

REACT 350[®] II

Product Description Assembly Manual



TRINITY
HIGHWAY

Ahead of the Curve[®]

REACT 350[®] II

The REACT 350[®] II has been tested pursuant to National Cooperative Highway Research Program (“NCHRP”) Report 350 specifications. The REACT 350[®] II has been deemed eligible for federal-aid reimbursement on the National Highway System by the Federal Highway Administration (“FHWA”).

Product Description Assembly Manual



15601 Dallas Parkway
Suite 525
Addison, Texas 75001



Warning: The local highway authority, distributors, owners, contractors, lessors, and lessees are **RESPONSIBLE** for the assembly, maintenance, and repair of the REACT 350[®] II. Failure to fulfill these **RESPONSIBILITIES** with respect to the assembly, maintenance, and repair of the REACT 350[®] II could result in serious injury or death.



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

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

The information contained in this manual supersedes all previous versions. The instructions, illustrations, and specifications are based on the latest REACT 350[®] II information available to Trinity Highway at publication. We reserve the right to make changes at any time. Please visit TrinityHighway.com/Product/REACT-350-II/ to confirm the latest revision.

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Customer Service Contacts

Trinity Highway is committed to the highest level of customer service. Feedback regarding the REACT 350® II, its assembly procedures, supporting documentation, and performance is always welcome. Please contact Trinity Highway for additional information:

Trinity Highway

| | |
|--------------|---|
| Telephone | (888) 323-6374 (USA) (214) 589-8140 (International) |
| Contact Link | TrinityHighway.com/Contact |

Important Introductory Notes

Proper assembly of REACT 350® II is critical to achieve performance that has been evaluated and accepted by the FHWA per NCHRP Report 350. These instructions should be read in their entirety and understood before assembling the REACT 350® II. These instructions are to be used only in conjunction with the assembly of the REACT 350® II and are for standard assemblies only as specified by the applicable highway authority. If you need additional information, or have questions about the REACT 350® II, please contact the highway authority that has planned and specified this assembly and, if needed, contact Trinity Highway's Customer Service Department. This product must be assembled in the location specified by the appropriate highway authority. If there are deviations, alterations, or departures from the assembly protocol specified in this manual, the device may not perform as tested.



Important: DO NOT use any component part that has not been specifically specified herein for the REACT 350® II during assembly or repair.

This product has been specified for use by the appropriate highway authority and has been provided to that user who has unique knowledge of how this system is to be assembled. No person should be permitted to assist in the assembly, maintenance, or repair of this system that does not possess the unique knowledge described herein. These instructions are intended for an individual qualified to both read and accurately interpret them as written. These instructions are intended only for an individual experienced and skilled in the assembly of highway products that are specified and selected by the highway authority.

A manufacturer's drawing package will be supplied by Trinity Highway upon request. Each system will be supplied with a specific drawing package unique to that system. Such drawings take precedence over information in this manual and shall be studied thoroughly by a qualified individual who is skilled in interpreting them before the start of any product assembly.

Safety Symbols

This section describes the safety symbols that appear in this REACT 350® II manual. Read the manual for complete safety and assembly information.

Symbol

Meaning



Safety Alert Symbol: Indicates Danger, Warning, Caution, or Important. Failure to read and follow the Danger, Warning, Caution, or Important indicators could result in serious injury or death to the workers and/or bystanders.



Important: Read safety instructions thoroughly and follow the assembly directions and suggested safe practices before assembling, maintaining, or repairing the REACT 350® II. It is the responsibility of the installer to follow the instructions contained in this manual. Failure to comply with these warnings could result in increased risk of serious injury or death in the event of a vehicle impact with a system.



Important: Please keep up-to-date instructions for later use and reference by anyone involved in the assembly of the product.

Safety Rules for Assembly

* Important Safety Instructions *

This manual must be kept in a location where it is readily available to persons who assemble, maintain, or repair the REACT 350® II. Additional copies of this manual are available from Trinity Highway by calling (888) 323-6374 or visiting TrinityHighway.com/Product/REACT-350-II/. Please contact Trinity Highway if you have any questions concerning the information in this manual or about the REACT 350® II. This manual may also be downloaded directly from the website below.

It is the responsibility of the installer to use appropriate safety precautions when operating power equipment, and when moving heavy equipment or REACT 350® II components. Work gloves, apron, eye / ear protection, safety-toe shoes, and back protection shall be used.



Warning: It is the responsibility of the installer to use all safety measures incorporating appropriate traffic control devices specified by the highway authority. These measures must be used to protect all personnel while at the assembly, maintenance, or repair site.



Warning: It is the responsibility of the installer to ensure that your assembly meets all appropriate Manual on Uniform Traffic Control Devices (“MUTCD”) and local standards.



Warning: It is the responsibility of the installer to ensure REACT 350® II delineation meet all federal, state, specifying agency, and local specifications.

Limitations and Warnings

Trinity Highway, in compliance with the NCHRP Report 350 “Recommended Procedures for the Safety Performance of Highway Safety Features”, contracts with FHWA approved testing facilities to perform crash tests, evaluation of tests, and submittal of results to the FHWA for review.

The REACT 350® II has been approved by FHWA as meeting the requirements and guidelines of NCHRP Report 350. These tests typically evaluate product performance defined by NCHRP Report 350 involving a range of vehicles on roadways, from lightweight cars (approx. 820 kg [1800 lb.]) to full size pickup trucks (approx. 2000 kg [4400 lb.]). A product can be certified for multiple Test Levels. The REACT 350® II is certified to the Test Level(s) as shown below:

Test Level 3: 100 km/h [62 mph]

These FHWA directed tests are not intended to represent the performance of systems 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 NCHRP Report 350 as approved by FHWA.

Trinity Highway neither represents nor warrants that the impact results of these federally established test criteria prevent or reduce the severity of any injury to person(s) or damage to property. These tests only demonstrate the occurrence of certain results following an impact within NCHRP Report 350 criteria. Every departure from the roadway is a unique event.

The REACT 350® II is intended to be assembled, delineated, and maintained within specific state and federal guidelines. It is important for the highway authority specifying the use of a highway product to select the most appropriate product configuration for its site specifications. The customer should be careful to properly select, assemble, and maintain the product. Careful evaluation of the site lay out, vehicle population type; speed, traffic direction, and visibility are some of the elements that require evaluation in the selection of a highway product. For example, curbs could cause an untested effect on an impacting vehicle.

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



Warning: Do not assemble, maintain, or repair the REACT 350® II until you have read this manual thoroughly and completely understand it. Ensure that all Danger, Warning, Caution, and Important statements within the manual are completely followed. Please call Trinity Highway at (888) 323-6374 if you do not understand these instructions.



Warning: Only Trinity Highway parts that are specified herein can be used for assembly, maintenance, or repair of the REACT 350® II. **Do not utilize or otherwise comingle parts from other Trinity Highway systems.** Such configurations have not been tested, nor have they been accepted for use. Assembly, maintenance, or repairs using unspecified parts or accessories is strictly prohibited.

System Overview

The REACT 350® II is a potentially reusable, re-directive, non-gating crash cushion for roadside obstacles up to 3' [914 mm] wide.



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

The REACT 350® II utilizes various Cylinder wall thicknesses to accommodate both light cars and heavier, high-center-of-gravity vehicles.

The REACT 350® II consists of a series of “smart plastic” Cylinders attached to a steel Base Track. The term “smart plastic” refers to the memory characteristics of the Cylinders. After a head-on impact as described in NCHRP Report 350, the REACT 350® II has the potential to recover a major portion of its shape, position, and energy absorbing capability. What constitutes a potentially reusable highway product should only be determined by a trained engineer, experienced in highway products, directed by the appropriate highway authority.

Two backup options are available to further meet specific requirements of each location. A Self-Contained Backup is available or the REACT 350® II can be mounted to a new or existing Concrete Backup. In some locations, either Backup type may be applicable.

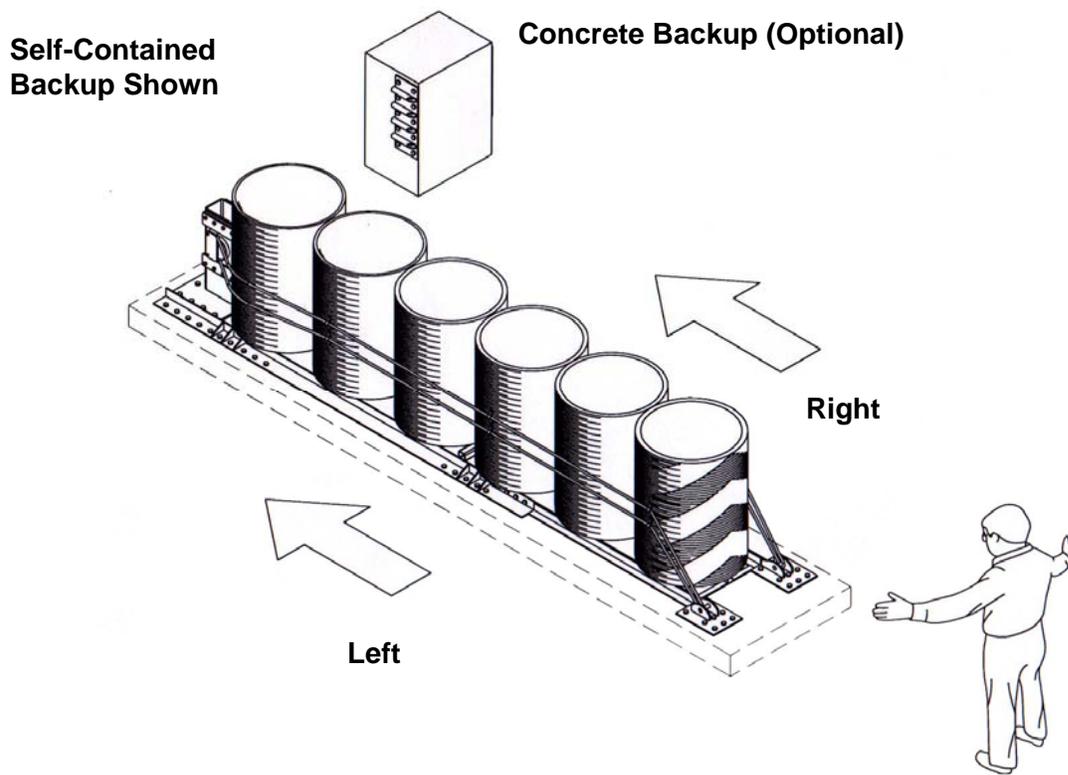


Figure 1 - REACT 350® II with Self-Contained Backup

Foundation/Anchoring



Warning: Ensure that this assembly conforms with the guidance provided by the AASHTO Roadside Design Guide, including, but not limited to, those regarding placement on or adjacent to curbs.

Asphalt Installations

REACT 350® II systems with a Self-Contained Backup may be installed in construction zones on asphalt. Assemblies on **Asphalt Concrete (“A.C.”)** must provide a minimum 3” [76 mm] layer of asphalt over a minimum 3” [76 mm] layer of **Portland Cement Concrete (“P.C.C.”)**, 6” [152 mm] layer of asphalt over 6” [152 mm] layer of subbase, or 8” [203 mm] layer of asphalt with no subbase.



Important: Only 18” [460 mm] threaded rods, utilizing Trinity Highway approved adhesive, can be used with asphalt foundations. Contact Customer Service for a complete list of approved adhesives (p. 3).

Concrete Installations

For concrete installations, the REACT 350® II should be installed only on an existing or freshly placed and cured concrete base (28 MPa [4000 psi] minimum). Orientation of the concrete base and the attenuator must comply with the project plans or as otherwise determined by the resident project engineer or appropriate highway authority.

Recommended dimension and reinforcement specifications for new concrete pads can be found in your site specific drawing package or standard drawings in the back.

The REACT 350® II may be installed on any of the following foundations using the specified anchorage:

Foundation A: Concrete Pad or Roadway

Foundation: 8” [200 mm] minimum depth P.C.C.

Anchorage: Approved adhesive with 7 1/2” [190 mm] studs 6” [152 mm] embedment

Foundation B: Asphalt over P.C.C.

Foundation: 3” [76 mm] minimum A.C. over 3” [76 mm] minimum P.C.C.

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

Foundation C: Asphalt over Compacted Subbase (“C.S.”)

Foundation: 6” [150 mm] minimum A.C. over 6” [150 mm] minimum C.S.

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

Foundation D: Asphalt

Foundation: 8” [200 mm] minimum A.C.

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

Trinity Highway Approved Adhesive Anchoring System

A Trinity Highway approved adhesive anchoring system is required to securely anchor crash cushions. Each approved adhesive kit contains adhesive, studs, nuts, washers and instructions. Both vertical and horizontal assemblies are possible using an approved adhesive anchoring system.



Important: Follow adhesive manufacturer's temperature storage requirements.

Anchor Assemblies

Note: Read all Trinity Highway approved adhesive instructions before starting.

1) Prepare the Concrete Foundation



Warning: Do not allow anchoring adhesive to contact skin or eyes. See material safety data sheet supplied with adhesive kit for first-aid procedures. Use only in well-ventilated area. Do not use near open flame.



Warning: It is the responsibility of the installer to maintain a safe work area including the use of standard work zone safety equipment & PPE: gloves, safety-toe shoes, and eye / ear protection.

The anchor bolts (studs) that anchor the REACT 350® II system Backup and/or Monorail sections to the concrete foundation must be those shipped in the kit or of high strength steel (Grade B7 or SAE-J429 Grade 5) tensile strength. These studs must be set in minimum 28 MPa [4000 psi] concrete. Allow the concrete to cure a minimum of seven days before applying anchoring adhesive.

2) Drill Boreholes



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

Use the part that is to be anchored as a drilling template. Use a rotary hammer drill to drill the boreholes 1/8" [3 mm] larger than the stud diameter to the recommended depth. See the approved adhesive instructions provided with your kit. Check to ensure all boreholes are drilled to the proper depth and aligned with the part to be anchored per table below.

| Anchor Drilling Information | | | | |
|------------------------------------|-----------------|-----------------------|---------------------|---------------|
| Anchor Size: | Bit Size | Drilling Depth | Torque | Medium |
| 3/4"x 7 1/2" | 22 mm [7/8"] | 160 mm [6 1/4"] | Manufacturer Spec | Concrete |
| 3/4"x 18" | 22 mm [7/8"] | 420 mm [16 3/4"] | 15 N-m [10 ft-lb] ⚠ | Asphalt |



Important: When mounting on asphalt, initial torque shall be as shown above. Due to the properties of asphalt, anchors may loosen over time. For this reason Trinity Highway recommends anchoring to asphalt only at temporary locations. It is recommended to re-torque anchors in asphalt every six months to the recommended torque specification.

3) Clean the Boreholes

Blow the concrete dust from the borehole using oil-free compressed air. Thoroughly brush it with a 7/8" diameter steel bristle tube brush and then blow it out again. If the borehole is wet, completely flush it with water while brushing and then blow it clean to remove all water using oil-free compressed air.

Note: Use of the Trinity Highway approved vacuum drilling equipment is authorized to replace the blowing and brushing requirement of Step 3.

4) Apply Approved Adhesive

Fill the borehole 100% full.



Caution: Fill borehole 100% full so it is even with the pavement surface per manufacturer's instructions.

5) Add Nuts to Anchors

Thread the nut on until flush with the end of the stud (Figure 2).

6) Insert Anchors in Boreholes and Wait for Adhesive to Cure

Push the stud down through the part to be anchored and into the borehole.



Warning: Do not disturb or load the stud until the approved adhesive material has fully cured (instructions supplied with the approved adhesive kit).

7) Torque the Nuts

Once the adhesive has fully cured, torque the nut to the manufacturer's recommended values.

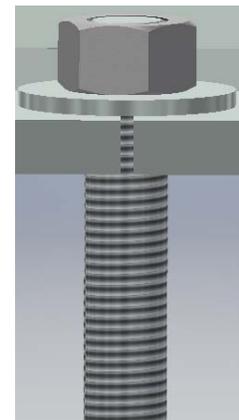


Figure 2
Anchor Application
(Before Applied Torque)

Anchor Assembly Cautions

1) Steel rebar

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

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



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

- B) Drill a new borehole down at an angle past the rebar to the proper depth. Anchor the stud by completely filling both boreholes with an approved adhesive.

Recommended Tools

Documentation

- Manufacturer's Instructional Manual
- Manufacturer's Drawing Package

Personal protective equipment

- Eye / Ear Protection
- Gloves
- Protective Clothing
- Reflective Vest
- Safety-Toe Shoes

Cutting equipment

- Grinder/Hacksaw or Torch
- Rebar Cutting Bit
- Rotary Hammer Drill
- 22 mm (7/8") x 178 mm (7") Hollow Drill Bit for vacuum feature
- 19 mm (3/4") x 178 mm (7") Concrete Drill Bit (double-fluted)



Important: Trinity Highway recommends using **double-fluted** drill bits to achieve optimum tensile strength when applying an approved adhesive anchoring system (p. 8).



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

Hammers

- Sledgehammer

Wrenches

- Heavy duty impact wrench
- 1/4", 5/16", 3/8", 3/4", 1 7/8" Sockets
- 3/4", 1 1/16", 1 1/8", 1 1/4" Deep Hex-head Sockets
- Ratchet and extensions for above sockets
- Standard adjustable wrench
- 1 1/16", 1 1/8", 1 1/4", 9/16", 5/8" combination wrenches
- Large Pipe Wrench

Screwdrivers

- Screw gun or standard drill with adapter chuck for small screws/bolts
- Flathead Screwdriver
- Phillips Screwdriver

Miscellaneous

- Traffic control equipment
- Lifting and moving equipment (A lifting device is preferred although a forklift can be used.) Minimum 2722 kg [6,000 lb.] capacity required. Do not lift overhead.
- Compressor (100 psi) and Generator (5 KW)
- Long pry bar
- Drift pin
- Tape measure 7.5 m (25')
- Chalk line
- Rags, water, and solvent for touch-up



Important: The above list of tools is a general recommendation and should not be considered an extensive list. Depending on specific site conditions and the complexity of the assembly specified by the appropriate highway authority, the required tools may vary. Decisions as to what tools are needed to perform the job are entirely within the discretion of the specifying highway authority and the authority's selected contractor performing the assembly of the system at the authority's specified assembly site.

Know Your REACT 350® II System

For specific assembly, maintenance, or repair details refer to the state or specifying agency's standard drawing(s) and/or Trinity Highway standard layout drawings.

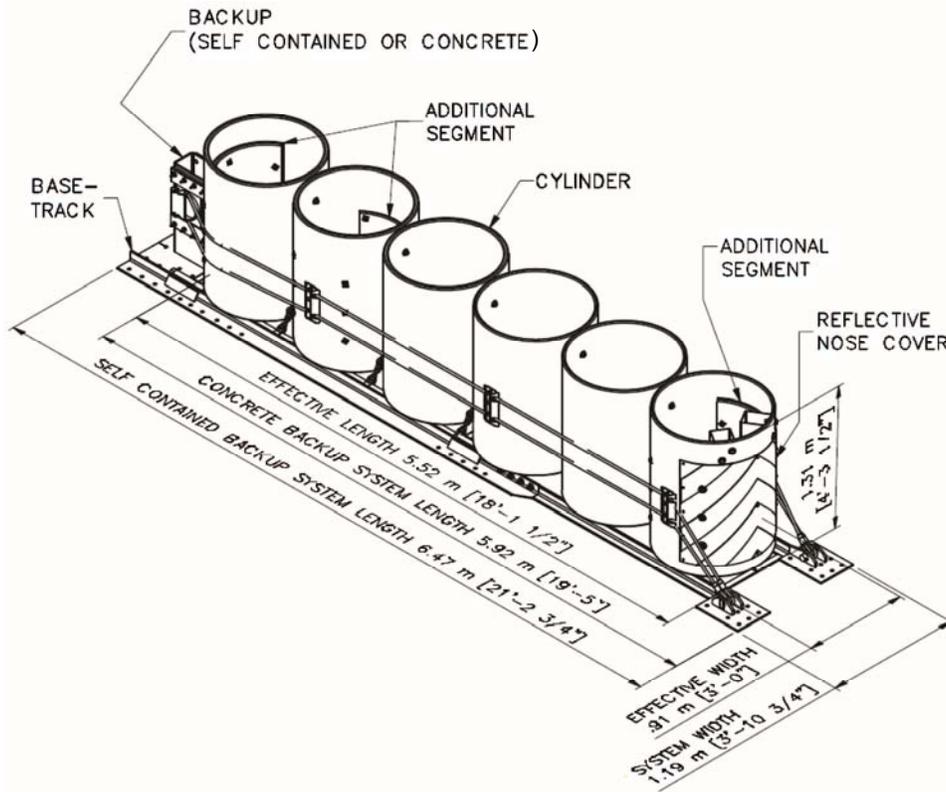


Figure 3

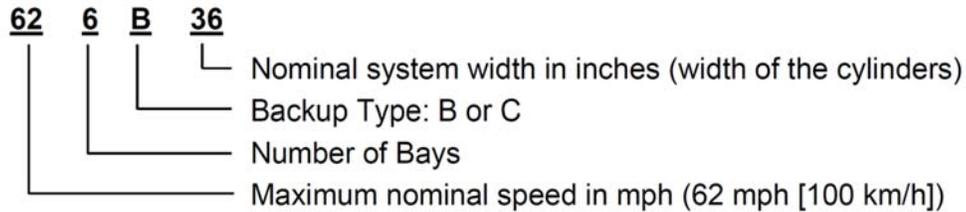
System Size

| | Backup | |
|------------------|---------------------|---------------------|
| | Self-Contained | Concrete |
| Effective Length | 5.52 m [18'-1 1/2"] | 5.52 m [18'-1 1/2"] |
| System Length | 6.47 m [21'-2 3/4"] | 6.02 m [19'-9"] |
| Effective Width | .91 m [3'-0"] | |
| System Width | 1.19 m [3'-10 3/4"] | |
| Height | 1.31 m [4'-3 1/2"] | |

Model Number Description

| PN | Backup Type | Width |
|--------|---------------------------------------|---|
| 626B36 | Self-Contained steel backup | B Typical object width*8" [203 mm] |
| 626C36 | Concrete Backup w/ Side Mount Anchors | C Max. object width 36" [914 mm] |

*See "Roadside Obstacle Width" on page 18 for more information.



Number of Bays

A Bay consists of one Cylinder. The terms Bay and Cylinder may be used interchangeably. The Cylinder at the front of the system (traffic end) is always Bay 1, and each subsequent Bay is sequentially numbered to the rear of the system (roadside obstacle end).

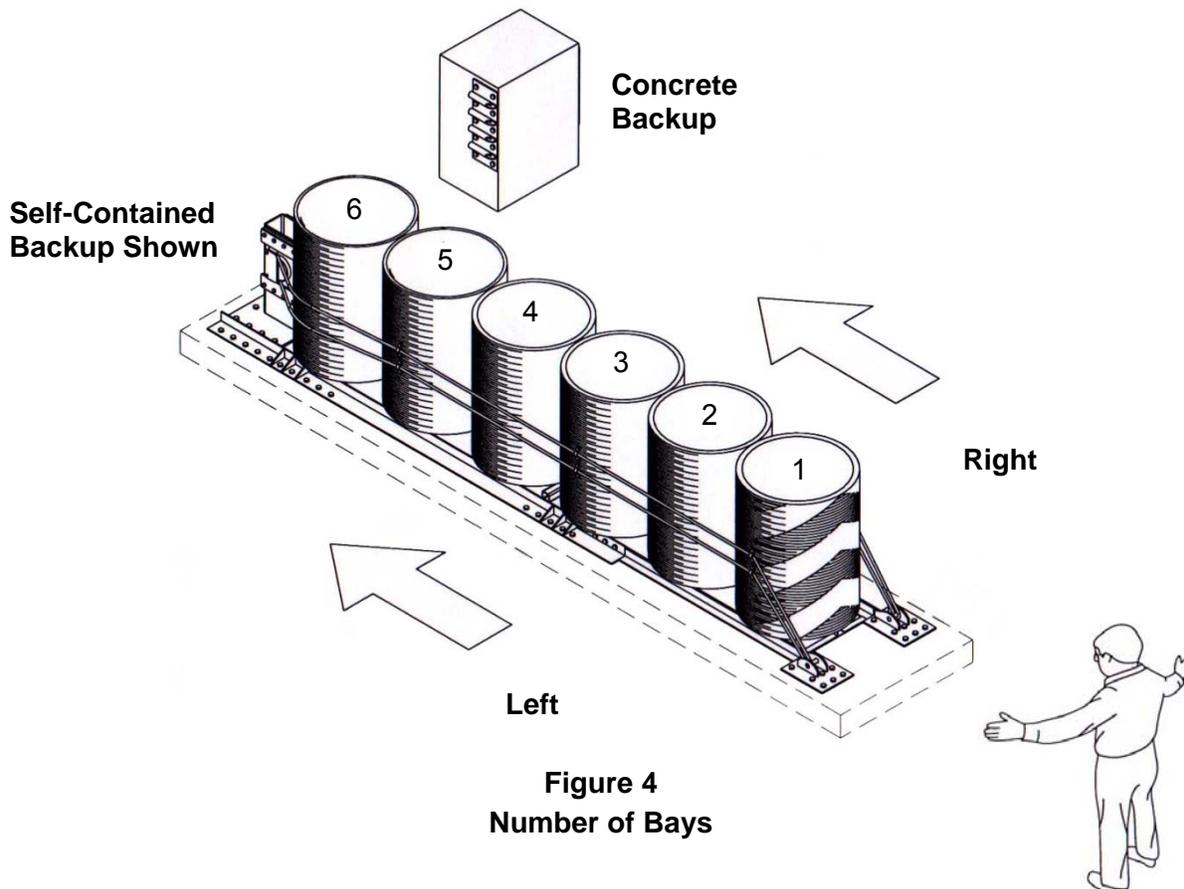


Figure 4
Number of Bays

Backup Type

It is important to fully understand the limitations of each backup type so the correct REACT 350® II is chosen for each location.

The REACT 350® II is available with a Self-Contained Backup or may be attached to a Concrete Backup. Refer to Figures 5a and 5b, along with the backup assembly drawings, to determine which type of backup is appropriate.

Self-Contained Backup

A REACT 350® II with a Self-Contained “steel tube” Backup will require two cables, one cable on each side of the Cylinders. These cables begin at the front of the system, travel through the Cable Guides on the Cylinders, loop around the backup structure, travel back through the Cable Guides, and terminate at the front of the system.

Concrete Backup

REACT 350® II with a Concrete Backup requires four cables. Two cables on each side of the Cylinders begin at the Side Anchor Plates, travel through the Cable Guides on the Cylinders, loop around the pin on the Front Anchor Plates, travel back through the Cable Guides, and terminate at the Side Anchor Plates.

Existing concrete structures may serve as backups for REACT 350® II provided they meet specific size and strength requirements.

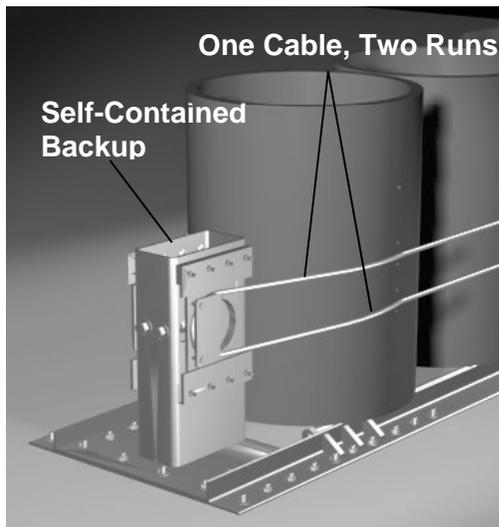


Figure 5a
Self-Contained Backup

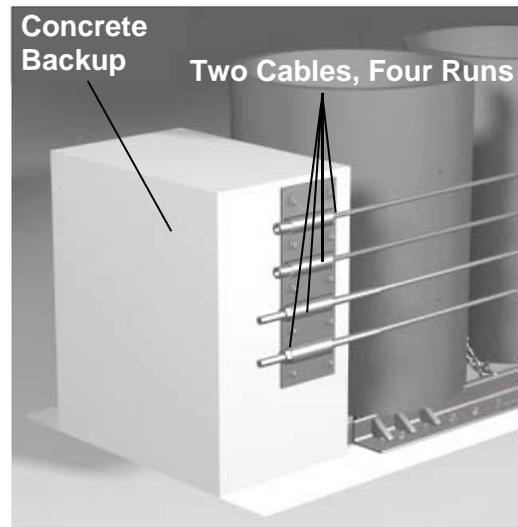


Figure 5b
Concrete Backup

System Design

Self-Contained Backup

The REACT 350® II with a Self-Contained Backup is intended to minimize assembly time. This type of system arrives at the site fully assembled. The assembly crew needs only to lift and place the system in front of the barrier then drill and set the anchors. Refer to the Assembly section on page 21 for a complete list of instructions.

Roadside Feature Width

Generally the REACT 350® II, with a Self-Contained Backup, can shield objects up to 8" [203 mm] wide in a gore application. This type of system can also shield wider roadside features in non-gore and bidirectional traffic locations (p. 17). Please contact Trinity Highway for any additional information (p. 3).

When shielding median barriers (32" [813 mm] high safety shape or single slope), a Self-Contained Backup may be used if the base or "toe" of the barrier is tapered @ 1:4 (15 deg. Maximum) starting at the projected face of the Self-Contained Backup (Figure 6). Transition panels must be added to any side exposed to traffic (p. 22, Figure 16). This helps prevent interaction of wheels on impacting vehicles.

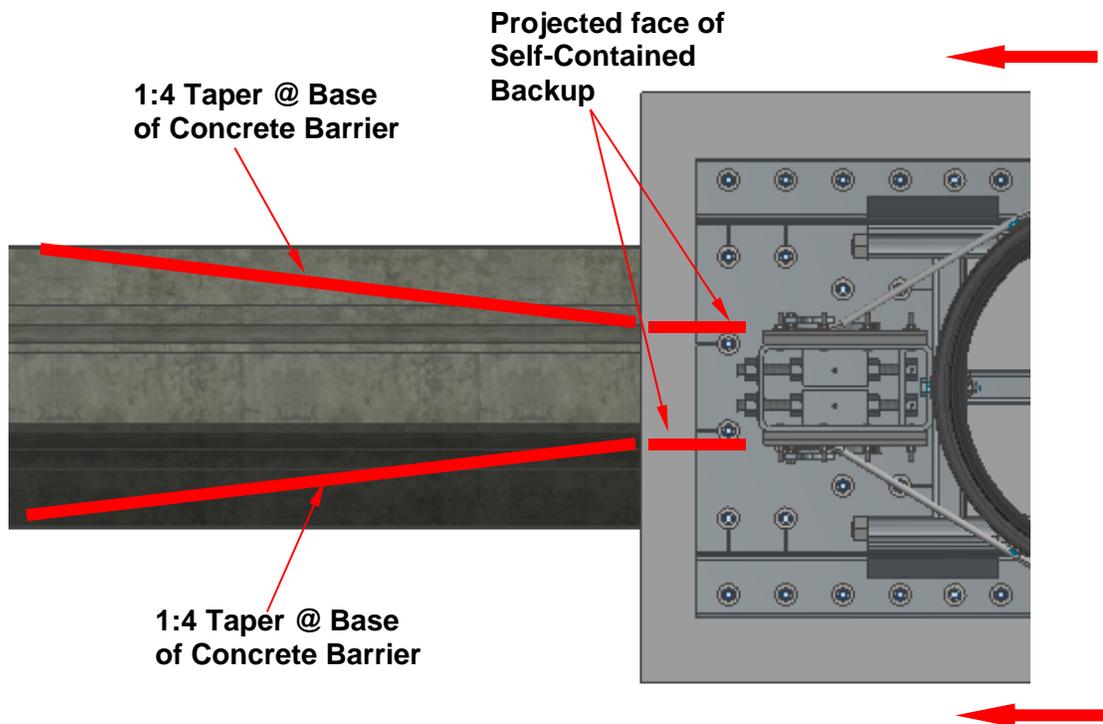


Figure 6
Tapered Barrier

Guardrail Attachment

Hardware is available to mount W-beam guardrail or a safety shaped barrier to the Self-Contained Backup of the REACT 350® II system. A folded Transition Plate and W-beam connector can mount to either or both sides of the backup assembly (Figure 7). If bidirectional traffic is present, special post spacing, rail, and rub-rail will be required for the guardrail. Thrie Beam guardrail adapters are also available. Contact Trinity Highway for assistance (p. 3).

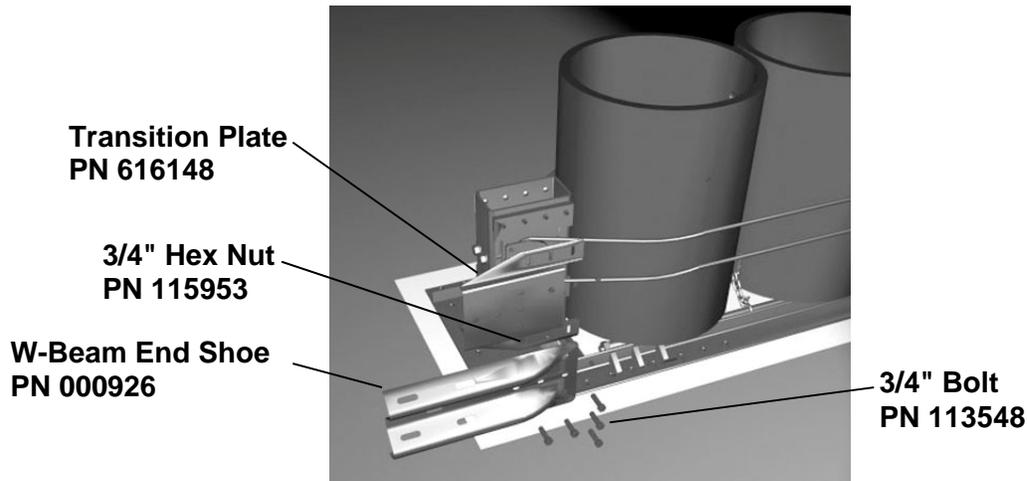


Figure 7
Guardrail Attachment Hardware

Bidirectional Traffic

If bidirectional traffic (vehicles traveling opposite directions on either side of the system) is present, special consideration needs to be taken when placing the system. It is important that the Self-Contained Backup does not become a roadside obstacle to the reverse direction traffic. If a system is placed in a location where traffic will be approaching from the rear of the system, transition hardware may be required.

Optionally, if space permits, the REACT 350® II may be offset so that the backup structure is shielded by the roadside feature (p. 17). Guardrail transition hardware may also be used.

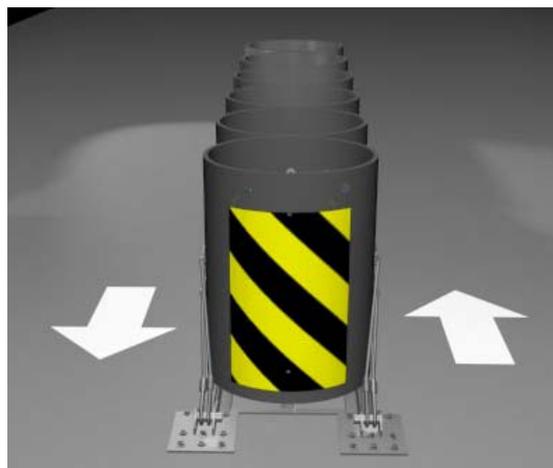


Figure 8
Bidirectional Traffic

Offsetting the System

The REACT 350® II, with a Self-Contained Backup, may be offset from the center of the roadside obstacle if space permits. Offsetting may be necessary for two reasons:

- 1) To shield a fixed object wider than 200 mm [8"]
- 2) If bidirectional traffic is present

When offsetting the system, align the vertical face of the Backup structure with the face of the barrier (Figure 9). With this method, REACT 350® II with Self-Contained Backup may shield roadside features up to 610 mm [24"].



Important: A Concrete Backup may be required if a wider roadside feature or bidirectional traffic are present. Please contact Trinity Highway Customer Service for additional information (p. 3).

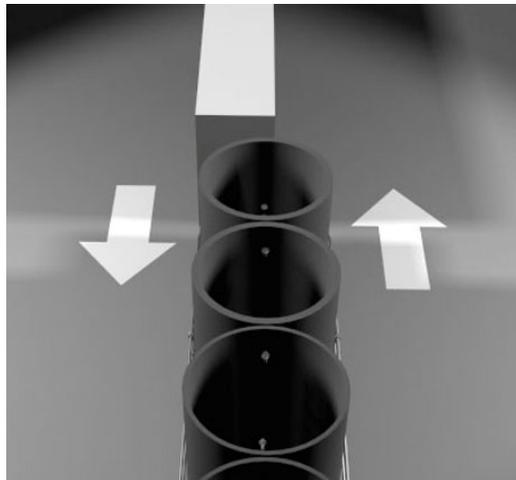


Figure 9

Offsetting the System

Concrete Backup

The REACT 350® II system is also intended to mount directly to a new or existing Concrete Backup. This type of system requires slightly more assembly time, as the cables must be assembled on site (p. 27).

Existing Concrete Backups must be a minimum of 40" [1000 mm] high, 24" [610 mm] long, and 30" [762 mm] to 36" [914 mm] wide, with 28-day strength of 4000 psi [28 MPa] and fully reinforced.

If your existing structure does not meet these minimums, special hardware and designs may be available for them. Contact Trinity Highway Customer Service Department if you have questions concerning Concrete Backup requirements (p. 3).

Roadside Obstacle Width

The REACT 350® II system with a Concrete Backup may be specified to protect obstacles up to 36" [914 mm] wide. The backup must be 30" [762 mm] to 36" [914 mm] wide to use standard side anchor hardware.

Bidirectional Traffic

If bidirectional traffic (vehicles traveling opposite directions on either side of the system) is present, special consideration needs to be taken when placing the system.

It is important for the highway design engineer and the assembler to ensure that the Concrete Backup itself does not become a roadside obstacle to the reverse direction traffic. If the system is placed in a location where traffic will be approaching from the rear of the system, the Backup should not protrude beyond the obstacle being shielded. Concrete tapering may be required.

Also, an additional standard Side Anchor Plate should be rotated 180 degrees and placed behind the first anchor plate (Figure 10). In this case, the backup must be at least 30" [762 mm] long.

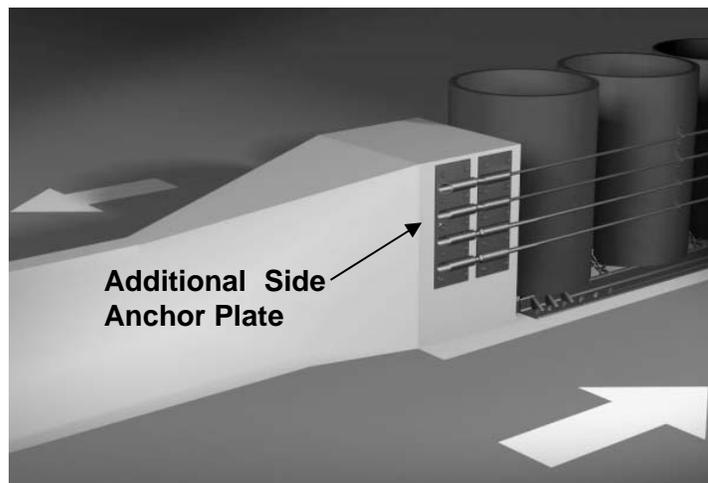


Figure 10

Standard Anchor Plate with Concrete Backup

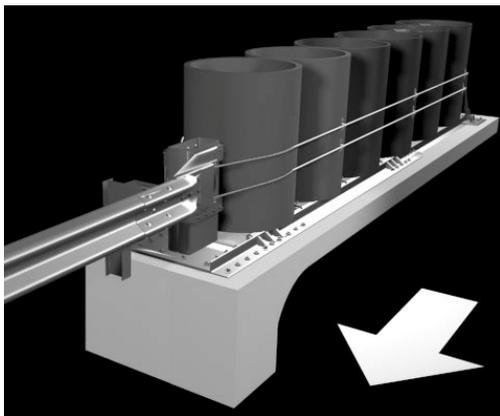


Figure 11a Below-Grade Anchor Block

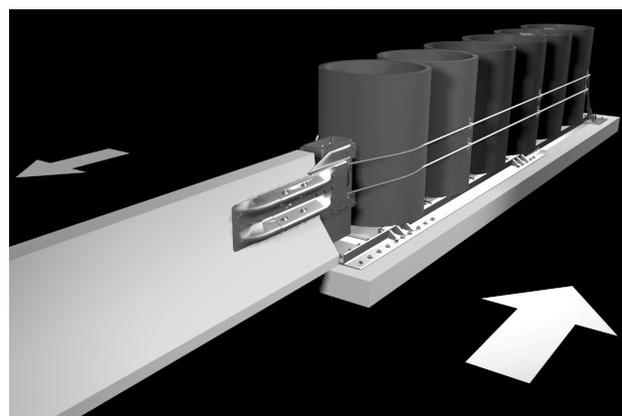


Figure 11b - Anchor Block Not Needed

Application Assistance

Contact Trinity Highway Customer Service if you would like input as to your specific application. Proper model selection is essential to the performance of the REACT 350® II. You will need to answer the following questions:

1. Are curbs, islands, or elevated objects (delineators or signs) present at the site? What height and width are they? All curbs and elevated objects should be removed. Curbs should be removed from behind the backup to approximately 50' [15 m] in front of the REACT 350® II. Any curbs that must remain should be 4" [102 mm] maximum and be mountable. Signs should not interfere with the system's ability to collapse. Generally, a vehicle should not interact with two **objects** at the same time. Allow adequate spacing.
2. If the deployment site is a gore area (place where two roads diverge), what is the angle of divergence?
3. What is the general geometry of the site? Include the roadway for 500' [150 m] in front of the roadside feature, so traffic patterns can be visualized.
4. Is there an existing guardrail or median barrier at the site?
5. What is the width of the roadside obstacle to be protected?
6. Will there be traffic approaching from the rear of the system? Is the system in a two-way traffic situation with traffic going in opposite directions on either side of the system, or is the system on the side of the road where cross over traffic is a concern? If yes, then a transition from the fixed object to the rear of the system may be necessary to prevent a vehicle from interacting with the rear of the system (pp. 16 and 18).
7. Are there any other unique features at the site that may affect the positioning or performance of the REACT 350® II? See the next page for Other Factors That May Affect Your System.



Warning: Do NOT modify the REACT 350® II in any way.



Warning: Safety measures incorporating appropriate traffic control devices specified by the highway authority must be used to protect all personnel while at the assembly, maintenance, or repair site.



Warning: Ensure that there is proper site grading for the REACT 350® II placement as dictated by the state or specifying agency, pursuant to FHWA acceptance.

Other Factors That May Affect Your System

1. The existence of drain inlets or buried culvert pipe.
2. Junction boxes or other appurtenances located near the roadside object.
3. Insufficient space for the length of system preferred.
4. The location and movement of expansion joints.
5. Breaking cross-slopes under or near the proposed assembly or severe cross-slope under the system. Provide leveling to 8% maximum.



Warning: The existence of any cross-slopes in excess of 8% or curbs may create an untested effect on the impacting vehicle.

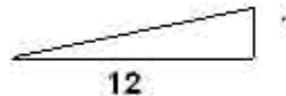


Figure 12
1:12 Cross-Slope

Joints

The REACT 350® II with Concrete Backup and split Base Track may span longitudinal expansion or construction joints. Any system interactive joint movement must be limited to 1 1/2" [38 mm].



Important: The REACT 350® II is not designed to span a transverse joint.

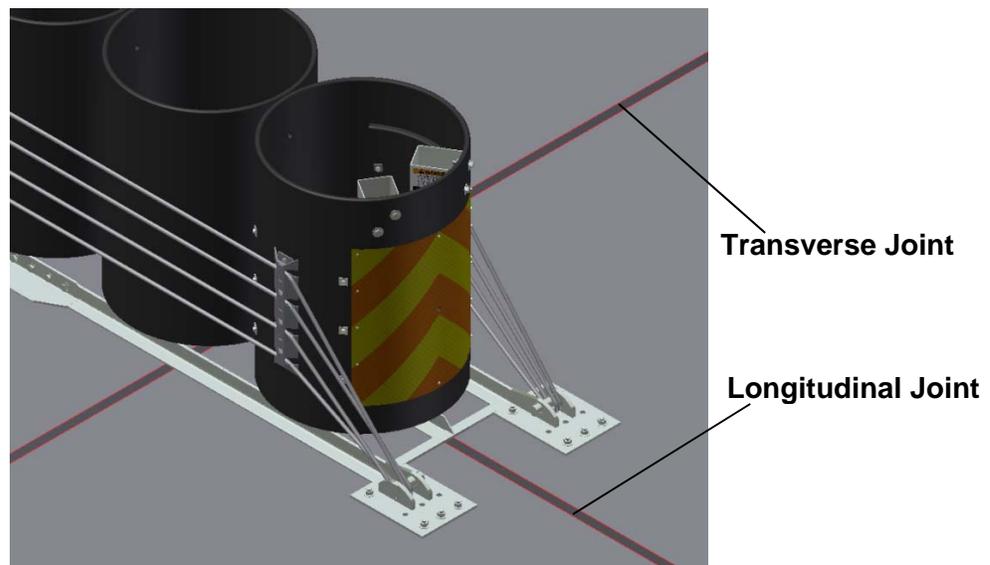


Figure 13
Longitudinal or Transverse Joints

Inspect Shipment

Before assembling the REACT 350® II at a specified location, check the received parts against the shipping list supplied with the system. Make sure all parts have been received. The system is shipped assembled. All assembly hardware can be found in the last Cylinder. The Pullout Assembly should be stored for post impact use.

Assembly

Note: The drawing assembly package provided with the REACT 350® II must be used with these instructions for proper assembly and should take precedence over these general instructions.

1) Deploy Traffic Control

A traffic control plan appropriate to the complexity of the project should be prepared and understood by all parties before the REACT 350® II is assembled. Follow the plan set forth by the highway authority specifying the use of this system.

Deploy the appropriate work zone safety devices prior to beginning the assembly and keep them present through all phases of deployment.



Warning: The correct safety equipment and traffic management system approved by the requisite highway authority must be used as required for any assembly using the REACT 350® II.

2) Determining the Base Point & Centerline

Typically the base point of the REACT 350® II will be the midpoint of the road obstacle at its front face. Offsetting the System may change if bidirectional traffic or expansion joints are present (p. 17).

Extend a chalk line from the base point, perpendicular to the roadside obstacle face, or as determined by project engineer, to a distance greater than the maximum length of the REACT 350® II (refer to the drawings provided). This chalk line will become the centerline for the REACT 350® II (Figure 14).

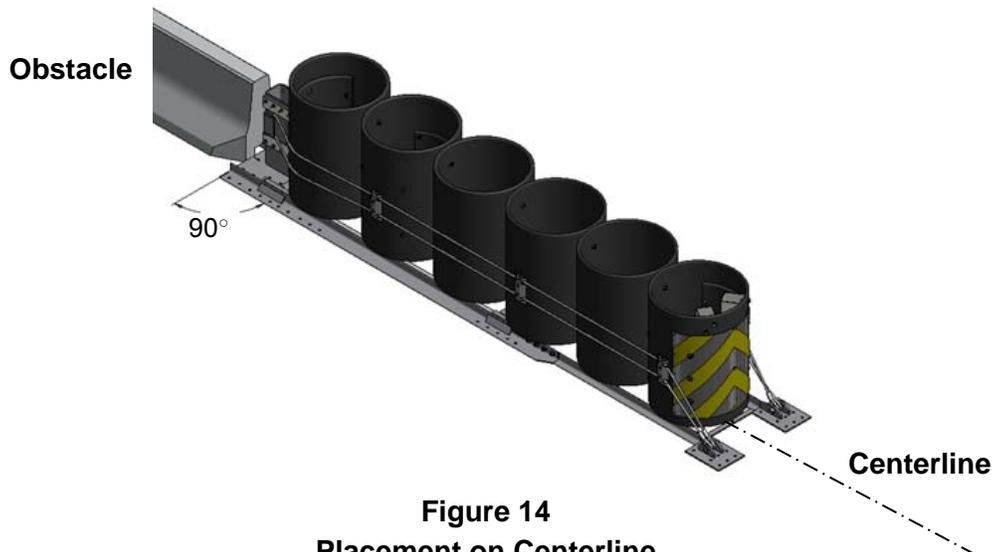


Figure 14
Placement on Centerline

3) Lifting/Placing the System

Mark the centerline on the front and rear of the Base Track. Use the Lifting Eyes located on the Middle Rail of the Rear Base Track (look down into the Cylinders) to lift the REACT 350® II into place (Figure 15).

Use fixed-length slings with a 6,000 lb. [2722 kg] minimum capacity. Fixed slings will prevent the REACT 350® II from tipping. Do not lift overhead. Measure from the centerline to ensure that the REACT 350® II is centered and positioned at the proper angle. The steel Base Track will rest flush against the roadside obstacle face for assemblies that do not require transitions.

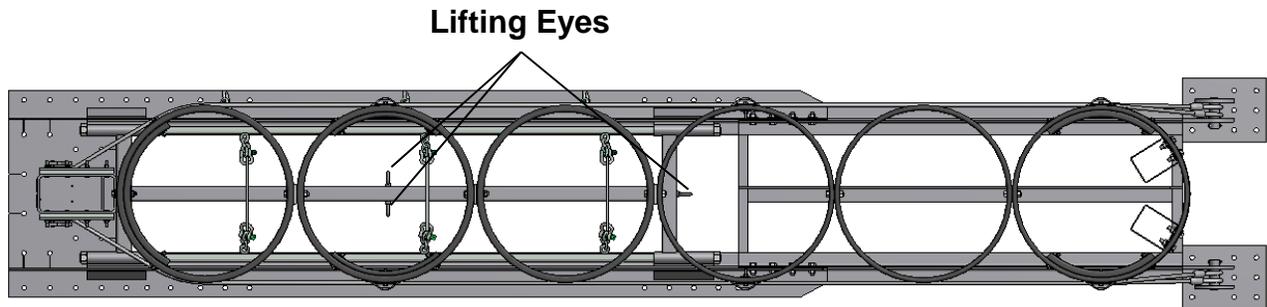


Figure 15 - Lifting Eye Location(s)



Warning: Ensure the hoist device is properly rated to lift the REACT 350® II system.

For Self-Contained Backup assemblies requiring transition hardware to concrete wall or safety shape barrier (PN 616120), the steel Base Track should be 5" [127 mm] forward of the roadside obstacle face (Figure 16).

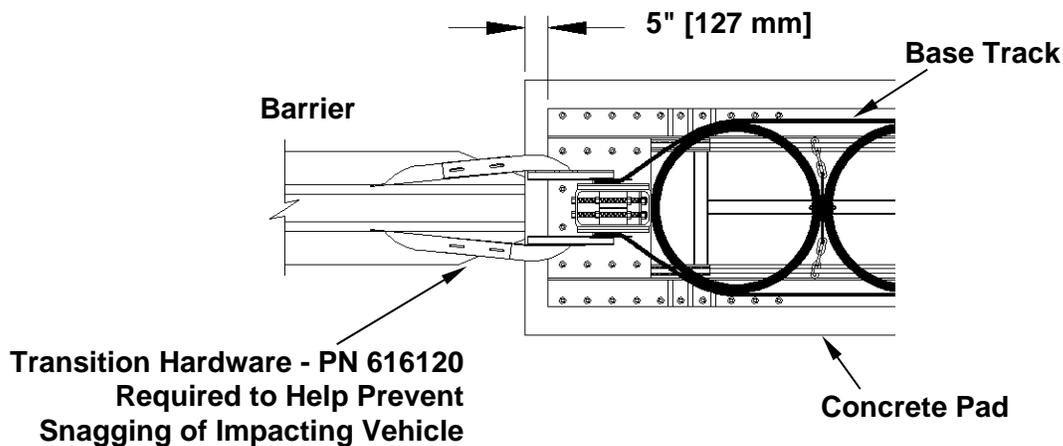


Figure 16 – Transition Hardware

Self-Contained Backups

4) Drill and Set Anchors

Use the holes in the Base Track as a template to locate and drill boreholes, 7/8" [22 mm] diameter x 6" [150 mm] deep into the concrete pad or roadway surface (Figure 17). All boreholes in Base Plate must be used to anchor the REACT 350® II system to the foundation. Use an approved adhesive kit with instructions to secure the 3/4" diameter x 7 1/2" long studs (p. 8).

After adhesive has cured, use 3/4" flat washers and nuts provided with kit to anchor Base Track to foundation.



Warning: Every anchor hole in the Base Plate must be used to secure the REACT 350® II to the foundation.

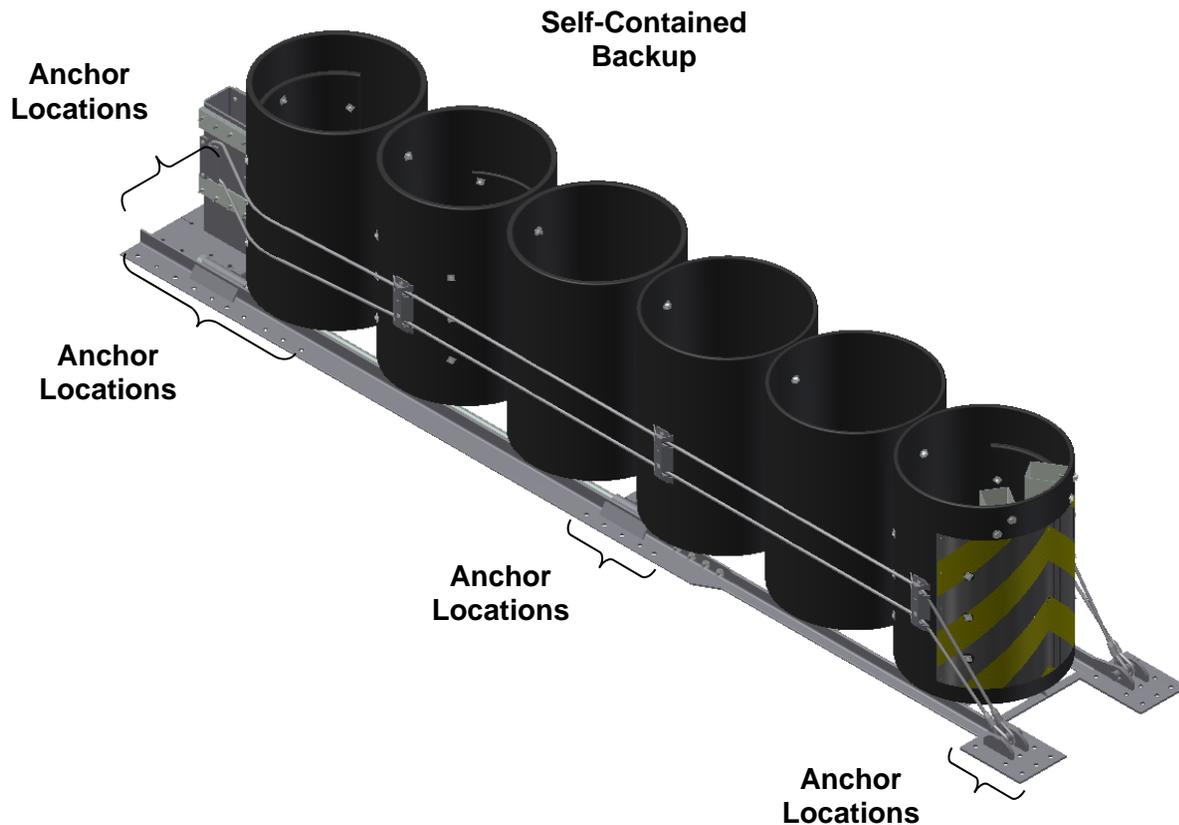


Figure 17 - Anchoring the System - Self-Contained Backup

5) Tension Restraining Cables

Use the two adjusting nuts at the rear of the Backup to tension the cables (Figure 18). When properly tensioned, the cables should not deflect more than 3" [75 mm] with 100 lb. [45 kg] downward pressure.

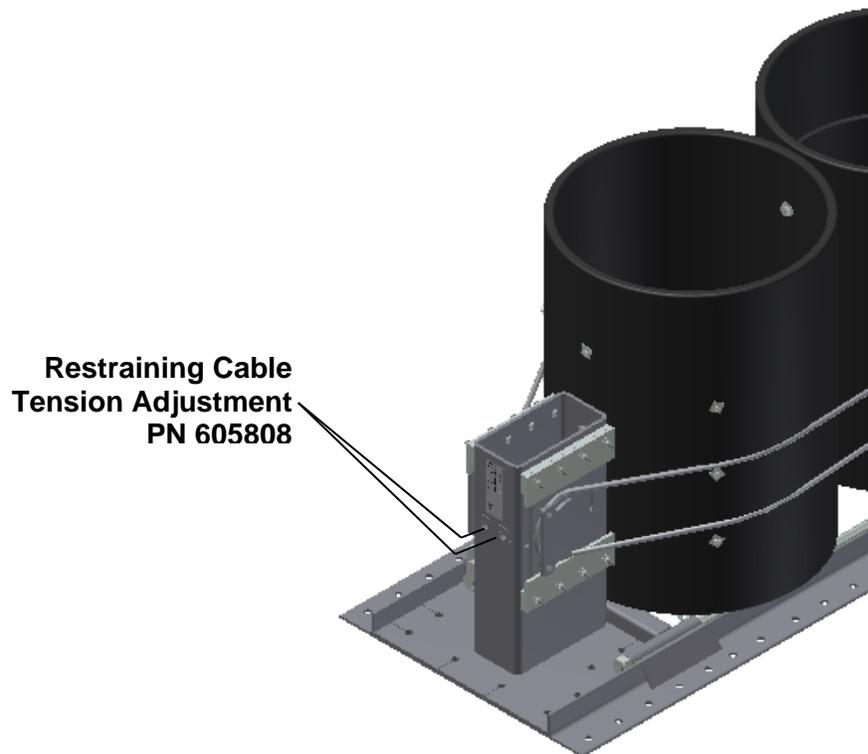


Figure 18 - Tension Adjustment (Self-Contained Backup)

Concrete Backups

1) Rear Cylinder Attachment

Use the top holes of each pair in the Rear Cylinder as a template to locate and drill two (2) holes, 7/8" [22 mm] diameter x 6" [150 mm] deep into the Concrete Backup (Figure 19). Use an approved adhesive kit with instructions to secure the 3/4" diameter x 7 1/2" long studs using instructions included with kit (p. 8). After adhesive has cured, use 3/4" nuts and flat washers included with the approved adhesive kit to attach the Cylinder Assembly to the Concrete Backup (Figure 19).

2) Drill and Set Anchors

Use the holes in the Base Track as a template to locate and drill holes, 7/8" [22 mm] diameter x 6" [150 mm] deep into the concrete pad or roadway surface (Figure 19). Use approved adhesive kits to attach 3/4" diameter x 7 1/2" long studs using instructions included with kit (p. 8). After adhesive has cured, use 3/4" flat washers and nuts provided with kit to anchor Base Track to foundation.



Warning: All holes in Base Plate must be used to anchor the REACT 350® II to the foundation.

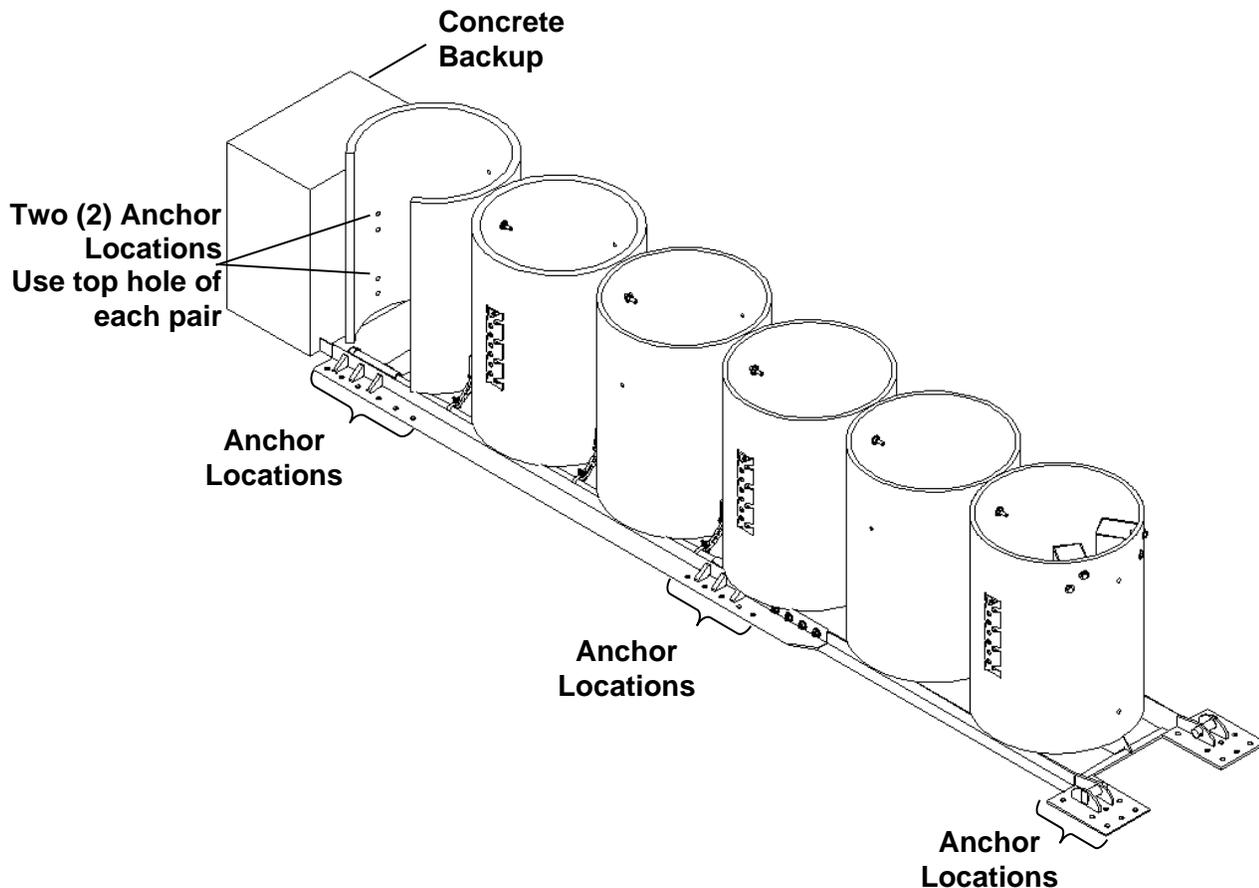


Figure 19 - Anchoring the System - Concrete Backup

3) Drill and Set Side Anchor Plate Anchors



Warning: For REACT 350® II with a Concrete Backup, Side Cable Anchor Plates must be attached.



Warning: The vertical placement of the Side Anchor Plates is critical to the performance of the REACT 350® II. If an existing backup is not tall enough to fulfill these requirements, special brackets are available. Consult Trinity Highway Customer Service for further information (p. 3).

When correctly assembled, the top of the Side Cable Anchor Plates should be 39" [991 mm] from the road surface. The front edge of the Side Cable Anchor Plates should be 2" - 4" [51 mm - 102 mm] from the front face of the backup to avoid reinforcing steel. The tapered tubes of the Side Cable Anchor Plates should face the front of the REACT 350® II (Figure 20). Use the holes in the Side Cable Anchor Plates as templates to match drill ten (10) holes per side of backup, 7/8" [22 mm] diameter x 5 1/2" [140 mm] deep into the Concrete Backup. **Use an approved adhesive kit to place twenty (20) 3/4" diameter x 6 1/2" long studs using instructions included with kit.** After adhesive has cured, use 3/4" flat washers and nuts provided with kit to attach side cable anchor plates (one on each side) to Concrete Backup (Figure 20).

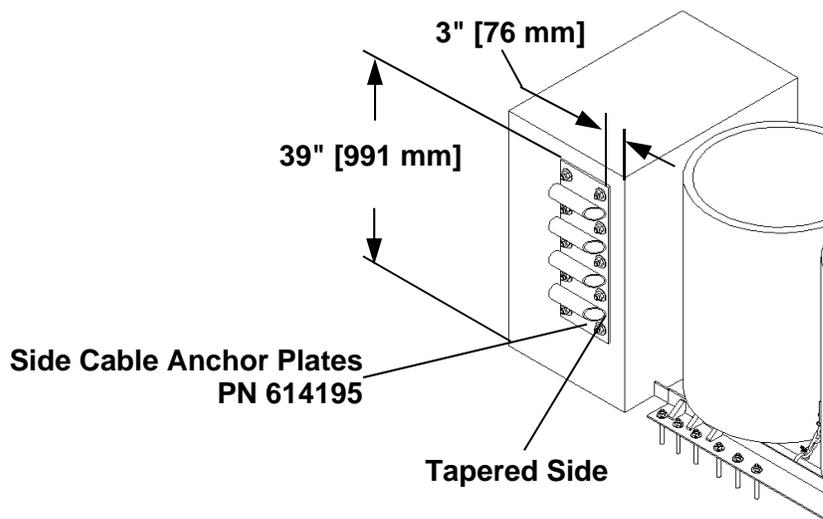


Figure 20 - Side Cable Anchor Plates

4) Attach Restraining Cables



Warning: Four (4) Restraining Cables must be attached; two (2) on each side of the Concrete Backup.

- A. Slide the threaded end of a Restraining Cable through the third guide down and attach flat washer and nut as shown in Figure 21. Tighten the nut so it is flush with the end of the threaded end of cable.

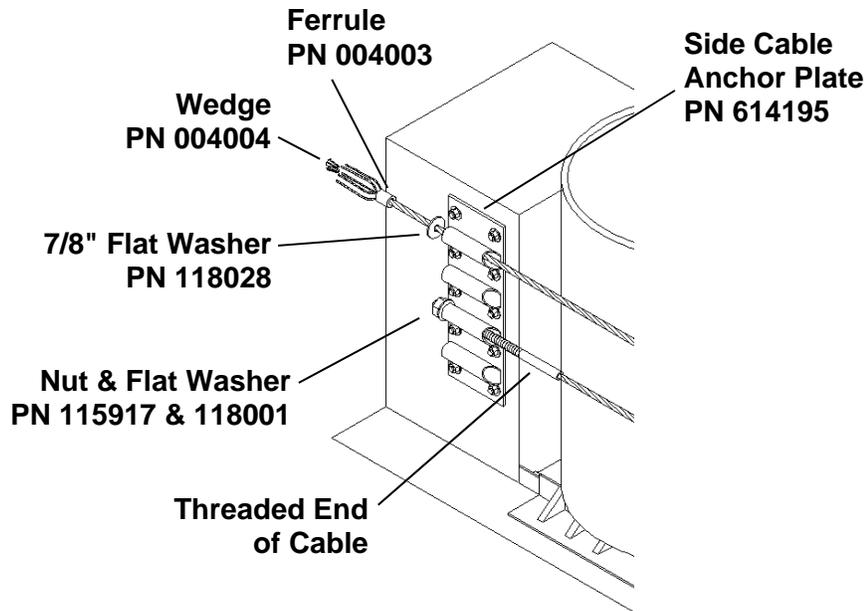


Figure 21 - Routing First Cable

- B. Route the Restraining Cable through the Cable Guides on the sides of the Cylinders, around the Restraining Cable Pin as shown in Figure 22, back through the Top Cable Guides on the Cylinders and through the Top Cable Guide of the Side Plate (Figure 23).

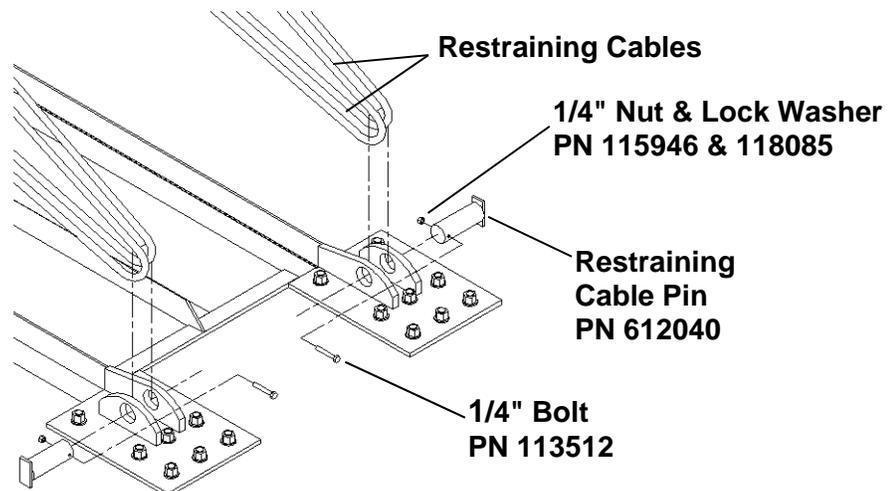
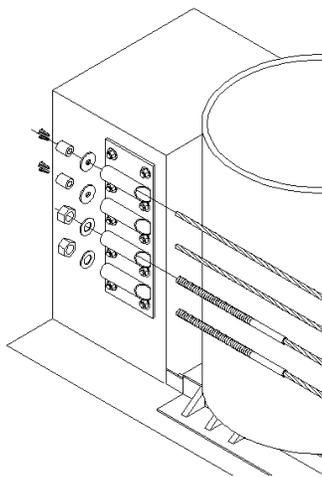


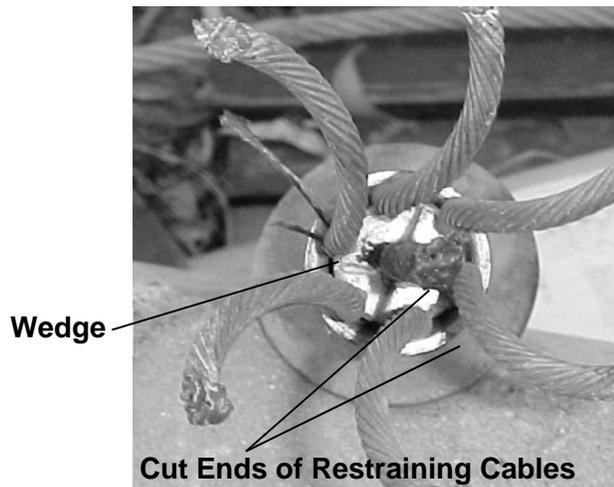
Figure 22 - Front of System Cable Attachment (Concrete Backup)

C. Pull on the cut end of the cable removing all possible slack. Slide the 7/8" x 3" flat washer and the ferrule (in that order) over the end of the non-threaded end of the Restraining Cable. Mark the cable 50 mm [2"] back from the ferrule. Leaving the ferrule and washer in place, cut the cable at the mark with a grinder or hack saw. Do not use a torch to cut the cable. Unbraid end of cable and insert middle strand between the two halves of the wedge. Carefully wrap the remaining six strands into the two halves of the wedge. Carefully wrap the remaining six strands into the slots around the wedge then push into ferrule to tighten (Figure 23 and Detail A). Use a drift pin and sledge hammer to seat the ferrule into the cable receptacles.

Repeat these steps for remaining three Restraining Cables, ensuring that the threaded ends of the Restraining Cables are attached through the lower two guides as shown in Figure 23.



**Figure 23 – Rear Cable Attachment
Concrete Backup**



Detail A – Cable Ferrule

5) Tension Restraining Cables

Use the nuts on the threaded end of the cables to tension the cables (Figure 21).

When properly tensioned, the cables should not deflect more than 75 mm [3"] with 45 kg [100 lb.] downward pressure.

Attach Nose Cover

1. Ensure appropriate Nose Cover is attached (Figure 24). The Nose Cover Selection below will assist in your selection and you should refer to local standards and MUTCD for nose.

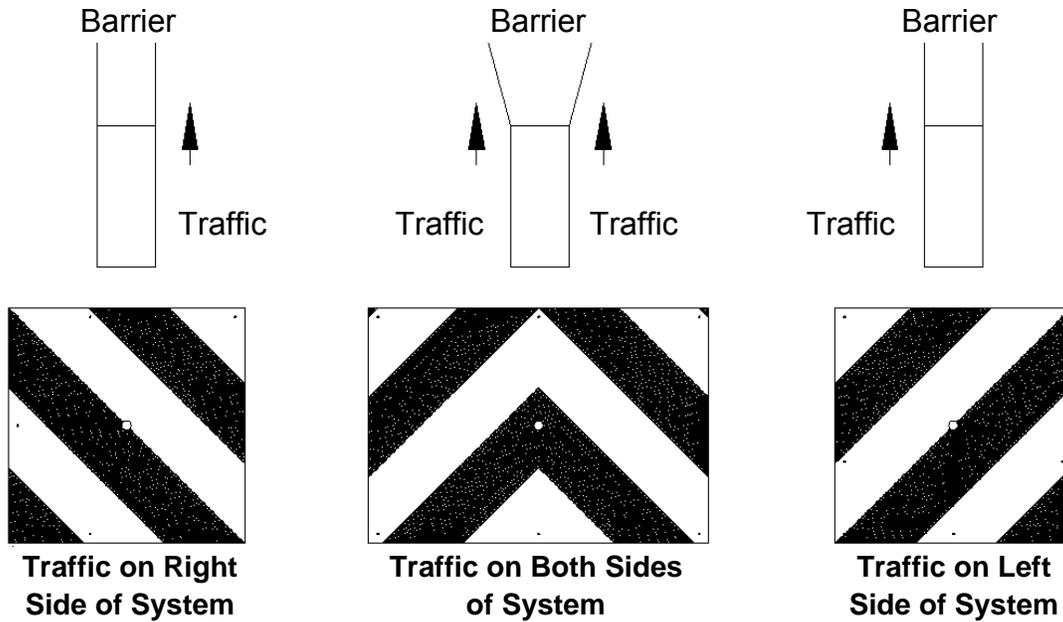


Figure 24 - Nose Cover Selection

2. Align 1" diameter hole in Nose Cover with 1" diameter hole in Cylinder (Figure 25).
3. Screw 1/4" self-drilling screw into Cylinder to punch through reflective tape and into the existing holes in Nose Cover until head of fastener is flush (10 places) (Detail B).

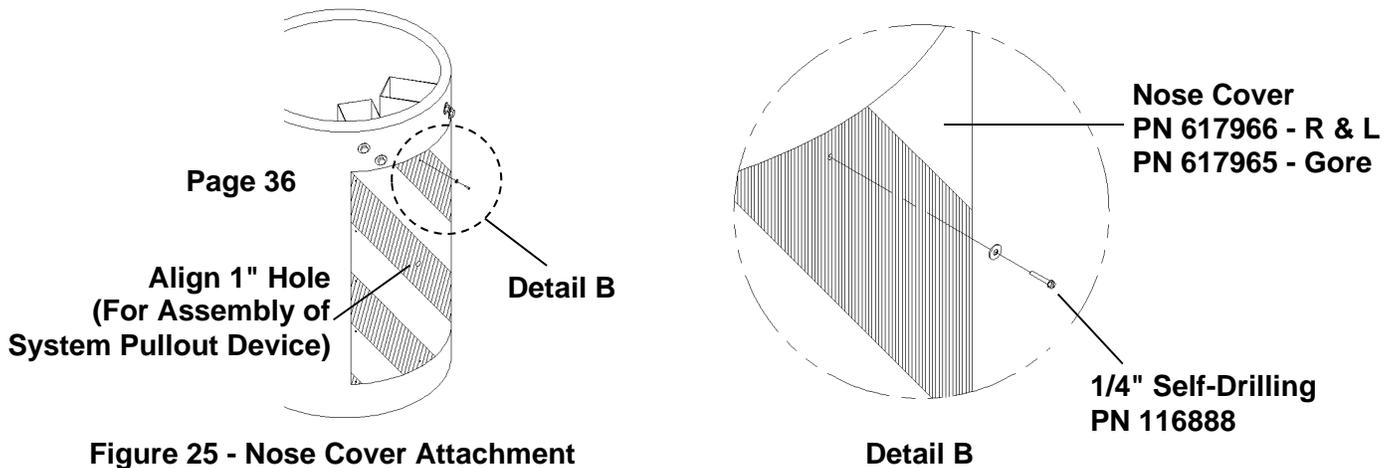


Figure 25 - Nose Cover Attachment

Affix Side Mount Reflectors

Refer to local standards and MUTCD for reflectors.

Attach Side Mount Reflectors to traffic side(s) of the system, with the white side facing traffic, by screwing #8 self-tapping screws through the reflector and into the Cylinder until head is flush (Figure 26).

Note: Reflector drawing available on page 58.

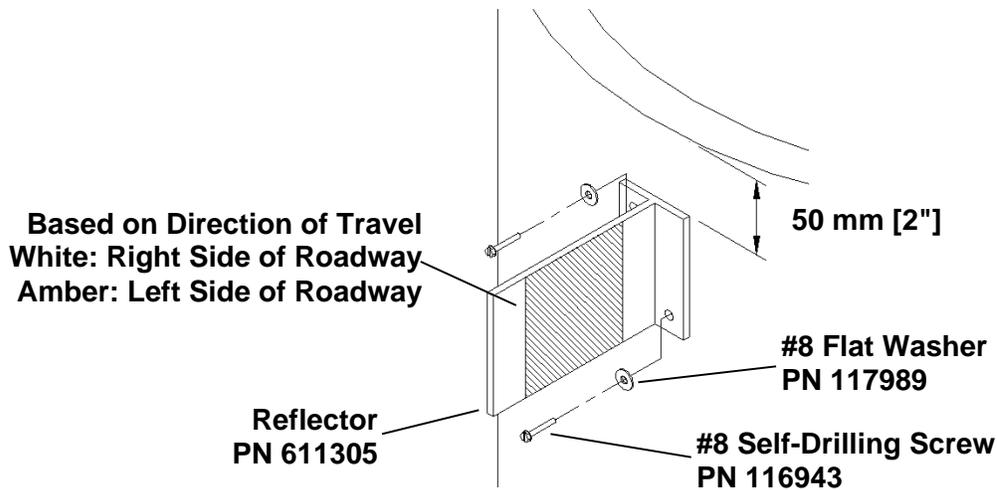


Figure 26 - Side Mounted Reflector



Warning: It is the responsibility of the installer to ensure that the REACT 350® II delineation meet all federal, state, specifying agency, and local specifications.

Attach Optional Debris Covers

To attach Optional Debris Covers, center a cover on Cylinder 1. Note the orientation of the grommets. The two grommets closest together should be located in the front or rear of the Cylinder (Figure 27). Additional style covers are available by contacting Trinity Highway for more options (p. 3).

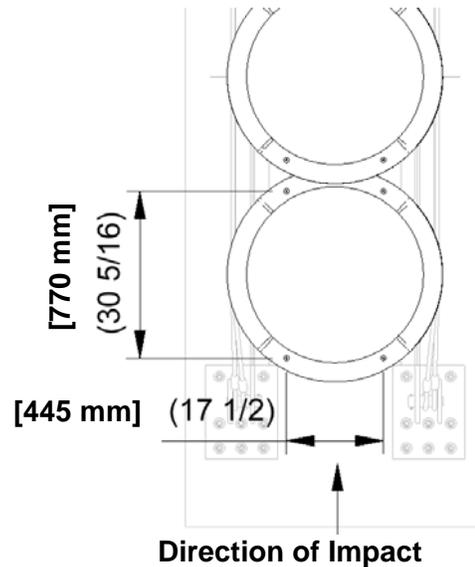


Figure 27

Next, attach Optional Debris Cover to Cylinder with four #10 flat head screws and fender washers ensuring each screw is positioned in the middle of the Cylinder wall (Figure 28).

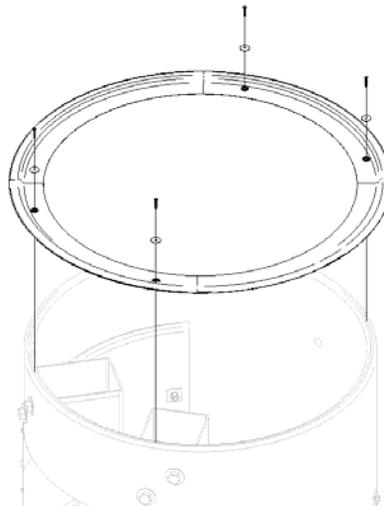


Figure 28

Continue to attach the remaining covers as described above.

Note: The covers may overlap; however, the overlap direction is not critical to system performance.

Maintenance and Repair

The REACT 350[®] II, through crash testing, has been shown to be a potentially reusable crash cushion. After impacts within NCHRP Report 350 criteria, it has been observed that, potentially, the bulk of the system can be reused. However, whether or not a system is reusable is the sole discretion of the highway authority specifying their use.



Warning: Use only Trinity Highway parts on the REACT 350[®] II system for assembly, maintenance, or repair. **The assembly or comingling of unauthorized parts is strictly PROHIBITED.** The REACT 350[®] II and its component parts have been accepted for state use by the FHWA. However, a comingled system has not been accepted within the applicable criteria.



Important: After impact, always follow Post Impact Instructions on page 36.

Estimated Time for Maintenance

An experienced two-person crew with the proper tools and spare parts should be able to complete the work in one to three hours depending on the damage done to the system.

Life Expectancy

Impacts

Potential life expectancy of the system is mostly dependent on system impacts. This includes:

1. The number of impacts
2. The severity of the impacts
3. The temperature at the time of the impacts

The REACT 350[®] II must be inspected after each impact. Depending on the impact, components may get damaged and need replacement. A cylinder requires replacement when the minor axis of the cylinder stays permanently at 18" [460 mm] or less (Figure 29) or the system does not reach 90% of the original length. It is critical that all cables and anchoring be checked and returned to original assembly conditions. Any parts used in the repair of the system must be original Trinity Highway parts (p. 3).

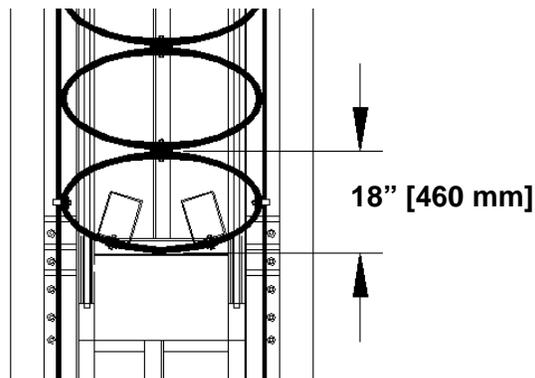


Figure 29 - Measure Minor Axis

Recycling Information

When parts need to be replaced, it is recommended that the old parts be recycled as follows:

Steel should be sold as scrap to a local metal recycler.

HDPE plastic cylinders should be sold to a plastic recycler if possible. If a recycler is unavailable, dispose of the material as plastic refuse.

Parts Ordering Procedure

1. Locate the Product Decal attached to the inside of the Rear Cylinder. Copy the sales order information from the decal.
2. Make a list of any damaged parts, using part numbers and descriptions found on the reference drawings included with the REACT 350® II system.
3. Only parts specified to be used in this system may be used during repair. The use of a part not specified in this system design renders this system as one that HAS NOT BEEN accepted by FHWA for use on the NHS and all observed crash testing to determine system performance is negated. The use of a part not contained herein during the repair renders the systems as something other than that which was tested.

Inspections

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

REACT 350® II Final Inspection Checklist

Site Location: _____

Date: _____

Inspector: _____

- Each anchor is torqued to adhesive manufacturer specification (p. 8)
- Every hole on the Base Track is fastened by an anchor (pp. 15, 17)
- All cables are attached and tensioned (pp.15, 21)
- Appropriate transitions are in place and properly fitted (p. 23)
- Ensure pre-assembled hardware fasteners have not loosened during shipment
- Each Cylinder is properly positioned on Base Track
- Clear all construction debris in and around system



Important: After impact, always follow Post Impact Instructions on page 36.

Visual Drive-By Inspection

1. Check to see if there is evidence of an impact. Check to verify that the REACT 350® II is fully extended from the backup. If it is not, a walk-up inspection will be necessary to determine the cause.
2. Note the location and condition of the REACT 350® II and the date of visual drive-by inspection on a log sheet.



Warning: Debris, snow, or ice inside the cylinders may prevent the REACT 350® II from absorbing the impact of a crash as observed in NCHRP Report 350 compliant crash testing. Perform a walk-up inspection as needed to check for and dispose of any debris inside the Cylinders. Failing to remove this debris or other material infringes upon the performance of the system as tested.

Walk-Up Inspection Checklist

Date: _____

Inspector: _____

- Remove any debris under or around the REACT 350® II.
- Remove any debris found inside the Cylinders.
- Replace Cylinders when the minor axis of the cylinders measures 460 mm [18"] or less (p. 26).
- Replace bent or damaged parts as soon as possible (p. 35).
- Verify that all nuts and bolts are tight and rust free.
- Ensure each Concrete Anchor Bolt is securely anchored using an approved adhesive.
- Verify that all Cylinders are in good condition and centered on the Base Track. Any Cylinder that is cracked or otherwise damaged should be replaced. Measure the minor axis of the Cylinders.
- All cables are attached with parts specified for use in this system.
- Note the location, condition, and date of inspection for any work done on the REACT 350® II. If further repair is necessary, note the repair requested. Refer to the standard drawing and assembly section of this manual for more information.



Warning: It is the responsibility of the installer to deploy locally approved personal safety equipment and traffic management for all walk-up inspections.

Post-Impact Instructions and Drawings

1. Deploy the appropriate **traffic control** devices to protect your crew.



Warning: Locally approved personal safety equipment and traffic management must be used for walk-up inspections.

2. All anchor bolts have remained firmly anchored in the roadway surface and in the Concrete Backup, if applicable. Replace any anchors that are loose, broken, or pulled out.
If the system is anchored to asphalt, up to 10% of the total anchors may be replaced if damaged. If more than 10% of the anchors are damaged, the system should be relocated to fresh, undisturbed asphalt and redeployed using the 460 mm [18"] threaded rods.
3. Clear and dispose of any debris inside the cylinders and on site.
4. Check the condition of the Cylinders. Any Cylinder that is cracked or otherwise damaged should be replaced. Measure the minor axis of the Cylinders. Cylinders require replacement when the minor axis of the Cylinders measures 460 mm [18"] or less (p. 34).
5. The REACT 350® II must be pulled out to its original length after each impact. The Pullout Assembly must be attached prior to this procedure and removed and stored when finished (Figure 30).

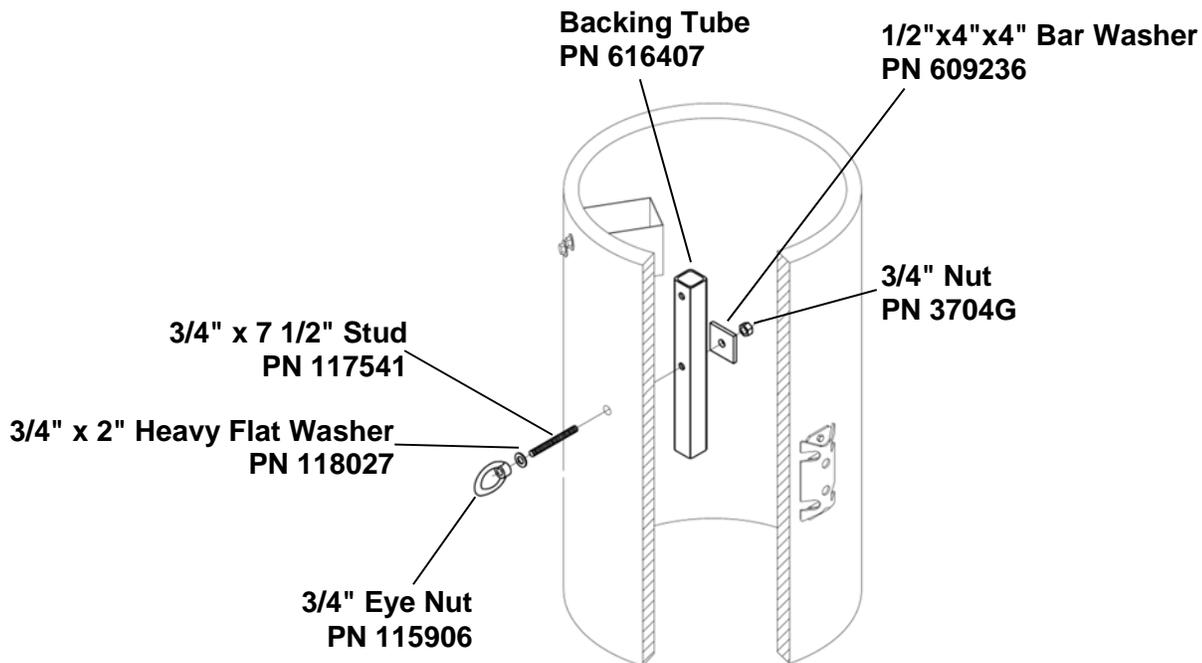
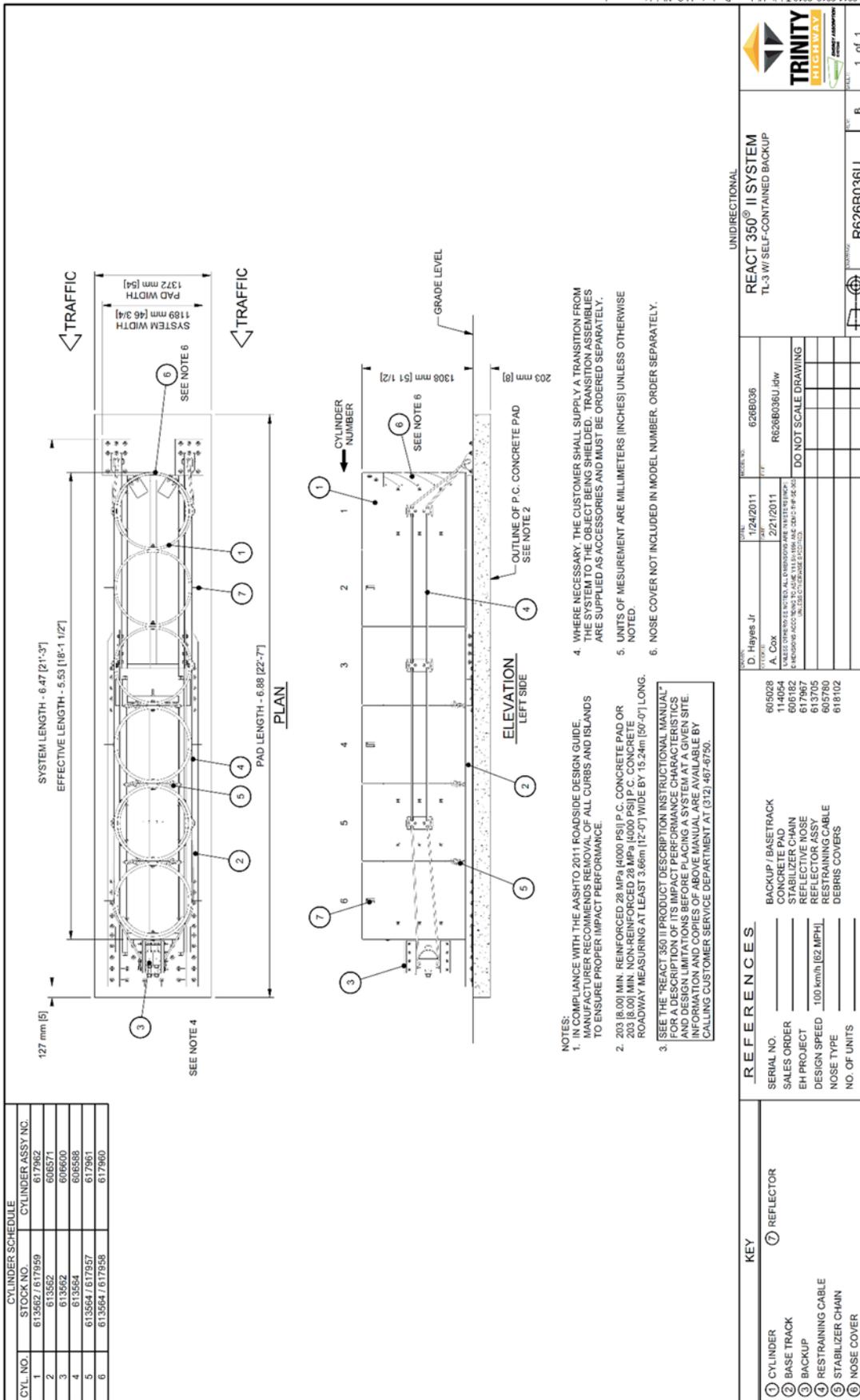


Figure 30 - Pullout Assembly



REACT 350® II TL-3 w/Self-Contained Backup R626B036U

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 SEE THE REACT 350 USER MANUAL



| | | | | |
|-------------------------------|----------------------|--------------|------|-------------|
| UNIDIRECTIONAL | PROJECT NO. | R626B036U | REV. | B |
| TRACT 350® II SYSTEM | DATE | 1/24/2011 | BY | D. Hayes Jr |
| TL-3 W/ SELF-CONTAINED BACKUP | DATE | 2/21/2011 | BY | A. Cook |
| | DESCRIPTION | R626B036U HW | | |
| | DO NOT SCALE DRAWING | | | |

| REV. | DESCRIPTION | DATE | BY |
|------|-------------------------|-----------|-------------|
| 1 | ISSUED FOR CONSTRUCTION | 1/24/2011 | D. Hayes Jr |
| 2 | REVISED TO ADD 1/2\"/> | | |

| REV. | DESCRIPTION | DATE | BY |
|------|-------------------------|-----------|-------------|
| 1 | ISSUED FOR CONSTRUCTION | 1/24/2011 | D. Hayes Jr |
| 2 | REVISED TO ADD 1/2\"/> | | |

| KEY | DESCRIPTION |
|-----|-------------------|
| ① | CYLINDER |
| ② | BASE TRACK |
| ③ | BACKUP |
| ④ | RESTRAINING CABLE |
| ⑤ | STABILIZER CHAIN |
| ⑥ | NOSE COVER |
| ⑦ | REFLECTOR |

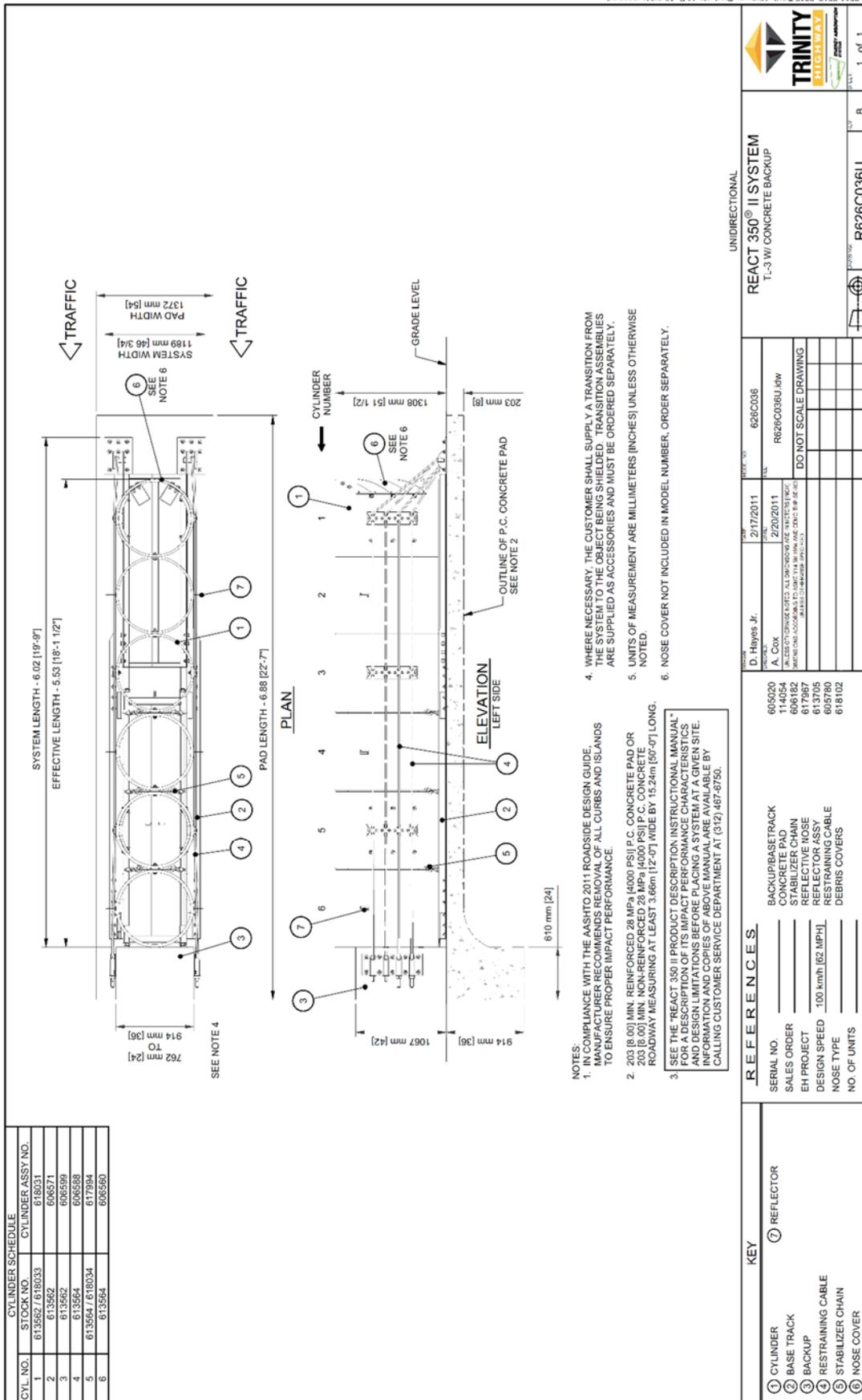
| REV. | DESCRIPTION | DATE | BY |
|------|-------------------------|-----------|-------------|
| 1 | ISSUED FOR CONSTRUCTION | 1/24/2011 | D. Hayes Jr |
| 2 | REVISED TO ADD 1/2\"/> | | |

| REV. | DESCRIPTION | DATE | BY |
|------|-------------------------|-----------|-------------|
| 1 | ISSUED FOR CONSTRUCTION | 1/24/2011 | D. Hayes Jr |
| 2 | REVISED TO ADD 1/2\"/> | | |

- NOTES:**
- IN COMPLIANCE WITH THE AASHTO 2011 ROADSIDE DESIGN GUIDE, MANUFACTURER RECOMMENDS REMOVAL OF ALL CURBS AND ISLANDS TO ENSURE PROPER IMPACT PERFORMANCE.
 - 203 (8.00) MIN. REINFORCED 28 MPa (4000 PSI) P.C. CONCRETE PAD OR CURB WITH 100 (4.00) MPa (14500 PSI) P.C. CONCRETE ROADWAY MEASURING AT LEAST 3.66m (12'-0") WIDE BY 19.24m (60'-0") LONG.
 - SEE THE "REACT 350 II PRODUCT DESCRIPTION INSTRUCTIONAL MANUAL" FOR A DESCRIPTION OF ITS IMPACT PERFORMANCE CHARACTERISTICS AND DESIGN LIMITATIONS BEFORE PLACING A SYSTEM AT A GIVEN SITE. INFORMATION AND COPIES OF ABOVE MANUAL ARE AVAILABLE BY CALLING CUSTOMER SERVICE DEPARTMENT AT (512) 467-6750.
 - WHERE NECESSARY, THE CUSTOMER SHALL SUPPLY A TRANSITION FROM THE SYSTEM TO THE OBJECT BEING SHIELDED. TRANSITION ASSEMBLIES ARE SUPPLIED AS ACCESSORIES AND MUST BE ORDERED SEPARATELY.
 - UNITS OF MEASUREMENT ARE MILLIMETERS (INCHES) UNLESS OTHERWISE NOTED.
 - NOSE COVER NOT INCLUDED IN MODEL NUMBER. ORDER SEPARATELY.

| REV. | DESCRIPTION | DATE | BY |
|------|-------------------------|-----------|-------------|
| 1 | ISSUED FOR CONSTRUCTION | 1/24/2011 | D. Hayes Jr |
| 2 | REVISED TO ADD 1/2\"/> | | |

| REV. | DESCRIPTION | DATE | BY |
|------|-------------------------|-----------|-------------|
| 1 | ISSUED FOR CONSTRUCTION | 1/24/2011 | D. Hayes Jr |
| 2 | REVISED TO ADD 1/2\"/> | | |



| CYLINDER SCHEDULE | |
|-------------------|-------------------------------|
| CYL. NO. | STOCK NO. / CYLINDER ASSY NO. |
| 1 | 613562 / 618033 |
| 2 | 613562 / 606571 |
| 3 | 613562 / 606599 |
| 4 | 613564 / 606558 |
| 5 | 613564 / 618034 |
| 6 | 613564 / 606560 |

| KEY | |
|-----|-------------------|
| ① | CYLINDER |
| ② | BASE TRACK |
| ③ | BACKUP |
| ④ | RESTRAINING CABLE |
| ⑤ | STABILIZER CHAIN |
| ⑥ | NOSE COVER |

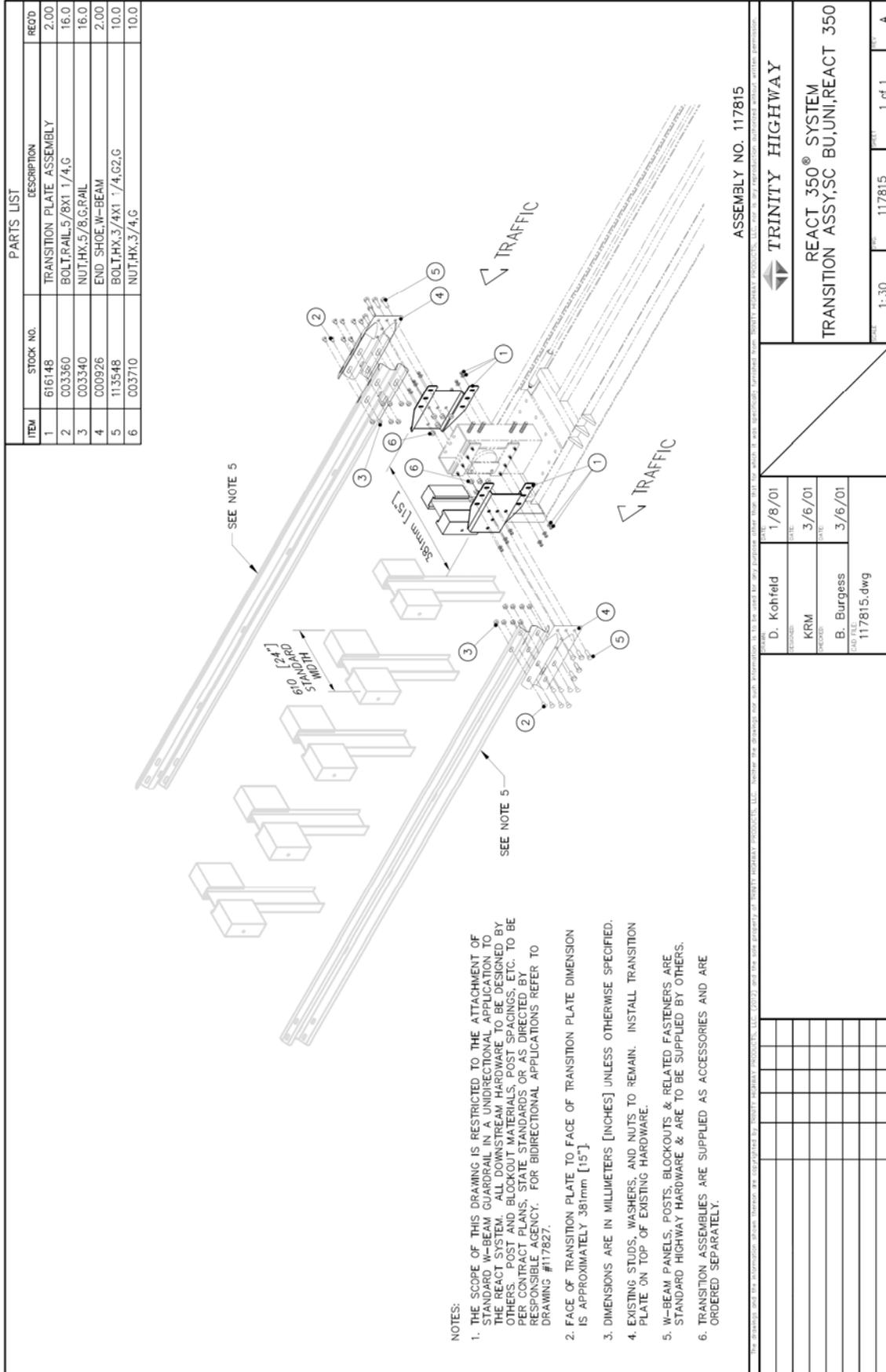
| REFERENCES | |
|--------------|-------------------|
| SERIAL NO. | 605020 |
| SALES ORDER | 114054 |
| EH PROJECT | 606182 |
| DESIGN SPEED | 100 km/h (62 MPH) |
| NOSE TYPE | 617807 |
| NO. OF UNITS | 605780 |
| | 618102 |

| DATE | BY | DESCRIPTION |
|-----------|--------------|---------------|
| 2/17/2011 | D. Hayes Jr. | 628C036 |
| 2/20/2011 | A. Cox | R626C036U I/W |

| REV | DESCRIPTION |
|-----|----------------------|
| 1 | DO NOT SCALE DRAWING |

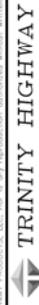
| UNIDIRECTIONAL | REACT 350® II SYSTEM | TL-3 w/ CONCRETE BACKUP |
|----------------|----------------------|-------------------------|
| ① | R626C036U | B |

REACT 350® II TL-3 w/Concrete Backup R626C036U



Transition Assembly, SC BU, UNI 117815

ASSEMBLY NO. 117815



TRACT 350® SYSTEM
TRANSITION ASSY,SC BU,UNI,TRACT 350

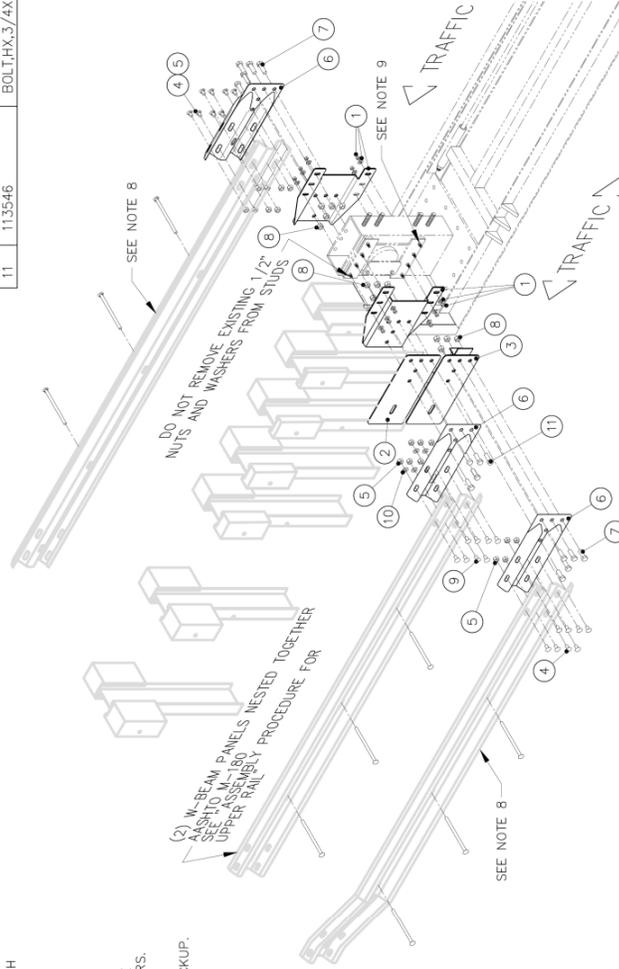
1:30 117815 1 of 1 A

| | |
|------------|--------|
| D. Kahfeld | 1/8/01 |
| KRM | 3/6/01 |
| B. Burgess | 3/6/01 |
| 117815.dwg | |

| PARTS LIST | | | |
|------------|-----------|---------------------------|-------|
| ITEM | STOCK NO. | DESCRIPTION | REQ'D |
| 1 | 616148 | TRANSITION PLATE ASSEMBLY | 2.00 |
| 2 | 608107 | END SHOE CONNECTOR PLATE | 1.00 |
| 3 | 613886 | RUBRAIL BRACE | 1.00 |
| 4 | 003360 | BOLT,RAIL,5/8X1 1/4,G | 16.0 |
| 5 | 003340 | NUT,HX,5/8,G,RAIL | 24.00 |
| 6 | 000926 | END SHOE W-BEAM | 3.00 |
| 7 | 113548 | BOLT,HX,3/4X1 1/4,G2,G | 10.0 |
| 8 | 003710 | NUT,HX,3/4,G | 15.00 |
| 9 | 003400 | BOLT,RAIL,5/8X2,G | 8.00 |
| 10 | 003300 | WASHER,FLAT,5/8 X 1 3/4,G | 8.00 |
| 11 | 113546 | BOLT,HX,3/4X1 1/2,G2,G | 5.00 |

NOTES:

- STANDARD BARRIER HARDWARE HAS BEEN USED TO DEVELOP THIS GUARDRAIL TRANSITION. SEE "A GUIDE TO STANDARDIZED HIGHWAY BARRIER RAIL HARDWARE," 2014, AASHTO TASK FORCE 13 JOINT COMMITTEE.
- DO NOT BOLT NESTED W-BEAM OR RUBRAIL W-BEAM TO POSTS AND BLOCKS ON POSTS #2 AND #4. BOLT BLOCKS DIRECTLY TO POSTS.
- USE OF PLATE WASHERS (FWR01) IS OPTIONAL.
- THE RUBRAIL MAY BE SHOP BENT IN THE LAST 915mm [36"] TO FACILITATE INSTALLATION.
- POSTS 1, 3, 5, 6 AND 7 REQUIRE AN ADDITIONAL HOLE TO ATTACH RUBRAIL.
- TRANSITION ASSEMBLIES ARE SUPPLIED AS ACCESSORIES AND ARE ORDERED SEPARATELY.
- END SHOES MUST BE LAPPED FOR TRAFFIC DIRECTION.
- W-BEAM PANELS, POSTS, BLOCKOUTS & RELATED FASTENERS ARE STANDARD HIGHWAY HARDWARE & ARE TO BE SUPPLIED BY OTHERS.
- DO NOT REMOVE EXISTING STUDS, NUTS, AND WASHERS FROM BACKUP.



ASSEMBLY NO. 117827

TRINITY HIGHWAY

REACT 350® SYSTEM
TRANSITION ASSY, SCBU, N,
REACT 350 W/RUB RAIL

ESTIMATED WEIGHT: 193.39 lb/mass

DATE: 1/23/01
DATE: 3/2/01

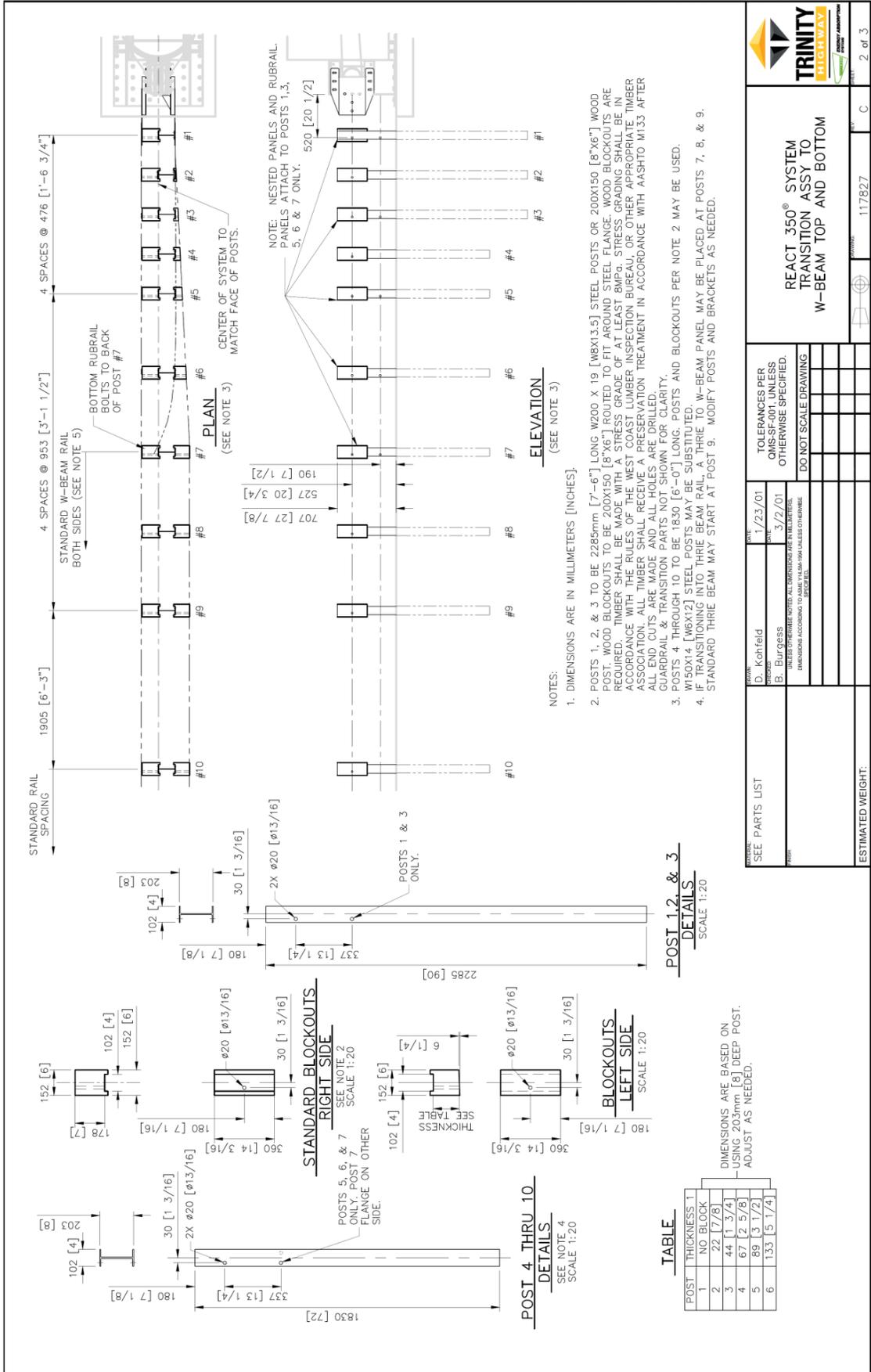
DESIGNED BY: D. Kohtfeld
CHECKED BY: B. Burgess

TOLERANCES PER
ANSI Y14.5 UNLESS
OTHERWISE SPECIFIED.

DO NOT SCALE DRAWING

1 of 3

Transition Assembly, SC BU, N, w/Rub Rail 117827



TRINITY HIGHWAY

REACT 350® SYSTEM TRANSITION ASSY TO W-BEAM TOP AND BOTTOM

DATE: 1/23/01
BY: D. Kohfeld

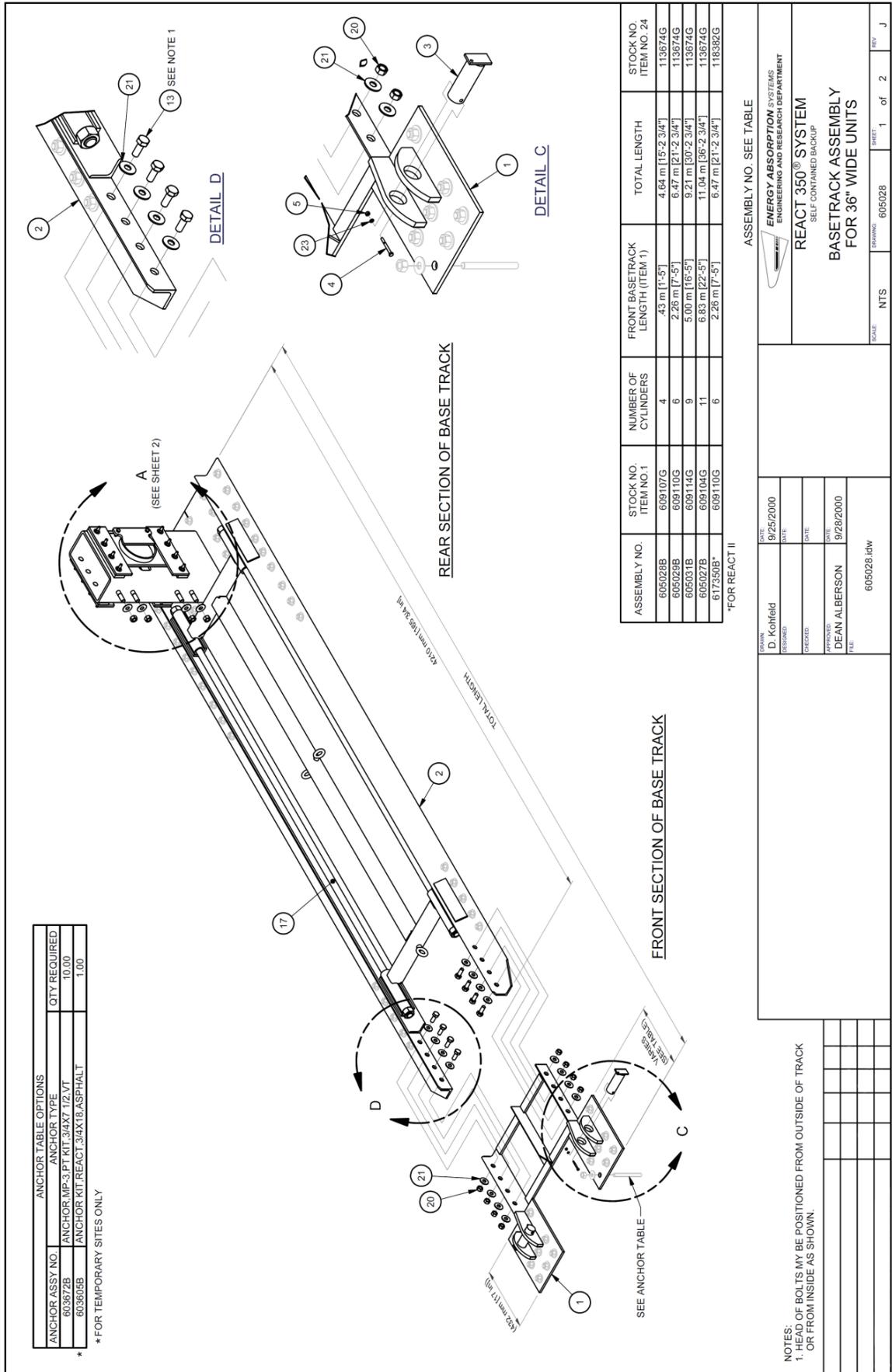
DATE: 3/2/01
BY: B. Blurgess

TOLERANCES PER OMS-SF-001 UNLESS OTHERWISE SPECIFIED.

DO NOT SCALE DRAWING

ESTIMATED WEIGHT: 117827

2 of 3



Base Track Assembly 36" Wide Units 605028

ANCHOR TABLE OPTIONS

| ANCHOR ASSEMBLY NO. | ANCHOR TYPE | QUANTITY REQUIRED |
|---------------------|---------------------------------------|-------------------|
| 603672 | ANCHOR, MP-3, PT. KIT, 3/4X7 1/2, VT | 7.00 |
| 603670 | ANCHOR, MP-3, PT. KIT, 3/4X6 1/2, HOR | 4.00 |

PARTS LIST

| ITEM | STOCK NO. | DESCRIPTION | REQ'D |
|------|-----------|--|-------|
| 1 | SEE TABLE | BASETRACK, FRONT | 1.00 |
| 2 | 612040 | PIN, RESTRAINING CABLE | 2.00 |
| 3 | 113512 | BOLT, H.K. 1/4X2 1/2, G2.G | 2.00 |
| 4 | 115946 | NUT, H.K. 1/4.G | 2.00 |
| 5 | 613615 | WELDMENT, REAR BASETRACK, CONC.(REACT) | 1.00 |
| 6 | 614195 | WELDMENT, CABLE ANCHOR, CONC.(REACT) | 2.00 |
| 8 | 113552 | BOLT, H.K. 3/4X2, G2.G | 8.00 |
| 9 | 118027 | WASHER, FLAT, 3/4X2, H.V.Y.G | 18.00 |
| 10 | 115953 | NUT, H.K. 3/4.G | 10.00 |
| 11 | 116823 | RRO ST 1 1/2X120, THREADED, BOTH ENDS | 2.00 |
| 12 | 115917 | NUT, H.K. 1 1/2.G | 4.00 |
| 13 | 117543 | STUD, 3/4X8 1/2, G5.G | 2.00 |
| 14 | 611475 | MP-3, PINT PACKAGE | 1.00 |
| 15 | 118085 | WASHER, LOCK, 1/4.G | 2.00 |

NOTES:

- BACKUP MUST BE ABLE TO WITHSTAND A MAXIMUM OVERTURNING MOMENT OF 226 kNm [2000 KIP-IN.] AT DECK LINE FOR DURATIONS 40± ms.
- IMPACT FORCES COULD BE TRANSFERRED INTO STRUCTURE THROUGH SYSTEM. ADEQUATE ANCHORAGE IS REQUIRED FOR PROPER IMPACT PERFORMANCE.
- USE ITEMS 1, 5 AND 6 AS TEMPLATES FOR DRILLING CONCRETE. INSTALL ITEM 13 USING MP-3 EPOXY ITEM 14 TO SECURE. USE NUTS AND WASHERS ITEMS 9 & 10.
- ANCHOR STUD, END SHOULD BE FLUSH WITH OUTSIDE SURFACE OF ANCHOR NUT, SEE DETAIL B SHEET 2.
- UNITS ARE mm [INCHES] UNLESS OTHERWISE NOTED.
- ANCHOR BOLTS MUST BE ORDERED SEPARATELY. SEE ANCHOR TABLE OPTIONS FOR PART NO.'S & QUANTITIES.

DETAIL A
SCALE 1:10

TABLE

| BASETRACK ASSEMBLY NO. | STOCK NO. ITEM NO.1 | NUMBER OF CYLINDERS | FRONT BASETRACK LENGTH (ITEM 1) | TOTAL LENGTH |
|------------------------|---------------------|---------------------|---------------------------------|------------------|
| 605020 | 609107 | 4 | 0.43 m [1'-5"] | 5.06 m [16'-7"] |
| 605022 | 609110 | 6 | 2.26 m [7'-5"] | 6.88 m [22'-7"] |
| 605025 | 609114 | 9 | 5.00 m [16'-5"] | 9.63 m [31'-7"] |
| 605019 | 609104 | 11 | 6.83 m [22'-5"] | 10.59 m [34'-9"] |

ASSEMBLY NO. SEE TABLE

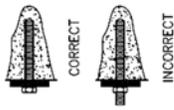
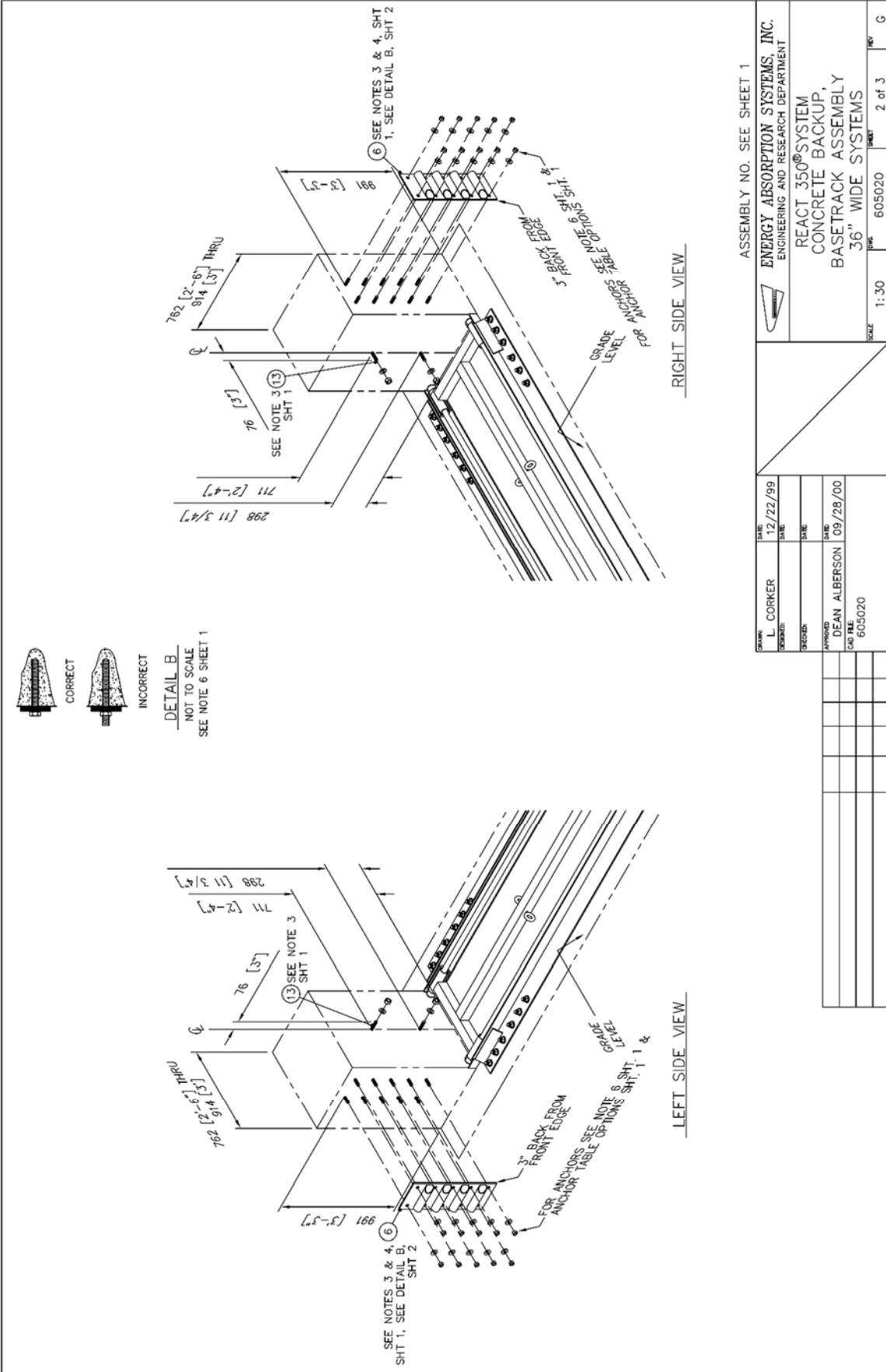
ENERGY ABSORPTION SYSTEMS, INC.
ENGINEERING AND RESEARCH DEPARTMENT

REACT 350[®] SYSTEM
CONCRETE BACKUP
BASETRACK ASSEMBLY
36" WIDE SYSTEMS

| | |
|-------------------------|----------------|
| DRAWN: L. CORKER | DATE: 12/22/99 |
| DESIGNED: [blank] | DATE: [blank] |
| CHECKED: [blank] | DATE: [blank] |
| APPROVED: DEAN ALBERSON | DATE: 09/28/00 |
| DOC FILE: 605020 | |

SCALE: 1:40 (FRONT), 1:3 (REAR)

Concrete B-up Base Track Assembly 36" Wide Units 605020



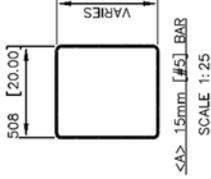
DETAIL B
 NOT TO SCALE
 SEE NOTE 6 SHEET 1

ASSEMBLY NO. SEE SHEET 1

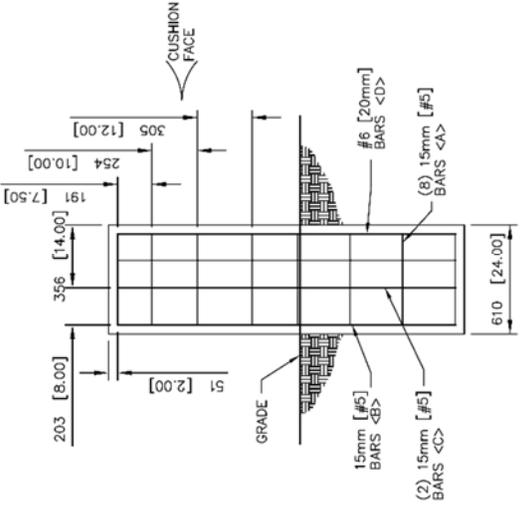
| | | | |
|----------|---------------|-------|----------|
| DRAWN | L. CORKER | DATE | 12/22/99 |
| DESIGNED | DEAN ALBERSON | DATE | 09/28/00 |
| SCALE | 1:30 | SHEET | 605020 |
| | | | 2 of 3 |
| | | | G |

ENERGY ABSORPTION SYSTEMS, INC.
 ENGINEERING AND RESEARCH DEPARTMENT
 REACT 350® SYSTEM
 CONCRETE BACKUP,
 BASETRACK ASSEMBLY
 36" WIDE SYSTEMS

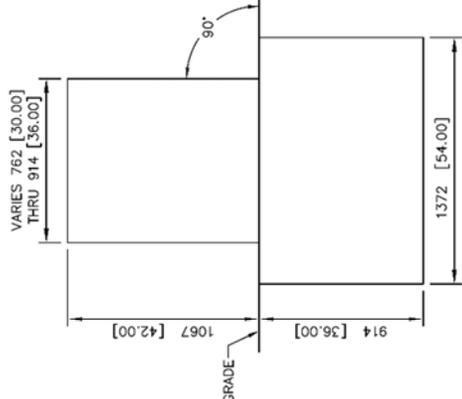
- NOTES:
- CROSS SLOPE OF PAD SHALL NOT EXCEED 8% 2% FROM FRONT TO BACK.
 - ALL CONCRETE TO BE 28 MPa (4000 PSI) P.C. CONCRETE.
 - FOR EXISTING APPROVED CONCRETE SURFACES:
 - MIN 180 (7) DECK STRUCTURE.
 - MIN 200 (8) NON-REINFORCED ROADWAY OR
 - MIN 150 (6) REINFORCED ROADWAY.
 - VERTICAL STEEL SHALL BE DOWELED 140 [5.5] MIN. USING MP-3® ANCHORING SYSTEM GROUT OR EQUAL. ADJUST REBAR AND CONCRETE QUANTITIES AS NEEDED.
 - PAD AND BELOW GRADE ANCHOR BLOCK TO BE POURED MONOLITHICALLY. DIMENSIONS ARE IN mm[inches] UNLESS OTHERWISE NOTED.



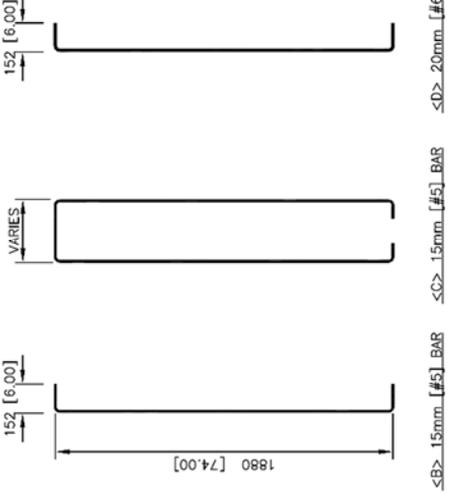
TOP VIEW REINFORCEMENT DETAIL



SIDE VIEW REINFORCEMENT DETAIL



FRONT VIEW



ENERGY ABSORPTION SYSTEMS, INC.
ENGINEERING AND RESEARCH DEPARTMENT

REACT 350® SYSTEM

CONCRETE BACKUP DETAILS
30-36, CONC, (REACT)

SCALE 1:25

NO. 605020

REV. 3 of 3

BY G

| | | | |
|----------|---------------|------|----------|
| DESIGNER | L. CORKER | DATE | 09/21/00 |
| CHECKED | | DATE | |
| APPROVED | DEAN ALBERSON | DATE | 09/28/00 |
| CAD FILE | 605020 | | |

TABLE

| NO. OF CYLINDERS | SYSTEM W/STEEL BACKUP | SYSTEM W/CONCRETE BACKUP | A | 10 mm (#3) REBAR QTY |
|------------------|-----------------------|--------------------------|------------------|----------------------|
| 4 | R43B036 | R43C036 | 5.06 m [16'-7"] | 17 |
| 6 | R55B036 | R55C036 | 6.88 m [22'-7"] | 23 |
| 9 | R62B036 | R62C036 | 9.63 m [31'-7"] | 32 |
| 9 | R70B036 | R70C036 | 9.63 m [31'-7"] | 32 |
| 11 | R75B036 | R75C036 | 11.46 m [37'-7"] | 38 |

NOTES:

1. ALL CONCRETE WORK AND REBAR DETAILS SHALL CONFORM TO THE LATEST ACI CODE AND MANUAL.
2. ALL CONCRETE TO BE 203 [8] MINIMUM THICK 28 MPa [4000 PSI] COMPRESSIVE STRENGTH AT 28 DAY TEST.
3. PROVIDE MIN. 5% CLEAR CONCRETE COVER OVER REINFORCING STEEL.
4. THE SLAB DETAILED ON THIS SHEET REQUIRES IT TO BE PLACED AGAINST AND SUPPORTED BY A RIGID BARRIER OR OTHER STRUCTURE. THE SUPPORT STRUCTURE OR BARRIER WILL RESIST PAD AND SYSTEM SLIDE DURING IMPACTS. THE SYSTEM COULD TRANSFER IMPACT LOADING TO ADJACENT STRUCTURES. PROVIDE ADEQUATE ANCHORAGE.
6. CROSS SLOPE OF PAD SHALL NOT EXCEED 8% AND NOT VARY MORE THAN 2% FROM FRONT TO BACK.

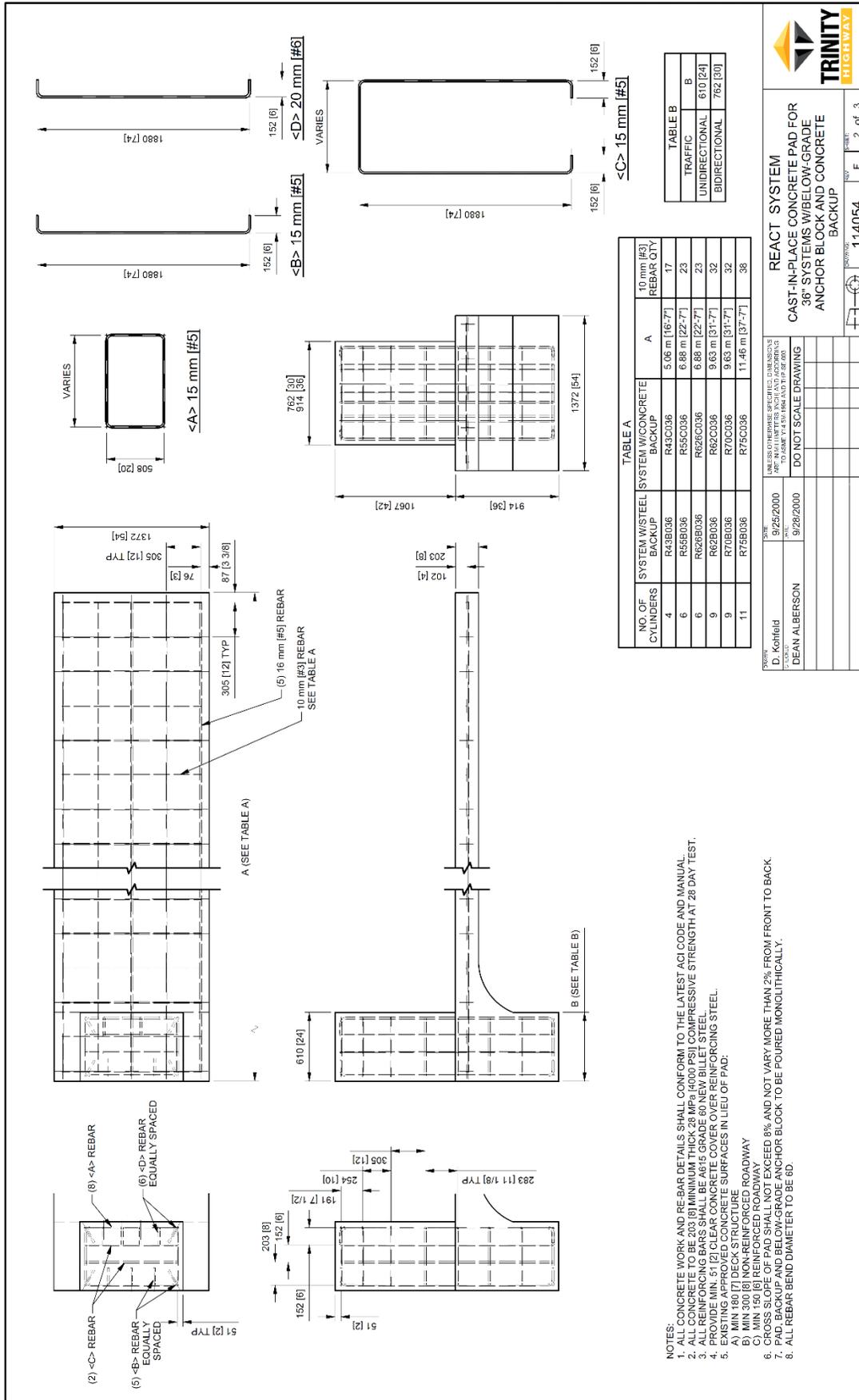
PROJECT: D. Kohfeld
DATE: 9/25/2000
DESIGNED BY: DEAN ALBERSON
SCALE: 9/28/2000
DO NOT SCALE DRAWING

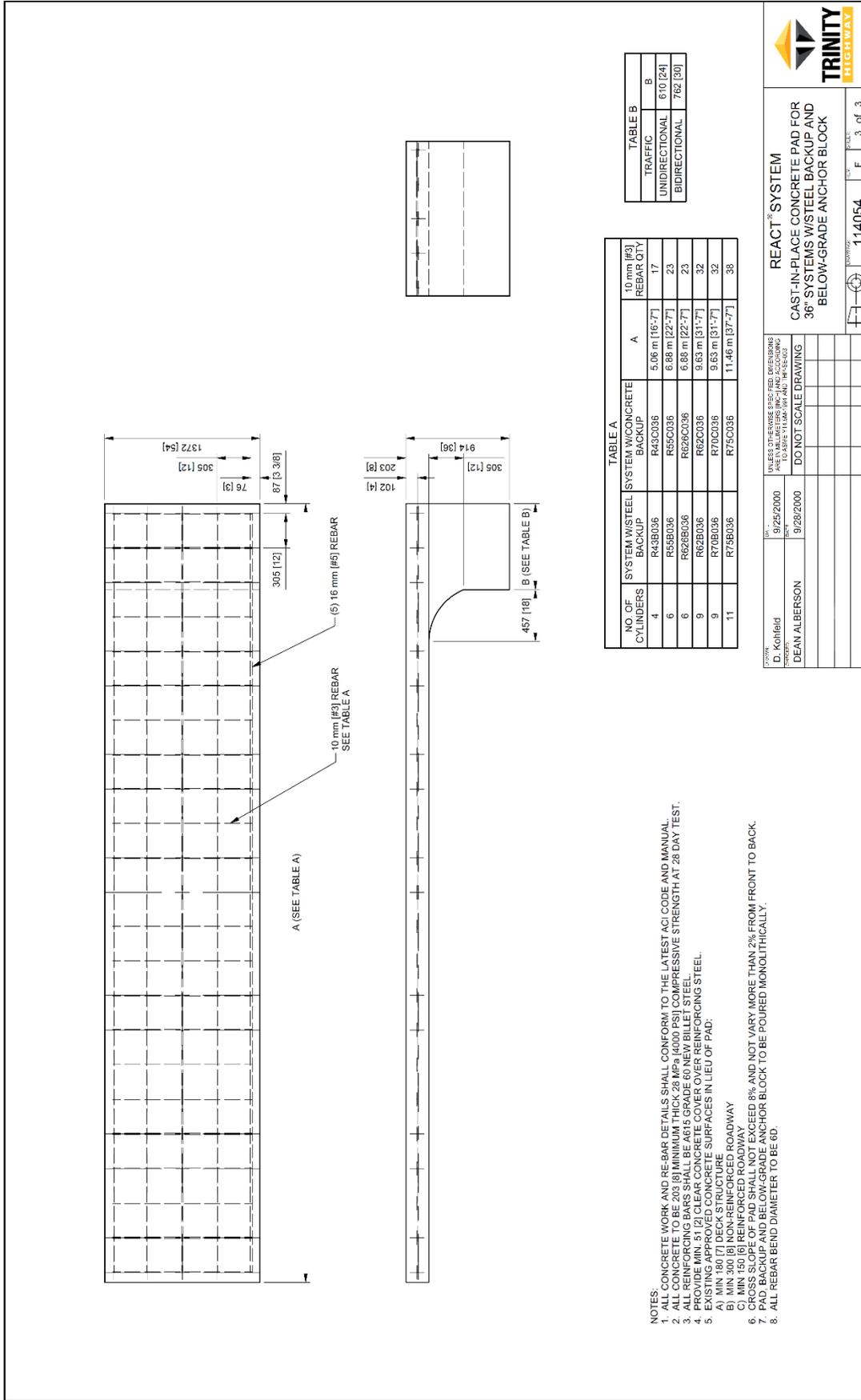
REACT® SYSTEM
CAST-IN-PLACE CONCRETE SLAB FOR
36" SYSTEMS W/STEEL BACKUP
AGAINST A RIGID BARRIER

114054 1 of 3

TRINITY HIGHWAY

Cast-in-Place Concrete Slab w/Steel Backup 36" **114054**





- NOTES:
1. ALL CONCRETE WORK AND REBAR DETAILS SHALL CONFORM TO THE LATEST ACI CODE AND MANUAL.
 2. ALL CONCRETE TO BE 203 [8] MINIMUM THICK 28 MPa [4000 PSI] COMPRESSIVE STRENGTH AT 28 DAY TEST.
 3. ALL REINFORCING BARS SHALL BE A615 GRADE 60 NEW BILLET STEEL.
 4. PROVIDE MIN. 51 [2] CLEAR CONCRETE COVER OVER REINFORCING STEEL.
 5. EXISTING ADJACENT CONCRETE SURFACES IN LIEU OF PAD:
 - A. MIN 300 [8] NON-REINFORCED ROADWAY
 - B. MIN 150 [8] REINFORCED ROADWAY
 - C. MIN 150 [8] REINFORCED ROADWAY
 6. CROSS SLOPE OF PAD SHALL NOT EXCEED 8% AND NOT VARY MORE THAN 2% FROM FRONT TO BACK.
 7. PAD BACKUP AND BELOW-GRADE ANCHOR BLOCK TO BE POURED MONOLITHICALLY.
 8. ALL REBAR BEND DIAMETER TO BE 6D.

TABLE A

| NO. OF CYLINDERS | SYSTEM W/STEEL BACKUP | SYSTEM W/CONCRETE BACKUP | A | 10 mm (#3) REBAR QTY |
|------------------|-----------------------|--------------------------|------------------|----------------------|
| 4 | R43B036 | R43C036 | 5.06 m [16'-7"] | 17 |
| 6 | R55B036 | R55C036 | 6.88 m [22'-7"] | 23 |
| 6 | R62B036 | R62C036 | 6.88 m [22'-7"] | 23 |
| 9 | R62B036 | R62C036 | 9.63 m [31'-7"] | 32 |
| 9 | R70B036 | R70C036 | 9.63 m [31'-7"] | 32 |
| 11 | R75B036 | R75C036 | 11.46 m [37'-7"] | 38 |

TABLE B

| TRAFFIC | B |
|----------------|----------|
| UNIDIRECTIONAL | 610 [24] |
| BIDIRECTIONAL | 762 [30] |

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS (INCHES AND FRACTIONS) TO NEAREST MILLIMETER AND INFEET/INCH

DO NOT SCALE DRAWING

DATE: 9/25/2000
 DRAWN BY: DEAN ALBERSON
 CHECKED BY: []
 APPROVED BY: []

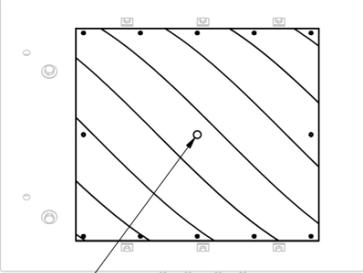
PROJECT: 114054
 SHEET: F
 OF: 3 of 3

REACTSM SYSTEM
 CAST-IN-PLACE CONCRETE PAD FOR
 36" SYSTEMS W/STEEL BACKUP AND
 BELOW-GRADE ANCHOR BLOCK

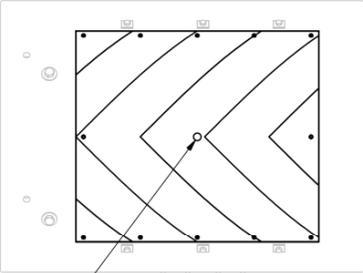
| PARTS LIST | | DESCRIPTION | QTY. |
|------------|-----------|---|------|
| ITEM 1 | STOCK NO. | NOSE COVER, .32X32, TL-3, REACT.** | 1 |
| 2 | 116888G | SCREW, HW, 1/4X1 1/4, SELF DRILL/TAP, P | 12 |

* GORE / UNIV (APPLICATION TYPE)
** TAPE COLOR

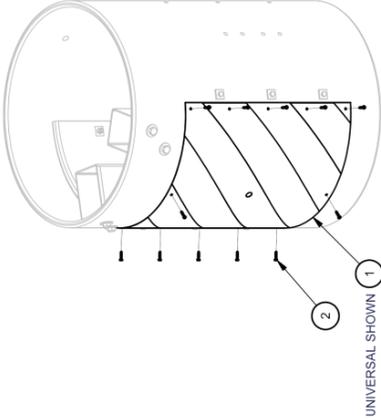
| ASSEMBLY NO. | DESCRIPTION | ITEM 1 |
|--------------|--------------------------------------|---------|
| 617967B | NOSE COVER ASSY, GORE, TL-3, REACT.Y | 617965B |
| 617968B | NOSE COVER ASSY, UNIV, TL-3, REACT.Y | 617966B |
| 618066B | NOSE COVER ASSY, GORE, TL-3, REACT.O | 618066B |
| 618069B | NOSE COVER ASSY, UNIV, TL-3, REACT.O | 618007B |



UNIVERSAL
ASSEMBLY NO. 617968B
(SEE NOTE 4)

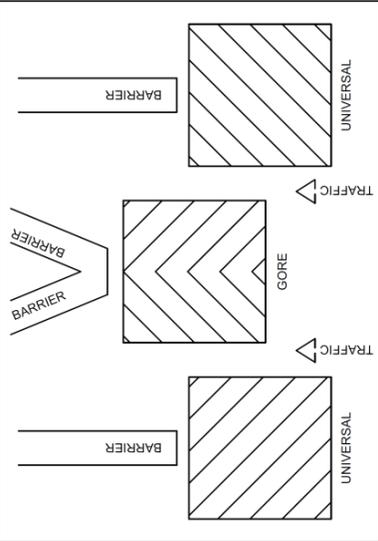


GORE
ASSEMBLY NO. 617967B



UNIVERSAL SHOWN (1)

APPLICATION DETAIL



NOTES:

- LOCATE $\phi 1"$ HOLE IN NOSE COVER OVER $\phi 1"$ HOLE IN CYLINDER. THEN SECURE WITH SCREWS (ITEM 2) USING THRU REFLECTIVE TAPE AND INTO EXISTING HOLES IN NOSE COVER UNTIL HEAD OF FASTENER (ITEM 2) IS FLUSH. DO NOT CONTINUE TO SPIN FASTENER.
- NOSE COVER NOT INCLUDED IN MODEL AND MUST BE ORDERED SEPARATELY. DESIRED NOSE MUST BE SPECIFIED WHEN ORDERING. REVIEW APPLICATION DETAIL TO VERIFY TYPE.
- AS SHOWN, APPROACH TRAFFIC PASSES TO LEFT OF SYSTEM NOSE. HAZARD/OBJECT IS ON RIGHT SIDE OF TRAVELWAY. FOR APPROACH TRAFFIC ON RIGHT OF SYSTEM NOSE & HAZARD/OBJECT ON THE LEFT OF TRAVELWAY, ROTATE 90°.

| | | | | |
|--|--|--|--|--|
| | | | | |
| | | | | |
| | | | | |
| | | | | |

ASSEMBLY NO. SEE TABLE



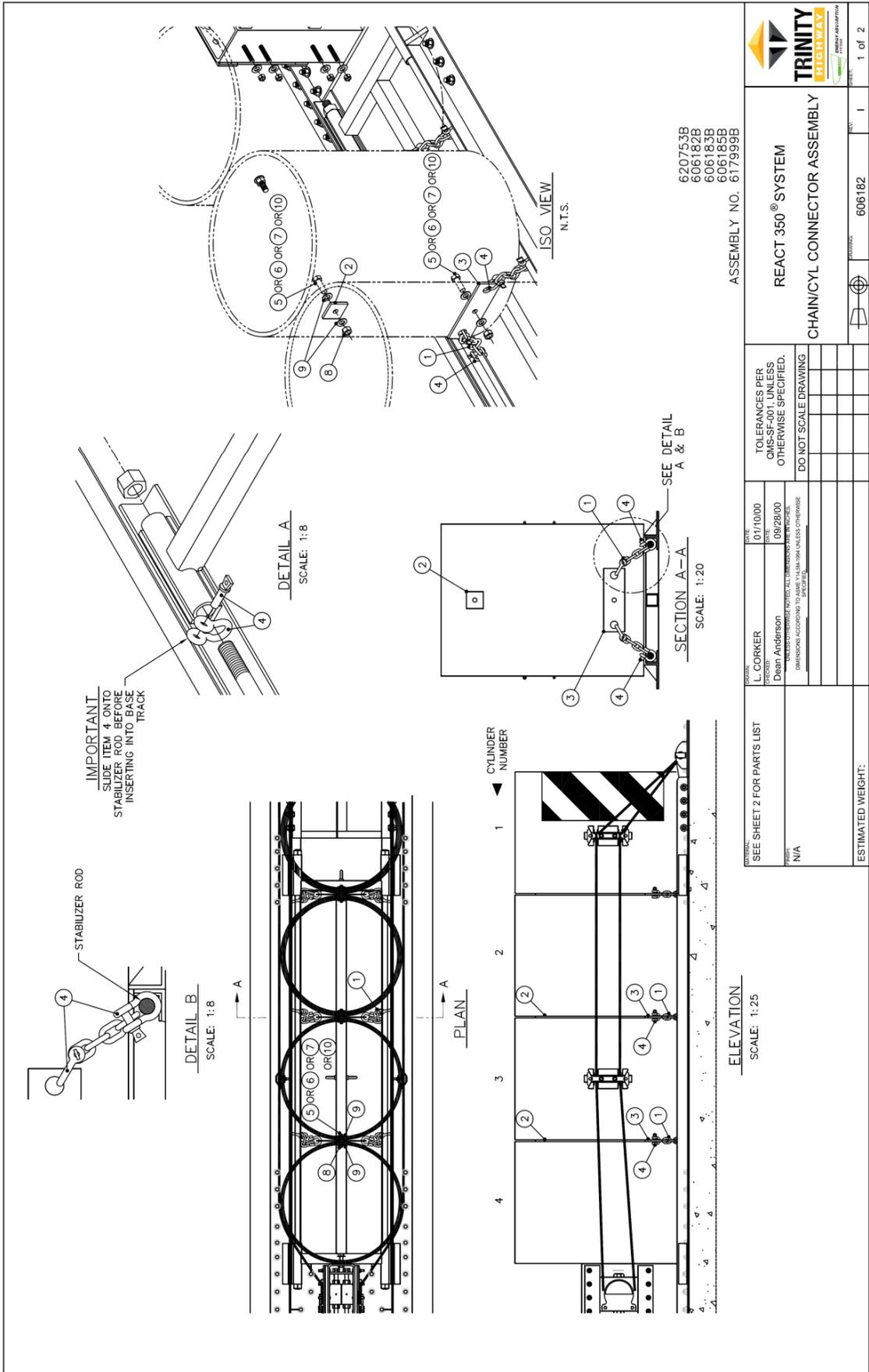
REACT 350° SYSTEM

NOSE COVER ASSEMBLY, TL-3, REACT

| | | | | | | | |
|-------|-----|---------|--------|-------|--------|-----|---|
| SCALE | NTS | DRAWING | 617967 | SHEET | 1 of 1 | REV | A |
|-------|-----|---------|--------|-------|--------|-----|---|

617967.dwg

Nose Cover Assembly TL-3 617967



Chain/CYL Connector Assembly 606182

ASSEMBLY NO. 617999B

ASSEMBLY 606182B

ASSEMBLY 606183B

| PARTS LIST (6 CYLINDER REACT 350 II) TL-3 (62 MPH) | | | |
|--|-----------|-------------------------------------|-------|
| ITEM | STOCK NO. | DESCRIPTION | REQ'D |
| 1 | 606177B | CHAIN, PROOF COIL,1/2,4 LINKS,REACT | 6 |
| 2 | 609236G | FTB ST 1/2X4X4 W/HOLE,G.(REACT) | 3 |
| 3 | 609256G | FTB ST 1/2X5X15,G.(REACT) | 3 |
| 4 | 117071G | SHACKLE,ANCHOR,5/8,W/SCREW PIN | 12 |
| 5 | 113564G | BOLT,HX,3/4X4 1/2,G5,G | 4 |
| 6 | 113567G | BOLT,HX,3/4X4,G5,G | 2 |
| 7 | 113558G | BOLT,HX,3/4X3 1/2,G5,G | 4 |
| 8 | 003710G | 3/4" HEX NUT A563 | 10 |
| 9 | 118027G | WASHER FLAT,3/4,HVY,G | 20 |

- * ITEM 5 USED TO CONNECT CYLINDERS 1 & 5 AND 5 & 6.
- * ITEM 6 USED TO CONNECT CYLINDERS 3 & 4.
- * ITEM 7 USED TO CONNECT CYLINDERS 1 & 2 AND 2 & 3.

| PARTS LIST (4 CYLINDER REACT 350) | | | |
|-----------------------------------|-----------|-------------------------------------|-------|
| ITEM | STOCK NO. | DESCRIPTION | REQ'D |
| 1 | 606177B | CHAIN, PROOF COIL,1/2,4 LINKS,REACT | 6 |
| 2 | 609236G | FTB ST 1/2X4X4 W/HOLE,G.(REACT) | 3 |
| 3 | 609256G | FTB ST 1/2X5X15,G.(REACT) | 3 |
| 4 | 117071G | SHACKLE,ANCHOR,5/8,W/SCREW PIN | 12 |
| 5 | 113564G | BOLT,HX,3/4X4 1/2,G5,G | 2 |
| 6 | 113567G | BOLT,HX,3/4X4,G5,G | 2 |
| 7 | 113558G | BOLT, HX, 3/4 X 4, G5, G | 2 |
| 8 | 003710G | 3/4" HEX NUT A563 | 6 |
| 9 | 118027G | WASHER FLAT,3/4,HVY,G | 12 |

- * ITEM 5 USED TO CONNECT CYLINDERS 2 & 3.
- * ITEM 6 USED TO CONNECT CYLINDERS 1 & 2.
- * ITEM 7 USED TO CONNECT CYLINDERS 3 & 4.

PLAN

ELEVATION

ASSEMBLY 606185B

| PARTS LIST (9 CYLINDER REACT 350, 62 MPH) | | | |
|---|-----------|-------------------------------------|-------|
| ITEM | STOCK NO. | DESCRIPTION | REQ'D |
| 1 | 606177B | CHAIN, PROOF COIL,1/2,4 LINKS,REACT | 6 |
| 2 | 609236G | FTB ST 1/2X4X4 W/HOLE,G.(REACT) | 3 |
| 3 | 609256G | FTB ST 1/2X5X15,G.(REACT) | 3 |
| 4 | 117071G | SHACKLE,ANCHOR,5/8,W/SCREW PIN | 12 |
| 5 | 113564G | BOLT,HX,3/4X4 1/2,G5,G | 6 |
| 6 | 113567G | BOLT,HX,3/4X4,G5,G | 2 |
| 7 | 113558G | BOLT,HX,3/4X3 1/2,G5,G | 2 |
| 8 | 003710G | 3/4" HEX NUT A563 | 16 |
| 9 | 118027G | WASHER FLAT,3/4,HVY,G | 24 |
| 10 | 113562G | BOLT,HX,3/4X3,G5,G | 6 |

- * ITEM 5 USED TO CONNECT CYLINDERS 6 & 7, 7 & 8, 8 & 9.
- * ITEM 6 USED TO CONNECT CYLINDERS 5 & 6.
- * ITEM 7 USED TO CONNECT CYLINDERS 1 & 2, 2 & 3, 3 & 4.

ASSEMBLY 620753B

| PARTS LIST (9 CYLINDER REACT 350, 70 MPH) | | | |
|---|-----------|-------------------------------------|-------|
| ITEM | STOCK NO. | DESCRIPTION | REQ'D |
| 1 | 606177B | CHAIN, PROOF COIL,1/2,4 LINKS,REACT | 6 |
| 2 | 609236G | FTB ST 1/2X4X4 W/HOLE,G.(REACT) | 3 |
| 3 | 609256G | FTB ST 1/2X5X15,G.(REACT) | 3 |
| 4 | 117071G | SHACKLE,ANCHOR,5/8,W/SCREW PIN | 12 |
| 5 | 113571G | BOLT,HX,3/4X5 1/2,G5,G | 6 |
| 6 | 113567G | BOLT,HX,3/4X4,G5,G | 2 |
| 7 | 113558G | BOLT,HX,3/4X3 1/2,G5,G | 2 |
| 8 | 003710G | 3/4" HEX NUT A563 | 16 |
| 9 | 118027G | WASHER FLAT,3/4,HVY,G | 24 |
| 10 | 113562G | BOLT,HX,3/4X3,G5,G | 6 |

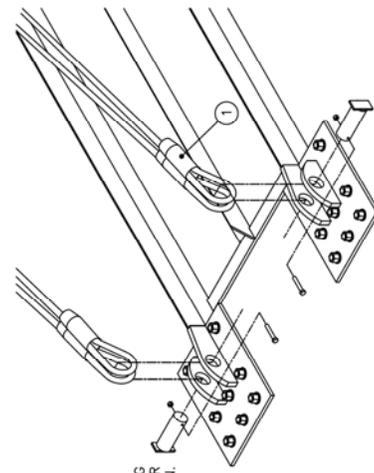
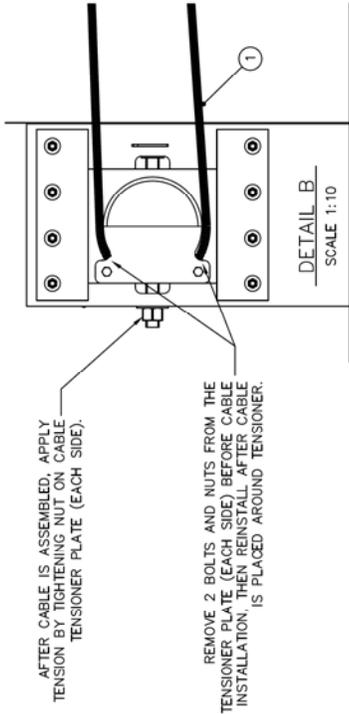
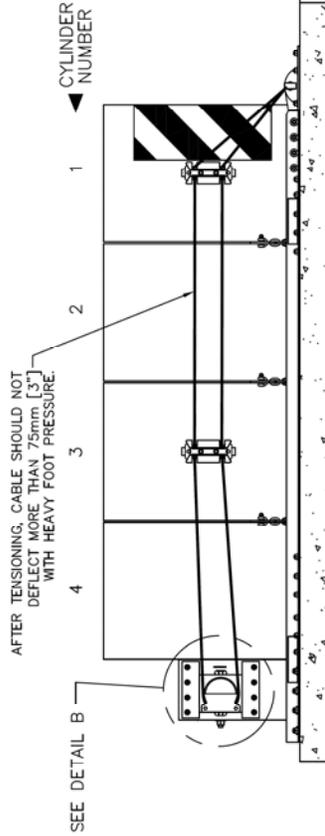
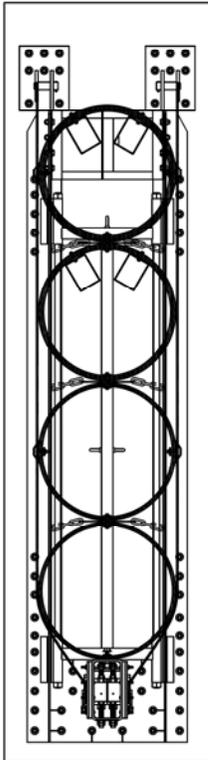
- * ITEM 5 USED TO CONNECT CYLINDERS 6 & 7, 7 & 8, 8 & 9.
- * ITEM 6 USED TO CONNECT CYLINDERS 5 & 6.
- * ITEM 7 USED TO CONNECT CYLINDERS 1 & 2, 2 & 3, 3 & 4.

| | | |
|---|--|---|
| <p>SEE PARTS LIST</p> <p>DATE: 01/10/00</p> <p>PREPARED BY: Dean Anderson</p> <p>DATE: 09/28/00</p> <p>DESIGNED BY: Dean Anderson</p> <p>DATE: 09/28/00</p> <p>REVISIONS ACCORDING TO AASHTO M 309 (REVISED) (SUPERSEDES)</p> | <p>REACT 350® SYSTEM</p> <p>CHAIN/CYL CONNECTOR ASSEMBLY</p> | <p>TOLERANCES PER QMS-SF-001, UNLESS OTHERWISE SPECIFIED.</p> <p>DO NOT SCALE DRAWING</p> |
| <p>ESTIMATED WEIGHT:</p> | <p>606182</p> | <p>2 of 2</p> |

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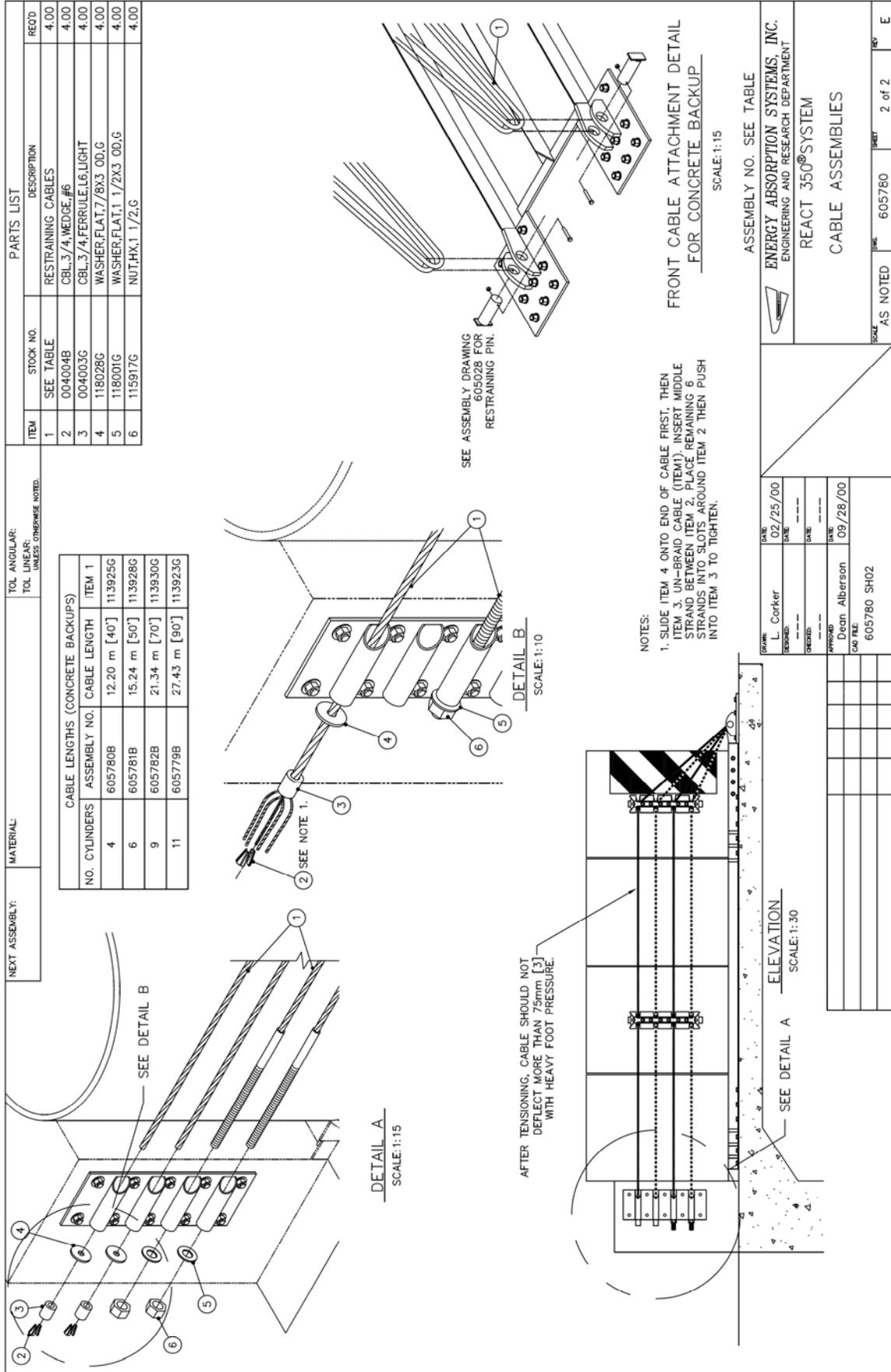
| | | | | | | | | | |
|----------------|--|-----------|--|--|--|----------------------------|--|--------------------|--|
| NEXT ASSEMBLY: | | MATERIAL: | | TOL. ANGULAR: TOL. LINEAR: UNLESS OTHERWISE NOTED. | | PARTS LIST | | REV'D | |
| | | | | | | ITEM STOCK NO. DESCRIPTION | | RESTRAINING CABLES | |
| | | | | | | 1 SEE TABLE | | 2.00 | |

| CABLE LENGTHS (SELF CONTAINED BACKUPS) | |
|--|------------------|
| NO. CYLINDERS | CABLE LENGTH |
| 4 | 9.12 m [29'-11"] |
| 6 | 12.8 m [41'-11"] |
| 9 | 18.3 m [59'-11"] |
| 11 | 21.9 m [71'-11"] |



| | | | | | | | | | | | | |
|----------------------|----------|-------------------------|------------------|---|-------|-------|-------|-------|-------|-----------------|---------------|--------|
| DATE: 9/25/00 | DATE: | DATE: | DATE: | DATE: | DATE: | DATE: | DATE: | DATE: | DATE: | | | |
| DESIGNED: D. KOHFELD | CHECKED: | APPROVED: DEAN ALBERSON | CAD FILE: 605780 | ENERGY ABSORPTION SYSTEMS, INC. ENGINEERING AND RESEARCH DEPARTMENT REACT 350® SYSTEM CABLE ASSEMBLIES | | | | | | SCALE: AS NOTED | SHEET: 1 of 2 | REV: E |

Cable Assemblies 605780



| ITEM | STOCK NO. | DESCRIPTION | REQD |
|------|-----------|------------------------------|------|
| 1 | SEE TABLE | RESTRAINING CABLES | 4.00 |
| 2 | 004004B | CBL, 3/4, WEDGE, #6 | 4.00 |
| 3 | 004003G | CBL, 3/4, FERRULE, L6, LIGHT | 4.00 |
| 4 | 118028G | WASHER, FLAT, 7/8X3 OD, G | 4.00 |
| 5 | 118001G | WASHER, FLAT, 1 1/2X3 OD, G | 4.00 |
| 6 | 115917G | NUT, HK, 1 1/2, G | 4.00 |

| CABLE LENGTHS (CONCRETE BACKUPS) | |
|----------------------------------|---------|
| NO. CYLINDERS | ITEM 1 |
| 4 | 113925G |
| 6 | 113928G |
| 9 | 113930G |
| 11 | 113923G |

| MATERIAL: | | | |
|--|--------------|---------------|---------|
| TOL. ANGULAR: TOL. LINEAR: UNLESS OTHERWISE NOTED. | | | |
| NO. CYLINDERS | ASSEMBLY NO. | CABLE LENGTH | ITEM 1 |
| 4 | 605780B | 12.20 m [40'] | 113925G |
| 6 | 605781B | 15.24 m [50'] | 113928G |
| 9 | 605782B | 21.34 m [70'] | 113930G |
| 11 | 605779B | 27.43 m [90'] | 113923G |

| PARTS LIST | |
|------------|---------------|
| DATE | 02/25/00 |
| DRAWN | L. Corker |
| REVISION | |
| DATE | |
| APPROVED | Dean Alberson |
| DATE | 09/28/00 |
| CAD FILE | 605780 SH02 |

| | | | | |
|-------------------------------------|--------|-----|--------|---|
| ASSEMBLY NO. SEE TABLE | 605780 | REV | 2 of 2 | E |
| ENERGY ABSORPTION SYSTEMS, INC. | | | | |
| ENGINEERING AND RESEARCH DEPARTMENT | | | | |
| REACT 350® SYSTEM | | | | |
| CABLE ASSEMBLIES | | | | |

| PARTS LIST | | REFLECTOR KIT ASSEMBLY | | | |
|------------|-----------|-----------------------------------|-----|-----------|-------------|
| ITEM | STOCK NO. | DESCRIPTION | QTY | REF. DET. | REF. DET. |
| 1 | 111306 | MARKER TAB FLEX/WHITE/AMBER/WHOLE | 4 | 6 | 10 12 14 |
| 2 | 116943 | SCREW PN#BX1,TAPPING,ABS | 8 | 12 | 16 20 24 28 |
| 3 | 117989 | WASHER,FLAT #8.S | 8 | 12 | 16 20 24 28 |

| ASSEMBLY ON 613705 | | ASSEMBLY ON 613702 | | ASSEMBLY ON 613704 | |
|--------------------|---|--------------------|---|--------------------|---|
| REF. | 1 | REF. | 1 | REF. | 1 |

NOTES:
 1. STARTING WITH REAR MOST CYLINDER PLACE MARKERS ACCORDING TO LOCAL STANDARDS AND MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD) BOTH FOR COLOR AND SPACING. SEE MUTCD BOTH IN DETAILS A & B. SEE APPLICATION SITE PLAN VIEWS FOR MARKER COLOR ORIENTATION.

TRINITY HIGHWAY PRODUCTS
 10000 W. 100th Ave., Suite 100, Greenwood, CO 80042
 (303) 440-1111
 www.trinityhighway.com

| REV. | DATE | BY | CHKD. | DESCRIPTION |
|------|------------|-----------|-------|----------------------|
| 1 | 10/18/2001 | F. POWELL | | DO NOT SCALE DRAWING |

ASSEMBLY NO. - SEE TABLE

Reflector Assembly, White/Amber, Side 613705

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| PARTS LIST | | | |
|------------|-----------|-------------------------------------|-------|
| ITEM | STOCK NO. | DESCRIPTION | REQ'D |
| 1 | 616407 | STT ST 3X3X1/4X36,W/HOLES | 1.00 |
| 2 | 117541 | STUD.3/4X7.1/2,G5,G | 1.00 |
| 3 | 115906 | NUT,ELC.3/4,G | 1.00 |
| 4 | 609236 | FTB ST 1/2X4X4,W/HOLE,G | 1.00 |
| 5 | 003704 | NUT,HX.3/4,G,GR, DH | 1.00 |
| 6 | 118027 | WASHER,FLAT.3/4X2,HVY,G | 1.00 |
| 7 | 115350 | INSTALLATION INSTRUCTIONS REACT 350 | 1.00 |
| 8 | 115674 | MATERIAL SAFETY INFORMATION NOTICE | 1.00 |

ASSEMBLY
612816

ASSEMBLY
612816
SCALE 1:10

ASSEMBLY
605805

ASSEMBLY
605805
SCALE 1:10

ASSEMBLY
605806

ASSEMBLY
605806
SCALE 1:10

NOTE:
1. INSTALLER TO DELIVER PULLOUT BRACKET & ASSOCIATED HARDWARE DRAWINGS & MANUAL TO AGENCY RESPONSIBLE FOR MAINTENANCE.

| | | | |
|--------------------------|----------------|---|-----------------|
| FORMER: SEE PARTS LIST | DATE: 02/21/01 | TOLERANCES PER CENIC-TRP-SF-001 UNLESS OTHERWISE SPECIFIED. | PROJECT: 611324 |
| DESIGNED: L. Conker | DATE: 2/27/01 | DO NOT SCALE DRAWING | SCALE: 1 of 1 |
| CHECKED: D. Jung | DATE: 2/27/01 | | |
| APPROVED: [Signature] | DATE: 2/27/01 | | |
| EST UNFINISHED WT: 2.640 | | | |

TRINITY HIGHWAY
CONCRETE SOLUTIONS

Misc. Hardware 611324

ASSEMBLY INSTRUCTIONS:

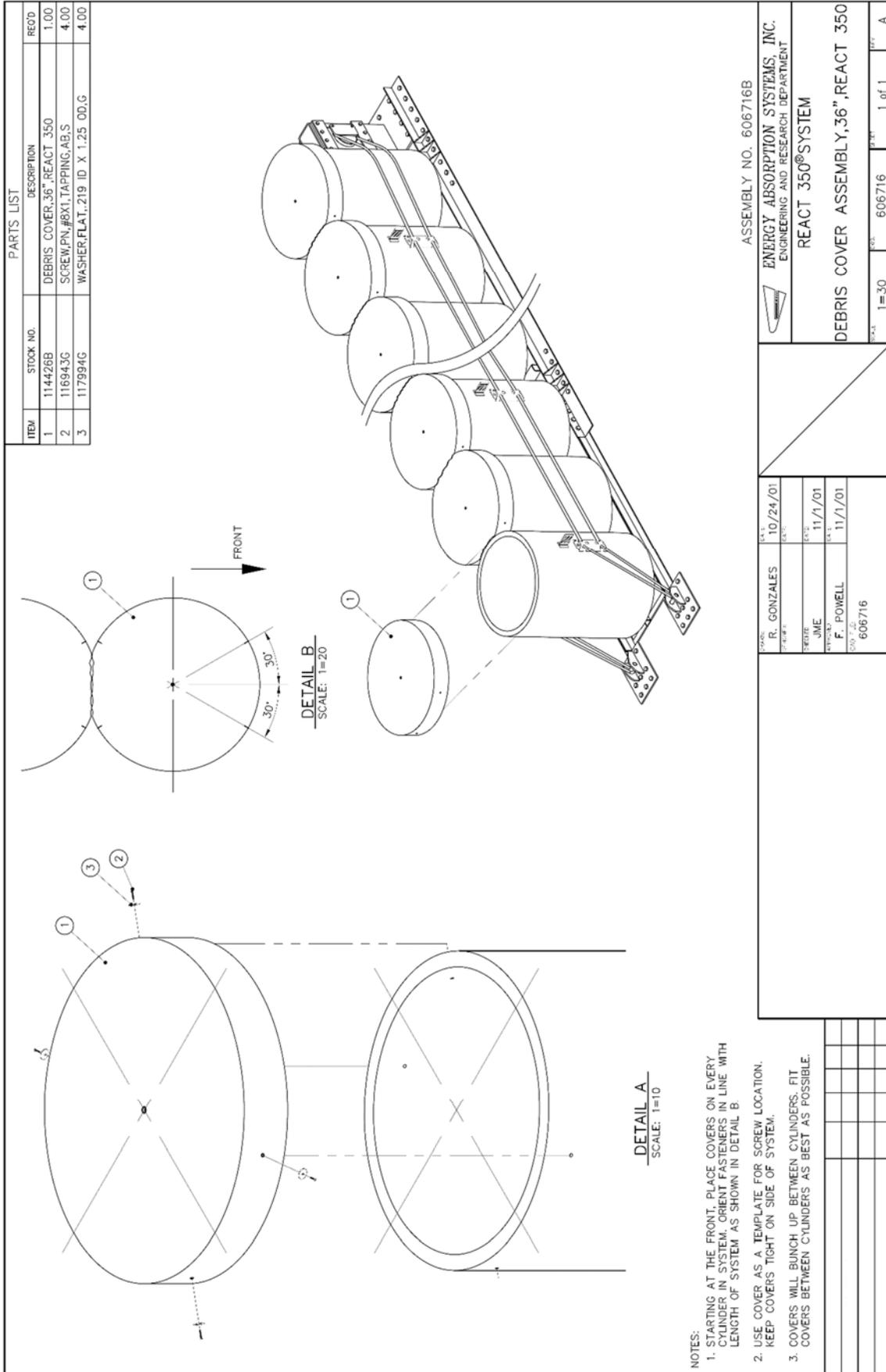
1. DRILL .2X9/16" HOLES AT THE LOCATION SHOWN. HOLES MUST BE ON A SIDE PERPENDICULAR TO LINE OF HEAD ON IMPACT.
2. ATTACH STANDOFF ASSEMBLY (ITEM 2) WITH SCREWS (ITEM 3), WASHERS (ITEM 6 & 7) AND NUTS (ITEM 8) AS SHOWN. THE STANDOFF MUST BE ORIENTED SO THAT IT IS PERPENDICULAR TO THE SYSTEM.
3. ORIENT DEBRIS COVER SO THAT THE ARROW STENCILED ON THE UNDERSIDE OF THE COVER POINTS TOWARD THE FRONT OF THE SYSTEM.
4. ATTACH DEBRIS COVER TO CYLINDER WITH FLAP SIDE UP USING 8 SCREWS (ITEM 4) AND 8 WASHERS (ITEM 5) AS SHOWN.

| PARTS LIST | | | |
|------------|-----------|--|------|
| ITEM | STOCK NO. | DESCRIPTION | QTY. |
| 1 | 615993 | TOP PRE-ASSEMBLY,DEBRIS COVER,36 | 1 |
| 2 | 614624 | STANDOFF ASSEMBLY,36 REACT | 1 |
| 3 | 113479 | BOLT,HX,1/2X3/8,G,ALL THREAD | 2 |
| 4 | 118661 | SCREW,FL,#10X1 1/4,S | 8 |
| 5 | 118019 | WASHER,FLAT,1/4X3/8,S | 8 |
| 6 | 118009 | WASHER,FLAT,1/2X1 3/8,G | 2 |
| 7 | 118082 | WASHER,LOCK,1/2,G | 2 |
| 8 | 118839 | NUT,HX,1/2,G | 2 |
| 9 | 115397 | INSTRUCTIONS,DEBRIS COVER II,ASSY,REACT,36 | 1 |

| | | | |
|--|--|-----------------------------|--|
| TOL. ANGULAR: ± 1/16 TOL. DIMENSIONAL: ± .01 TOL. DECIMAL: .XXX ± .005 UNLESS OTHERWISE SPECIFIED DO NOT SCALE DRAWING | DATE: 7/19/2007 DESIGNED BY: D. Sandridge DRAWN BY: S. Thompson CHECKED BY: _____ UNLESS OTHERWISE NOTED, ALL DIMENSIONS ARE IN INCHES DIMENSIONS IN PARENTHESES ARE FOR REFERENCE ONLY UNLESS OTHERWISE SPECIFIED | EST UNFINISHED WT.: 6.4 lbs | TRINITY HIGHWAY DEBRIS COVER ASSY II, REACT 350,36 INSTRUCTION NO. 115397 PART NO. 606715 SHEET 1 of 1 |
|--|--|-----------------------------|--|

Debris Cover Assembly, 36" 606715

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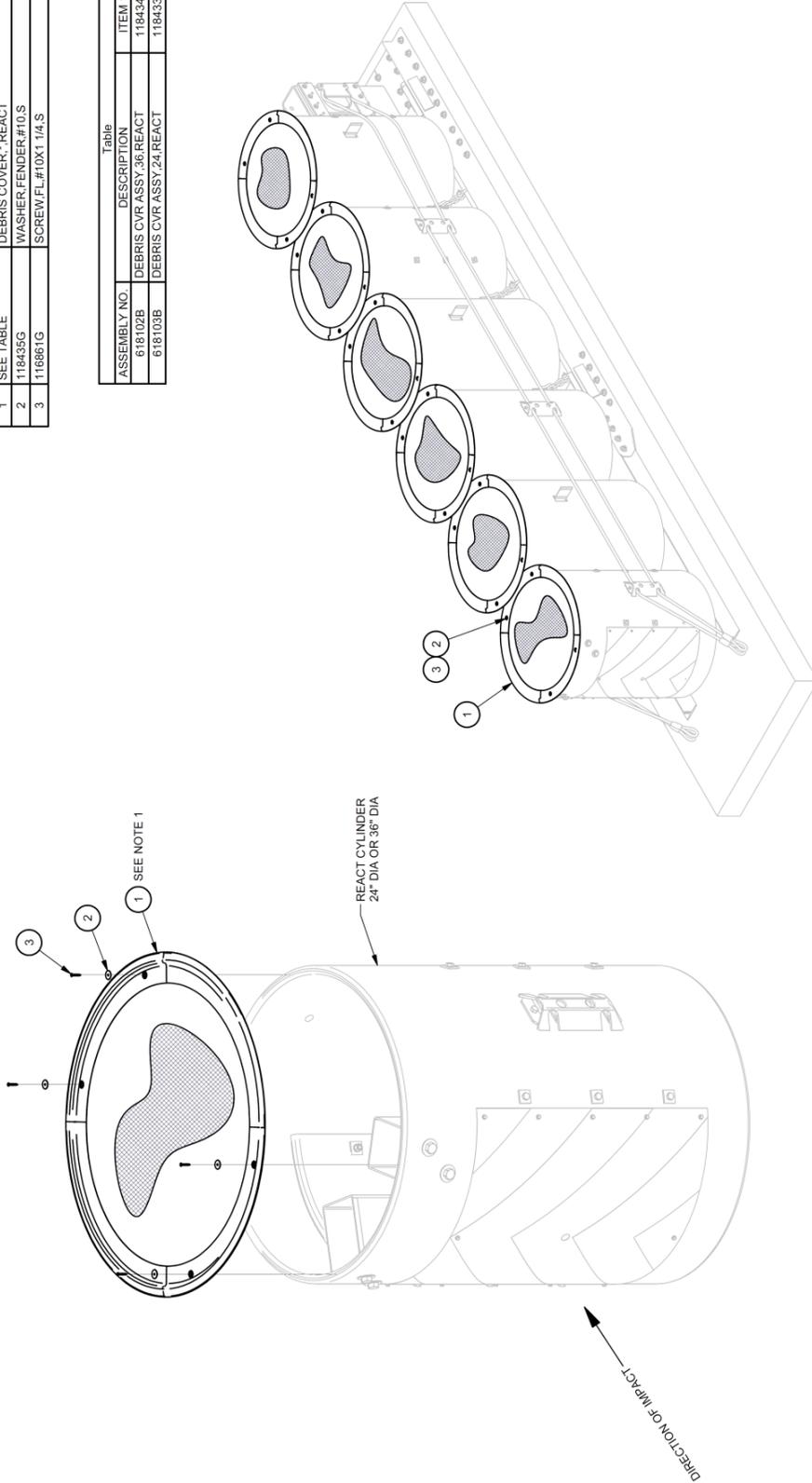


- NOTES:
1. STARTING AT THE FRONT, PLACE COVERS ON EVERY CYLINDER IN SYSTEM. ORIENT FASTENERS IN LINE WITH LENGTH OF SYSTEM AS SHOWN IN DETAIL B.
 2. USE COVER AS A TEMPLATE FOR SCREW LOCATION. KEEP COVERS TIGHT ON SIDE OF SYSTEM.
 3. COVERS WILL BUNCH UP BETWEEN CYLINDERS. FIT COVERS BETWEEN CYLINDERS AS BEST AS POSSIBLE.

Debris Cover Assembly, 36" 606716

| PARTS LIST | | | |
|------------|-----------|-------------------------|------|
| ITEM | STOCK NO. | DESCRIPTION | QTY. |
| 1 | SEE TABLE | DEBRIS COVER, * REACT | 1 |
| 2 | 118435G | WASHER, FENDER, #10 S | 4 |
| 3 | 116861G | SCREW, FL, #10X1.1/4, S | 4 |

| Table | | | |
|--------------|---------------------------|---------|-----------|
| ASSEMBLY NO. | DESCRIPTION | ITEM 1 | CYL DIA * |
| 618102B | DEBRIS CVR ASSY, 36 REACT | 118434B | 36" |
| 618103B | DEBRIS CVR ASSY, 24 REACT | 118433B | 24" |



ASSEMBLY NO. SEE TABLE



DEBRIS CVR ASSY, * REACT

| | | | |
|-------------|-----------------|------|-----------|
| DESIGNED BY | D. Hayes Jr | DATE | 4/19/2011 |
| DRAWN BY | A. Van Brocklin | DATE | 1/31/2011 |
| CHECKED BY | J. Espinoza | DATE | 5/3/2011 |
| APPROVED BY | A. Van Brocklin | DATE | 5/2/2011 |
| FILE | 618102.dwg | | |

NOTES:
1. VERIFY ORIENTATION OF ITEM 1 DURING INSTALLATION.

| | | | | | | | |
|-------|---------|--------|-------|---|----|---|-----|
| SCALE | DRAWING | 618102 | SHEET | 1 | of | 1 | REV |
|-------|---------|--------|-------|---|----|---|-----|

Debris Cover Assembly 618102

| ITEM | STOCK NO. | DESCRIPTION | QTY. | ** |
|------|-----------|-------------------------------------|------|----|
| 1 | 617247 | WING PLATE,FRONT,REACT,DPA | 1 | 1 |
| 2 | 617248 | WING PLATE,MID,REACT,DPA | 1 | 0 |
| 3 | 617251 | WING PLATE,REAR,REACT,DPA | 1 | 1 |
| 4 | 607938 | DRIVABLE POST QS,CZ,DPA | 8 | 6 |
| 5 | 612679 | POST CAP QS,CZ,DPA | 8 | 6 |
| 6 | 113551 | BOLT,HX,3/4X2 1/2,G8,G | 32 | 24 |
| 7 | 113553 | BOLT,HX,3/4X2,G5,G | 50 | 40 |
| 8 | 118027 | WASHER,FLAT,3/4X2,HVY,G | 100 | 80 |
| 9 | 003710 | 3/4" HEX NUT A563 | 50 | 40 |
| 10 | 115321 | INSTALLATION INSTRUCTIONS,DPA,REACT | 1 | 1 |

* 607938 ALL OTHER REACT 350
 ** REACT 43B036

ITEM 2 NOT REQUIRED FOR REACT 43B036

NOTES:
 1. CROSS SLOPE OF STRONG SOIL FOUNDATION SHALL NOT EXCEED 8% AND NOT VARY MORE THAN 2% FROM FRONT TO REAR.
 2. USE THE WING PLATES AS A GUIDE FOR DRIVING POSTS.
 3. CAUTION, THE REACT SYSTEM MUST BE CORRECTLY ANCHORED FOR PROPER IMPACT PERFORMANCE. DPA ASSEMBLY MAY BE USED TO ATTACH SYSTEM TO STRONG SOIL, ASPHALT OVERLAYS SHOULD BE 102 mm (4.00 in) THICK OR LESS. DRIVABLE PILE ANCHOR SYSTEM SUPPLIED BY ENERGY ABSORPTION SYSTEMS, INC. REACT SYSTEMS INSTALLED ON SOIL MUST BE INSPECTED TO ENSURE THE ANCHORS ARE STILL PROPERLY SET FOLLOWING EACH IMPACT. RE-ANCHOR AS NECESSARY.
 5. EVERY SQUARE HOLE IN THE WING PLATES MUST HAVE A DRIVABLE POST ANCHORING IT.
 6. REACT SYSTEM DRIVABLE PILE ANCHOR.
 INSTALLATION ADDENDUM INSTRUCTIONS FOR FURTHER INFORMATION.

DATE: 11/22/2006
 DRAWN BY: D. Hayes Jr.
 CHECKED BY: R. Broughtner
 ASSEMBLY NO: 607938
 DATE: 3/16/2006
 FILE: 607938.dwg
 ALL DIMENSIONS ARE IN MILLIMETERS (MM) UNLESS OTHERWISE SPECIFIED.
 DIMENSIONS TO ALL DIMENSION LINES UNLESS OTHERWISE SPECIFIED.
 DO NOT SCALE DRAWING

TRINITY HIGHWAY
 DRIVABLE PILE ANCHOR ASSY/REACT
 PART 1 of 1

Drivable Pile Anchor (DPA) 607938

NOTES:

NOTES:



TRINITY

HIGHWAY

Ahead of the Curve[®]

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