



M23 Appendix B

NZTA M23:2022

Appendix B: concrete and bridge barrier systems

31 May 2022

Version 3

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This document is available on the Waka Kotahi NZ Transport Agency website at www.nzta.govt.nz

Document references

- AS/NZS 3845 Part 1:2015
- AS/NZS 3845 Part 2:2017
- AUSTRROADS Part 6: Roadside Design, Safety and Barriers
- AUSTRROADS Part 3: Geometric Design
- American Association of Highway and Transportation Officials (AASHTO) Manual for Assessing Safety Hardware (MASH)
- System Suppliers' documentation
- Waka Kotahi NZTA M23
- Waka Kotahi NZTA M23 Interim acceptance notices
- Waka Kotahi Bridge Manual
- Waka Kotahi Traffic Control Devices Manual



Waka Kotahi is part of, and contributes to, the Road to Zero safety strategy.

Road to Zero is the government's strategy to guide improvements in road safety over the period 2020–2030. The strategy's vision is to stop people being killed or seriously injured on our roads. This means that no death or serious injury while travelling on our roads is acceptable.

For more information visit www.nzta.govt.nz/road-to-zero

Revision record

Date	Notes
2016	Draft release
April 2022	Formal release
May 2022	Inclusion of roadside barrier minimum lengths and anchor spacing to replace content from Appendix A & new format

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Glossary

(Refer also to AS/NZS 3845 Part 1 2015 and Part 2 2017)

Anchorage	The component used to restrain the end of the barrier system and to transmit impact forces to the ground. A permanent barrier system must be anchored to the ground
Bi-directional application	Two-way traffic. E.g. Barrier hardware that can be hit by both adjacent and opposing traffic
Clear Area	An area, behind or in front of a road safety barrier system, which should be kept free of hazards for the proper operation of the road safety barrier system or combination of systems. Also referred to as run out area
Clear Zone	An outdated safety concept which has been replaced by a risk assessment of the Design Envelope in accordance with Safe System principles. Clear Zones were defined as the roadside area bordering the travel lanes which should be free of hazards and traversable
Crashworthy	A feature that has been proven acceptable for use under specified conditions either through crash testing or in-service performance
Crossfall	The transverse sloping of the road surface toward the shoulder or gutter
Deflection	The horizontal displacement of the barrier when impacted
Delegated Authority role	For state highway projects, this is the Waka Kotahi Lead Safety Advisor. For other RCAs, the appropriate person may be someone with equivalent delegated authority to make decisions on the acceptability of proposed safety hardware.
Design Envelope	The roadside area of interest, the scale of which is based on a risk assessment in accordance with Safe System principles, within which hazards should be treated or protected
End Terminal	A crashworthy end treatment must be provided when the end of a barrier is exposed to head-on impacts
FHWA	USA Federal Highways Administration
Flare Rate	The curvature applied near the end of a road safety barrier installation. Expressed as the ratio of the longitudinal distance to the transverse offset, by which a road safety barrier flares away from the road
Flexible Barrier	Barrier systems which dissipate crash impact energy largely by deflection of the barrier system. Lower impact forces are imposed on the vehicle and occupants
F-Shape Barrier	Concrete barrier of the current accepted F-shape cross-section
Gating	A road safety barrier terminal designed to allow an impacting vehicle to pass through the device, when impacted at an angle, upstream from the point of redirection
Impact angle	For a longitudinal barrier, it is the angle between the face of the barrier and the vehicle's impact direction.
Installation Designer	The entity that designs the length, location and types of components of a system to be installed on a section of the road network. The Installation Designer designs the system to suit the particular conditions of the section of road network
Length of need	The required length of barrier system that is redirective, to shield the hazard
MASH	Manual for Assessing Safety Hardware (MASH) is a Manual for Assessing Highway Safety Features. This is the current Waka Kotahi test protocol for road safety hardware
Minimum Length	Minimum standalone length of safety barrier system, excluding end terminals
NCHRP 350	National Co-operative Highway Research Program (report) 350
New Jersey Barrier	Generally a concrete barrier of the New Jersey Barrier profile. Superseded by the F-shape Barrier
Point of Redirection	That point on a barrier system downstream of which will be redirective. Previously referred to as "point of need"
Proprietary	A road safety barrier system that is the subject of patent or other intellectual property rights
Public Domain	A road safety barrier system that is not the subject of patent or other intellectual property rights within Australia and New Zealand. Note: These systems are also referred to as non-proprietary road safety barrier systems
RCA	Road Controlling Authority that has control of the road, sometimes referred to as Road Authority
Redirective	The ability of a barrier system to redirect an impacting vehicle away from the barrier without barrier pocketing or rupture
Ribbon Strength	The longitudinal strength of a barrier system to provide crash energy containment and redirection

Rigid Barrier	Barrier system that has no deflection under impact. Higher impact energy transmitted to vehicle and occupants
Semi-Rigid Barrier	Barrier systems which deflect during re-direction. Impact energy to vehicle and occupants is less than for a rigid system but greater than a flexible system
Shy Line	The distance from the edge of the travelled way outside of which the start of a roadside object (e.g. barrier) will not cause a driver to change their vehicles lateral placement or speed
Site Specific Risk Assessment	An assessment which is specific to the site that considers risk based on parameters such as road user exposure, crash likelihood and crash severity
Slope	The relative steepness of the terrain expressed as a ratio or percentage
System Installer	The entity that installs the system
System Owner	The entity that has the property rights to the road safety hardware system through their ownership of the patent
System Supplier	The entity that supplies the system or device
Test Level (TL)	A set of prescribed test conditions, defined in terms of vehicular mass, impact speed and angle that defines the crash energy
Uni-directional application	One-way traffic eg barrier hardware that cannot be hit by opposing traffic
Vaulting	Abrupt upward movement of an impacting vehicle
Wear and tear	Damage that naturally and inevitably occurs as a result of normal use or aging
Working Width	The minimum width that is required to prevent an impacting design vehicle from colliding 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
WRSB	Wire Rope Safety Barrier, a flexible barrier system

1. Bridge barrier locations

Rigid barrier used on structures may also be used on the roadside or median. Where rigid barriers are not fixed to a structure an appropriate foundation must be provided.

2. Bridge barrier performance

2.1 Performance level

Irrespective of any testing regime (such as MASH or NCHRP350) when used for protection of super- and sub-structure elements:

- a. W-Beam barrier systems are considered to provide Performance Level 3 protection;
- b. Thrie-beam barrier systems are considered to provide Performance Level 4 protection;
- c. Monolithic concrete barrier systems are considered to provide either Performance Level 4 (at 915 mm) or Performance Level 5 (at 1070 mm); and
- d. "HT" type barrier systems (PA HT, T80HT) are considered to provide Performance Level 5 (at 1270 mm).

2.2 W-beam on structures

W-Beam barriers (see B1, B2, B5 and B6) are a legacy system and not accepted for use on State highway bridges.

2.3 Thrie-beam on structures

Proprietary Thrie-beam barriers – refer to Section 7.

Public domain Thrie-beam systems (B3, B4, B5 and B7) are a legacy system and not accepted for use on State highway bridges but may be considered suitable for local road structures subject to Road Authority acceptance.

3. Compliant specific use bridge barrier systems

On occasion, site specific approval may be granted for use of variations to standard barrier systems. Such approval is to be sought from the Waka Kotahi Lead Safety Advisor before finalising any design drawings or contract documentation.

4. Structural design considerations

With respect to the B9 series standard design drawings for rigid bridge barriers (refer to Section 5), the following points must be considered by the Installation Designer:

- a. The Installation Designer is responsible for ensuring that the slab or other structure supporting all on-bridge barriers is capable of resisting the forces and moments imparted on them resulting from barrier overstrength.
- b. The traffic face profiles shown on the drawings may not be altered from the profiles as dimensioned.
- c. The non-traffic face profile defined on the drawings may be varied, such as by the addition of aesthetic embossing or panels, but the Installation Designer is responsible for ensuring that structural capacity is maintained or bettered.

5. Non-proprietary bridge barrier systems

F-shape concrete barrier



Summary	
Test level / conditions:	<ul style="list-style-type: none"> • TL-4: minimum height 915 mm • TL-5: minimum height 1070 mm
For use with	Used as either median barriers (doubled sided) or roadside (single sided) barriers with appropriate transition to semi-rigid barriers (RSB-5M)
Status	Accepted
Technical information	
Dimensions	Refer to drawings B8-1 to B8-5 (refer also AASHTO SGM10a-b)
Weight	915 kg per lineal metre (approximate, for median TL-4)
Minimum length when not founded on a structure	<ul style="list-style-type: none"> • TL-4: 48 m • TL-5: 66 m
Maximum anchor footing spacing	<ul style="list-style-type: none"> • TL-4: 48 m* • TL-5 24 m* <p>*Barriers founded on a structure shall be fixed to the deck for their entirety</p>
Working width at up to 4.6 m height	<ul style="list-style-type: none"> • TL-4: 2.2 m • TL-5: 2.4 m
Other restrictions / considerations	<ul style="list-style-type: none"> • For additional details refer to NZ Transport Agency drawings B8-1 to B8-5 (Section 9) • The barrier may be cast-in-place, slip formed or precast. All precast segments or cast-in-place segments less than 12 m in length must be joined to adjacent sections by at least three 25 mm diameter steel dowels (TL4), at least four 25 mm diameter steel dowels (TL5), or an equivalent joining method accepted by the RCA • Specification for slip formed variant provided as Appendix D of this Specification • “Pin and loop” or other temporary concrete barrier joint configurations are not accepted for use as permanent barriers (also note these are semi-rigid, not rigid barriers)

Heavy traffic (HT) barrier (PA HT and T80 HT)



Summary	
Test level / conditions:	TL-5: height 1270 mm
For use with	Roadside barriers with appropriate transition to semi-rigid barriers (B9-2 and RSB-5M)
Status	Accepted
Technical information	
Dimensions	Refer to drawings B9-1 to B9-3
Weight	Varies with system and configuration
Minimum length when not founded on a structure	66 m
Maximum anchor footing spacing	24 m* *Barriers founded on a structure shall be fixed to the deck for their entirety
Working width at up to 4.6 m height	1.5 m
Other restrictions / considerations	<ul style="list-style-type: none"> • For additional details refer to NZ Transport Agency drawings B9-1 to B9-3 (Section 9) • The barrier may be cast-in-place, slip formed or precast. All precast segments or cast-in-place segments less than 12 m in length must be joined to adjacent sections by at least three 25 mm diameter steel dowels (TL4), at least four 25 mm diameter steel dowels (TL5), or an equivalent joining method accepted by the RCA • Specification for slip formed variant provided as Appendix D of this Specification • “Pin and loop” or other temporary concrete barrier joint configurations are not accepted for use as permanent barriers (also note these are semi-rigid, not rigid barriers)

6. Proprietary bridge barrier systems

VGSH 2000 steel bridge barrier



Summary	
Test level / conditions:	EN 1317 H2 (approximately equivalent to MASH TL-3)
For use with	Transition available to Thrie-beam and W-beam
Status	Accepted
Technical information	
Dimensions	<ul style="list-style-type: none"> • Post Spacing: 2.0 m centres • System Height: 1.25 m • Minimum plinth width: 450 mm
Weight	84.7 kg per lineal metre (without optional mesh or sheet facing)
Minimum length	Minimum length of the bridge parapet 27 m
Working width	1.0 m (deflection 1.0 m from EN 1317 H2 testing)
Other restrictions / considerations	<ul style="list-style-type: none"> • Appropriate mesh or sheeting should be affixed to traffic face of system in situations (i) to (vi) of Bridge Manual appendix B clause B2.4 (ie to prevent climbing of the barrier where the risk of falling or the hazards present are greatest). • The minimum horizontal curvature without pre-curving of main rails is 75 m. Smaller radii can be accommodated by special arrangement with pre-curving

VGSH 4000 steel bridge barrier



Summary

Test level / conditions:	EN 1317 H4a (exceeds MASH TL-4)
For use with	Transition available to Thrie-beam
Status	Accepted

Technical information

Dimensions	<ul style="list-style-type: none"> • Post Spacing: 2.0 m centres • System Height: 1.5 m • Minimum plinth width: 650 mm • Minimum plinth height: 100 mm
Weight	149.5 kg per lineal metre (without optional mesh or sheet facing)
Minimum length	Minimum length of the bridge parapet 27 m
Working width	1.3 m (deflection 1.3 m from EN 1317 H4a testing)
Other restrictions / considerations	<ul style="list-style-type: none"> • Appropriate mesh or sheeting should be affixed to traffic face of system in situations (i) to (vi) of Bridge Manual appendix B clause B2.4 (ie to prevent climbing of the barrier where the risk of falling or the hazards present are greatest). • The minimum horizontal curvature without pre-curving of main rails is 500 m. Smaller radii can be accommodated by special arrangement with pre-curving

VGAN 300 aluminium bridge barrier



Summary

Test level / conditions:	EN 1317 H2 (approximately equivalent to MASH TL-3)
For use with	Transition available to Thrie-beam and then to W-beam
Status	Accepted

Technical information

Dimensions	<ul style="list-style-type: none"> • Post Spacing: 3.0 m centres • System Height: 1.07 m • Minimum plinth width: 450 mm
Weight	25.4 kg per lineal metre
Minimum length	Minimum length 30 m
Working width	790 mm (from NCHRP 350 TL-4 testing)
Other restrictions / considerations	<ul style="list-style-type: none"> • Appropriate mesh or sheeting should be affixed to traffic face of system in situations (i) to (vi) of Bridge Manual appendix B clause B2.4 (ie to prevent climbing of the barrier where the risk of falling or the hazards present are greatest). • The minimum horizontal curvature without pre-curving of main rails is 150 m. Smaller radii can be accommodated with pre-curving • The manufacturer's connection detail in conjunction with the Waka Kotahi standard transition detail (RSB-5M) must be used to connect the VGAN 300 Aluminium Bridge Barrier system to a semi-rigid road safety barrier on the structure approach • Where parapet meshing is required to meet Building Code and or road controlling authority requirements, the manufacturer's detail must be used, or an alternative fixing agreed • Classed as a rigid performance level 4 barrier system in terms of the Waka Kotahi Bridge Manual

7. Proprietary Thrie-beam barriers

The following general notes apply to all proprietary Thrie-beam barriers used on bridges and structures:

- a. Proprietary Thrie-beam barriers should only be used where Performance Level 4 or less protection has been deemed appropriate in accordance with the relevant procedure in the Waka Kotahi Bridge Manual.
- b. Proprietary Thrie-beam barriers may be considered where it has been determined that a system with greater performance cannot be installed, for example due to site constraints on retrofit projects. For state highway projects such cases represent a departure from recommendations and must be supported by a departure report accepted by the Waka Kotahi Lead Safety Advisor.
- c. The System Supplier may be required to make information available for the Structure Designer. Such information may include but not be limited to:
 - i. Offset from the deck edge.
 - ii. Load transferred into the deck and/or anchors.
 - iii. Transition and/or post spacing from highway onto the structure.
 - iv. Post spacing on the structure.
- d. Where structure deck strength is relatively low compared to crash forces, consideration must be given to the likely failure mechanism in the event of a crash. Generally, failure of the barrier post or fixings will be preferable to damage to the structure. If the deck strength is less than that of the barrier it may be necessary to consider barrier variants that reduce likelihood of damage to the structure, however some barrier variants have different performance to accepted barriers and their use must be supported by a departure report accepted by the Waka Kotahi Lead Safety Advisor and/or Lead Advisor Structures, as appropriate. Other factors, such as the length of the structure may affect the level of risk with a short section of barrier variant generally having lower risk than a long section.
- e. The minimum offset from the barrier posts to the edge of the structure should be at least equal to the expected dynamic deflection of the barrier in the event of a crash. This is usually based on test deflection, however factors such as impact speed, impact angle and vehicles type will affect deflection. In many situations there will not be sufficient structure width to allow for full deflection as well as acceptable barrier offset from traffic lanes. In such cases a reduced post offset from the edge of the structure may be considered, however this will require a departure report detailing the effects of the reduced offset to be submitted to the Waka Kotahi Lead Safety Advisor for consideration. In cases where the System Supplier has developed variants of their barrier system to cater for installation with low offset the information provided by the System Supplier may be used as information to support the departure process, however a departure request is still necessary.
- f. For bridges with length over 150 m intermediate anchors may be required as per the Bridge Manual appendix B clause B8.2. The System Supplier shall supply details of the intermediate anchors.
- g. Accepted transitions must be used to connect the Thrie-beam barrier system to adjoining W-beam barrier and/or terminals.
- h. Non-standard post lengths may be considered where necessary if system performance is warranted by the system supplier and the maintenance burden is acceptable to the road authority.

Ezy-Guard HC Thrie-beam barrier



Summary	
Test level / conditions:	MASH TL-3 and TL-4
For use with	An appropriate transition to W-beam, concrete (MASH tested RSB-5M transition) or QuadGuard M10 to provide a crashworthy terminal and anchorage
Status	Accepted
Technical information	
Dimensions	<ul style="list-style-type: none"> • Z-Post length: 954 mm + 16 mm thick baseplate • System Width: 245 mm + 30 mm baseplate overhang • Rail Height: 980 mm • Post spacing: 2000 mm
Minimum length	MASH TL-4 system 82 m (excluding transitions and terminals/crash cushions)
Working width	<ul style="list-style-type: none"> • TL-3: 1.16 m (deflection 1.16 m) • TL-4: 2.46 m (deflection 1.77 m)
Weight	Thrie-beam guardrail: 72 kg (per panel)
Grade or placement restrictions	A maximum approach and cross slope of 1V:10H is preferable. On slopes greater than this, acceptance is required from the road controlling authority

Sentry Thrie-beam barrier



Summary	
Test level / conditions:	MASH TL-3 and TL-4
For use with	An appropriate transition to W-beam or concrete (MASH tested RSB-5M transition)
Status	Accepted
Technical information	
Dimensions	<ul style="list-style-type: none"> • Post Length: 1024 mm + 16 mm thick baseplate • System Width: 200 mm + baseplate overhang • System Height: 1050 mm • Post spacing: 2.0 m
Minimum length	MASH TL-4 system 86 m (excluding transitions and terminals/crash cushions)
Working width	<ul style="list-style-type: none"> • TL-3: 1.53 m (deflection 1.45 m) • TL-4: 2.80 m (deflection 1.53 m)
Weight	Thrie-beam guardrail: 72 kg (per panel)
Grade or placement restrictions	A maximum approach and cross slope of 1V:10H is preferable. On slopes greater than this, acceptance is required from the road controlling authority

8. Standard drawings

Standard drawings for the systems detailed in Section **Error! Reference source not found.** above are provided on the following pages.

Electronic copies (in PDF format) are also available from the Transport Agency website at <http://www.nzta.govt.nz/network/technical/hardware/drawings.html>

9. Non-proprietary (public domain) bridge barrier system drawings

B8 Series – Test Level 4/5 F-shape Concrete Barrier:

- B8-1 – concrete details
- B8-2 – Thrie-beam to Concrete Transition
- B8-3 – Thrie-beam to Concrete Transition Details
- B8-4 – typical dowelled barrier joint
- B8-5 – Thrie-beam to concrete alternative details

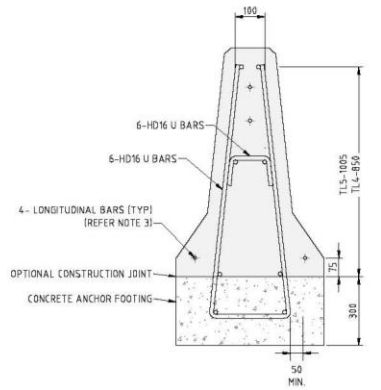
B9 Series – Test Level 5 Concrete Barrier (PA HT, T80HT):

- B9-1A – PA HT bridge barrier
- B9-1B – PA HT bridge barrier
- B9-1C – T80HT bridge barrier
- B9-1D – T80HT bridge barrier
- B9-2 – bridge barrier - semi rigid transition details
- B9-3 – bridge barrier transition details

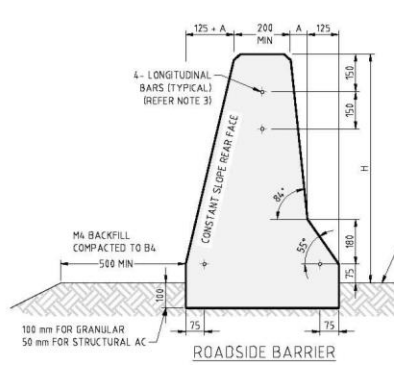
The drawings in the following list are legacy systems from April 2022. Legacy systems may be maintained (repaired) but not installed as new installations on state highway projects without site-specific acceptance by the Waka Kotahi Lead Safety Advisor.

The drawings detail the non-proprietary (public domain) bridge barrier systems as originally detailed in the Waka Kotahi NZ Transport Agency Bridge Manual and accepted for use subject to the requirements of the Bridge Manual Appendix B Section **Error! Reference source not found.** Reduced size copies of the drawings are provided in the following pages and full-size versions can be accessed on the [Waka Kotahi website](#).

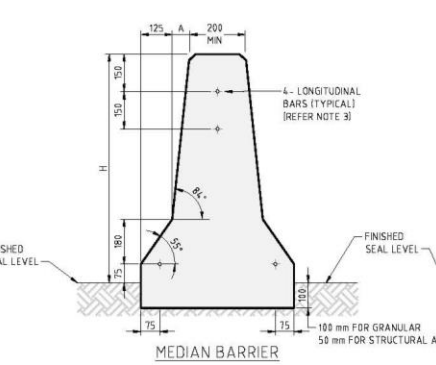
- B1 – W-Beam assembly and fixing details (No Top Rail)
- B2 – W-Beam assembly and fixing details (With Top Rail)
- B3 – Thrie-Beam assembly and fixing details (No Top Rail)
- B4 – Thrie-beam assembly and fixing details (With Top Rail)
- B5 – guardrail holding down details
- B6 – intermediate anchor details (W-beam)
- B7 – intermediate anchor details (Thrie-beam)



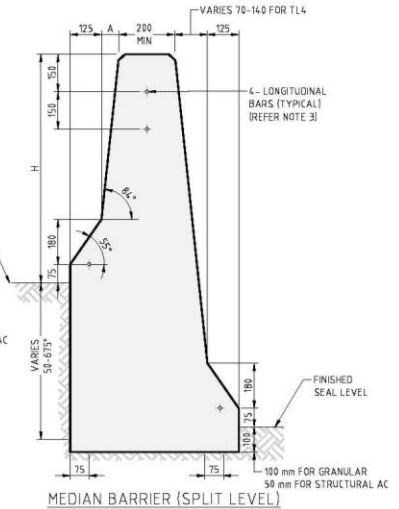
CONCRETE BARRIER AND ANCHOR FOOTING
TYPICAL REINFORCING



ROADSIDE BARRIER
ALTERNATIVE ANCHOR FOOTING



MEDIAN BARRIER



MEDIAN BARRIER (SPLIT LEVEL)

F-SHAPE MONOLITHIC RIGID BARRIER	H	A
TL4	915mm	70mm
TL5	1070mm	85mm

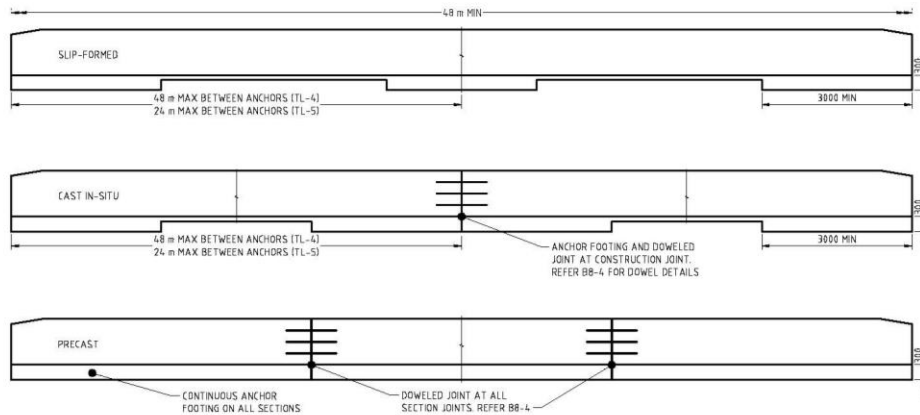
*FOR RETAINED HEIGHT >675mm SEPARATE BARRIERS TO BE INSTALLED FOR EACH CARRIAGEWAY

NOTES

- ALL WORK TO BE AS PER NZTA M23 AND BRIDGE MANUAL (3RD EDITION).
- ALL DIMENSIONS IN MILLIMETRES UNLESS NOTED OTHERWISE.
- LONGITUDINAL REINFORCEMENT TO BE EITHER 4 NO. 12.7mm PRE-STRESSING STRANDS (SLIP FORM BARRIER) OR 4 NO. HD16 BARS (PRECAST OR CAST IN SITU BARRIER).
- SURFACE FINISH: F5.
- HD16 U BARS TO HAVE 50mm CONCRETE COVER.
- TIPS OF HD16 U BARS TO BE WITHIN 100mm OF TOP OF BARRIER.
- ANCHOR FOOTING MAY BE CAST INSITU PRIOR TO BARRIER SLIP FORMING.
- ANCHOR FOOTING SHALL BE ORIENTATED SUCH THAT 6 U BARS ARE LOCATED AT THE BARRIER TERMINATION END.
- REINFORCEMENT IS TO BE ADJUSTED TO SUIT THE INCREASED HEIGHT DUE TO ANY DIFFERENCE IN CARRIAGEWAY LEVELS.
- FOR CAST IN-SITU AND PRECAST PROVIDE DOWELED BARRIER JOINTS (REF BB-3) AT 6 m MIN/60 m MAX CENTRES. SLIP FORM SHALL HAVE CONTRACTION JOINTS, WITH CONTINUOUS REINFORCEMENT, AT 3.0m CENTRES SAWCUT TO 50mm DEEP MAXIMUM AND FILLED WITH BACKING ROD AND SEALANT.
- A 3m LONG 300mm DEEP REINFORCED ANCHOR FOOTING MUST BE PROVIDED AT BOTH ENDS, AND AT SPACINGS NO GREATER THAN 6m TO PROPERLY SECURE THE BARRIER. INTERMEDIATE ANCHORS TO BE REINFORCED AS PER END ANCHORS. SLIP FORM REINFORCEMENT SHALL BE CONTINUOUS THROUGH INTERMEDIATE ANCHOR FOOTING (NO AIR GAP REQUIRED).
- PRECAST CONCRETE BARRIERS TO BE USED IN TEMPDRARY SITUATIONS MUST CONFORM TO EITHER THE TRANSPORT AGENCY'S TCB-1 DESIGN (PUBLIC DOMAIN), OR ONE OF THE ACCEPTED PROPRIETARY DESIGNS, AS LISTED IN NZTA M23 APPENDIX C. THAT IS, STANDARD F-SHAPE PROFILE UNITS THAT ARE DESIGNED TO BE PLACED ON THE ROAD SURFACE, NOT EMBEDDED. THE TCB-1, JJ-HOOKS, T-LOK, ETC. SYSTEMS ARE NOT CONSIDERED SUITABLE FOR PERMANENT USE.
- PRECAST CONCRETE BARRIER TO BE USED IN PERMANENT INSTALLATIONS MUST CONFORM TO THE F-SHAPE PROFILE AND DETAILS GIVEN IN M-23. FOR PRECAST SECTIONS, THE 300mm DEEP, 3m LONG FOOTING IS REQUIRED AT EACH END OF THE PRE-CAST UNIT. SHEAR KEY JOINTS ARE NOT ACCEPTED, A DOWELED JOINT MUST BE PROVIDED THAT IS CAPABLE OF TRANSFERRING THE FULL OPERATIONAL LOADS ACROSS THE JOINT.
- PRECAST PERMANENT BARRIERS WITH LIFTING EYES MUST HAVE THE LIFTING EYES GROUTED OVER FLUSH WITH THE CONCRETE FOLLOWING INSTALLATION.

CONCRETE WORK

- CONCRETE SHALL BE MANUFACTURED IN ACCORDANCE WITH NZS 3104 AND ALL CONCRETE WORK SHALL COMPLY WITH NZS 3109. TOLERANCES FOR CONSTRUCTION OF CONCRETE BARRIERS SHALL BE AS STATED IN AS/NZS 3845 PART 1.
- SYSTEM MUST BE CONNECTED TO AN ACCEPTED BARRIER SYSTEM, END TREATMENT OR CRASH CUSHION USING AN ACCEPTED TRANSITION SYSTEM.
- CONCRETE BARRIER TO HAVE FORMED FINISH SURFACE TO F5 AND ALL CONSTRUCTION JOINTS TO BE TYPE B IN ACCORDANCE WITH NZS3109. CHAMFER ALL EXPOSED EDGES.
- THE 28 DAY COMPRESSIVE STRENGTH AND CONCRETE BINDER TYPE SHALL BE IN ACCORDANCE WITH THE DURABILITY REQUIREMENTS OF NZS 3101 FOR RELEVANT EXPOSURE CLASSIFICATION FOR AN INTENDED LIFE OF 50 YEARS, BUT IN ALL CASES SHALL BE A MINIMUM OF 30MPa. MAXIMUM NOMINAL AGGREGATE SIZE SHALL BE 20mm. DESIGN TO CONFORM TO THE DURABILITY REQUIREMENTS OF NZS 3101.
- ALL REINFORCEMENT STEEL DESIGNATED "HD" SHALL BE GRADE 500E MICRO ALLOY. ALL OTHER REINFORCING STEEL SHALL BE GRADE 300E MA.
- REINFORCEMENT SHALL COMPLY WITH AS/NZS 4671.
- MINIMUM REINFORCEMENT BAR LAP LENGTHS SHALL BE:
 - A) HD16 BARS - 800mm
 - B) HD20 BARS - 1050mm
- MINIMUM COVER TO REINFORCEMENT SHALL BE 50mm UNLESS NOTED OTHERWISE.
- MAXIMUM DEPTH OF AESTHETIC DESIGN ON BARRIER FACE SHALL BE 10 mm.



No.	Revision	Date	Accepted	Date
			JC	04/2022
			JH	04/2022
2	PUBLIC RELEASE	04/22		
1	FOR COMMENT RELEASES	09/18		



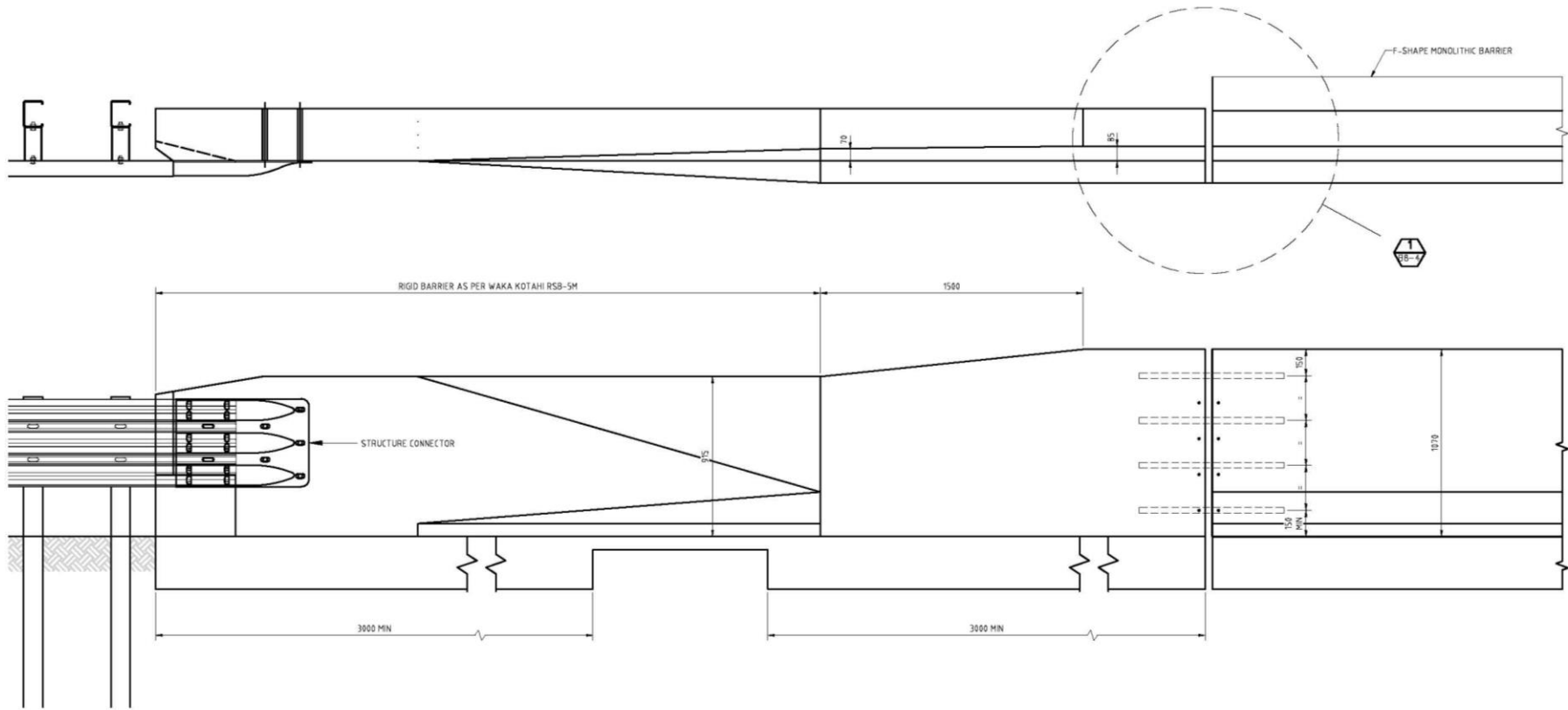
Series F-Shape Monolithic Barrier System

Title Concrete Details

Ref./Number

B8-1

Rev. 2



NOTE
1. REFER SHEET BB-1 FOR GENERAL NOTES.

No.	Revision	Date	Accepted	Date
			JC	04/2022
			JH	04/2022
2	PUBLIC RELEASE	04/22		
1	FOR COMMENT RELEASES	09/18		

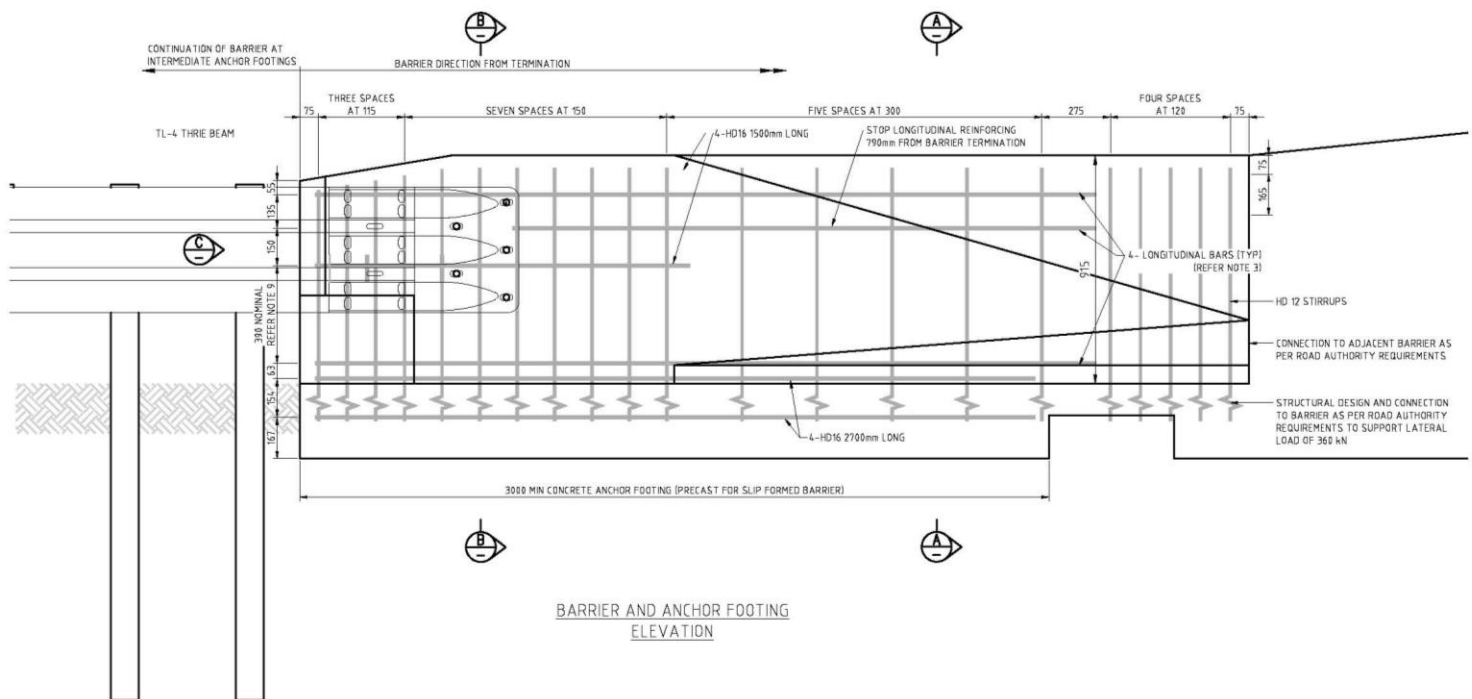


Series F-Shape Monolithic Barrier System
Title Thrie-beam to Concrete Transition

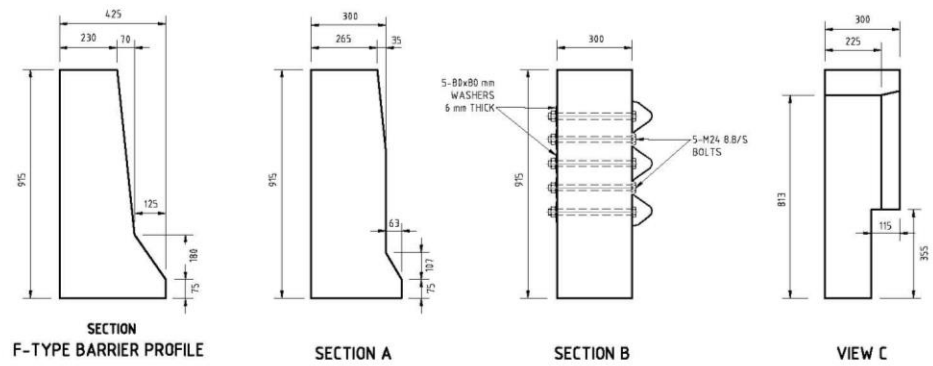
Ref./Number

B8-2

Rev. **2**



BARRIER AND ANCHOR FOOTING ELEVATION



NOTE
1. REFER SHEET BB-1 FOR GENERAL NOTES.

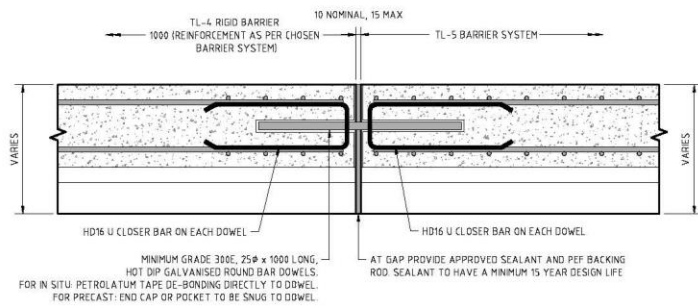
No.	Revision	Date
2	PUBLIC RELEASE	04/22
1	FOR COMMENT RELEASES	09/18

Accepted JC	Date 04/2022
Endorsed JH	Date 04/2022



Series	F-Shape Monolithic Barrier System
Title	Thrie-beam to Concrete Transition Details

Ref./Number	B8-3
Rev.	2

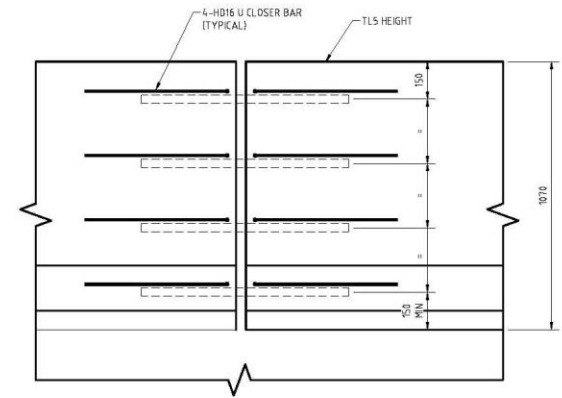


MINIMUM GRADE 380E, 25# x 1000 LONG,
HOT DIP GALVANISED ROUND BAR DOWELS
FOR IN SITU. PETROLATUM TAPE DE-BONDING DIRECTLY TO DOWEL.
FOR PRECAST: END CAP OR POCKET TO BE SNUG TO DOWEL.

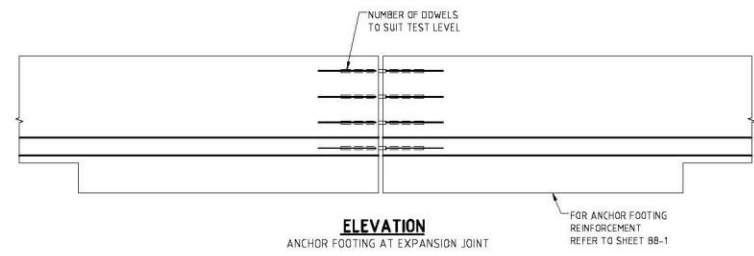
AT GAP PROVIDE APPROVED SEALANT AND PEF BACKING
ROD. SEALANT TO HAVE A MINIMUM 15 YEAR DESIGN LIFE

PLAN
TYPICAL DOWELLED BARRIER JOINT

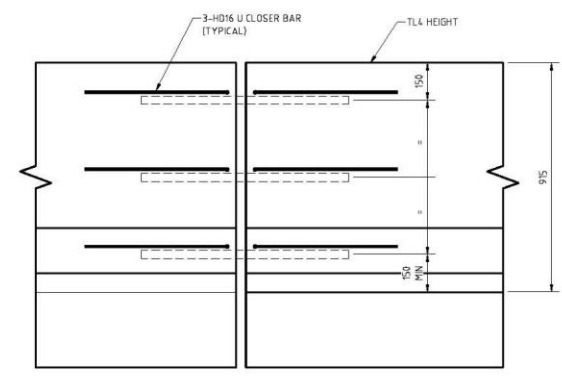
DETAIL 1
BB-2



ELEVATION
TLS5 TO TLS MONOLITHIC



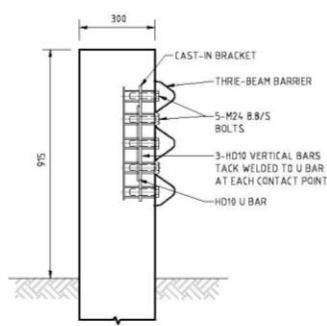
ELEVATION
ANCHOR FOOTING AT EXPANSION JOINT



ELEVATION
TL4 TO TL4 MONOLITHIC

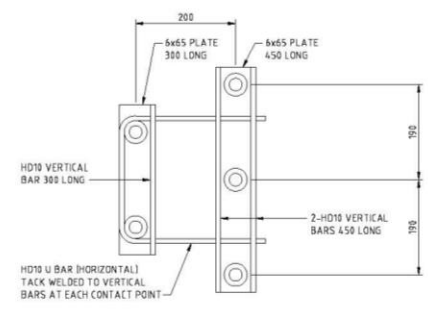
- NOTES**
- REFER SHEET BB-1 FOR GENERAL NOTES.
 - IN ALL CASES REINFORCEMENT BARS SHALL BE AS PER SHEET BB-1 UNLESS NOTED OTHERWISE.

No.	Revision	Date	Accepted JC	Date 04/2022	 Standard Detail	Series F-Shape Monolithic Barrier System	Ref./Number B8-4
			Endorsed JH	Date 04/2022		Title Typical Dowelled Barrier Joint	
2	PUBLIC RELEASE	04/22					<div style="border: 1px solid black; padding: 2px; display: inline-block;">Rev. 2</div>
1	FOR COMMENT RELEASES	09/18					



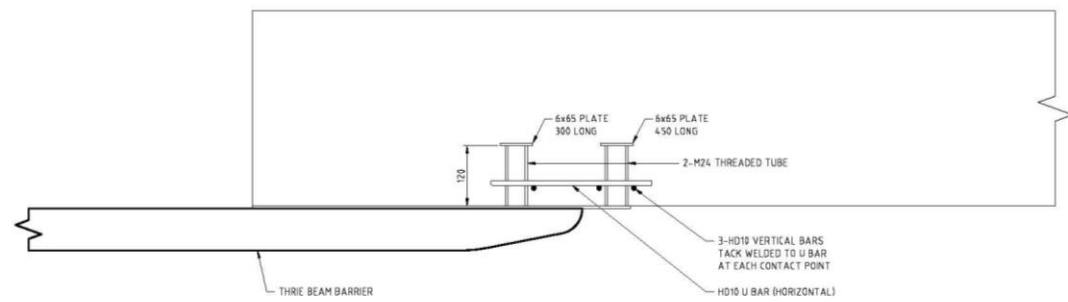
**ALTERNATIVE FIXING DETAIL
CAGE REINFORCEMENT**

SPECIAL NOTE:
ANCHOR REINFORCING AND CONNECTION TO FOUNDATION NOT SHOWN FOR THE SAKE OF CLARITY



ELEVATION

SPECIAL NOTE
ALL CAST-IN BRACKETS SHALL BE HOT DIP GALVANISED AFTER FABRICATION IN ACCORDANCE WITH AS/NZS4680



PLAN

NOTE
1. REFER SHEET BB-1 FOR GENERAL NOTES

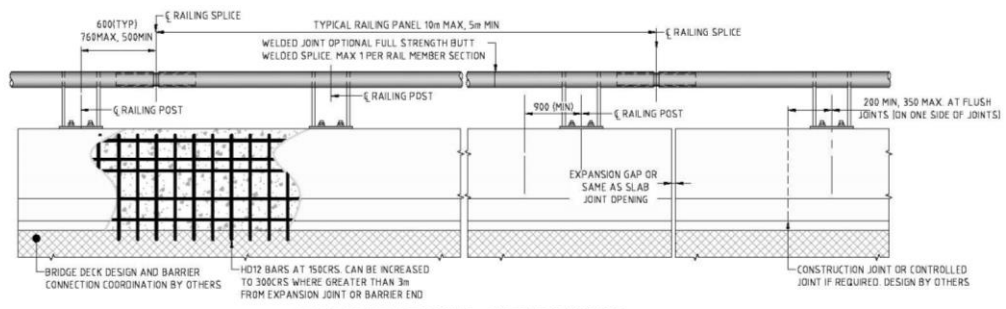
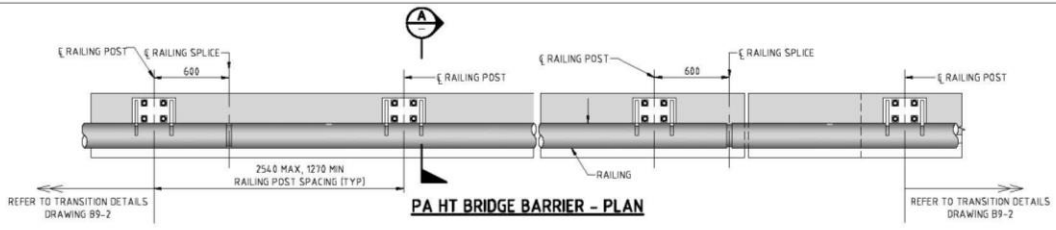
No.	Revision	Date	Accepted	Date
			JC	04/2022
			JH	04/2022
2	PUBLIC RELEASE	04/22		
1	FOR COMMENT RELEASES	09/18		

WAKA KOTAHI
NZ TRANSPORT AGENCY
Standard Detail

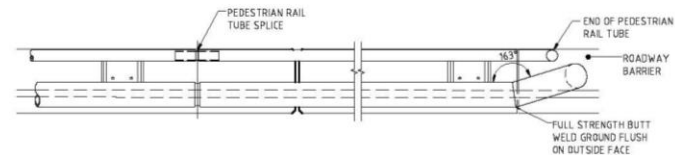
Series	F-Shape Monolithic Barrier System
Title	Thrie-beam to Concrete Alternative Details

Ref./Number	B8-5	Rev. 2
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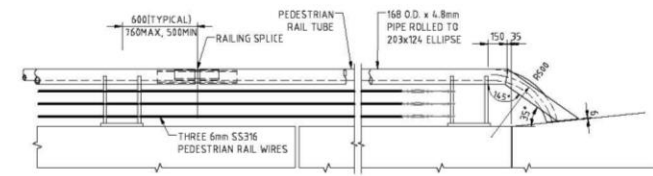
- NOTES**
- REFER SHEET B9-3 FOR GENERAL NOTES.
 - REFER SHEET B9-1B FOR RAIL DETAILS.



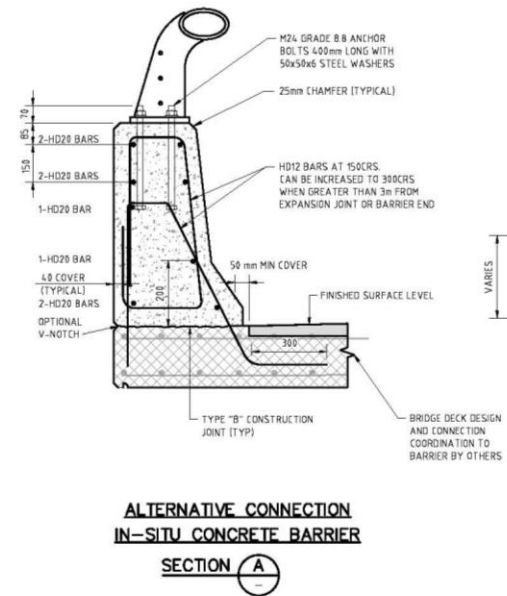
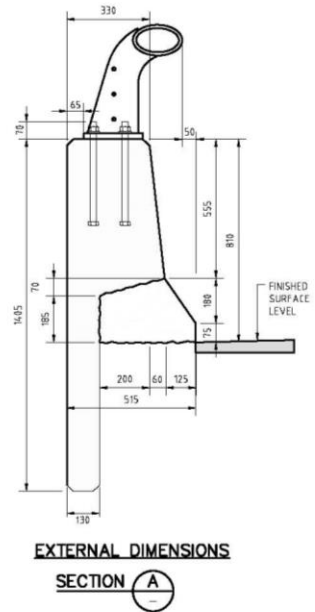
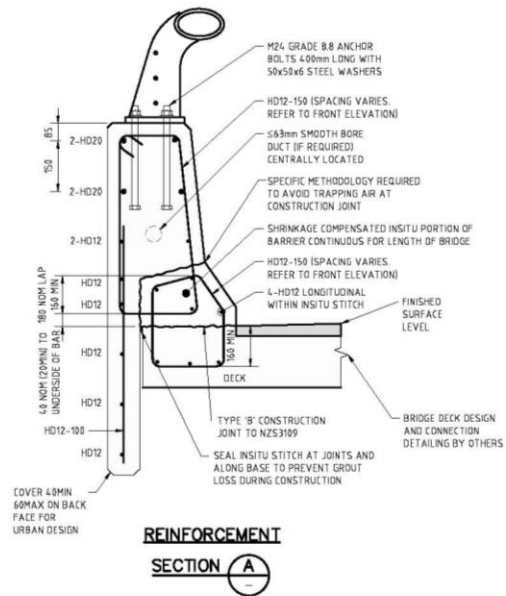
PA HT BRIDGE BARRIER - FRONT ELEVATION



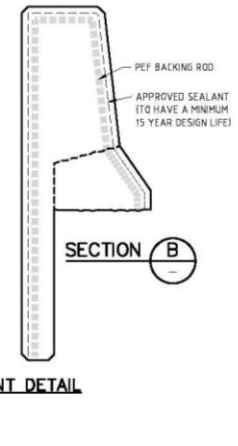
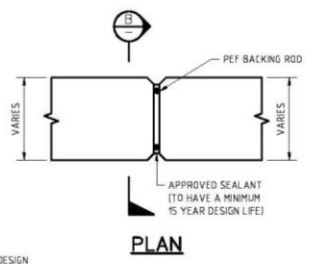
PA HT BARRIER ALTERNATIVE (INCLUDES PEDESTRIAN HANDRAIL) - PLAN



PA HT BARRIER ALTERNATIVE (INCLUDES PEDESTRIAN HANDRAIL) - FRONT ELEVATION



ALTERNATIVE CONNECTION IN-SITU CONCRETE BARRIER SECTION A



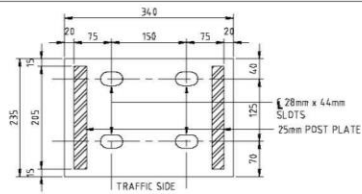
TYPICAL EXPANSION JOINT DETAIL

No.	Revision	Date	Accepted	Date
			JC	04/2022
			JH	04/2022
2	PUBLIC RELEASE	04/22		
1	FOR COMMENT RELEASES	09/18		



Series	Non-Proprietary Bridge Barrier System
Title	PA HT Bridge Barrier (Adapted for use in NZ)

Ref./Number	B9-1A	Rev. 2
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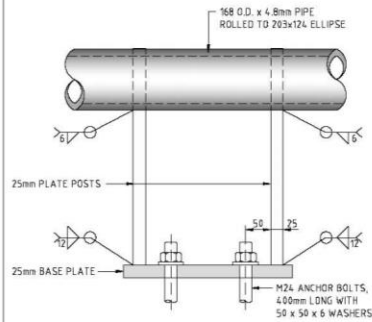
PLAN SECTION THROUGH RAILING POST

APPROVED RAILING MATERIAL	
293mm x 124mm ELLIPSE RAILING	SLEEVE MEMBER (AT RAILING SPLICE)
MATERIAL DESCRIPTION	MATERIAL TYPE
168mm O.D. x 4.8mm TUBE 150NB ULTRA PIPE C35BLO AS/NZS 1163 OR ASTM A53 E OR S APPROVED EQUIVALENT	C35BLO AS/NZS 1163
	THICKNESS
	API-SLX52
	6.4mm

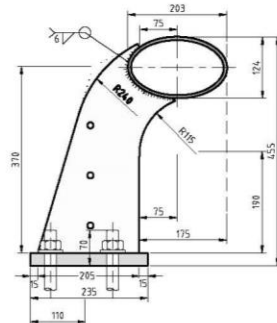
OTHER SECTIONS OF EQUAL OR GREATER STRENGTH ARE ACCEPTABLE FOR ELLIPTICAL MEMBERS. THE MAJOR AND MINOR DIAMETERS OF THE RAIL MEMBER MAY VARY +/- 4.5mm FROM PLAN DIMENSION HOWEVER THE DIFFERENCE BETWEEN THE OUTSIDE DIAMETER OF THE ELLIPTICAL SLEEVE AND THE INSIDE DIAMETERS OF THE RAIL MEMBER CANNOT EXCEED 6.5mm

APPROVED PEDESTRIAN RAILING MATERIAL			
88.9mm TUBE RAILING	SLEEVE MEMBER AT SPLICE	TUBE PLATE	TOGGLE BOLT
88.9mm O.D. x 5.49mm TUBE GRADE 250 AS/NZS 1163:2016	76mm O.D. X 5.49mm TUBE GRADE 250 AS/NZS 1163:2016	6mm THICK GRADE 250 AS/NZS 3678:2016	H.S. BOLT, NUT AND WASHER AS/NZS 1252

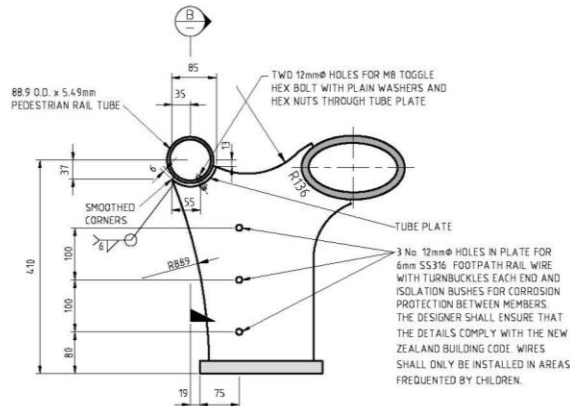
NOTE
1. REFER SHEET B9-3 FOR GENERAL NOTES



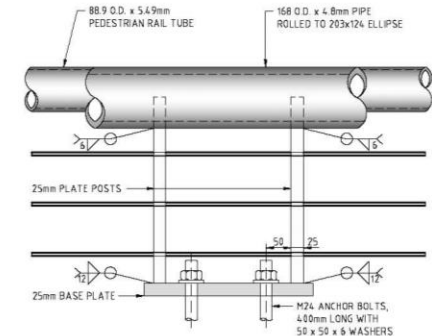
ELEVATION



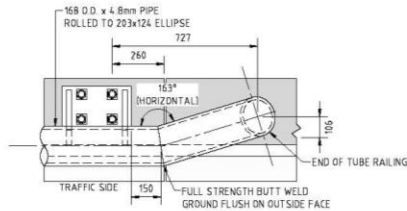
SIDE VIEW



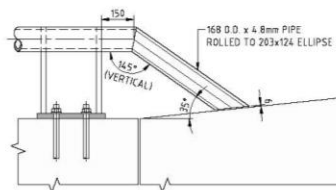
SIDE ELEVATION - PEDESTRIAN RAILING POST



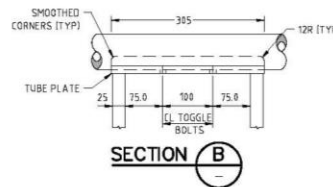
FRONT ELEVATION - PEDESTRIAN RAILING POST



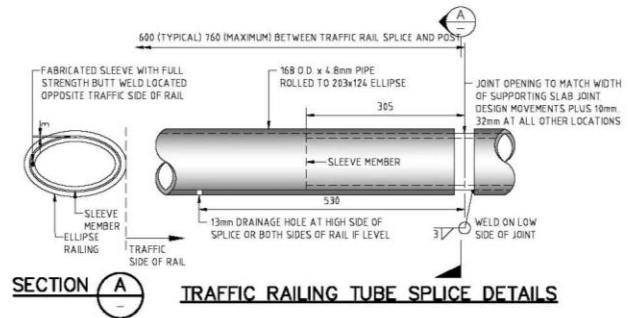
BARRIER RAIL TERMINATION - PLAN



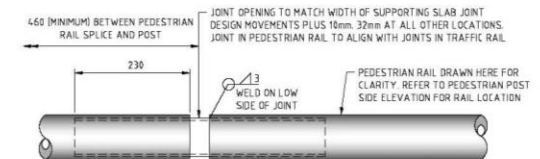
BARRIER RAIL TERMINATION - ELEVATION



SECTION B



TRAFFIC RAILING TUBE SPLICE DETAILS



PEDESTRIAN RAILING TUBE SPLICE DETAILS

No.	Revision	Date	Accepted	Date
			JC	04/2022
			JH	04/2022
2	PUBLIC RELEASE	04/22		
1	FOR COMMENT RELEASES	09/18		



Series Non-Proprietary Bridge Barrier System

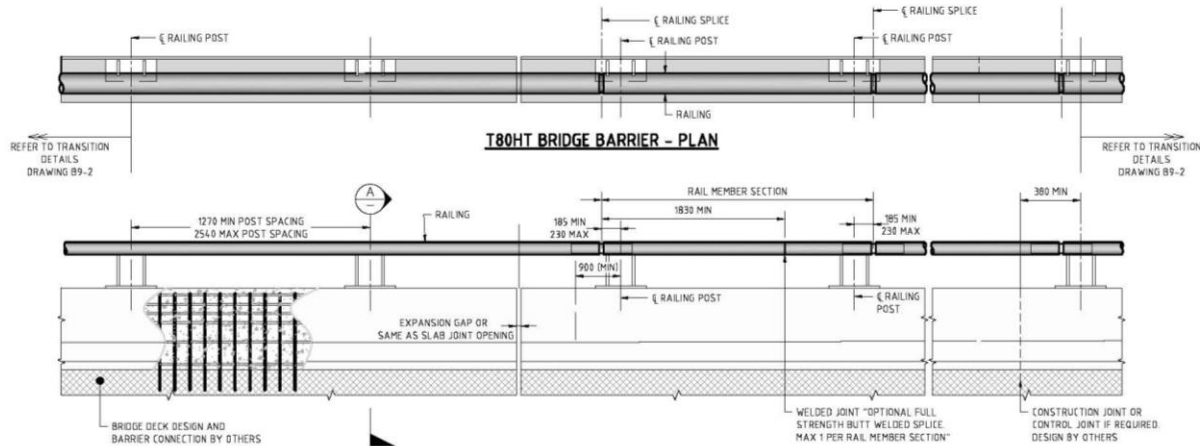
Title PA HT Bridge Barrier
(Adapted for use in NZ)

Ref./Number

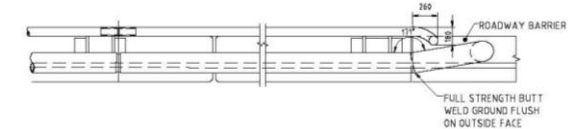
B9-1B

Rev. 2

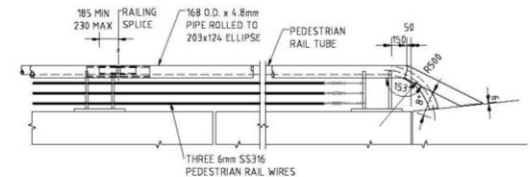
- NOTES**
1. REFER SHEET B9-3 FOR GENERAL NOTES.
 2. REFER SHEET B9-10 FOR RAIL DETAILS.



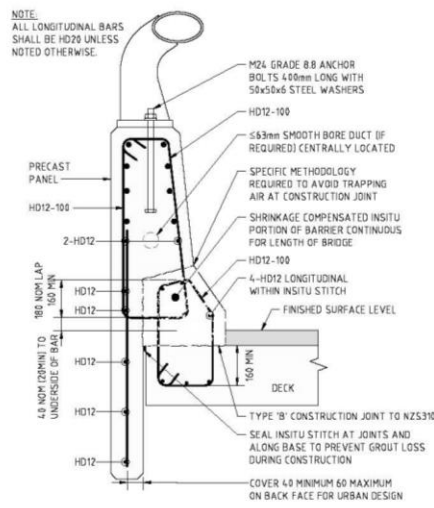
T80HT BRIDGE BARRIER - FRONT ELEVATION



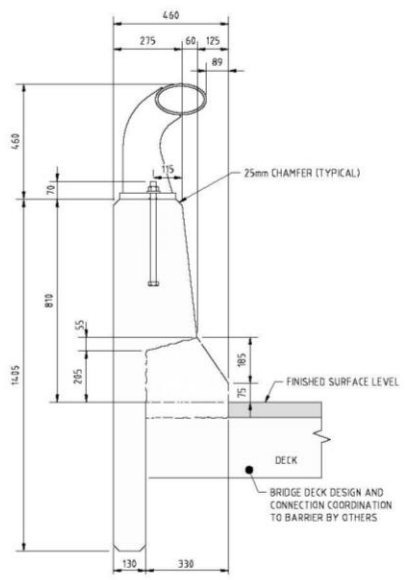
T80HT BARRIER ALTERNATIVE (INCLUDES PEDESTRIAN HANDRAIL) - PLAN



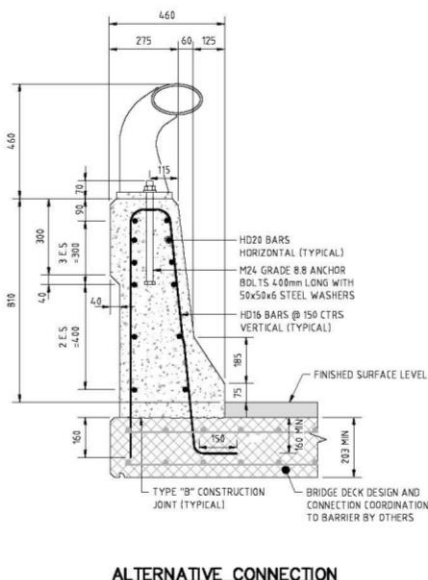
T80HT BARRIER ALTERNATIVE (INCLUDES PEDESTRIAN HANDRAIL) FRONT ELEVATION



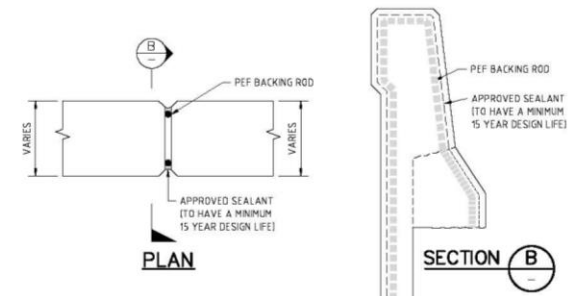
REINFORCEMENT SECTION A



EXTERNAL DIMENSIONS SECTION A



ALTERNATIVE CONNECTION IN-SITU CONCRETE BARRIER SECTION A

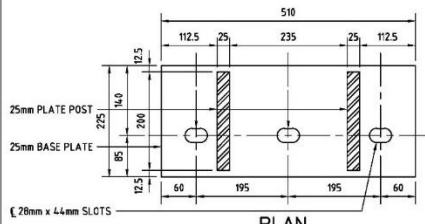


TYPICAL EXPANSION JOINT DETAIL

No.	Revision	Date	Accepted	Date
			JC	04/2022
			JH	04/2022
2	PUBLIC RELEASE	04/22		
1	FOR COMMENT RELEASES	09/18		



Series	Non-Proprietary Bridge Barrier System	Ref./Number	B9-1C
Title	T80HT Bridge Barrier (Adapted for use in NZ)	Rev.	2



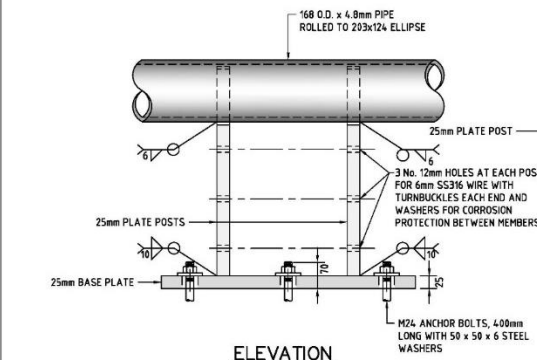
PLAN SECTION THROUGH RAILING POST

APPROVED RAILING MATERIAL		
MATERIAL DESCRIPTION	MATERIAL TYPE	THICKNESS
203mm x 124mm ELLIPSE SLEEVE MEMBER (AT RAILING SPLICE)		
168mm O.D. x 4.8mm TUBE 150NB ULTRA PIPE (C350L0 AS/NZS 1163 OR ASTM A53 E OR S APPROVED EQUIVALENT)	C350L0 AS/NZS 1163	6.4mm
	API-5LX52	

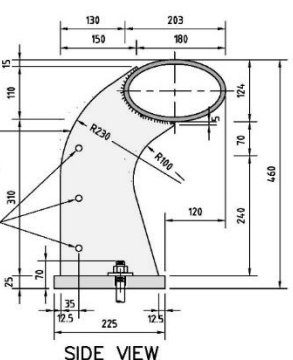
OTHER SECTIONS OF EQUAL OR GREATER STRENGTH ARE ACCEPTABLE FOR ELLIPTICAL MEMBERS. THE MAJOR AND MINOR DIAMETERS OF THE RAIL MEMBER MAY VARY +/- 4.5mm FROM PLAN DIMENSION. HOWEVER THE DIFFERENCE BETWEEN THE OUTSIDE DIAMETER OF THE ELLIPTICAL SLEEVE AND THE INSIDE DIAMETERS OF THE RAIL MEMBER CANNOT EXCEED 6.5mm

APPROVED PEDESTRIAN RAILING MATERIAL			
88.9mm TUBE RAILING	SLEEVE MEMBER AT SPLICE	TUBE PLATE	TOGGLE BOLT
88.9mm O.D. x 5.49mm TUBE GRADE 250 AS/NZS 1163/2016	76mm O.D. x 5.49mm TUBE GRADE 250 AS/NZS 1163/2016	6mm THICK GRADE 250 AS/NZS 3678/2016	H.S BOLT, NUT AND WASHER AS/NZS 1252

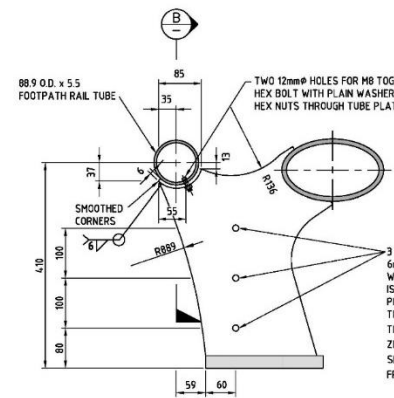
NOTES
1 REFER SHEET B9-3 FOR GENERAL NOTES.



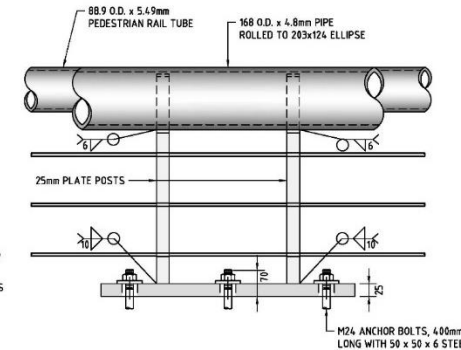
ELEVATION



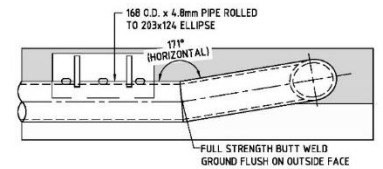
SIDE VIEW



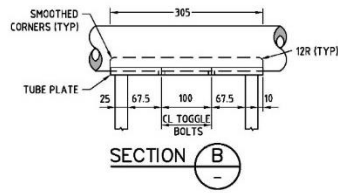
SIDE ELEVATION - PEDESTRIAN RAILING POST



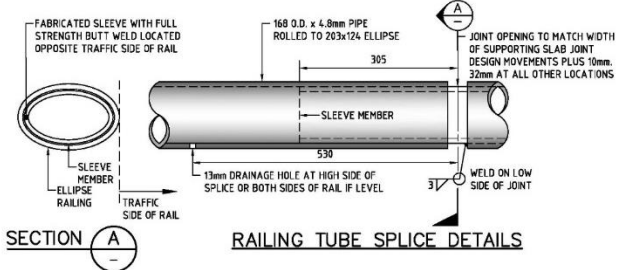
ELEVATION - PEDESTRIAN RAILING POST



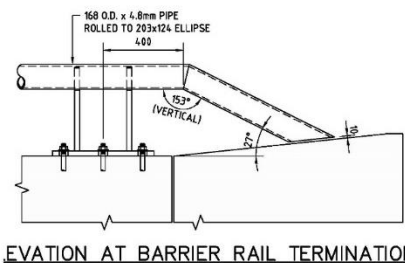
PLAN AT BARRIER RAIL TERMINATION



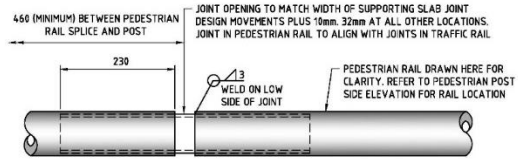
SECTION B



RAILING TUBE SPLICE DETAILS



ELEVATION AT BARRIER RAIL TERMINATION



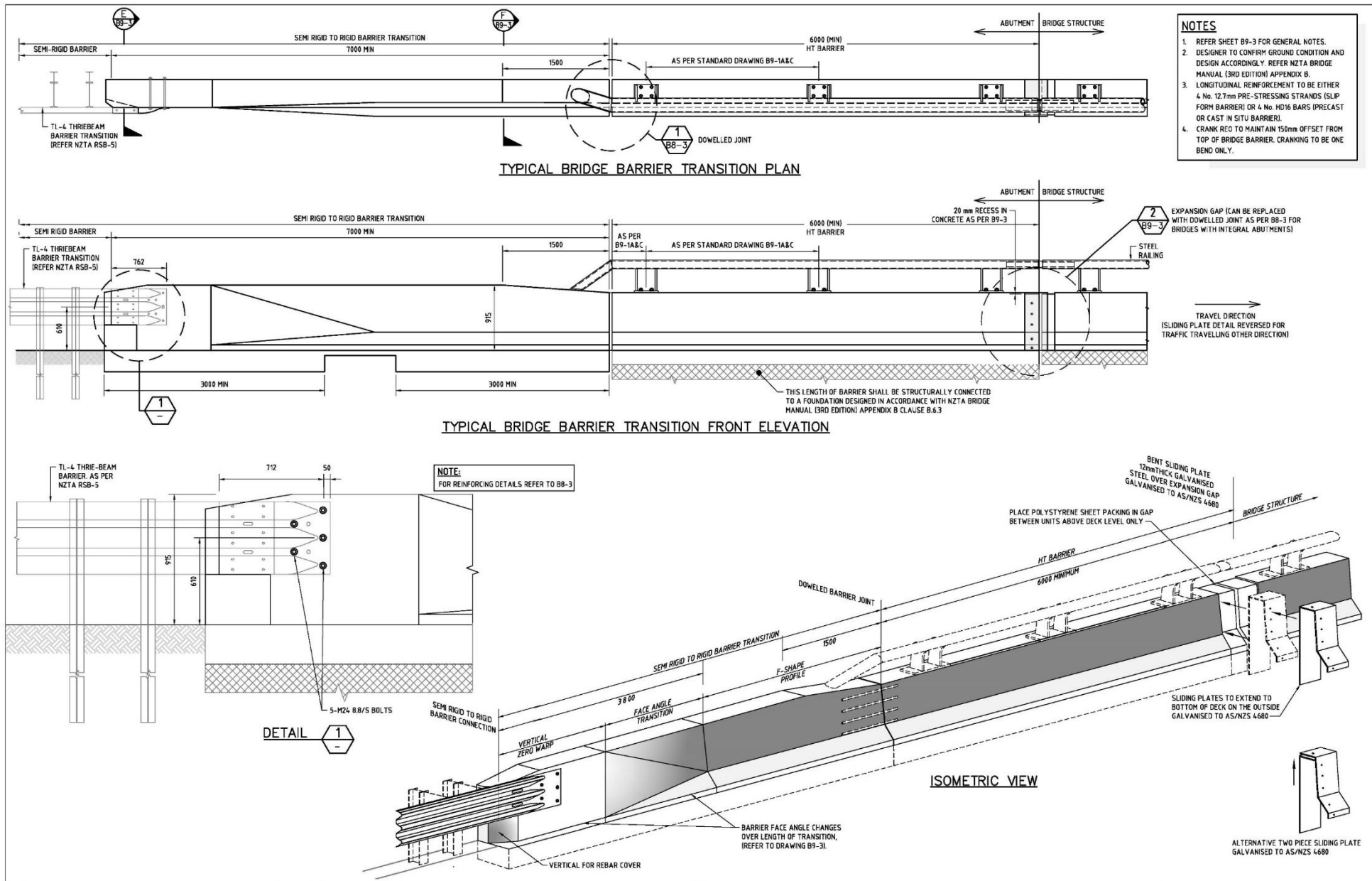
PEDESTRIAN RAILING TUBE SPLICE DETAILS

No.	Revision	Date	Accepted	Date
			JC	04/2022
			JH	04/2022
2	PUBLIC RELEASE	04/22		
1	FOR COMMENT RELEASES	09/18		

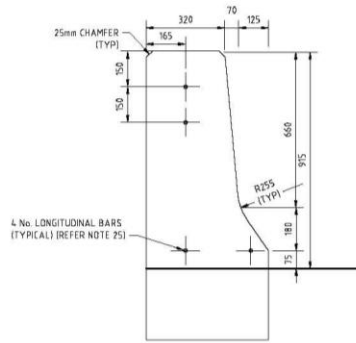
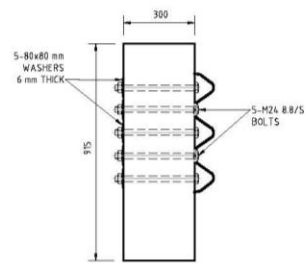


Series	Non-Proprietary Bridge Barrier System
Title	T80HT Bridge Barrier (Adapted for use in NZ)

Ref./Number	B9-1D
Rev.	2



No.	Revision	Date	Accepted	Date	 WAKA KOTAHI NZ TRANSPORT AGENCY Standard Detail	Series Non-Proprietary Bridge Barrier System Bridge Barrier - Semi Rigid Transition Details	Ref./Number B9-2	Rev. 2
			JC	04/2022				
			JH	04/2022				
2	PUBLIC RELEASE	04/22						
1	FOR COMMENT RELEASES	09/18						

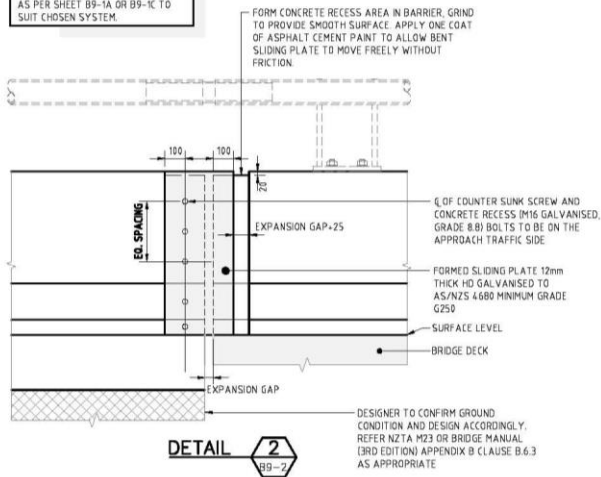


NOTE:
STEEL RAILS, ANCHOR REINFORCING AND CONNECTION FOUNDATION NOT SHOWN FOR CLARITY.

SECTION E
B9-2

SECTION F
B9-2

NOTE:
ALL REINFORCEMENT BARS SHALL BE AS PER SHEET B9-1A OR B9-1C TO SUIT CHOSEN SYSTEM.



DETAIL 2
B9-2

NOTES

1. ALL WORK TO BE AS PER NZTA M23 AND BRIDGE MANUAL (3RD EDITION).
2. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE (U.N.O.).
3. SECTIONS E AND F SHOW PAINT BARRIER. FOR T80HT BARRIER DIMENSIONS AND REINFORCING TO CHANGE AS REQUIRED.
4. RAILING SYSTEM SHALL BE USED ON STRUCTURES WITH EXPANSION JOINTS THAT PROVIDE MOVEMENT UP TO 127mm WHERE MOVEMENT EXCEEDS 127mm THE USE OF CASE SPECIFIC ALTERNATIVE SOLUTIONS SHALL BE CONSIDERED.
5. LOCATE RAILING SPLICES AT EXPANSION JOINTS AND AT OTHER LOCATIONS WHERE NECESSARY. PROVIDE RAILINGS AS LONG AS PRACTICAL, WITH A MINIMUM OF THREE POSTS BETWEEN RAILING SPLICES.

CONCRETE WORK

6. CONCRETE SHALL BE MANUFACTURED IN ACCORDANCE WITH NZS 3104. TOLERANCES FOR CONSTRUCTION OF CONCRETE BARRIERS SHALL BE AS STATED IN AS/NZS 3845 PART 1.
7. SYSTEM MUST BE CONNECTED TO A TRANSITION BLOCK AS DETAILED ON NZTA DRAWING B9-2 WHICH IN TURN MUST BE CONNECTED TO AN ACCEPTED BARRIER SYSTEM, END TREATMENT OR CRASH CUSHION USING AN ACCEPTED TRANSITION SYSTEM.
8. CONCRETE BARRIER TO HAVE FORMED FINISH SURFACE TO F5 AND ALL CONSTRUCTION JOINTS TO BE TYPE B IN ACCORDANCE WITH NZS 3109 CHAMFER ALL EXPOSED EDGES.
9. THE 28 DAY COMPRESSIVE STRENGTH AND CONCRETE BINDER TYPE SHALL BE IN ACCORDANCE WITH THE DURABILITY REQUIREMENTS OF NZS 3101 FOR RELEVANT EXPOSURE CLASSIFICATION, BUT IN ALL CASES SHALL BE A MINIMUM OF 40MPa. MAXIMUM NOMINAL AGGREGATE SIZE SHALL BE 20mm.
10. CONCRETE WORK SHALL COMPLY WITH NZS 3109.
11. ALL REINFORCEMENT STEEL DESIGNATED "HD" SHALL BE GRADE 500E MICRO ALLOY. ALL OTHER REINFORCING STEEL SHALL BE GRADE 300E MA.
12. REINFORCEMENT SHALL COMPLY WITH AS/NZS 4671.
13. HIGH STRENGTH NON-SHRINK GROUT TO BE PROVIDED UNDER RAIL POST BASE PLATE IF GAPS LARGER THAN 2mm EXISTS.
14. MINIMUM REINFORCEMENT BAR LAP LENGTHS SHALL BE:
 - a) HD16 BARS - 800mm
 - b) HD20 BARS - 1050mm
15. MINIMUM COVER TO REINFORCEMENT SHALL BE 50mm U.N.O.
16. MAXIMUM DEPTH OF AESTHETIC DESIGN ON BARRIER FACE SHALL BE 10 mm.

STEEL WORK

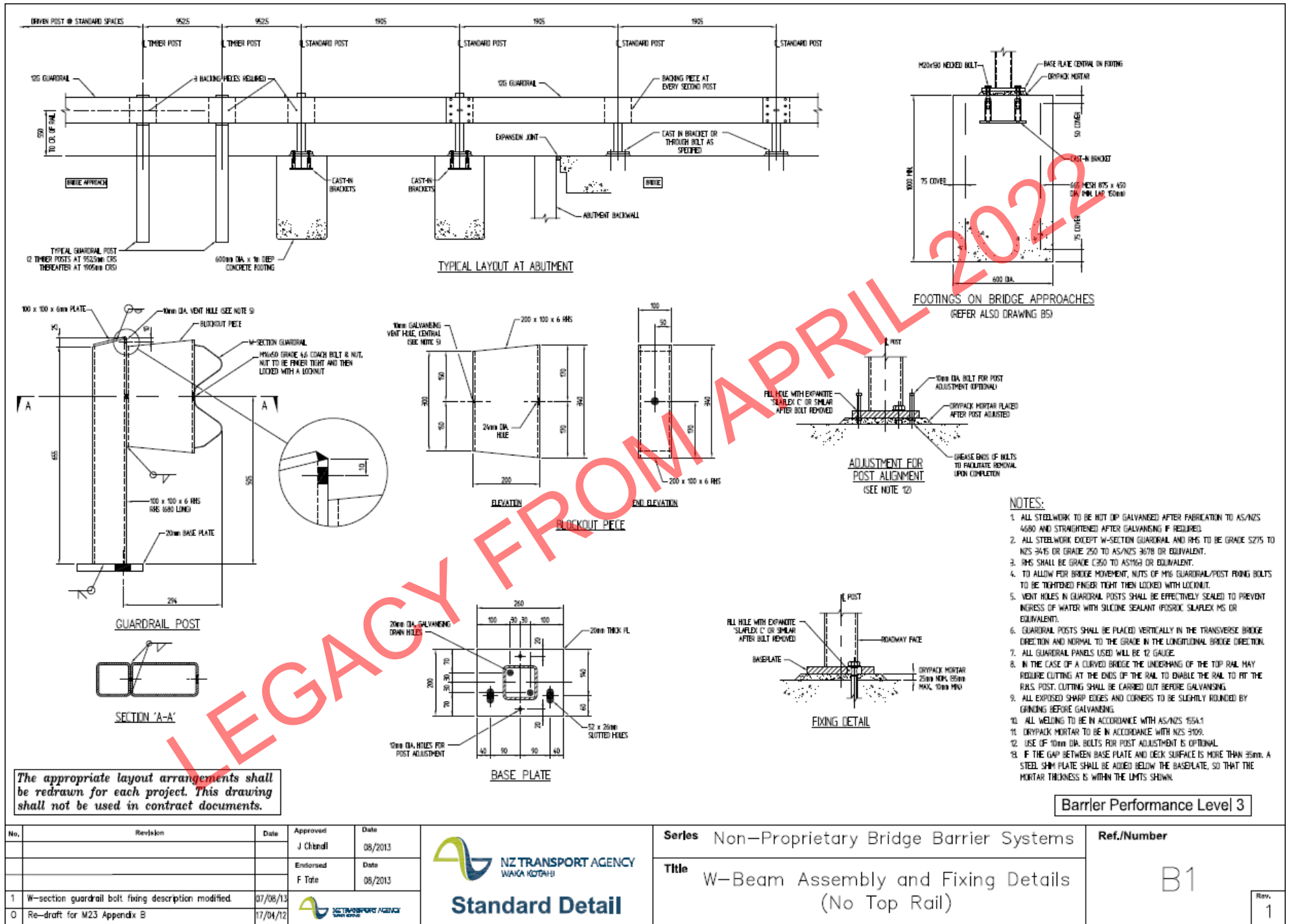
17. ALL RAILING COMPONENTS TO BE GALVANIZED IN ACCORDANCE WITH AS/NZS 2312.2 AND AS/NZS 4680 UNLESS OTHERWISE SHOWN ON THE PLANS. GALVANISING THICKNESS TO BE HDG600 MINIMUM WITH HDG900 MINIMUM FOR COASTAL OR HIGH RISK LOCATION.
18. FOR CATEGORY D COASTAL ENVIRONMENT INTERFACE BETWEEN STEEL AND CONCRETE TO BE COATED WITH INERT NON-INHIBITIVE ANTI-CORROSIVE EPOXY PRIMER AND HIGH BUILD ANTI-CORROSIVE EPOXY INTERMEDIATE COATING PLUS CORROSION, ABRASION AND CHEMICAL RESISTANT TOP COAT. FOR LESS HARSH ENVIRONMENT GALVANIZED SURFACES THAT ARE IN CONTACT WITH CONCRETE OR CEMENTITIOUS MORTAR THAT ARE EXPOSED TO THE WEATHER SHALL BE PRECOATED BY THE COATING APPLICATOR WITH A 225µm MINIMUM DRY FILM THICKNESS OF A COMPATIBLE EPOXY BARRIER COAT.
19. PLACE POST AND POST ANCHOR BOLTS PERPENDICULAR TO GRADE AND RAILS PARALLEL TO GRADE. LOCATE RAILING SPLICES AT EXPANSION JOINTS AND AT OTHER LOCATIONS WHERE NECESSARY. PROVIDE RAILINGS AS LONG AS PRACTICAL, WITH A MINIMUM OF THREE POSTS BETWEEN RAILING SPLICES.
20. ROUND OR CHAMFER ALL EXPOSED EDGES OF STEEL COMPONENT 2mm BY GRINDING PRIOR TO GALVANIZING.
21. PLATES SHALL BE GRADE 350 TO AS/NZS 3678 AND DOWEL BARS SHALL BE GRADE 300 MA TO AS/NZS 3679.
22. ALL WELDING SHALL CONFORM TO AS/NZS 1554-1. ALL WELDS SHALL BE WELD CATEGORY SP.
23. ERECTION SHALL COMPLY WITH SECTION 15 OF NZS 3404.
24. ALL DRILLED HOLES AND WELDING SHALL BE COMPLETED IN SHOP PRIOR TO GALVANIZING THE STEEL.
25. RECTANGULAR RAIL SECTION IS NOT PERMITTED.
26. LONGITUDINAL REINFORCEMENT TO BE EITHER 4 No. 12.7mm PRE-STRESSING STRANDS (SLIP FORM BARRIER) OR 4 No. HD16 BARS (PRECAST OR CAST IN SITU BARRIER).

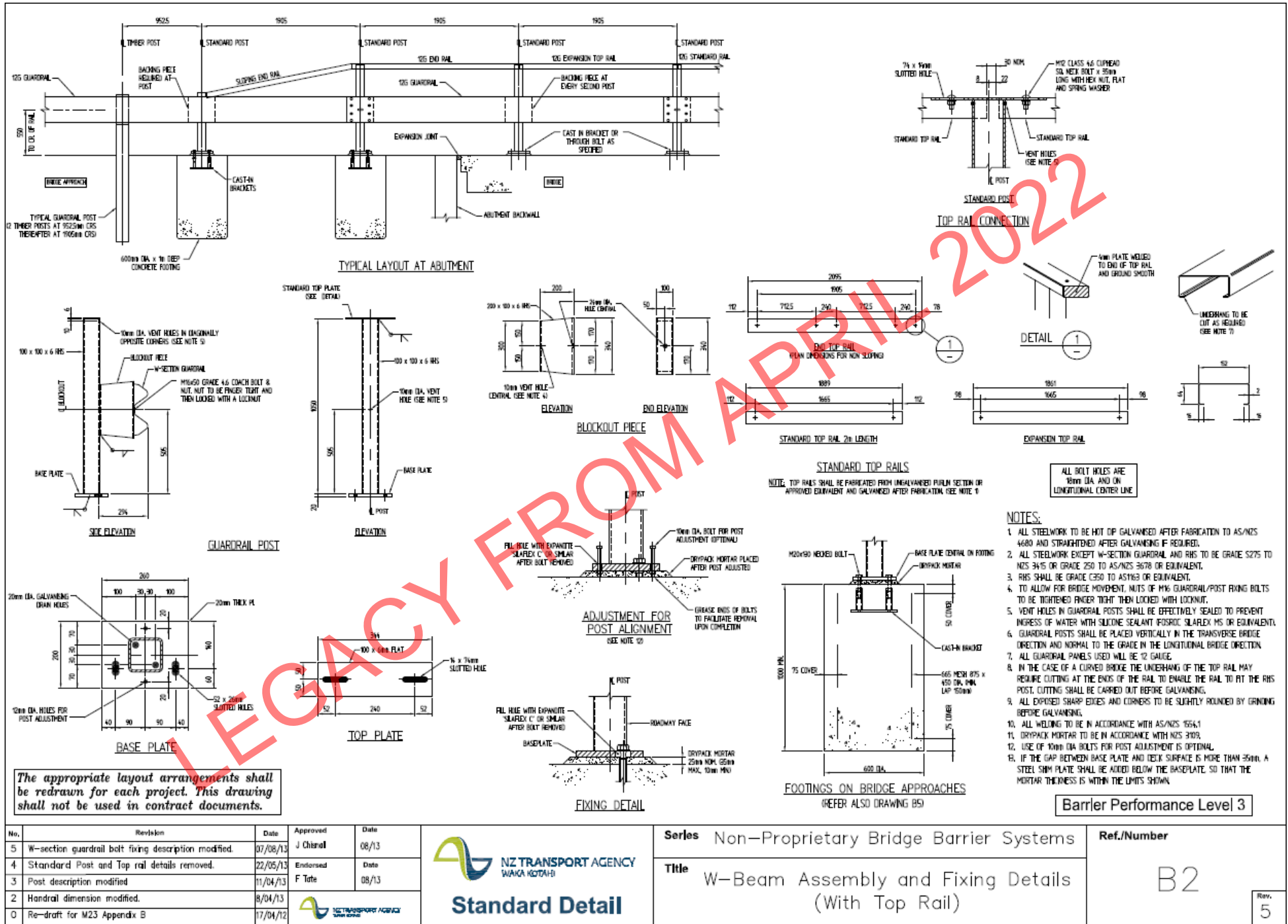
No.	Revision	Date	Accepted	Date
			JC	04/2022
			Endorsed	Date
			JH	04/2022
2	PUBLIC RELEASE	04/22		
1	FOR COMMENT RELEASES	09/18		

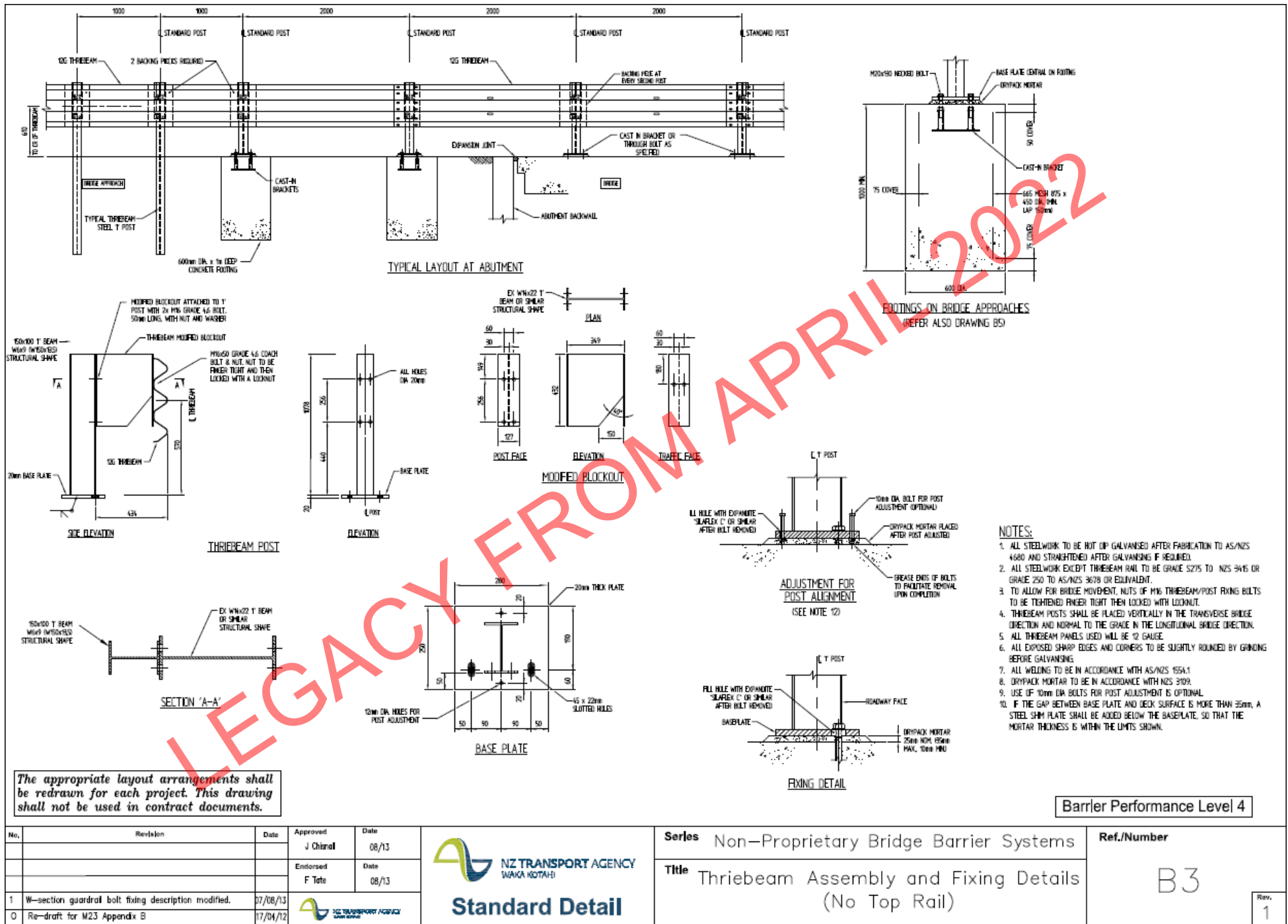


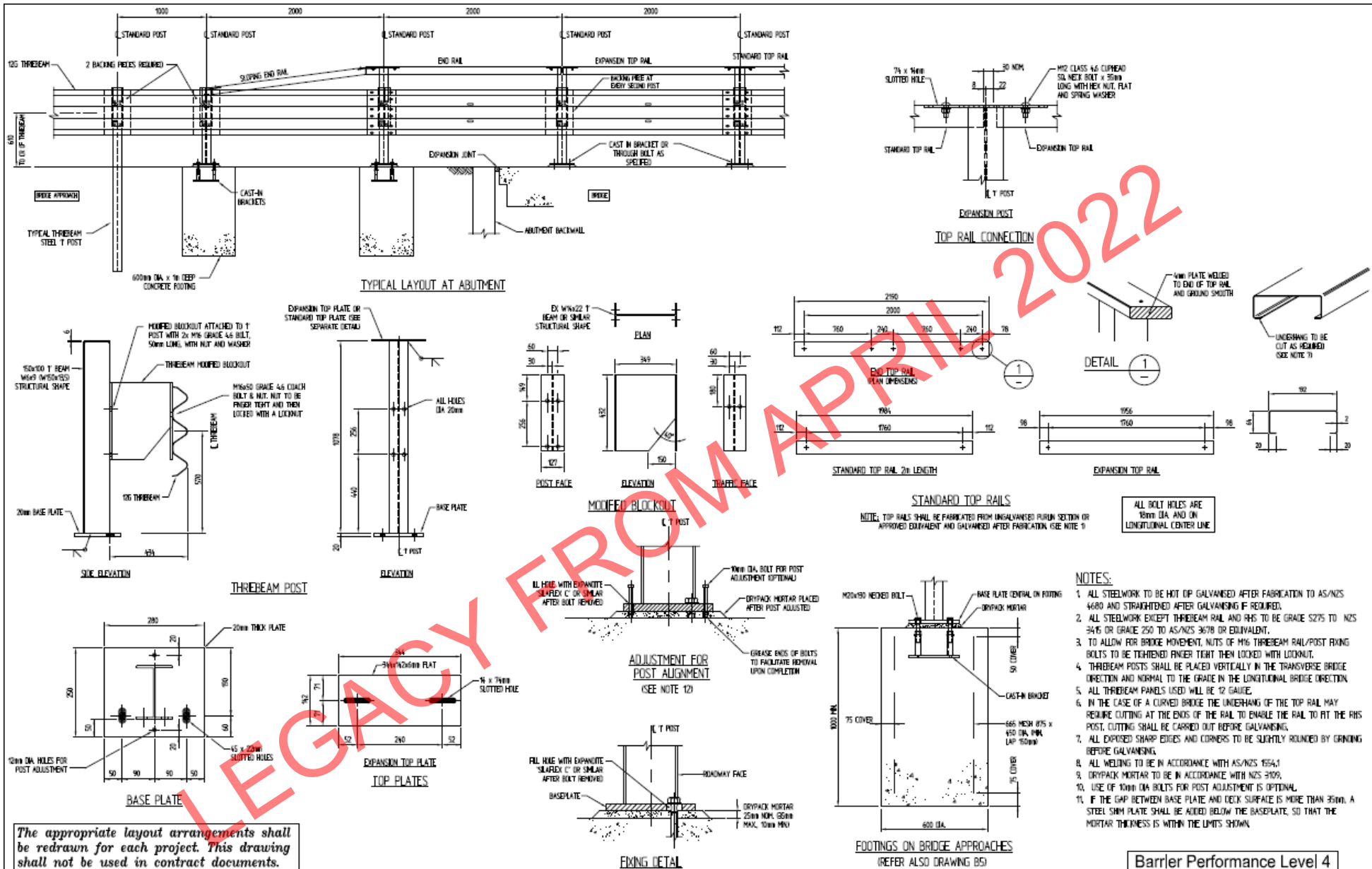
Series	Non-Proprietary Bridge Barrier System
Title	Bridge Barrier - Transition Details

Ref./Number	B9-3
Rev.	2

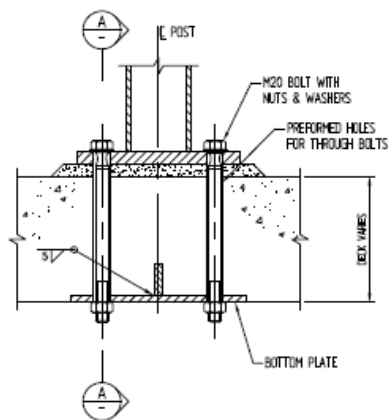




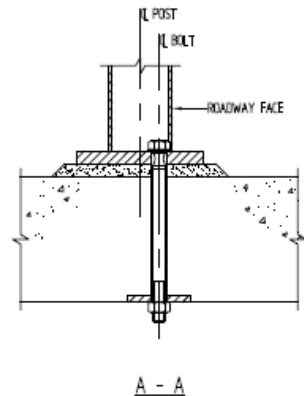




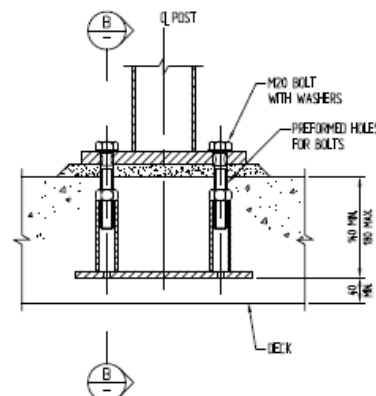
No.	Revision	Date	Approved	Date	Series	Ref./Number
5	W-section guardrail bolt fixing description modified.	07/08/13	J Chenal	08/13	Non-Proprietary Bridge Barrier Systems	B4
4	Standard Post details been deleted.	23/05/13	Emorsand			
3	Post under middle of sloping rail deleted.	11/04/13	F Tate	08/13		
2	Handrail dimension modified	5/04/13				
0	Re-draft for M23 Appendix B	17/04/12				
 Standard Detail					Title Thriebeam Assembly and Fixing Details (With Top Rail)	Rev. 6



THROUGH BOLT ASSEMBLY

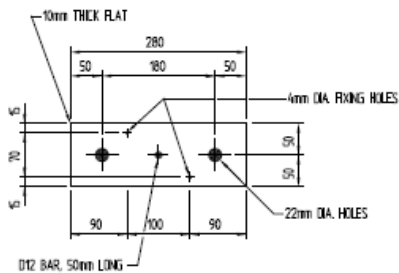


A - A



B - B

CAST-IN BRACKET ASSEMBLY

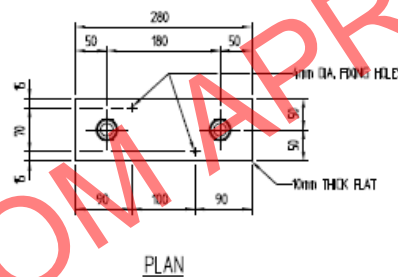


BOTTOM PLATE

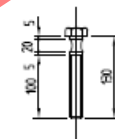


LONG GUARDRAIL BOLT

M20 CLASS 4.6 GALVANISED BOLT WITH NECK TURNED DOWN TO GIVE FAILURE LOAD OF 90 + 5kN IN TENSION. LENGTH TO BE SPECIFIED



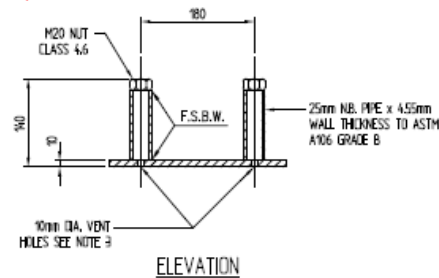
PLAN



M20 CLASS 4.6 GALVANISED BOLT WITH NECK TURNED DOWN TO GIVE FAILURE LOAD OF 90 + 5kN IN TENSION

STANDARD GUARDRAIL BOLT

TYPICAL THROUGH BOLT FIXING DETAILS FOR GUARDRAIL



ELEVATION

TYPICAL CAST-IN BRACKET FIXING DETAILS FOR GUARDRAIL

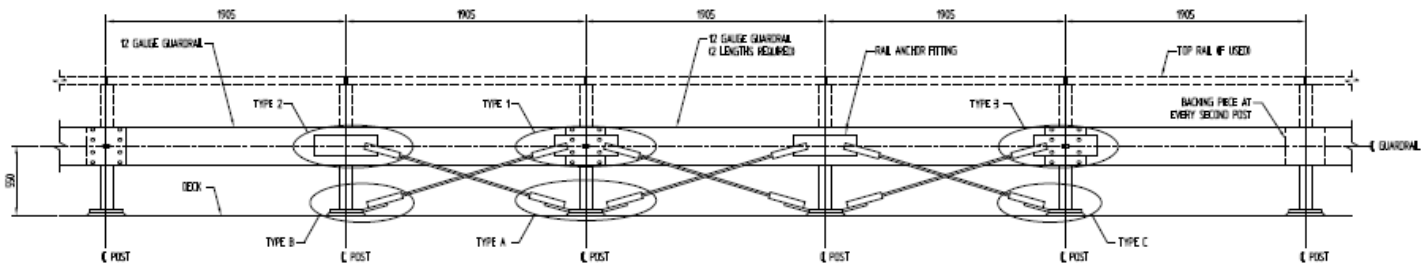
NOTES:

1. ALL STEELWORK INCLUDING THROUGH BOLTS, BOTTOM PLATES, STEEL WASHERS AND NUTS TO BE HOT DIP GALVANISED AFTER FABRICATION TO AS/NZS 4680 AND STRAIGHTENED AFTER GALVANISING IF REQUIRED.
2. ALL STEELWORK, EXCEPT RHS, TO BE GRADE S275 TO NZS 3416 OR GRADE 250 TO AS/NZS 3678 OR EQUIVALENT. RHS SHALL BE GRADE C350 TO AS193 OR EQUIVALENT.
3. VENT HOLES SHALL BE EFFECTIVELY SEALED TO PREVENT INGRESS OF WATER WITH APPROVED SEALANT OR PLUG.
4. ALL WELDING SHALL BE IN ACCORDANCE WITH AS/NZS 1554.1

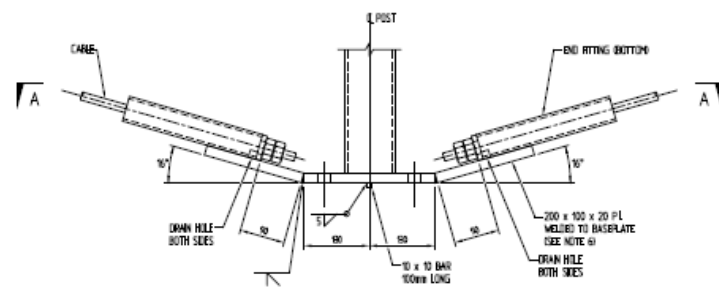
The appropriate layout arrangements shall be redrawn for each project. This drawing shall not be used in contract documents.

Barrier Performance Level 3 & 4

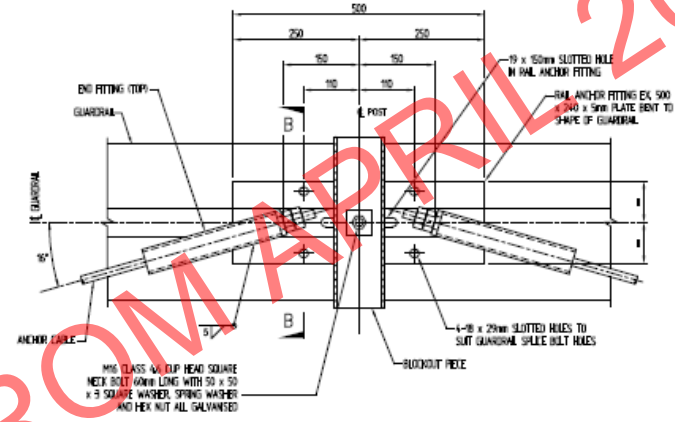
No.	Revision	Date	Approved	Date	 Standard Detail	Series	Non-Proprietary Bridge Barrier Systems	Ref./Number	<p>B5</p> <table border="1"> <tr> <td>Rev.</td> <td>0</td> </tr> </table>	Rev.	0
Rev.	0										
			Endorsed	Date		Title	Guardrail Holding Down Bolt Details				
0	Re-draft for M23 Appendix B	17/04/12									



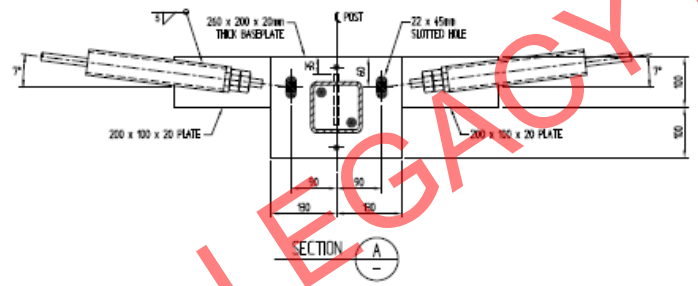
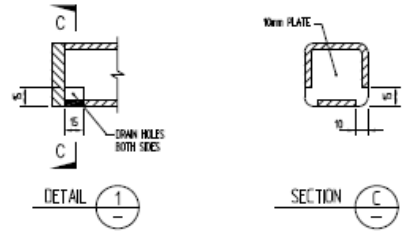
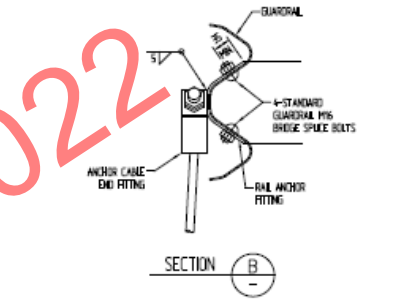
NOTE: NO BACKING PIECES REQUIRED ON INTERMEDIATE ANCHORS.
TYPICAL ELEVATION



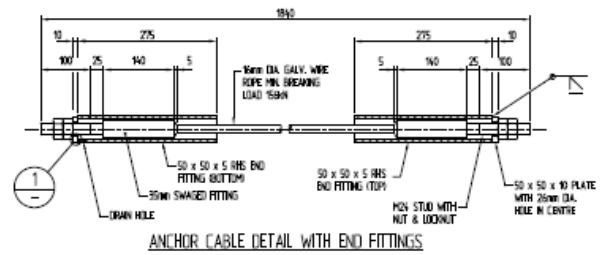
ELEVATION - BASE
 TYPE A - AS SHOWN
 TYPE B - AS SHOWN BUT WITH LHS END FITTING BOTTOM OMITTED AND 20mm PLATE OMITTED
 TYPE C - AS SHOWN BUT WITH RHS END FITTING BOTTOM OMITTED AND 20mm PLATE OMITTED



RAIL ANCHOR CONNECTION SECTION THROUGH BLOCKOUT PIECE
 TYPE 1 - AS SHOWN
 TYPE 2 - AS SHOWN BUT WITH LHS END FITTING (TOP) OMITTED
 TYPE 3 - AS SHOWN BUT WITH RHS END FITTING (TOP) OMITTED



SECTION A

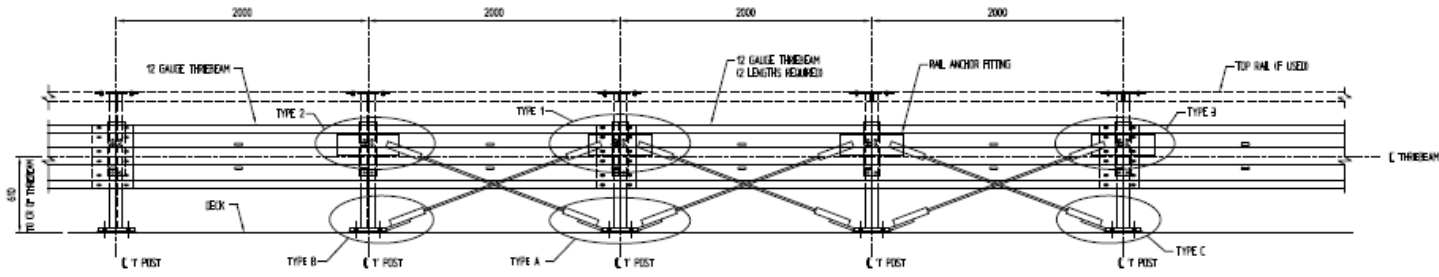


ANCHOR CABLE DETAIL WITH END FITTINGS

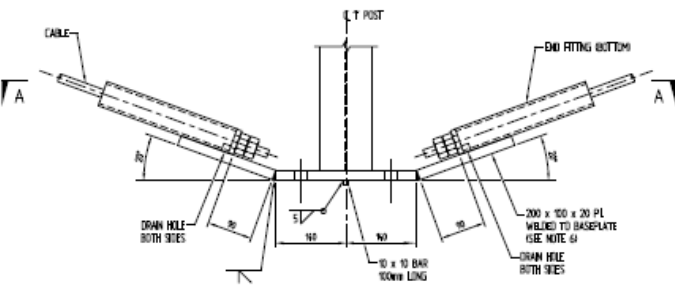
- NOTES:**
1. ALL STEELWORK TO BE HOT DIP GALVANIZED AFTER FABRICATION TO AS/NZS 4680 AND STRAIGHTENED AFTER GALVANIZING IF REQUIRED.
 2. ALL STEELWORK TO BE GRADE S275 TO N25 S415 OR GRADE 250 TO AS/NZS 3678 OR EQUIVALENT.
 3. RHS SHALL BE GRADE C350 TO AS1163 OR EQUIVALENT.
 4. ALL WELDING TO BE IN ACCORDANCE WITH AS/NZS 1554.1
 5. ALL EXPOSED SHARP EDGES AND CORNERS TO BE SLIGHTLY ROUNDED BY GRINDING BEFORE GALVANIZING.
 6. BASE PLATES FOR INTERMEDIATE ANCHOR POSTS MAY BE FORMED BY HOT BENDING AS AN ALTERNATIVE TO THE WELDED CONNECTION.
 7. CABLE SWAGE IS TO BE GALVANIZED BEFORE SWAGING IS DONE.
 8. FOR DETAILS OF GUARDRAIL POSTS, SEE DRAWINGS B1 & B2.
 9. ALL GUARDRAIL PANELS USED WILL BE 12 GAUGE.

The appropriate layout arrangements shall be redrawn for each project. This drawing shall not be used in contract documents.

No.	Revision	Date	Approved	Date	 Standard Detail	Series	Non-Proprietary Bridge Barrier Systems	Ref./Number	B6
			Endorsed	Date		Title	Intermediate Anchor Details (W-Beam)		
0	Re-draft for M23 Appendix B	17/04/12							Rev. 0

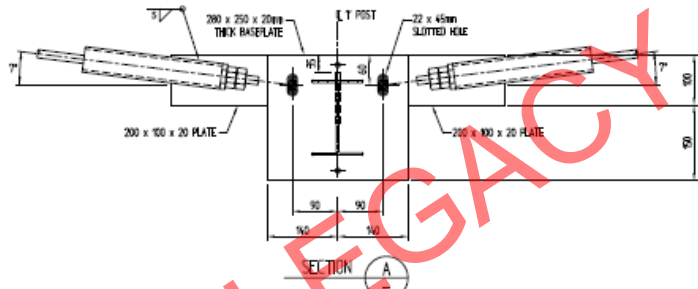


TYPICAL ELEVATION

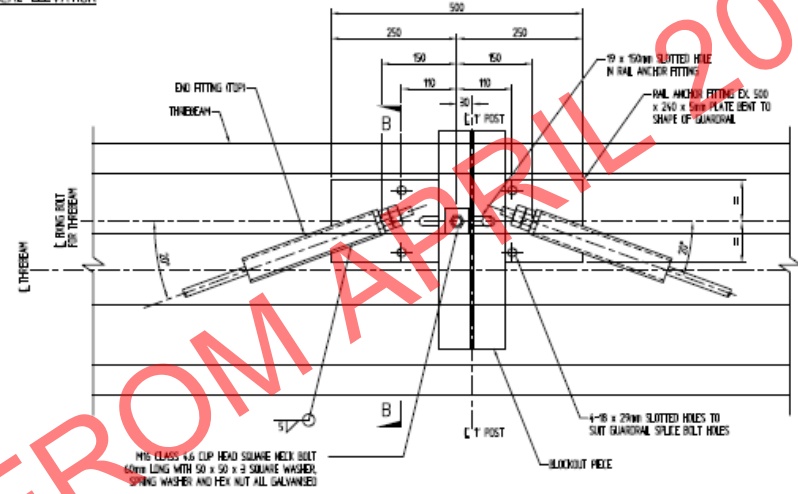


ELEVATION - BASE

TYPE A - AS SHOWN
 TYPE B - AS SHOWN BUT WITH LWS END FITTING (BOTTOM) OMITTED AND 20mm PLATE OMITTED
 TYPE C - AS SHOWN BUT WITH RWS END FITTING (BOTTOM) OMITTED AND 20mm PLATE OMITTED

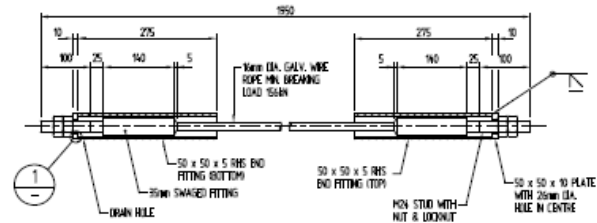


SECTION A

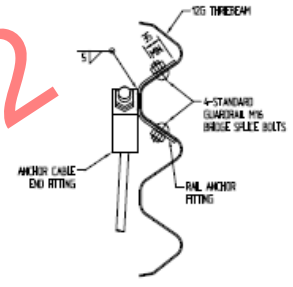


RAIL ANCHOR CONNECTION SECTION THROUGH BLOCKOUT PIECE

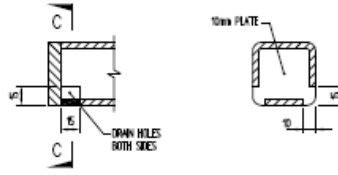
TYPE 1 - AS SHOWN
 TYPE 2 - AS SHOWN BUT WITH LWS END FITTING (TOP) OMITTED
 TYPE 3 - AS SHOWN BUT WITH RWS END FITTING (TOP) OMITTED



ANCHOR CABLE DETAIL WITH END FITTINGS



SECTION B



DETAIL 1

SECTION C

NOTES:

1. ALL STEELWORK TO BE HOT DIP GALVANISED AFTER FABRICATION TO AS/NZS 4680 AND STRAIGHTENED AFTER GALVANISING IF REQUIRED.
2. ALL STEELWORK TO BE GRADE S275 TO NZS 3415 OR GRADE 250 TO AS/NZS 3678 OR EQUIVALENT.
3. RHS SHALL BE GRADE C350 TO AS1163 OR EQUIVALENT.
4. ALL WELDING TO BE IN ACCORDANCE WITH AS/NZS 1554.1
5. ALL EXPOSED SHARP EDGES AND CORNERS TO BE SLIGHTLY ROUNDED BY GRINDING BEFORE GALVANISING.
6. BASE PLATES FOR INTERMEDIATE ANCHOR POSTS MAY BE FORMED BY HOT BENDING AS AN ALTERNATIVE TO THE WELDED CONNECTION.
7. CABLE SWAGE IS TO BE GALVANISED BEFORE SWAGING IS DONE.
8. FOR DETAILS OF THRIEBEAM POSTS, SEE DRAWINGS B7 & B4.
9. ALL THRIEBEAM PANELS USED WILL BE 12 GAUGE.

Barrier Performance Level 4

The appropriate layout arrangements shall be redrawn for each project. This drawing shall not be used in contract documents.

No.	Revision	Date	Approved	Date	 Standard Detail	Series	Non-Proprietary Bridge Barrier Systems	Ref./Number	
			Endorsed	Date		Title	Intermediate Anchor Details (Thriebeam)		B7
0	Re-draft for M23 Appendix B	17/04/12							Rev. 0