffic speed/type, direction, and visibility are some of the elements that require evaluation by the highway authority in the selection of a highway product. For example, curbs could cause an untested effect on an impacting vehicle.

After an impact occurs, the debris from the impact should be removed from the area immediately and the specified highway product should be evaluated and restored to its original specified condition or replaced as the highway authority determines as soon as possible.

Do not install, maintain, or repair this system until you have read this manual throughly and completely understand it. Ensure that all Danger, Warning, Caution, and Important statements within the manual are completely followed. Please call Valtir at (888) 323-6374 if you do not understand these instructions or have questions.

Do not modify this system in any way.

It is the sole responsibility of the project engineer and/or local highway authority and its engineer to ensure that this system and delineation used meet all federal, state, specifying agency, and local specifications.

It is the sole responsibility of the project engineer and/or local highway authority and its engineer to ensure that the installation meets all appropriate Manual on Uniform Traffic Control Devices (MUTCD) and local standards.

PN. 119616
Revision A | November 2024

System Overview

The NOVUS™ 100 system is a re-directive crash cushion for roadside features up to 635 mm [26”] wide. Whether the system is reusable after an impact is left to the sound discretion of the highway authority specifying the use of the system.

How to Determine Left/Right

To determine left from right when ordering transitions, stand in front of the system facing the roadside feature. Your left is the system’s left and your right is the system’s right.

Defining the Bays

Each bay is a repeated section of a diaphragm and 4 side panels. Each diaphragm will have base track guides attached at the base of the track.

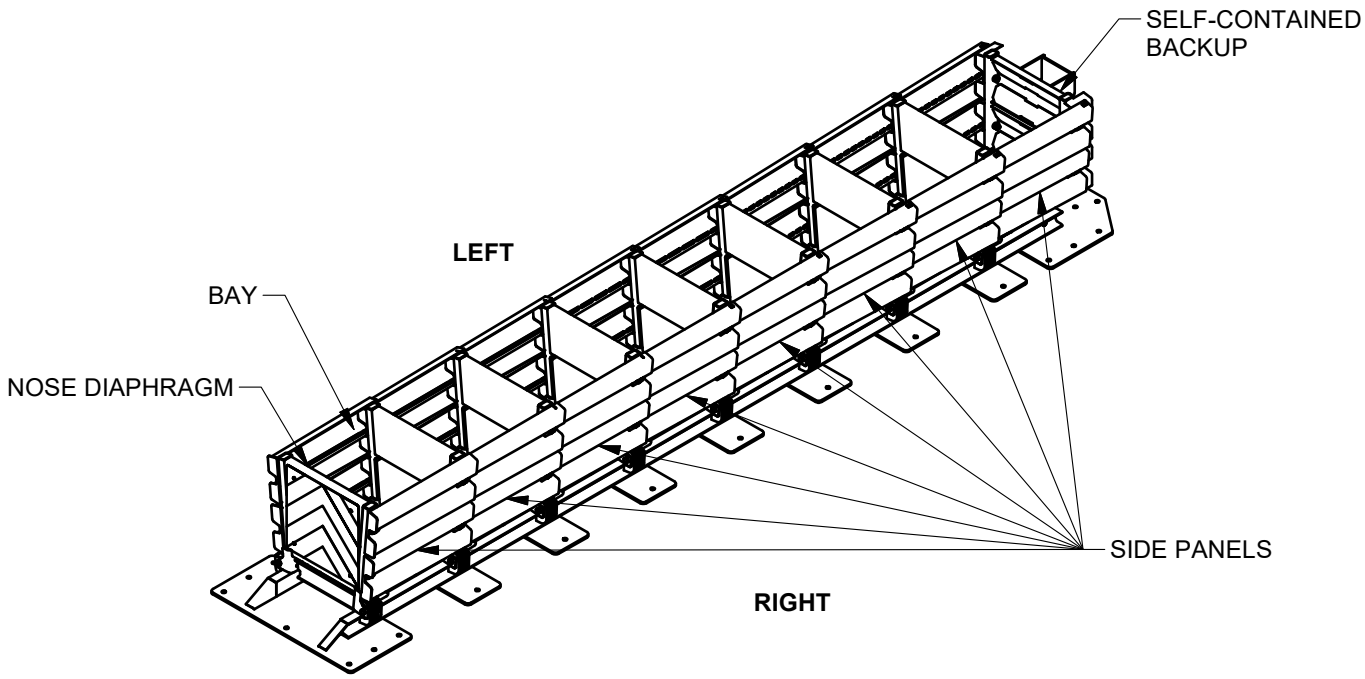


Figure 1

PN. 119616
Revision A | November 2024

Location Requirements

Unidirectional Application

Installation of a NOVUS™ 100 system and its backup connections of transitions depends on the traffic pattern and the road feature at the particular location. Unidirectional traffic (one side or both) requires no transition (Figures 2 and 3). Call Customer Service at (888) 323-6374 or your local Valtir representative with questions regarding this and other types of assembly.

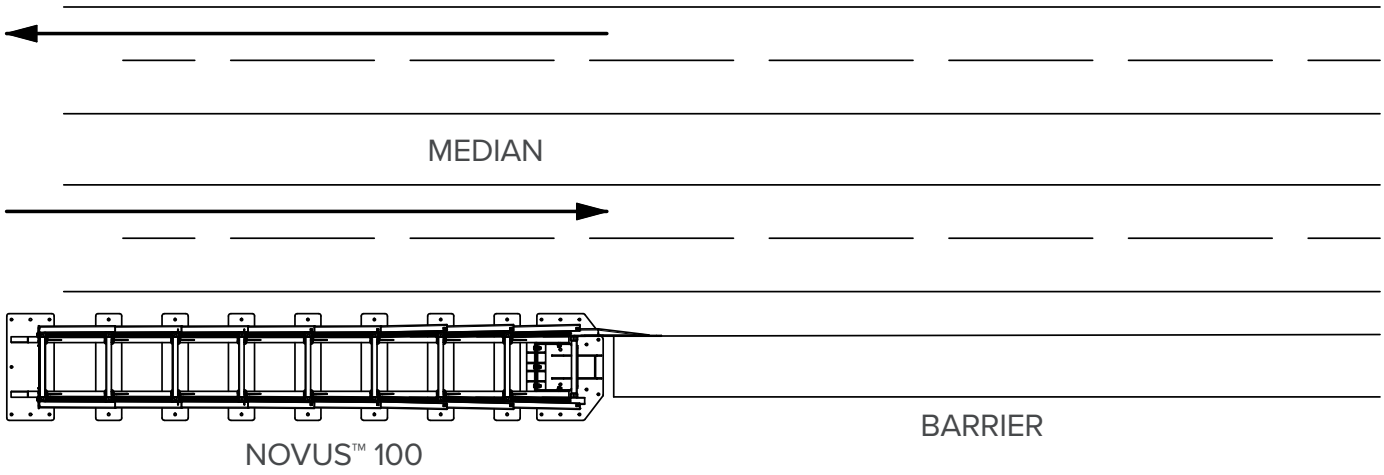


Figure 2 - Unidirectional Traffic Flow - One Side Requires No Transition

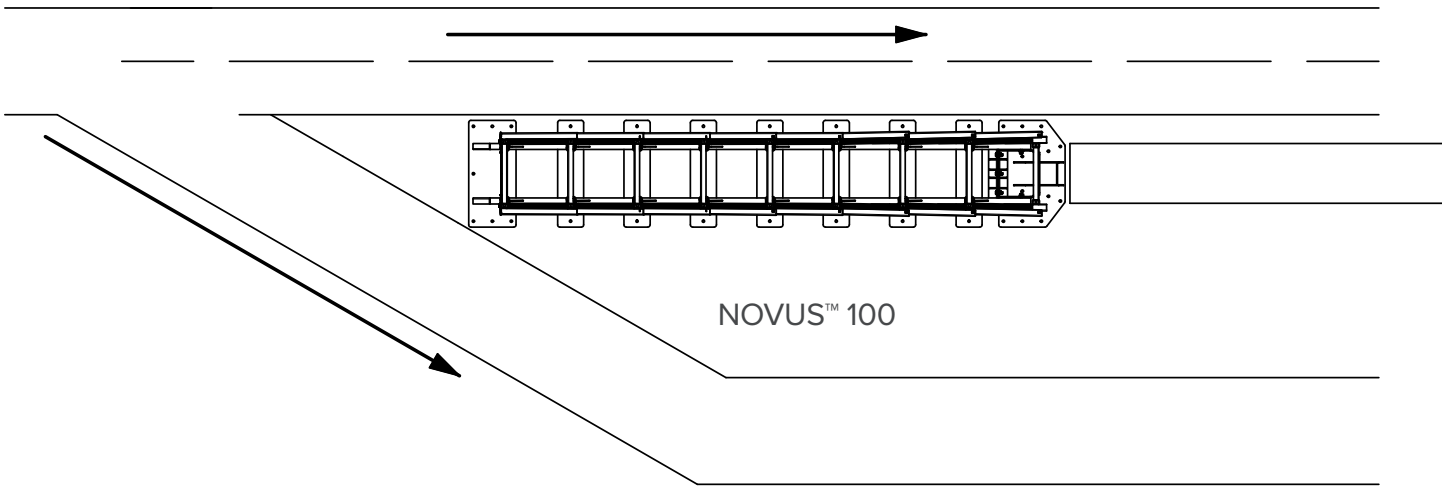


Figure 3 - Unidirectional Traffic Flow - Both Sides Require Unidirectional Transitions*

* Unidirectional transitions may be required contact customer service prior to deployment if you have any questions

PN. 119616
Revision A | November 2024

Bidirectional Application

See Figure 4 for installations that face oncoming traffic from the reverse direction. Appropriate transitions must be applied to the end of the backup structure. Valtir can provide transitions for a variety of concrete barrier or guardrail profiles.

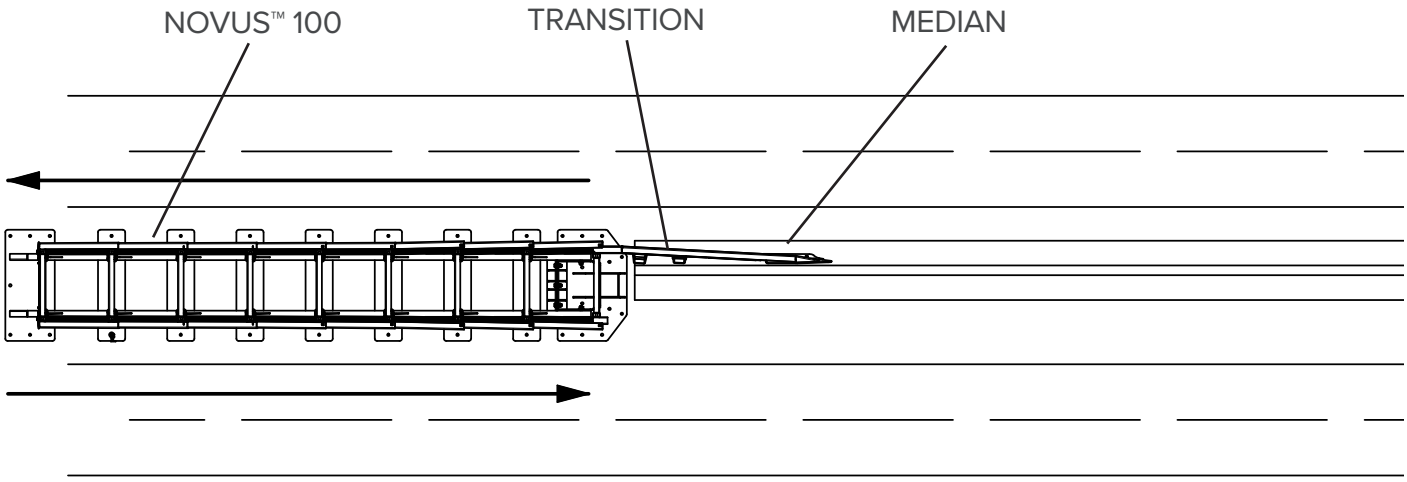


Figure 4 - Bidirectional Traffic Flow - Requires Transition on One Side

Approach Zone and Clear Zone

The AASHTO Roadside Design Guide states the NOVUS™ 100 should not be placed directly behind a raised curb. The approach area in front of the system in the direction of traffic flow should slope at a rate of no greater than 10% (6 degrees or 10:1) from the surrounding area. The cross-slope should differ from the surrounding area by no more than 8% (5 degrees or 12:1). The clear zone behind the NOVUS™ 100 should be consistent with the area behind the downstream Length-of-Need (“LON”) of the barrier. The entire length of the NOVUS™ 100 can be used in LON calculations as it is fully redirecting.

Downstream Zone

The NOVUS™ 100 system should be assembled so that a 762 mm [30”] clear space will exist on both sides of the road feature for the Fender Panels to retract during an end-on impact (Figure 5)

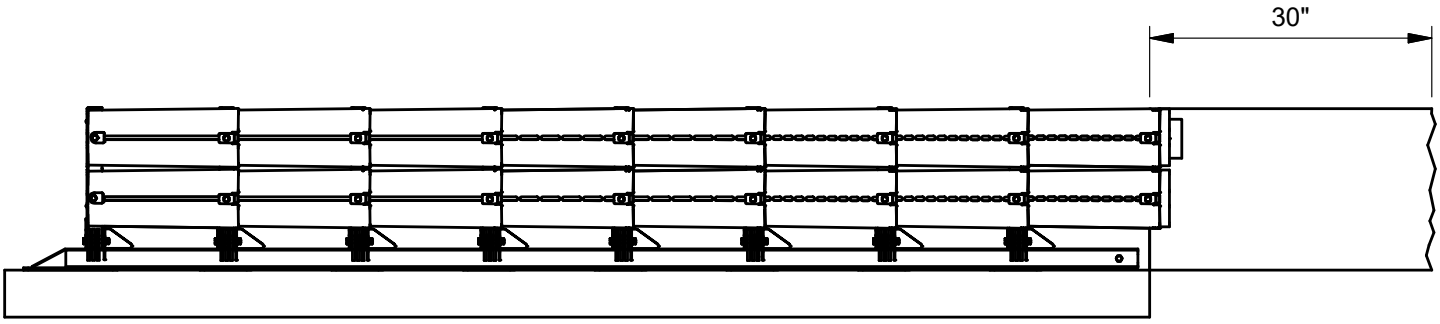
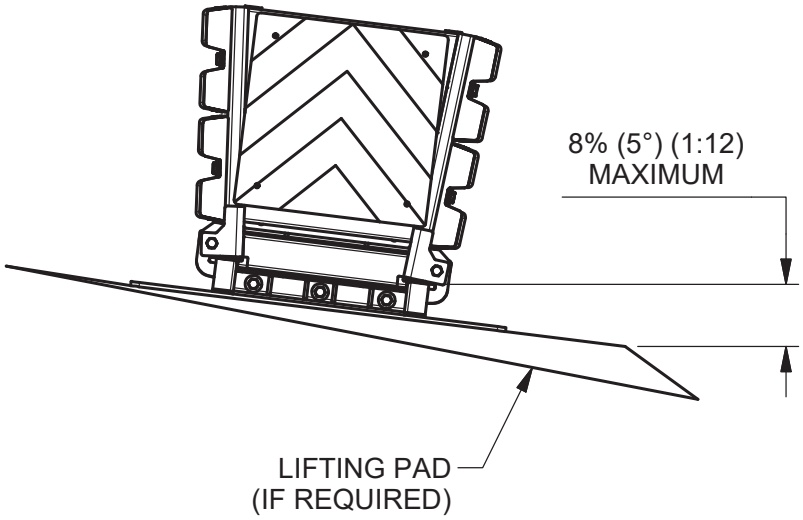


Figure 5 - Clear Space for Panel Retraction

PN. 119616
Revision A | November 2024

Site Preparation

The NOVUS™ 100 must be assembled on an existing foundation of freshly placed and cured concrete foundation (4000 psi [28 MPa] minimum), or on a foundation of 6” Asphalt over compacted sub-base. Location and orientation of the concrete foundation and attenuator must comply with project plans or as otherwise determined by the local highway authority.



Foundation/Anchoring

It is the responsibility of the installer to ensure the foundation conforms to the AASHTO Roadside Design Guide.

The NOVUS™ 100 may be installed on any of the following foundations using the specified anchorage:

Valtir Approved Adhesive Anchoring System

A Valtir approved adhesive anchoring system is required to securely anchor crash cushions. Each approved adhesive kit contains adhesive, studs, nuts and washers. Vertical assemblies may be mounted using an approved adhesive anchoring system. Horizontal assemblies are possible using an approved anchoring system.

Foundation A: Reinforced Concrete Pad or Roadway (See drawing 628787, sheet 2)

Foundation: 6” [152 mm] minimum depth 28 MPa [4000 psi] Portland Cement Concrete P.C.C.

Anchorage: Approved adhesive with 7” [180 mm] studs with 5 1/2” [140 mm] embedment

Foundation B: Unreinforced Concrete Pad or Roadway (See drawing 628787, sheets 1 and 3)

Foundation: 8” [203 mm] minimum depth 28 MPa [4000 psi] P.C.C. Pad.

ANCHOR BLOCK IS NOT REQUIRED WHEN USING 203 mm [8”] CONCRETE PAD INSTALLED AGAINST AN IMMOVABLE STRUCTURE SUCH AS A CONCRETE WALL OR ABUTMENT. CONCRETE ROADWAY, MEASURING AT LEAST 3.66 m [12’-0”] WIDE BY 15.24 m [50’-0”] LONG. ANCHOR

Anchorage: Approved adhesive with 7” [180 mm] studs with 5 1/2” [140 mm] embedment

Foundation C: Asphalt over P.C.C.

Foundation: 3” [76 mm] minimum asphalt concrete (A.C.) over 3” [76 mm] minimum P.C.C.

Anchorage: Length of anchor required is 18” [460 mm] with embedment of 16 1/2” [420 mm]

PN. 119616
Revision A | November 2024

Foundation D: Asphalt over Subbase

Foundation: 6” [152 mm] minimum A.C. over 6” [152 mm] minimum Compacted Subbase (C.S.)

Anchorage: Approved adhesive with 18” [460 mm] studs with 16 1/2” [420 mm] embedment

Foundation E: Asphalt Only

Foundation: 8” [203 mm] minimum A.C.

Anchorage: Approved adhesive with 18” [460 mm] studs with 16 1/2” [420 mm] embedment

Vertical Anchors

It is the responsibility of the installer to ensure the foundation conforms to the AASHTO Roadside Design Guide.

1. The NOVUS™ 100 backup and base track must be anchored with a total of 33 anchors. Anchor stud length will vary depending on foundation. These studs must be set in minimum 4000 psi [28 MPa] concrete. Approved adhesive cartridges are required for anchoring in a concrete foundation. Eight adhesive cartrdges are required for anchoring one system. Allow the concrete to cure a minimum of seven days before applying anchoring adhesive.

It is the responsibility of the installer to consult OSHA silica respiratory standard 29 CFR 1910.134 for debris removal from borehole(s) and use Valtir approved adhesive to achieve optimum tensile strength. Do not use diamond drill bits for drilling boreholes.

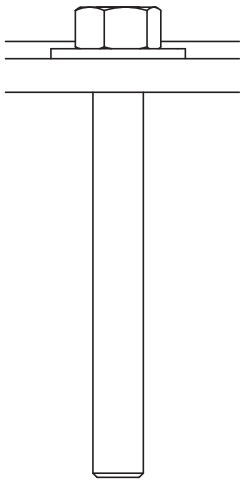
2. Use the part that is to be anchored as a drilling template. Use a rotary hammer to Drill the boreholes 7/8” [22 mm] diameter to the recommended depth. See the approved adhesive instructions provided with your kit. Check to ensure each borehole is drilled to the proper depth as shown below and aligned with the part to be anchored per the anchoring information below.

Vertical Anchoring Information				
Stud Size	**Concrete Bit Size**	**Minimum Depth**	**Recommended Torque**	**Foundation Type**
3/4” x 7”	7/8” [22 mm]	6” [152 mm]	110 ft-lbs	Concrete
3/4” x 18”	7/8” [22 mm]	16” [407 mm]	15 ft-lbs	Asphalt

PN. 119616

Revision A | November 2024

3. Blow the concrete dust from the borehole using oil-free compressed air. Thoroughly brush it with a 7/8” [22 mm] diameter steel bristle tube brush and then blow it out again. If the borehole is wet, completely flush it with water while brushing and then blow it clean to remove all water. Alternatively, a hollow concrete drill bit with an approved vacuum system may be used to prepare and clean the boreholes.
4. Fill the borehole to the top of the pavement surface. Fill from the bottom-up to prevent air pockets.
5. Place a flat washer onto the stud then thread a nut onto the stud until the end of the stud is flush with the top of the nut.
6. Push the stud down through the part to be anchored and into the boreholes.
7. Once the adhesive has fully cured, torque the nut to the adhesive manufacturer’s specification



Vertical Anchoring

Horizontal Anchors, Mechanical Fasteners

Valtir approved horizontal anchors are required for anchoring transition panels to concrete abutments and barriers. The anchors used are Hex Head Concrete Screws.

Horizontal Anchoring Information			
Screw Size	**Concrete Bit Size**	**Minimum Depth**	**Recommended Torque**
3/4” x 5”	3/4” [19 mm]	5 1/2” [140 mm]	150 ft-lbs
3/4” x 5 1/2”	3/4” [19 mm]	6” [229 mm]	150 ft-lbs

Anchor Assembly Cautions

If steel rebar is encountered while drilling an anchor borehole, apply one of the following solutions:

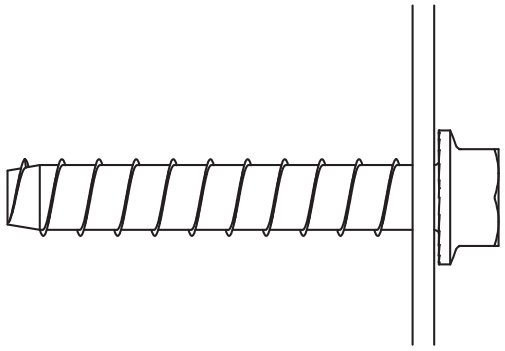
A. Use a rebar drill bit for the rebar only and then switch back to the concrete bit to finish drilling into the underlying concrete until the proper borehole depth is reached

Do not drill through rebar without first obtaining permission to do so from the project engineer.

B. Drill a new borehole down at an angle past the rebar to the proper depth.

Rebar

Per the project engineer’s recommendation, if rebar is encountered while drilling a borehole, the rebar may be drilled through or the borehole may be drilled at an angle.



Horizontal Anchoring

PN. 119616
Revision A | November 2024

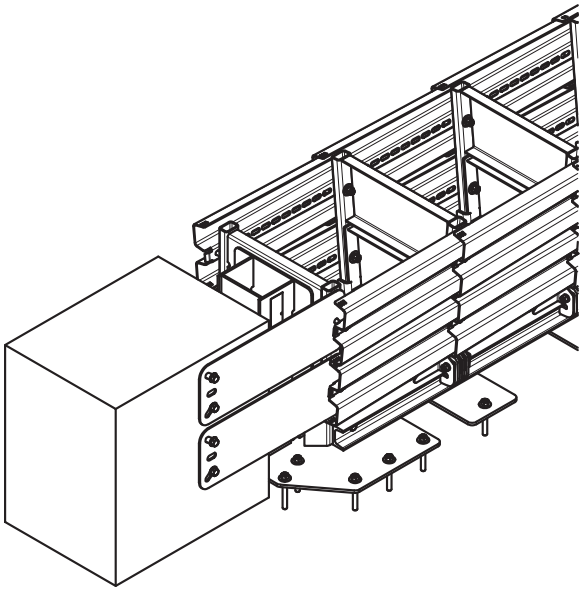
Transitions

The NOVUS™ 100 can be used in unidirectional and bidirectional applications. Transition panels must be added to any side exposed to traffic if there is potential of vehicle interaction on the impacting face or end of roadside obstacle. The proper transition panel to use will depend on the direction of traffic and what type of barrier or roadside obstacle the NOVUS™ 100 is shielding. Contact the Customer Service Department for additional information.

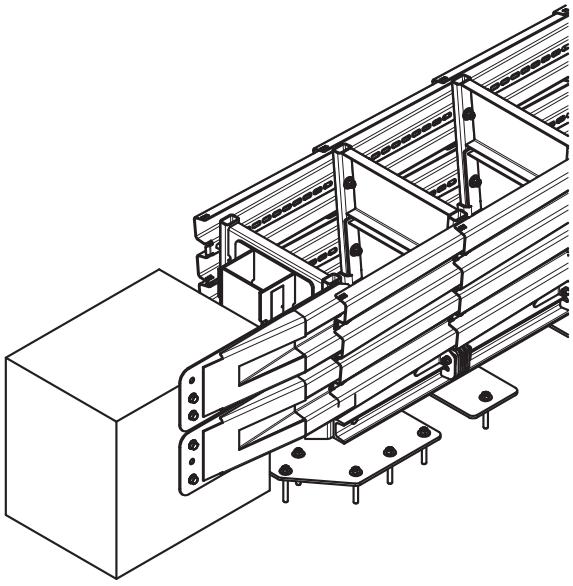
The system backup must not become a roadside obstacle to reverse direction traffic. A system placed with traffic approaching from the rear will require transition hardware.

Horizontal Anchors, Mechanical Fasteners

Valtir approved horizontal anchors are required for anchoring transition panels to concrete abutments and barriers. The anchors used are Hex Head Concrete Screws.

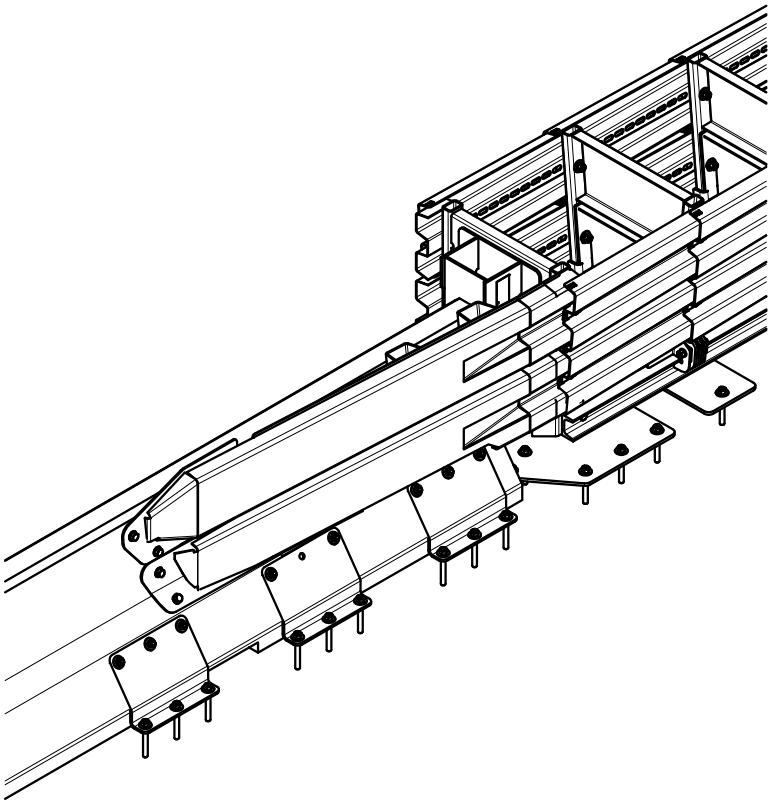


Unidirectional Transition



Vertical Wall Wrong Way Transition

PN. 119616
Revision A | November 2024

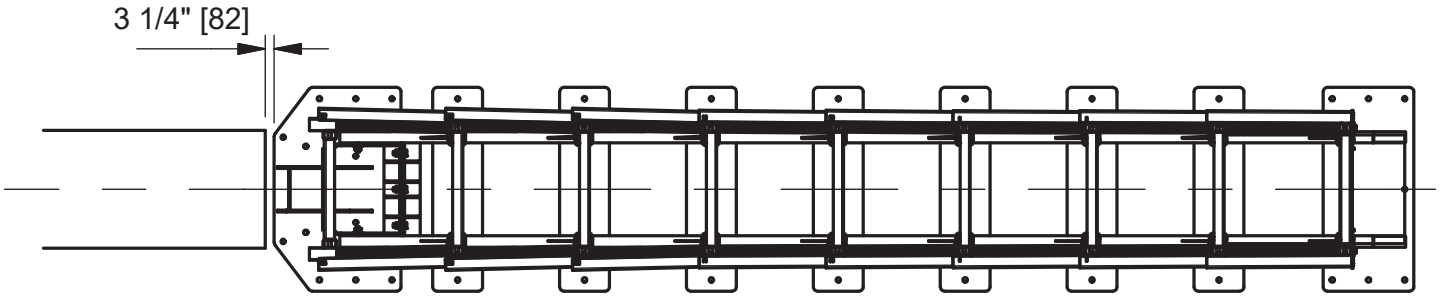


Standard CMB Wrong Way Transition

PN. 119616
Revision A | November 2024

Pre-Assembled System Installation

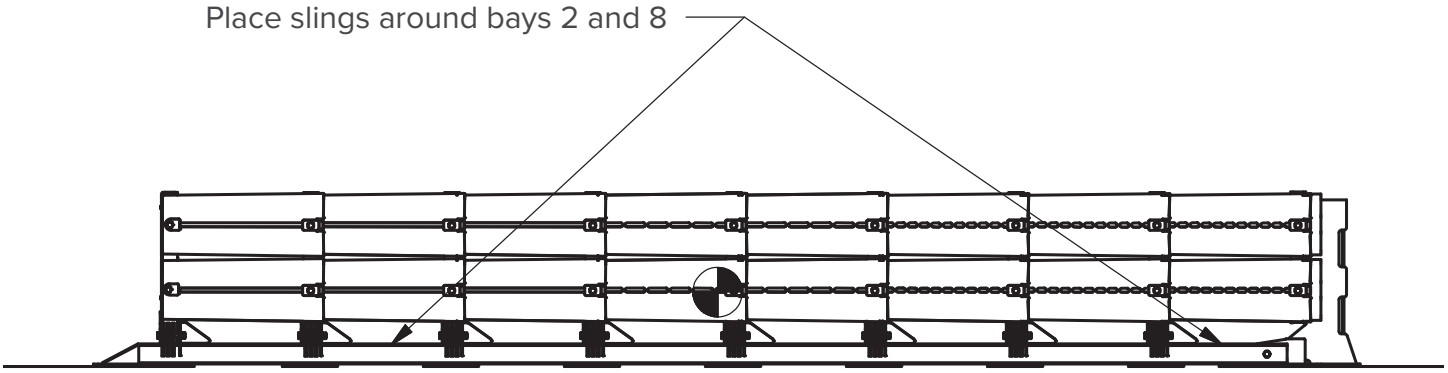
1. Typically the base point of the NOVUS™ 100 will be the midpoint of the roadside obstacle at its front face. This may change depending on obstacle width or if bidirectional traffic is present (refer to the provided drawing package for details). Mark a centerline from the base point, perpendicular to the roadside obstacle face, or as determined by project engineer, to a distance greater than the maximum length of the NOVUS™ 100.



2. Use single slings (QTY 4) with a 4,000 lb. [1814 kg] minimum lift capacity. Place a single loop in the back just rear of the last diagram, and a double loop in the foward position just ahead of the third diaphram. Slings must wrap around the ouitside of the side panels for maximum stabilty during placement. Care should be taken to ensure that the system can be handled safely prior to and during any move. When picking up the NOVUS™ 100 with a forklift, the forks should be positioned underneath the basetrack. This allows for maximum stability and control of the load while it is being lifted and moved. It's important to ensure that NOVUS™ 100 center of gravity is centered on the forks, see cg location for reference, and the forklift's capacity is rated to lift 4000 lbs.

DO NOT lift the system using the side panels. All lifting must be under the base track rails.

Lifting straps must be removed after system installation.

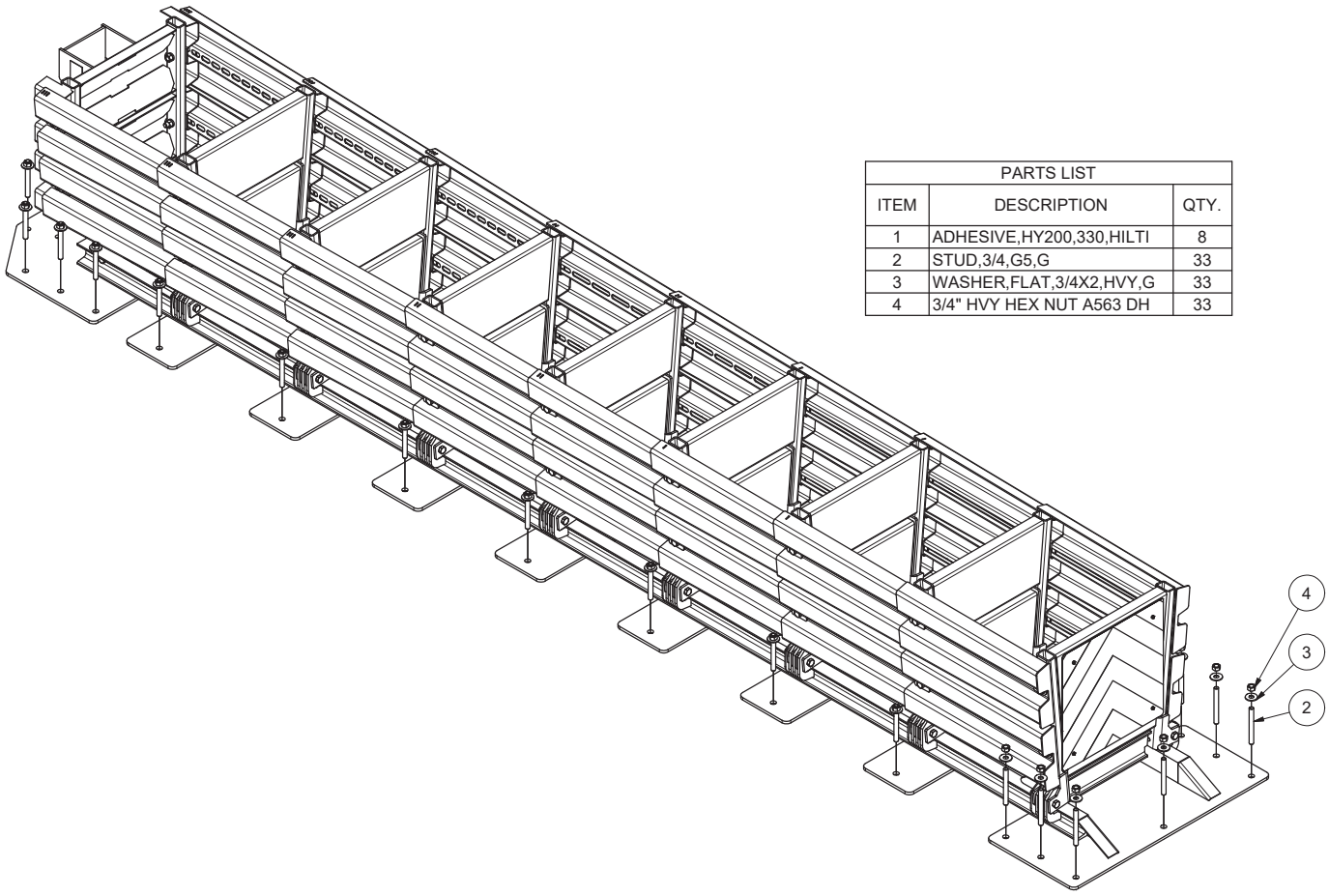


3. The NOVUS™ 100 can also be lifted under the base track rails using a forklift with a minimum 4000 lb. lift capacity.

PN. 119616
Revision A | November 2024

Lifting strap must be removed after system installation.

NOVUS™ 100 systems can be placed directly onto the foundation as a complete unit. Holes for the anchor studs can be drilled into foundation using the system as a template. Because of the open design of all the NOVUS™ 100 systems, it is not necessary to disassemble any portion of the system in order to drill the anchoring holes.

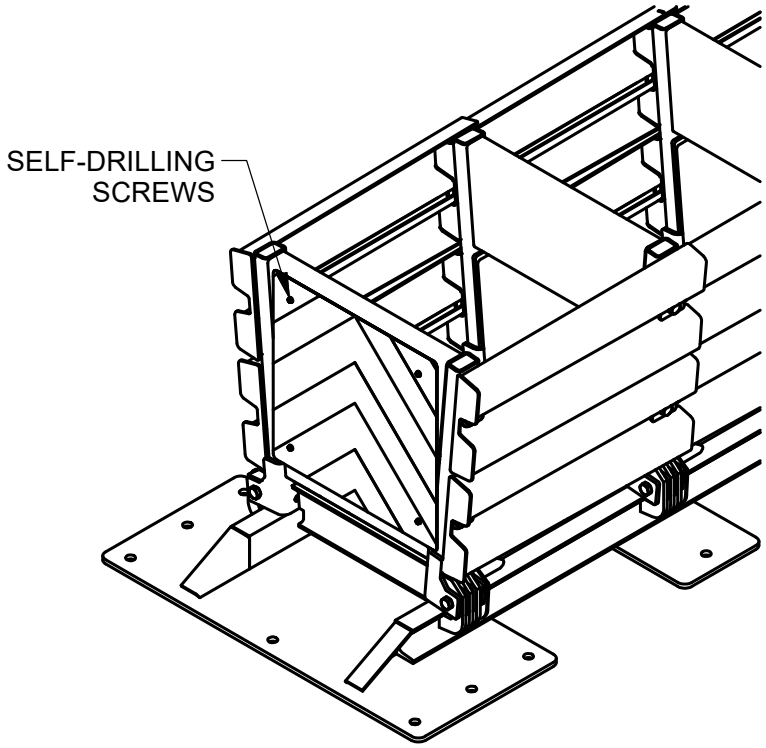


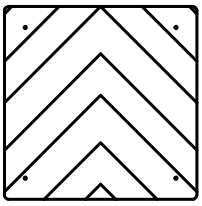
PARTS LIST		
ITEM	DESCRIPTION	QTY.
1	ADHESIVE,HY200,330,HILTI	8
2	STUD,3/4,G5,G	33
3	WASHER,FLAT,3/4X2,HVY,G	33
4	3/4" HVY HEX NUT A563 DH	33

PN. 119616
Revision A | November 2024

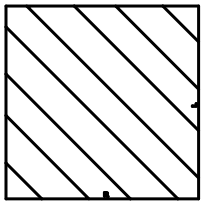
Nose Delineation

The NOVUS™ 100 is intended for use on gores, medians or side-of-the-road applications in both unidirectional and bidirectional traffic situations. Delineation of the nose section can be customized for any location. Standard yellow reflective sheeting is provided with the NOVUS™ 100 and can be used to delineate left shoulder, right shoulder, or gore applications. There is one panel that is directional (left or right) or gore on reverse side.





Gore Area



Left/Right

PN. 119616
Revision A | November 2024

Components

Below is a pictorial depiction of the components/hardware for the NOVUS™ 100.

Note: The following components/hardware are not shown to scale:

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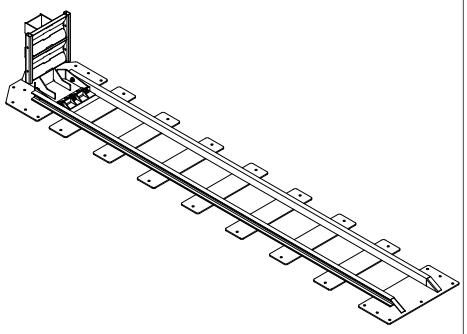	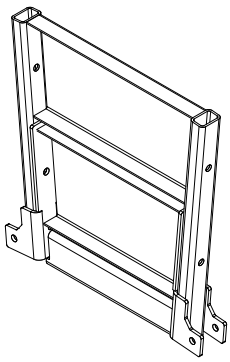	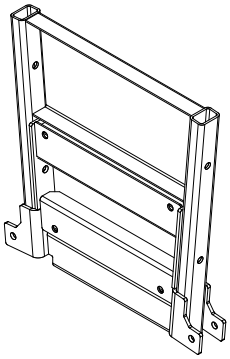
BACKUP & BASETRACK ASSY, NOVUS	DIAPHRAGM, WELDMENT, NOVUS	DIAPHRAGM, WELDMENT, HD, NOVUS

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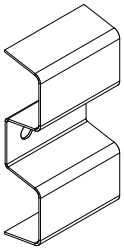
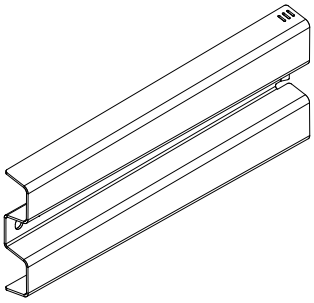
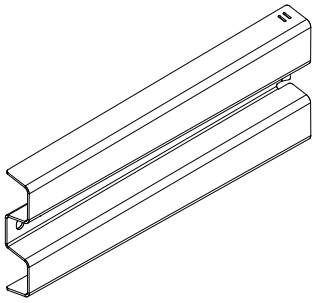
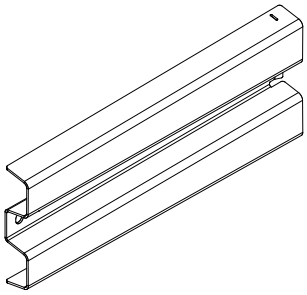
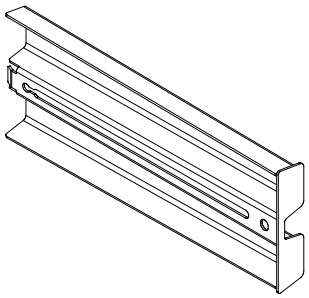
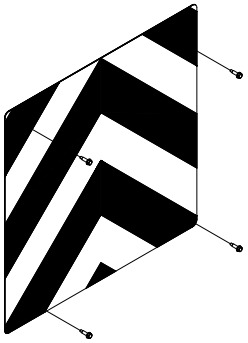
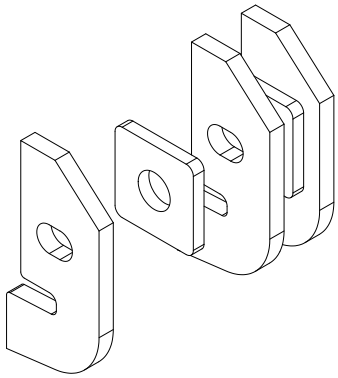
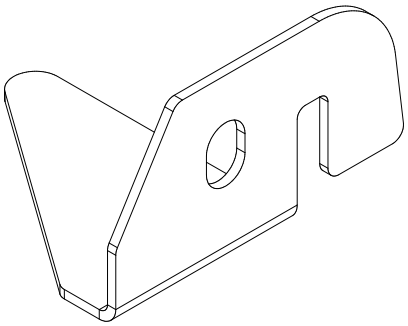
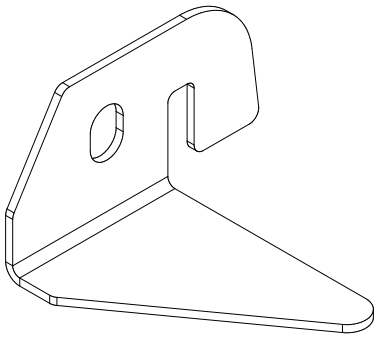
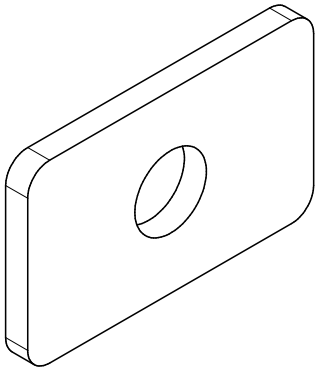
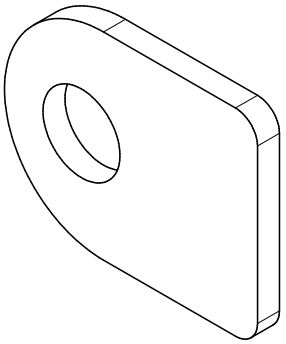
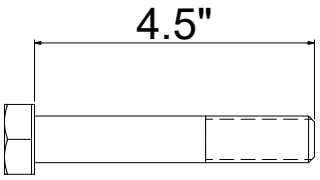
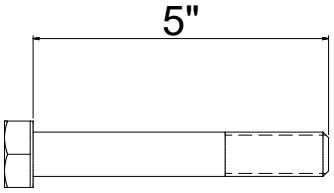
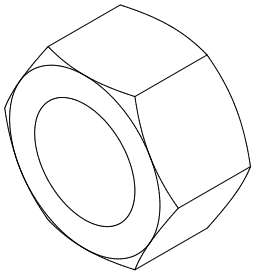
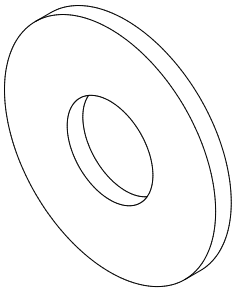
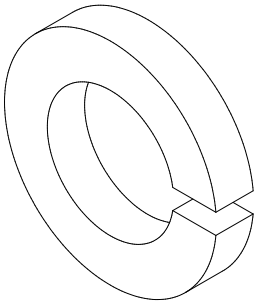
		
PANEL, END, NOVUS, G	PANEL, SIDE, SLOT III, NOVUS,G	PANEL, SIDE, SLOT II, NOVUS, G

ID: 7 PN: 628739	ID: 8 PN: 628740	ID: 9 PN: 628747
		
PANEL, SIDE, SLOT I, NOVUS, G	PANEL SIDE, SLOT, WELDMENT, NOVUS,G	REFL PNL, 23X23, Y/B, GORE, KIT, NOVUS

PN. 119616
Revision A | November 2024

ID: 10 PN: 628731	ID: 11 PN: 628734	ID: 12 PN: 628735
		
RAIL, GUIDE, KIT, NOVUS	BRACKET, RAIL GUIDE, R	BRACKET, RAIL GUIDE, L

ID: 13 PN: 628743	ID: 14 PN: 628744	ID: 15 PN: 113564
		
FLT 1/4X2X3 1/4, W/HOLE	FLT 1/4X2 1/4X2 7/8, W/HOLE	BOLT,HX, 3/4X4 1/2, G5, G

ID: 16 PN: 113573	ID: 17 PN: 003704	ID: 18 PN: 118027	ID: 19 PN: 118089
			
BOLT, HX, 3/4X5, G5, G	3/4 HVY HEX NUT A563 DH	WASHER, FLAT, 3/4X2, HEAVY, G	WASHER, LOCK, 3/4, G

PN. 119616
Revision A | November 2024

Bill of Materials

Use only Valtir parts on the NOVUS™ 100 System for assembly, maintenance, or repair. The assembly or comingling of unauthorized parts is strictly PROHIBITED. Failure to follow this warning could result in serious injury or death in the event of a vehicle impact with a system.

ITEM	PART NO.	DESCRIPTION	QTY
1.	628720	BACKUP & BASETRACK ASSY,NOVUS	1
2.	628721	DIAPHRAGM,WELDMENT,NOVUS	7
3.	628727	DIAPHRAGM,WELDMENT,HD,NOVUS	1
4.	628736	PANEL,END,NOVUS,G	4
5.	628737	PANEL,SIDE,SLOT III,NOVUS,G	12
6.	628738	PANEL,SIDE,SLOT II,NOVUS,G	8
7.	628739	PANEL,SIDE,SLOT I,NOVUS,G	8
8.	628740	PANEL,SIDE,SLOT,WELDMENT,NOVUS,G	4
9.	628747	REFL PNL,23X23,Y/B,GORE,KIT,NOVUS	1
10.	628731	RAIL,GUIDE,KIT,NOVUS	16
11.	628734	BRACKET,RAIL GUIDE,R	8
12.	628735	BRACKET,RAIL GUIDE,L	8
13.	628743	FLT 1/4X2X3 1/4,W/HOLE	32
14.	628744	FLT 1/4X2 1/4X2 7/8,W/HOLE	4
15.	113564	BOLT,HX,3/4X4 1/2,G5,G	36
16.	113573	BOLT,HX,3/4X5,G5,G	16
17.	003704	3/4 HVY HEX NUT A563 DH	90
18.	118027	WASHER,FLAT,3/4X2,HEAVY,G	81
19.	118089	WASHER,LOCK,3/4,G	57

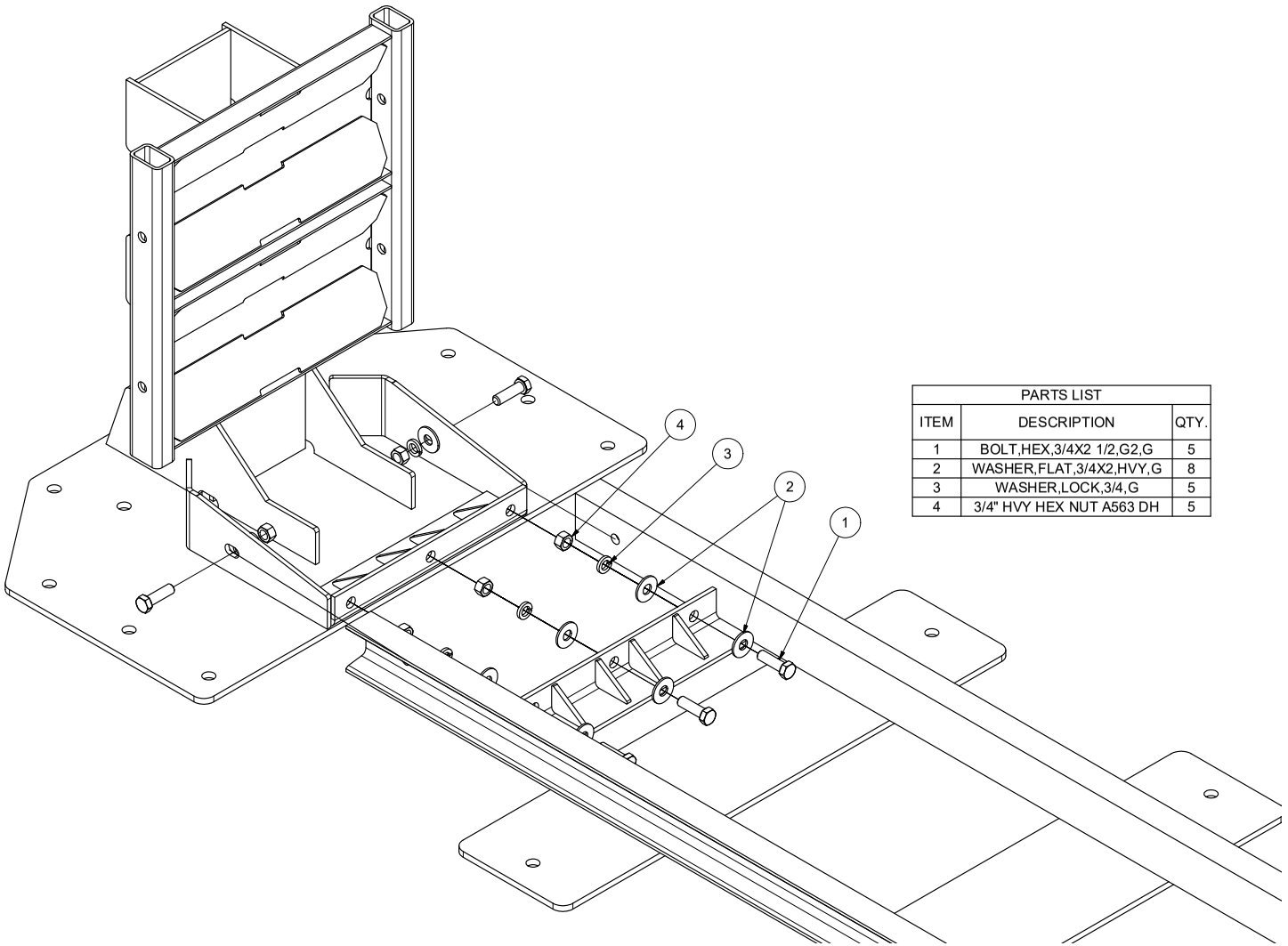
PN. 119616
Revision A | November 2024

ASSEMBLY INSTRUCTIONS

Backup Assembly

The NOVUS™ 100 can be assembled completely in a shop before being taken to the roadway. Doing so will protect the workers and ensure a faster field installation. The following steps are for complete assembly of the crash cushion system before anchoring into the roadway.

1. Insert backup assembly into rails so that the holes are aligned with the track assembly. Use the 3/4”x2” grade 2 hex bolts in the orientation as shown to attach the 2 assemblies together. Use a flat washer on both sides of the 3 front connections.

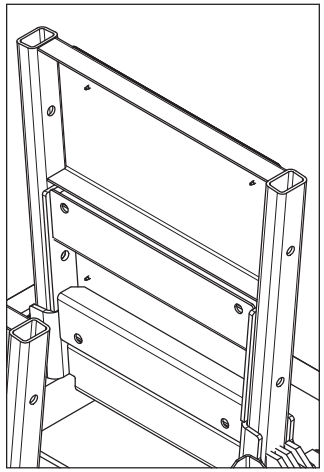


PARTS LIST		
ITEM	DESCRIPTION	QTY.
1	BOLT,HEX,3/4X2 1/2,G2,G	5
2	WASHER,FLAT,3/4X2,HVY,G	8
3	WASHER,LOCK,3/4,G	5
4	3/4" HVY HEX NUT A563 DH	5

PN. 119616
Revision A | November 2024

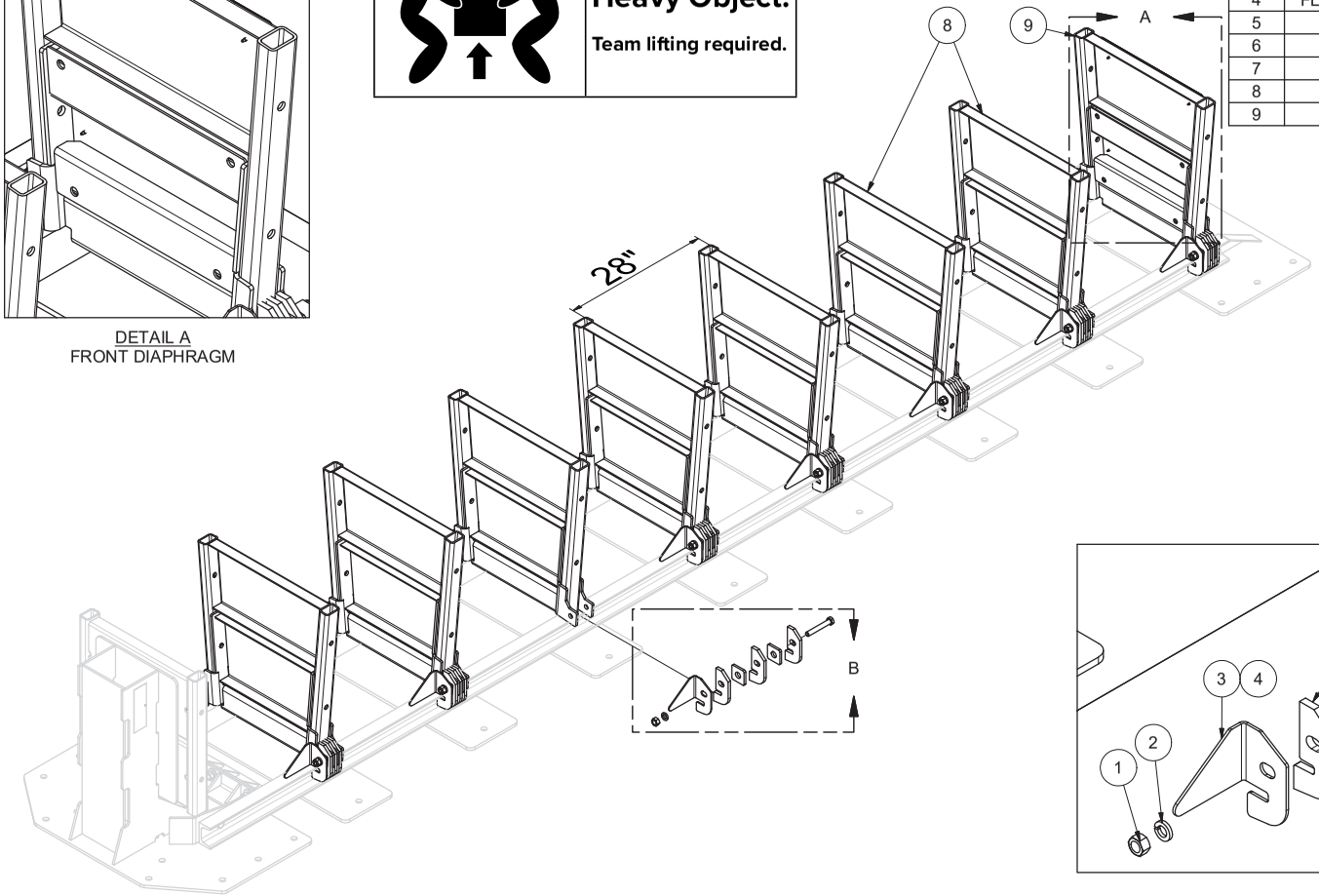
Diaphragm Placement

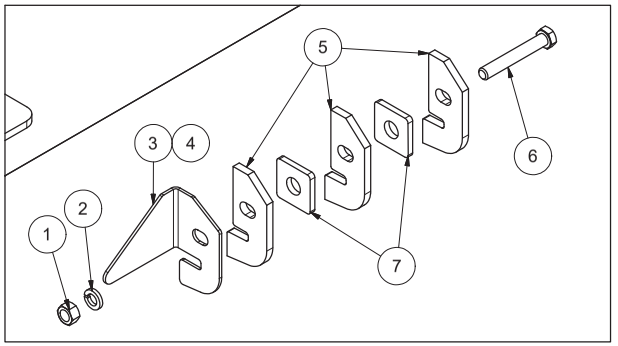
2. The NOVUS 100 system contains 8 diaphragm weldments. Note the front diaphragm has extra reinforcement panels and holes for the reflective sheeting (Detail A). Place diaphragms starting from the rear with the flat face pointing forward. Make sure the bottom of the diaphragm inserts between both rails. The base track guides must be placed in correct sequence to ensure proper performance. (Detail B). Space the diaphragms 28” apart, centered over each rail base plate. The rail guide plates are fastened with 3/4”X5” grade 5 hex bolts. Make sure not to use the shorter bolts.



DETAIL A
FRONT DIAPHRAGM

PARTS LIST		
ITEM	DESCRIPTION	QTY.
1	3/4" HVY HEX NUT A563 DH	16
2	WASHER,LOCK,3/4,G	16
3	FLT 3/16X6 9/16X9 3/8,W/SLOT,BENT,RIGHT	8
4	FLT 3/16X6 9/16X9 3/8,W/SLOT,BENT,LEFT	8
5	FLT 1/2X3.1/4X6 9/16,W/SLOT	48
6	BOLT,HEX,3/4X5,G5,G	16
7	FLT 3/8X2 3/4X2 3/4,W/HOLE	32
8	DIAPHRAGM,WELDMENT,NOVUS	7
9	DIAPHRAGM,WELDMENT,HD,NOVUS	1





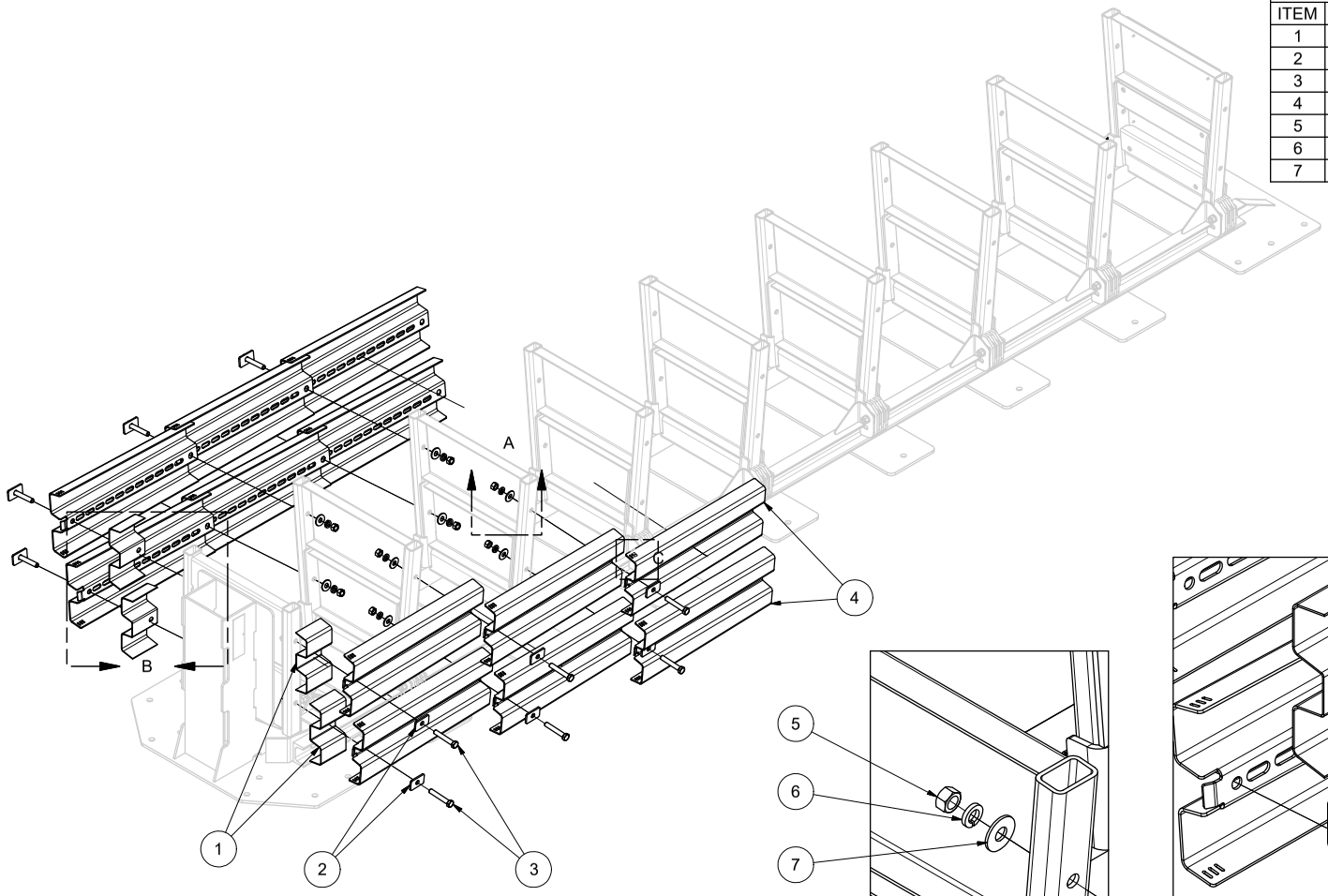
DETAIL B
ITEMS 3 AND 4 ARE BENT OPPOSITE OF EACH
OTHER FOR LEFT AND RIGHT SIDE OF RAILS

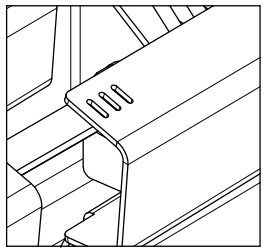
PN. 119616
Revision A | November 2024

Side Panel Placement

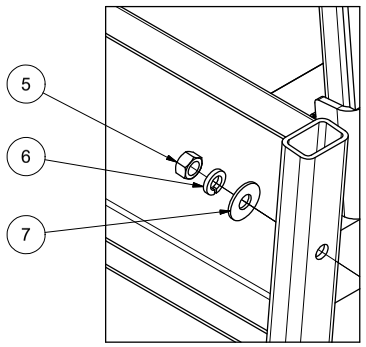
3. Assemble side panels through the diaphragm side holes starting from the rear of the base track. The first 12 panels will be type 3 panels indicated by the 3 slots (detail C). The first 4 panels will need to be placed together with the short end panels using a 3/4”X4 1/2” bolt (detail B). Insert the bolt through item 2 before inserting into the panel, so that item 2 is on the outside of the panel. Loosely tighten the nut over the bolt. Note that the side panels share bolts so all side panels must be placed before completely tightening all of them.

PARTS LIST		
ITEM	DESCRIPTION	QTY.
1	PANEL,END,NOVUS,G	4
2	FLT 1/4X2X3 1/4,W/HOLE	12
3	BOLT,HEX,3/4X4 1/2,G5,G	12
4	PANEL,SIDE,SLOT III,NOVUS,G	12
5	3/4" HVY HEX NUT A563 DH	12
6	WASHER,LOCK,3/4,G	12
7	WASHER,FLAT,3/4X2,HVY,G	12

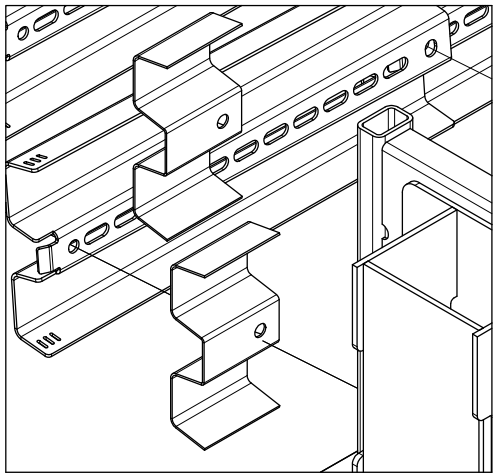




DETAIL C
PANEL TYPE III



DETAIL A



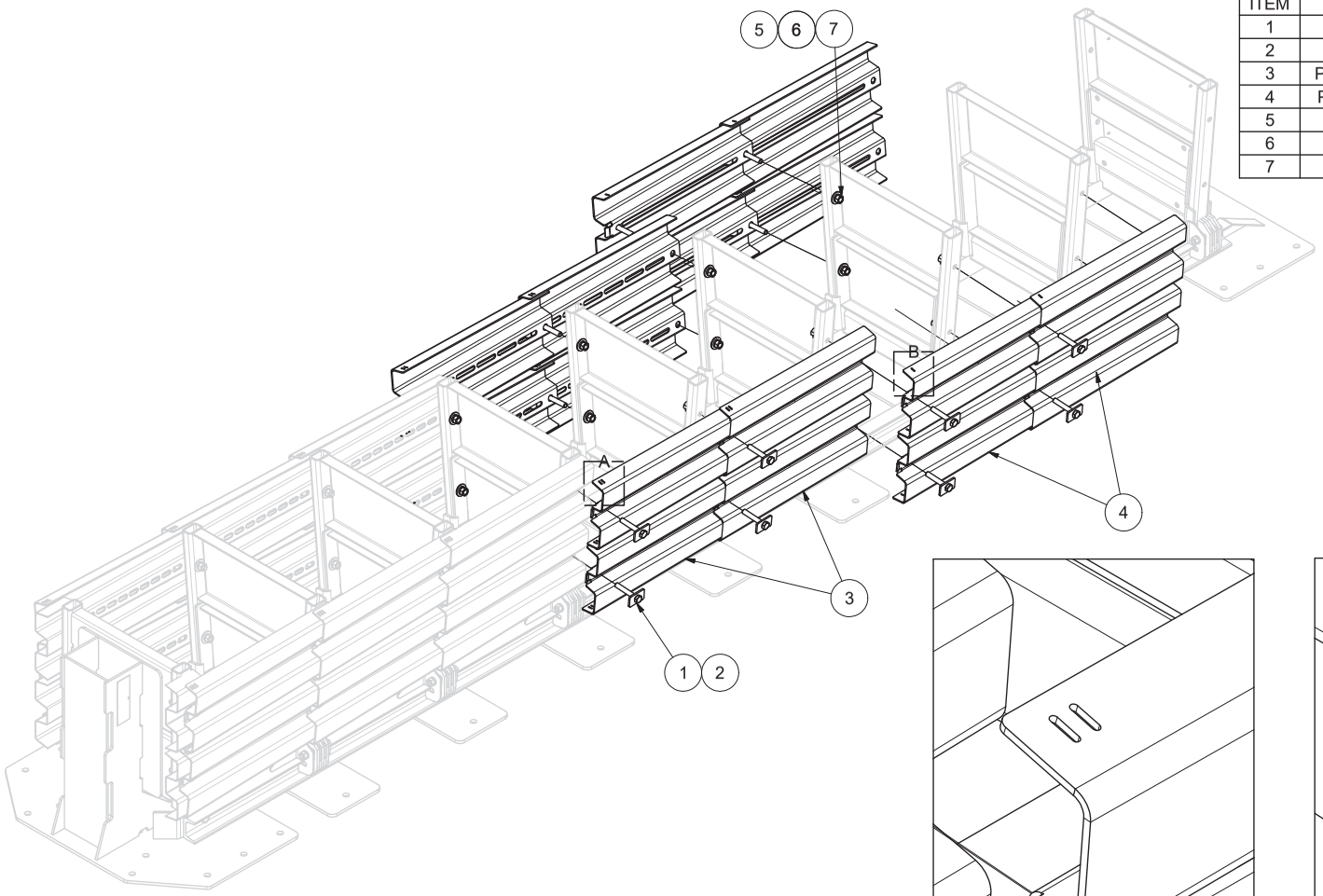
DETAIL B
END PANELS

PN. 119616
Revision A | November 2024

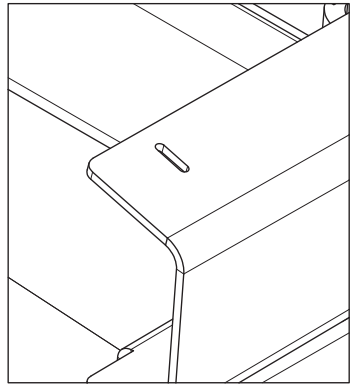
Side Panel Placement (cont.)

4. After installing type 3 panels, add the 8 remaining type 2 panels (detail A). Using the same procedure as step 3, add the type 1 panels (detail B).

PARTS LIST		
ITEM	DESCRIPTION	QTY.
1	BOLT,HEX,3/4X4 1/2,G5,G	16
2	FLT 1/4X2X3 1/4,W/HOLE	16
3	PANEL,SIDE,SLOT II,NOVUS,G	8
4	PANEL,SIDE,SLOT I,NOVUS,G	8
5	WASHER,FLAT,3/4X2,HVY,G	16
6	WASHER,LOCK,3/4,G	16
7	3/4" HVY HEX NUT A563 DH	16



DETAIL A
ITEM 3, TYPE II PANEL



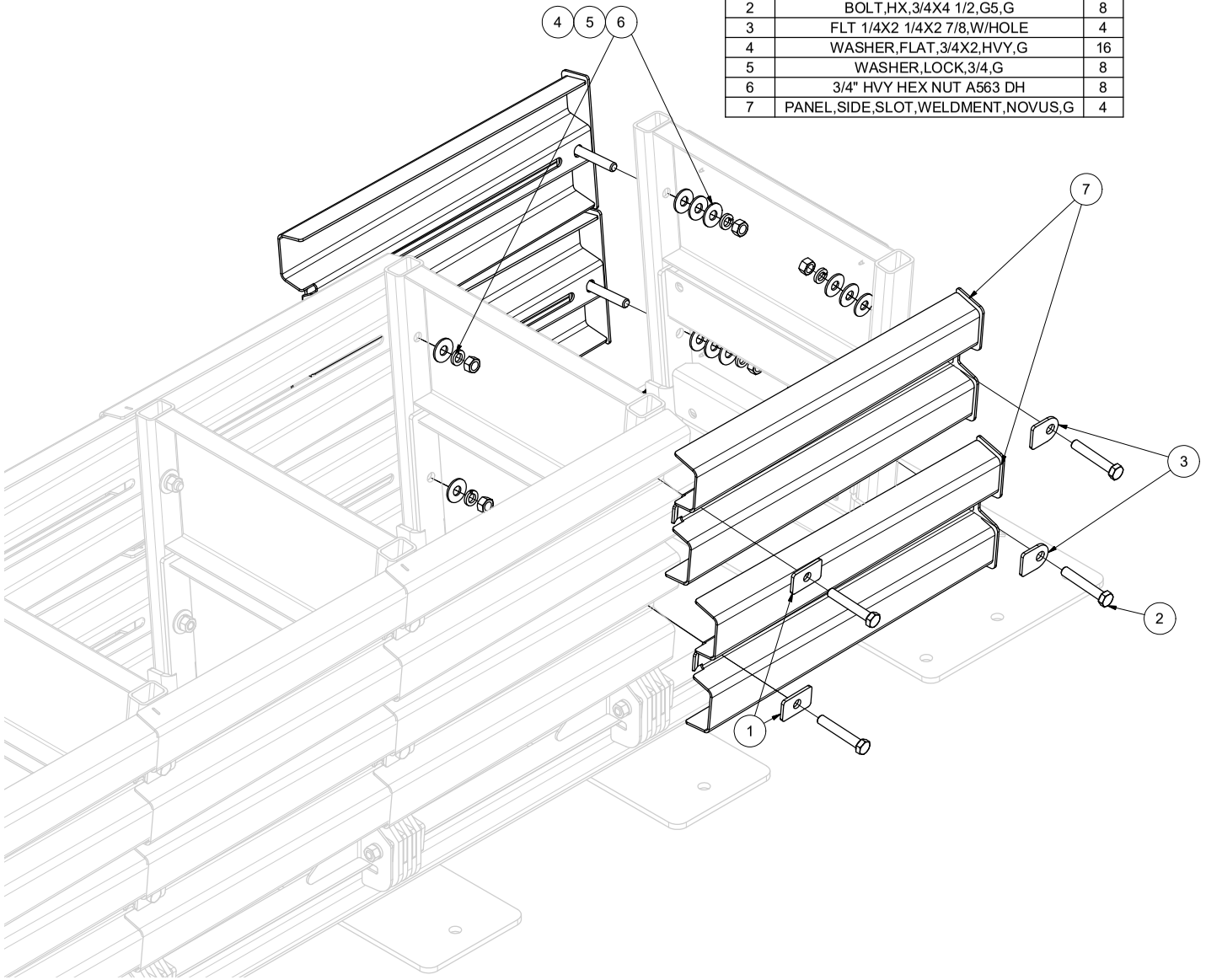
DETAIL B
ITEM 4, TYPE I PANEL

PN. 119616
Revision A | November 2024

Front Side Panel Placement

5. The front side panels do not have identifying slots. Mount the panels with the flat cap side facing the front. Use 2 extra flat washers each for the front 4 connections. Place item 3 with the round side facing forward to avoid interference with the front plate. Tighten all side panel bolts to 65 lb-ft [88 N-m]

PARTS LIST		
ITEM	DESCRIPTION	QTY.
1	FLT 1/4X2X3 1/4,W/HOLE	4
2	BOLT,HX,3/4X4 1/2,G5,G	8
3	FLT 1/4X2 1/4X2 7/8,W/HOLE	4
4	WASHER,FLAT,3/4X2,HVY,G	16
5	WASHER,LOCK,3/4,G	8
6	3/4" HVY HEX NUT A563 DH	8
7	PANEL,SIDE,SLOT,WELDMENT,NOVUS,G	4



Installation Checklist

Performed by:_____

Date: _____

Location: _____

☐ Transitions, if required, are in place and properly fitted.

☐ Every anchor hole on the backup and base track is fastened to the foundation by an anchor.

☐ Each anchor is torqued to the adhesive manufacturer's specifications.

☐ Sling and sling strap are removed from the system.

☐ Appropriate nose cover is attached.

☐ Remove all construction debris in and around the system.

Inspections by the appropriate highway authority are recommended as determined by that authority based upon volume of traffic and impact history. Visual drive-by inspections are recommended at least once every three months. Walk-up inspections are recommended at least twice a year.

Visual Drive-By Inspection

1. If the NOVUS™ 100 is not fully extended, a walk-up inspection will be required to determine the cause or identify damage.

It is important to inspect a system after any impact.

2. Determine the condition of the first bay components.
3. Record the date, location, and system location.

Debris, snow, or ice inside the bays may prevent the NOVUS™ 100 from absorbing the impact of a crash as observed in MASH compliant crash testing. Perform a walk-up inspection as needed to check for and remove any debris inside or around each bay. Failing to remove this debris or other material infringes upon the performance of the system as tested.

PN. 119616
Revision A | November 2024

System Repair and Maintenance

NOVUS™ 100 systems are designed for minor field repair or rapid replacement of the entire unit.

The energy-absorbing side panels of the NOVUS™ 100 systems can be replaced depending on the extent of the impact. Because NOVUS™ 100 systems are delivered fully assembled, replacing the entire damaged system on the roadside and then performing the necessary repairs safely and accurately in the maintenance shop away from traffic dangers may be more practical.

Removal / Replacement of System

The NOVUS™ 100 system can be removed from its foundation by releasing the Anchor Nuts that hold down the Crossties. Flat wrenches may be required to access the Anchor Studs along the perimeter of the base track and backup. Once released, the system can be lifted as a unit and transported back to a maintenance facility for repair. A new or reconditioned NOVUS™ 100 system can be positioned on the existing Anchor Studs and firmly attached using approved nuts and washers.

If anchors are damaged, contact customer service for further information.

Complete replacement of a roadside system after an impact is a convenient, but not required, way to protect workers by limiting exposure to traffic. All decisions for reusability are made by the specifying highway authority.

Types of Damage

NOVUS™ 100 systems are designed to withstand end-on impacts and redirecting side impacts within the AASHTO MASH criteria. Side impacts, depending on the severity, may only cause cosmetic damage to the system. Any system that has been impacted along its side should be examined to ensure that the damage is only cosmetic and that any damage that might hinder subsequent functions of the system is repaired. During some severe high-speed redirecting impacts with heavy vehicles, a NOVUS™ 100 system may become permanently twisted. If the deformation of the Base Assembly causes a portion of one side of the system to be raised more than 1 1/2” when compared to the other side of the system, then the damaged Base Assembly should be replaced.

PN. 119616
Revision A | November 2024

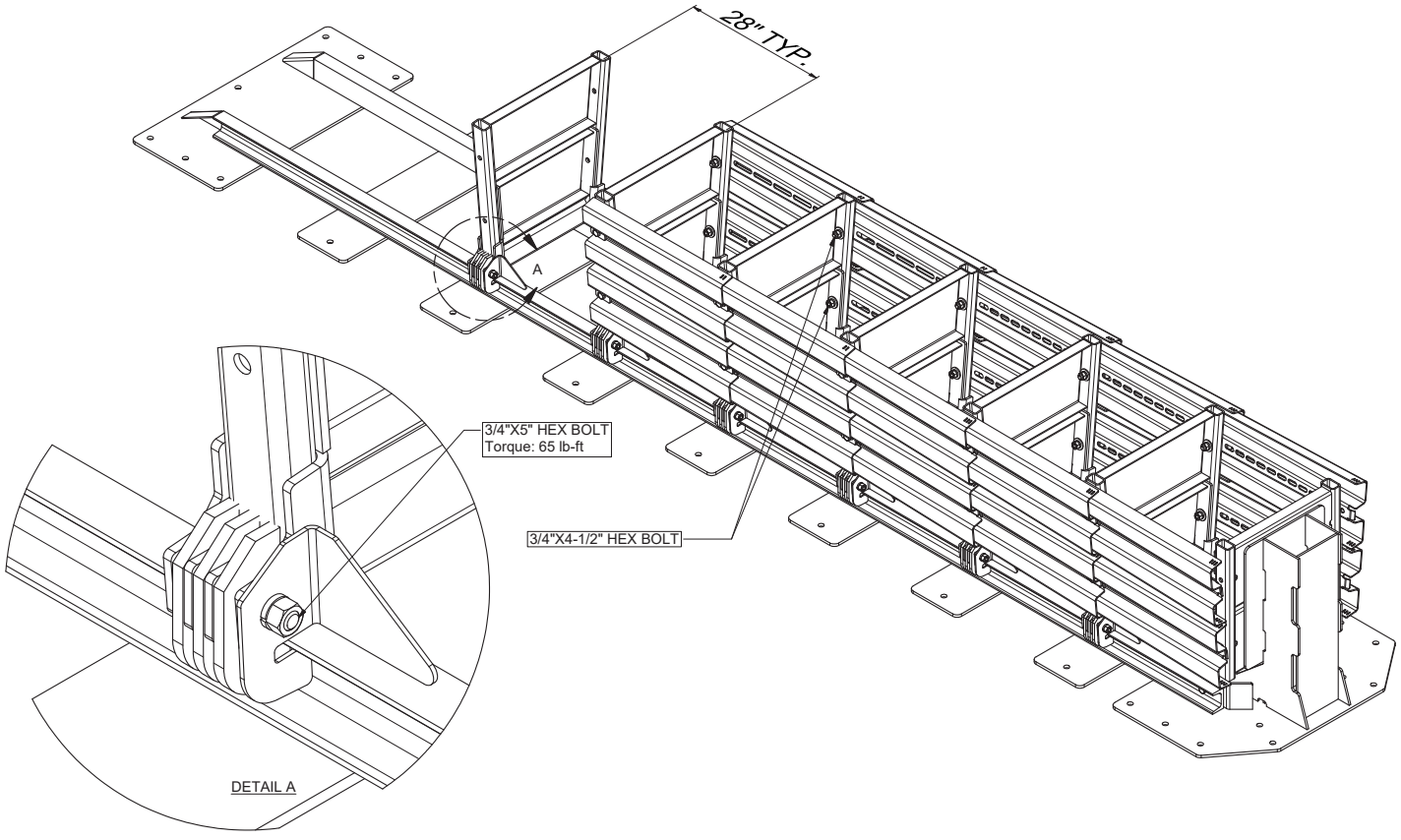
The NOVUS™ 100 must be inspected after each impact. Depending on the impact, components may get damaged and need replacement. It is critical that all components and anchoring be checked and returned to original assembly conditions.

Use only Valtir parts that are specified herein for assembling, maintaining, or repairing the NOVUS™ 100 Do not utilize or otherwise commingle parts from other systems even if those systems are other Valtir systems. Such configurations have not been tested, nor have they been deemed eligible for use. Assembly, maintenance, or repairs using unspecified parts or accessories is strictly prohibited.

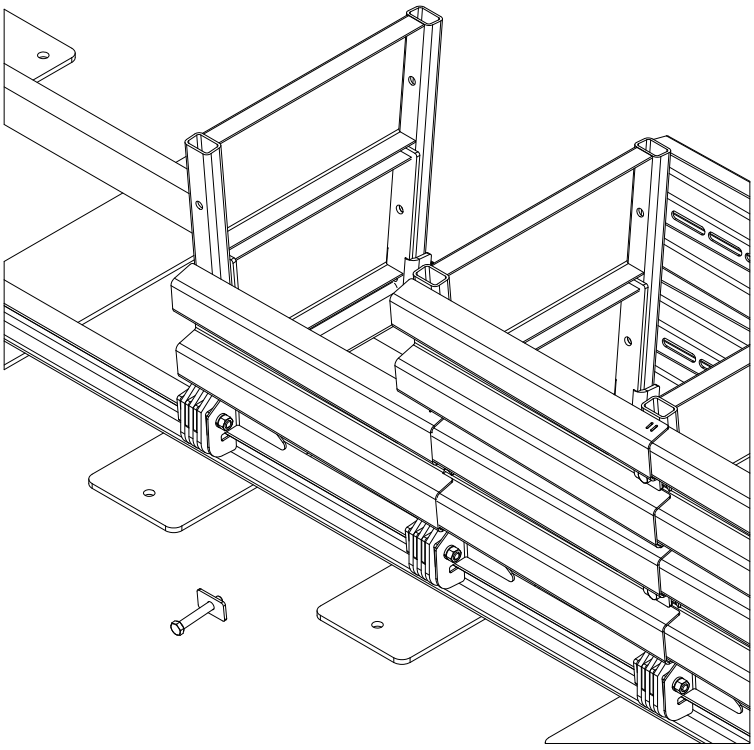
Valtir makes no recommendation whether use or reuse of any part of the system is appropriate or acceptable following an impact. It is the sole responsibility of the project engineer and/or the local highway authority and its engineers to make that determination. It is critical that you inspect this product after assembly is complete to make certain that the instructions provided in this manual have been strictly followed.

Repair Procedure

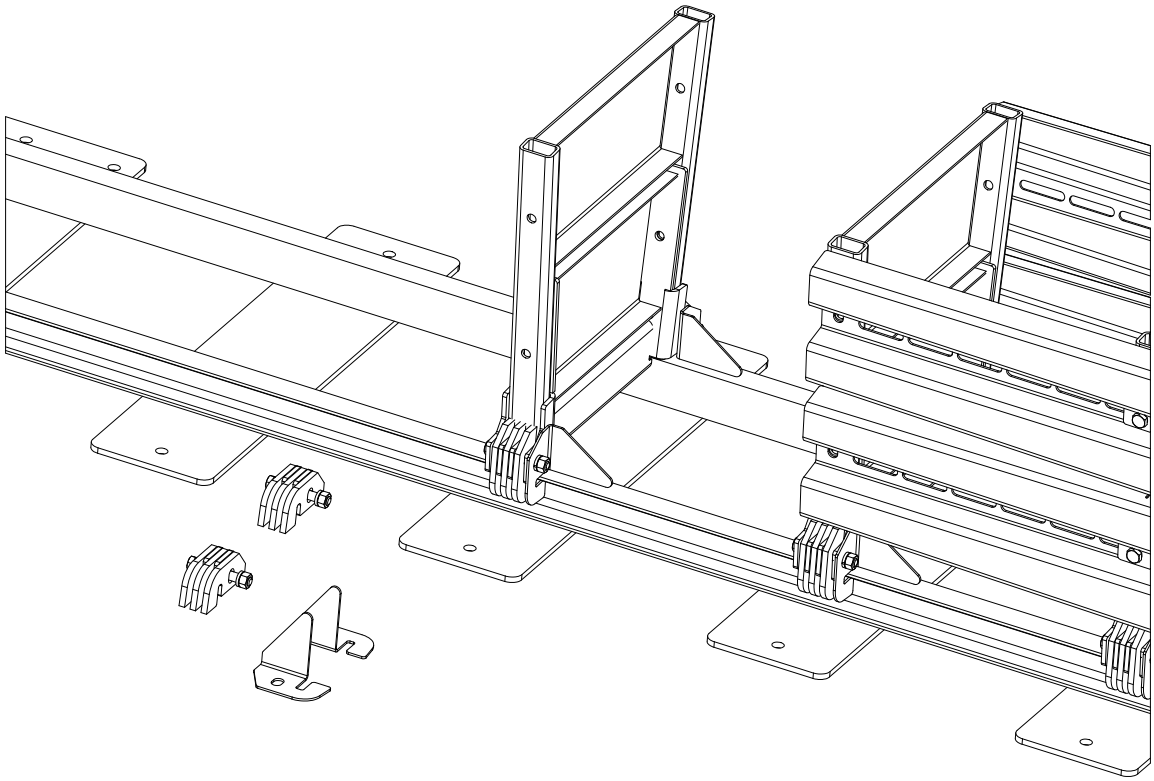
To repair the NOVUS™ 100 system, all damaged parts must be replaced. Refer to the parts list to determine quantities of replacement parts required.



1. Remove damaged side panels by removing 2 bolts going through the adjacent diaphragms. Use a 1-1/4” size socket wrench. If the side panels are jammed into each other, it may be necessary to pry them apart with a bar. Bolts that are stuck can be tapped out with a pin and hammer.

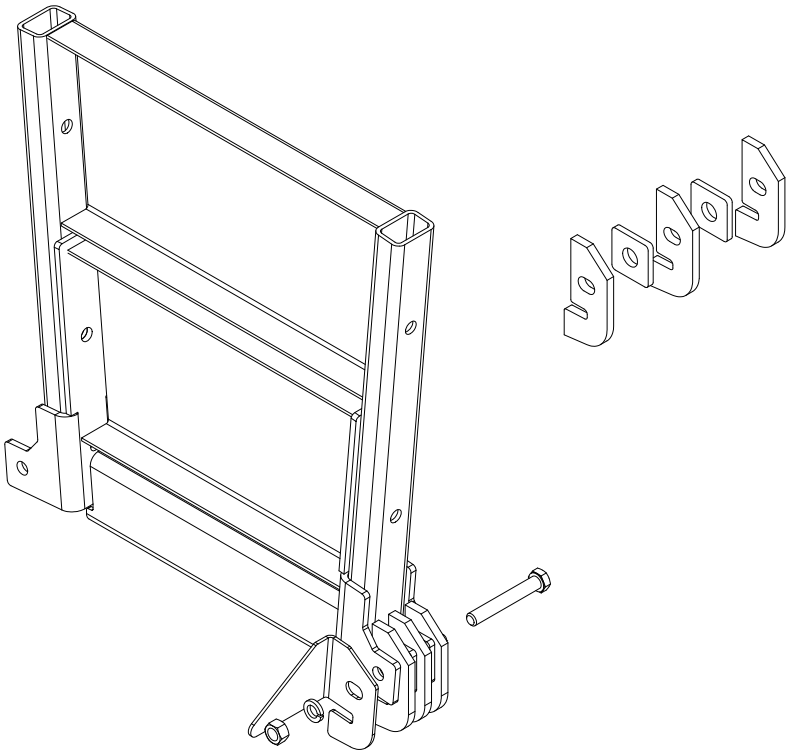


2. With side panels removed, the diaphragm may still be connected to the rails with the bolted rail guide connection on both sides. Base track guides must be unbolted to remove the diaphragm. Remove damaged diaphragm.

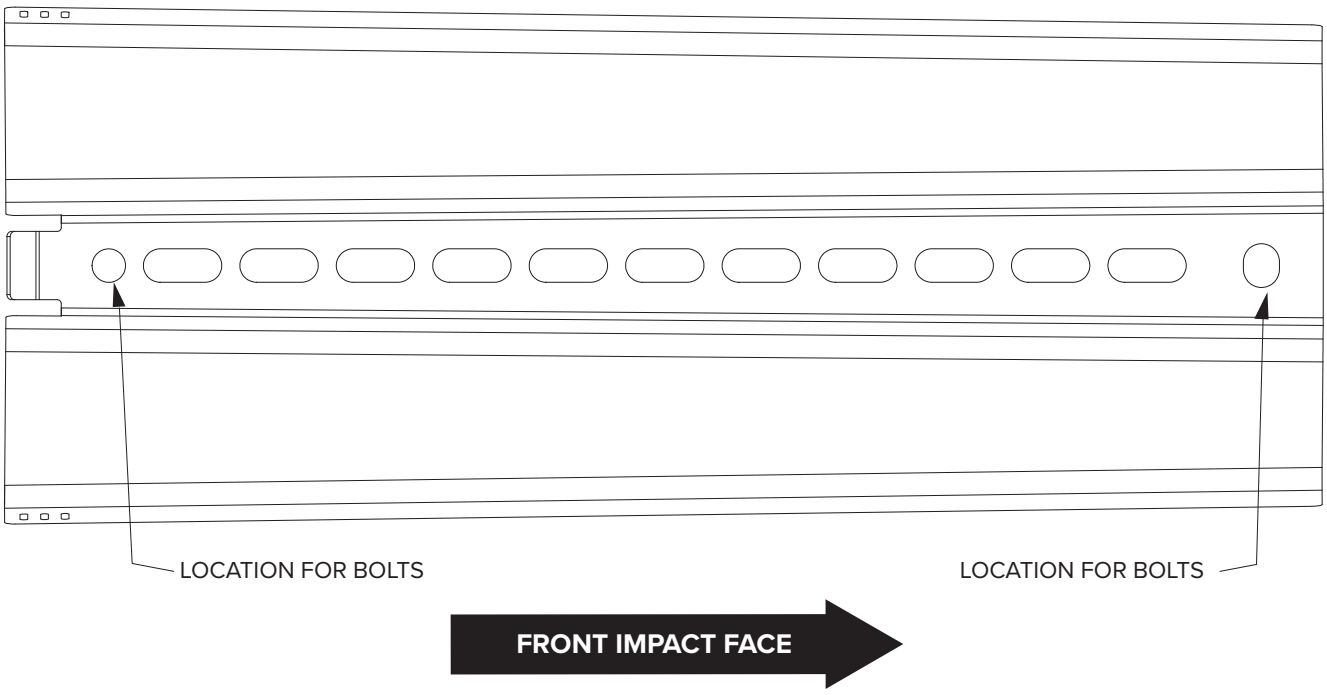


PN. 119616
Revision A | November 2024

3. Insert new diaphragms with flat side facing towards front. Make sure the bottom flange has been inserted between rails. Diaphragm spacing is approximately 28” apart. Attach new guide rail plates and folded bracket as shown on next page. Use a ¾”X5” grade 5 bolt, lock washer and heavy hex nut.



4. Side plates are stacked on each other and must be replaced in correct order from the rear to the front of the system. Replace side panels with ¾”X4-1/2” bolt and rectangular plate washers on front face. Bolts must be inserted in farthest holes of each side panel 28” apart. Alternate replacing left and right side panels starting with lower panels first. Do not tighten the bolts completely until all side panels and diaphragms have been positioned in place. Side panels bolts must be tightened to 65 lb-ft.



PN. 119616
Revision A | November 2024

System Repair Checklist

Inspector: _____

Date: _____

Location: _____

- ☐ Remove all construction debris in and around the system
- ☐ There are no damaged or warped components on the system
- ☐ Ensure correct quantity and sequence of side panels by checking all part numbers and referring to appropriate Valtir drawings
- ☐ Verify that rail plates are stacked properly and in place
- ☐ Backup assembly is attached to base track
- ☐ Verify all bolts are in place and tight
- ☐ Appropriate reflective nose cover is attached.

PN. 119616
Revision A | November 2024

Inspection Log

Location: _____

System Serial Number: _____

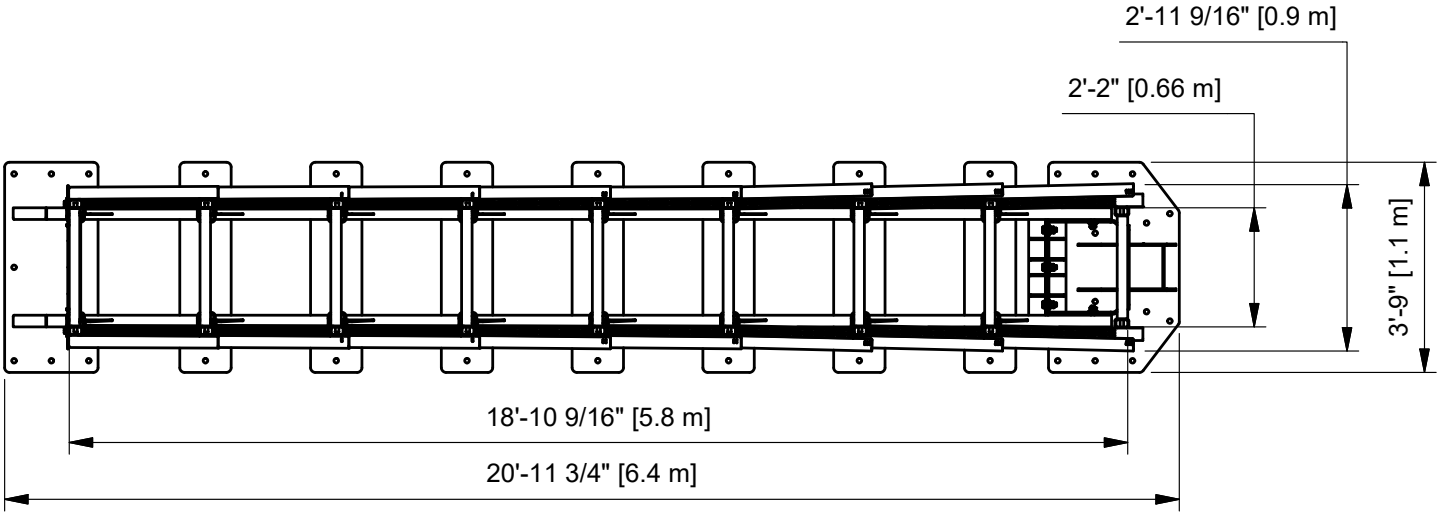
Date	Inspector	Condition	Maintenance/Actions

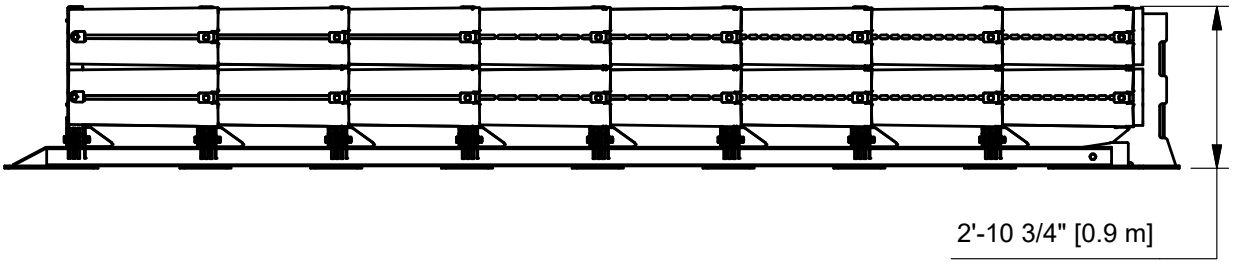
PN. 119616
Revision A | November 2024

Technical Specifications

Dimensions (nominal)

Length	21’ [6.4 m]
Width	26” [660 mm]
Height	34 3/4” [883 mm]
Weight	3,800 lb [1723.6 kg] (approx)



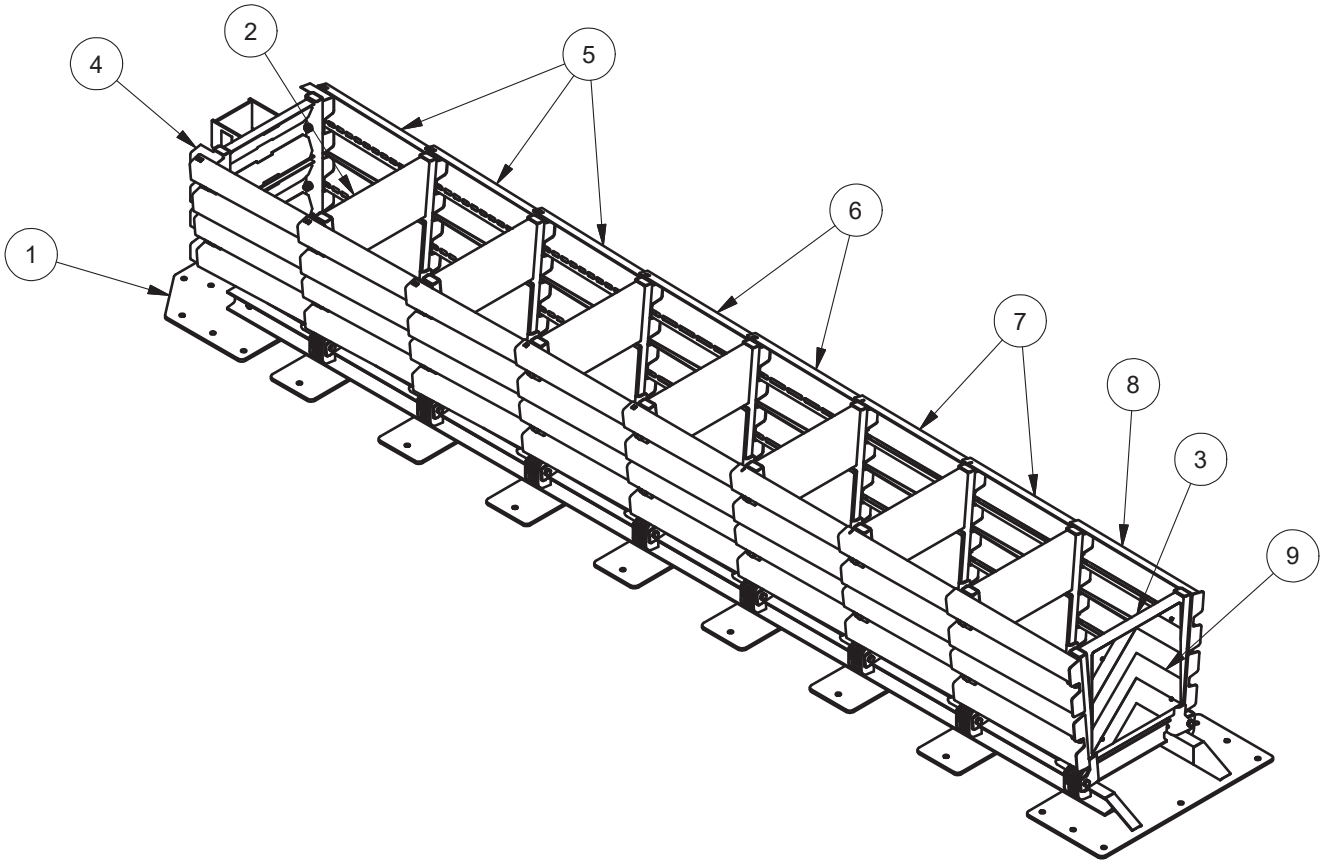


PN. 119616
Revision A | November 2024

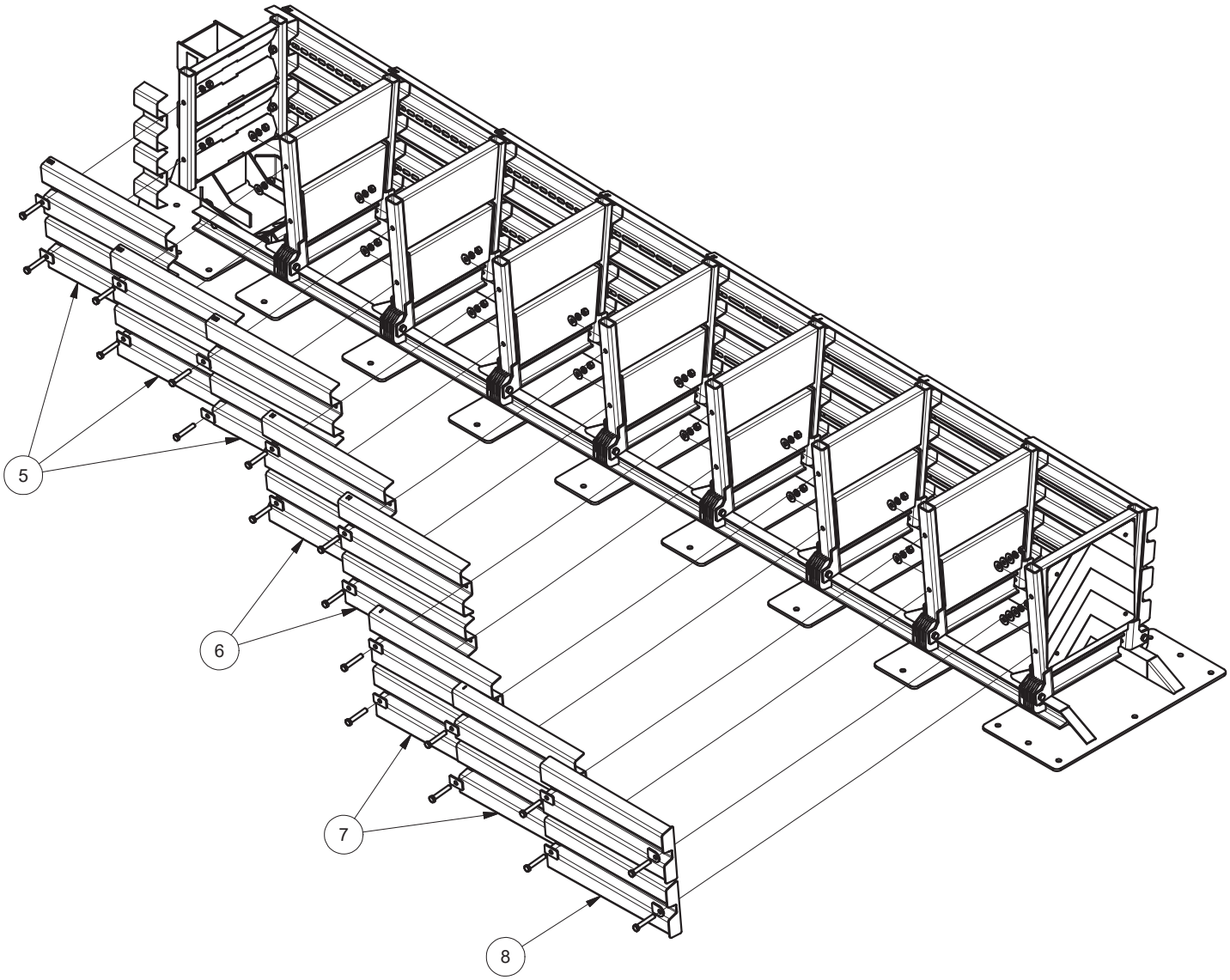
Parts List

System Components

ITEM	PART NO.	DESCRIPTION	QTY
1	628720	BACKUP & BASETRACK ASSY,NOVUS	1
2	628721	DIAPHRAGM,WELDMENT,NOVUS	7
3	628727	DIAPHRAGM,WELDMENT,HD,NOVUS	1
4	628736	PANEL,END,NOVUS,G	4
5	628737	PANEL,SIDE,SLOT III,NOVUS,G	12
6	628738	PANEL,SIDE,SLOT II,NOVUS,G	8
7	628739	PANEL,SIDE,SLOT I,NOVUS,G	8
8	628740	PANEL,SIDE,SLOT,WELDMENT,NOVUS,G	4
9	628747	REFL PNL,23X23,Y/B,GORE,KIT,NOVUS	1
10	628731	RAIL,GUIDE,KIT,NOVUS	16
11	628734	BRACKET,RAIL GUIDE,R	8
12	628735	BRACKET,RAIL GUIDE,L	8
13	628743	FLT 1/4X2X3 1/4,W/HOLE	32
14	628744	FLT 1/4X2 1/4X2 7/8,W/HOLE	4
15	113564	BOLT,HX,3/4X4 1/2,G5,G	36
16	113573	BOLT,HX,3/4X5,G5,G	16
17	003704	3/4 HVY HEX NUT A563 DH	90
18	118027	WASHER,FLAT,3/4X2,HEAVY,G	81
19	118089	WASHER,LOCK,3/4,G	57



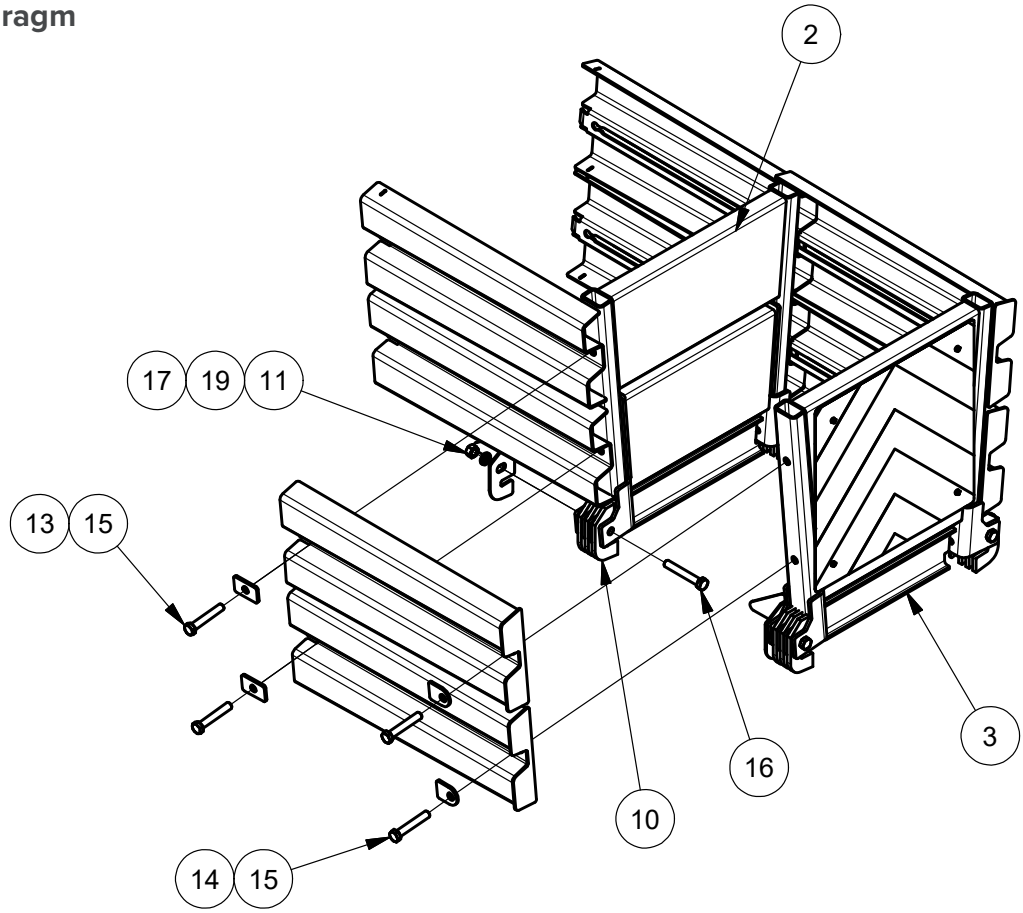
PN. 119616
Revision A | November 2024



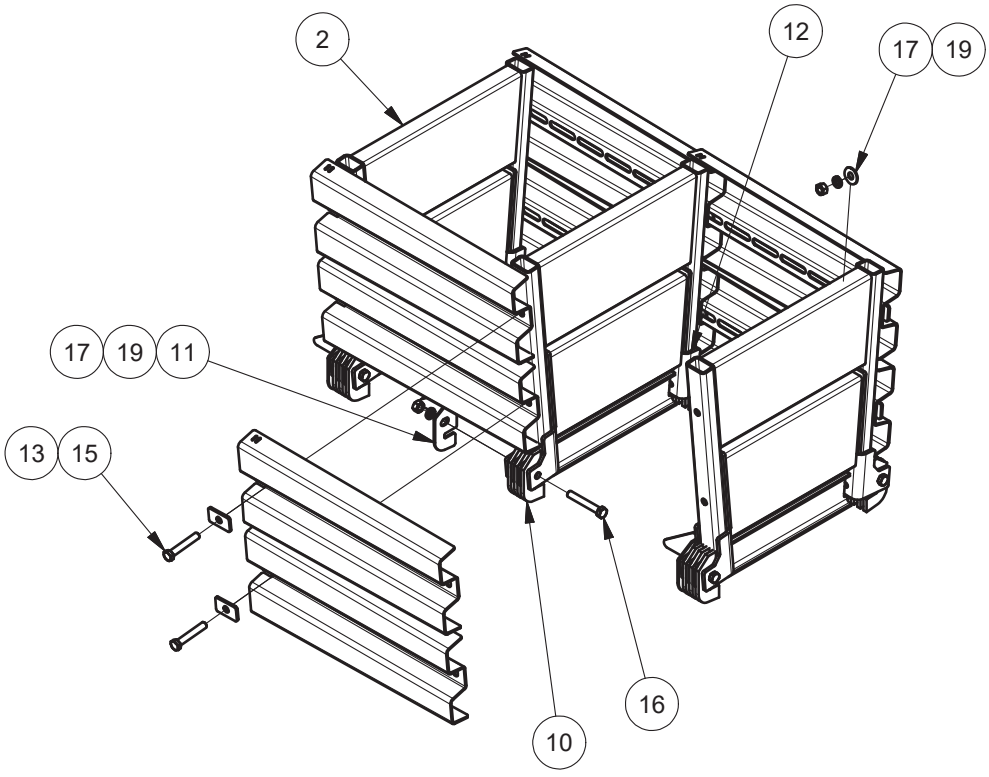
The panels, on the left and right (upper and lower), are the same in each bay.

PN. 119616
Revision A | November 2024

Front Diaphragm



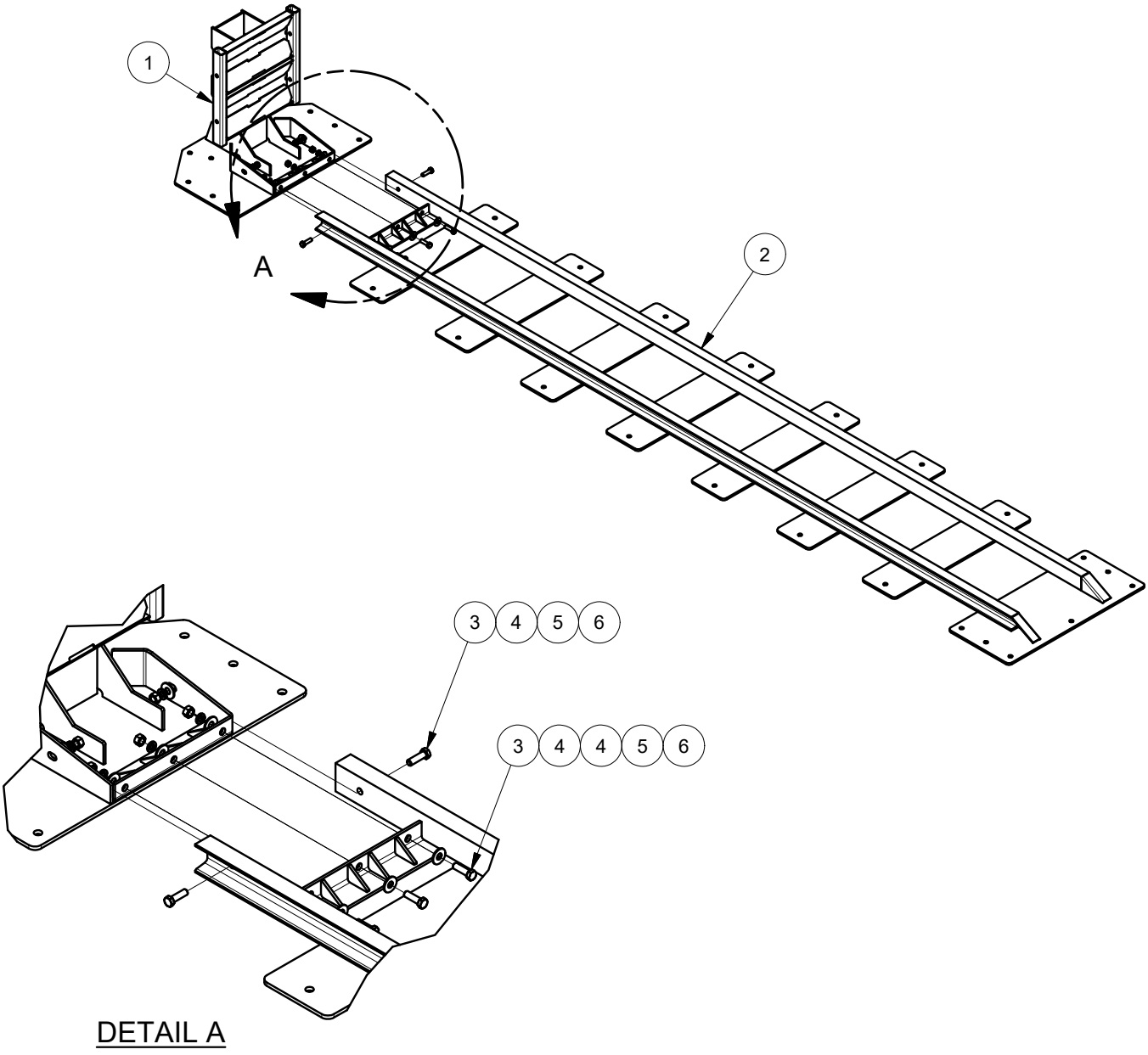
Diaphragms



PN. 119616
Revision A | November 2024

Backup & Basetrack Assembly (628720)

1	628700	BACKUP,BOLT-TOGETHER,NOVUS
2	628713	BASETRACK,BOLT-TOGETHER,NOVUS
3	113550	BOLT,HX,3/4X2 1/2,G2,G
4	118027	WASHER,FLAT,3/4X2,HVY,G
5	118089	WASHER,LOCK,3/4,G
6	003704	3/4 HVY HEX NUT A563 DH



PN. 119616
Revision A | November 2024

Notes:

PN. 119616
Revision A | November 2024

NOVUS™ 100 System
PN 119616
Product Manual

Revision History

Revision Level	Effective Date	ECO #	Description of Changes	Approved by:
A	11/05/2024	A	Added repair and replacement instructions. Some image alterations.	A

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