

Australian Road Barriers
Product Manual



**AUSTRALIAN
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BARRIERS**

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J-J Hooks[®]

Important Notes

1. This manual must be read in conjunction with State & Territory road authority approvals, guidelines, the site-specific risk assessment and the management plan for each individual worksite.
2. State & Territory road authorities reserve the right to approve, reject or restrict the use of specific products within the road reserve. If you are unsure of the current status of any products within this manual please contact Australian Road Barriers on 1800 003 826.
3. JJ Hooks® Safety Barriers are not warranted to prevent any injury or loss due to any accident howsoever caused but may significantly reduce the consequences of such an accident.
4. It is the responsibility of the end user to assess the risks associated with the use of (or failure to use) a safety barrier system tested in accordance with the MASH-16 and NCHRP 350 test methods, and with the particular site and traffic conditions for which barriers are being considered.
5. Any Barriers that are deemed to be 'not roadworthy'/'damaged beyond repair' are to have the JJ Hooks® removed from each end of the barrier. This removes the possibility of the barriers being used accidentally on roadwork sites.

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1. INTRODUCTION

JJ Hooks® Connection System is a Proprietary Product of Easi-Set Industries of Midland Virginia, USA.

Australian Road Barriers P/L is the exclusive licensee in Australia.

The purpose of this document is to provide the end user of the JJ Hooks® Safety Barrier System with installation and maintenance instructions to enable the barriers to be used safely and in accordance with the Australian and New Zealand Standard AS/NZS3845 Parts 1 and 2 - Road Safety Barrier Systems and Devices, and with the requirements of the local road authority.

The JJ Hooks® Concrete Safety Barrier from Australian Road Barriers P/L is a precast reinforced concrete barrier incorporating the patented JJ Hooks® connection system. The barriers when placed on site form a continuous chain of positively interlocked safety barriers capable of accommodating varying horizontal and vertical alignments.

If additional information is required, please contact Australian Road Barriers:

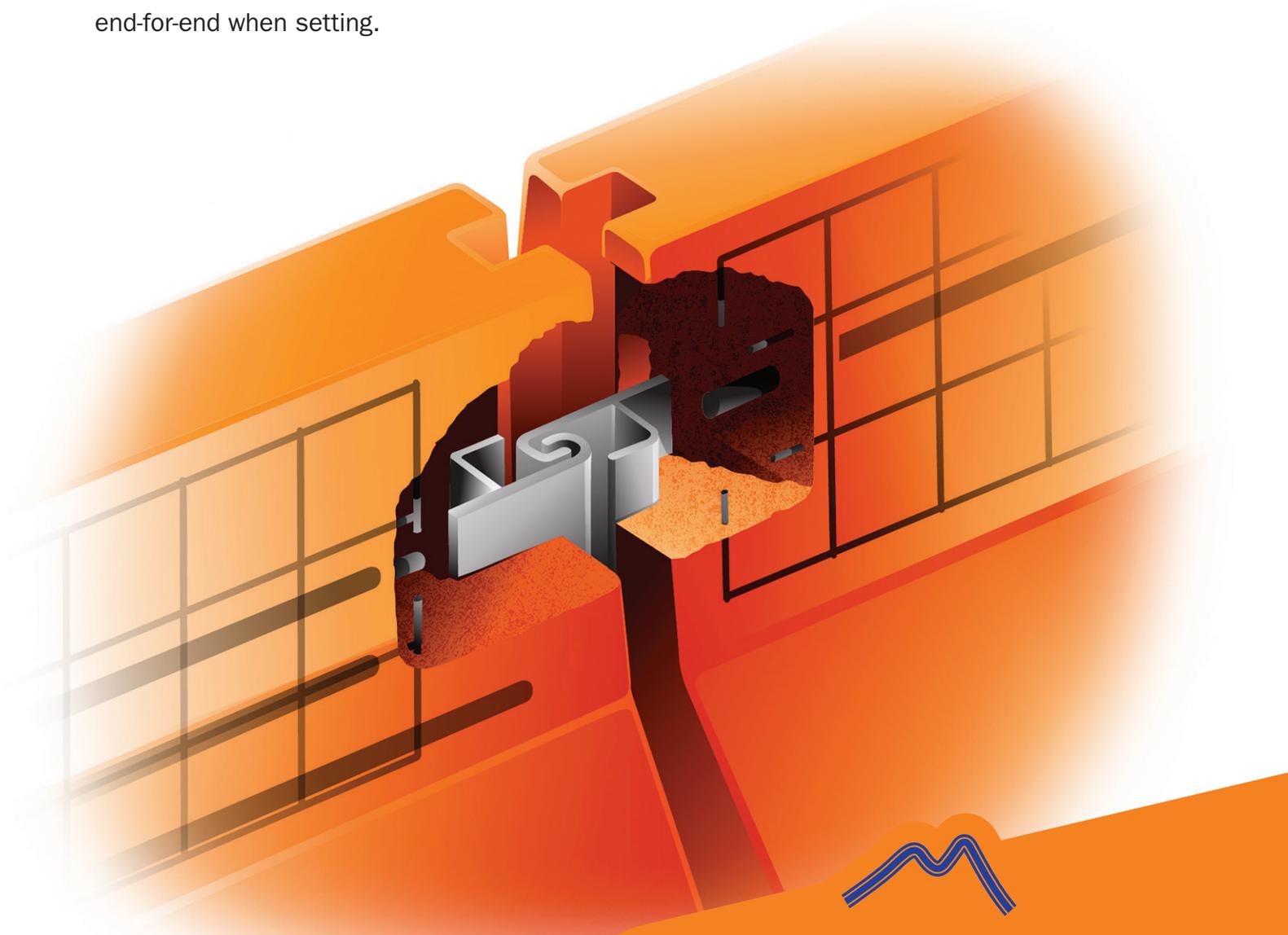
Telephone: 1800 003 826

Website: www.roadbarriers.com.au

Email: sales@roadbarriers.com.au

2. SYSTEM DESIGN

All JJ Hooks® barriers are a high strength, steel-reinforced, precast concrete longitudinal safety barrier containing the JJ Hooks® positive connection system. This connection system contains no loose hardware and the barrier end design incorporates a self-aligning system for ease of installation and removal. Identical ends allow the barrier to be turned end-for-end when setting.



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3. COMPLIANCE

The JJ Hooks® Safety Barrier system has been fully crash tested to MASH-16 Test Level 3 (TL-3) and NCHRP 350 Test Level 3 (TL-3) and complies with the manufacturer's requirements of AS/NZS3845 Parts 1 and 2.

MASH-16 TL-3

MASH Test 3-11 specifies a 2,270 kg pickup truck (defined as 2270P) impacting the JJ Hooks® Barrier at a target speed and angle of 100 km/h and 25 degrees, respectively. Crash tests performed were evaluated in accordance with the criteria presented in MASH for Test Level 3 [2016].

NCHRP 350 TL-3

NCHRP 350 Test 3-11 specifies a 2,000 kg pickup impacting the JJ Hooks® Barrier at a target speed and angle of 100 km/h and 25 degrees, respectively. Crash tests performed were evaluated in accordance with the criteria specified for NCHRP Report 350 test designation 3-11.

The JJ Hooks® Safety Barrier system has been accepted for use throughout Australia with approvals from the following states;

- Victoria (VicRoads)
- New South Wales/ACT (Transport For NSW)
- Queensland (Department of Transport and Main Roads)
- South Australia (Department of Planning, Transport and Infrastructure)
- Tasmania (Department of Infrastructure, Energy and Resources)
- Western Australia (Main Roads Western Australia) Pending

State & Territory road authority approvals take precedence over recommendations in this product manual. Authorities must be consulted before any barrier installation proceeds.

4. APPLICATIONS

The JJ Hooks® Barrier can be used in many different applications

Some examples are:

- Road construction
- General road maintenance
- Bridge repairs
- Detours and diversions
- Lane closure
- Security
- Protection of crowds and pedestrians
- Building and construction site protection
- Mine site delineation

5. PRODUCTS

ARB currently has four JJ Hooks® barrier products on the Austroads acceptance list, including:

- a. 6.0m MASH (TL-3)
- b. 6.0m NCHRP 350 (TL-3)
- c. 3.6m MASH (TL-3)
- d. 3.6m NCHRP 350 (TL-3)

ARB 6.0m JJ Hooks® barrier design has not changed therefore is accepted for use as either MASH (TL-3) or NCHRP 350 (TL-3).

ARB 3.6m JJ Hooks® barrier design has changed meaning two separate barriers are accepted for use, 3.6m MASH (TL-3) Barrier and NCHRP 350 (TL-3) Barrier.

Please note that the MASH approved 3.6m JJ Hooks® barrier with the 455mm JJ Hook cannot be connected to the NCHRP350 rated 3.6m barrier (300mm Hook) or to the MASH rated 6m JJ Hooks® barrier with the 300mm connection hook.

For more information, please see Appendix 1.

6. SITE CONDITIONS

JJ Hooks® barriers must be placed on a flat, stable and compacted surface capable of being trafficked by road vehicles for short periods. The crossfall must not exceed 6%. Unstable surfaces such as deep mud, uncompacted sand or excessively wet surfaces are considered inappropriate. Ideally the surface should be paved and must be free of swales, ditches or other irregularities. The minimum width of stable ground behind the barriers must not be less than the expected deflection of the barrier system.

Barriers must be placed at the same level as the travelled lane and must not be placed in front, behind or on top of kerbing.

Barriers should (where practicable) be placed parallel to the travelled lane and as far away from the travelled lane as possible.

JJ Hooks® barriers are suitable for use in all atmospheric conditions normally encountered on Australian roads without any reduction in effectiveness.



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7. CURVE RADII

The curved sections of existing roads and many different sites have widely varying designs requiring the barrier to position around work areas and following road contours. The JJ Hooks® have a maximum angle between barriers of approximately 7 degrees. The minimum achievable radius will depend on the barrier length. Please see table 1 for more information.

Table 1 - JJ Hooks® Curve Radii

Type	Barrier Length (m)	Maximum Angle (degrees)	Minimum Radius (m)
MASH - 16	3.6	7	32
	6.0	7	51
NCHRP 350	3.6	7	32
	6.0	7	51

8. DYNAMIC DEFLECTION

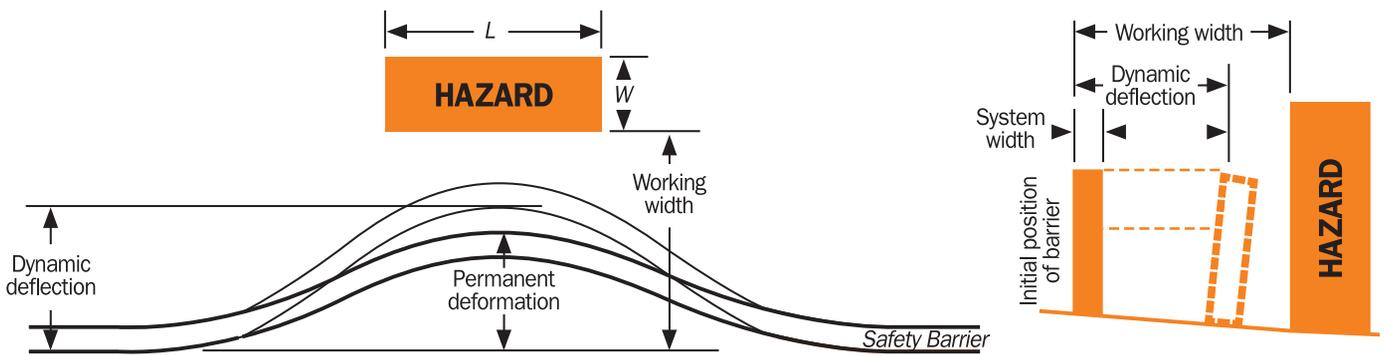
Dynamic deflection refers to the lateral barrier displacement according to calculated kinetic energy values of 2270kg (MASH-16) or 2000kg (NCHRP 350) vehicle impacting. Dynamic deflection will differ between products depending on the test criteria used, NCHRP 350 or MASH-16. Please see table 2 for more information.

with an object behind a road safety barrier system. This includes both the dynamic deflection of the road safety barrier (if any) and the extra width to allow for the roll (vertical rotation) of an impacting vehicle. This ensures that the system width can be accommodated between the deformed road safety barrier and the hazard during impact and that the top of a high heavy vehicle will not impact a high hazard during impact.

9. WORKING WIDTH

The Working Width that is required to prevent an impacting design vehicle from colliding

Please see table 2 for more information.



Type	Barrier Length (m)	Dynamic Deflection (m)	Working Width (m)
MASH 16	3.6	1.63	2.23
	6.0	1.6	2.2
NCHRP 350 (80km/h mandated by ASBAP)	3.6	1.1	1.7
	6.0	1.1	1.7

Table 2 - JJ Hooks® Dynamic Deflection and Working Width

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10. MINIMUM LENGTH

(Length of need)

In order to replicate the MASH-16 TL-3 and NCHRP 350 TL-3 test conditions a minimum No. metres of barrier should be laid upstream and downstream from the point at which the test dynamic deflection is to be achieved.

The Length of Need is the minimum required JJ Hooks® barriers only and does NOT include the end terminals.

Please see table 3 for more information.

Note: some of the State Road Authorities specify a minimum installation length which may be greater than that recommended below.

Table 3 - JJ Hooks® Minimum Length

Type	Barrier Length (m)	Minimum Length (m)	Minimum Barrier (No.)
MASH - 16	3.6	57.6	16
	6.0	66.0	11
NCHRP 350	3.6	57.6	16
	6.0	60.0	10

11. TERMINATING THE SAFETY BARRIER

The ends of safety barriers must be appropriately treated to avoid creating additional hazards.

Each type of end treatment has its own advantages and disadvantages and, in some circumstances, new hazards may be created through their use. It is the responsibility of the user to assess the suitability of any end treatment to the site conditions.

Users should be aware that on a two-lane two-way carriageway, the departure end of a barrier system will require an end treatment as it will be considered an approach end to the opposing traffic.

End treatments recommended by Australian Road Barriers;

- Smart Crash Cusion
- Universal TAU-M Crash Casion
- Quadguard M10 CZ
- SLED End Terminal
- ABSORB M
- ABSORB 350 Crash Casion
- Quadguard CZ

Specification are described in Appendix 2.

State & Territory authority approvals along with product manual of required end terminal should be consulted and will take precedence over recommendations in this Product Manual.

12. INSTALLATION

12.1. Resources Required

The following are the minimum resources required for the safe installation of JJ Hooks® Barriers:

- 2 x 5.0 Tonne (2 x 2.5 Tonne is some NCHRP 350 3.6m barrier) 'Swiftlift' lifting clutches or equivalent.
- 1 x chain sling – ideally a 2 leg Grade 80, 10 mm chain sling;
- Tag/Control line (at discretion of dogman giving consideration to site layout, lifting procedure, etc.)
- 1 x Crane, Crane Truck or plant with a certified lifting point capable of safely lifting the barrier at the required offset (standard 6.0 m barrier is 4.3 tonne, standard 3.6m barrier is 2.5 tonne), capable of a vertical lift of 1 metre and with a clearance from hook to ground of at least 3.8 metres;
- Certified crane or plant operator;
- Dogman or crane chaser equipped with safety boots, gloves and any other PPE required at the particular site;
- Traffic control as appropriate to the site and as required by the local road authority.

12.2. Lifting Procedure

12.2.1. Pre Lift-Inspection

Prior to lifting a JJ Hooks® Barrier the following items must be inspected:

- Lifting anchors for wear, corrosion, deformation or cracking.

The lifting anchors are located in the top surface of each barrier, $\frac{1}{4}$ of the length of the barrier in from each end.

Do not lift barriers using the swift lifts if wear or corrosion exceeds 10%, or if the swift lift is deformed or cracked.

- The JJ Hooks® Barrier for structural damage, signs of impact or cracking (excluding shrinkage cracks). Exercise due care when lifting barriers which show evidence of structural damage.

Note: JJ Hooks® Barriers contain SL718 reinforcing mesh in each face providing a fully reinforced concrete product. Shrinkage cracking is normal and will not reduce the serviceability of the barrier or increase the risks associated with lifting the barrier.

- For barriers currently connected the joint must be checked for debris and cleaned if necessary, to minimise the risk of snagging during the lifting process.

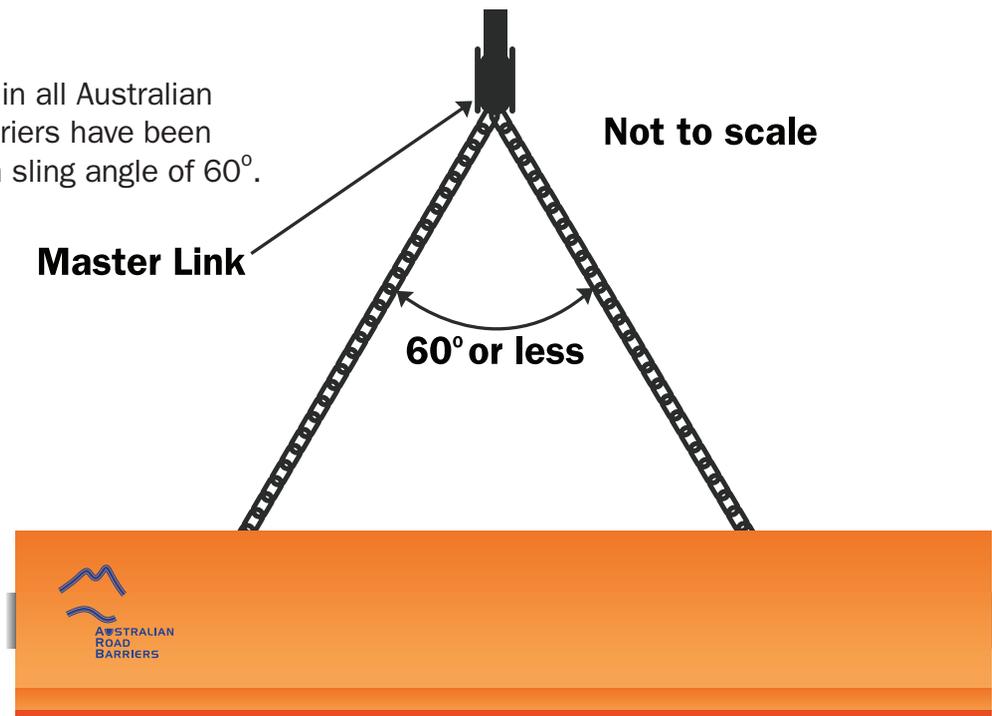


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12.2.2. Sling Angle

The lifting anchors used in all Australian produced JJ Hooks® barriers have been designed for a maximum sling angle of 60°.



The easiest way to ensure that the sling angle is not exceeded is to make sure that each leg of the chain sling is longer than the distance between the lifting anchors. Alternatively, you can measure from the top of the barrier to the underside of the Master Link prior to lifting the barrier.

12.2.3. Lifting

It is essential that:

- The lifting clutches, chains, etc. are attached by suitably trained and experienced operators and/or personnel.
- Only one barrier is lifted at a time.
- The tabs of the lifting clutches are aligned with the chain sling.
- The lifting point of the crane is positioned over the centre of the barrier prior to commencing the lift.
- Barriers are lifted evenly and remain horizontal.
- Barriers are lifted and positioned as smoothly as possible to avoid barrier damage and impact loading the lifting apparatus and crane.
- If the connection snags, stop the lift and either remove the debris causing the snag or adjust the chain sling.

Tag/control lines should be used whenever the dogman determines that the risks associated with rotation of the barriers outweigh those introduced by the use of a line.

12.3. Installation Sequence

Working in the direction of the traffic, commence the installation of the barriers at the approach end of the system and work through to the departure end.

Barriers should be installed sequentially to ensure that the correct installation spacing is achieved. If a gap is required within a run of barriers the barriers should be installed through and past the gap and then removed to create the gap. Either use an accepted gate or protect the exposed ends of the barrier with an accepted end treatment (and provide the appropriate length of need.) This will ensure that the barriers adjacent to the gap are appropriately spaced if the gap needs to be closed during the project.

End treatments on the approach side of the barrier run should be installed after the first barrier has been placed.

Barriers should be removed in the reverse order.

12.4. Installation Procedure

- Ensure that appropriate temporary traffic management is in place for the barrier installation process. This may include, temporary road or lane closures, speed restrictions, etc.
- Set/mark out the barrier alignment;
- Attach lifting clutches to the lifting anchors cast in the top of the barriers;
- Attach a suitable chain sling to the lifting clutches and position the crane or lifting plant so that the hook or lifting point is directly above the centre of the barrier;
- Lift the first barrier into position;
- Work from the non-trafficked side of the barrier(s) wherever possible, taking into account of entrapment hazards;
- Lift each subsequent barrier into position - each barrier must be lifted high enough so that the bottom of the engaging hook is above the top of the hook on the preceding barrier. The chaser or dogman should first guide the engaging hook into the adjacent rebate and then move to the other end of the barrier to ensure the desired alignment is achieved.
- Barriers should be placed at their maximum separation to replicate test conditions (approximately 25mm).
- Visually inspect each installation ensuring there are no objects or ground conditions that cause the barrier joins to be uneven or twisted.

13. MAINTENANCE

Under normal operating conditions JJ Hooks® barriers require no maintenance other than regular inspections for damage, removal of any litter or debris built up around the barriers and occasional cleaning if the visibility of the barriers is affected.

Where the barriers are placed for extended periods in locations where they are exposed to sea water, sea air or in areas where salt is used to control snow, the steel hooks and lifting anchors should be regularly cleaned and inspected for signs of corrosion. Hooks or anchors showing signs of corrosion (other than surface discoloration) must be reported to Australian Road Barriers so that the barriers can be assessed and replaced as necessary.

14. REPAIR

14.1 Cementitious Patch Repair

The purpose of this Work Instruction is to ensure cementitious patch repairs are carried out safely and in accordance with the customers requirements. Typically these repairs represent the reinstatement of spalled or chipped concrete within the cover zone. Deeper repairs shall be by agreed procedure submitted as part of an NCR.



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Cementitious Patch Repair:

1. Where required, oil, and grease shall be removed using a degreaser and the area scrubbed using a detergent;
2. The area to be patched shall be broken back to a sound and dense concrete substance to a minimum depth of 10mm;
3. The substrate shall be cleaned with compressed air to remove all loose material;
4. The substrate shall be soaked with clean water and any excess water removed;
5. If required, the patch area may be formed up using form ply to hold in place until set;
6. The substrate shall be coated with a bondcrete primer substance in accordance with the manufacturer's instructions;
7. The patch shall be filled with Parchem Renderoc HB70 placed in accordance with the manufacturer's instructions. The patch shall be applied while the bondcrete primer is still tacky;
8. Apply a fairing coat of Parchem Renderoc FC placed in accordance with the manufacturer's instructions;
9. All repairs shall be dressed with a fine abrasive stone or sandpaper.
10. If required, the patch can be painted in accordance to the customers requirements;

15. BARRIER DISMANTLE AND RECYCLE

If a barrier is deemed to be damaged beyond repair (DBR) after an incident, then it must be removed from the barrier run and from site to ensure that it is not used again as it will no longer replicate the barriers specified crash test conditions and will therefore not meet Australian Standards. JJ Hooks® Barriers can be removed from the barrier run quite easily by simply lifting the damaged barrier out and replacing it with a

new barrier. For more information, please refer to 12.4 Installation Procedure.

The connection system of the DBR barrier must be removed to ensure it is not used on public roads.

DBR barriers can be used in a variety of ways in private yards as a bent connection system (JJ Hooks®) is usually the cause of the barrier being deemed DBR, i.e. the structural integrity of the barrier is still good enough for this use.

The other alternative for a DBR barrier is to send it to a concrete recycling plant where the steel reinforcement can be removed and it can be turned into a variety of materials.

16. INCIDENT REPORTING

Incidents that result in significant damage to individual barriers or to the barrier system as a whole, must be made safe, and reported to Australian Road Barriers for investigation. Significant damage would include concrete spalls larger than fist size, deformation of the hooks, any damage to the end treatments or cracking (excluding shrinkage cracks).

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Appendix 1. JJ Hooks®
Product Drawing

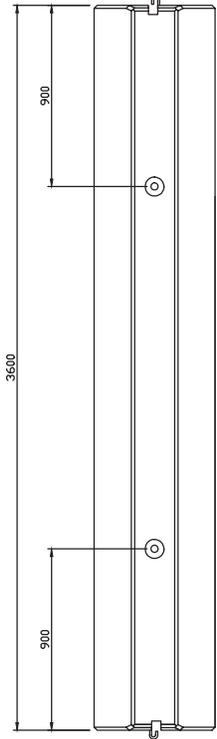


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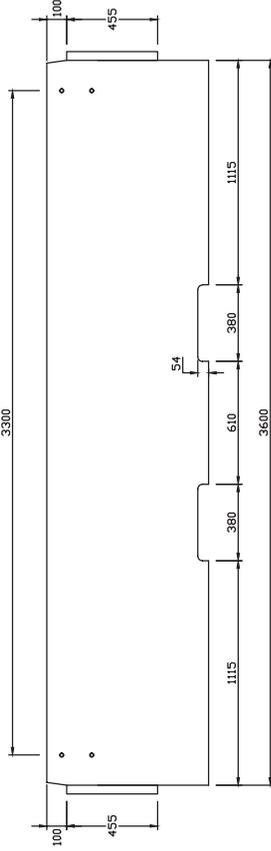
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JJ Hooks®

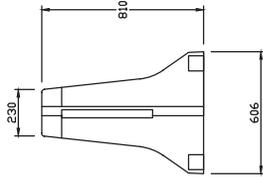
The JJ hook connection system is a proprietary product of EASI-SET INDUSTRIES of Midland Virginia, USA. AUSTRALIAN ROAD BARRIERS PTY LTD is the exclusive licensee in Australia.



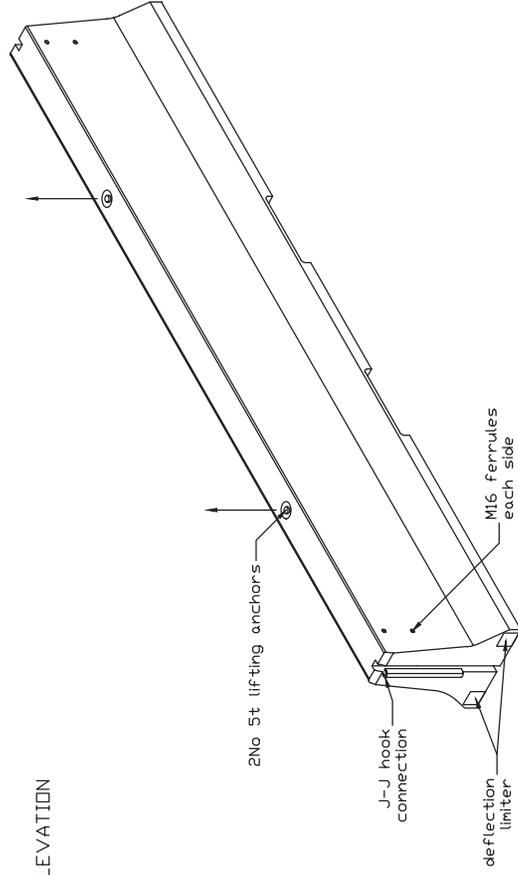
PLAN



ELEVATION



END ELEVATION



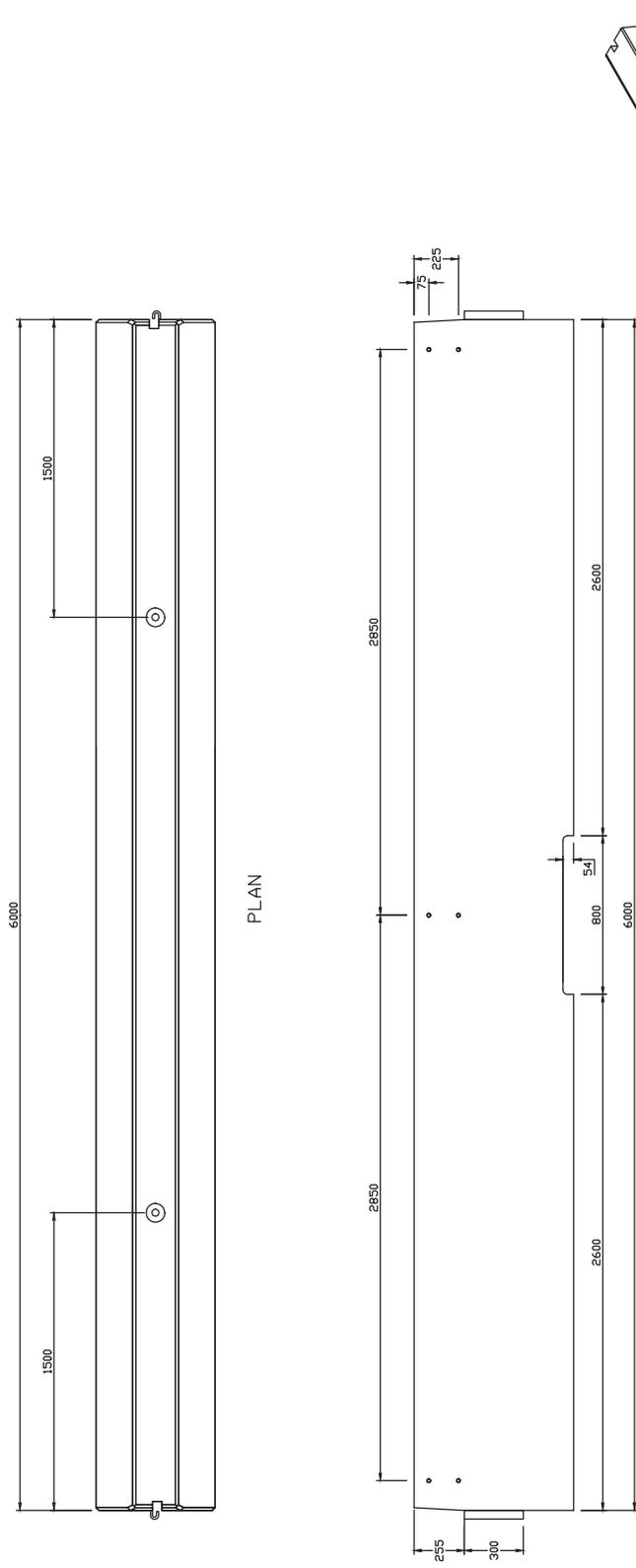
- Notes:
1. Concrete strength 32MPa to AS 1379.
 2. REINFORCEMENT Reinforcing steel in accordance with AS 4671.
 3. REINFORCING fabric in accordance with AS 4671.
 4. DESIGN CRITERIA Safety Barrier to AS/NZ 3845.
 5. MASH test level 3 (TL-3).
 6. LIFTING and HANDLING Lifting anchors installed in accordance with manufacturers instructions.
 7. LIFTING anchors are 5 tonne x 240mm. Set as shown.
 8. Unit Mass 2.48 tonnes based on 2450 kg/m³.
 9. All dimensions are in millimeters.

DRAWN Glenn D Checked		TITLE ARB 3.6m J-J Hooks Barrier MASH Test Level 3	
SIZE A3	DWG No	SCALE NTS	REV
	ARB-3.6m-Barrier (TL-3)	SHEET	1:1



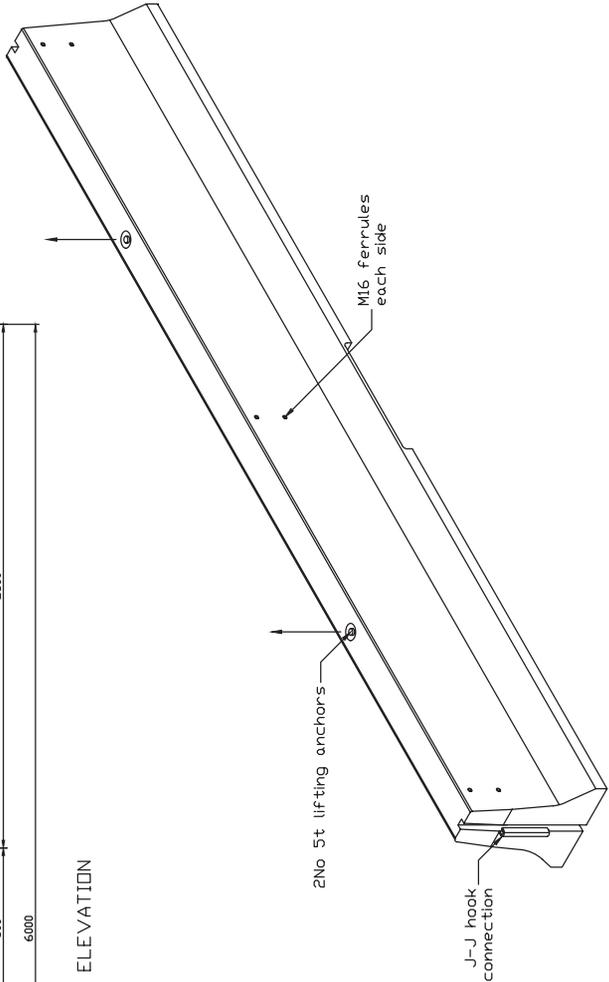
6m JJ Hooks® MASH & NCHRP 350 Free Standing Barrier

The JJ hook connection system is a proprietary product of EAST-SET INDUSTRIES. EAST-SET INDUSTRIES is the exclusive licensee in Australia of AUSTRALIAN ROAD BARRIERS PTY LTD.



END ELEVATION

ELEVATION



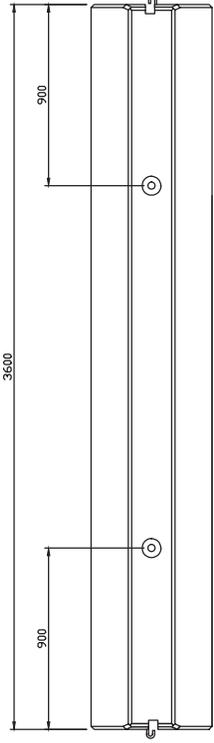
- Notes:
1. Concrete strength 32MPa, to AS 1379.
 2. REINFORCEMENT
 3. Reinforcing steel in accordance with AS 4671.
 4. Reinforcing fabric in accordance with AS 4671.
 5. DESIGN CRITERIA
 6. Safety Barrier to AS/NZ 3845.
 7. NCHRP 350 test level 3 (TL-3).
 8. LIFTING and HANDLING
 9. Lifting anchors installed in accordance with manufacturers instructions.
 10. Lifting anchors are 5 tonne x 240mm. Set as shown.
 11. GENERAL
 12. Unit Mass 4.30 tonnes based on 2450 kg/m³.
 13. All dimensions are in millimeters.



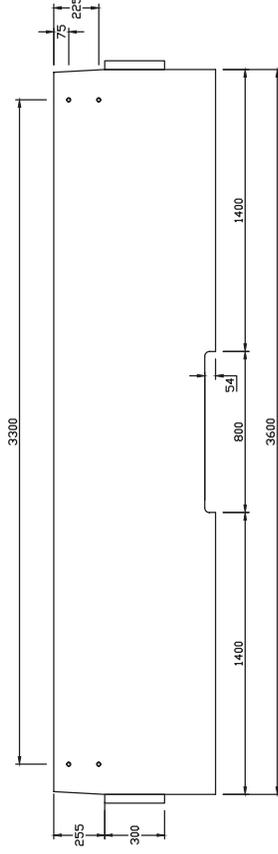
DRAWN Glenn D Checked	TITLE ARB 6.0m J-J Hooks Barrier MASH (TL3) and NCHRP 350 (TL3)
	SIZE A3
	DWG No ARB-6m-Barrier
	SCALE NTS
	SHEET 1:1
	REV

3.6m JJ Hooks® NCHRP 350 Free Standing Barrier

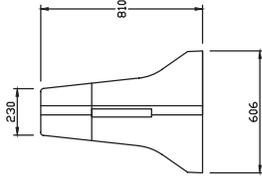
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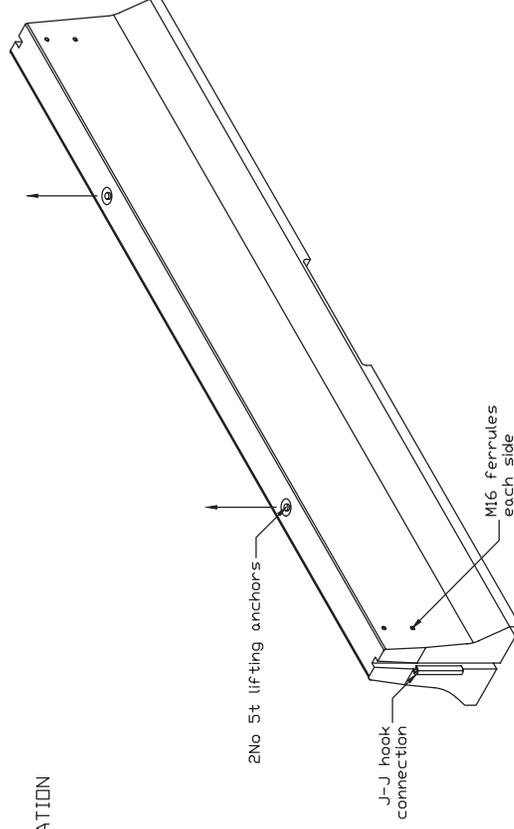
PLAN



ELEVATION



END ELEVATION



- Notes:
1. Concrete strength 32MPa to AS 1379.
 2. REINFORCEMENT
 3. Reinforcing steel in accordance with AS 4671.
 4. Reinforcing fabric in accordance with AS 4671.
 5. DESIGN CRITERIA
 6. Safety Barrier to AS/NZ 3845.
 7. NCHRP 350 test level 3 (TL-3).
 8. LIFTING and HANDLING instructions in accordance with manufacturers instructions.
 9. Lifting anchors are 5 tonne x 240mm. Set as shown.
 10. GENERAL
 11. Unit Mass 2.48 tonnes based on 2450 kg/m³.
 12. All dimensions are in millimeters.

DRAWN Glenn D Checked	TITLE	ARB 3.6m J-J Hooks Barrier NCHRP (TL3)	
	SIZE	A3	REV
	DWG No	ARB-3.6m-Barrier	
	SCALE	NTS	SHEET 1:1



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Appendix 2
General Overview Drawings of
Optional End Treatments



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General Overview

1. Smart Crash Cushion

The Smart Crash Cushion is a fully re-directive, non-gating, bidirectional Crash Cushion End Treatment. This device is designed for safety and its reusability. Smart Cushion has been tested to MASH Test Level 3-37. MASH Test 3-37 is a reverse direction test on the transition between a narrow F-Profile barrier (less than 610mm wide).

To replicate the MASH Test Level 3-37 conditions of the Smart Cushion and the reinforcement of the F-Profile barrier used in that crash test, Australian Road Barriers will manufacture a transition barrier suitable for connection to the Smart Crash Cushion and the pavement as per drawing: **6m JJ Hooks® Concrete Transition Barrier – Smart Cushion – Anchor details**

The installation of this system should be in strict accordance with local road authority approvals and the manufacturer's product/installation manual. This manual can be found at: www.smartcushion.com.au

2. Universal TAU-M Crash Cushion

The Universal TAU-M is a fully re-directive, non-gating, bidirectional Crash Cushion End Treatment designed to meet MASH TL-3 and TL-2 testing requirements in a compact, partially reusable design. Universal TAU-M Crash Cushion has been tested to MASH Test Level 3-37.

To replicate the MASH Test Level 3-37 conditions of the Universal TAU-M Crash Cushion and the reinforcement of the F-Profile barrier used in that crash test, Australian Road Barriers will manufacture a

transition barrier suitable for connection to the Universal TAU-M Crash Cushion and the pavement as per drawing below:

6m JJ Hooks Concrete Transition Barrier – Universal TAU-M Crash Cushion – Anchor details

The installation of this system should be in strict accordance with local road authority approvals and the manufacturer's product/installation manual. This manual can be found at: <http://www.acprod.com.au>

3. QuadGuard M10 CZ

The QuadGuard M10 CZ is a re-directive, non-gating crash cushion that consists of an engineered steel nose and crushable, energy absorbing cartridges surrounded by a framework of steel Quad-Beam panels. The system is tested to the Manual for Assessing Safety Hardware (MASH) Test Level 3.

The first barrier behind the QuadGuard M10 CZ should be anchored as per drawing:

Quadguard M10 CZ Transition and Anchor Details to JJ Hooks® Barrier

The installation of this system should be in strict accordance with local road authority approvals and the manufacturer's product/installation manual. This manual can be found at: <https://www.ingalcivil.com.au>

4. SLED End Terminal

The Sentry Longitudinal Energy Dissipater (SLED) End Terminal is a narrow, non re-directive, gating crash cushion. The system is tested to the Manual for Assessing Safety Hardware (MASH) Test Level 3 with an 80km/h restricted Austroads Safety Barrier Assessment Panel (ASBAP) approval only.

The installation of this system should be in strict accordance with local road authority approvals and the manufacturer's product/installation manual. This manual can be found at: <https://www.saferoads.com.au>

5. ABSORB M

The ABSORB-M is a water filled, non-re-directive, gating, crash cushion designed to meet the latest test standards defined in the Manual for Assessing Safety Hardware (MASH), with an 70km/h restricted Austroads Safety Barrier Assessment Panel (ASBAP) approval only.

The installation of this system should be in strict accordance with local road authority approvals and the manufacturer's product/installation manual. This manual can be found at: <http://www.acprod.com.au>

6. ABSORB 350 Crash Cushion

The ABSORB 350 Crash Cushion is a water-filled, non-re-directive, gating crash cushion that is approved to NCHRP 350 Test Level 1 and Test Level 2 criteria with an 70km/h restricted Austroads Safety Barrier Assessment Panel (ASBAP) approval only.

The installation of this system should be in strict accordance with local road authority approvals and the manufacturer's product/installation manual. This manual can be found at: <http://www.acprod.com.au>

7. QuadGuard CZ

The QuadGuard CZ is a free-standing, non-gating, re-directive end treatment, specifically designed for construction zones. The QuadGuard CZ System has successfully passed the complete NCHRP 350, Test Level 3 Test matrix.

The first barrier behind the QuadGuard CZ should be anchored as per drawing;

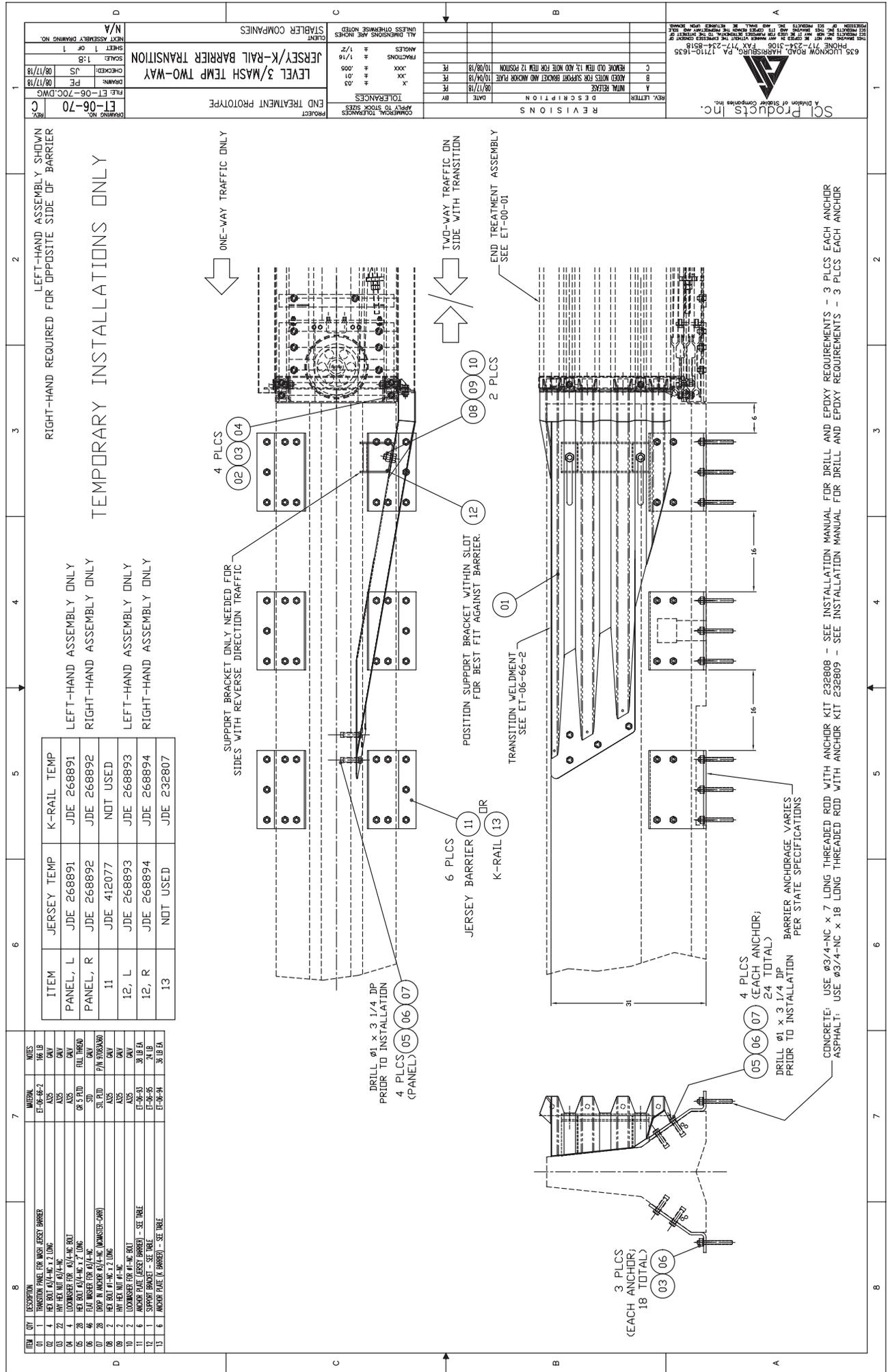
The installation of this system should be in strict accordance with local road authority approvals and the manufacturer's product/installation manual. This manual can be found at: <https://www.ingalcivil.com.au>



**AUSTRALIAN
ROAD
BARRIERS**

www.roadbarriers.com.au

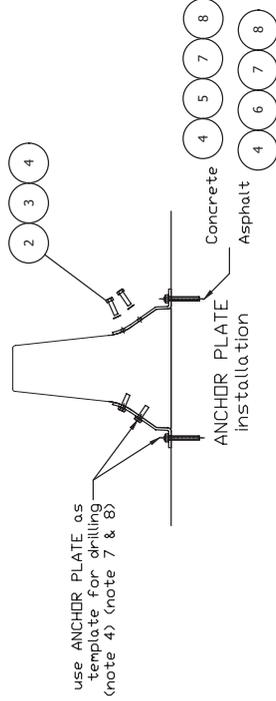
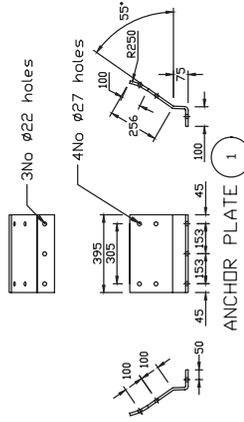
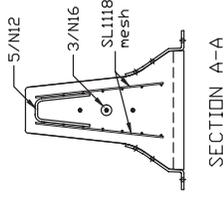
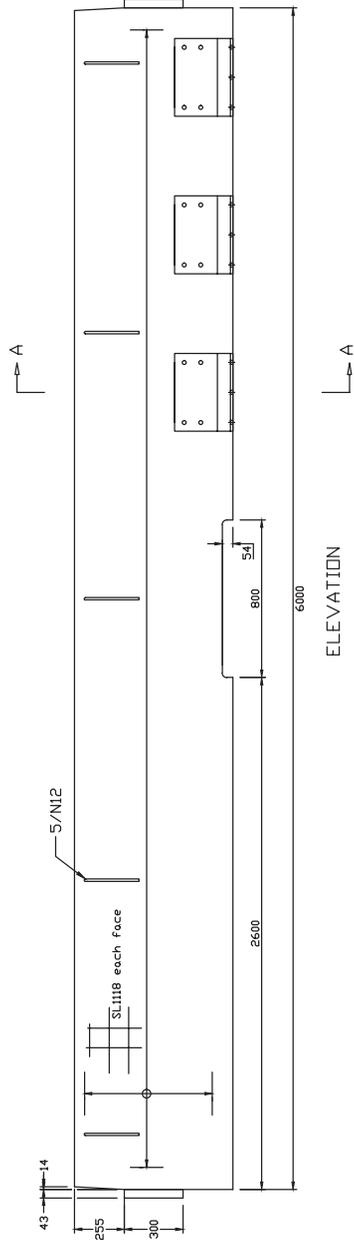
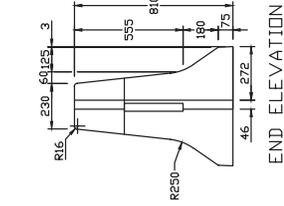
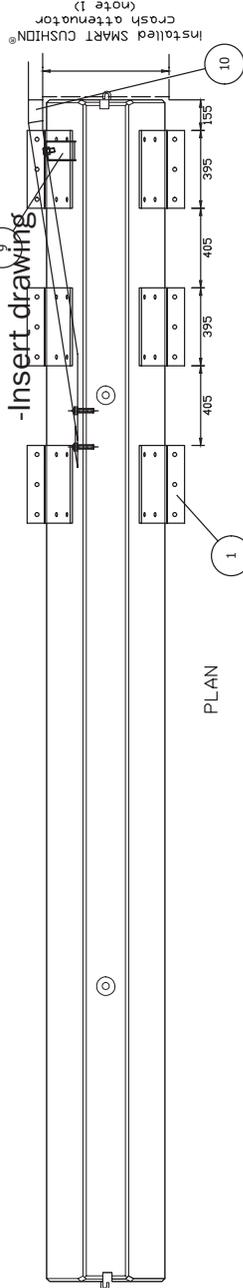
SMART CRASH CUSHION TRANSITION TO JJ Hooks® BARRIER



635 LUCKNOW ROAD, HARRISBURG, PA 17110-1635
 PHONE 717-234-3106 FAX 717-234-8518
 A Division of Stabler Companies Inc.
 SCI Products Inc.

6M JJ Hooks® CONCRETE TRANSITION BARRIER – SMART CUSHION – ANCHOR DETAILS

The JJ hook connection system is a proprietary product of EAST-SET INDUSTRIES of Midland, Virginia, USA. AUSTRALIAN ROAD BARRIERS PTY LTD. is the exclusive licensee in Australia.



- Notes:
1. Install SMART CUSHION® crash attenuator in accordance with manufacturers installation manual.
 2. Pins for fixing the anchor plates to the transition barrier and pavement shall be supplied as a kit to the barrier installer by SMART CUSHION® crash attenuator supplier.
 3. Use barrier ANCHOR PLATE as template for drilling barrier.
 4. Drill $\varnothing 25 \times 90$ deep hole in barrier.
 5. Set drop-in pins (supplied) with setting tool or with punch. Typical (12) places each side.
 6. Use barrier ANCHOR PLATE as template for drilling pavement foundations.
 7. Drill $\varnothing 25 \times 140$ embedment for concrete.
 8. Drill $\varnothing 25 \times 420$ embedment for Asphalt.

- Notes:
9. Epoxy threaded rod using HILTI HY 200. Typical (9) each side.
 10. Barrier concrete: 32MPa (min)
 11. Reinforcement cover: 50 (-0+5) unless noted otherwise.
 12. All dimensions are in millimeters
 13. Not all chamfers and fillets shown for clarity

Item	Qty	Description
1	6	Anchor Plate 12mm Grade 250 (min)
2	24	Drop-In Anchor 3/4"-10NC x 3" (supplied)
3	24	Hex Bolt 3/4"-10NCx2" (supplied)
4	42	Flat Washer 3/4" (supplied)
5	18	Threaded Rod 3/4"-10NCx7" (supplied)
6	18	Threaded Rod 3/4"-10NCx18" (supplied)
7	18	Hex Nut 3/4"-10NC (supplied)
8	2	Anchor Bolt Epoxy (note 9)
9	2	Support Bracket - Right (left not shown)
10	2	Transition Panel - Right (left not shown)

DRAWN Glenn D Checked		TITLE ARB Transition Barrier 6m (Smart Cushion Installation)	
Australian Road Barriers 17 Old Creswick Road Ballarat Vic 3352 AUSTRALIAN ROAD BARRIERS Phone: 1800 003 826 Email: sales@roadbarriers.com.au		SIZE A3	REV B
B 11-05-20	Support Bracket added	SCALE 1:25	SHEET 1:1
A 09-04-20	Initial Issue		

UNIVERSAL TAU-M CRASH CUSHION TRANSITION TO JJ Hooks® BARRIER

NOTES: UNLESS OTHERWISE SPECIFIED.

1. TAU-M SYSTEM TO BE INSTALLED PER MANUFACTURER'S INSTRUCTIONS. SEE ASSEMBLY AND INSTALLATION MANUAL FOR ADDITIONAL DETAILS. TL-3 MODEL 30TM100CA SHOWN, TL-2 MODEL 30TM070CA MAY BE INSTALLED IN SIMILAR FASHION.
2. J-J HOOK FREESTANDING BARRIER (3.6m or 6m) TO BE INSTALLED PER MANUFACTURER'S INSTRUCTIONS.
3. TAU-M FOUNDATION MATERIAL, SPECIFICATIONS, AND ANCHORAGE MUST BE IN ACCORDANCE WITH BSI FOUNDATION SPECIFICATIONS FOR ASPHALT FOUNDATIONS. REFERENCE LTS DRAWING A040113.

4.

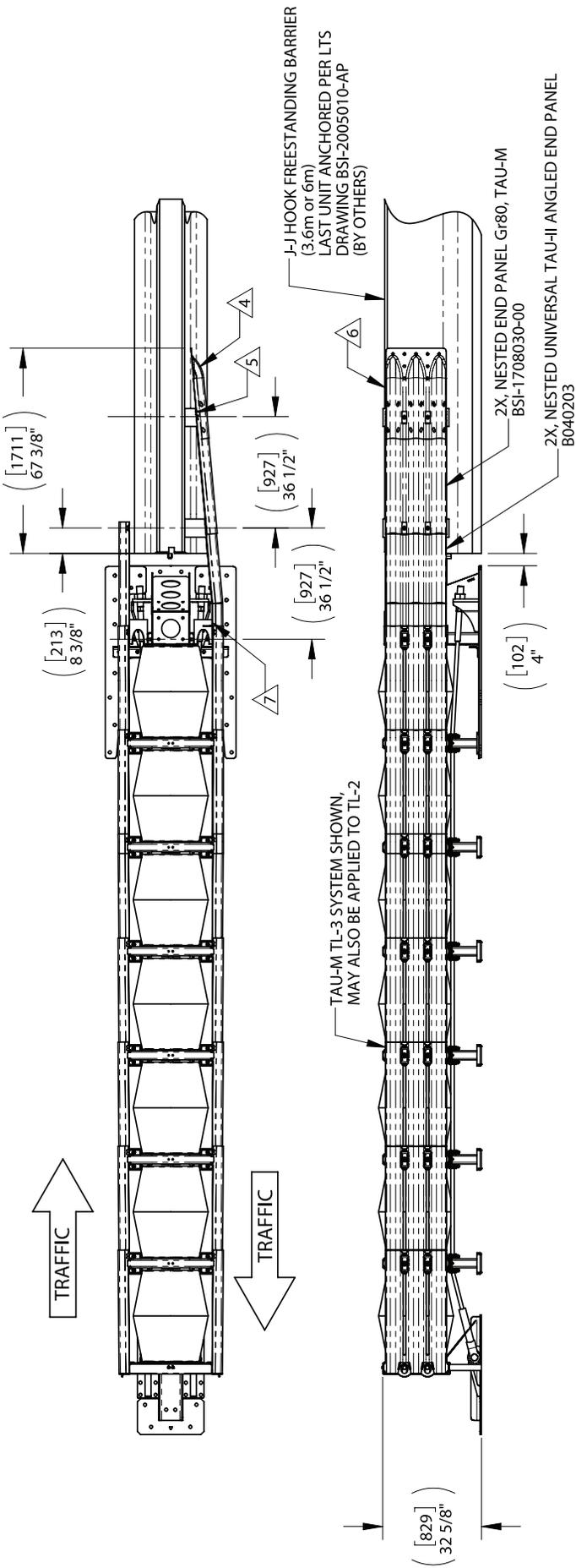
THREE BEAM TERMINAL CONNECTOR PER AASHTO HARDWARE SPECIFICATION RTE01b.

5. PANELS AND BLOCKOUTS ATTACHED TO BARRIER WALL WITH 5/8" [16mm] BOLTS WITH BEAM WASHERS, FLAT WASHERS, AND NUT. 24" [610mm] THREADED RODS MAY BE FIELD TRIMMED. HOLES DRILLED THROUGH MEDIAN BARRIER ARE 3/4" [20mm]. MECHANICAL OR CHEMICALLY BONDED ANCHORS MAY BE USED THAT MEET OR EXCEED 15000 LBF [67kN] SHEAR AND PULL OUT STRENGTH.

6. ATTACH THREE BEAM TERMINAL CONNECTOR TO MEDIAN BARRIER WITH (3) 5/8" [16mm] THREADED ROD WITH BEAM WASHERS, FLAT WASHERS, AND NUTS. THREADED ROD MAY BE FIELD TRIMMED.

7. TRANSITION BRACKET TO BE INSTALLED OVER PIPE PANEL MOUNTS UNDER THE (2) NESTED ANGLED END PANELS AND THE SLIDING PANEL. BEND IN TRANSITION BRACKET FACES REARWARD AND FIT AROUND PIPE PANEL MOUNTS. JOINT IS SECURED WITH SLIDING BOLTS.

8. TRANSITION COMPONENTS ARE INCLUDED IN BSI-1805008-00.

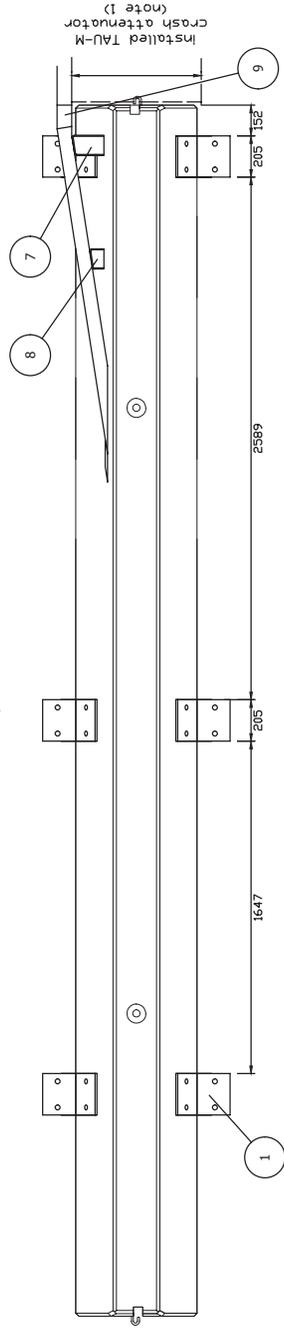


		BARRIER SYSTEMS Rio Vista, CA 94871 Tel: 888-800-8691 www.barriersystems.com	
TITLE UNIVERSAL TAU-M TRANSITIONED TO J-J HOOK FREESTANDING BARRIER ASPHALT, BI-DIRECTIONAL		REV. 1	
SIZE B		DWG NO. BSI-2005027-AP	
APPROVALS NDPP 5/12/20 JMT 5/12/20		DO NOT SCALE DRAWING	
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES. FRACTIONS DECIMAL ANGLES 1/16 .XXX = 1.010 1/2 1/2		INTERPRET DIMENSIONS AND TOLERANCES PER ASME Y14.5-1994	
THIRD ANGLE PROJECTION		DO NOT SCALE DRAWING	
REV 1		ECN#	
DATE 5/12/20		SCALE 1:36	
SHEET 1 OF 1		1	

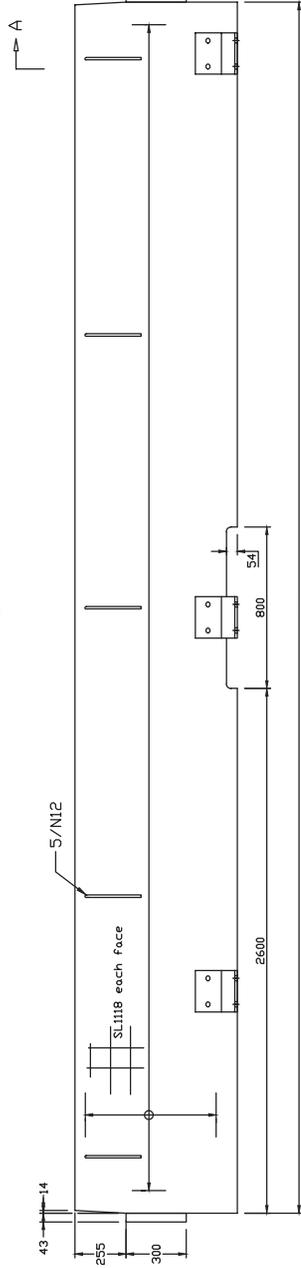
This drawing is provided for informational purposes only and is based upon information provided to Lindsay Transportation Solutions ("Lindsay") by the customer (which may not reflect, among other things, certain information that could be obtained via an in-person visit to, or familiarity with, the installation site). Neither Lindsay nor any of its affiliates is liable for any direct, indirect, incidental, consequential, or punitive damages arising out of or related to the customer's access to, use of, or reliance upon this drawing. This drawing is not a substitute for professional engineering or architectural services. The product must be assembled and installed in a manner not inconsistent with the Procedures and must comply with federal, state and local standards. Installation and any modifications to the product should be reviewed and approved by the Authority.

6M JJ Hooks® CONCRETE TRANSITION BARRIER – UNIVERSAL TAU-M – ANCHOR DETAILS

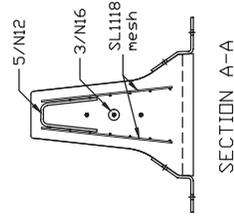
The JJ Hook connection system is a proprietary product of EAST-SET INDUSTRIES AUSTRALIAN ROAD BARRIERS PTY LTD is the exclusive licensee in Australia.



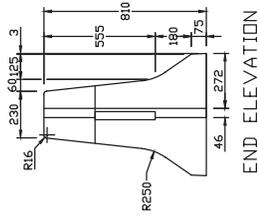
PLAN



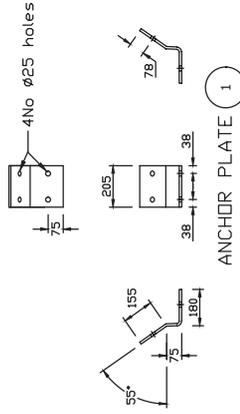
ELEVATION



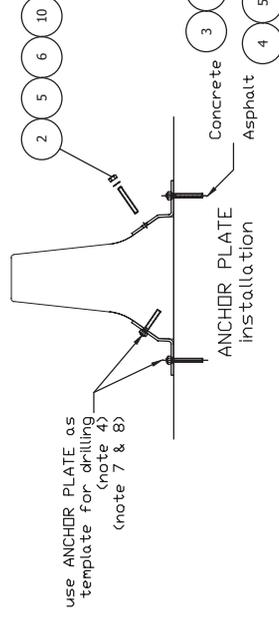
SECTION A-A



END ELEVATION



ANCHOR PLATE 1



ANCHOR PLATE installation

- Notes:
1. Install universal TAU-M crash attenuator in accordance with manufacturers installation manual.
 2. Pins for fixing the anchor plates to the transition barrier and pavement shall be supplied as a kit to the barrier installer by TAU-M crash attenuator supplier.
 3. Use barrier ANCHOR PLATE as template for drilling barrier.
 4. Drill Ø22x150 deep hole in barrier.
 5. Set M20 studs (threaded rod) in barrier with anchor epoxy. Typical 12 places each side.
 6. Use barrier ANCHOR PLATE as template for drilling pavement foundations.
 7. Drill Ø25x150 (min) embedment for concrete.
 8. Drill Ø25x410 (min) embedment for Asphalt.

- Notes:
9. Epoxy studs (threaded rod) using HILTI HY 200.
 10. Barrier concrete: 32MPa (min)
 11. Reinforcement cover: 50 (-0+5) unless noted otherwise.
 12. All dimensions are in millimeters
 13. Not all chamfers and fillets shown for clarity

PARTS LIST	
Item	Description
1	6 Anchor Plate 12mm grade 250 (min)
2	12 Studs (threaded rod) 3/4" (M20x200)
3	12 Threaded Rod 3/4" (M20x200min)
4	12 Threaded Rod 3/4" (M20x460min)
5	24 Hex Nut 3/4" (M20)
6	24 Flat Washer 3/4" (M20)
7	2 Inrie Beam Blockout – Right (left not shown)
8	2 Inrie Beam Blockout – Right (left not shown)
9	2 Transition Rail – Right (left not shown)
10	2 Anchor Bolt Epoxy (note 9)

A 16-05-20	Initial Issue		Australian Road Barriers 17 Old Creswick Road Ballarat Vic 3352 AUSTRALIAN ROAD BARRIERS Phone: 1800 003 826 Email: sales@roadbarriers.com.au	DRAWN Glenn D Checked	TITLE ARB Transition Barrier 6m (TAU-M Crash Cushion Installation)
			SIZE A3	DWG No ARB-Transition Barrier-003	REV A
				SCALE 1:25	SHEET 1:1

QUADGUARD M10 CZ TRANSITION AND ANCHOR DETAILS TO JJ Hooks® BARRIER

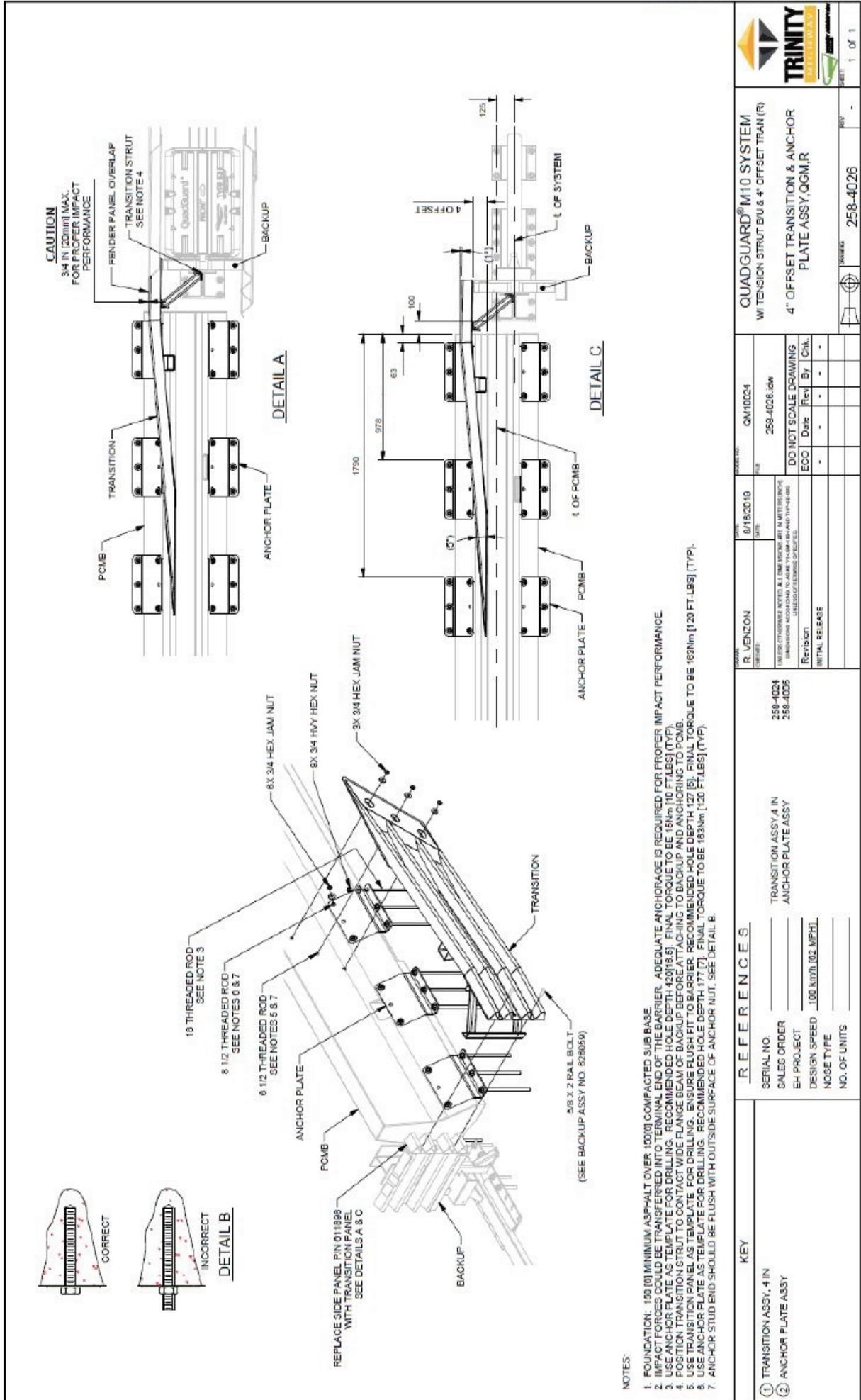
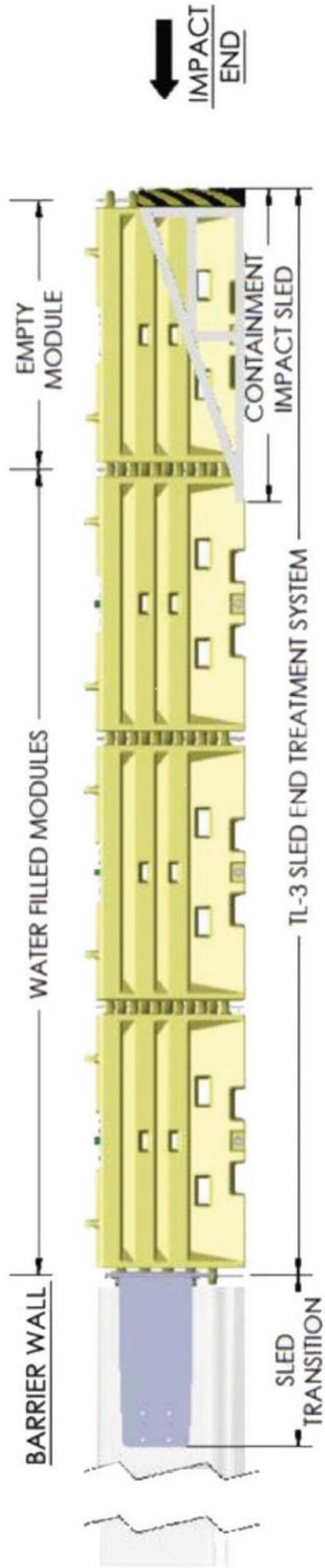
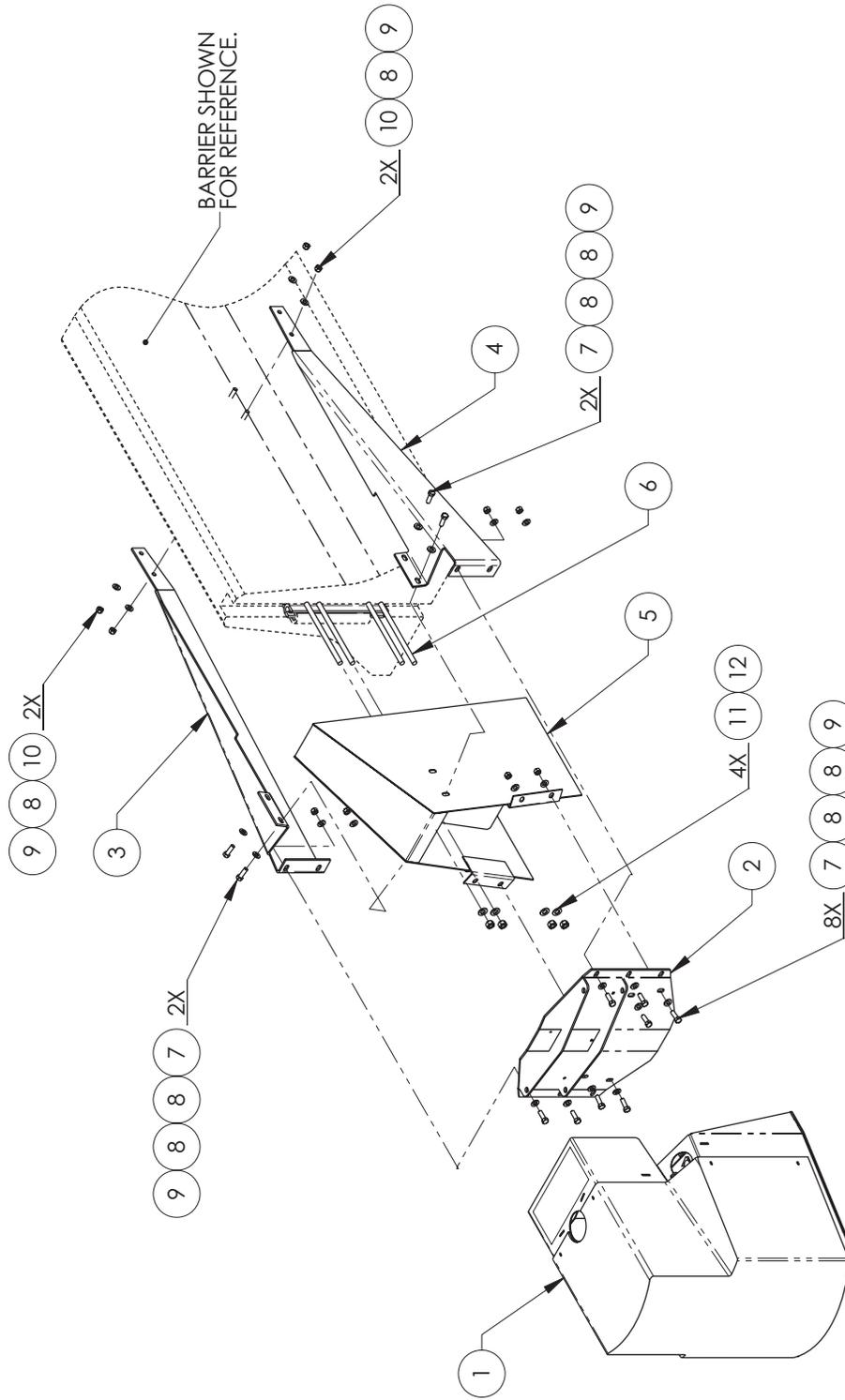


Figure 1: QuadGuard MASH Transition and Anchor Plate Assembly

**SLED TRANSITION END TERMINAL TO
JJ Hooks® BARRIER**



ABSORB 350 END TERMINAL TRANSITION TO JJ Hooks® BARRIER



		3333 Vasco Valley Parkway, Ste 800 Woodland, CA 95698 Tel: 888-800-3691 www.barriersystemsinc.com	
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES. FRACTIONS DECIMAL ANGLES ±1/16 ±.00 ±1/2° .XX ±.00 INTERPRET DIMENSIONS AND TOLERANCES AS SHOWN		TITLE JJ-HOOK BARRIER TO ABSORB 350 ATTACHMENT, PCB HINGE	
APPROVALS DRAWN BY: AEM DRAWN DATE: 02/17/12 APPR'D BY: GAD APPR'D DATE: 02/17/12	REV A 2117 0 1819	SIZE B 08/22/13 2/17/12	DWG NO. JJPCB DATE ECN# REV 1 OF 1

QUADGUARD CZ CRASH CUSHION TRANSITION TO JJ Hooks® BARRIER

PARTS LIST		ITEM	STOCK NO.	DESCRIPTION	REQ'D
	CORRECT	1	SEE TABLE	PANEL, TRANSITION, 4 OFFSET, QG	1.00
	INCORRECT	2	2760301-0000	BRACKET, SUPPORT, 4 TRANS TO CMB	1.00
		3	3525130-0000	ANCHOR, MP-3, PT KIT, 3/4X6 1/2 HOR	1.00
		4	2699341-0000	BOLT, RAIL, 5/8X2, G	3.00
		5	2704191-0000	NUT, HX, 5/8, G, RAIL	3.00

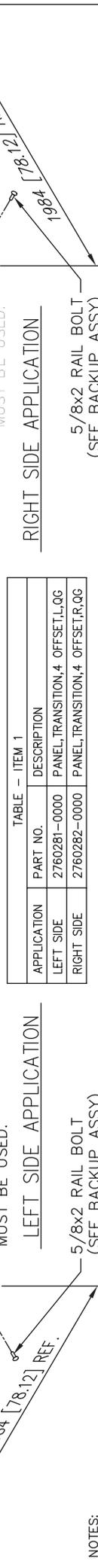
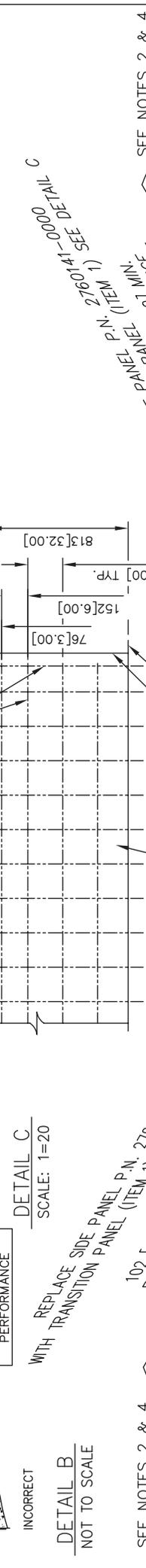


TABLE - ITEM 1	
APPLICATION	PART NO.
LEFT SIDE	2760281-0000
RIGHT SIDE	2760282-0000

NOTES:

- THE CONCRETE BARRIER REINFORCEMENT SHOWN IN DETAIL "A" IS RECOMMENDED TO ENSURE ADEQUATE BARRIER INTEGRITY FOR PROPER IMPACT PERFORMANCE. IT IS APPROPRIATE FOR A STANDARD SAFETY SHAPED BARRIER WITH A 610 [24.00] BASE AND A 150 [6.00] TOP. VARIATIONS MAY BE REVIEWED AND DETERMINATIONS MADE AS TO REASONABLE EQUIVALENCE BY PROJECT ENGINEER.
- USE TRANSITION PANEL AS TEMPLATE FOR DRILLING. RECOMMENDED HOLE DEPTH 127 [5.00]. FINAL TORQUE TO BE 16.3Nm [120 FT-LBS] (TYP).
- IMPACT FORCES COULD BE TRANSFERRED INTO TERMINAL END OF THE BARRIER. ADEQUATE ANCHORAGE IS REQUIRED FOR PROPER IMPACT PERFORMANCE.
- ANCHOR STUD END SHOULD BE FLUSH WITH OUTSIDE SURFACE OF ANCHOR NUT, SEE DETAIL B.

5. MIN. 27.6 MPa [4000 PSI] P.C. CONCRETE MEDIAN BARRIER.

REFERENCES

DATE	DESIGNED	CHECKED	APPROVED	CAD FILE	NEXT ASSEMBLY
08/21/96	J. Espinoza	J. WELCH	B. Burges	354018.dwg	
8/21/96			S. Turner		
8/27/96					
8/27/96					

LEFT ASSEMBLY NO. 354018L-0000
RIGHT ASSEMBLY NO. 354018R-0000

ENERGY ABSORPTION SYSTEMS, INC.
ENGINEERING AND RESEARCH DEPARTMENT

TRANSITION ASSY, 4 OFFSET, QG

SCALE: N.T.S. DWG: 35-40-18 SHEET: 1 of 1 REV: G

QUADGUARD CZ ANCHOR PLATE DETAILS

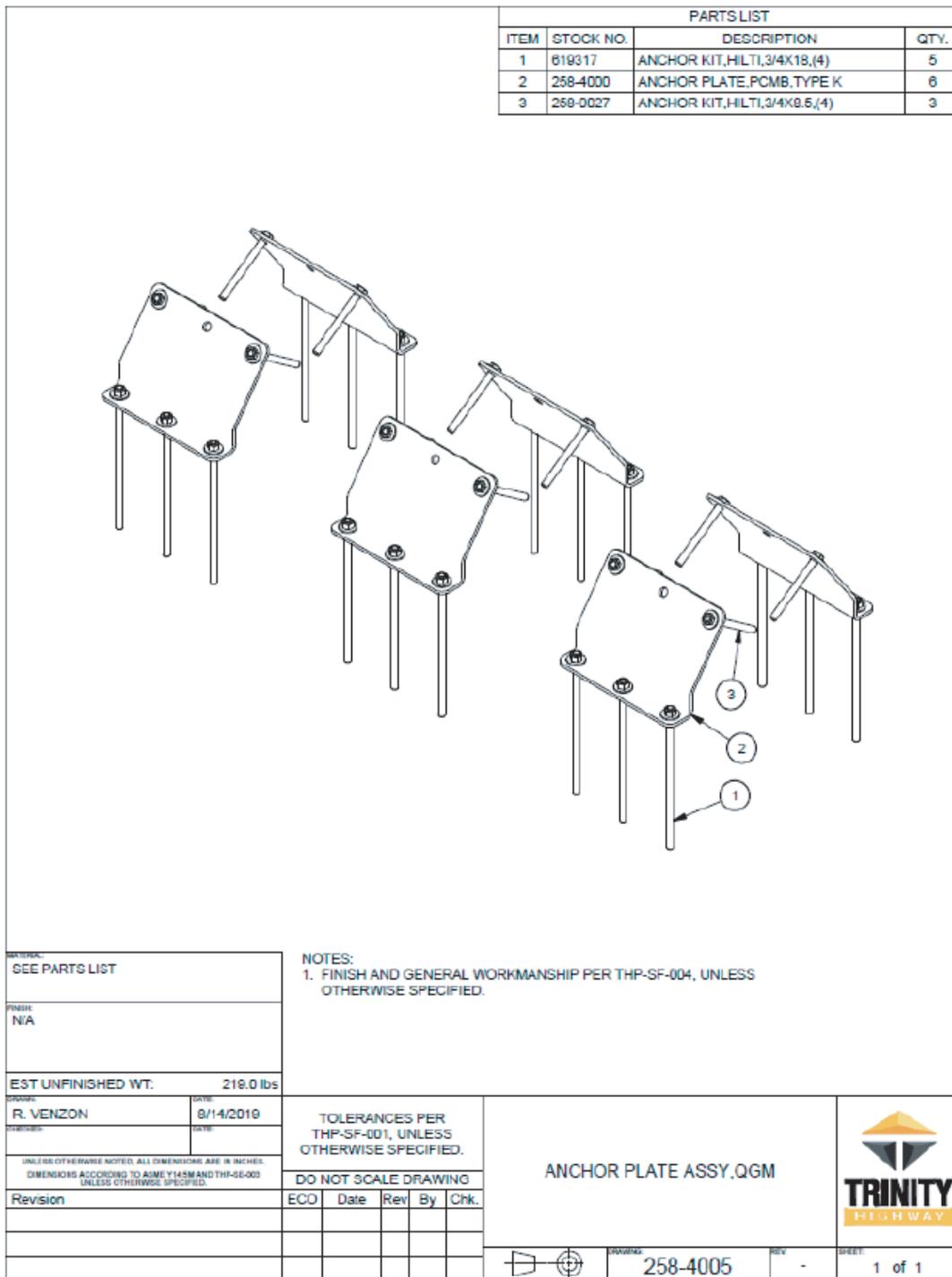


Figure 4: Anchor Plate Assembly

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