SMART POD®

CRASH CUSHION

INSTALLATION, MAINTENANCE & DESIGN MANUAL

HILL & SMITH

SmartPod IMD V2023 R1 111723

Revision List

DATE	VERSION	REVISION	SUMMARY OF CHANGES

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System Drawings

Concrete Barrier Transitions

Guardrail Transitions

SmartPod Overview

The SmartPod impact attenuator is manufactured by Hill & Smith. It is partially reusable, fully redirective, non-gating, bi-directional and tested to AASHTO MASH-16 for Test Level 3.

The SmartPod Impact attenuator is used to help protect motorists from hazards in both permanent and temporary work zone locations. It can transition to wide hazards and attach to most types of median and roadside barriers.

For head-on impacts the SmartPod attenuator utilizes energy absorbing PODs that are crushed to absorb kinetic energy while safely stopping vehicles. The PODs are contained in a framework of panels and bulkheads that also provide the redirective properties for side impacts.

The SmartPod attenuator is slightly tapered from front to rear. This allows the side panel sections to nest over the next section which minimizes stress and damage. During a head-on impact, the panels are designed to move freely past each other and do not become wedged when the system is compressed.

Wide temperature variations and temperature extremes do not affect the performance of the SmartPod impact attenuator.

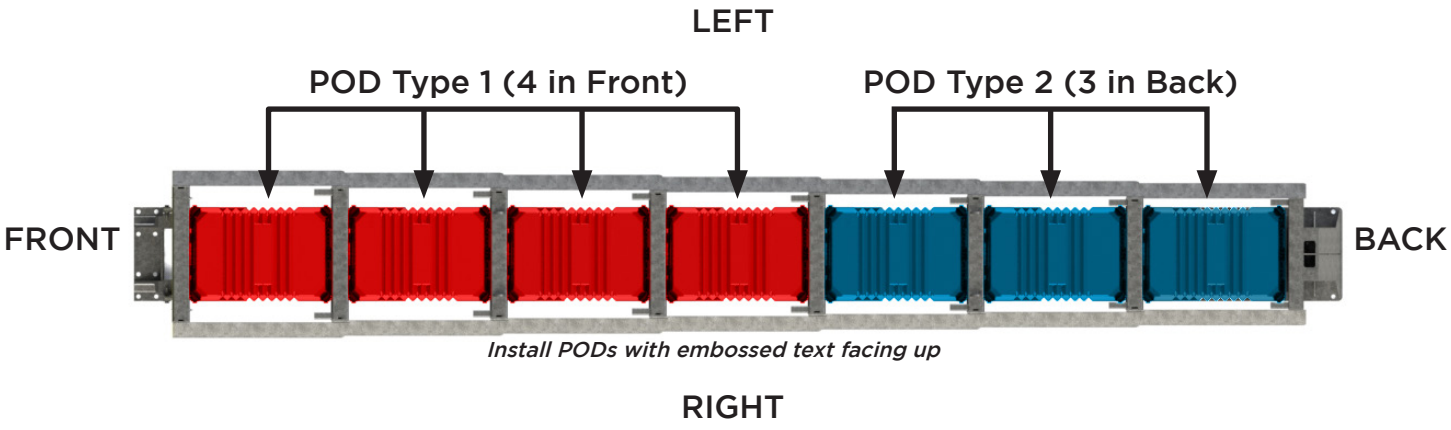


Figure 1: System Orientation / Pod Placement

Safety Considerations

There are always inherent risks associated with the use of tools and heavy equipment related to the installation and maintenance of highway safety products. Throughout this manual, you will find safety messages that are proceeded by safety symbol warnings. These warnings are provided for your personal and immediate safety, and they must be read, understood and followed at all times.

The safety warnings that precede any relevant safety messages should be interpreted in the following manner:

This symbol signifies conditions that could result in serious personal injury or death to installers or bystanders. Extreme care and attention are required during these activities.

This symbol signifies conditions that could result in injury to installers or bystanders. Care and attention are required during these activities.

Always use this manual during installation, maintenance, and repair. Failure to follow the instructions in this manual may result in improper performance of the device.

Hill & Smith recommends the use of general and agency required safety equipment during installation, inspection, maintenance, and repair including but not limited to:

- Safety Goggles
- Hard Hat
- Steel Toe Boots
- High Visibility Clothing
- Work Gloves

Limitations and Warnings

To ensure that the SmartPod meets and/or exceeds the requirements outlined in the Manual for Assessing Safety Hardware (MASH), Hill & Smith has contracted with an FHWA approved ISO certified third-party testing facility to conduct crash tests and prepare crash test reports. The SmartPod has passed the MASH and is eligible for use on the National Highway System.

This device was tested within the MASH-16 test matrix in a series of inline, offset, side, and angle impacts. This testing matrix is not intended to represent every vehicle type or every impact condition on the roadway. Hill & Smith expressly disclaims any warranty or liability for claims arising from damage or injury to any persons or property resulting from any impact with Hill & Smith road safety products, other vehicles, or roadside hazards, regardless of whether the products were installed in consultation with Hill & Smith or by third parties.

⚠ WARNING

This manual must be available to the installers and supervisors associated with the installation of this device at all times. If you have questions about the installation, maintenance, or repair of this product, or if you require additional copies of this manual, please contact Hill & Smith.

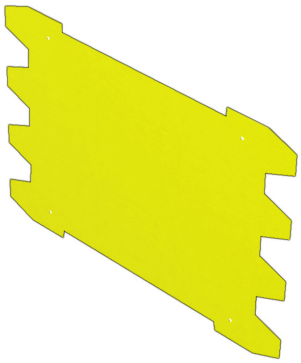
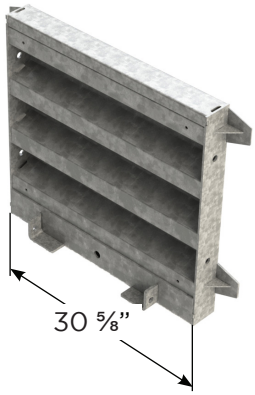
The current edition of this manual can be downloaded at:
https://www.hillandsmith.com

Hill & Smith Inc.
614-340-6294
info@HillAndSmith.com

Bill of Materials - SmartPod TL-3 413900

ITEM NO.	JDE#	DESCRIPTION	QTY
1	413901	BASEFRAME	1
2	413902	DELINEATOR PANEL	1
3	413903	BULKHEAD 1	1
4	413904	BULKHEAD 2	1
5	413905	BULKHEAD 3	1
6	413906	BULKHEAD 4	1
7	413907	BULKHEAD 5	1
8	413908	BULKHEAD 6	1
9	413909	BULKHEAD 7	1
10	414313	BULKHEAD FOOT	14
11	413910	BACKSTOP	1
12	413911	SIDE PANEL FRONT & MID	12
13	413912	SIDE PANEL REAR	2
14	272597	SIDE KEEPER FRONT	4
15	413913	SIDE KEEPER MID	20
16	413914	SIDE KEEPER REAR	4
17	412527	NUT HEX 3/4-10 GALV A325	34
18	413916	WASHER, 3/4 ASTM F436 HDG	34
19	413917	DIE SPRING, 3/4X2, CHROME-SILICON	4
20	413918	HEX BOLT 3/4-10 X 2, GALV	6
21	413919	HEX BOLT 1/4-20X4 1/2 GR 5, PLT	4
22	412570	WASHER, 1/4 GR5, PLT	4
23	412571	LOCK NUT 1/4-20 SERRATED FLANGE, PLT	4
24	414179	RECT WASHER 3X1 3/4X1/4, GALV	28
25	414178	LOCK WASHER, 3/4 GR 8, PLT	28
26	414176	HEX BOLT 3/4-10X3 GR8, PLT	28
27	414177	HEX NUT 3/4-10 GR8, PLT	28
28	414206	SmartPod TYPE 1	4
29	414207	SmartPod TYPE 2	3

System Components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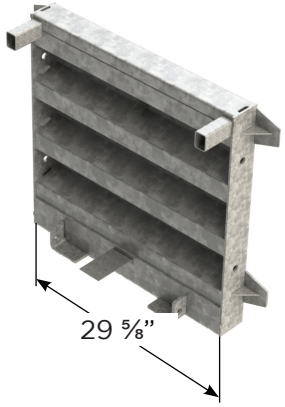	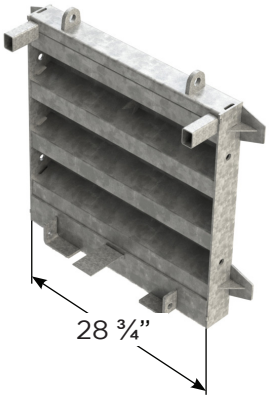	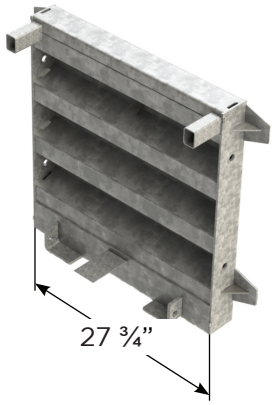
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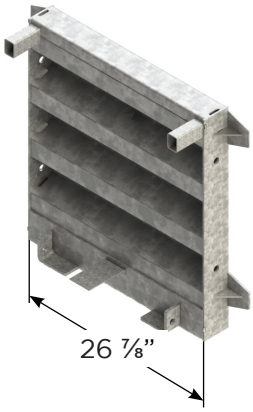
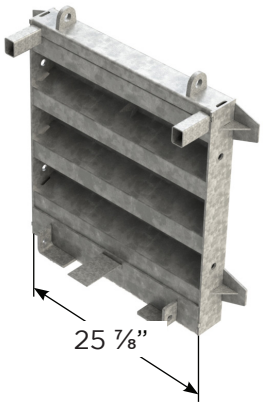
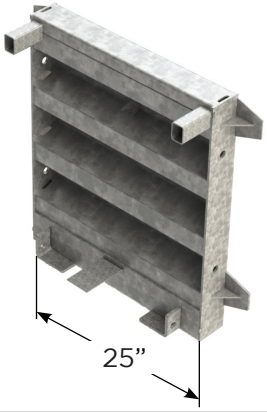
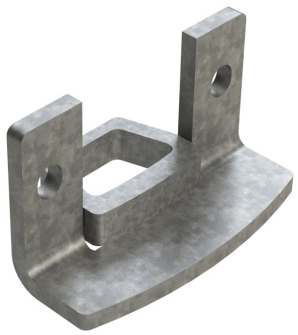
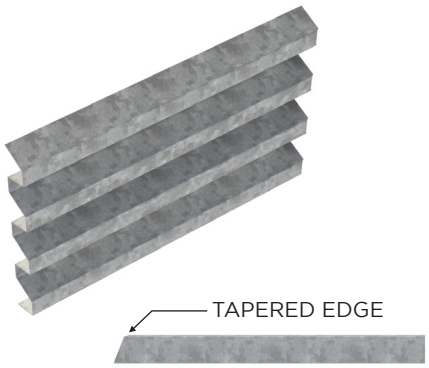
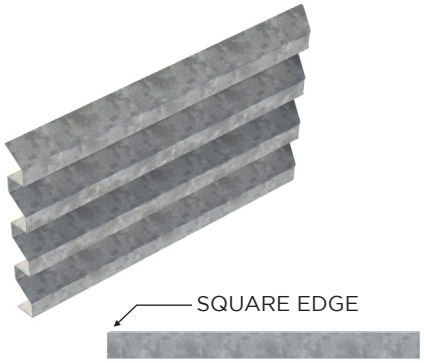
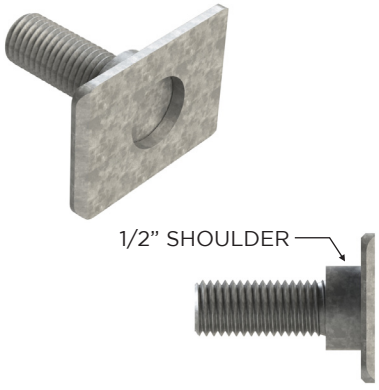
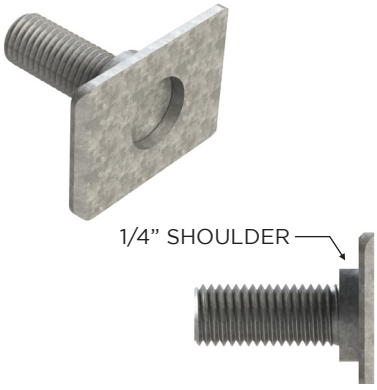
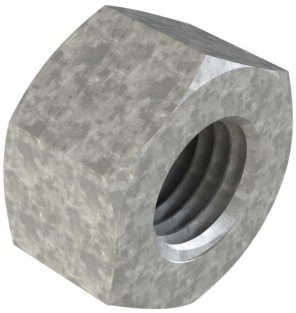
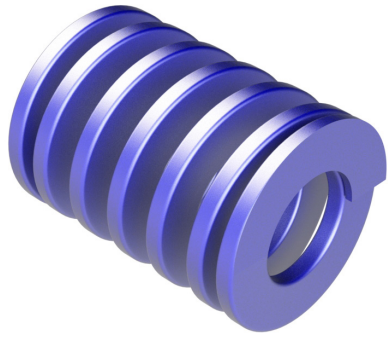
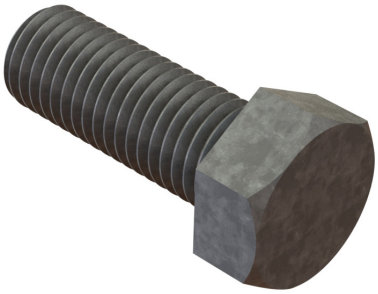
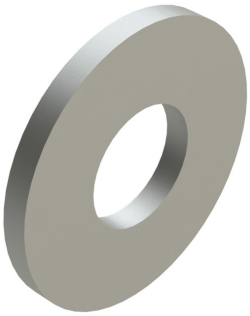
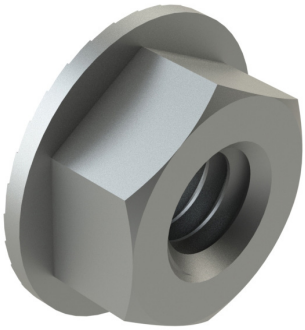
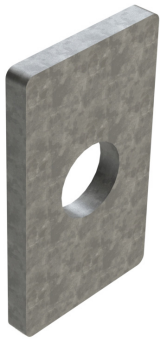
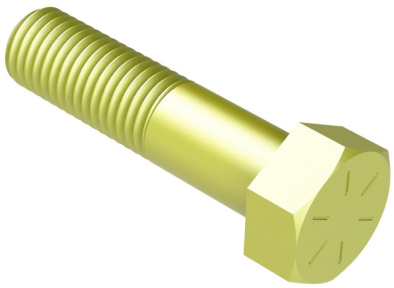
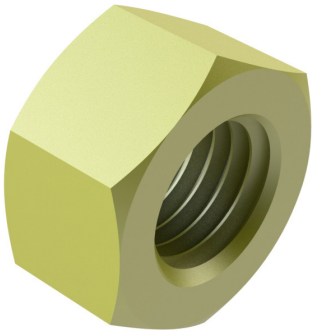
		
Bulkhead 5 413907 (QTY 1)	Bulkhead 6 413908 (QTY 1)	Bulkhead 7 413909 (QTY 1)

System Components (Cont.)

		
Bulkhead Foot 414313 (QTY 14)	Backstop 413910 (QTY 1)	Side Panel Front and Mid 413911 (QTY 12)
		
Side Panel Rear 413912 (QTY 2)	Side Keeper Front 272597 (QTY 4)	Side Keeper Mid 413913 (QTY 20)
		
Side Keeper Rear 413914 (QTY 4)	Nut Hex 3/4-10 GALV A325 412527 (QTY 34)	Washer, 3/4 ASTM F436 HDG 413916 (QTY 34)

System Components (Cont.)

		
Die Spring 3/4x2, Chrome-Silcon 413917 (QTY 4)	Hex Bolt 3/2-10 X 2, GALV 413918 (QTY 6)	Hex Bolt 1/4-20X4½ GR5, PLT 413919 (QTY 4)
		
Washer, 1/4 GR5, PLT 412570 (QTY 4)	Lock Nut 1/4-20 Serrated Flange, PLT 412571 (QTY 4)	Rect Washer 3x1 3/4x1/4, GALV 414179 (QTY 28)
		
Lock Washer, 3/4 GR8, PLT 414178 (QTY 28)	Hex Bolt 3/4-10X3 GR8, PLT 414176 (QTY 28)	Hex Nut 3/4-10 GR8, PLT 414177 (QTY 28)

System Components (Cont.)

	
SmartPod Type 1 414206 (QTY 4)	SmartPod Type 2 414207 (QTY 3)

ANCHOR ACCESSORIES (SOLD SEPARATELY)

		
Red Head A7+ Epoxy (28 oz) 271242	Red Head A102 Manual Dispenser 271946	Red Head A200 Pneumatic Dispenser 272274
		
Asphalt Anchor Kit (3/4X18") 270663 (QTY 48 each - Rods, Nuts, & Washers) TL-3 Unit Requires 12x28oz Tubes of Epoxy	Concrete Anchor Kit (3/4x7") 414212 (QTY 38 each - Rods, Nuts, & Washers) TL-3 Unit Requires 3x28oz Tubes of Epoxy	

SmartPod System Description

The SmartPod is a re-directive, non-gating crash attenuator that consists of a baseframe, intermediate bulkheads, a backstop, side panels, and energy absorbing PODS. The baseframe is anchored to the mounting surface and provides support for the bulkheads and backstop. The bulkheads support the side panels that provide a flat outer redirective surface for side impacts and contain the energy absorbing PODS. The SmartPod telescopes rearward upon frontal impact, compressing the PODS. Damaged PODS are replaced, and the attenuator is easily repaired after impact.

	System Dimensions
Front Width	37 ½ inches
Rear Width	31 ¾ inches
Nominal Width	24 inches
Length	22 feet 6½ inches
Height	33 ½ inches
Weight	3158 lbs.
Test Level	MASH Test Level 3

Table 1: System Dimensions

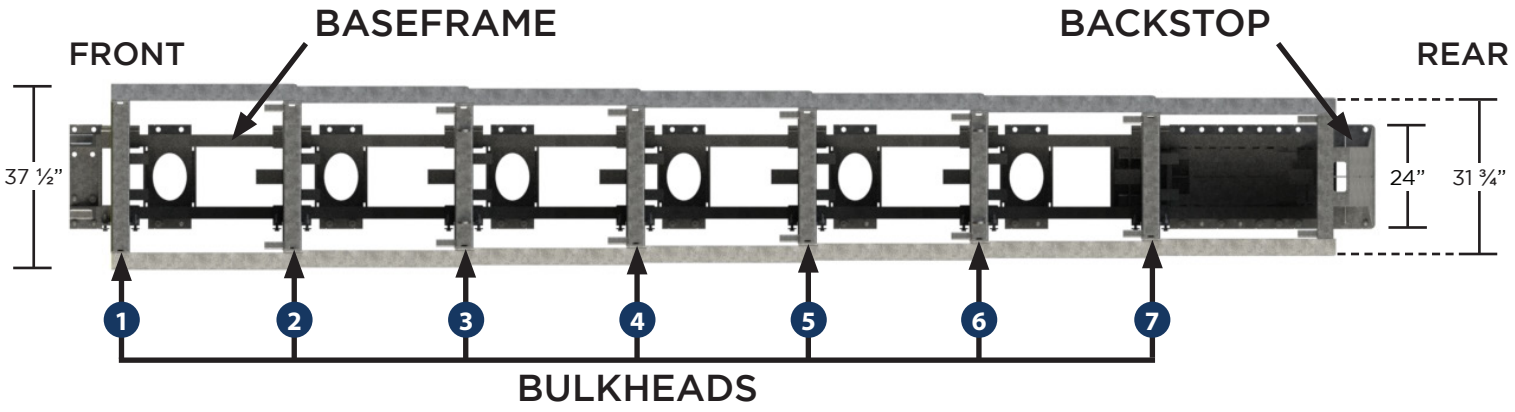


Figure 2: System Exoskeleton

SmartPod System Description (Cont.)

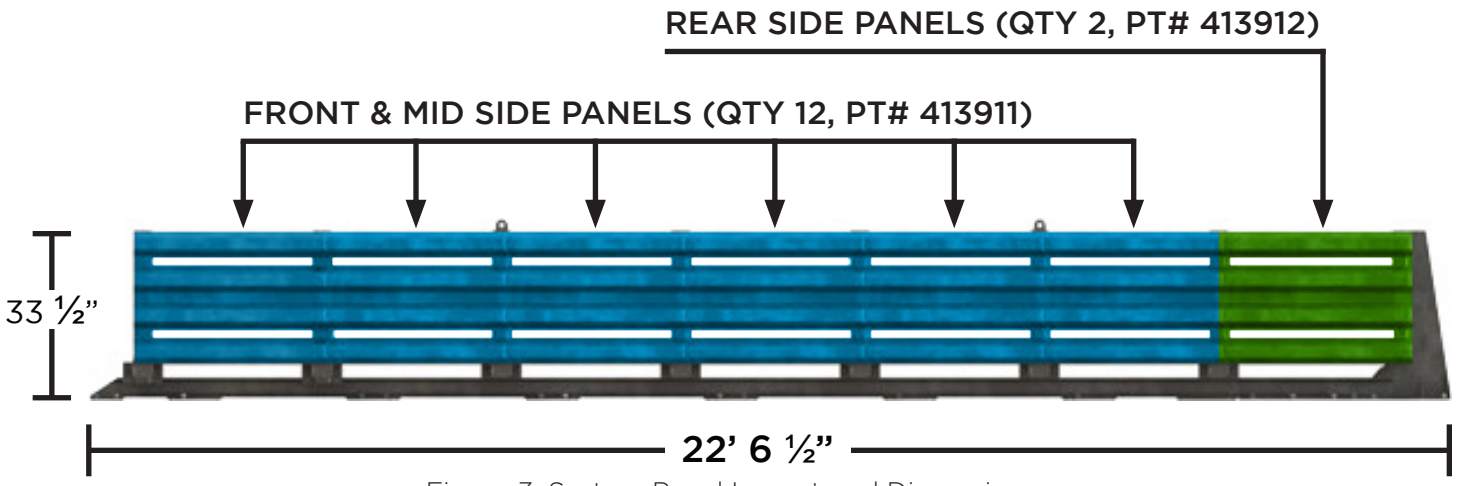


Figure 3: System Panel Layout and Dimensions

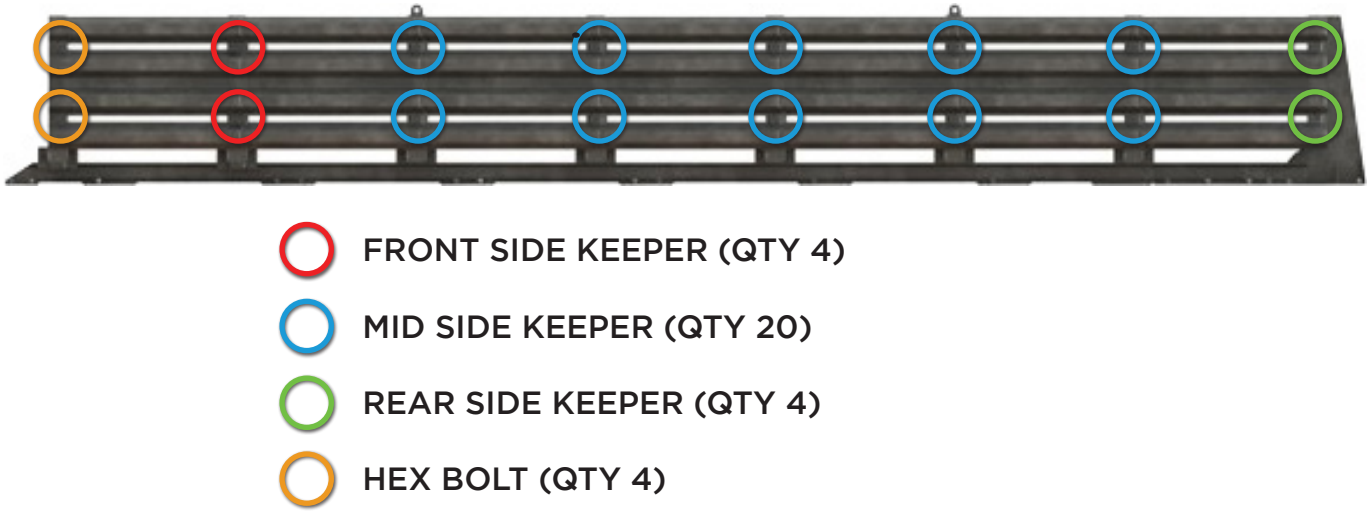


Figure 4: Keeper and Hex Bolt Layout and Quantities

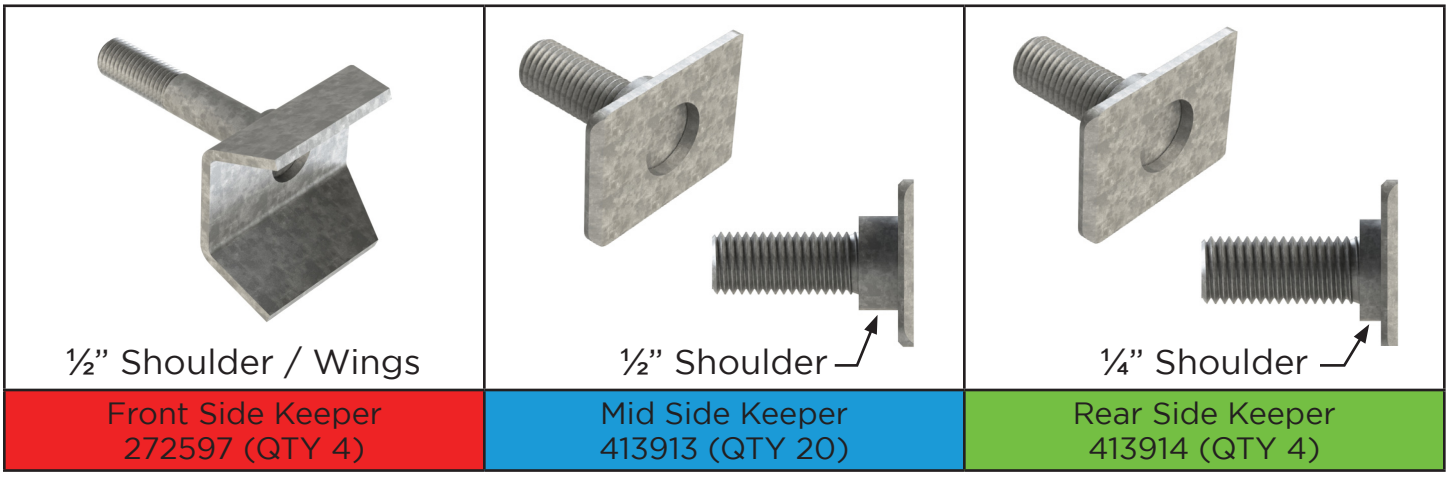


Figure 5: Keeper Shoulder Comparison

Design Considerations

General

The SmartPod impact attenuator complies with MASH-16. It is designed for temporary work zone and permanent applications. The system is a freestanding crash cushion anchored only to the foundation, positioned in front of the hazard. It does not require an additional support structure.

Foundations

Foundations must be a flat surface with longitudinal and cross slopes of 10:1 (horizontal:vertical) or less. Contact Hill & Smith for guidance with questions regarding transition options. Do not install the SmartPod impact attenuator near drainage basins or expansion joints without consulting Hill & Smith Applications Engineering. Portland Concrete Cement (PCC) foundation pads are preferred for permanent installations; asphaltic concrete (AC) foundation pads are appropriate for temporary work zone installations.

Pad Material and Thickness	Anchor Embedment
6 inch reinforced PCC	5 ½ inch
8 inch non-reinforced PCC	5 ½ inch
3 inch AC over 3 inch non-reinforced PCC	16 ½ inch
6 inch AC over 6 inch compacted subgrade	16 ½ inch
8 inch AC	16 ½ inch

Table 2: Foundation and Anchor Options

Concrete compressive strength shall be 4000 psi at 28 days. ***Foundation lengths may vary significantly when using wide transitions.***

Location

The location of the SmartPod impact attenuator relative to the hazard being shielded determines its position and transition requirements.

Design Considerations (Cont.)

Approach Zone – The SmartPod impact attenuator should not be placed directly behind or adjacent to raised curbs that exceed 4 inches in height. The longitudinal and cross slopes in front of the device should not exceed 10:1 (horizontal:vertical). Contact the Hill & Smith Applications Engineering department for additional guidance.

Barrier Width – The nominal width of the SmartPod impact attenuator is 24 inches at the rear. Barriers 24 inches wide or less can be shielded without using a transition if there is no exposure to reverse direction traffic. Barriers that are wider than 24 inches and/or have exposure to reverse direction traffic require a transition, available from Hill & Smith.

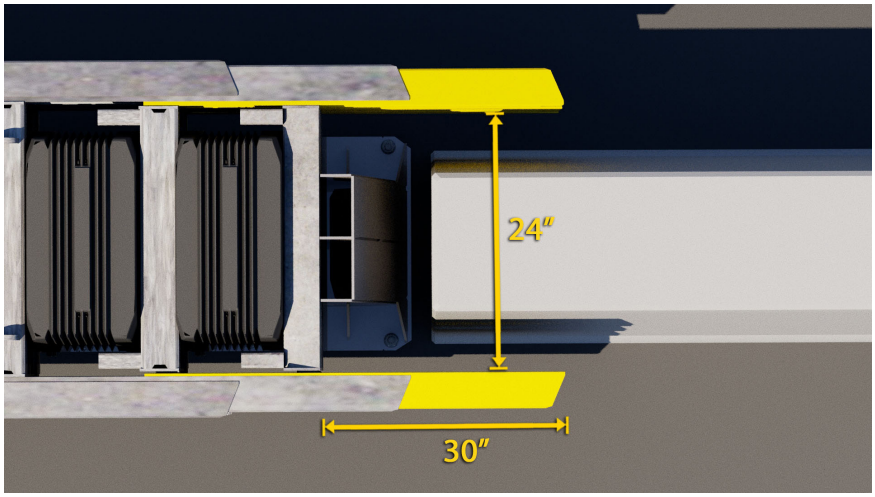


Figure 6: Nominal Width / Panel Travel Zone

DANGER

On full compression, the last set of side panels will telescope 30 inches beyond the backstop at the rear of the crash cushion (Figure 6). All objects that may interfere with this motion can affect the performance of and cause undue damage to the crash cushion. This panel travel zone must be kept clear at all times.

Barrier Height – The SmartPod impact attenuator is approximately 33 ½ inches high.

Barrier Shape – The SmartPod transitions allow for connection to many barrier profiles. Contact Hill & Smith applications engineering for installation support.

Equipment List

The following tools and equipment will be required to install and repair the SmartPod:

- Standard roadside work area safety equipment
- Personal safety equipment (gloves, latex gloves for epoxy, eye/face protection, etc.)
- Means of safely unloading 3200 lbs.
- Compressed air source/vacuum
- 1 inch nylon bottle brush
- Safety goggles
- Four lifting slings or four-point sling
- Bosch rotary hammer drill 13 1/2 amp #11263EVS Model 0 611 263 739 or equal
- ⅞ inch X 22 inch concrete drill bit for concrete installations or ⅞ inch X 28 inch drill bit for asphalt installations
- Relton rebar eater bit #RB-14 - ⅞ inch rebar cutter bit or equal
- 1 inch X 12 inch concrete drill bit for drop-in anchors on transitions
- Punch or setting tool for drop in anchors (Part # 264383)
- 1/2 inch electric drill for rebar bit and bottle brush (cordless will work for bottle brush)
- Epoxy dispenser for 28 oz. dual cartridge system. A spare is recommended in case of malfunction. (Part # 271946)
- Socket wrench and breaker bar
- Torque wrench (200 ft-lb capacity) with 3 ft extension
- Measuring and layout equipment (tape measure, chalk line, markers, etc.)
- Combination wrenches, deep sockets (Including 7/16 inch - ⅝ inch, 1 ¼ inch, 1 ½ inch, 1 ⅝ inch) and 3+ inch extension
- 5 foot wedge and round-ended pry bar
- Suitable pulling means – Chain 20’ x ½” Grade 100
- Misc. small tools (hammers, pliers, screw drivers, vise grips, etc.)
- Loctite Threadlocker Blue 242

This list is adequate for general installation and repair. Depending on site conditions, additional tools and equipment may be required.

Installation

All work during installation, repair and inspection of the SmartPod should be performed with proper traffic control according to federal, state and local standards. Proper performance depends on the correct installation of the SmartPod on an approved foundation. Any SmartPod not installed according to the drawings and the requirements of this installation manual may present an unsafe condition and should be reinstalled accordingly.

⚠ WARNING

Impacts with vehicles of size or mass outside of those tested in accordance with MASH-16, or with vehicles traveling at speeds greater than those tested will not necessarily produce results within the test criteria. The crash cushion is in conformance with all requirements of MASH Test Level 3.

Site Preparation

Check to make sure there are no drains, expansion joints, buried conduit, cables or utility lines in the footprint space where the attenuator will be placed. Remove any curbs greater than 4 inches or obstacles in front of or adjacent to the attenuator for a minimum distance of 12 feet from the attenuator. Be sure to set up proper traffic control before beginning any installation or repair work at the site.

Foundations

New foundations should be installed according to Appendix C – Foundation Drawing. Concrete cure strength should reach 4,000 psi minimum before use. The surface of the foundation must be cleaned of all debris, dirt, mud, sand, etc., as the crash cushion must sit on a flat plane, although longitudinal and/or cross slopes of up to 10:1 (horizontal:vertical) are acceptable. Reference the foundation and anchor options in Table 2.

Note: Concrete should be minimum 4000 psi at full cure. The cross slope should not exceed 10:1.

Installing the SmartPod on an existing foundation may result in anchor bolt locations interfering with rebar in the foundation. When rebar is encountered, rebar bits should be used to finish the holes. Concrete bits may bend around

Installation (Cont.)

the rebar and continue to drill at an angle while the anchors will not bend when inserted.

Prior to installing the SmartPod on an existing foundation, the concrete must be thoroughly inspected for slope, signs of cracking, surface wear, shifting from original position, undercut of earth below or to the sides supporting the foundation, settling, and any other signs of age or deterioration which may make the foundation unusable. If any of these signs are evident, the foundation should be removed and a new one must be installed according to Appendix B. If prior bolt hole patterns are present, use proper engineering calculations to assure adequate anchor strength in the new hole locations.

Placement of the SmartPod

Measure the correct distance and offset of the SmartPod according to the type of object being shielded and the type of transition being used. The dimensions shown on the transition drawings may be used as a guide for this. System drawings are also available. Contact the Hill & Smith Applications Engineering department for additional guidance.

The crash cushion is shipped in one piece, fully assembled. The SmartPod can be lifted below the skid frame with a boom or forklift of suitable capacity. **Do not lift directly under the side panels (Figure 7a)!**

Figure 7a: Lift Below the Skid Frame

Installation (Cont.)

⚠ WARNING

As an alternative, lift at the (4) tabs located at the top of bulkheads 3 and 6 (Figure 7b).

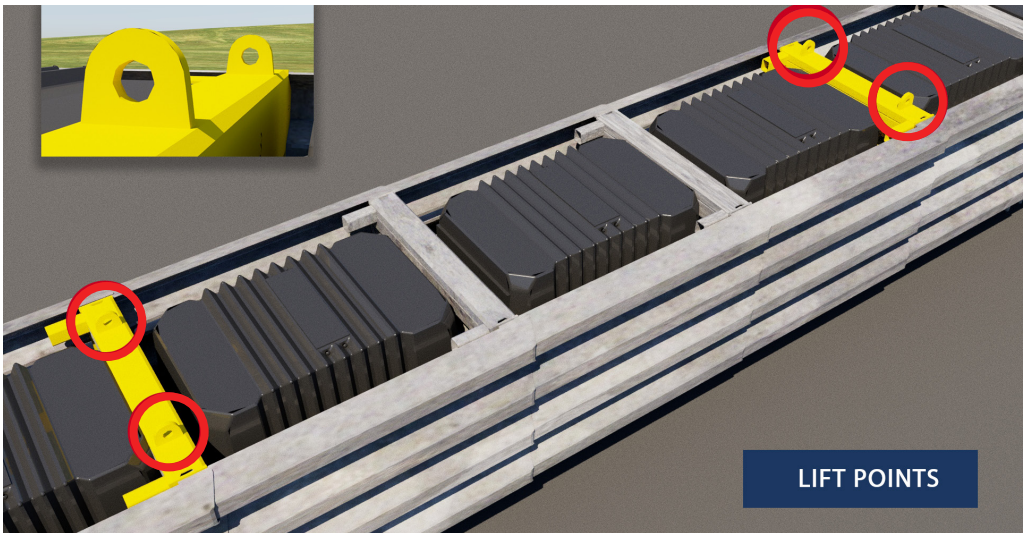


Figure 7b: System Lifting Points

Once in place, double-check the measurements to be sure of the proper location of the SmartPod before anchoring.

Anchor Installation

For foundation and anchor options, reference Table 3.

Pad Material and Thickness	Anchor Length	Anchor Embedment
6 inch reinforced PCC	7 inches	5 ½ inch
8 inch non-reinforced PCC	7 inches	5 ½ inch
3 inch AC over 3 inch non-reinforced PCC	18 inches	16 ½ inch
6 inch AC over 6 inch compacted subgrade	18 inches	16 ½ inch
8 inch AC	18 inches	16 ½ inch

Table 3: Foundation and Anchor Options

Installation (Cont.)

Using the holes in the base as a template, drill 7/8" holes to the proper depth as previously defined. If the SmartPod is being installed on an existing foundation and the drills are hitting rebar, use a core drill or rebar cutter to ensure that straight, vertical holes are made at each location. Take care that the holes do not break out the bottom of the foundation as this may result in loss of epoxy during anchor placement.

Once the holes are drilled, clean the hole of all debris. To ensure epoxy adhesion, anchor holes MUST be cleaned with compressed air or a vacuum and a bottle brush to remove embedded dust and cuttings. Before injecting the epoxy ensure that all holes are clean of debris.

Inject the epoxy into each hole at an angle to avoid air entrapment. Use a sufficient amount of epoxy so that the hole will be completely filled when the bolt is inserted. Screw the nut on the anchor bolt flush with the end, put the washer on the stud, and immediately insert the anchor stud all the way to the bottom while turning the anchor. This method assures the anchor bolts are vertically plumb and the threads are coated with epoxy. It is also important that the studs are inserted vertically plumb if the unit needs to be lifted off for replacement.

There is a quantity of 38 anchors for the TL-3 concrete attenuator and 48 anchors for the asphalt attenuator. For concrete and asphalt anchor locations, reference Figure 8. The epoxy will be ready for bolt tightening depending on the temperature. **See the epoxy container instructions for temperature and bolt up times.** Allow the epoxy to cure before tightening the nuts.

Torque the anchor nuts to 125 ft-lbs. Asphalt anchors should have a torque value of 10 ft-lbs.

Anchor bolts should not project more than ½ inch above the nut after final torque is completed.

Redhead A7+ epoxy is not supplied with the unit and may be ordered separately. Reference Figure 10, Anchor Accesories for epoxy anchor options. Other agency approved epoxies meeting or exceeding these specifications may be substituted. Consult Hill & Smith Applications Engineering for recommendations.

Installation (Cont.)

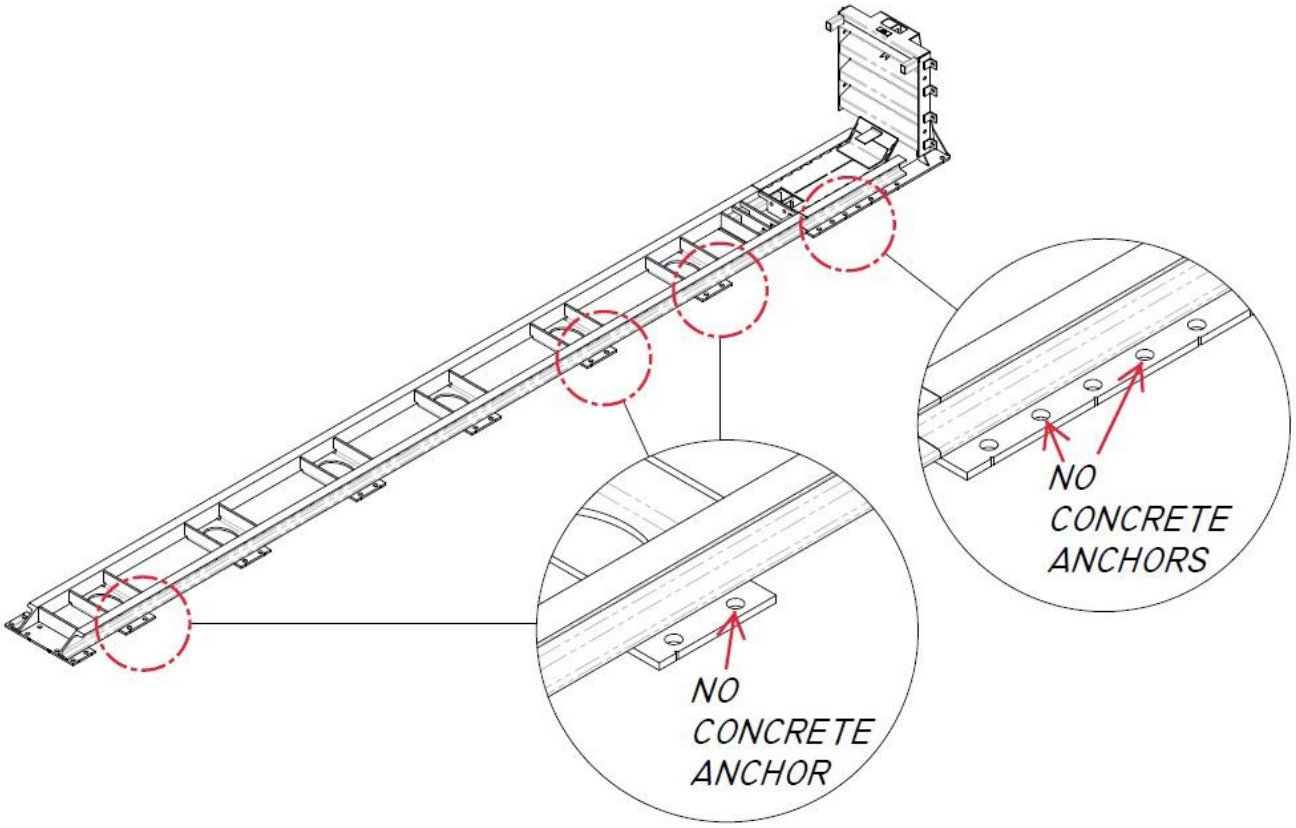


Figure 8: Concrete and Asphalt Anchor Locations

Figure 9: Concrete Anchor Locations are Notched

Figure 9a: Anchor ALL Front Plate Holes

Installation (Cont.)

		
Red Head A7+ Epoxy (28 oz) 271242	Red Head A102 Manual Dispenser 271946	Red Head A200 Pneumatic Dispenser 272274
		
Asphalt Anchor Kit (3/4X18”) 270663 (QTY 48 each - Rods, Nuts, & Washers) TL-3 Unit Requires 12x28oz Tubes of Epoxy	Concrete Anchor Kit (3/4x7”) 414212 (QTY 38 each - Rods, Nuts, & Washers) TL-3 Unit Requires 3x28oz Tubes of Epoxy	

Figure 10: Anchor Epoxy / Anchor Options

Delineator Panel Attachment

Installation of the front delineation plate will be determined by the location of the attenuator and state regulations. A delineation plate is shipped with a yellow powder coat background and no striping. It is attached to Bulkhead 1 with four ¼ x 4 ½-inch bolts, washers and locknuts. Delineation striping examples are shown in Figure 11.

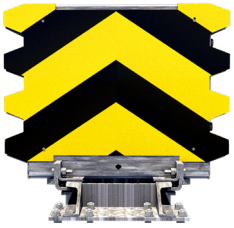
		
Left Shoulder	Median Installation	Right Shoulder

Figure 11: Delineation Striping Examples

Installation (Cont.)

Transition Installation

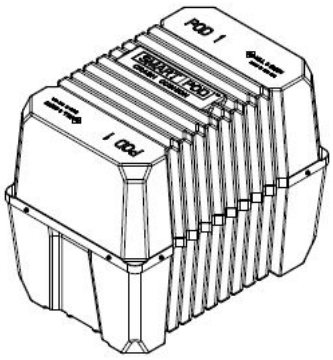
Transitions may be required. Any installation of a SmartPod with exposure to reverse direction impact will require a transition. Contact your representative or Applications Engineering for drawings and transition details. Transition drawings and parts explosions for the most popular transition options are located in the appendices. See Transitions to Concrete and Transitions to Asphalt in this manual.

Final Inspection

After the anchor bolts have been tightened to the proper torque value, check that the SmartPod is not distorted in any way as might happen if the unit is secured to a foundation which is not a flat plane. Check that no part of the unit has been damaged by shipping and handling. Verify that all assembly bolts are tight and have not come loose during shipping or installation.

Verify the Pods are in the proper locations and the correct orientation with the top right-side up. The top side of the Pods are embossed with text. Confirm that there are 4 Type 1 Pods in the front of the system and 3 Type 2 Pods in the rear.

Finally, check that no tools or other equipment have been left within the SmartPod structure. Use the post-installation checklist to confirm the installation details.



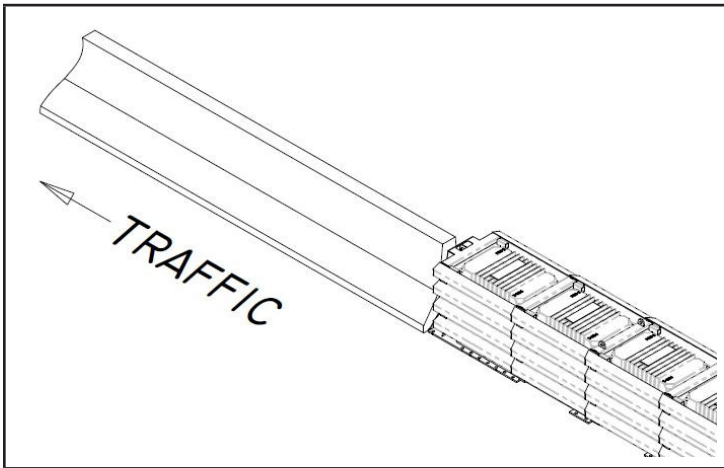
Embossed Side UP

Installation Checklist

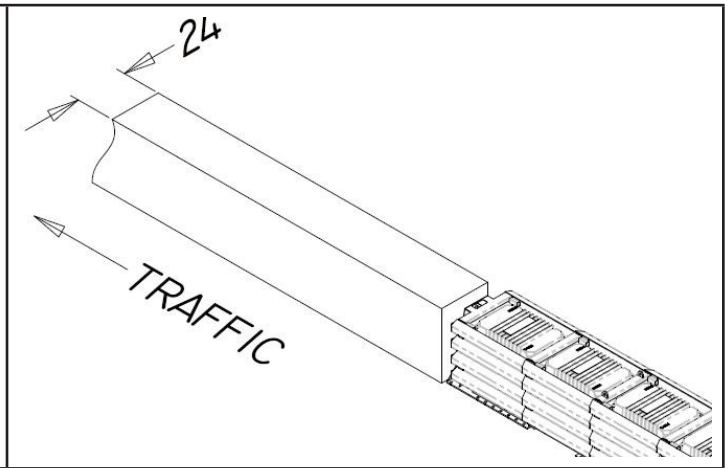
✓	Check each of the boxes below. Refer to the Installation Manual for questions and further details. **Download current manual at https://hillandsmith.com.**
	Foundation Requirements
	6” reinforced concrete pad or 8” non-reinforced pad. For asphalt, refer to Table 3.
	Pad is planar with max cross slope of 10:1 (front to back, side to side).
	Concrete is 4,000 psi at full cure.
	Inspect new and existing foundations for slope, signs of cracking, shifting from original position, undercut below or sides, settling or other signs of age/deterioration.
	Foundation pad per Appendix B of Installation Manual.
	Unloading and Placement
	Position with a device that can safely lift 3,200 lbs.
	Lift the system under the skid frame or use the four lifting tabs located on Bulkheads 3 and 6.
	Attenuator centered or aligned on hazard to provide the best possible protection and redirection capabilities possible.
	Anchors, Drilling, Cleaning, Adhesive and Torque Values
	Anchor embedment per specifications in Appendix B.
	Anchor holes drilled to proper depth using a 7/8” diameter drill bit.
	Remove loose Debris from drilling holes with a vacuum or air hose.
	“Scrub out” holes using a nylon or wire bottle brush and remove dust with a vacuum or with compressed air.
	Use supplied RedHead A-7 epoxy or approved alternative per manufacturer’s recommendations.
	Rotate anchor rods one full turn while inserting into the anchor holes previously filled with adhesive.
	After adhesive has fully cured, torque anchor nuts to 125 ft.-lbs. with no more than 1/2” of anchor rod thread visible above the nut.
	All 48 anchors installed for asphalt system or all 38 anchors installed for concrete system.
	Hardware Check
	All Hardware is tightened to specifications.
	Rear Panel Clearance
	Rearmost panel clearance for travel straight back 30” beyond backstop.
	Front Panels
	Stripe front delineation panel per agency regulations for the site location.
	Transitions
	Transitions required for hazards wider than 24” or if Bi-directional traffic. See Manual for further information and available transitions.

Location:	**Date:**
Serial #:	**Inspector Signature:**

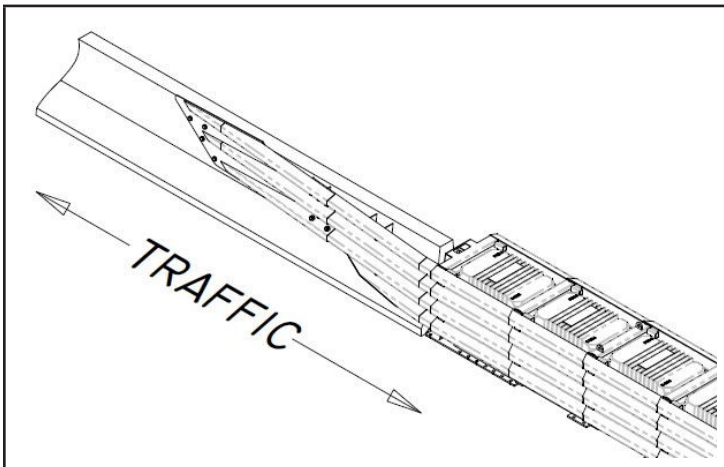
Transitions to Concrete



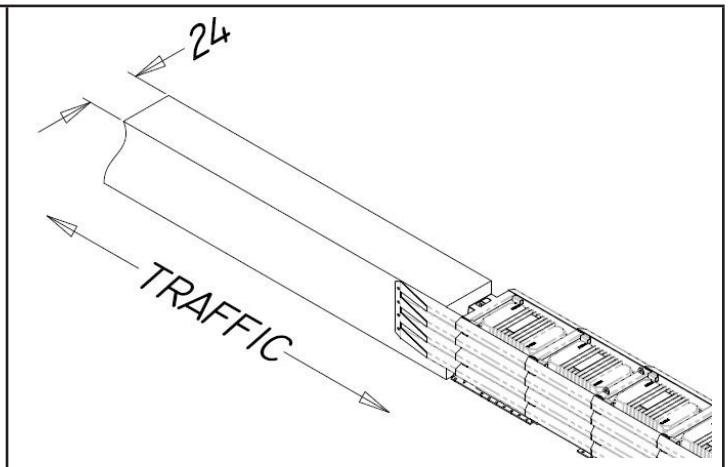
UNIDIRECTIONAL - SAFETY SHAPE
(APPENDIX D) NO TRANSITION NEEDED



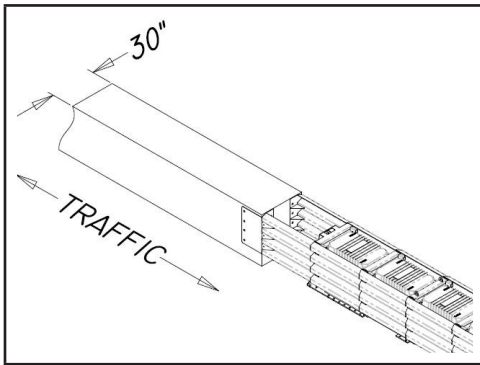
UNIDIRECTIONAL 24” BLOCK
(APPENDIX E) - NO TRANSITION NEEDED



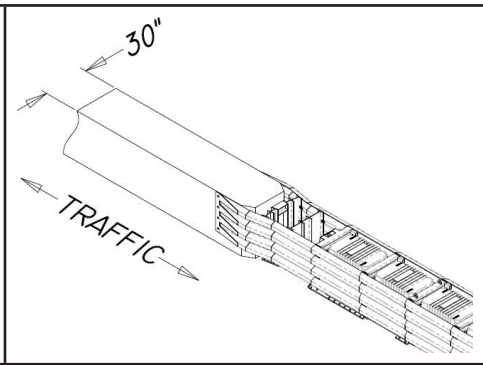
BIDIRECTIONAL NEW JERSEY SHAPE
(APPENDIX F & G)



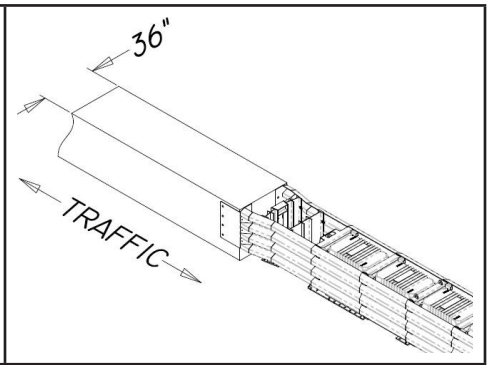
BIDIRECTIONAL 24” BLOCK
(APPENDIX H)



BIDIRECTIONAL 30” STRAIGHT
(APPENDIX I)

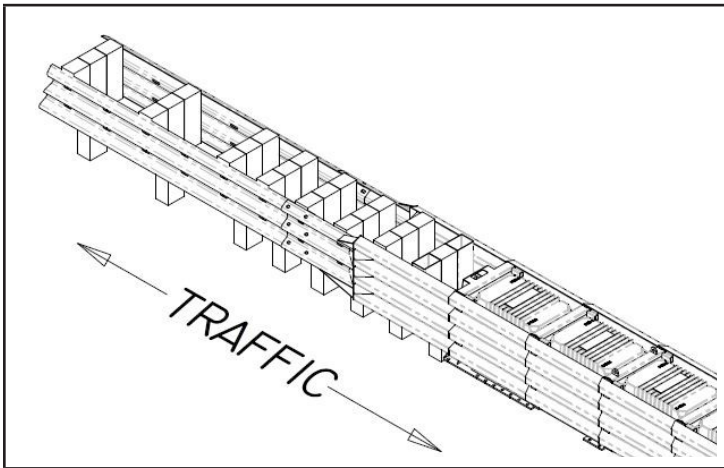


BIDIRECTIONAL 30” FLARED
(APPENDIX J)

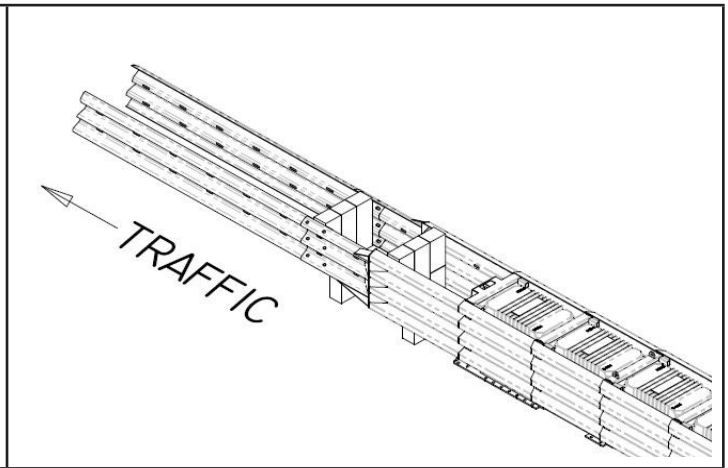


UNIDIRECTIONAL 36” STRAIGHT
(APPENDIX K)

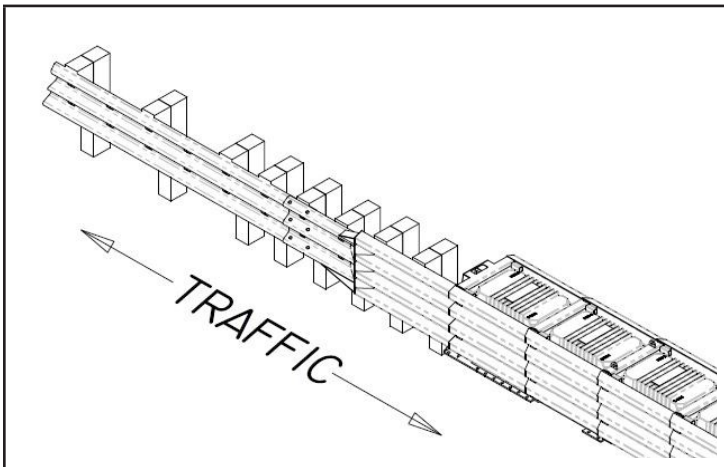
Transitions to Guardrail



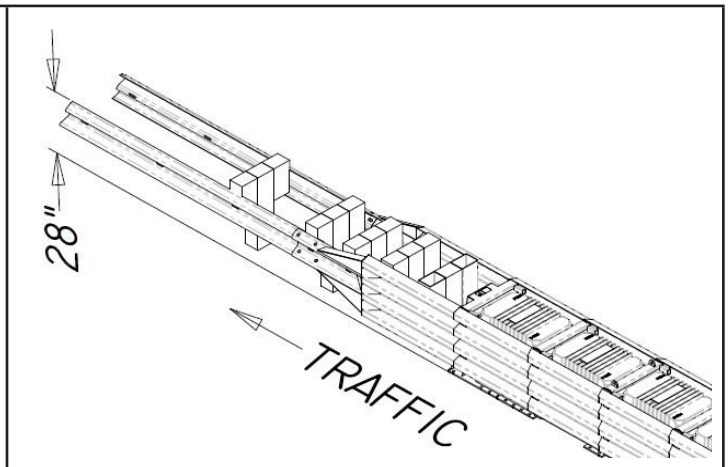
THRIE BEAM DOUBLE-SIDED BIDIRECTIONAL (APPENDIX L)



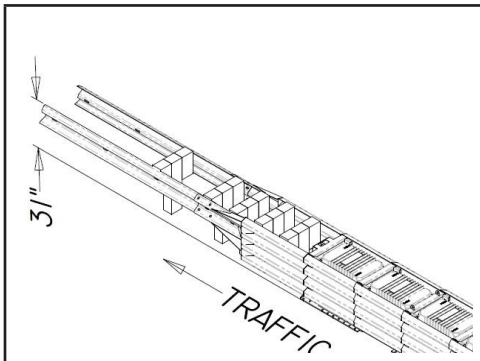
THRIE BEAM DOUBLE-SIDED UNIDIRECTIONAL (APPENDIX M)



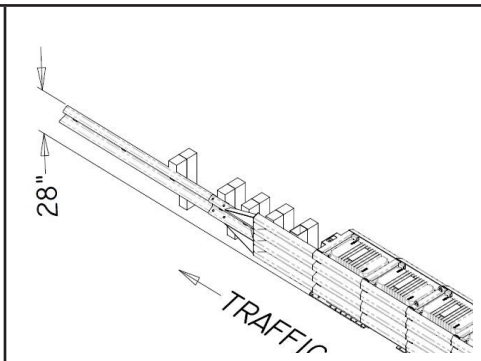
THRIE BEAM SINGLE-SIDED BIDIRECTIONAL (APENDIX N & O)



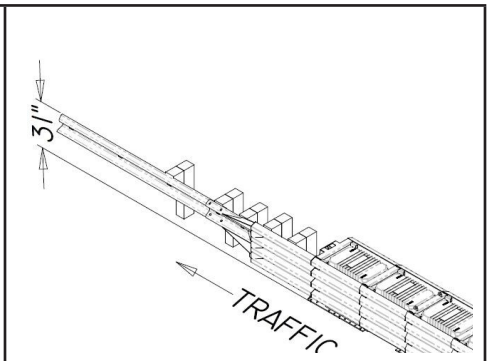
W-BEAM DOUBLE-SIDED 28" UNIDIRECTIONAL (APPENDIX P)



W-BEAM DOUBLE-SIDED 31" UNIDIRECTIONAL (APPENDIX Q)



W-BEAM SINGLE-SIDED 28" UNIDIRECTIONAL (APPENDIX R)



W-BEAM SINGLE-SIDED 31" UNIDIRECTIONAL (APPENDIX S)

Post-Impact Inspection & Repair

Inspecting the SmartPod After Impact

After an impact, perform a full evaluation to determine the required replacement parts. Replace parts that show signs of fatigue, bending or other visible damage. PODs can be removed for better access during repairs.

Post-Impact Inspection Steps:

1. Inspect and replace any damaged side panels.
2. Inspect and replace any damaged side keeper bolts on all panels.
3. Inspect and replace any damaged Bulkhead rail attachment hardware.
4. Replace any damaged PODS in the proper orientation.
5. Loose or damaged anchor bolts should be extracted and reinstalled.

⚠ WARNING

All work should be performed with proper Traffic Control according to the Agency guidelines.

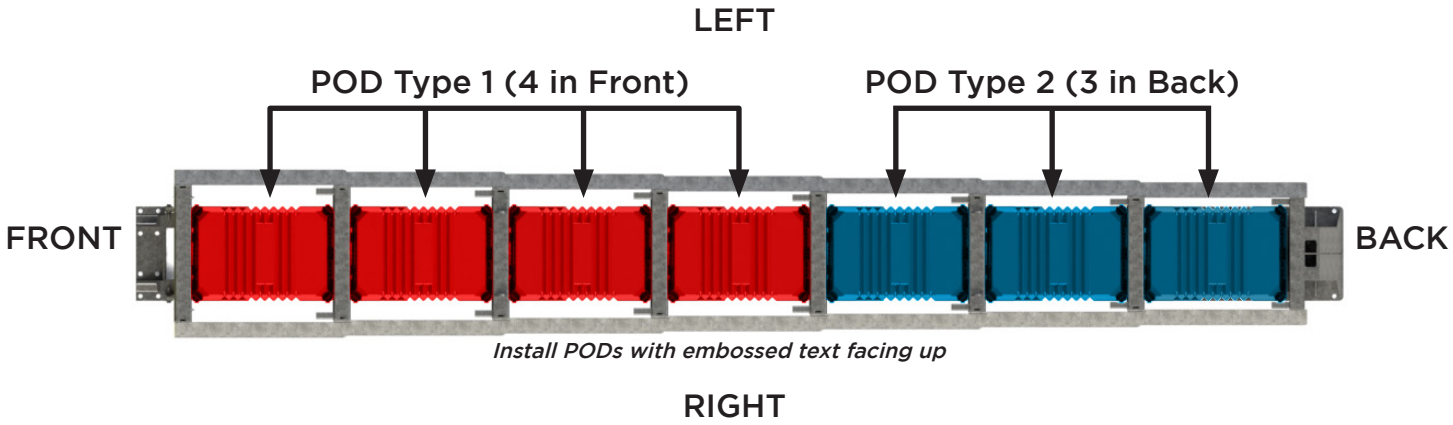


Figure 12: POD Replacement Orientation

Repair after Frontal Impact

1. Attach a suitable chain to the Front Bulkhead at the access points.
2. Pull the first bulkhead forward to extend the unit. If accessible, the side keepers can be loosened if the system is difficult to pull out.
3. Replace any damaged PODs in the proper orientation.
4. Complete the Post-Inspection Checklist after resetting.

Post-Impact Inspection and Repair (Cont.)

POD Impact Indicator

After resetting a frontal impact, some of the PODS may be partially deformed. Do not reuse a POD that does not return the original shape.

To determine if a POD needs to be replaced after an impact, locate the "Impact Indicator" tab on the Backstops. If the POD casing located next to the tab is "penetrated" by the impact indicator, the POD should be replaced.

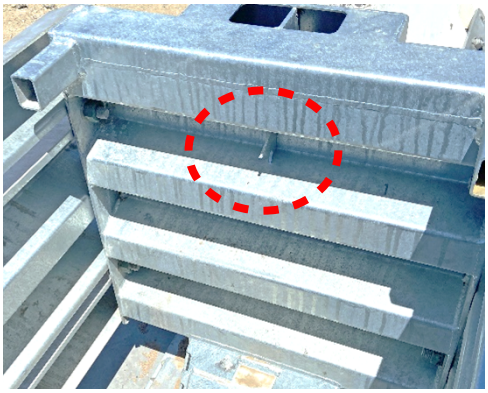


Figure 13: POD Impact Indicator

Parts Replacement: Panels / Bulkhead / Backstop

Front Panel Replacement

1. Remove the front delineator panel for better access.
2. Remove the four hex bolts that attach the front panel of the first Bulkhead.
3. On the inside of Bulkhead #2, remove the hex nuts and washers attached to the front side keeper bolts.
4. Remove the front side keeper bolts.
5. Remove and replace the damaged panel, making sure that the panels are overlapped correctly.
6. Remember that the tapered panel edge is positioned to the rear of the SmartPod and is outside of the panel behind it.
7. Install the four hex bolts that attach the Front Panel to Bulkhead.
8. Install the front side keeper bolts.
9. Align the panels with the front side keeper flanges to assure they are not in a bind when tightened.
10. When reinstalling side keepers, make sure that they fully seated into the panel slot.
11. The inner panel is tight and pinned to the frame, while the outer panel slides in the panel slot.

Post-Impact Inspection and Repair (Cont.)

12. The Front Panel side keeper bolt has a spring between the washer and Bulkhead 1. Apply Loctite Threadlocker Blue 242 and tighten the nut until the gap between the washer and Bulkhead 1 measures 1 - 13/16" (see Appendix A 413900, Section D-D).
13. Replace the front delineator panel.

Side Panel Replacement

1. Remove the hex nuts and washers on all of the side keeper bolts that attach the side panel to the mobile frames.
2. Side panels may have a combination of keeper bolts depending on the panel location.
3. Remove the side keeper bolts.
4. Remove and replace the damaged panel.
5. Make sure that the panels are overlapped correctly.
6. Remember that the tapered panel edge is positioned to the rear of the SmartPod and is outside of the panel behind it
7. Attach the side panel to the frame with the appropriate side keeper bolts.
8. Align the panels with the keeper flanges to assure they are not in a bind when tightened.
9. Torque the nuts to 200 ft-lbs and if needed, use a pry bar to prevent the keeper from rotating while being tightened.

Rear Panel Replacement

1. Remove the four (4) keepers that attach the rear panel by removing the hex nuts on the end of the side keeper located on the inside of the mobile frame and the backstop.
2. Two (2) center side keepers are attached to the last bulkhead.
3. Two (2) rear side keepers are attached to the backstop.
4. Remove and replace the damaged panel.

Post-Impact Inspection and Repair (Cont.)

5. Make sure that the panels are overlapped correctly and that the keeper bolts and panels are aligned.
6. Align the panels with the keeper flanges to assure they are not in a bind when tightened.
7. Torque the nuts to 200 ft-lbs and if needed, use a pry bar to prevent the keeper from rotating while being tightened.

Bulkhead Replacement

A unique feature of the SmartPod is the reverse taper design that allows the system to stack together with minimal interference between the panels. To accomplish this, the bulkheads are slightly wider at the front of the system and narrower at the back. There are 7 bulkheads in a Test Level 3 system as well as the backstop at the rear of the unit.

1. First, identify the bulkhead that needs to be replaced.
2. There is a stamp on the top of each bulkhead identifying the location and orientation.
3. To replace a bulkhead, locate and remove the 2 bolts that attach the bulkhead foot to the base rail.
4. Remove hex nuts and washers on all side keeper bolts.
5. Remove side keeper bolts and panels, replacing any damaged components.
6. Remove and replace the damaged bulkhead.
7. Replace the bulkhead feet and side guide bolts and torque all nuts to 280 ft-lbs.
8. Reattach the panels with the proper side keeper bolts, washers, and hex nuts.
9. Assure the side panels are overlapping correctly and the side keeper shoulders are in the correct orientation and fully seated in the panel slot.

Post-Impact Inspection and Repair (Cont.) - Maintenance

Backstop Replacement

Damage to the Backstop assembly may be sustained after a severe impact. If the backstop shows signs of damage consult with Hill & Smith applications engineering for evaluation and repair guidance.

Periodic Maintenance

Maintenance is site dependent. Small amounts of accumulated debris and trash should not affect the performance of the SmartPod.

Significant accumulation of dirt, mud, or any debris can impede the collapse of any system. We suggest an annual clean-out of the system in the fall. If sites are in locations prone to heavy rain/mud runoff, more frequent cleaning may be required.

SmartPod Commercial 1-Year Warranty

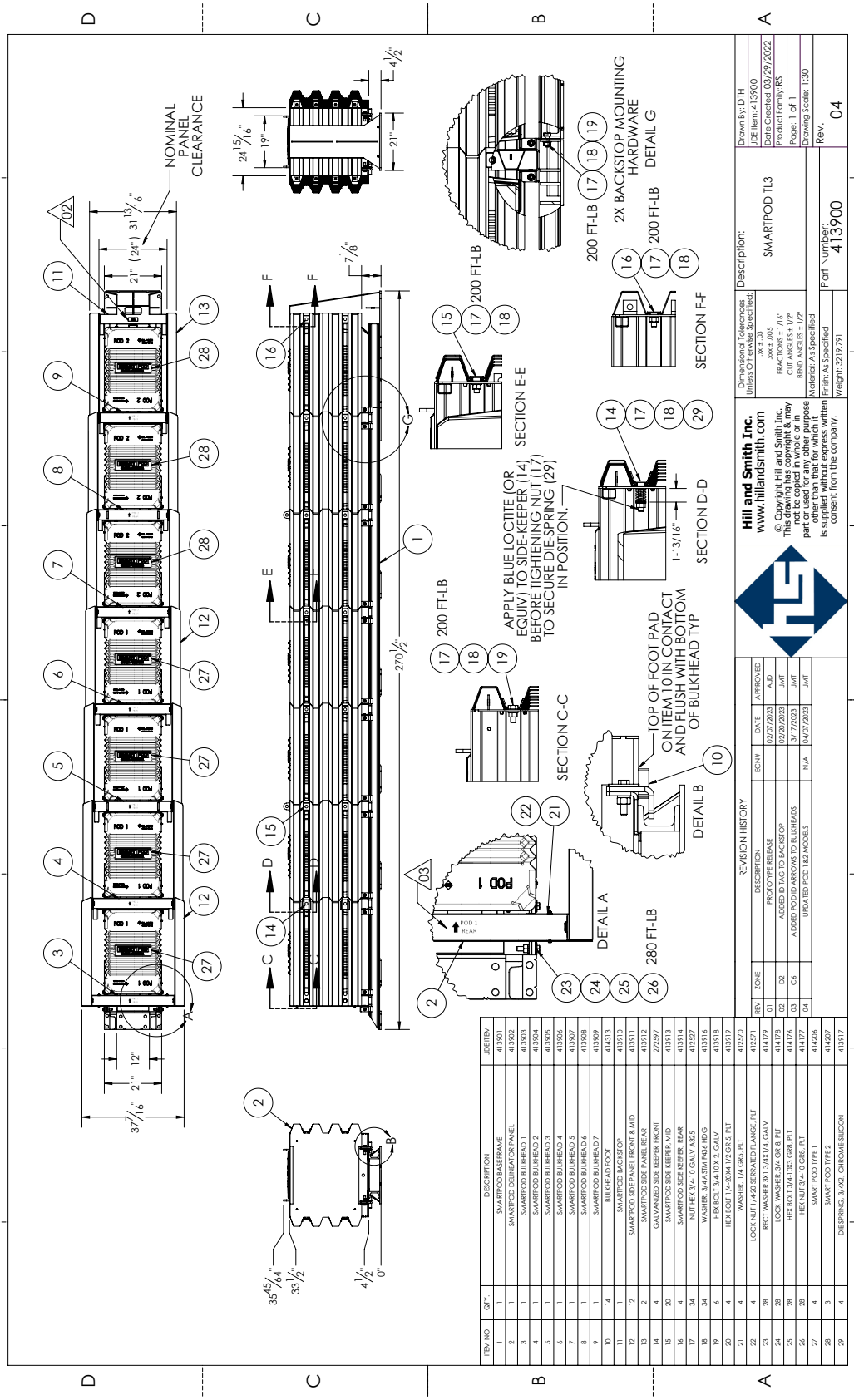
Hill & Smith Inc. warrants this product to be free from defect in material and workmanship under normal use and service for a period of one (1) year beginning on the date of installation. Hill & Smith Inc. will repair or replace without charge to the original customer any defective component. This is the sole and exclusive remedy.

This warranty is contingent upon proper use of the System and does not cover Systems that have been modified (including the addition of parts) without the approval of Hill & Smith Inc., or which are in need of repair due to damage from external cause, including accident, collision, improper handling, improper transporting, failure to properly maintain the System as recommended by Hill & Smith Inc., abuse, misuse, or which have been damaged by outside parties not employed by Hill & Smith Inc., whether in installation or otherwise.

THIS IS A LIMITED WARRANTY AND IT IS THE ONLY WARRANTY MADE BY HILL & SMITH INC. HILL & SMITH INC. MAKES, AND CUSTOMER RECEIVES, NO OTHER WARRANTY, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OR MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. SCI PRODUCTS INC. SHALL HAVE NO LIABILITY WITH RESPECT TO ITS OBLIGATIONS UNDER THIS WARRANTY FOR CONSEQUENTIAL, EXEMPLARY OR INCIDENTAL DAMAGES EVEN IF IT HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. THERE ARE NO WARRANTIES WHICH EXTEND BEYOND THIS DOCUMENT WITH RESPECT TO THE PRODUCT INDICATED ABOVE. BUYER ACKNOWLEDGES THAT ANY STATEMENTS MADE WHICH ARE NOT FOUND IN THIS DOCUMENT ARE NOT PROMISES TO BE RELIED UPON.

THE BUYER AGREES TO INSPECT THE PRODUCT ON RECEIPT AS FULLY AS THE BUYER DESIRES AND TO NOTIFY HILL & SMITH INC. OF ANY REVEALED DEFECT.

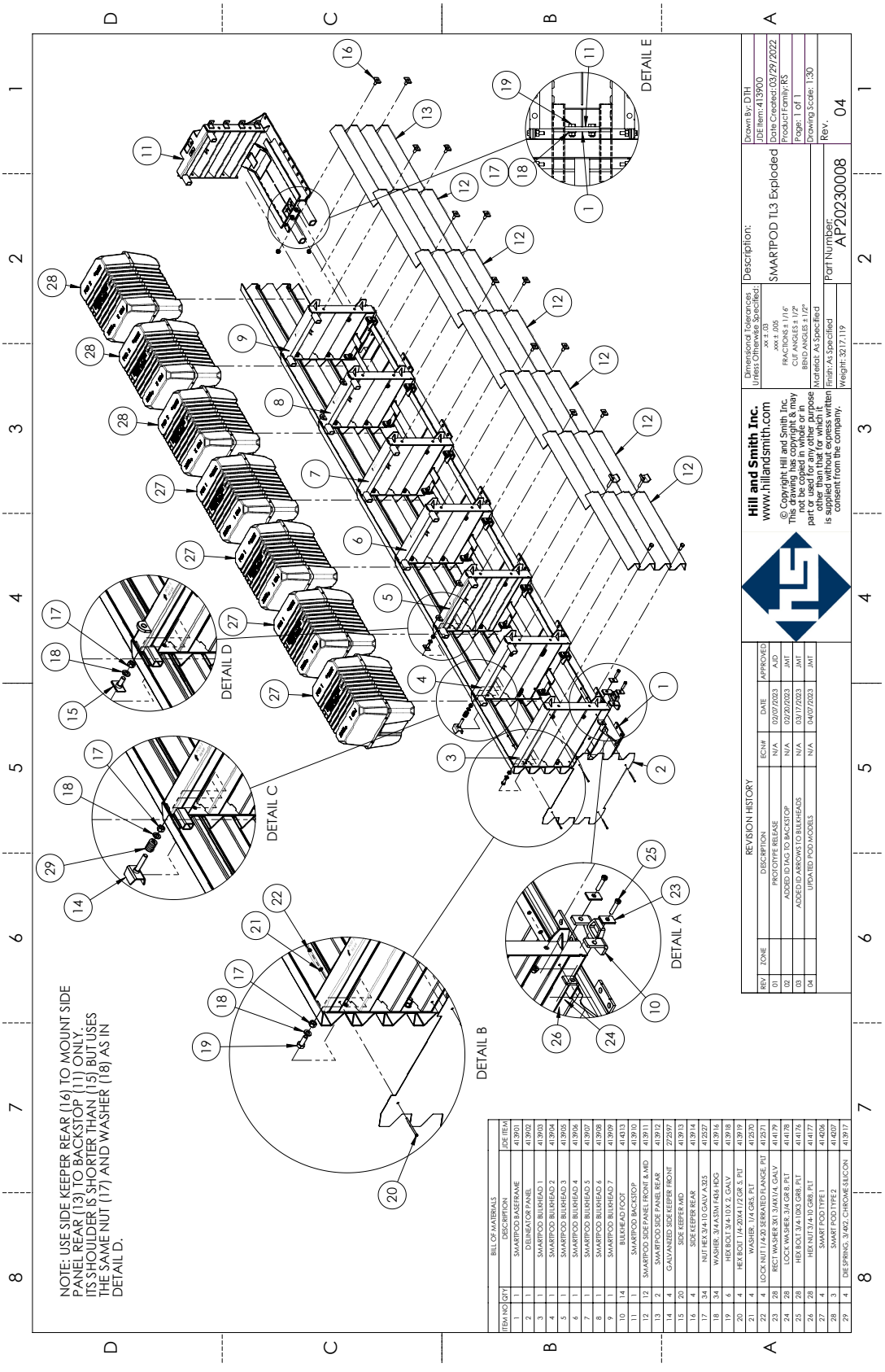
Appendix A: Test Level 3 System Drawing



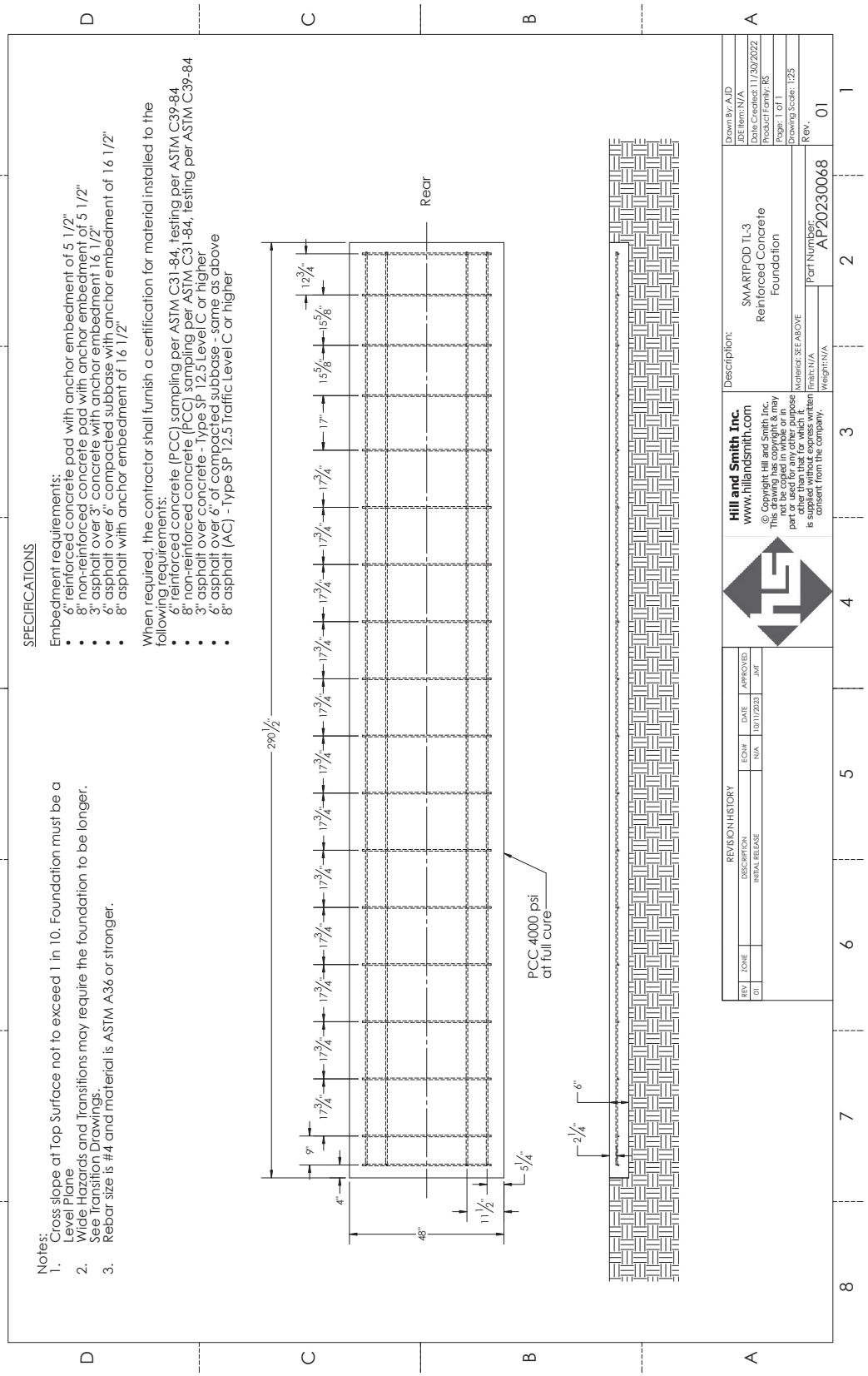
ITEM NO	QTY.	DESCRIPTION	JDE ITEM
1	1	SMARTPOD BASEFRAME	413901
2	1	SMARTPOD DEBRIS/ATOR PANEL	413902
3	1	SMARTPOD BULKHEAD 1	413903
4	1	SMARTPOD BULKHEAD 2	413904
5	1	SMARTPOD BULKHEAD 3	413905
6	1	SMARTPOD BULKHEAD 4	413906
7	1	SMARTPOD BULKHEAD 5	413907
8	1	SMARTPOD BULKHEAD 6	413908
9	1	SMARTPOD BULKHEAD 7	413909
10	14	BULKHEAD FOOT	414313
11	1	SMARTPOD BACKSTOP	413910
12	12	SMARTPOD SIDE PANEL FRONT & MID	413911
13	2	SMARTPOD SIDE PANEL REAR	413912
14	4	GALVANIZED SIDE KEEPER, FRONT	272597
15	20	SMARTPOD SIDE KEEPER, MID	413913
16	4	SMARTPOD SIDE KEEPER, REAR	413914
17	34	NUT HEX 3/4-10 GALV A325	412527
18	34	WASHER, 3/4 A.STM F436 HDG	413916
19	6	HEX BOLT 3/4-10 X 2, GALV	413918
20	4	HEX BOLT 1/4-20X4 1/2 GR 5, PLT	413919
21	4	WASHER, 1/4, GR5, PLT	412570
22	4	LOCK NUT 1/4-20 SERRATED FLANGE, PLT	412571
23	28	RECT WASHER 3X1.3/4X1/4, GALV	414179
24	28	LOCK WASHER, 3/4, GR 8, PLT	414178
25	28	HEX BOLT, 3/4-10X3, GR8, PLT	414176
26	28	HEX NUT 3/4-10, GR8, PLT	414177
27	4	SMART POD TYPE 1	414206
28	3	SMART POD TYPE 2	414207
29	4	DIE SPRING, .3/4X2, CHROME-SILICON	413917

REV	ZONE	DESCRIPTION	ECN#	DATE	APPROVED
01		PROTOTYPE RELEASE		02/07/2023	AJD
02	D2	ADDED ID TAG TO BACKSTOP		02/20/2023	JMT
03	C6	ADDED POD ID ARROWS TO BULKHEADS		3/17/2023	JMT
04		UPDATED POD 1 &2 MODELS	N/A	04/07/2023	JMT

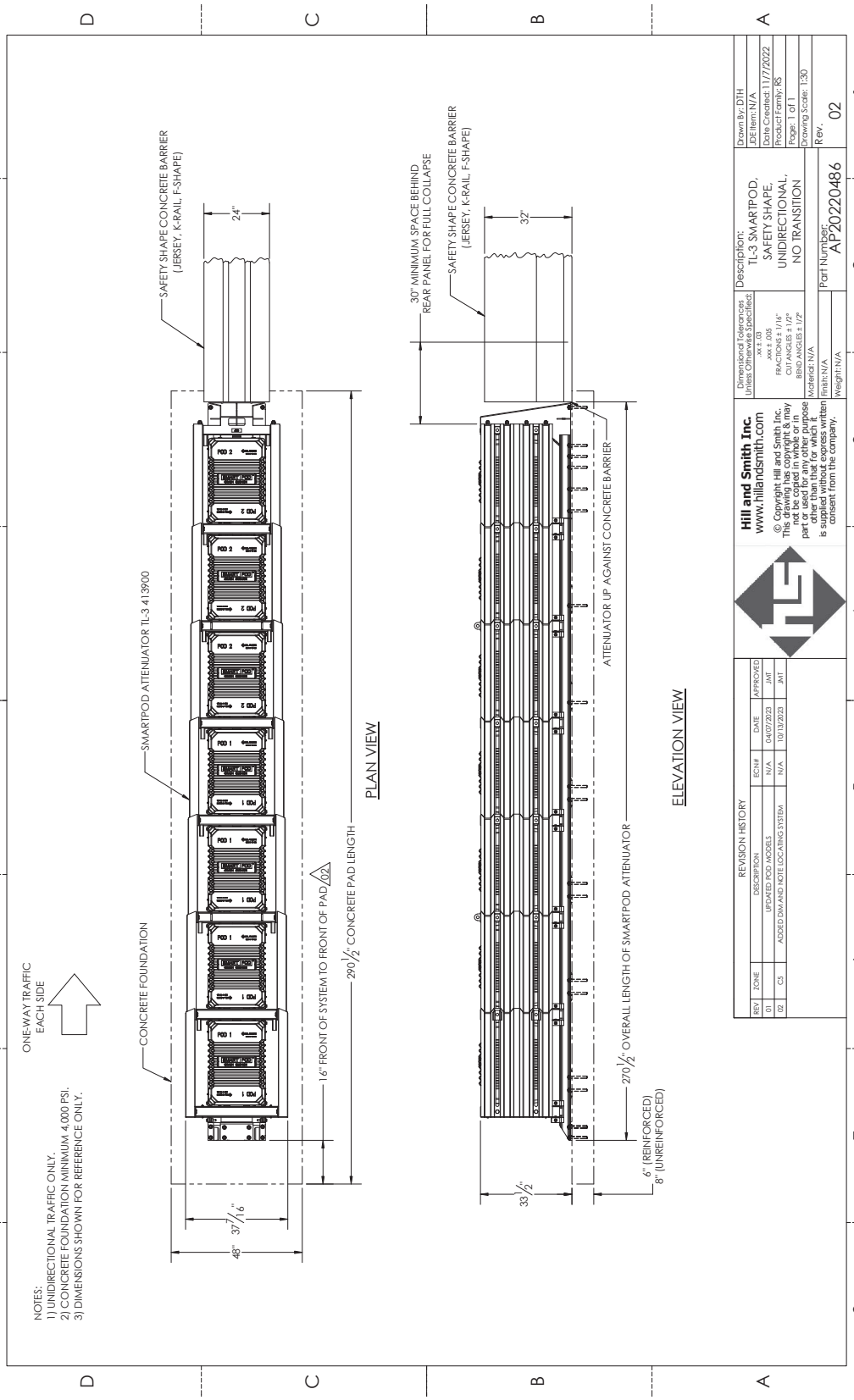
Appendix B: Exploded Test Level 3 System Drawing



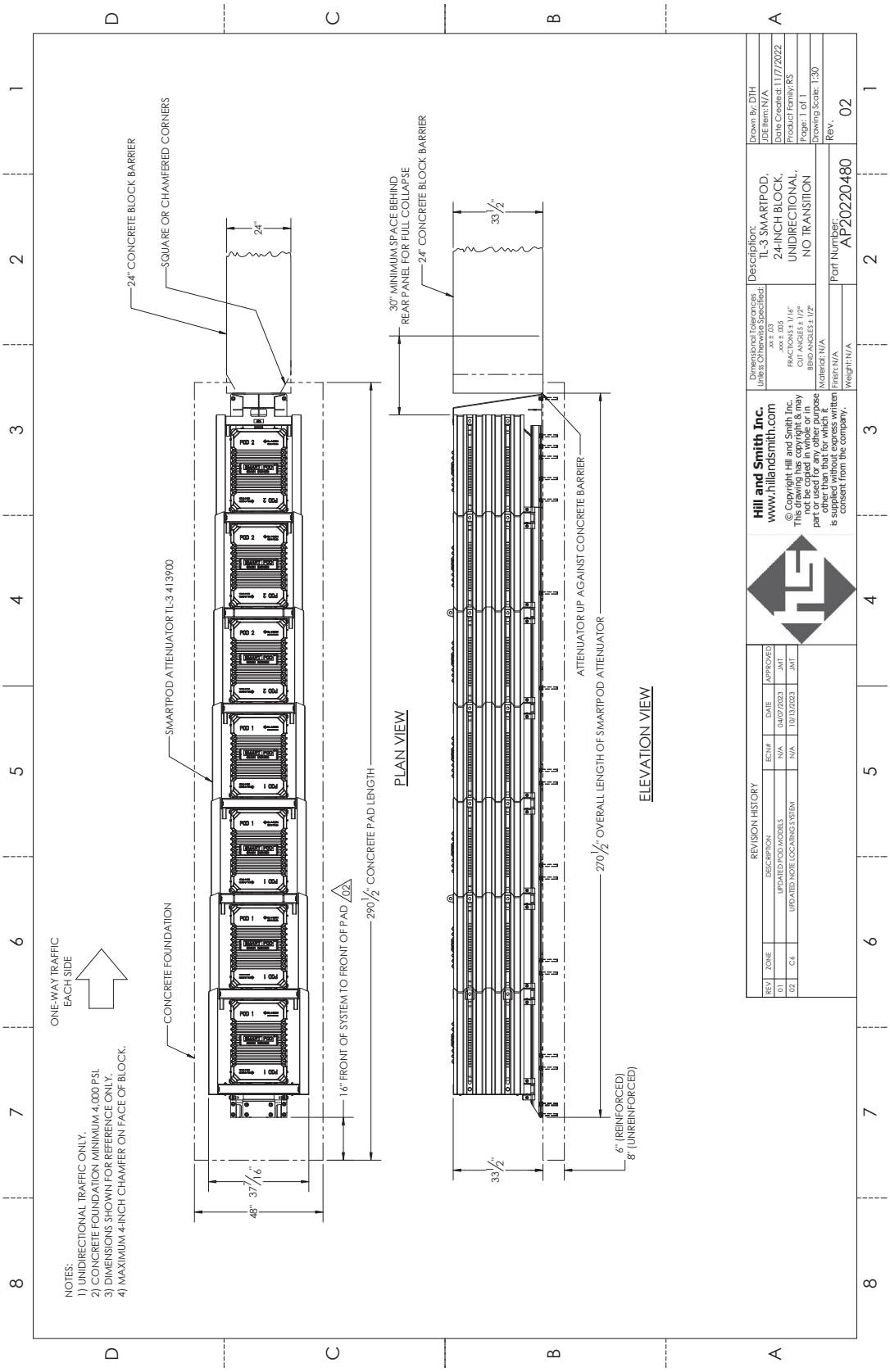
Appendix C: Test Level 3 Foundation Drawing



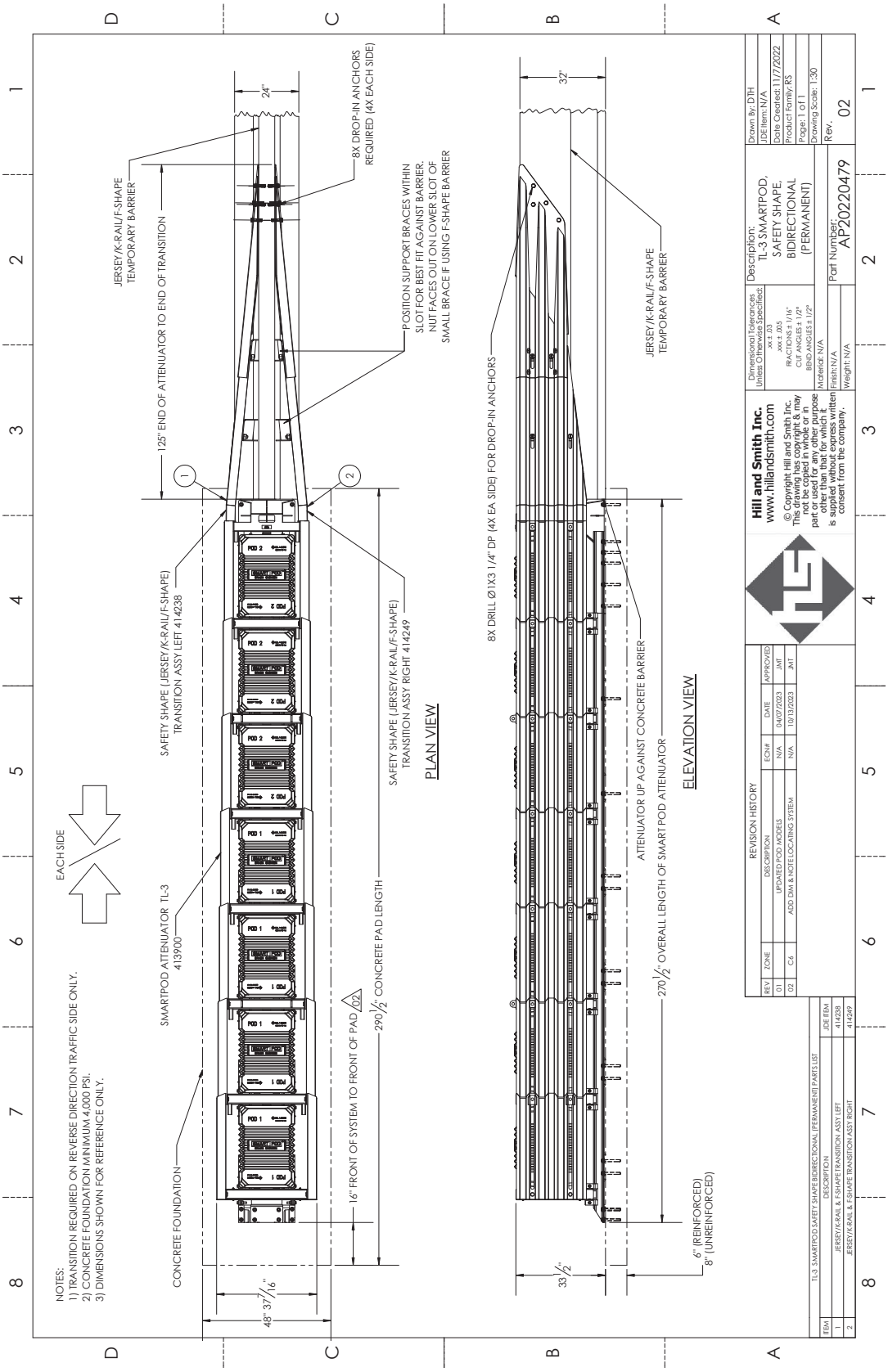
Appendix D: Safety Shape Unidirectional - NO TRANSITION



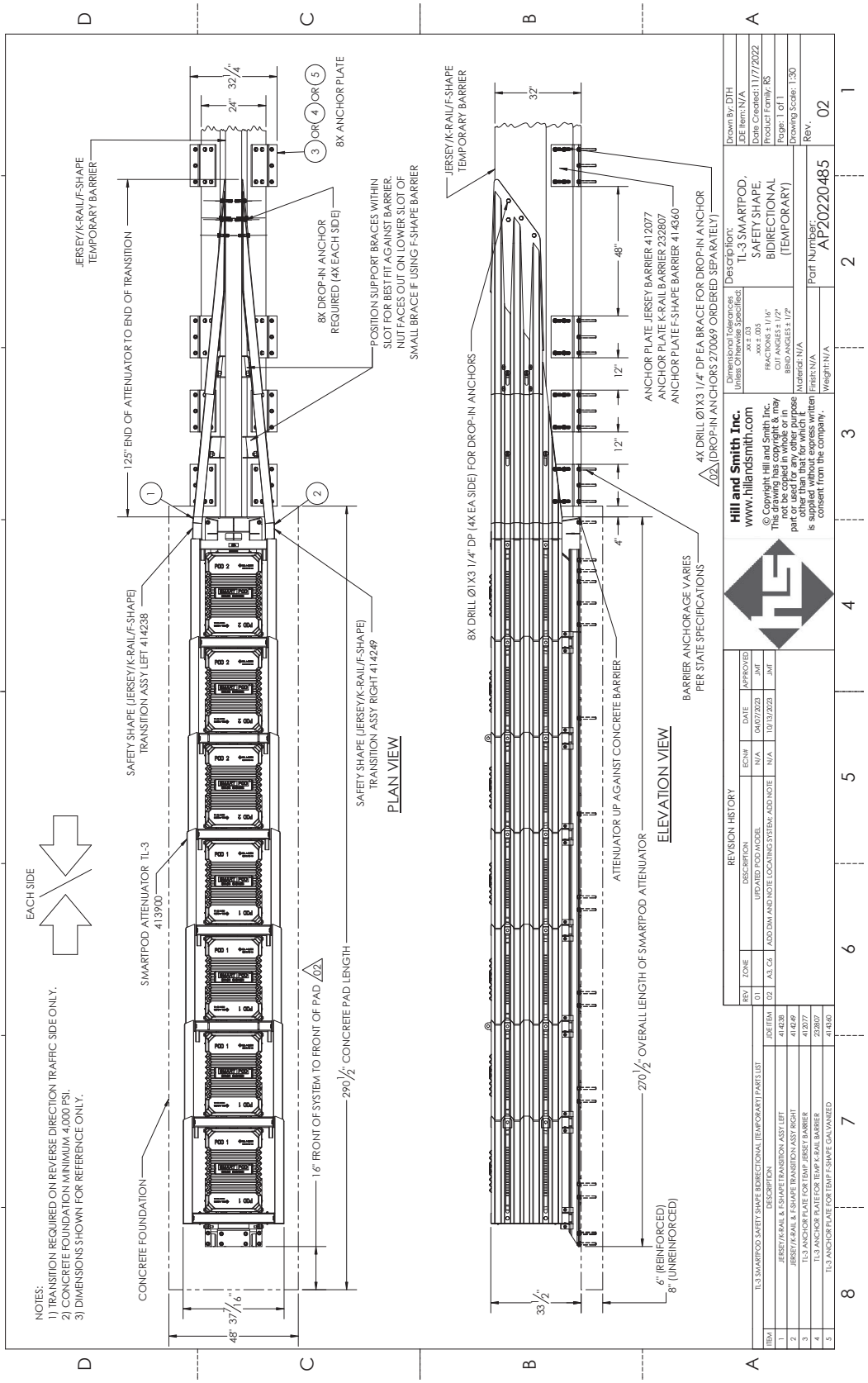
Appendix E: 24-Inch Block Unidirectional - NO TRANSITION



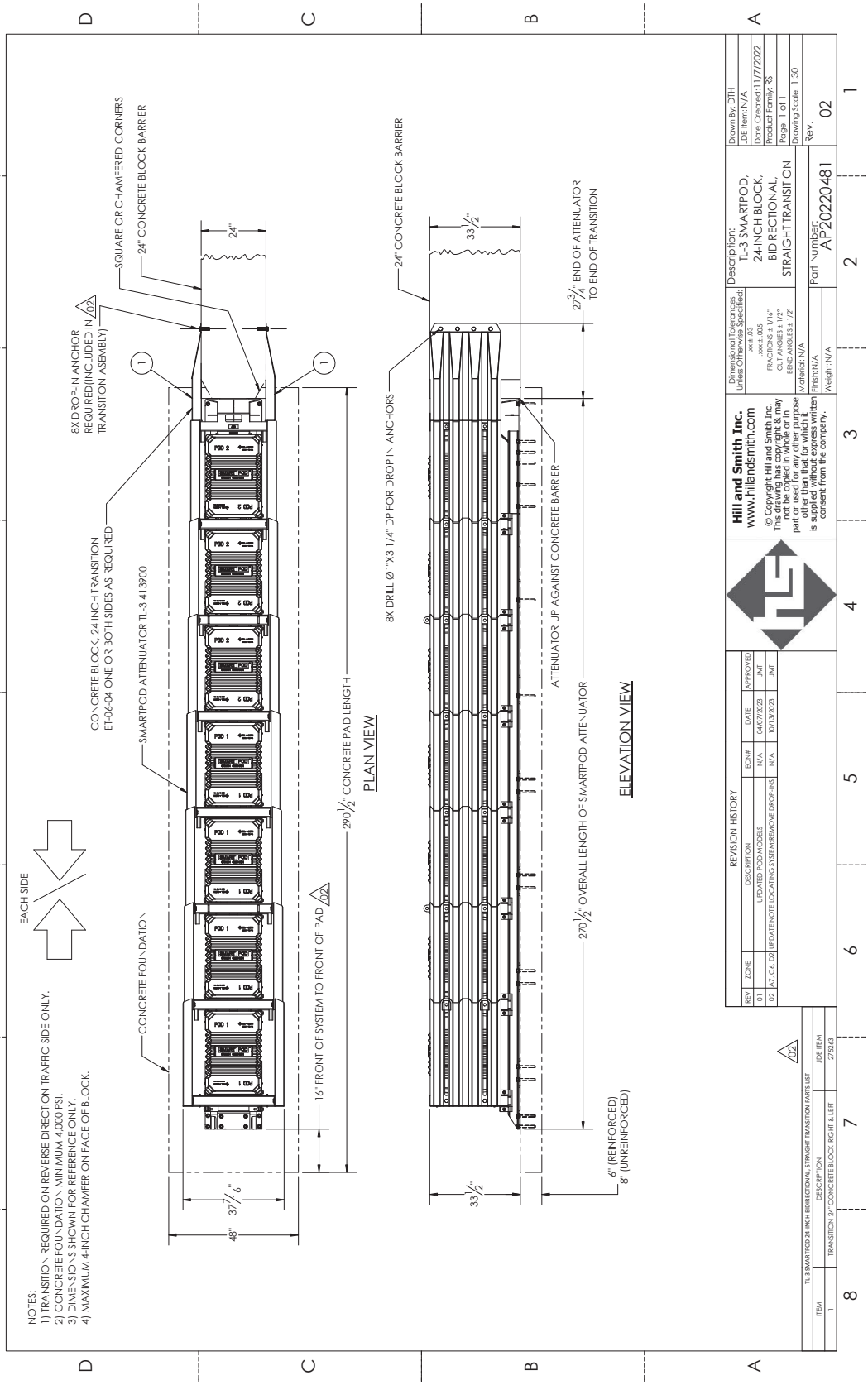
Appendix F: Safety Shape Bidirectional (Permanent Barrier)



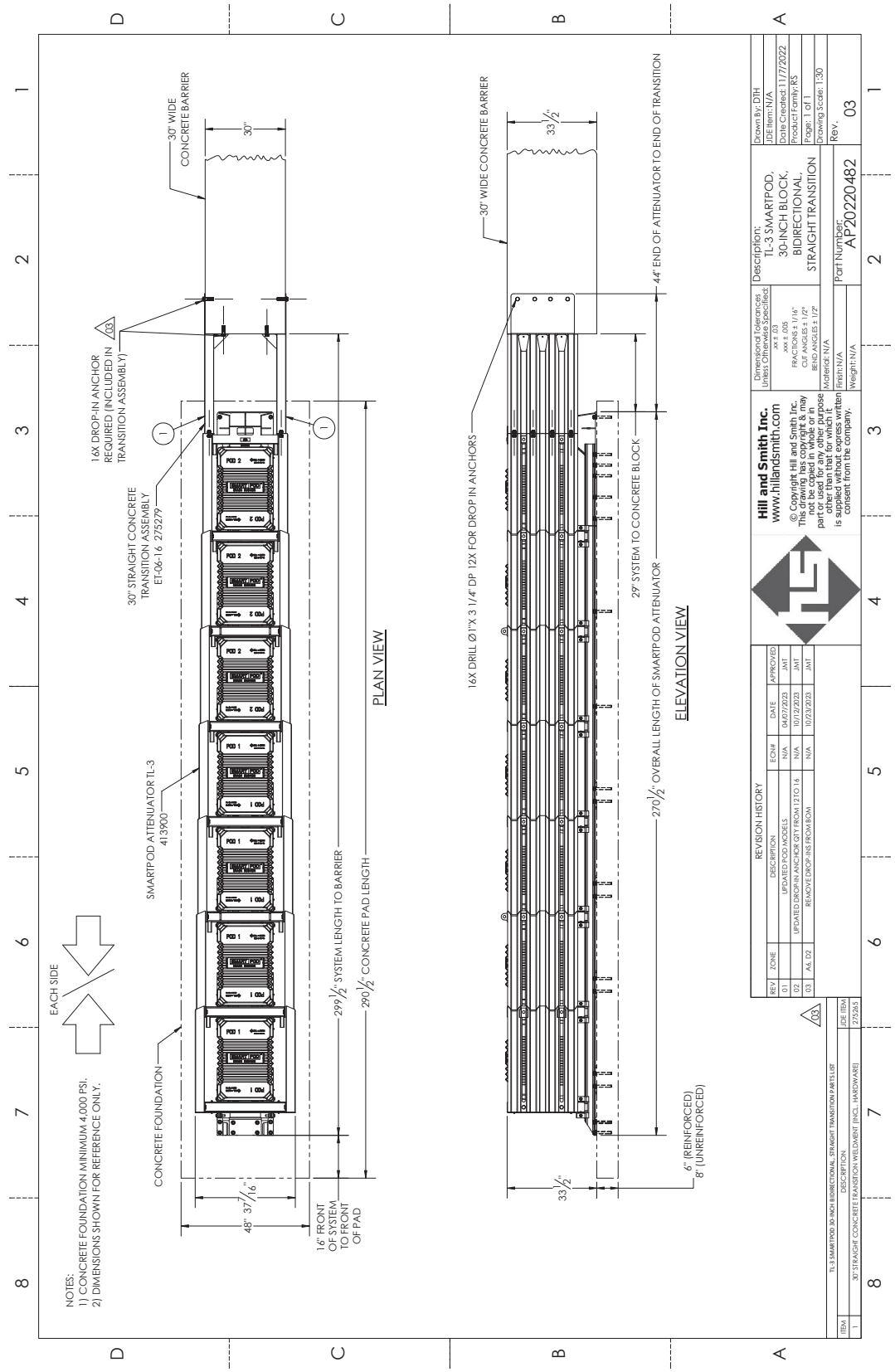
Appendix G: Safety Shape Bidirectional, (Temporary Barrier)



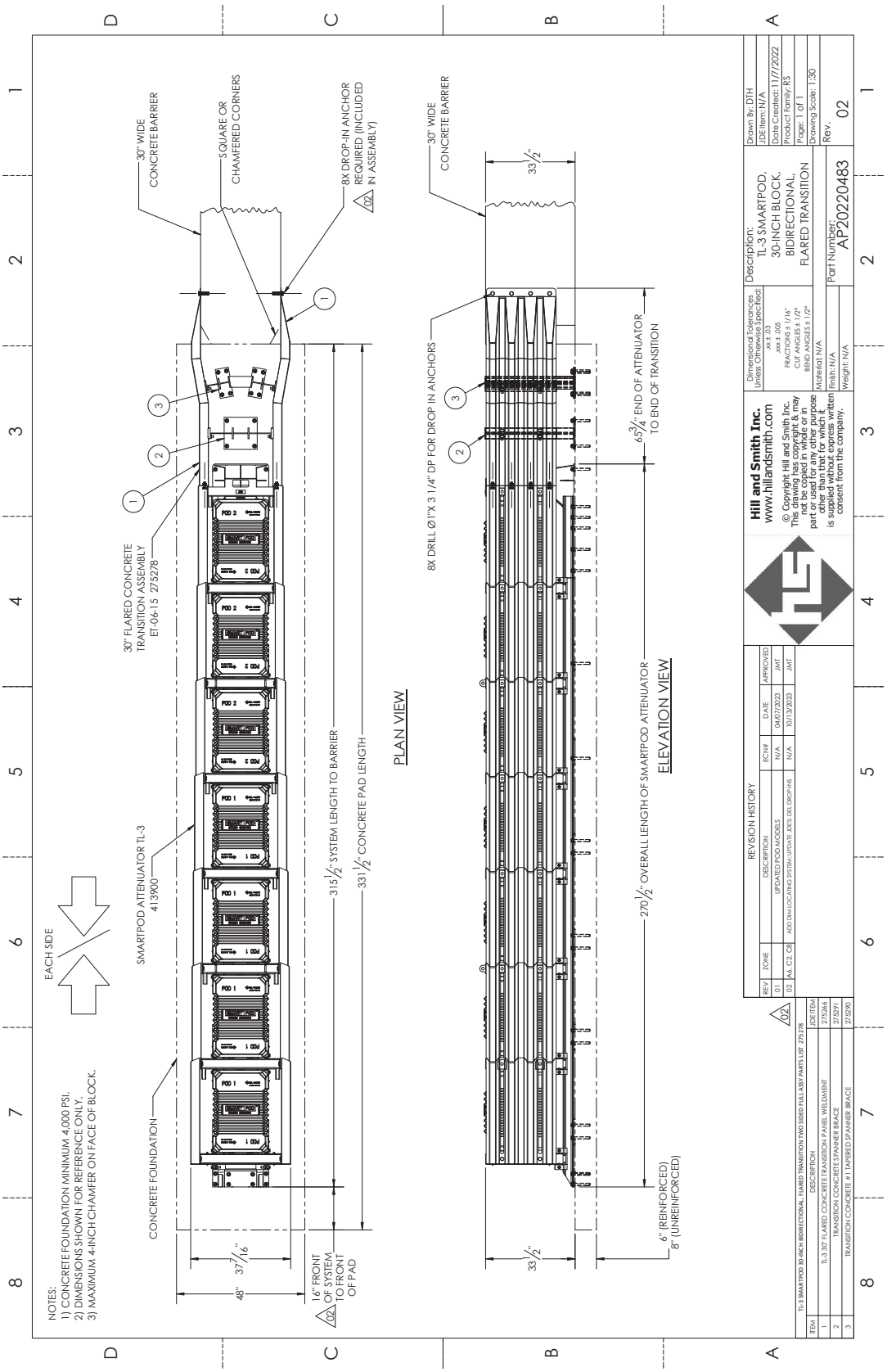
Appendix H: 24-Inch Bidirectional, Straight Transition



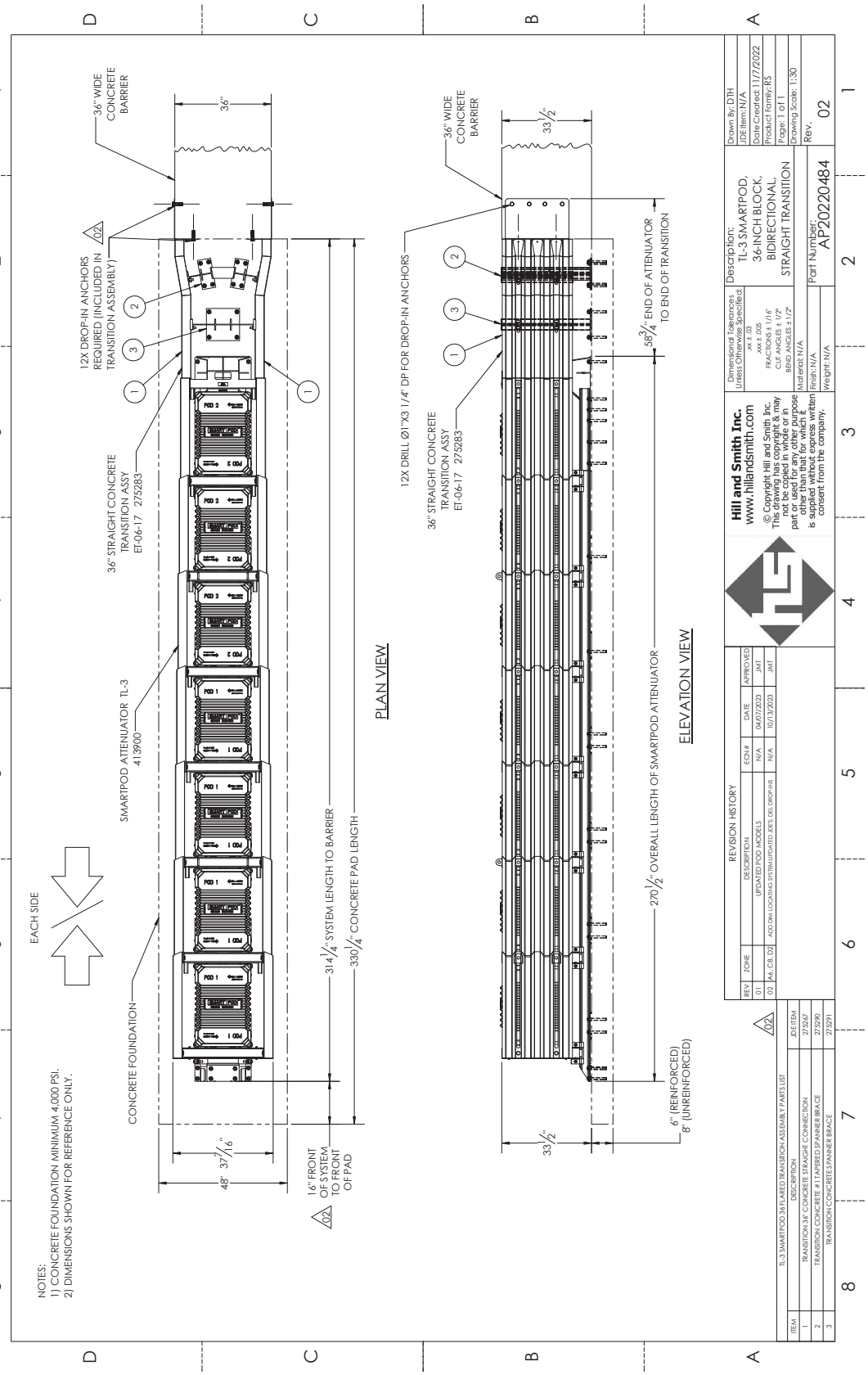
Appendix I: Complete 30-Inch Bidirectional, Straight Transition



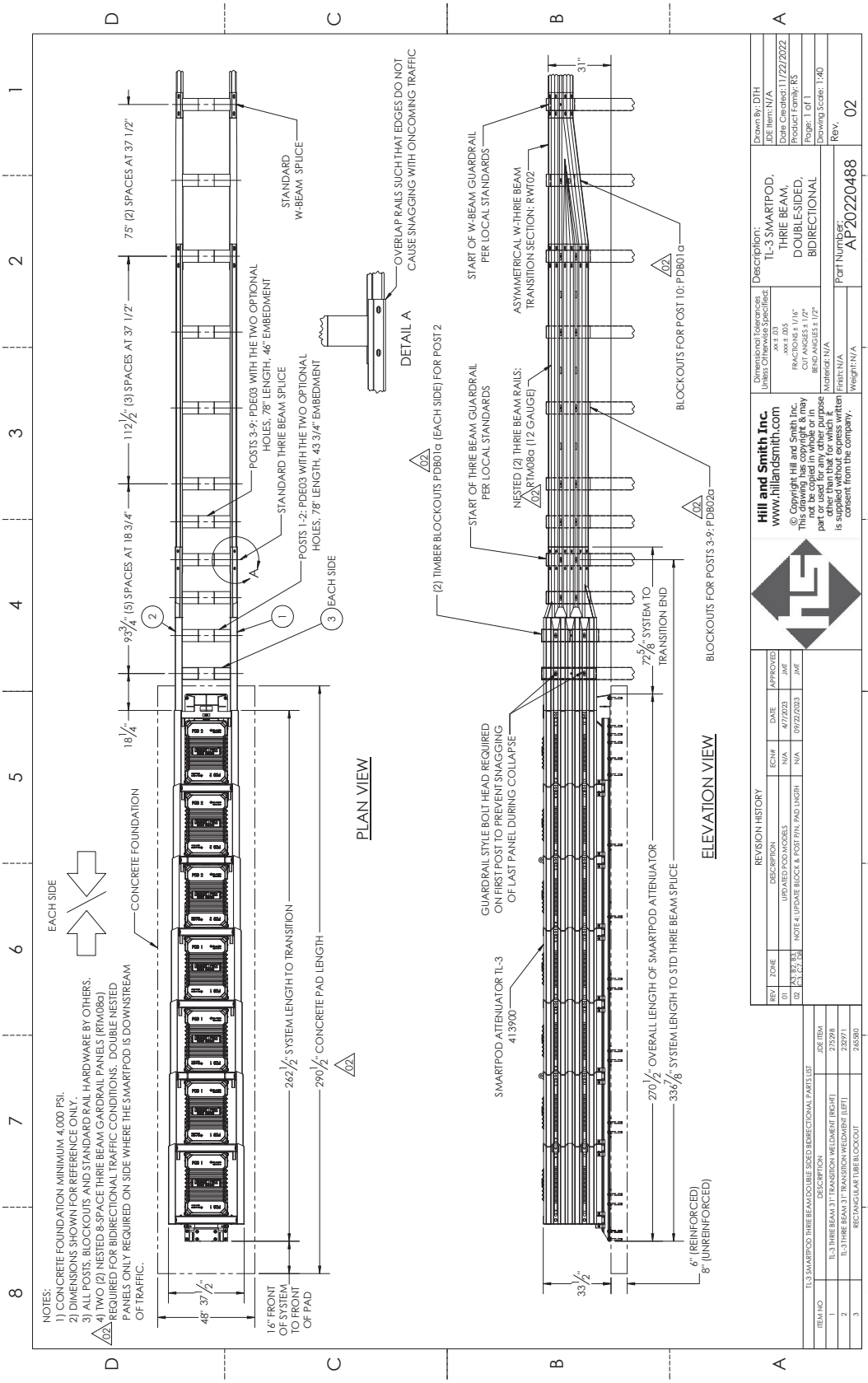
Appendix J: 30 Inch Bidirectional, Flaired Transition



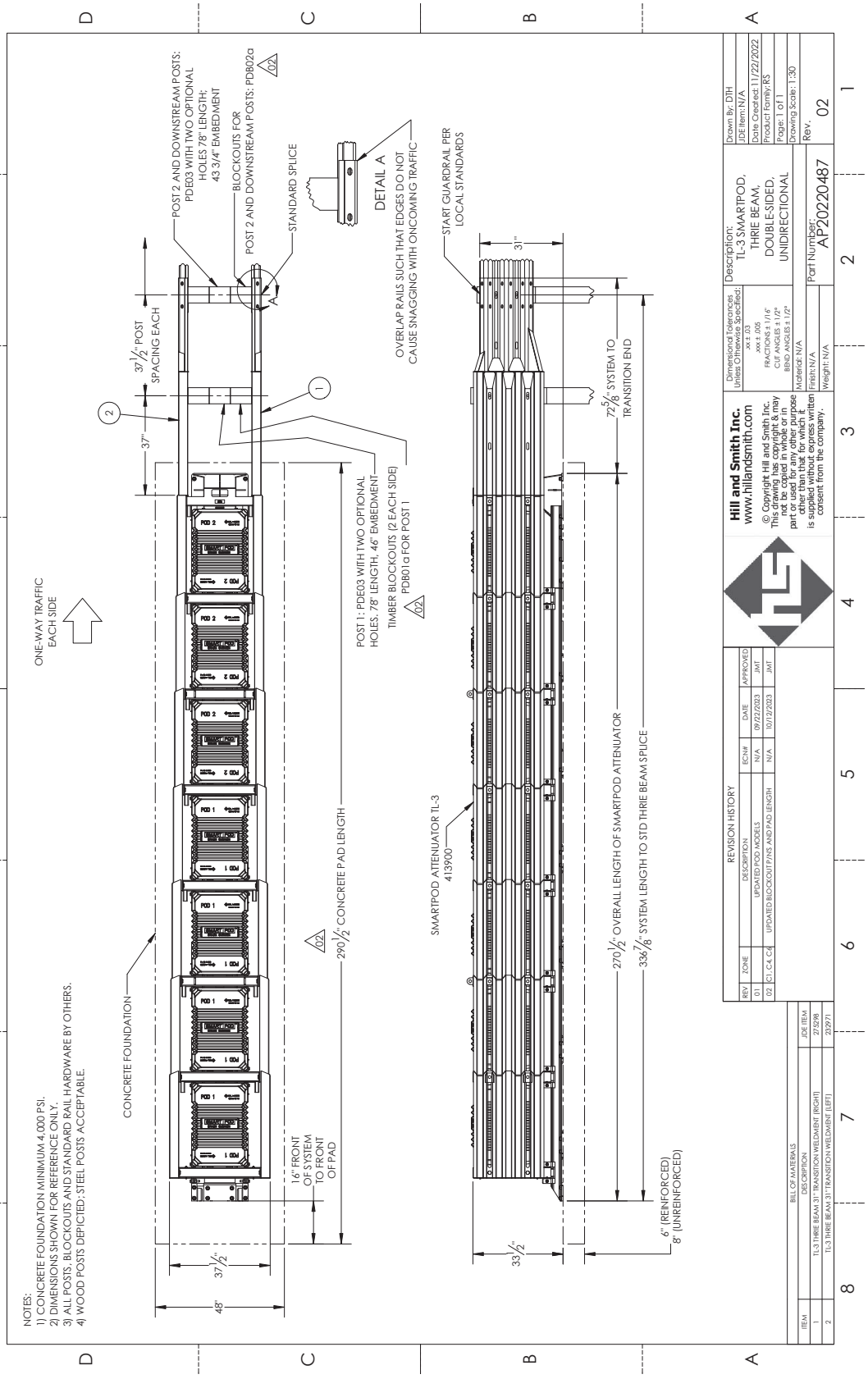
Appendix K: 36” Bidirectional, Straight Transition



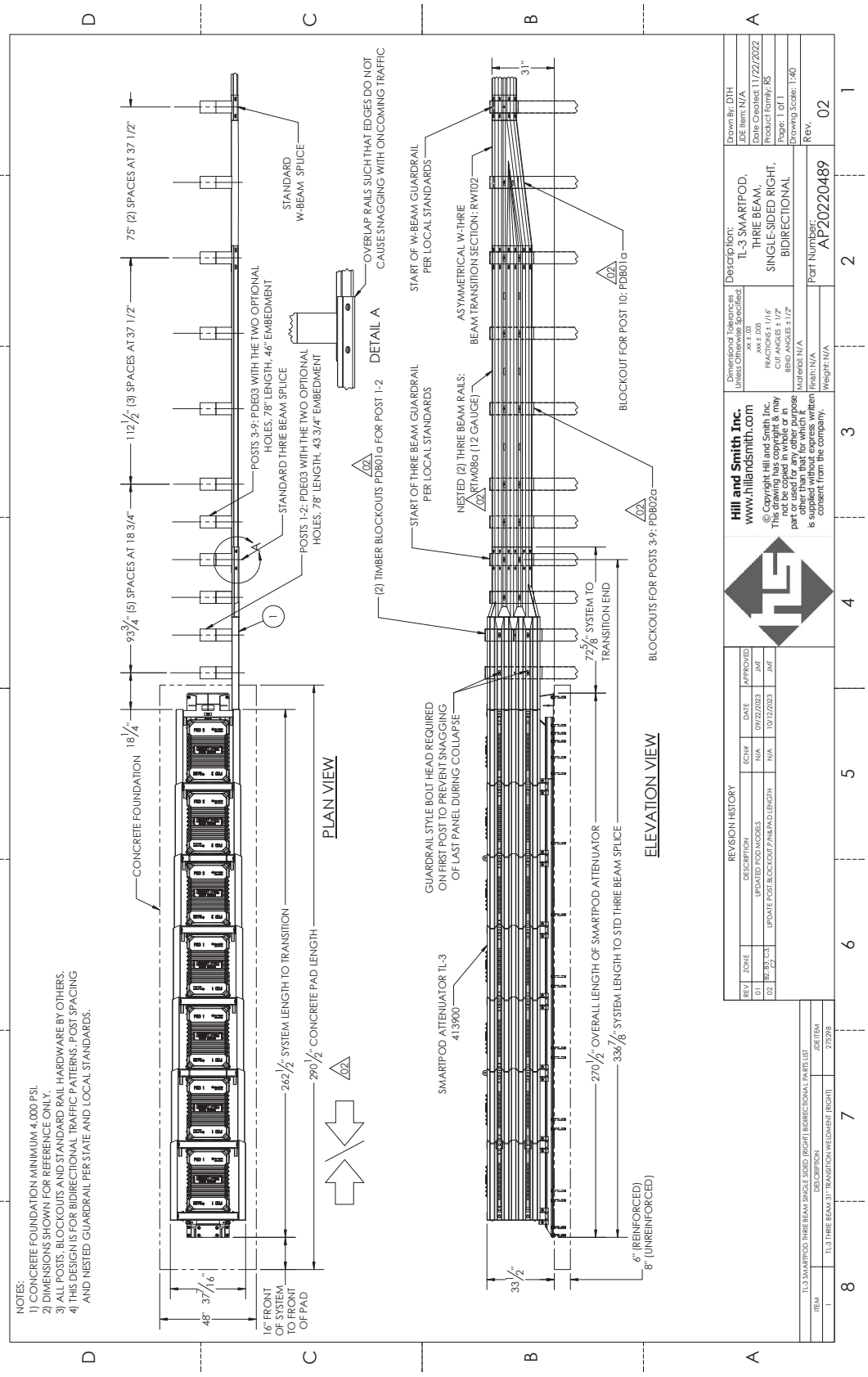
Appendix L: Thrie Beam Double-Sided Bidirectional



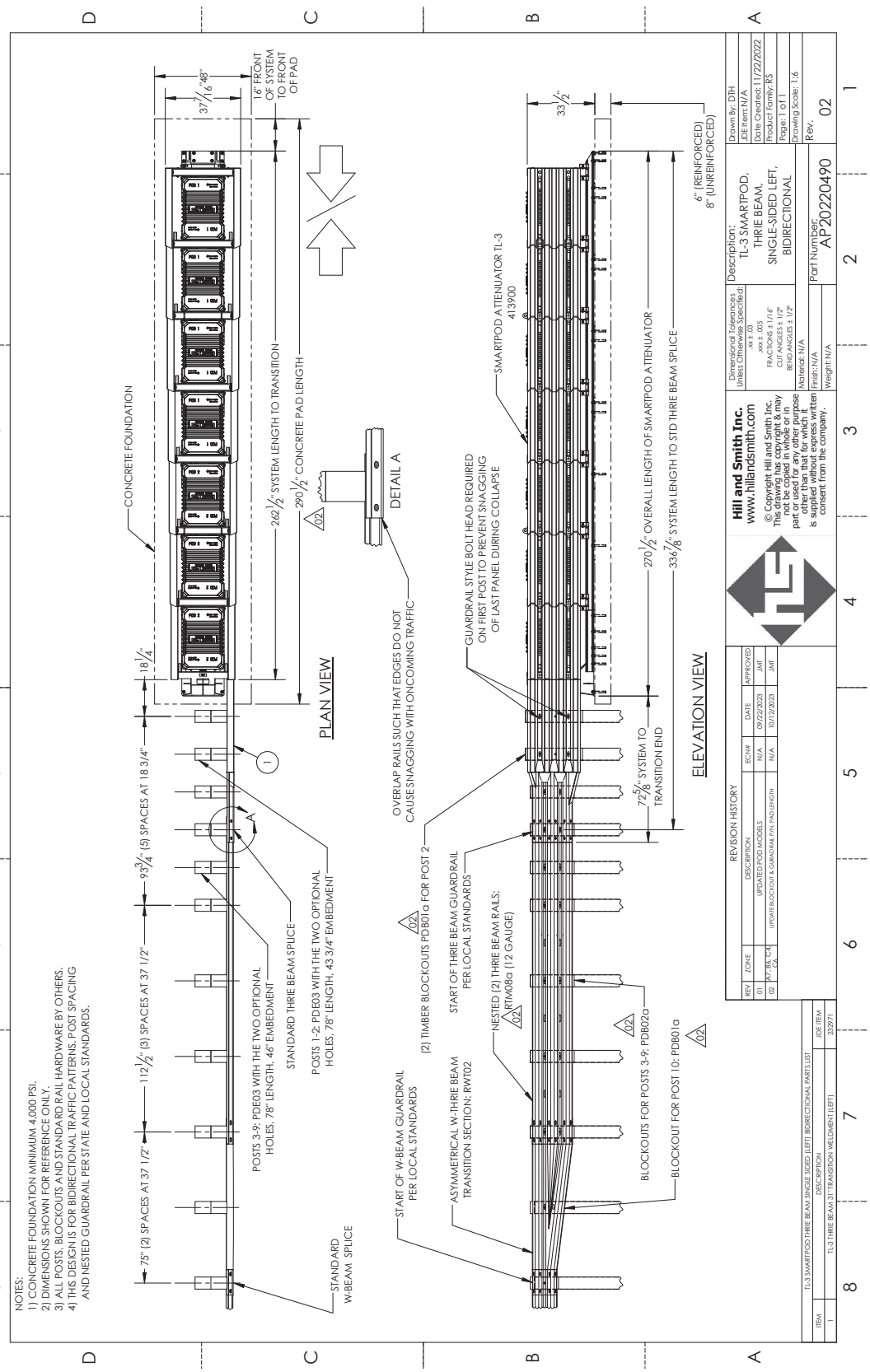
Appendix M: Thrie Beam Double-Sided Unidirectional



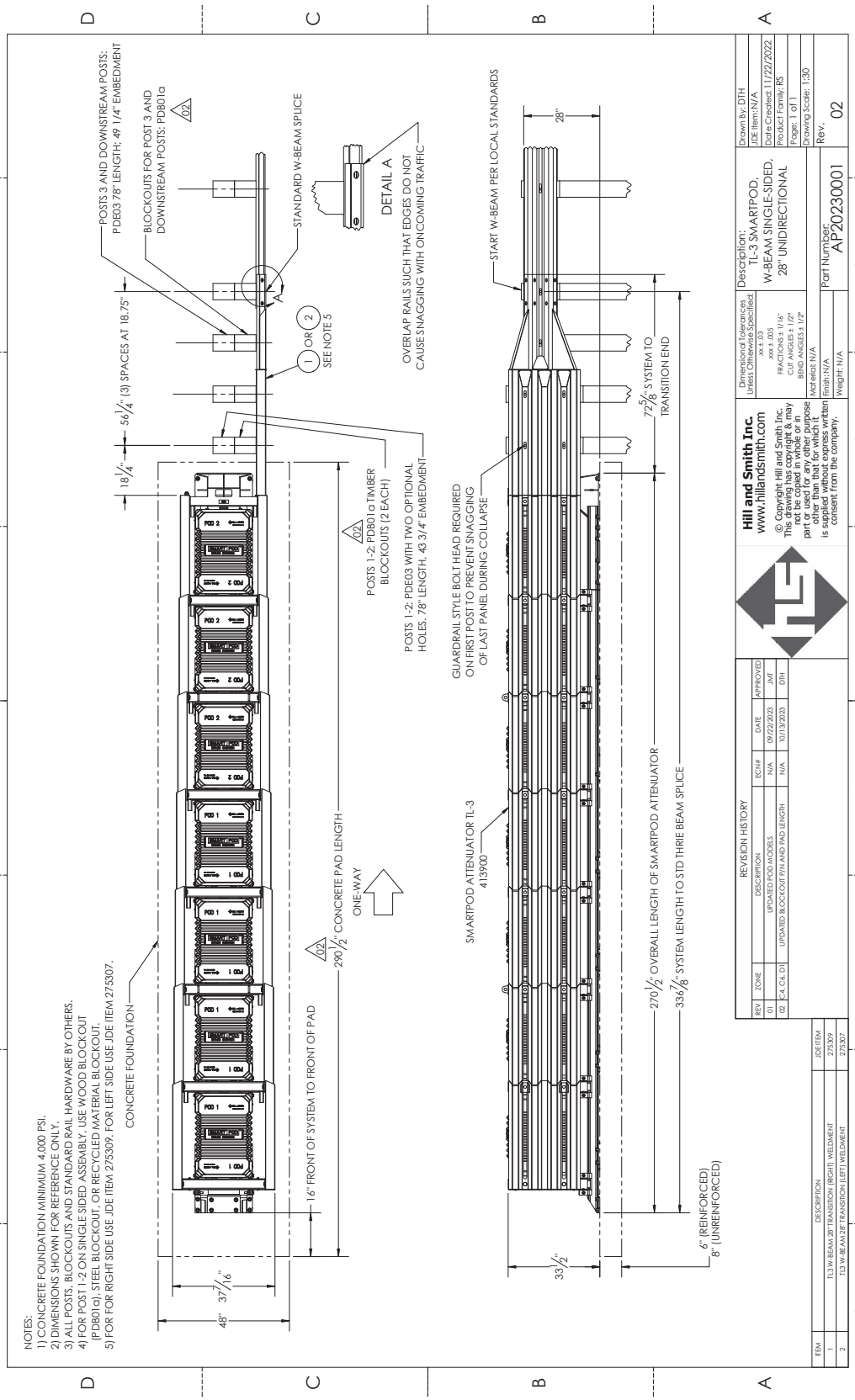
Appendix N: Thrie Beam Single-Sided Right Bidirectional



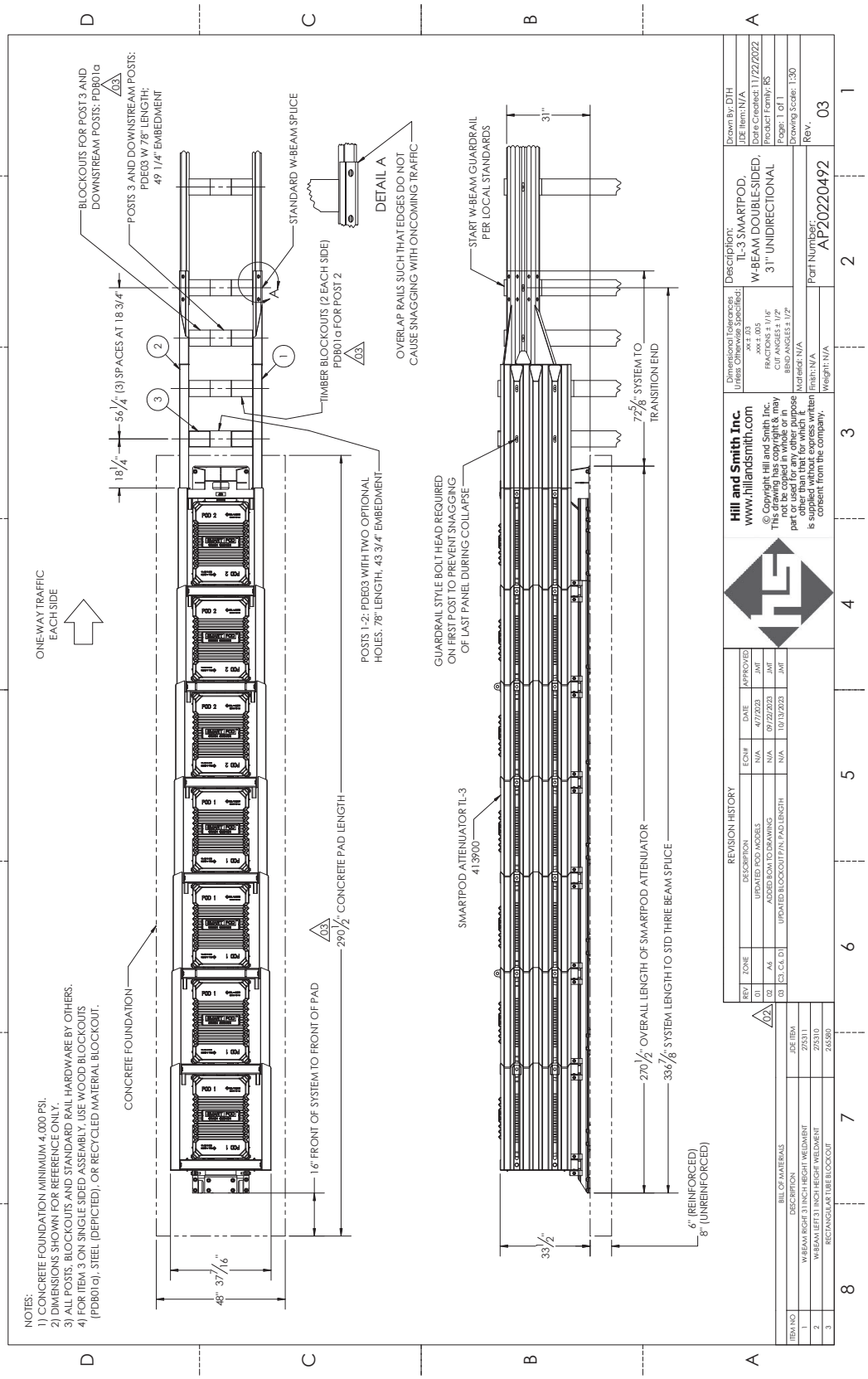
Appendix O: Thrie Beam Single-Sided Left Bidirectional



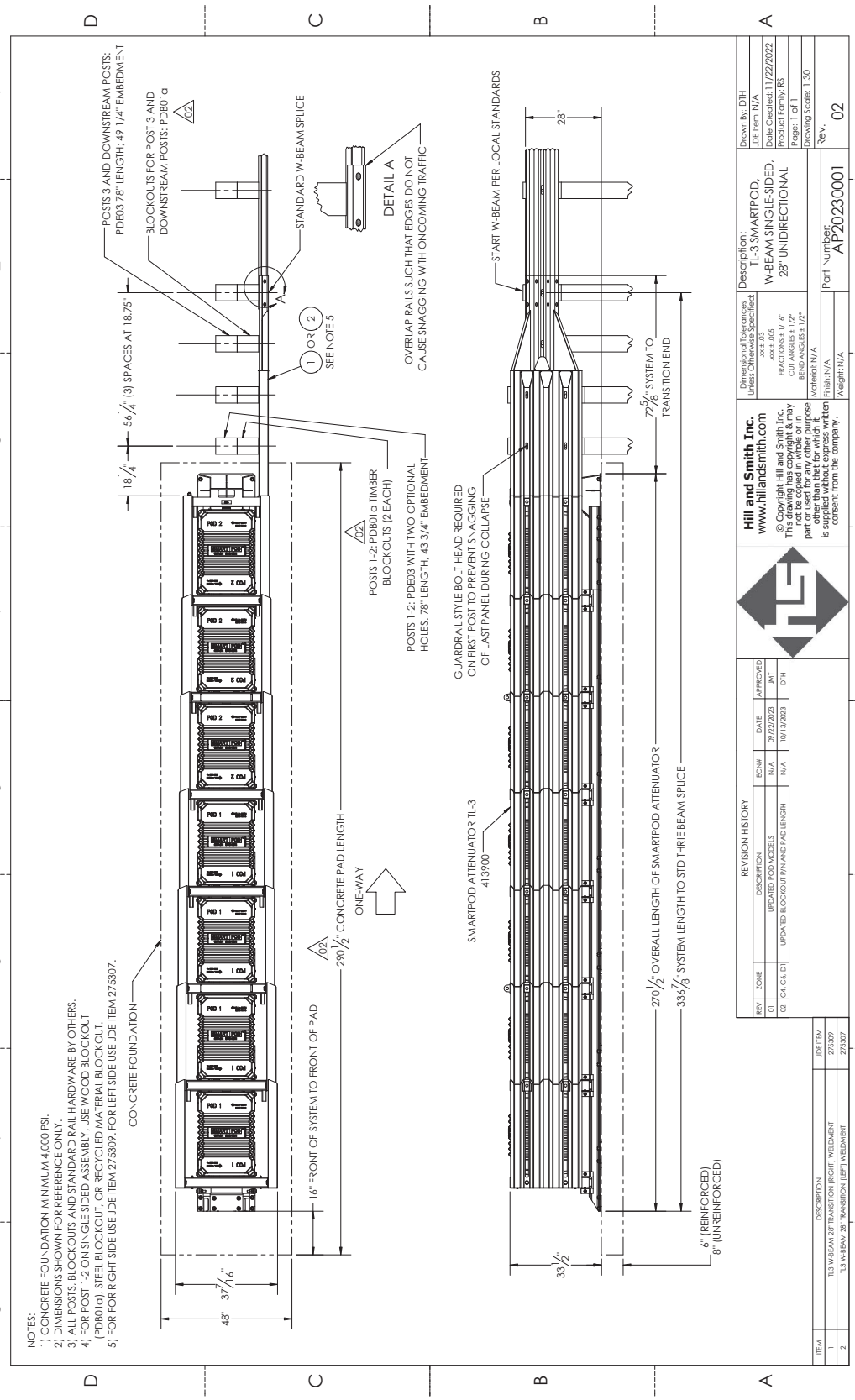
Appendix P: W-Beam Double-Sided 28-Inch Unidirectional



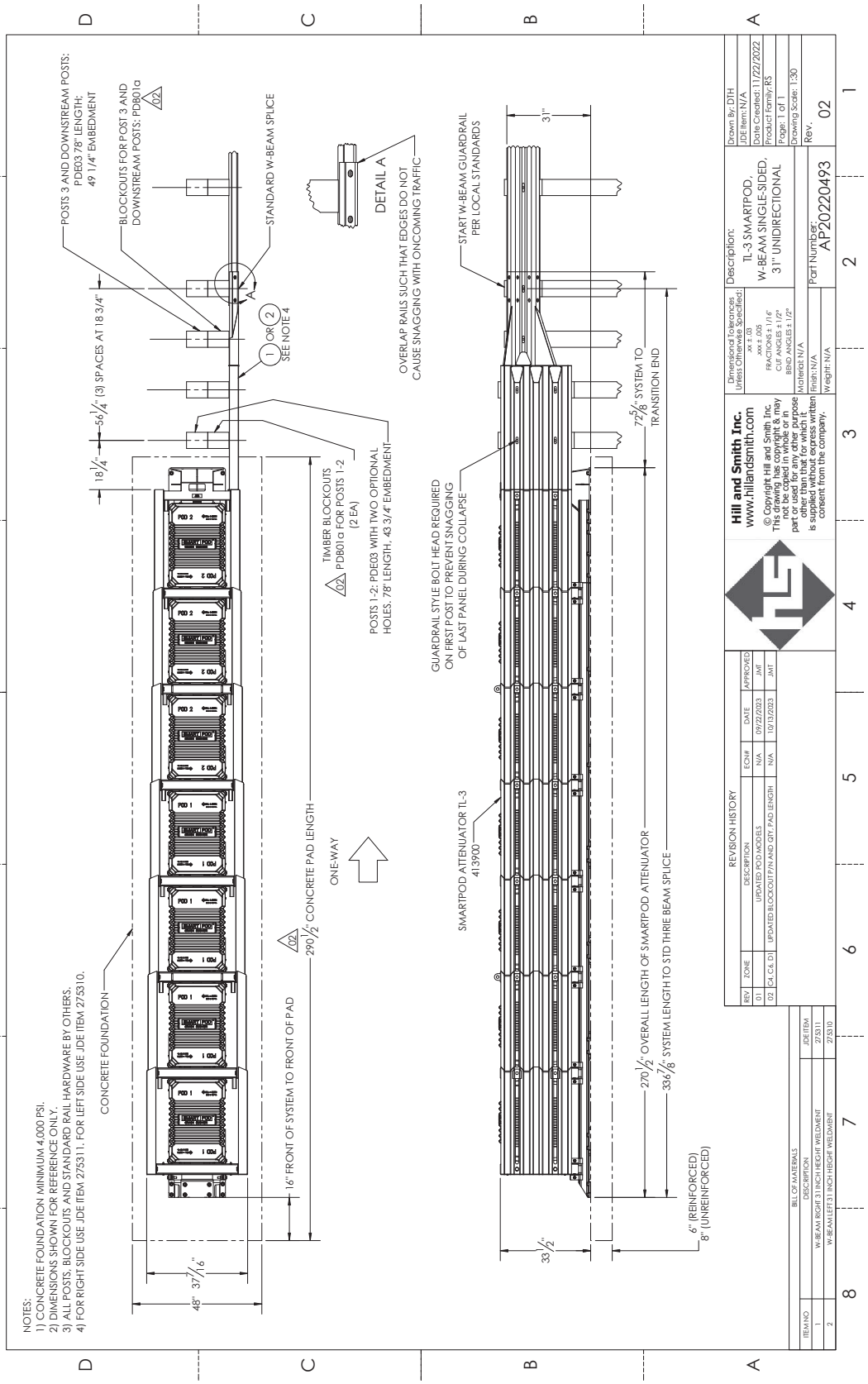
Appendix Q: W-Beam Double-Sided 31-Inch Unidirectional



Appendix R: W-Beam Single-Sided 28-Inch Unidirectional



Appendix S: W-Beam Single-Sided 31-Inch Unidirectional



NOTES

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