



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

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

July 9, 2025

In Reply Refer To:
HSST-1/B-390

Archie Scott III
Asynt Solutions
1167 Treehaven Ln.
Columbus Ohio 43204
USA

Dear Mr. Scott III:

We received your initial correspondence on May 28, 2024 requesting issuance of a Federal-aid reimbursement eligibility letter under the Federal-aid highway program for the roadside safety system, device, design, product, or hardware (collectively “device”) described below. On November 28, 2024, we received a complete set of files needed to complete our review. We write to inform you that the device Ape Barrier System is eligible for Federal-aid reimbursement. This letter is assigned Federal Highway Administration (FHWA) control number B-390.

ELIGIBILITY LETTERS

The FHWA issues Federal-aid reimbursement eligibility letters for new roadside safety devices that are crash tested in accordance with the industry standard of the American Association of State Highway and Transportation Officials (AASHTO) Manual for Assessing Safety Hardware (MASH).

FHWA, the Department of Transportation, and the United States (government) do not regulate roadside safety devices, crash test facilities, or the manufacturing industry. Issuance of eligibility letters is discretionary and provided only as a service to the states. FHWA may, at its discretion, decline to issue, revise, or rescind an eligibility letter. Eligibility letters are only issued by the FHWA headquarters Office of Safety.

Eligibility letters are issued only as notice to the states that a device is eligible for reimbursement under the Federal-aid highway program. They do not establish approval or certification for any other purpose. Issuance of an eligibility letter is not a prerequisite or requirement for state transportation agencies seeking to use Federal-aid funds for roadside safety devices. State agencies may use a device for which an eligibility letter has not been issued and seek Federal-aid reimbursement.

FEDERAL-AID REIMBURSEMENT

The request for issuance of this letter certified the device was crash tested in accordance with the industry standard of AASHTO’s MASH. This eligibility letter is based on that certification and

the material offered in support of its issuance. The device described below is eligible for reimbursement under the Federal-aid highway program.

Name of system: Ape Barrier System

Type of system: Long barrier

Test Level: Test Level 3

Testing conducted by: Calspan LLC

Date of request: May 28, 2024

Information about the device, including material such as the eligibility request, crash test reports, drawings, or images are included in one or more attachment(s) to this letter.

Eligibility letter B-390 is inapplicable to devices, optional equipment, alternate materials, or other features that were not crash tested in accordance with AASHTO's MASH.

This letter is issued only for the subject device as crash tested under AASHTO's MASH. Later modification(s) of the device are not eligible for Federal-aid reimbursement under this letter. Notice of later modification(s) should be given to transportation agencies, facility owners, and operators (collectively "agencies").

Agencies should be provided appropriate information about the device's design, installation, maintenance, materials, and mechanical properties.

Issuance of this letter is discretionary, and it may be revised or rescinded at FHWA's discretion. This letter is not a determination of compliance with the Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD) or ownership of any intellectual property rights.

This eligibility letter is not a determination by the government that a crash involving the subject device will result in any particular outcome. It is limited to only the device's eligibility for Federal-aid reimbursement.

INTELLECTUAL PROPERTY

Issuance of this eligibility letter does not convey property rights of any sort nor any exclusive privilege. This letter is not authorization or consent by the government for the use, manufacture, or sale of any patented or proprietary system, device, design, product, or hardware for which the requester is not the patent owner. Eligibility letters are not an expression of any view, position, or determination by the government as to the validity, scope, or ownership of any intellectual property rights to a specific device. These letters do not grant, impute, suggest, or otherwise establish any ownership, distribution, or licensing rights to the requester. The government expresses no opinion about the intellectual property rights relating to any device for which this or any other eligibility letter is issued.

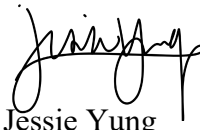
PUBLIC DISCLOSURE

To prevent any misunderstanding, and as discussed above, this Federal-aid eligibility letter is assigned FHWA control number B-390. It should only be reproduced in full with its attachment(s). This Federal-aid eligibility letter and the material offered by the requester supporting its issuance is public information. All eligibility letters and supporting material are subject to public disclosure under the Freedom of Information Act (FOIA). Eligibility letters are available to the public at

https://safety.fhwa.dot.gov/roadway_dept/countermeasures/reduce_crash_severity/.

If you have any questions please contact Paul LaFleur at Paul.LaFleur@dot.gov.

Sincerely,

A handwritten signature in black ink, appearing to read 'Jessie Yung', with a stylized flourish at the end.

Jessie Yung
Director, Office of Safety Technologies
Office of Safety

Enclosures

Request for Federal Aid Reimbursement Eligibility of Highway Safety Hardware

Submitter	Date of Request:	May 28, 2024	☒ New ☐ Resubmission
	Name:	Archie Scott III	
	Company:	Asynt Solutions	
	Address:	1167 Treehaven Ln. Columbus Ohio 43204	
	Country:	USA	
	To:	Michael S. Griffith, Director FHWA, Office of Safety Technologies	

I request the following devices be considered eligible for reimbursement under the Federal-aid highway program.

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

!-!-!

System Type	Submission Type	Device Name / Variant	Testing Criterion	Test Level
'B': Rigid/Semi-Rigid Barriers (Roadside, Median, Bridge Railings)	☒ Physical Crash Testing ☐ Engineering Analysis	Ape Barrier System	AASHTO MASH	TL3

By submitting this request for review and evaluation by the Federal Highway Administration, I certify that the product(s) was (were) tested in conformity with the AASHTO Manual for Assessing Safety Hardware and that the evaluation results meet the appropriate evaluation criteria in the MASH.

Individual or Organization responsible for the product:

Contact Name:	Archie Scott III	Same as Submitter ☒
Company Name:	Asynt Solutions	Same as Submitter ☒
Address:	1167 Treehaven Ln. Columbus Ohio 43204	Same as Submitter ☒
Country:	USA	Same as Submitter ☒
Enter below all disclosures of financial interests as required by the FHWA 'Federal-Aid Reimbursement Eligibility Process for Safety Hardware Devices' document.		
Asynt Solutions and Calspan LLC, share no financial interests between the two organizations. This includes no shared financial interest but not limited to: i. Compensation including wages, salaries , commissions, professional fees, or fees for business referrals iii. Research funding or other forms of research support; iv. Patents, copyrights , licenses, and other intellectual property interests; vi. Business ownership and investment interest s;		

PRODUCT DESCRIPTION

☒ New Hardware or Significant Modification

☐ Modification to Existing Hardware

The Asynt Solutions Ape Barrier System is a composite pinned longitudinal barrier which measures 288 in (7,315 mm) long, 32 in (813 mm) tall, with a 20 in (508 mm) wide flange at the bottom and a 7 in (178 mm) width at the top of the barrier. Each barrier has eight holes for an anchor pin to be inserted in, two holes measure 19.5 in (495 mm) from either edge of the barrier and the inner two holes measure 124.5 in (3162 mm) from either edge of the barrier. Each barrier is pinned to the ground in two locations using a 20" (508 mm) long x 1-1/4" (31.75 mm) diameter Asphalt Pin with a washer plate welded to the top. Each barrier has 1 anchor in the furthest hole downstream on the traffic side of the barrier and 1 anchor in the first hole downstream on the protected side of the barrier. The pin is sank into the asphalt and granular subbase, at 0 degrees from plumb vertical into the 3.5 in (89 mm) thick asphalt pavement. Each barrier weighs 1,200 lbs (544 kg) individually and is able to connect to other barriers through male and female face plates where one barrier will slide one plate into the gab of the other.

The barriers have 4 holes through the face of the barrier at the anchor pin locations for forklifts to lift and transport each barrier. The barrier also has two more roadway drainage channels to allow water to pass through to prevent flooding. These holes measure 5.9 in (150mm) tall x 8.7 in (220 mm) wide. Finally, there are two through holes at the top of the barrier for lift straps to be strung through, allowing for machinery to move the barrier.

CRASH TESTING

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

Engineer Name:	Benjamin Metzger	
Engineer Signature:	Benjamin Metzger Digitally signed by Benjamin Metzger Date: 2024.11.13 15:00:22 -05'00'	
Address:	4455 Genesee Street, Cheektowaga, NY 14225	Same as Submitter ☐
Country:	USA	Same as Submitter ☐

A brief description of each crash test and its result:

Required Test Number	Narrative Description	Evaluation Results
3-10 (1100C)	For this test, 10 barriers at a total length of 240 ft (73.2 m), were lined up so that they would be impacted at a 25° by the test vehicle. The vehicle was set to impact 3.6 ft (1,097 mm) upstream from the 5th and 6th barrier in the line. This test is intended to evaluate the longitudinal barrier's ability to successfully contain and redirect small passenger vehicles impacting within the length-of-need. For small cars, the primary concerns are the potential for vehicle under-ride, wheel snag, rollover, and head-slap. The primary evaluation is based on intrusion into the occupant compartment, vehicle stability, and occupant risk values. The test was conducted using a commercially available 2018 Nissan Versa with a test inertia mass of 2,381 lbs (1,080 kg). A 165 lbs (75 kg) standard test dummy was included in the vehicle as per the MASH 3-10 requirements which brought the Gross Static Mass up to 2,546 lbs (1,155 kg). The test vehicle impacted 3.6 ft (1,097 mm) upstream of the joint of barrier 5 and 6 of the system setup at a velocity of 62.0 mph (99.8 km/hr). Upon impact, the barrier began deflecting as it redirected the vehicle along the direction of its installation until reaching a maximum deflection of 10.2" (259 mm). The test vehicle was redirected from the barrier so that it eventually came to a rest due to the vehicles on board brakes 202' (61.6 m) downstream from the point of impact and 54' (16.5 m) to the left of the barrier line. The vehicle stayed within the required exit box conditions as it was redirected and disengaged from the barrier. The test vehicle's occupant compartment was not penetrated by the test articles and there was a maximum deformation of 4.5" (114.3 mm) in the occupant compartment. No major debris from the impact was noted on either the protected side of the barrier or along the impact area. The vehicle remained upright and did not exceed 75° roll and pitch throughout the test and its final trajectory was stable. TEST RESULT = PASS	

Required Test Number	Narrative Description	Evaluation Results
3-11 (2270P)	For this test, 10 barriers at a total length of 240 ft (73.2 m), were lined up so that they would be impacted at a 25° by the test vehicle. The vehicle was set to impact 4.3 ft (1,311 mm) upstream from the 5th and 6th barrier in the line. This test is intended to evaluate the longitudinal barrier's maximum strength and verify a barriers performance for impacts involving light trucks and SUVs due to the high rollover frequencies observed in crash data and during historical full-scale crash testing with light truck vehicles. The primary concerns are the potential for vehicle over-ride, rollover, and head-slap. The primary evaluation is based on barrier maximum strength and vehicle stability while still having to meet occupant risk values. The test was conducted using a commercially available 2017 Dodge Ram with a test inertia mass of 4,947 lbs (2,244 kg). The test vehicle impacted 4.3 ft (1,311 mm) upstream of the joint between barriers 5 and 6 of the system setup at a velocity of 61.8 mph (99.5 km/hr). Upon impact, the barrier began deflecting as it redirected the vehicle along the direction of its installation until reaching a maximum deflection of 20.2" (513.3 mm). The test vehicle was redirected from the impact so that it eventually came to a rest due to the vehicles on board brakes 176' (53.6 m) downstream from the point of impact and 8ft (2.4 m) to the left of the barrier line. The vehicle stayed within the required exit box conditions as it was redirected and disengaged from the barrier. The test vehicle's occupant compartment was not penetrated by the test article and there was a maximum deformation of 0.5" (12.9mm) in the occupant compartment. No major debris from the impact was noted on either the protected side of the barrier or along the impact area. The vehicle remained upright and did not exceed 75° roll and pitch throughout the test and its final trajectory was stable. TEST RESULT = PASS	
3-20 (1100C)	N/A	
3-21 (2270P)	N/A	

Full Scale Crash Testing was done in compliance with MASH by the following accredited crash test laboratory (cite the laboratory's accreditation status as noted in the crash test reports.):

Laboratory Name:	Calspan LLC,	
Laboratory Signature:	Benjamin Metzger Digitally signed by Benjamin Metzger Date: 2024.11.13 15:00:41 -05'00'	
Address:	4455 Genesee Street Cheektowaga, NY 14225	Same as Submitter ☐
Country:	USA	Same as Submitter ☐
Accreditation Certificate Number and Dates of current Accreditation period :	L20-602 December 31, 2022	

Submitter Signature*: **Archie Scott III** Digitally signed by Archie Scott III
 Date: 2024.11.13 15:14:22 -05'00'

Submit Form

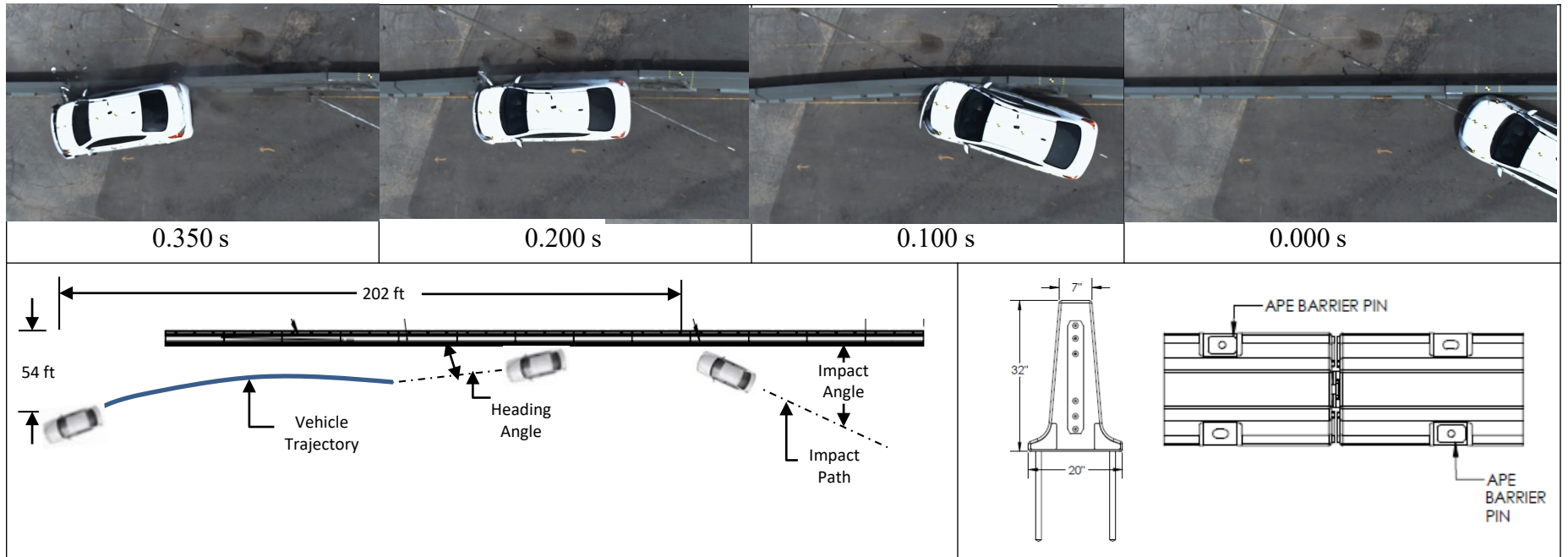
ATTACHMENTS

Attach to this form:

- 1) Additional disclosures of related financial interest as indicated above.
- 2) A copy of the full test report, video, and a Test Data Summary Sheet for each test conducted in support of this request.
- 3) A drawing or drawings of the device(s) that conform to the Task Force-13 Drawing Specifications [[Hardware Guide Drawing Standards](#)]. For proprietary products, a single isometric line drawing is usually acceptable to illustrate the product, with detailed specifications, intended use, and contact information provided on the reverse. Additional drawings (not in TF-13 format) showing details that are relevant to understanding the dimensions and performance of the device should also be submitted to facilitate our review.

FHWA Official Business Only:

Eligibility Letter		
Number	Date	Key Words

**General Information**

Test Agency Calspan LLC
 Test Standard Test No. MASH Test 3-10
 Calspan Test No. BR0236
 Test Date 2024-05-01

Test Article

Type Longitudinal Barrier
 Name..... Ape™ Barrier System

Installation Length 240 ft (73.2 m)

Material or Key Elements ... Ten 24 ft (7.3 m) long sections of APE pinned composite barrier, 32 in (812.8 mm) above surface pavement x 20 in (508 mm) wide at the base x 7 in (178 mm) wide at top, with two 1-1/4 in (31.7 mm) diameter x 20 in (508 mm) long bolts at the intermediate joints driven into the asphalt and granular subbase, vertically into the asphalt pavement with a 3/8 in (9.5 mm) thick washer plate welded to anchor pins to secure barrier to ground.

Soil Type and Condition AASHTO M147-65 material added above subgrade and below the asphalt was #2 (2inch) crushed stone compacted to above 90% of its dry density

Test Vehicle

Type/Designation 1100C
 Make and Model..... 2018 Nissan Versa
 Curb 2,381 lb (1,080 kg)
 Test Inertial 2,381lb (1,080 kg)
 Dummy 165 lb (75 kg)
 Gross Static..... 2,546 lb (1,145.8 kg)

Impact Conditions

Targeted Speed 62.0 mi/h (99.8 km/h)
 Targeted Angle..... 25.0°
 Targeted Location..... 3.6 ft (1097.4 mm)
 Upstream of joint #4

Actual Speed 62.0 mi/h (99.8 km/h)
 Actual Angle..... 25.0°
 Actual Location..... 3.6 ft (1097.4 mm)
 Upstream of joint #4

Impact Severity 54.6 kip-ft (74.1 kJ)

Exit Conditions

Speed 54.7 mi/h (88.0 km/h)
 Trajectory/Heading Angle ... 12.0 °

Occupant Risk Values

Longitudinal OIV 16.5 ft/s (5.0 m/s)
 Lateral OIV 25.0 ft/s (7.6 m/s)
 Longitudinal Ridedown 5.6 g
 Lateral Ridedown 8.6 g
 THIV 9.3 m/s
 ASI 1.85

Max. 0.050-s Average

Longitudinal 8.8 g
 Lateral..... 14.3 g
 Vertical..... 3.2 g

Post-Impact Trajectory

Stopping Distance..... 202 ft (61.5 m) downstream
 54 ft (16.5 m) left of barrier line

Vehicle Stability

Maximum Yaw Angle 75.1°
 Maximum Pitch Angle 25.7°
 Maximum Roll Angle..... 33.6°
 Vehicle Snagging..... No
 Vehicle Pocketing No

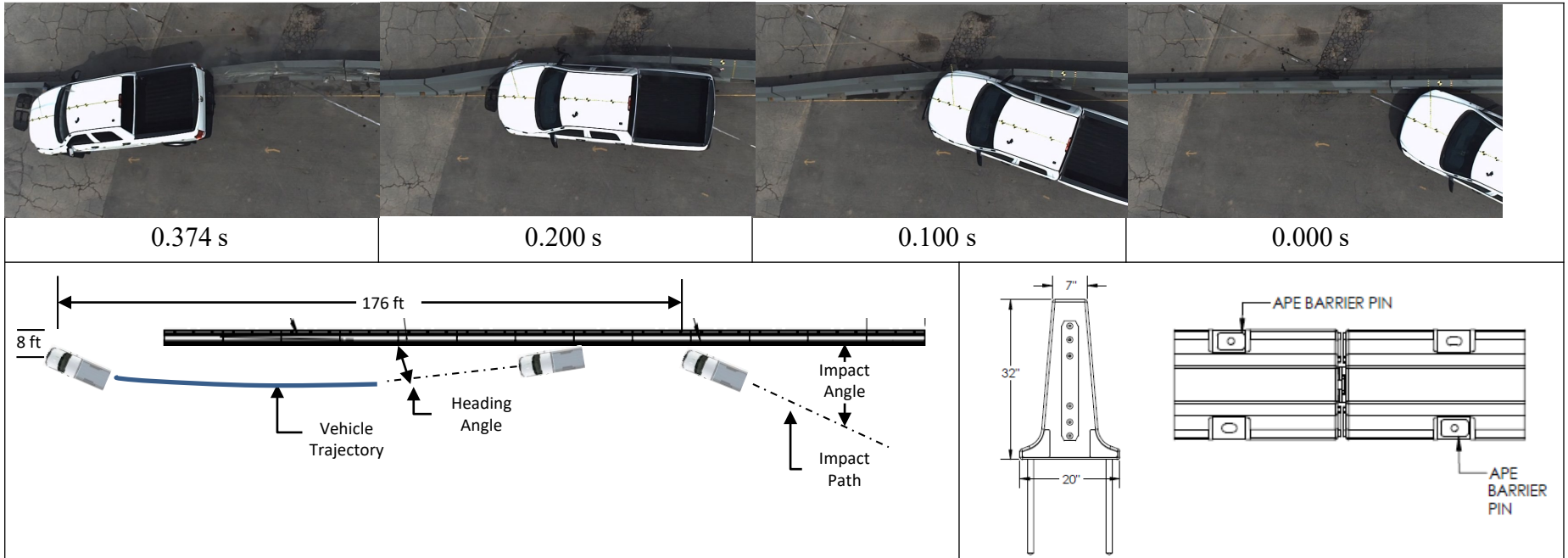
Test Article Deflections

Dynamic..... 10.2 in (259.1 mm)
 Static..... 6.9 in (175.3 mm)
 Working Width..... 30.2 in (767.1 mm)

Vehicle Damage

VDS 01RFQ3
 CDC 01RFEW3
 Max. Exterior Deformation 3.9 in (99.1 mm)
 Max. Occupant Comp.
 Deformation 4.5 in (114.3 mm)
 Wheel/Foot Pan

Summary of Results for MASH Test 3-10 on Longitudinal Barrier



General Information

Test Agency Calspan LLC
Test Standard Test No. MASH Test 3-11
Calspan Test No. BR0235
Test Date 2024-04-29

Test Article

Type Longitudinal Barrier
Name..... Ape Barrier™ System

Installation Length 240 ft (73.2 m)

Material or Key Elements ... Ten 24 ft (7.3 m) long sections of APE pinned composite barrier, 32 in (812.8 mm) above surface pavement x 20 in (508 mm) wide at the base x 7 in (178 mm) wide at top, with two 1-1/4 in (31.7 mm) diameter x 20 in (508 mm) long bolts at the intermediate joints driven into the asphalt and granular subbase, vertically into the asphalt pavement with a 3/8 in (9.5 mm) thick washer plate welded to anchor pins to secure barrier to ground.

Soil Type and Condition AASHTO M147-65 material added above subgrade and below the asphalt was #2 (2inch) crushed stone compacted to above 90% of its dry density

Test Vehicle

Type/Designation 2270P
Make and Model..... 2017 Dodge Ram
Curb 4,788 lb (2,172 kg)
Test Inertial 4,947 lb (2,244 kg)
Dummy N / A
Gross Static 4,947 lb (2,244 kg)

Impact Conditions

Target Speed 62.0 mi/h (99.8 km/h)
Target Angle..... 25.0°
Target Location..... 4.3 ft (1,310.6 mm)
Upstream of joint #4

Actual Speed 61.8 mi/h (99.5 km/h)
Actual Angle..... 25.7°
Actual Location..... 4.3 ft (1,310.6 mm)
Upstream of joint #4

Impact Severity 118.9 kip-ft (161.2 kJ)

Exit Conditions

Speed 53.5 mi/h (86.1 km/h)
Trajectory/Heading Angle ... 13.9 °

Occupant Risk Values

Longitudinal OIV 10.0 ft/s (3.1 m/s)
Lateral OIV..... 14.9 ft/s (4.5 m/s)
Longitudinal Ridedown 6.6 g
Lateral Ridedown..... 10.2 g
THIV..... 6.0 m/s
ASI 1.05

Max. 0.050-s Average

Longitudinal 5.0 g
Lateral..... 8.1 g
Vertical..... 4.1 g

Post-Impact Trajectory

Stopping Distance..... 176 ft (53.6 m) downstream
8 ft (2.4 m) left of barrier line

Vehicle Stability

Maximum Yaw Angle 65.8°
Maximum Pitch Angle 18.5°
Maximum Roll Angle..... 42.1°
Vehicle Snagging..... No
Vehicle Pocketing No

Test Article Deflections

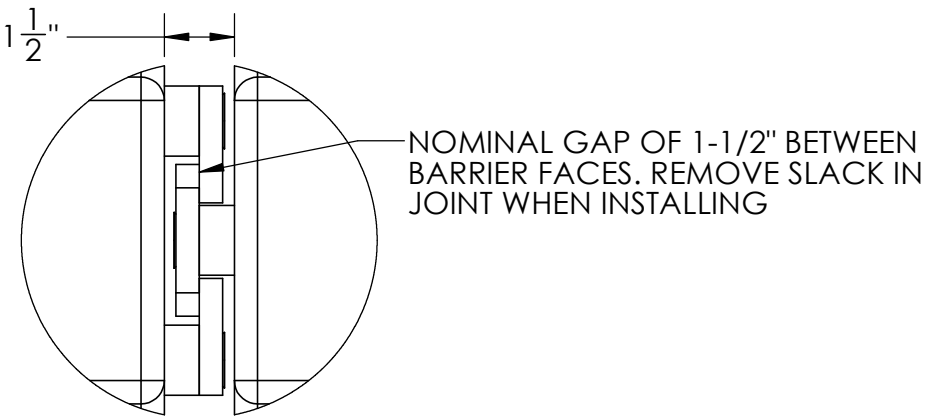
Dynamic..... 20.2 in (513.3 mm)
Static..... 14.5 in (368.3 mm)
Working Width..... 40.2 in (1,021.1 mm)

Vehicle Damage

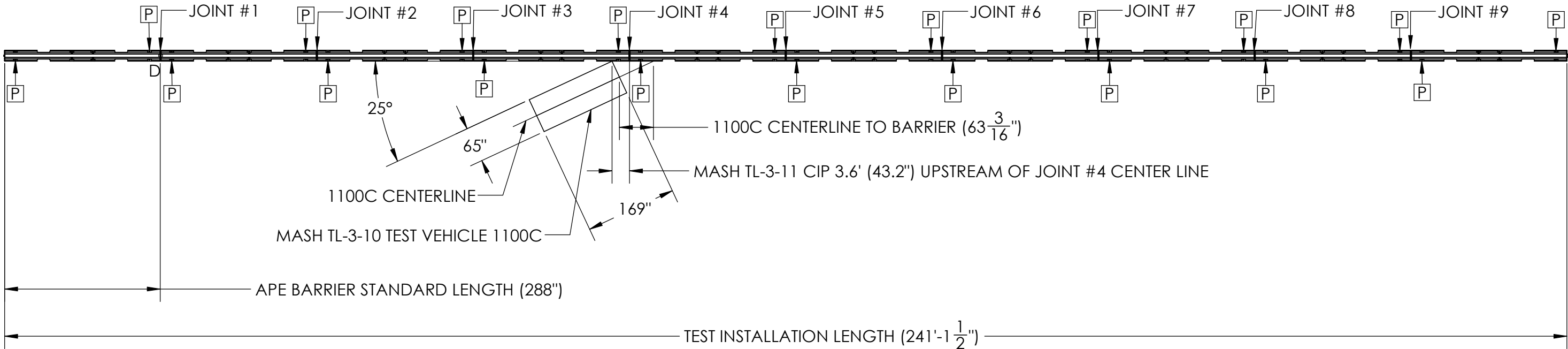
VDS 01RFQ3
CDC 01RFEW3
Max. Exterior Deformation 0.2 in (5.1 mm)
Max. Occupant Comp.
Deformation 0.5 in (12.9 mm)
Front Floor Pan

Summary of Results for MASH Test 3-11 on Longitudinal Barrier

- NOTES:
- 1.) [P] SHOWS LOCATION OF APE BARRIER 1-1/4" X 20" ASPHALT DROP PINS WITH WASHER PLATE. REFER TO DRAWING **INST-012024**
 - 2.) CRITICAL IMPACT POINT TL-3-11 IS 4.3' UPSTREAM OF JOINT #4
 - 3.) CRITICAL IMPACT POINT TL-3-10 IS 3.6' UPSTREAM OF JOINT #4



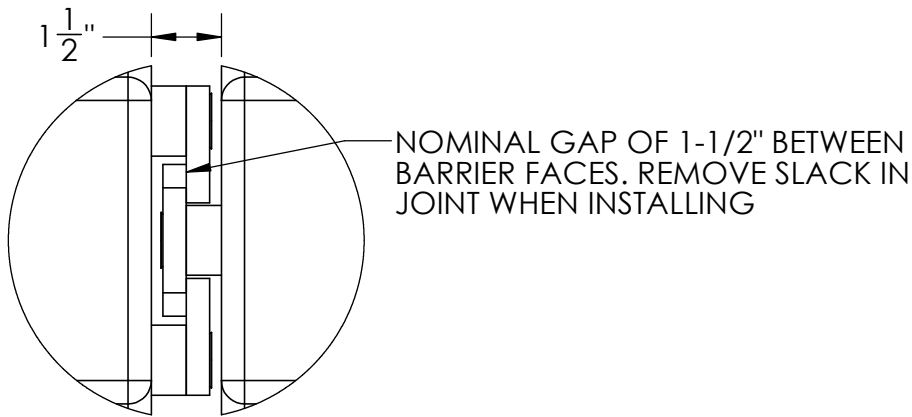
DETAIL D
APE BARRIER SYSTEM JOINT
SCALE 1 : 4



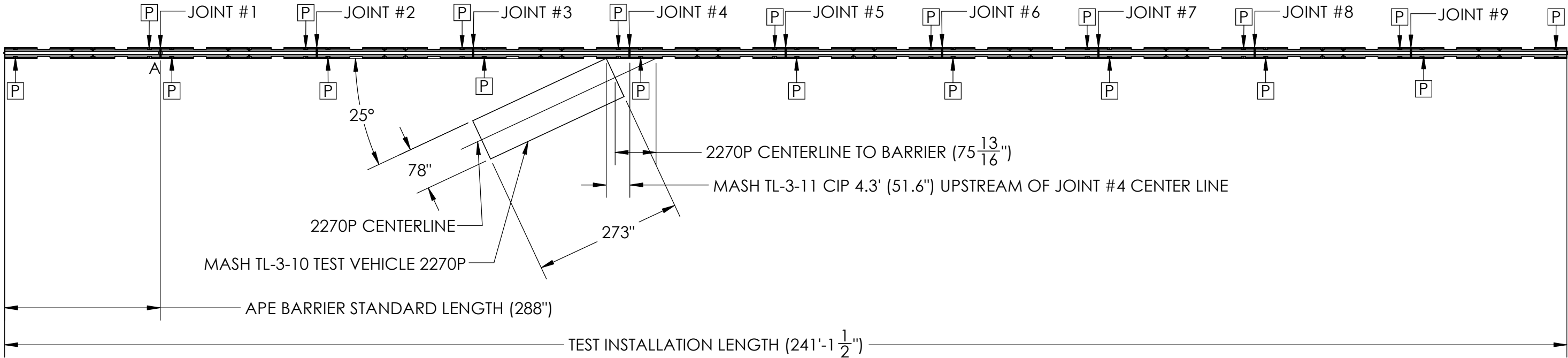
PROPRIETARY AND CONFIDENTIAL
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF <INSERT COMPANY NAME HERE>. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF <INSERT COMPANY NAME HERE> IS PROHIBITED.

		UNLESS OTHERWISE SPECIFIED:		NAME	DATE	TITLE: APE BARRIER MASH-16 TL-3 INSTALLATION DRAWINGS		
		DIMENSIONS ARE IN INCHES	DRAWN					
		TOLERANCES: FRACTIONAL ±	CHECKED					
		ANGULAR: MACH ± BEND ±	ENG APPR.					
		TWO PLACE DECIMAL ±	MFG APPR.			SIZE B DWG. NO. REV		
		THREE PLACE DECIMAL ±						
		INTERPRET GEOMETRIC TOLERANCING PER:	Q.A.					
		MATERIAL	COMMENTS: 					
		FINISH						
NEXT ASSY	USED ON							
APPLICATION		DO NOT SCALE DRAWING				WEIGHT:		SHEET 2 OF 2

- NOTES:
- 1.) [P] SHOWS LOCATION OF APE BARRIER 1-1/4" X 20" ASPHALT DROP PINS WITH WASHER PLATE. REFER TO DRAWING **INST-012024**
 - 2.) CRITICAL IMPACT POINT TL-3-11 IS 4.3' UPSTREAM OF JOINT #4
 - 3.) CRITICAL IMPACT POINT TL-3-10 IS 3.6' UPSTREAM OF JOINT #4

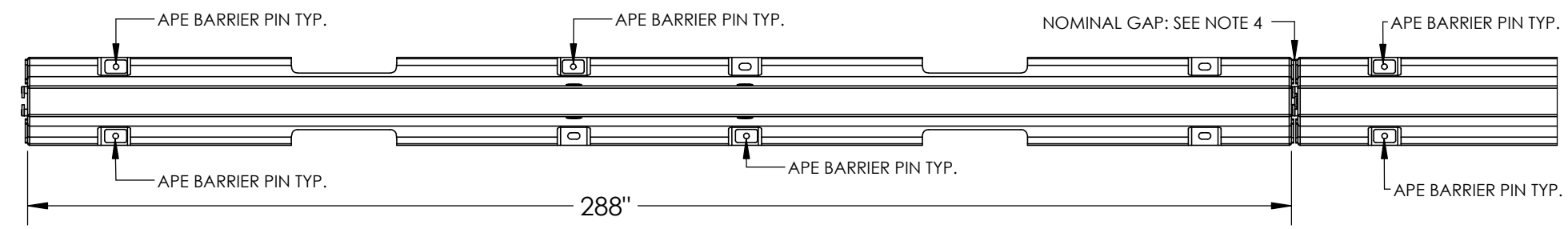
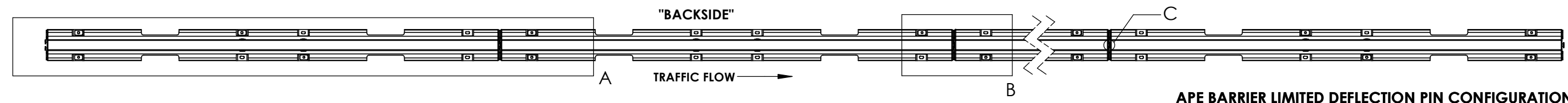


DETAIL A
APE BARRIER SYSTEM JOINT
SCALE 1 : 4

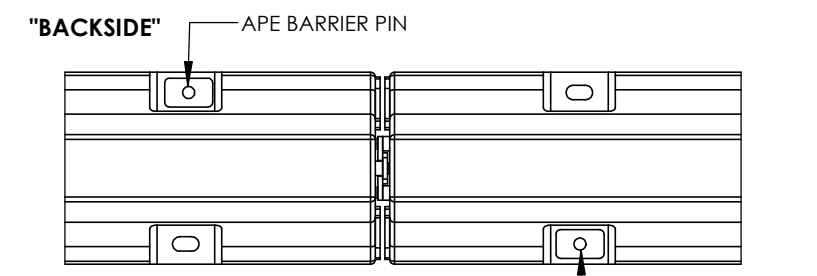


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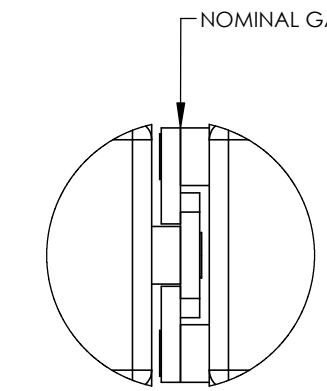
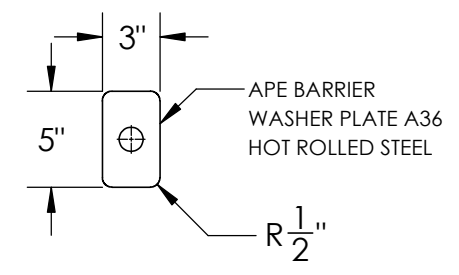
		UNLESS OTHERWISE SPECIFIED:		NAME	DATE	TITLE: APE BARRIER MASH-16 TL-3 INSTALLATION DRAWINGS		
		DIMENSIONS ARE IN INCHES	DRAWN	AS	4/24/24			
		TOLERANCES: FRACTIONAL ±	CHECKED					
		ANGULAR: MACH ± BEND ± TWO PLACE DECIMAL ± THREE PLACE DECIMAL ±	ENG APPR.					
			MFG APPR.			SIZE DWG. NO. REV B		



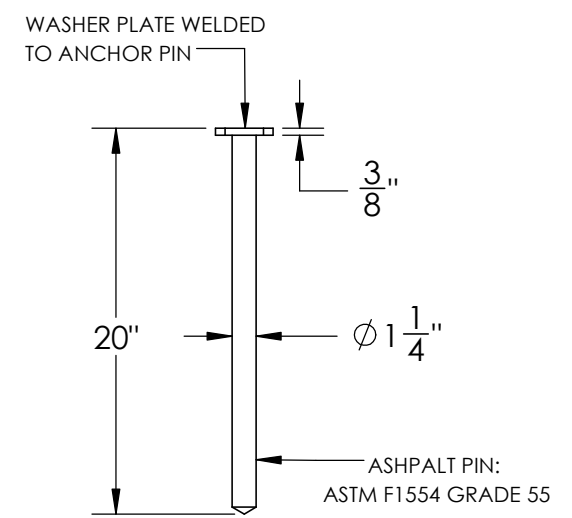
DETAIL A
SCALE 1 : 35



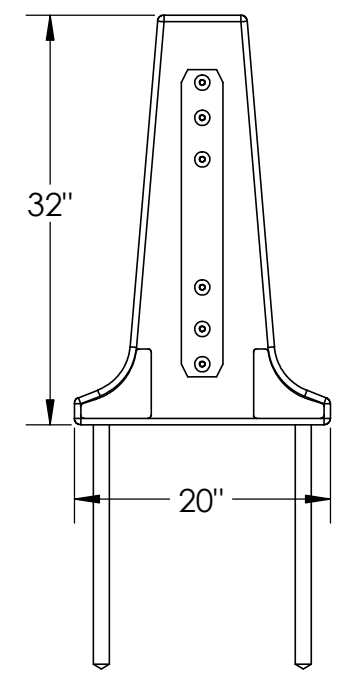
DETAIL B
SCALE 1 : 20



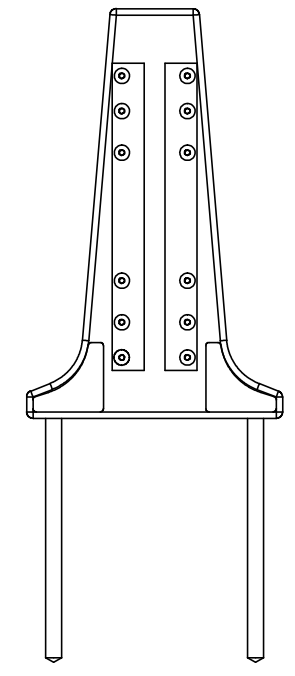
DETAIL C
APE BARRIER SYSTEM JOINT
SCALE 1 : 5



APE BARRIER ASPHALT
DROP PIN
SCALE 1:10



APE BARRIER MALE END
WITH ASPHALT PIN
SCALE: 1:15



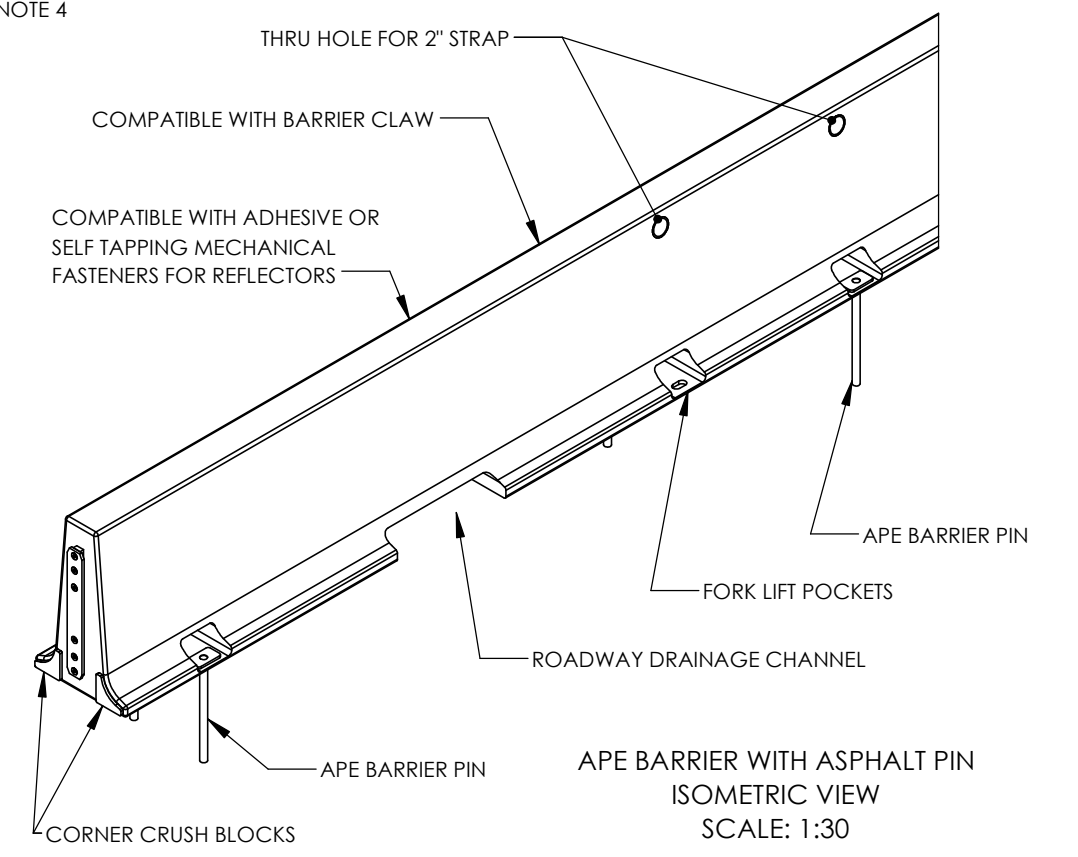
APE BARRIER FEMALE END
WITH ASPHALT PIN
SCALE: 1:15

APE BARRIER LIMITED DEFLECTION PIN CONFIGURATION

PIN THE LENGTH OF NEED AT BEGINNING AND END PER **DETAIL A** (6 PINS). PIN INTERMEDIATE JOINTS IN ACCORDANCE WITH **DETAIL B** (2 PINS PER JOINT). FOR **DETAIL B**, ENSURE THE PIN BEFORE THE JOINT IS ON THE BACKSIDE OF THE BARRIER WALL RELATIVE TO TRAFFIC FLOW.

SURFACE	ANCHOR TYPE
ASPHALT ROADWAY (3" MINIMUM)	APE BARRIER ASPHALT DROP PIN
CONCRETE ROADWAY (6" MINIMUM)	APE BARRIER CONCRETE DROP PIN
CONCRETE BRIDGE DECK (8" MINIMUM)	1" KELIBOLT OR APPROVED EQUAL

ASPHALT ROADWAY (3" MINIMUM) IS THE ONLY TESTED CONFIGURATION. IT IS EXPECTED THAT THE OTHER PINS AND PIN SUBSTRATES ARE TO PERFORM EQUIVALENTLY BUT HAS NOT BEEN TESTED.



APE BARRIER WITH ASPHALT PIN
ISOMETRIC VIEW
SCALE: 1:30

NOTES:

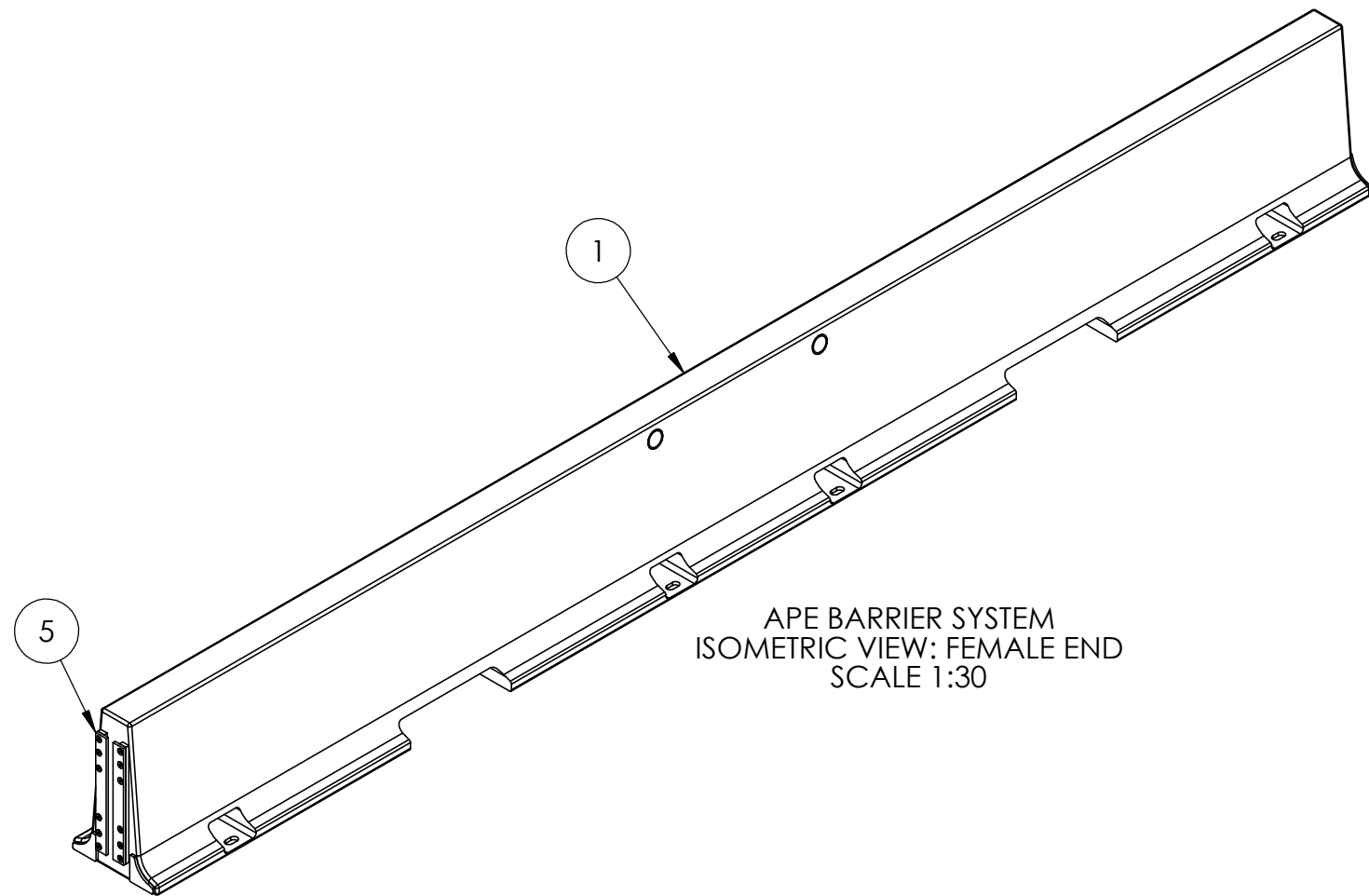
- 1.) APE BARRIERS ARE NOT TO BE INSTALLED IN DIRT OR EARTHEN SOILS. FOR INSTALLATIONS IN BASE MATERIALS OTHER THAN CONCRETE OR ASPHALT, CONTACT THE MANUFACTURER.
- 2.) STANDARD APE BARRIER LENGTH IS 24 FT (7.3 M).
- 3.) STANDARD APE BARRIER (24') WEIGHT IS 1,200 LBS (544 KG) ± 10%.
- 4.) IF AMBIENT TEMPERATURE IS LESS THAN 20°F REMOVE THE SLACK AT JOINT TO ALLOW FOR BARRIER EXPANSION. IF AMBIENT TEMPERATURE IS BETWEEN 20°F AND 95°F, CENTER THE BARRIER CONNECTIONS. IF AMBIENT TEMPERATURE IS ABOVE 95°F, PUSH BARRIER CONNECTIONS TIGHT TO ALLOW FOR BARRIER CONTRACTION.

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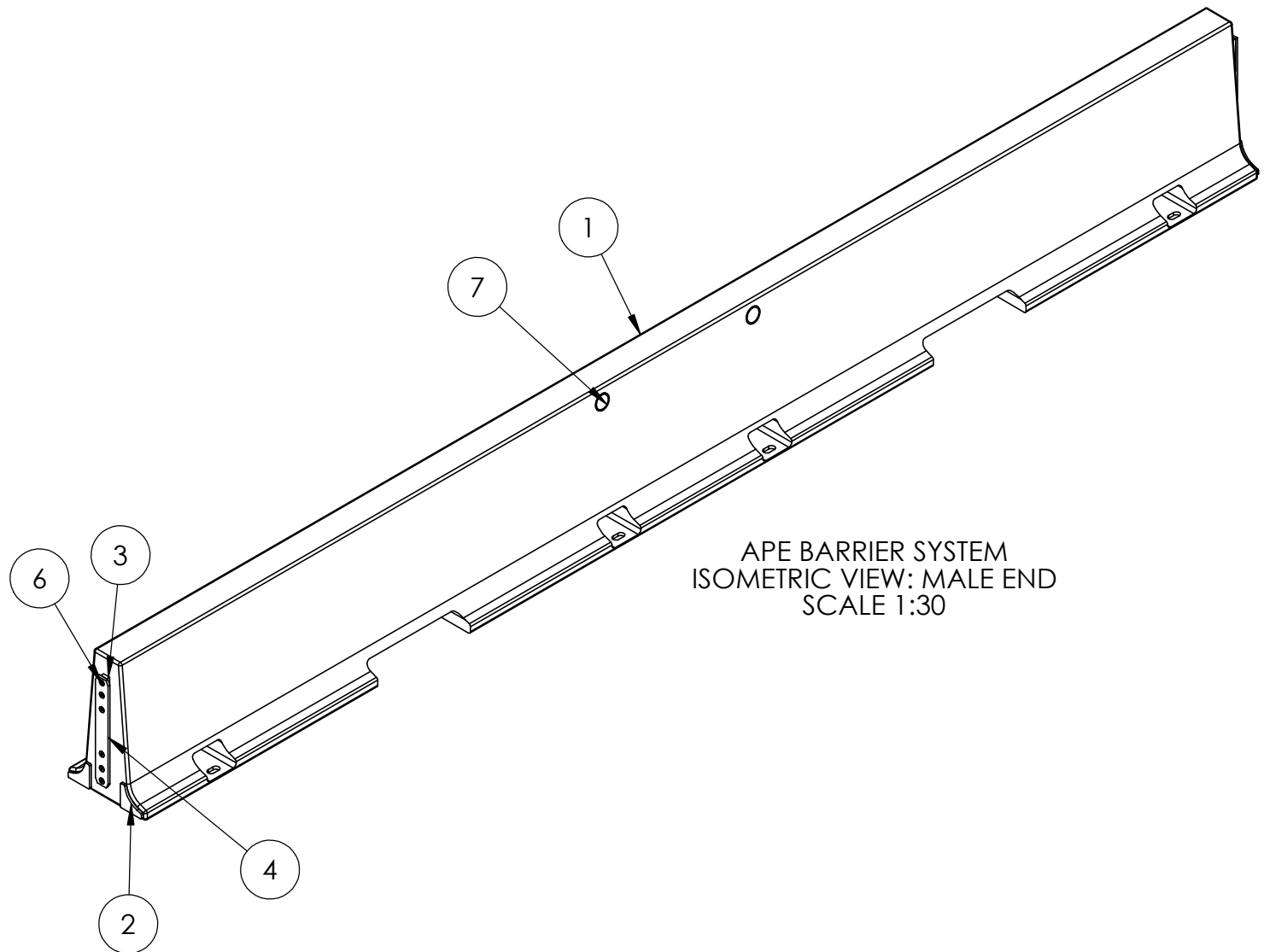
	NAME	DATE
DRAWN	AS III	05/21/24
CHECKED	MB	05/21/24



TITLE: APE BARRIER™ SYSTEM LIMITED DEFLECTION INSTALLATION		
SIZE B	DWG. NO. INS-LTD-001	REV F
WEIGHT: 1200 LBS EA.		SHEET 1 OF 1



APE BARRIER SYSTEM
ISOMETRIC VIEW: FEMALE END
SCALE 1:30



APE BARRIER SYSTEM
ISOMETRIC VIEW: MALE END
SCALE 1:30

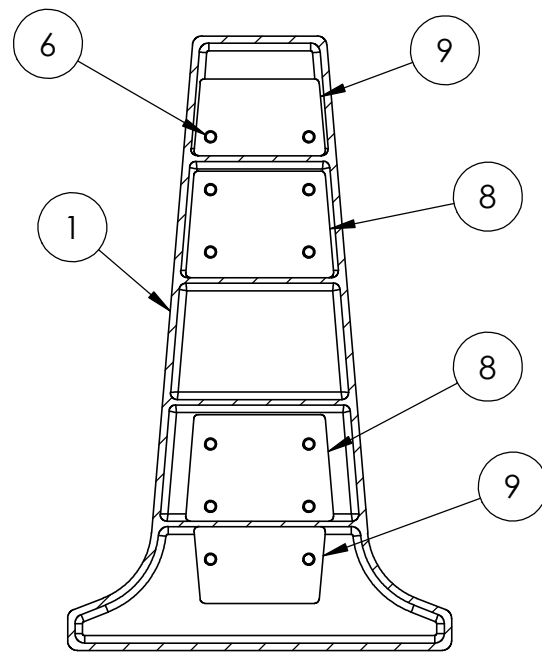
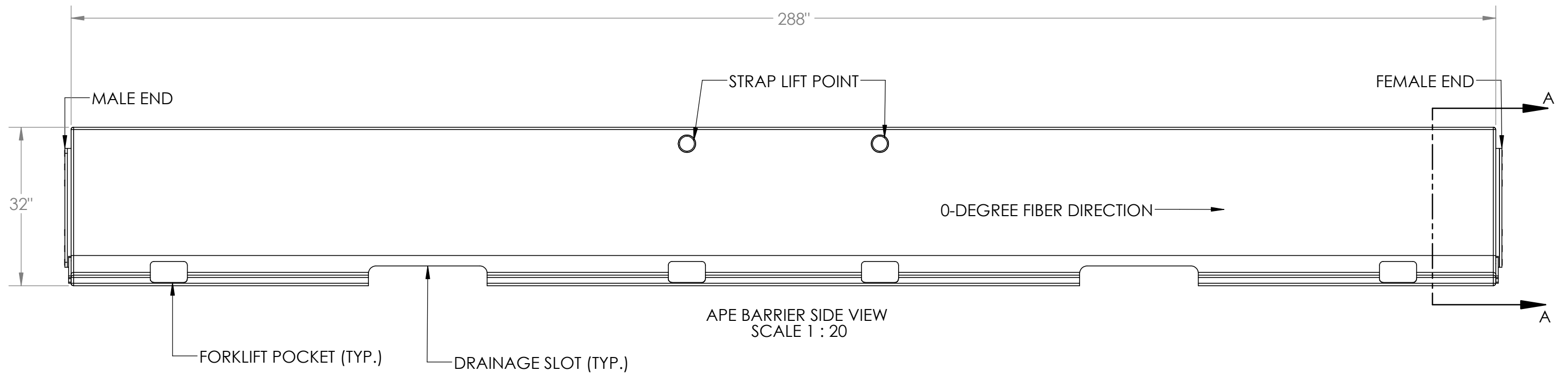
ITEM NO.	ITEM	QTY
1	APE BARRIER SYSTEM BARRIER BODY (PN 2023001 REV O)	1
2	CORNER CRUSH BLOCK (PN 2023007 REV A)	4
3	CONNECTION HARDWARE BASE PLATE	3
4	CONNECTION HARDWARE TYPE A FACE PLATE	1
5	CONNECTION HARDWARE TYPE B FACE PLATE	2
6	5/8"-11 X 2-1/2" HEX DRIVE CAP SCREW	18
7	STRAP LIFT POINT SLEEVE	2
8	STEEL EMBED TYPE A	4
9	STEEL EMBED TYPE B	4
10	FOAM001	6
11	FOAM002	6
12	FOAM003	6
13	FOAM004	6
14	FOAM005	4
15	FOAM006	2

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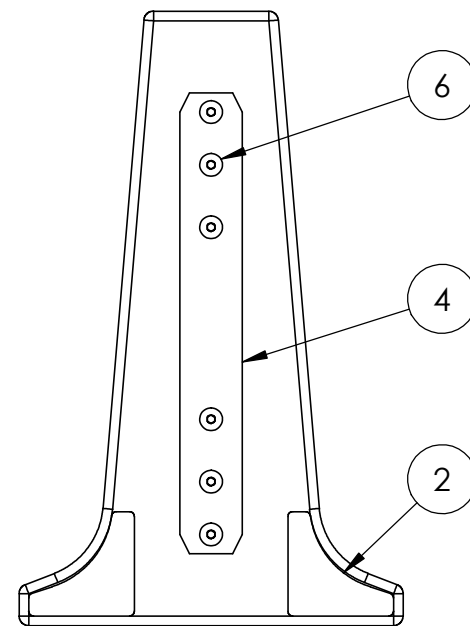
	NAME	DATE
DRAWN	AS III	05/21/24
CHECKED	MB	05/21/24



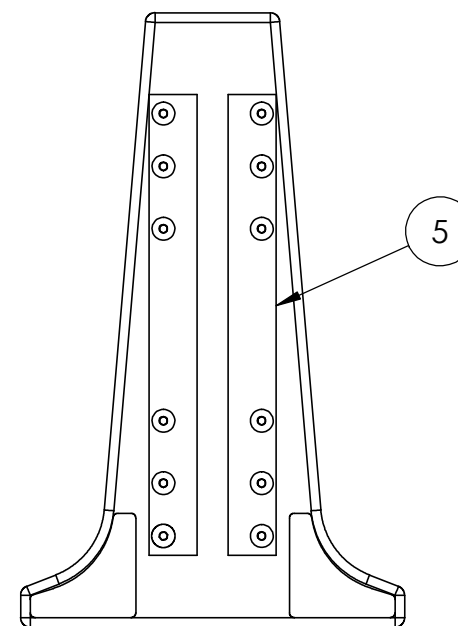
TITLE: APE BARRIER™ SYSTEM MATERIAL OVERVIEW PACKET		
SIZE B	DWG. NO. MAT-0012024	REV E
WEIGHT: 1200 LBS EA.		SHEET 1 OF 4



APE BARRIER SECTION VIEW
EMBEDDED STEEL PLATES SHOWN
SECTION A-A
SCALE 1 : 10



APE BARRIER: MALE END VIEW
SCALE 1 : 10



APE BARRIER: FEMALE END VIEW
SCALE 1 : 10

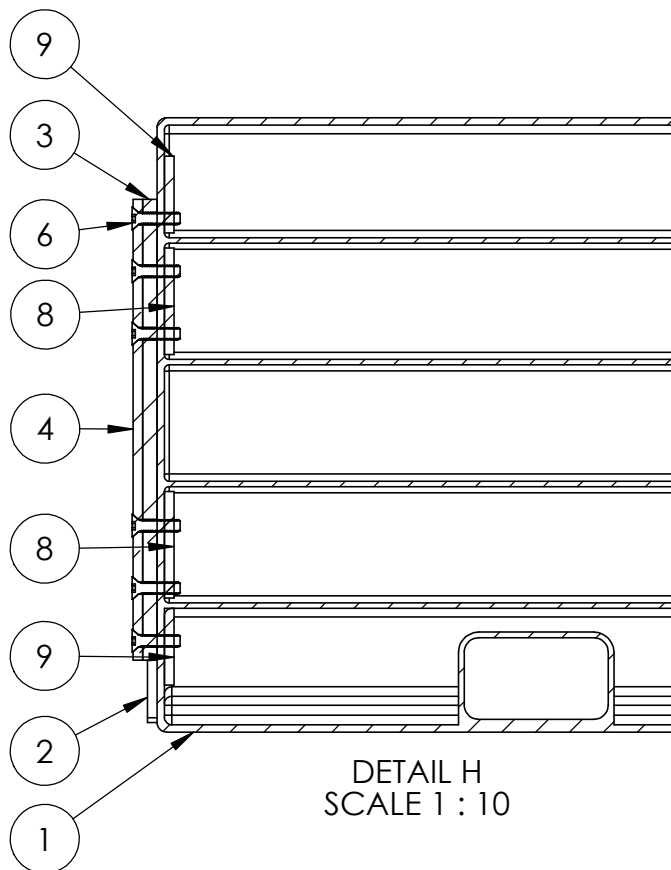
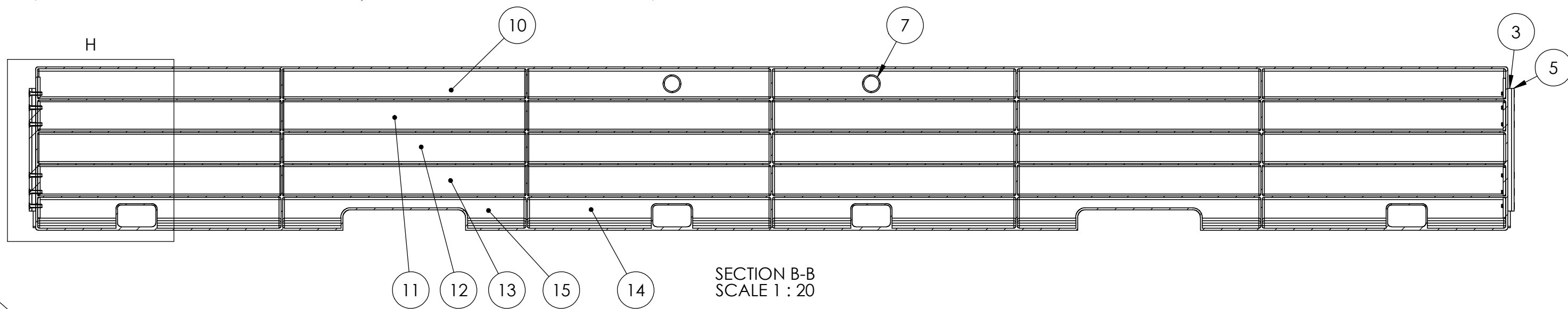
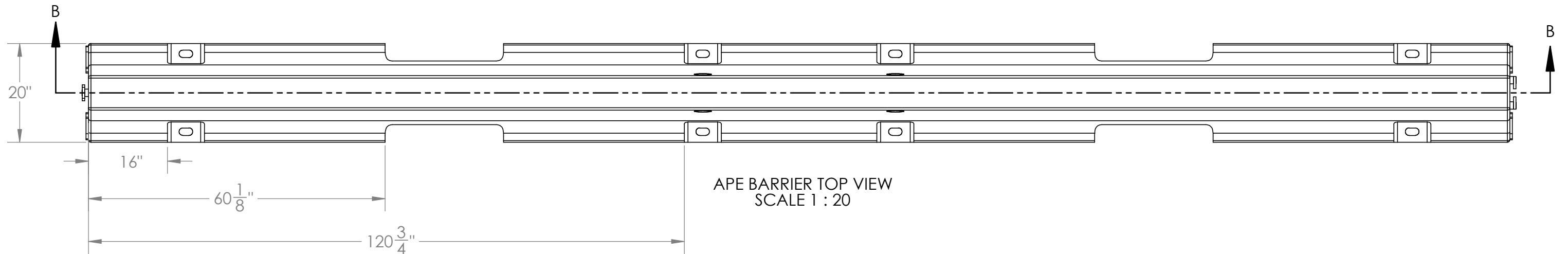
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	NAME	DATE
DRAWN	AS III	05/21/24
CHECKED	MB	05/21/24



TITLE: APE BARRIER™ SYSTEM SIDE VIEW AND SECTON VIEW		
SIZE B	DWG. NO. MAT-0012024	REV E
WEIGHT: 1200 LBS EA.		SHEET 2 OF 4



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			TITLE: APE BARRIER™ SYSTEM TOP VIEW AND SECTION VIEW		
	NAME	DATE			
DRAWN	AS III	05/21/24			
CHECKED	MB	05/21/24			
			SIZE	DWG. NO.	REV
			B	MAT-0012024	E
			WEIGHT: 1200 LBS EA.		SHEET 3 OF 4

Ape Barrier™ System: Material Property Requirements				
ITEM NO.	Material	Description	Quantity	Required Properties
1,2	Fiber Reinforced Polymer (FRP) Barrier Body and Corner Crush Blocks	E-Glass fiber reinforced polymer composite materials that comprise the barrier body and the corner crush block laminates.	980 lbs (+/- 10%)	1. Min. Ultimate Tensile Stress (Longitudinal) per ASTM D3039: 57.5 ksi 2. Min. Ultimate Compression Stress (Longitudinal) per ASTM 6641: 57.5 ksi 3. Min. Average Tensile Modulus (Longitudinal & Transverse) per ASTM D3039: 3,000 ksi 4. Min. Average Compression Modulus (Longitudinal & Transverse) per ASTM D6641: 3,000 ksi 5. Fiber Architecture: 0/+45/90/-45 Quadraxial 6. Fiber Architecture Weights (+/- 5%): 0 deg: 33.55 oz/sq.yd. / 45 deg: 20.61 oz/sq.yd. / 90 deg: 16.00 oz/sq.yd. / - 45 deg: 20.61 oz/sq.yd 7. Fiber Content by Weight: 68% (+/- 4%)
3,4,5	Steel Connection Hardware (Type A Face Plate, Type B Face Plate, Base Plate)	Steel components that are externally fastened to the Ape Barrier System to create the connection hardware that joins barriers together.	6 Total	ASTM A36 steel or approved equal
6	Steel Hex Head Cap Screws	5/8"-11 x 2-1/2" Alloy Steel Hex Drive Flat Head Screw	18	1. Min. Tensile Strength: 130 ksi 2. Drive Size: 3/8" 3. Hardness: Rockwell C37
7	Lift Point Sleeves	Sleeve insert to prevent abrasion of lifting straps. Non-structural component.	2	Acceptable materials include PVC, ABS, fiber reinforced polymer (FRP), or approved equal.
8,9	Steel Embeds	1/2" thick embedded steel plates for structural attachment of connection hardware.	8 Total	ASTM A36 steel or approved equal
10,11,12,13,14,15	Foam Core	Closed cell foam core used during manufacturing process. Non-structural component.	48 cu.ft.	1. Min. Density: 1.5 lb/cu.ft 2. Min. Compressive Strength: 20 psi
N/A	Adhesive	Methyl Methacrylate Adhesive (MMA) for bonding corner crush block to barrier.	2.5 oz	1. Min. Adhesive Shear Strength per ASTM D5868: 1.0 ksi
N/A	Asphalt Pin	1-1/4" Dia. x 20" Steel Round Bar. Used during field installation.	Per Drawing INS-LTD-001 REV F	ASTM F1554 GRADE 55 steel or approved equal
N/A	Washer Plate	(5"x 3" x 3/8") Steel Washer Plate Welded to Asphalt Pin. Used during field installation.	Per Drawing INS-LTD-001 REV F	ASTM A36 steel or approved equal
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