

# Big Sandy®

## Installation Procedure Manual

### (Big Sandy Series 48000)



160 Avenida La Pata  
San Clemente, CA 92673

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### **IMPORTANT:**

**Read and understand ALL installation instructions before  
attempting to install the Big Sandy® System.**

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## **Limitations and Warnings**

TrafFix Devices Inc. (TDI), in compliance with the Manual for Assessing Safety Hardware (MASH) recommended procedures for the Safety Performance of Highway Features. TDI contracts with ISO accredited testing facilities to conduct crash tests, evaluation of tests, and submittal of results to the Federal Highway Administration for Eligibility for Federal-Aid Reimbursement. The Big Sandy® Inertial Crash Cushion was tested to meet the safety evaluation guidelines of MASH. The Big Sandy has been tested at TL-3 (62.1 mph/ 100 km/hr) speed impact conditions. These tests are intended to evaluate product performance by simulating those impacts outlined by MASH involving a range of vehicles on the roadways, from cars with an approx. weight of 2425 lbs [1100 kg] to trucks with an approx. weight of 5004 lbs [2270 kg]. The Big Sandy is a TL-3 tested device capable of decelerating and stopping the light and heavy weight vehicles 2425 lbs [1100 kg] and 5004 lbs [2270 kg] in accordance with the criteria of Tests 3-40, 3-41, 3-42, 3-43, 3-44 and 3-45 for TL-3 (62.1 mph/ 100 km/ hr) FHWA Eligibility. Reference FHWA Eligibility letter CC-139. These specified tests are not intended to represent the systems performance when impacted by every vehicle type or every impact condition existing on the roadway. This system is tested only to the test matrix criteria of MASH. TrafFix Devices does not represent nor warrant that the results of these controlled tests show that vehicle impacts with the products in other conditions would necessarily avoid injury to person(s) or property. Impacts that exceed the system's specifications may not result in acceptable crash performance as outlined in MASH; relative to structural adequacy, occupant risk, and vehicle trajectory. TDI expressly disclaims any warrant or liability for injury or damage to person(s) or property resulting from any impact, collision, or harmful contact with products, other vehicles, or nearby hazards or objects by any vehicle, object or person, whether or not the products were installed by third parties. The Big Sandy system is intended to be assembled, installed and maintained in accordance with specific State and Federal guidelines.

## Safety Precautions

CAUTION



**Before handling any TraffFix Devices product always be sure to wear proper protective equipment including:**



SAFETY EYEWEAR



HARDHAT



HEARING PROTECTION



STEEL TOE BOOTS



SAFETY VEST



GLOVES

## **System Overview**

The Big Sandy® Inertial Crash Cushion System (ICS) is a non-redirective, gating crash cushion, designed to shield the end of rigid objects in both temporary and/or permanent roadside installations. The Big Sandy consists of an array of individual free-standing plastic sand filled barrels in consecutive rows which contain gradually increasing weights of sand within the array. The Big Sandy barrels are not anchored to the road surface and do not require a transition to the barrier it is shielding. The Big Sandy can be used on concrete, asphalt, gravel, compacted dirt, and inertial (barrel/module) pallets.

### **Crash Performance**

The Big Sandy barrels come in three configurations: 2100 lbs. (960 kg) barrels with an overall height of 52.5 in. (1336 mm), 1400 lbs. (640 kg) barrels with an overall height of 40.75 in. (1035 mm), and a two-piece combo barrel consisting of a pedestal base, and an upper canister. When assembled, the hour glass shaped combo barrel has a height of 40.3 in. (1024 mm). Combo barrels have three molded in marks designating three weight demarcation fill levels. The bottom mark designates a fill level of 200 lbs. (90 kg) of sand. The middle mark designates 400 lbs. (180 kg) of sand. The top mark designates 700 lbs. (320 kg) of sand. All Big Sandy barrels use the same 37 in. (940 mm) diameter snap on lid.

The Big Sandy barrels used for TL-3 MASH testing are identical and unchanged from the Big Sandy barrels that have passed NCHRP Report 350 testing (Reference Letter CC-52A-C). The Big Sandy ICS 12 barrel array used for TL-3 MASH testing is identical to the Big Sandy 12 barrel array that passed NCHRP Report 350 testing. Because the barrels and arrays are the same, Big Sandy barrels and arrays produced since 1998 are now MASH compliant and interchangeable (Refer to MASH eligibility letter CC-139).



**Figure 1: TrafFix Devices Big Sandy System shown in 12 barrel array TL-3 configuration.**

## Product Components and General Specifications

### Barrel Specifications

All Big Sandy® Barrels are yellow in color and have an outer shell made from energy attenuating plastic. The frangible modules will break upon impact and disperse the contained sand. The barrels will not crack when left on the job site or stored for long periods of time.

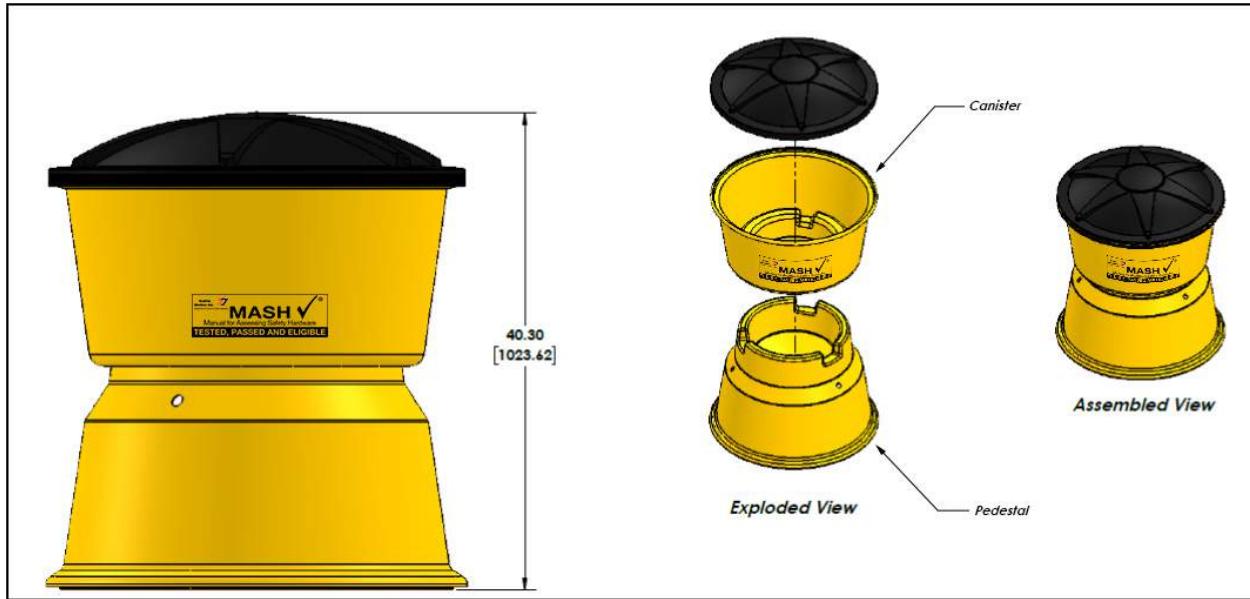


Figure 2: Combo Barrel details.

### Overall Dimensions:

Height: 40-5/16" [1023 mm]

Pedestal Weight: 17 lbs.  $\pm$  1 lbs. [7.7 kg  $\pm$  0.5 kg]

Canister Weight (Empty): 16 lbs.  $\pm$  1 lbs. [7.3 kg  $\pm$  0.5 kg]

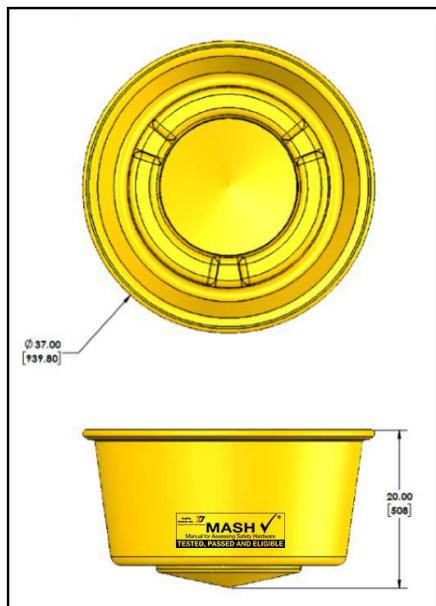


Figure 2a: Canister details.

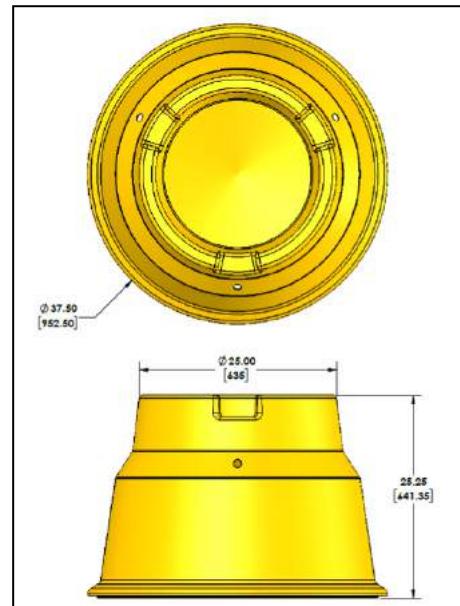


Figure 2b: Pedestal details.

## Product Components and General Specifications

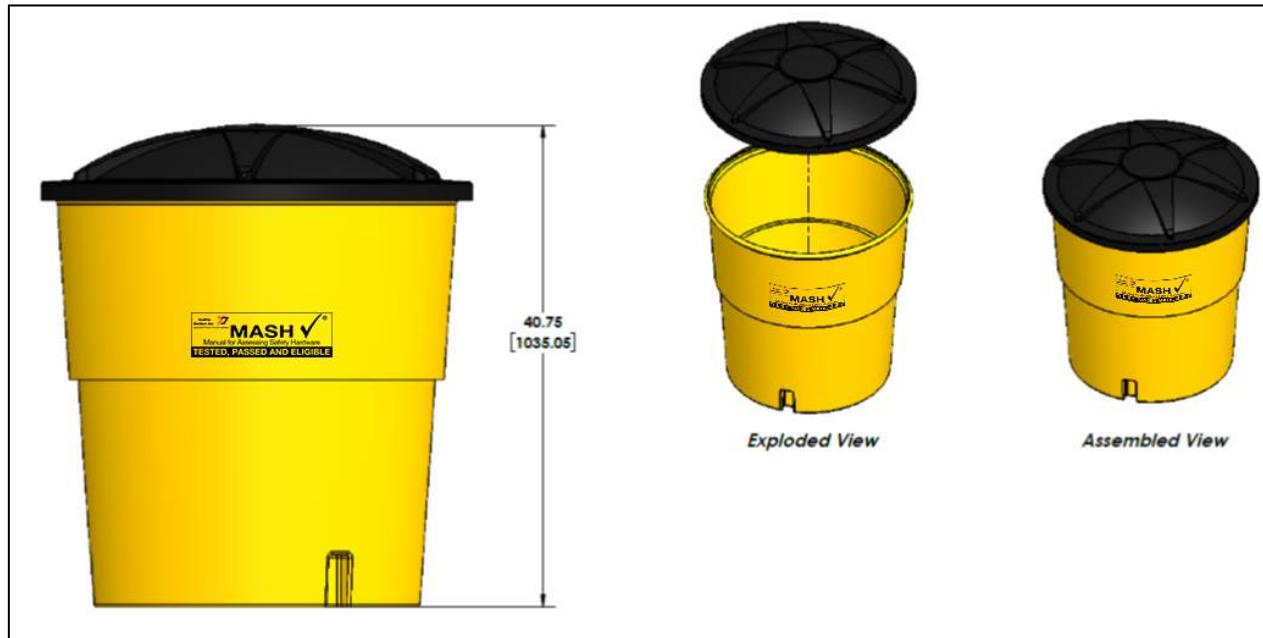


Figure 3: 1400 lbs. Barrel details.

### Overall Dimensions:

Height: 40-3/4" [1035 mm]

Barrel Weight (Empty): 23 lbs.  $\pm$  1 lbs. [10.4 kg  $\pm$  0.5 kg]

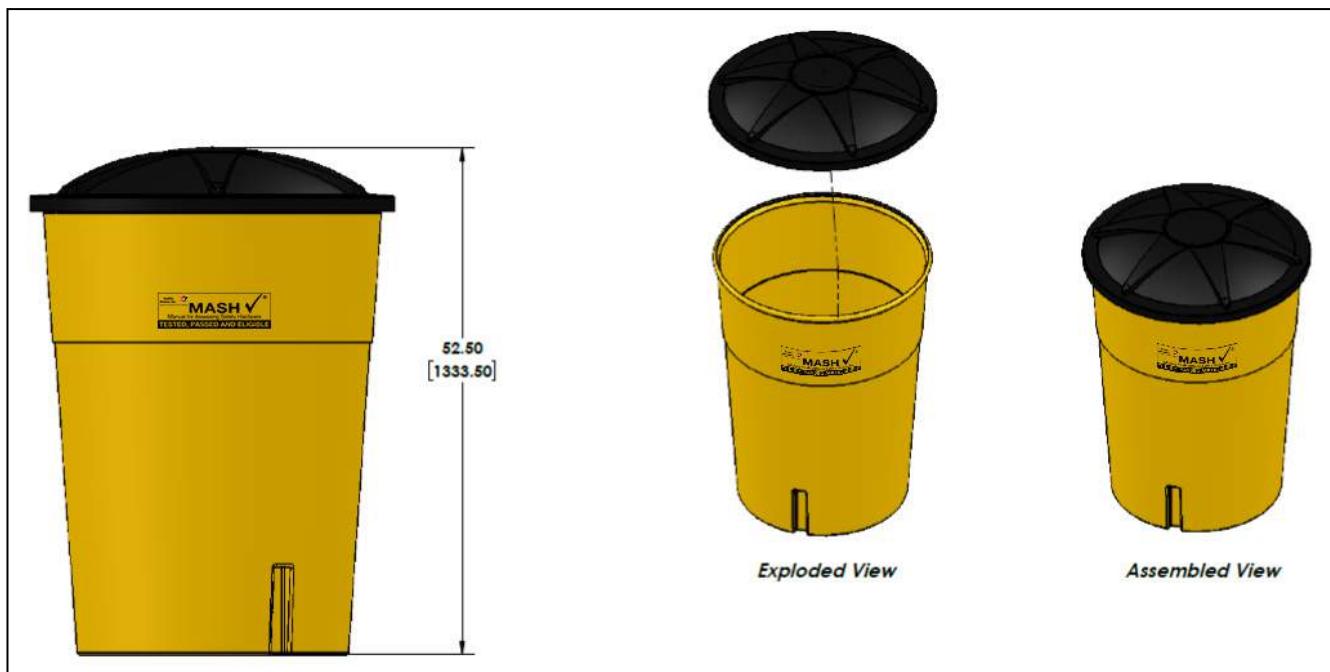


Figure 4: 2100 lbs. Barrel details.

### Overall Dimensions:

Height: 52-1/2" [1333 mm]

Barrel Weight (Empty): 29 lbs.  $\pm$  1 lbs. [13.2 kg  $\pm$  0.5 kg]

## Recommendations for Stacking

Sand Barrels can be stacked **ONLY** when empty and are not designed to be stacked on each other when filled. The 1400 lbs. and 2100 lbs. sand barrels are designed to be stacked as seen in Figure 5. The Canister and Pedestal for the Combo Barrel are also stacked as shown in the figure below. The lids for all the sand barrels can also be stacked as shown in Figure 5 (right).

**FOR STORAGE, STACK EMPTY ONLY - DO NOT STACK WHEN FILLED.**



Figure 5: Barrel Stacking of Combo, 1400 lbs., and 2100 lbs. Barrels with Stacked Lids

# Big Sandy® Sand Barrel Installation/ Assembly



## Recommended\* Tools

**This list of tools is a recommendation. The actual tools required will depend on site conditions for the assembly and installation. Personal protective equipment should always be used during assembly and installation. Safety eyewear, steel toe boots, hard hat and gloves are recommended as protection devices for the installer's safety.**

### **Documents:**

Before the assembly and installation of this product, it is recommended that the complete installation manual and drawing package be reviewed for clarity of the installation.

### **Tools:**

1. Chalk Line
2. Tape Measure
3. Concrete Marking Pencil (if needed)
4. Screwdriver/Wedge tool (if needed)
5. Big Sandy Lifting Ring
6. Forklift

\*More or less tools may be needed.

# Big Sandy® Sand Recommendation

Big Sandy sand barrels have been tested using and are designed for use with washed clean dry construction grade sand. The moisture content for sand using in Big Sandy barrels must be below 5%. The sand used should always meet the highway agency specifications.

TraFFix Devices, Inc. accepts the gradation data below detailing acceptable sand for use in Big Sandy sand barrels.

Sieve Size	Mass Percent Passing
3/8"	100%
No. 4	75 - 100%
No. 8	70 - 100%
No. 16	25 - 90%
No. 30	25 - 75%
No. 50	< 30%
No. 100	< 10%
No. 200	< 3%

In addition to the above acceptable sand gradation, TraFFix Devices participated in sand barrel testing where 3/8" pea gravel was used in place of sand, and showed safe performance. When acceptable to the local road authority, TraFFix Devices allows the use of 3/8" pea gravel in Big Sandy sand barrels

## Cold Weather Applications

When the Big Sandy is used in a cold weather application, where freezing is a concern, rock salt can be used to prevent the sand from freezing. The rock salt should be added by mixing a percent by volume to the sand. The percentage can range from a minimum of 3% by volume and increased depending on weather conditions. The highway agency should determine through experience the proper proportions that produce satisfactory results. Pea gravel can also be used to help prevent freezing. Using pea gravel in place of sand allows for more efficient drainage of moisture, which decreases the chances of the material freezing. Whichever freeze prevention method is used the barrels should be inspected when there are extended periods of freezing weather. The fill material used should always meet the highway agency's specifications.

## Installation/Assembly: Combo Sand Barrel (200 lbs./400 lbs./700 lbs.)

The assembly of the Big Sandy® Combo Barrel consists of three components: one (1) pedestal, one (1) Canister, and one (1) Lid. The Canister interlocks with the Pedestal by laying the Canister on top of the Pedestal, inserting the Canister into the recesses of the pedestal as shown in Figure 6a. The Canister and the Pedestal are secured in place with the help of the butyl pads that are located within the recesses at the bottom of the canister. There are marks on the outer wall of the canister indicating the sand level of where 200 lbs., 400 lbs., and 700 lbs. are designated to be, as shown in Figure 6b below. There is also a label located on the inside wall of the Canister indicating the same levels of where sand should be depending on the weight of sand that is needed (See Figure 6c). If in the event the Lid needs to be removed, use a wedge tool to pry the lid open all around the rim of the barrel. Figure 7a through 7c shows the correct fill level of sand for the 200 lbs., 400 lbs., and 700 lbs. barrels.



Figure 6a: Combo Barrel  
Assembly



Figure 6b: Outside Sand Level Marks Shown



Figure 6c: Inside Sand Level Marks Shown

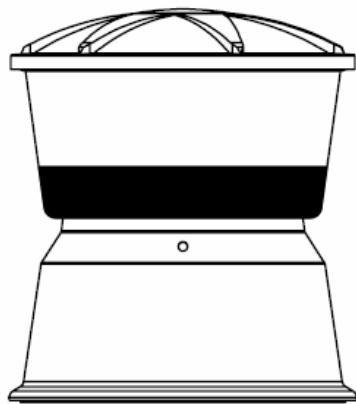


Figure 7a: Barrel Filled  
at 200 lbs. (90 kg)

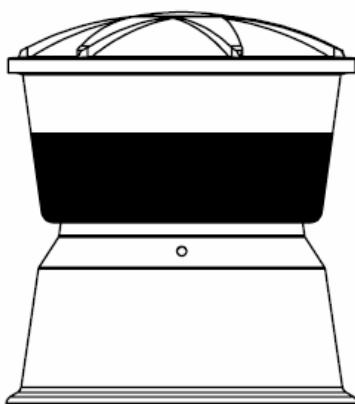


Figure 7b: Barrel Filled  
at 400 lbs. (180 kg)

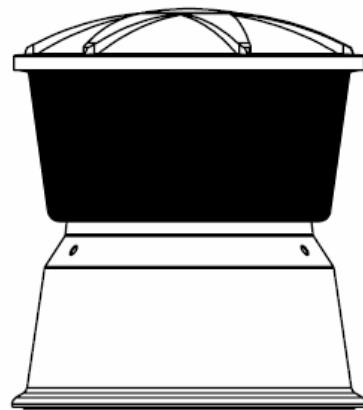


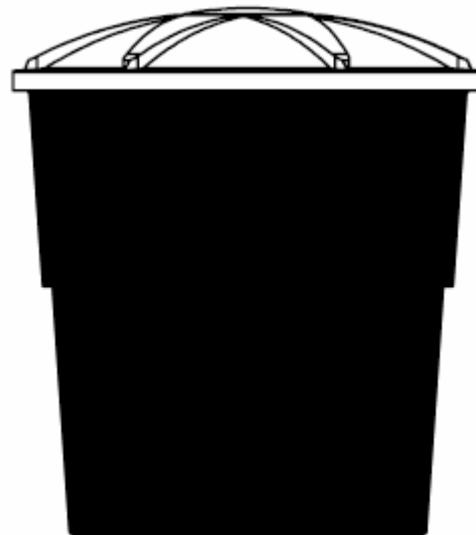
Figure 7c: Barrel Filled  
at 700 lbs. (320 kg)

## **Installation/Assembly: 1400 lbs. & 2100 lbs. Sand Barrel**

The assembly of the Big Sandy® 1400 lbs. Barrel consists of two components: one (1) 1400 lbs. barrel, and one (1) Lid. The sand is to be filled up to the rim of the barrel itself. The Lid then snaps on top of the barrel as shown in Figure 8a. If in the event the Lid needs to be removed, use a wedge tool to pry the lid open all around the rim of the barrel. Figure 8b shows the correct fill level of the sand.

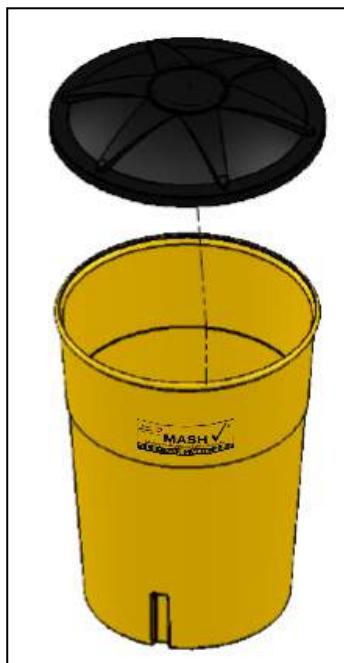


**Figure 8a: 1400 lbs. Barrel Assembly.**

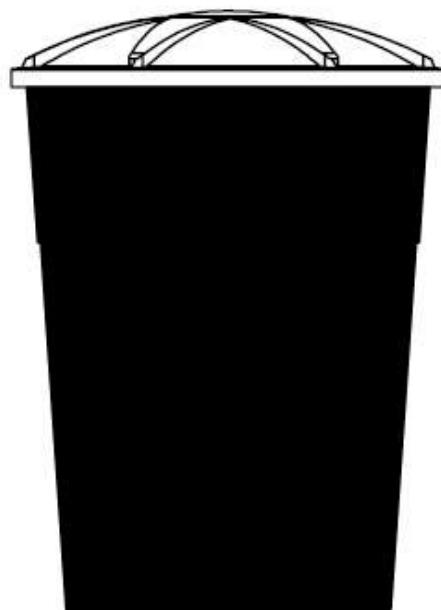


**Figure 8b: Barrel Filled at 1400 lbs. (640 kg)**

The assembly of the Big Sandy 2100 lbs. Barrel consists of two components: one (1) 2100 lbs. barrel, and one (1) Lid. The sand is to be filled up to the rim of the barrel itself. The Lid then snaps on top of the barrel as shown in Figure 9a. If in the event the Lid needs to be removed, use a wedge tool to pry the lid open all around the rim of the barrel. Figure 9b shows the correct fill level of the sand.



**Figure 9a: 2100 lbs. Barrel Assembly.**



**Figure 9b: Barrel Filled at 2100 lbs. (960 kg)**

## **Installation/Assembly: Using the Sand Barrel Lifting Ring**

Once the sand barrels have been filled with sand, safely position the filled barrels using the Big Sandy® Lifting Ring, as shown in Figure 10 below (refer to the sand barrel array configuration chart on pg. 14 for proper positioning). For proper use of the Lifting Ring, a forklift or any other lifting mechanism must be used to attach to the red lifting strap. Once attached onto the forklift, safely lower the lifting ring to the intended filled barrel that needs to be positioned. The hoops located at the bottom of the lifting ring will match the curved surface of the filled sand barrel and will clutch onto the barrel when the forklift raises the lifting ring, as shown in Figure 11. For re-positioning of the filled sand barrels, safely repeat this procedure to move the barrels to their intended position.



*Figure 10: Big Sandy Lifting Ring*



*Figure 11: Forklift with attached Lifting Ring moves 1400 lbs. filled sand barrel*

25 mph (40 kph)	21 21	14 14	14 14								
30 mph (48 kph)	21 21	14 14	14 14	14							
35 mph (56 kph)	21 21	14 14	14 14	14	7						
40 mph (64 kph)	21 21	14 14	14 14	14	7	4					
45 mph (72 kph)	21 21	14 14	14 14	14 14	14	7	4				
50 mph (80 kph)	21 21	14 14	14 14	14 14	14	7	4	2			
55 mph (89 kph)	21 21	14 14	14 14	14 14	7	7	4	2	2		
** 62 mph (100 kph)	21 21	14 14	7 7	7 7	7	4	4	2			
65 mph (105 kph)	21 21	14 14	14 14	7 7	4	4	2	4	2	2	2
70 mph (113 kph)	21 21	14 14	14 14	14 14	7	4	2	4	2	2	2

Figure 12: Sand Barrel Array Configurations for various Speed Applications.

21 2100 lbs. (960 kg)

14 1400 lbs. (640 kg)

7 700 lbs. (320 kg)

4 400 lbs. (180 kg)

2 200 lbs. (90 kg)

\*\* NCHRP 350 and MASH Tested 12 Barrel Array

NOTE: This chart provides examples of a typical array plan for a specific speed application and should in no way override what is specified by your Local or State Traffic Engineer. Contact your Local or State Traffic Engineer for specific site recommendations for each situation and location

## Appendix A:

# Big Sandy® Specifications

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**TraffFix Devices Inc.**  
**Big Sandy®**  
**TL-3 General Specifications**

**I. General**

The Big Sandy components and subassemblies shall be designed and manufactured by:

TraffFix Devices Inc. (TDI)

Corporate Office San Clemente, California

Manufacturing & Distribution Center, San Clemente, California

**II. System Description**

The Big Sandy Inertial Crash Cushion System is a TL-3 is a non-redirective, gating crash cushion, designed to shield the end of rigid objects in both temporary and/or permanent roadside installations that meet crashworthy requirements of MASH.

The TraffFix Big Sandy Inertial Crash Cushion System shall be constructed from individually free-standing plastic sand filled barrels in consecutive rows which contain gradually increasing weights of sand within the array. Each individual barrel shall consist of:

- Virgin polyethylene (PE) plastic shell, containing UV stabilizers and antioxidants. Barrels shall be manufactured in yellow color.
- Designed into each bottom surface of the 2100 lbs. and 1400 lbs. barrels shall be three stacking lugs which assemble into three recessed voids on the outer bottom surface. This feature locks the sections together vertically and prevents shifting during transport or when stored.
- The Combo Barrels, designed into the bottom surface of the top halves (Canisters) shall be three stacking lugs which assemble into three recessed voids on the inner bottom surface. This feature locks the sections together vertically and prevents shifting during transport or when stored.
- The Combo Barrels, designed into the top surface of the bottom halves (Pedestals) shall be three stacking lugs which assemble into three recessed voids on the inner top surface. This feature locks the sections together vertically and prevents shifting during transport or when stored.
- The approximate dimensions and empty weight for each sand barrel shall be:
  - Combo Sand Barrel: Overall Height of 40-5/16" [1023 mm] with a Pedestal weight of 17 lbs. [7.7 kg] and Canister empty weight of 16 lbs. [7.3 kg]
  - 1400 lbs. Sand Barrel: Overall Height of 40-3/4" [1035 mm] with an empty weight of 23 lbs. [10.4 kg]
  - 2100 lbs. Sand Barrel: Overall Height of 52-1/2" [1333 mm] with an empty weight of 29 lbs. [13.2 kg]
- Each barrel shall be manufactured with one 37 in. [940 mm] diameter snap on lid.

### **III. Performance Criteria**

The Big Sandy® shall be tested and pass all test requirements of MASH for Test Level 3 (TL-3) impact conditions for 2,420 lbs. and 5,000 lbs. [1,100 kg and 2,270 kg] vehicles at speeds of 62 mph [100 km/h].

The Big Sandy test results shall demonstrate that a gating, non-redirective crash cushion shall safely decelerate the 1100C and 2270P impact vehicles and shall not exceed the maximum allowable occupant risk values.

Occupant impact velocity

Maximum allowable: 12.2 m/s for occupant

Ridedown acceleration

Maximum allowable: 20.49 G

Detached debris shall not show potential for penetrating the vehicle occupant compartment or present a hazard to other traffic, pedestrians, or workers in a work zone.

A vehicle impacting the TrafFix Big Sandy shall remain upright during and after the collision.

The impacting vehicle's intrusion into adjacent traffic lanes shall be minimized.

# Appendix B:

## FHWA Eligibility Letter

### CC-139

Use this link to locate the letter  
on the FHWA Website

[https://safety.fhwa.dot.gov/roadway\\_dept/countermeasures/  
reduce crash severity/barriers/pdf/cc139.pdf](https://safety.fhwa.dot.gov/roadway_dept/countermeasures/reduce_crash_severity/barriers/pdf/cc139.pdf)

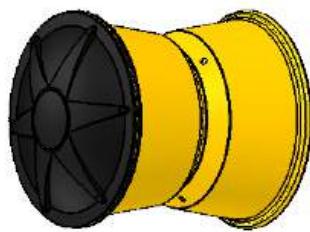
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# Appendix C:

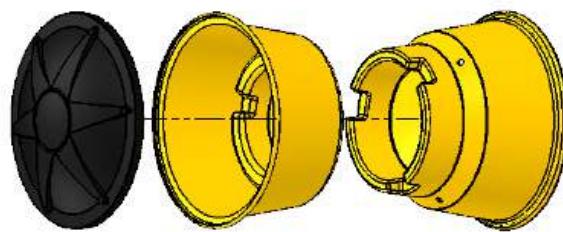
# Manufacturer

# Drawings

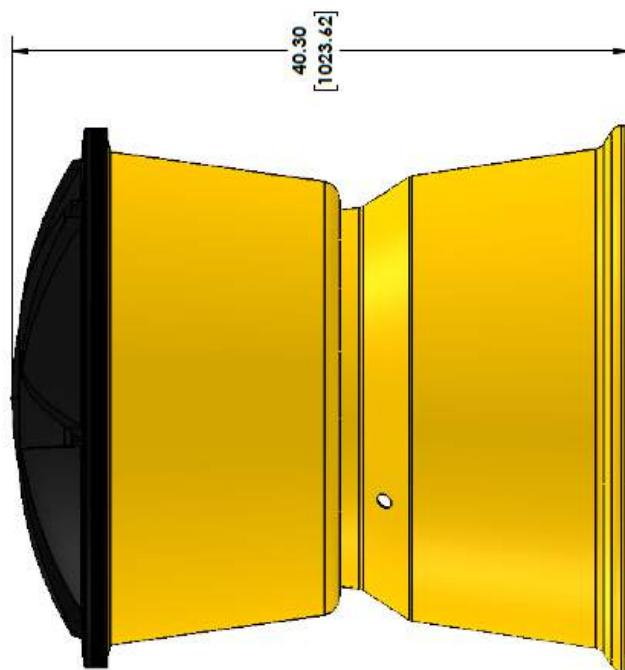
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Assembled View



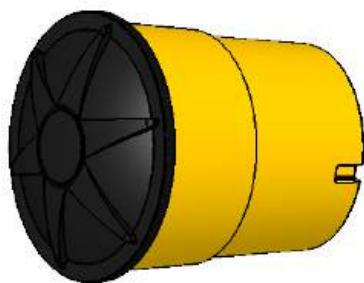
### *Exploded View*



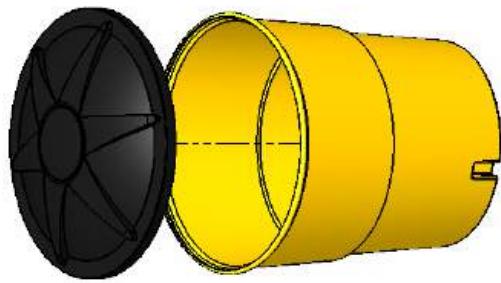
1. Units: Inches [mm]  
*NOTES: UNLESS OTHERWISE SPECIFIED*

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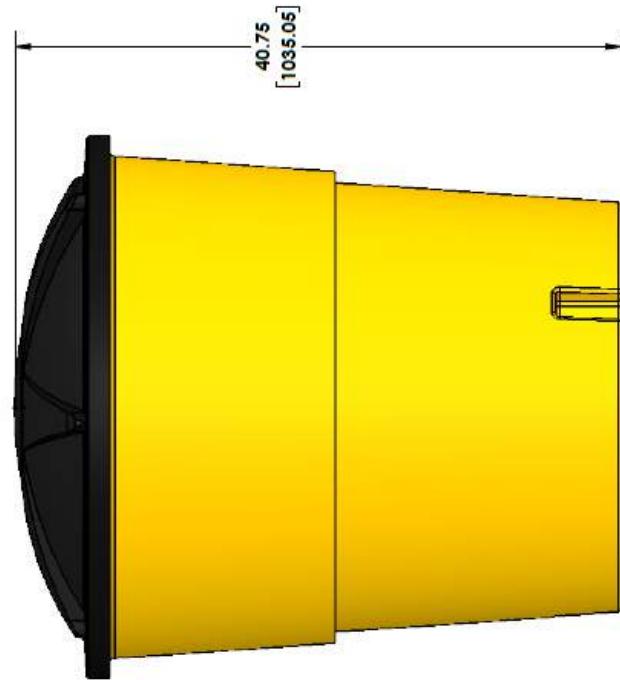
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DAWN, NY Christopher Jaime	<b>B</b>	<b>200-101</b>	<b>C</b>
CHECKED BY: FA	DATE: 2/23/17		
APPROVED BY: FA	DATE: 2/23/17		
			SHEET 1 OF 1



Assembled View

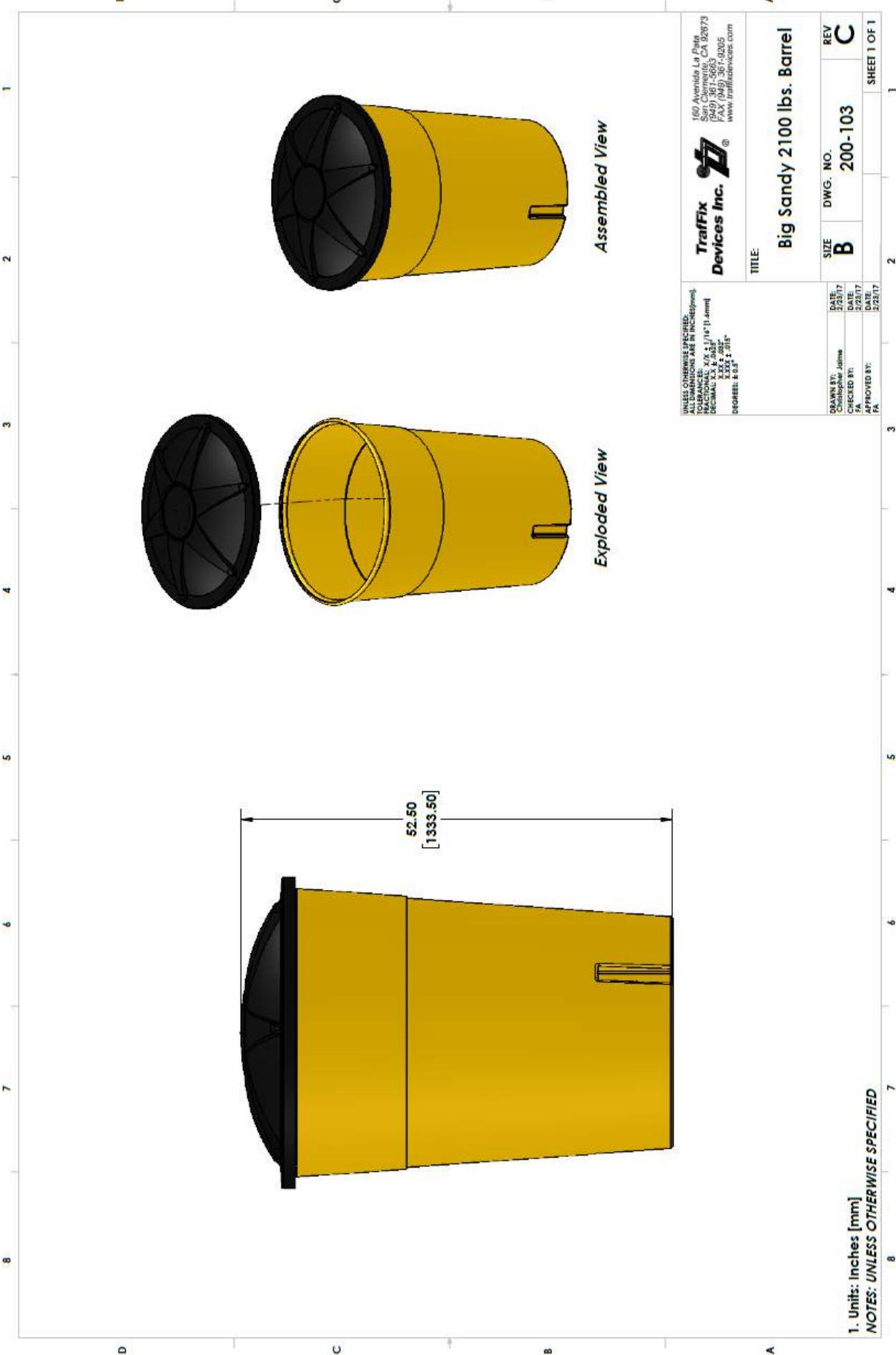


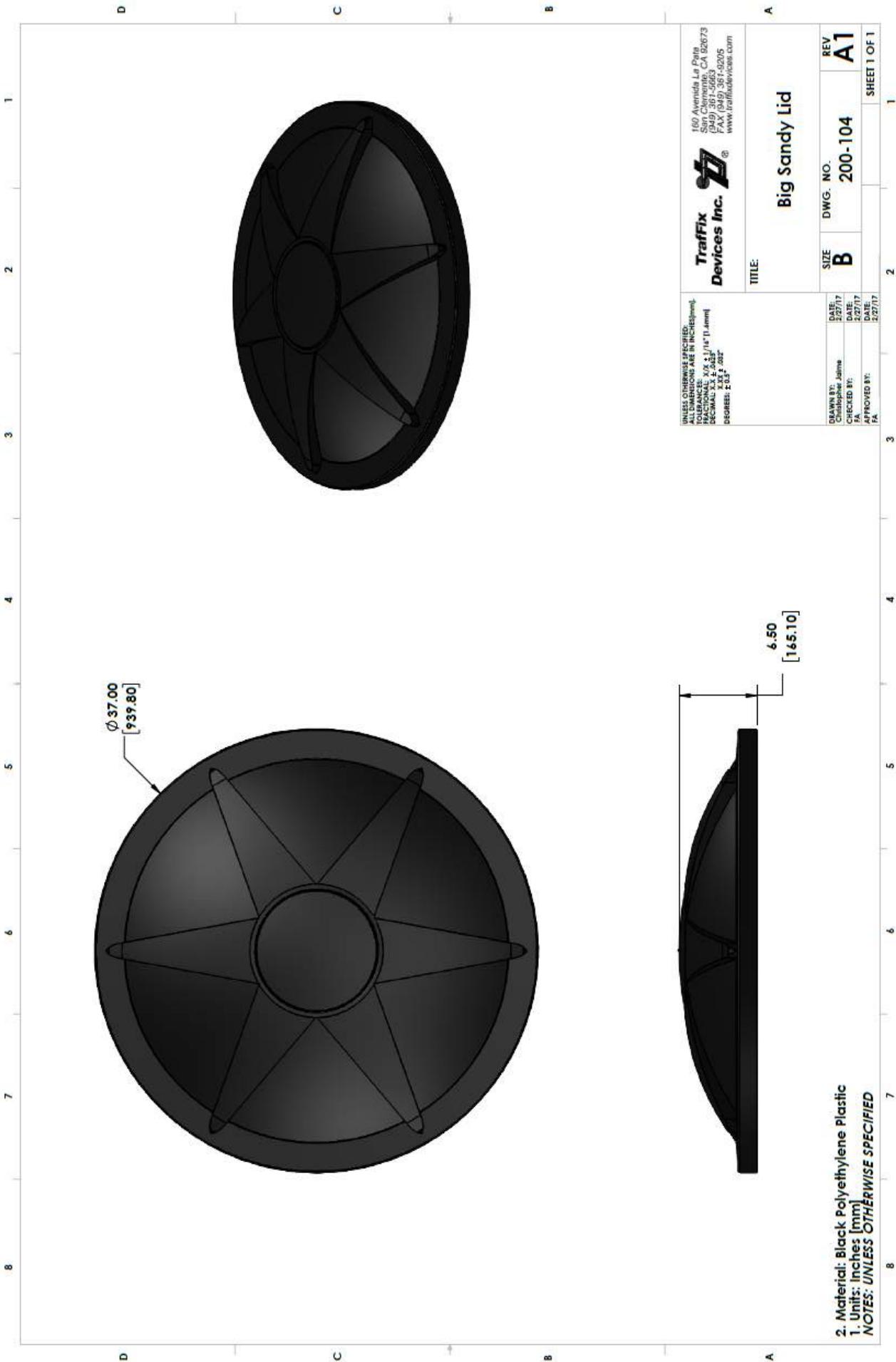
### *Exploded View*

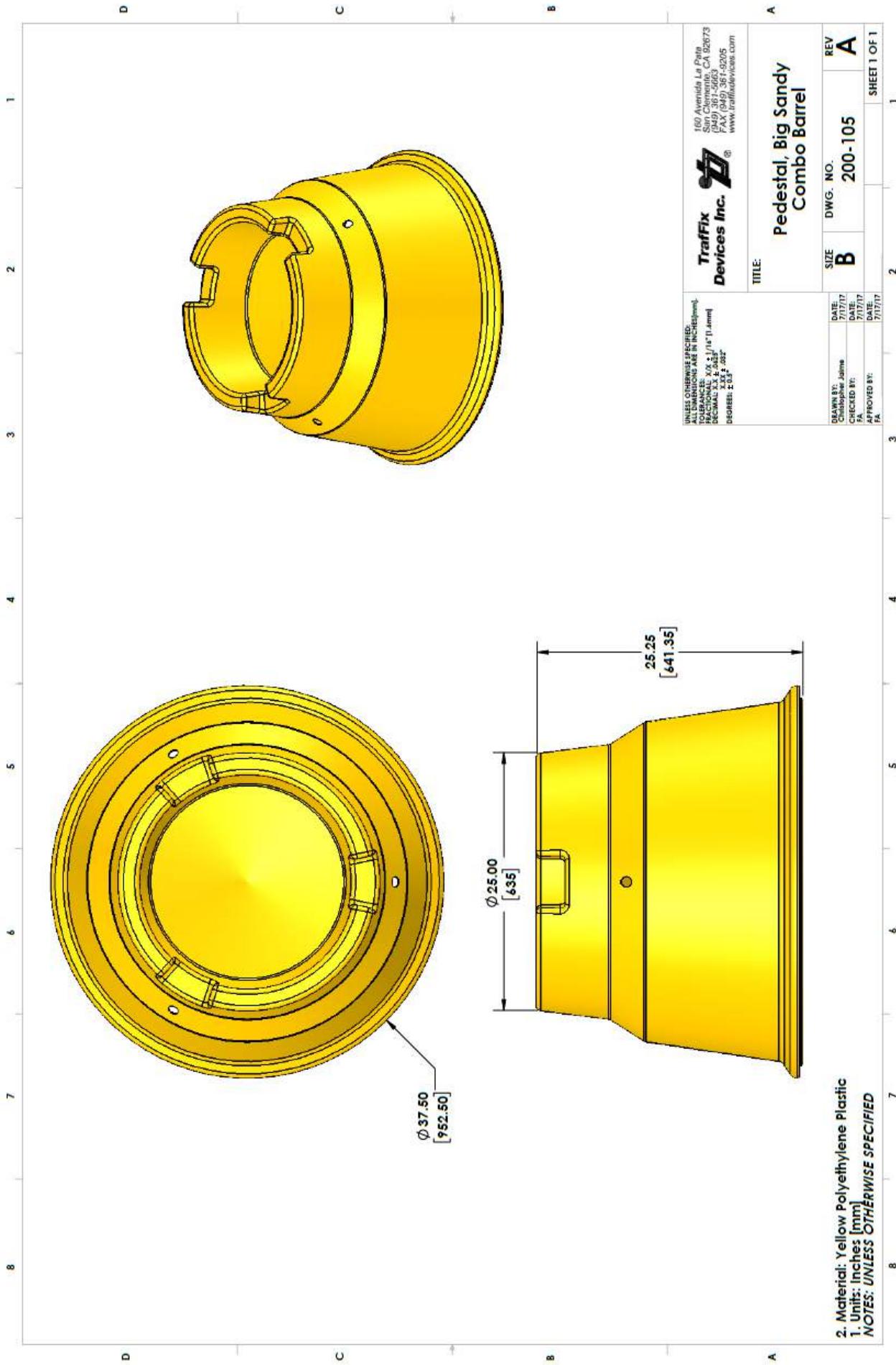


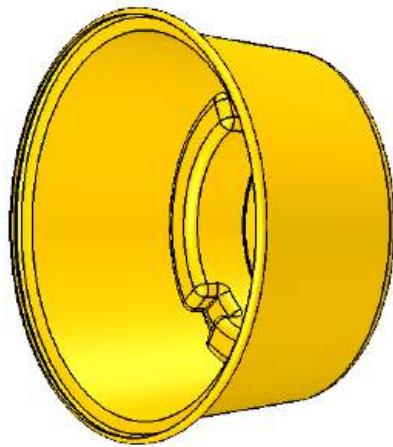
1. Units: Inches [mm]  
NOTES: UNLESS OTHERWISE SPECIFIED

	SIZE	DWG. NO.	REV
DRAWN BY: Christopher Joline	DATE: 2/28/17	200-102	C
CHECKED BY: FA	DATE: 2/28/17		
APPROVED BY: FA	DATE: 2/28/17		
			SHEET 1 OF 1

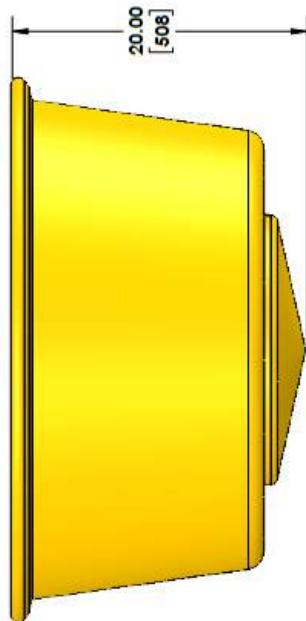








A 3D CAD model of a thick-walled cylindrical part. The part features a central hole and a flange on the outer edge. A dimension line indicates the outer diameter is 37.00 mm (939.80 mm). The model is shown in a perspective view with a light yellow color.



2. Material: Yellow Polyethylene Plastic  
1. Units: Inches [mm]  
NOTES: UNLESS OTHERWISE SPECIFIED

<p>ALL DIMENSIONS IN INCHES [mm]. ALL DIMENSIONS ARE IN INCHES [mm]. FRACTIONAL: <math>1 \frac{1}{2}</math> <math>2 \frac{1}{2}</math> <math>3 \frac{1}{2}</math> <math>4 \frac{1}{2}</math> [1.5mm] DECIMAL: 1.5 2.5 3.5 4.5 DEGREES: <math>\pm 0.5^\circ</math></p>		<p>TRAFFIX DEVICES INC. </p>		<p>160 Avenida La Parra Sun City, CA 92676-73 TEL: (626) 361-5205 FAX: (544) 361-5205 www.trafficdevices.com</p>		<p>Canister, Big Sandy Combo Barrel</p>		<p>REV A SHEET 1 OF 1</p>	
<b>B</b>	<b>200-106</b>								
TITLE:									

## Notes:

## Notes:

# Important Contact Information

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