STEELGAL
NZ LIMITED

steelgal.co.nz

RHINO-STOP®

Modular Vehicle Impact Barriers

Product Manual

Ref: PM 019/05

Leading Safety

Full-scale crash tested systems

Compliance to AS/NZS 2890.1 Parking Facilities

Compliance to AS/NZS 1170.1 Structural Design Actions

BCA compliant solutions available

Energy Absorbing

Yielding base plate designs

Controlled absorption of vehicle impact energy

Lower anchor bolt forces

Prevents damage to the concrete substrate

Fast Assembly

Fully modular systems

Fewer anchor bolts per post

Durable

Galvanised components

Local Support

Designed by Safe Direction for Australian designers and constructors

Customised solutions available for non-standard applications

RHINO-STOP®

Modular Vehicle Impact Barriers

1.0 Introduction

Car park barriers are a specific range of safety barrier systems designed for the protection of people, plant and equipment. Their design and function are specific to vehicle movements encountered in a car park or warehouse environment.

Designers of car park and warehouse barriers should consider the following;

- The barriers should be capable of withstanding impact loads in accordance with relevant building standards;
- Impacts are likely to be perpendicular to the barrier i.e. 90°;
- There is often pedestrian pathways adjacent to barriers;
- The barrier is often installed on the edge of a deck with a drop to a lower level ;
- There may be a requirement for the barriers to compliment the architectural features of the car park;
- Space provided for barriers is often limited in an attempt to maximise car spaces;
- A barrier may be required to provide the additional function of restricting access to certain areas;
- The attachment of a barrier should not compromise the structural design of the car park; and
- Impact damage should be confined to the barrier system not the car park structure.

2.0 The RHINO-STOP® Advantage

Developed in response to demand from Australian designers and constructors, the RHINO-STOP® family of car park and warehouse barriers are the latest innovation in modular designs providing superior design, rapid installation and driver confidence.

All RHINO-STOP® products are full-scale crash tested to demonstrate compliance to Australian Standards and feature specially engineered, energy-absorbing base plate designs.

The ability of the RHINO-Posts to absorb impact energy is a significant design feature when compared to traditional base plate designs.

By absorbing impact energy, the RHINO-Posts reduce the forces transferred through the anchor bolts. This results in fewer anchor bolts per post and prevents damage to the concrete substrate during impact, an important consideration for designers and owners of car parks.

Safe Direction has developed a comprehensive range of modular barrier solutions to suit various impact conditions and architectural requirements.

3.0 Standards & Guidelines

There are numerous standards and guidelines governing the use of car park barriers. Depending upon the design use for the barrier system, one or more standards or guidelines may be required to be observed.

3.1 AS/NZS 2890.1 Parking Facilities

This standard sets out the minimum requirements for the design and layout for off-street parking facilities, including multi-storey car parks.

Barriers shall be constructed to prevent vehicles from running over the edge of a raised platform or deck of a multi-storey car park including the perimeter of all decks above ground level. They are required wherever the drop from the edge of the deck to a lower level exceeds 600mm.

AS/NZS 2890.1 states that barriers shall comply with the following requirements;

a. They shall be designed structurally for the loading requirements of AS/NZS 1170.1;

b. If at the end of a parking space, they shall be at least 1.3m high so that drivers backing into the space can see the barrier above the rear of the vehicle; and

c. They shall not be made from brickwork, unreinforced concrete or other materials likely to shatter on impact.

3.2 AS/NZS 1170.1 Structural Design Actions, Part 1 Permanent, Imposed and Other Actions

Light Vehicle Traffic Areas (Type F): parking, garages, driveways and ramps restricted to cars, light vans, etc not exceeding 2500kg gross mass.

Medium Traffic Areas (Type G): Vehicles exceeding 2500kg and not exceeding 10,000kg. Driveways, ramps, repair workshops, footpaths with vehicle access, and car parking.

The horizontal imposed action on barriers required to withstand the accidental impact from vehicles during parking shall be taken as follows;

a) For light traffic areas (Type F)

   i. Barriers - 30kN

   ii. Barriers at the end of straight ramps exceeding 20m in length and intended for downward travel - 240kN

b) For barriers in medium traffic areas (Type G) - 40kN

The impact force shall be distributed over a 1.5m length at any position along the barrier and shall be assumed to act 0.5m above floor level for light traffic areas and at 1.0m for medium traffic areas.

3.3 Building Code of Australia

A 1m high continuous barrier (balustrade) must be provided along the side of a floor if the trafficable surface is 1m or more above the surface beneath.

Openings in the barrier must not allow a 125mm sphere to pass through any opening.

If the drop to a lower level exceeds 4m, any horizontal elements between 150mm and 760mm above the floor must not facilitate climbing.

The barrier must be of strength and rigidity to withstand the foreseeable impact of people and where appropriate, the static pressure of people pressing against it.

4.0 RHINO-STOP®

Providing superior design, rapid installation and driver confidence, RHINO-STOP® is compliant to the 30kN impact force described in AS/NZS 1170.1: Structural Design Actions.

Additional crash testing achieving a 60kN impact load has also been performed demonstrating the reserve capacity and strength of the RHINO-STOP® system.

RHINO-STOP® may be installed as a standalone post and w-beam guardrail configuration or with balustrade and mesh infill attachments when fall protection for pedestrians is required. The modular design of RHINO-STOP® and its available attachments allows the system to be configured to suit site requirements using standard components.

RHINO-STOP® is an energy-absorbing, semi-rigid barrier providing reduced dynamic deflection. The energy absorbing feature reduces damage to the impacting vehicle and the barrier system. The semi-rigid feature of RHINO-STOP® reduces the space requirement between fixed object hazards and the barrier, conserving valuable floor space.

The pedestrian-friendly base plate design provides the ideal solution for installation adjacent to walkways.

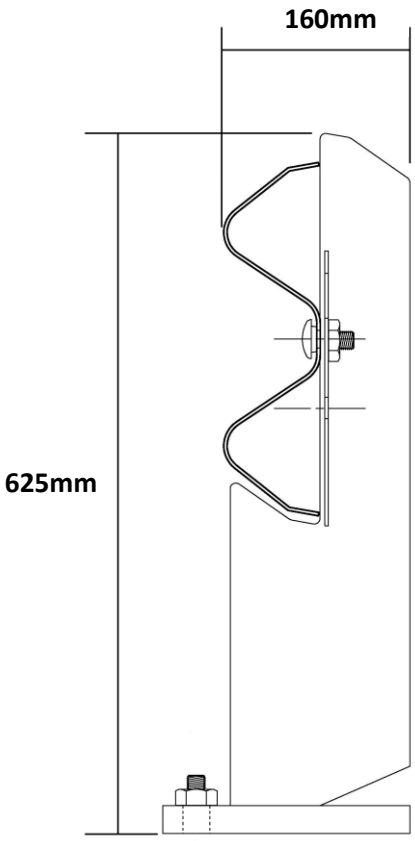
4.1 RHINO-STOP® Specifications

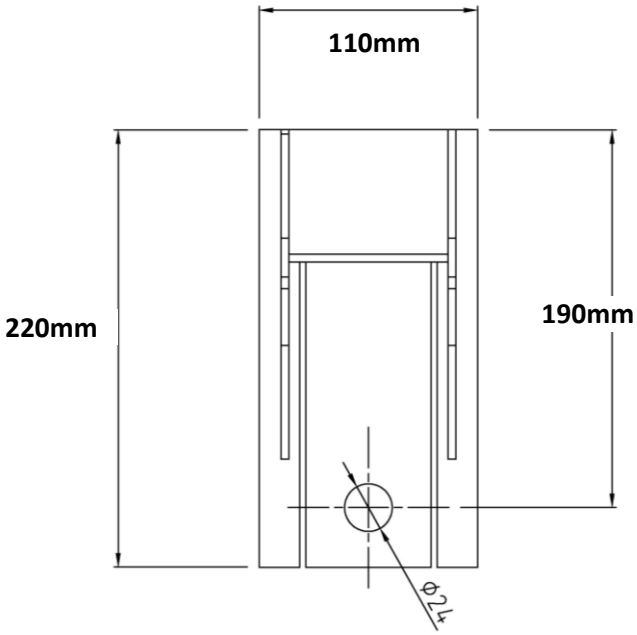
Compliance:	AS/NZS 2890.1 AS/NZS 1170.1 30kN - Type F (Light Traffic)
Post height:	625mm
Rail height:	600mm
Base plate:	110mm x 220mm
System width:	160mm
Post spacing:	2.0m centres (max.)
Anchor type*:	M20 x 160mm Clawbolt
Anchors per post:	1 off
Hole diameter:	20mm
Substrate Thickness:	200mm minimum (32Mpa)
Bolt Embedment:	100mm minimum
Bolt Edge Distance:	125mm minimum
Min. number of posts:	3 off per installation
Post deflection:	90mm for 30kN impact (at the top of the post)
Available attachments:	1100mm Handrail 1300mm Sight rail Mesh infill
Finish:	Hot dip galvanised

*Chemical anchor options available upon request

RHINO-STOP®

Modular Vehicle Impact Barriers



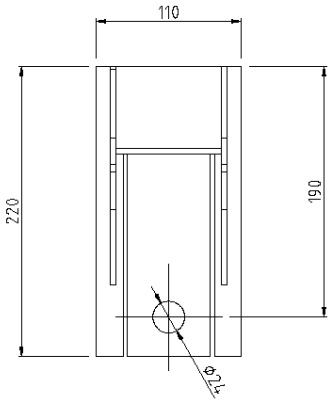


RHINO-STOP® Post & Base Plate Dimensions

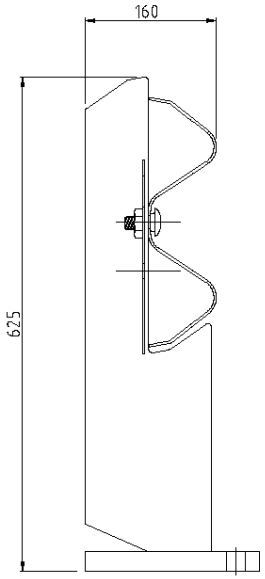
RSPT1

RHINO–STOP HAS BEEN ASSESSED TO EXCEED THE 30kN IMPACT LOAD AS DESCRIBED IN AS/NZS 1170.1 FOR LIGHT TRAFFIC AREAS.

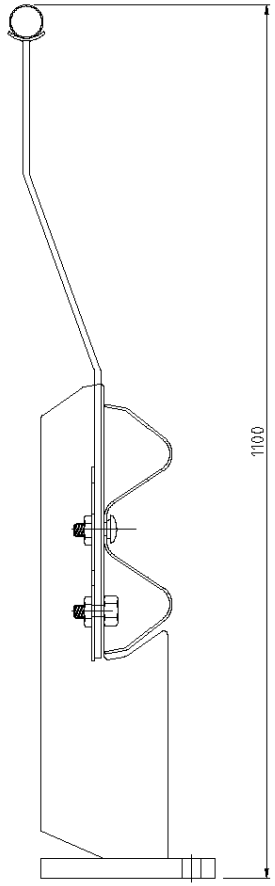
MAX. POST SPACING 2m



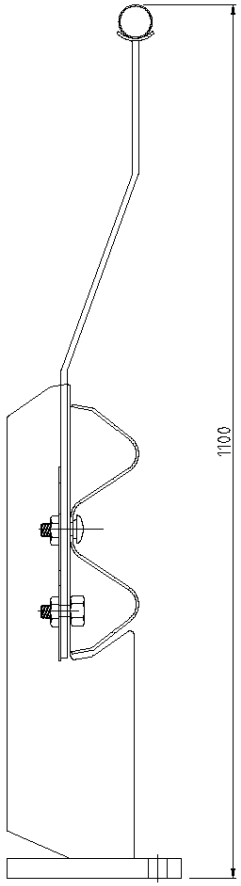
BASE PLATE DETAIL



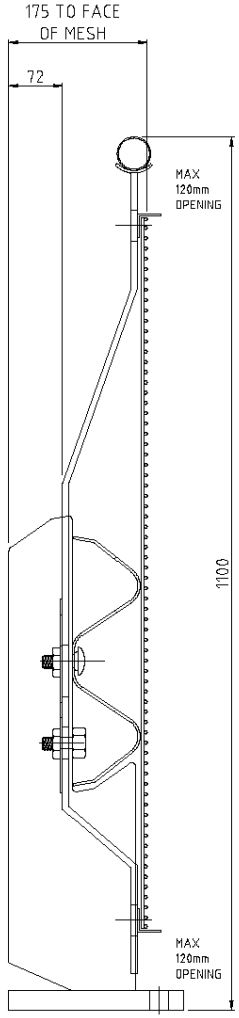
RHINO- STOP TYPE 1
GUARDRAIL



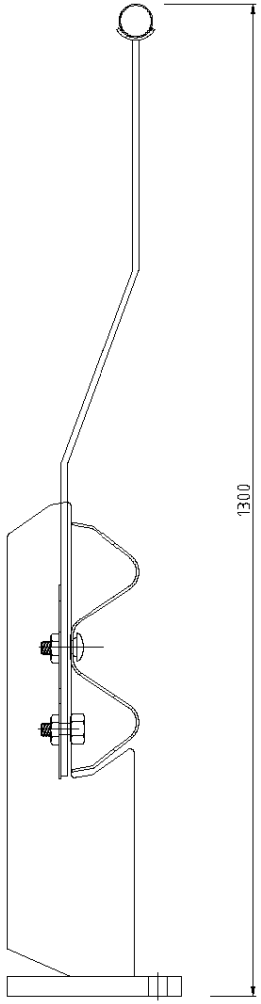
RHINO-STOP TYPE 2
GUARDRAIL &
OFFSIDE BALUSTRADE



RHINO-STOP TYPE 3
GUARDRAIL &
NEARSIDE BALUSTRADE



RHINO-STOP TYPE 4
GUARDRAIL, BALUSTRADE &
ANTI-CLIMB MESH



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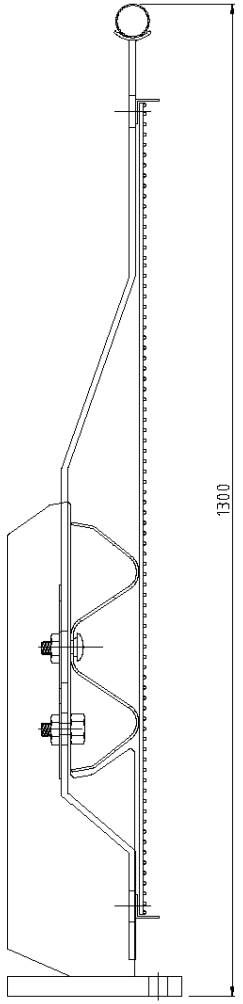
GUARDRAIL &
SIGHT RAIL



RHINO-STOP TYPE 6
GUARDRAIL, SIGHT RAIL &
ANTI-CLIMB MESH

REVISIONS						REVISIONS					
B	21.07.14	REISSUED FOR INITIAL ISSUE	DB	TC							
A	05.11.13	INITIAL ISSUE	DB	TC							
REV	DATE	DESCRIPTION	DRAWN	APPRD.		REV	DATE	DESCRIPTION	DRAWN	APPRD.	

SAFE DIRECTION

DRAWING DESCRIPTION	RHINO-STOP ASSEMBLY TYPES				
DRAWING REFERENCE	GR-WB-026	DRAWN BY	AUSTEC DRAFTING	DIMENSIONS	mm
		CHECKED	H. WALLACE	SCALE	NTS
		APPROVED	T. COLQUHOUN		

RHINO-STOP®

Modular Vehicle Impact Barriers

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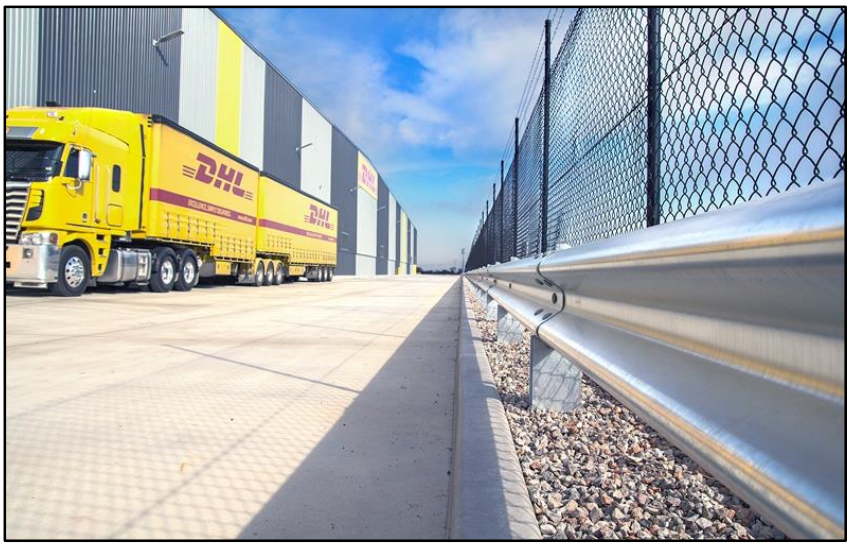
Modular Vehicle Impact Barriers



5.0 RHINO-STOP® Sky-Edge

RHINO-STOP® Sky-Edge conserves valuable floor space by positioning the post on the outside edge of the concrete substrate. RHINO-STOP® Sky-Edge is compliant to the 30kN impact force described in AS/NZS 1170.1: Structural Design Actions.

RHINO-STOP® Sky-Edge may be installed as a standalone post and w-beam guardrail configuration or with balustrade and mesh infill attachments when fall protection for pedestrians is required. The modular design of RHINO-STOP® Sky-Edge and its available attachments allows the system to be configured to suit site requirements using standard components.

RHINO-STOP® Sky-Edge is an energy-absorbing, semi-rigid barrier. The energy-absorbing features reduces loading to the anchor bolt and prevents damage to the concrete substrate.

The positioning of RHINO-STOP® Sky-Edge allows the full width of the concrete substrate to be utilised for parking or vehicle travel.

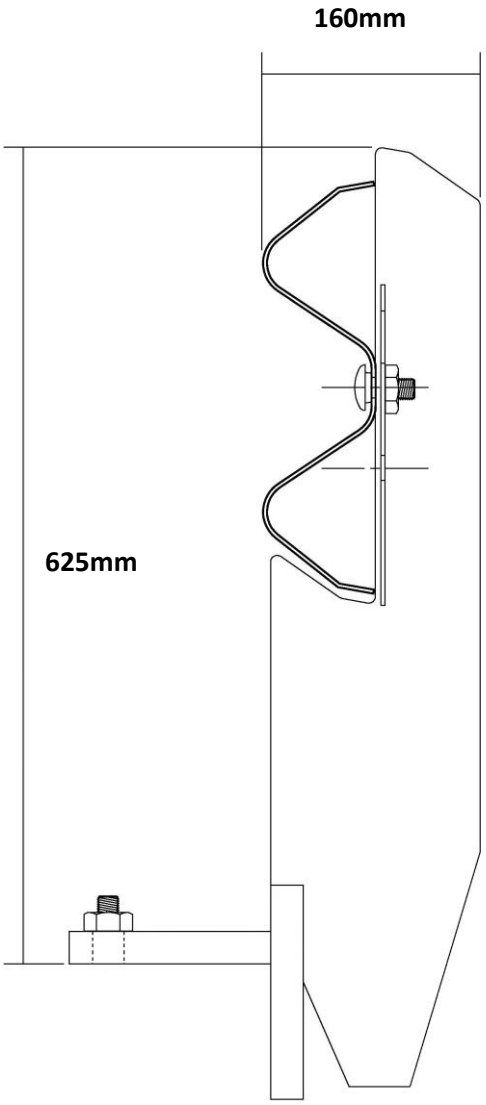
5.1 RHINO-STOP® Sky-Edge Specifications

Compliance:	AS/NZS 2890.1 AS/NZS 1170.1 30kN - Type F (Light Traffic)
Post height:	625mm
Rail height:	600mm
Base plate:	170mm x 65mm
System width:	160mm
Post spacing:	2.0m centres (max.)
Anchor type*:	M20 x 160mm Clawbolt
Anchors per post:	1 off
Hole diameter:	20mm
Substrate Thickness:	200mm minimum (32Mpa)
Bolt Embedment:	100mm minimum
Bolt Edge Distance:	125mm minimum
Min. number of posts:	3 off per installation
Available attachments:	1100mm Handrail 1300mm Sight rail Mesh infill
Finish:	Hot dip galvanised

*Chemical anchor options available upon request

RHINO-STOP® Sky-Edge

Modular Vehicle Impact Barriers

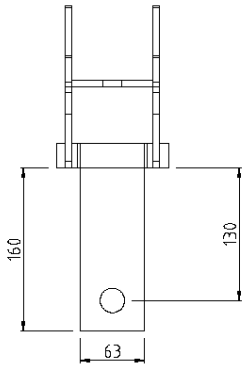


RHINO-STOP® Sky-Edge Post Dimensions

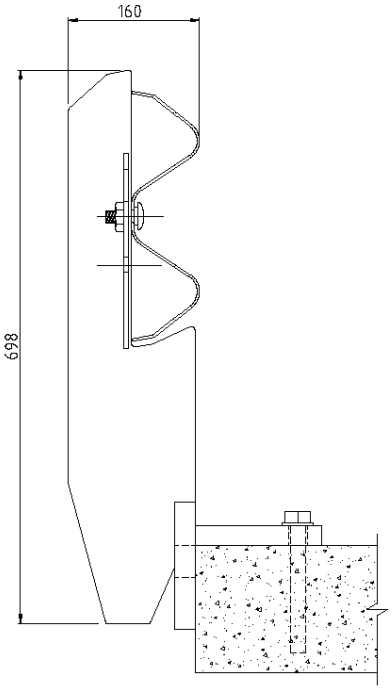
RSSET1

RHINO–STOP HAS BEEN ASSESSED TO EXCEED THE 30kN IMPACT LOAD AS DESCRIBED IN AS/NZS 1170.1 FOR LIGHT TRAFFIC AREAS.

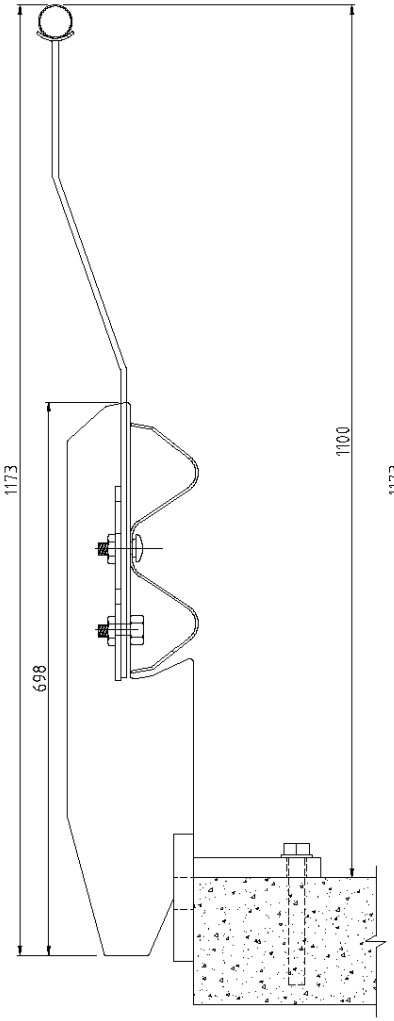
MAX. POST SPACING 2m



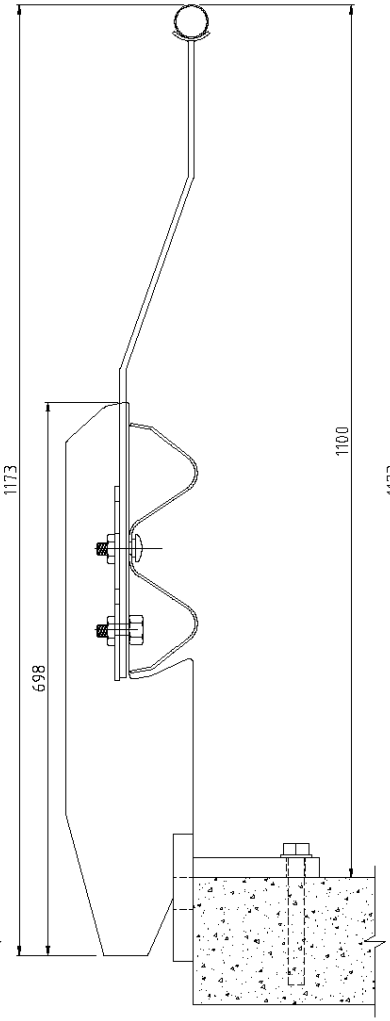
RHINO-STOP
SKY EDGE PLAN VIEW



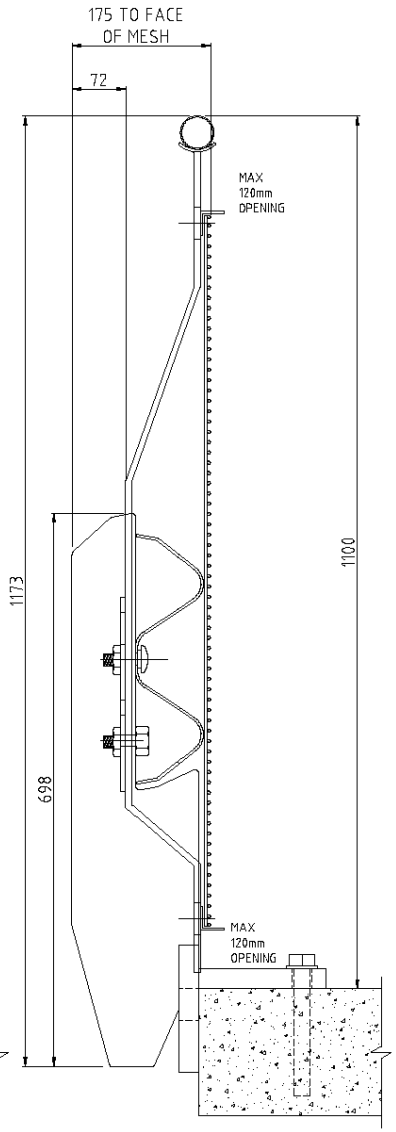
RHINO-STOP
SKY EDGE TYPE 1
GUARDRAIL



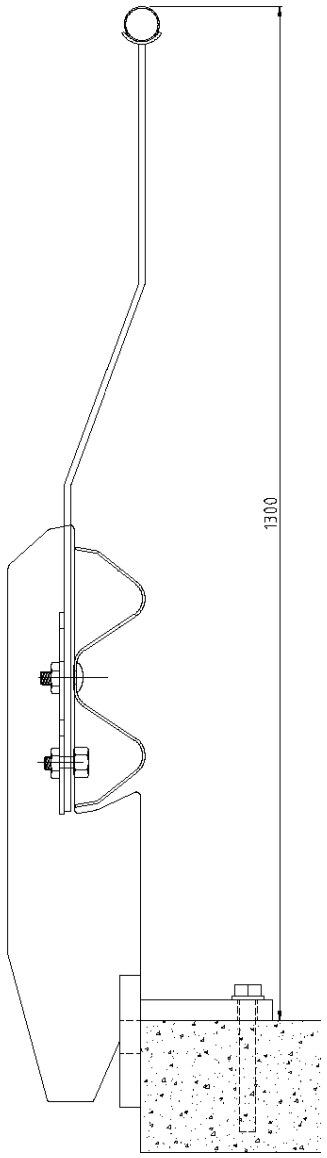
RHINO-STOP
SKY EDGE TYPE 2
GUARDRAIL &
OFFSIDE BALUSTRADE



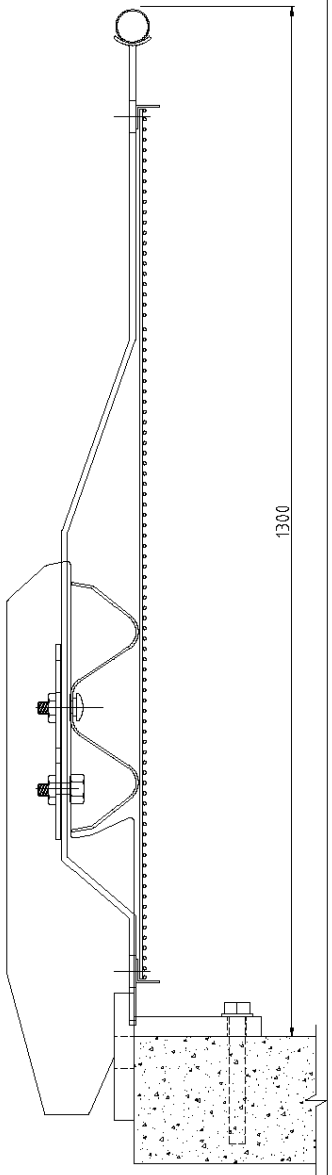
RHINO-STOP
SKY EDGE TYPE 3
GUARDRAIL &
NEARSIDE BALUSTRADE



RHINO-STOP
SKY EDGE TYPE 4
GUARDRAIL, BALUSTRADE &
ANTI-CLIMB MESH



RHINO-STOP
SKY EDGE TYPE 5
GUARDRAIL &
SIGHT RAIL



RHINO-STOP
SKY EDGE TYPE 6
GUARDRAIL, BALUSTRADE,
ANTI-CLIMB MESH & SIGHT RAIL

REVISIONS	REV	DATE	DESCRIPTION	DRAWN	APPRD.
	C	06.11.15	TYPE 6 HANDRAIL EXTENSION UPDATED	MS	TC
	B	19.05.15	TYPE 5 HANDRAIL EXTENSION UPDATED	MS	TC
	A	16.09.14	INITIAL ISSUE	DB	TC

SAFE DIRECTION

DRAWING DESCRIPTION: RHINO-STOP SKY EDGE ASSEMBLY TYPES

DRAWING REFERENCE: GR-WB-036

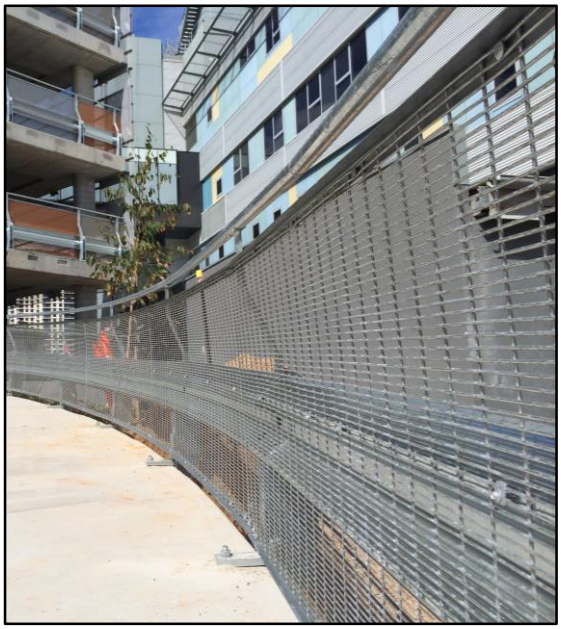
DRAWN BY	AUSTEC DRAFTING	DIMENSIONS	mm
CHECKED	H. WALLACE	SCALE	NTS
APPROVED	T. COLQUHOUN		

RHINO-STOP® Sky-Edge

Modular Vehicle Impact Barriers

RHINO-STOP® Sky-Edge

Modular Vehicle Impact Barriers



6.0 RHINO-STOP® 240

RHINO-STOP® 240 has been developed to withstand high speed, high energy vehicle impacts. RHINO-STOP® 240 is compliant to the 240kN impact force described in AS/NZS 1170.1: Structural Design Actions.

The 240kN impact load is a requirement for barriers installed at the end of ramps exceeding 20m and intended for downward travel.

RHINO-STOP® 240 may be installed as a standalone post and w-beam guardrail configuration or with balustrade and mesh infill attachments when fall protection for pedestrians is required. The modular design of RHINO-STOP® 240 and its available attachments allows the system to be configured to suit site requirements using standard components.

RHINO-STOP® 240 can withstand vehicle impact speeds of up to 30km/h. These high-energy impacts can also represent impacts from low speed, heavy vehicles such as forklifts.

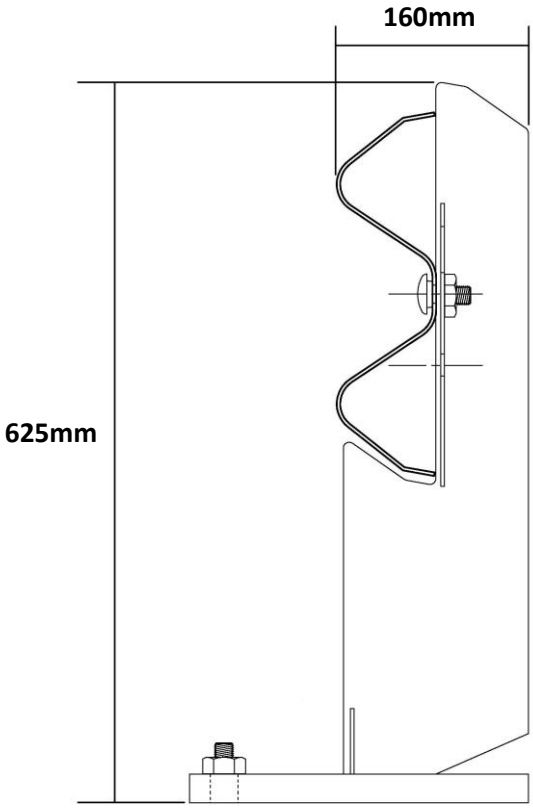
6.1 RHINO-STOP® 240 Specifications

Compliance:	AS/NZS 2890.1 AS/NZS 1170.1 240kN - Type F (Opposite Ramps)
Post height:	625mm
Rail height:	600mm
Base plate:	320mm x 270mm
System width:	160mm
Post spacing:	800mm centres (for 240kN)
Anchor type*:	M20 x 160mm Clawbolt
Anchors per post:	2 off
Hole diameter:	20mm
Substrate Thickness:	200mm minimum (32Mpa)
Bolt Embedment:	100mm minimum
Bolt Edge Distance:	125mm minimum
Min. number of posts:	6 off per installation
Post deflection:	240mm for 240kN impact (at the top of the post)
Available attachments:	1100mm Handrail 1300mm Sight rail Mesh infill
Finish:	Hot dip galvanised

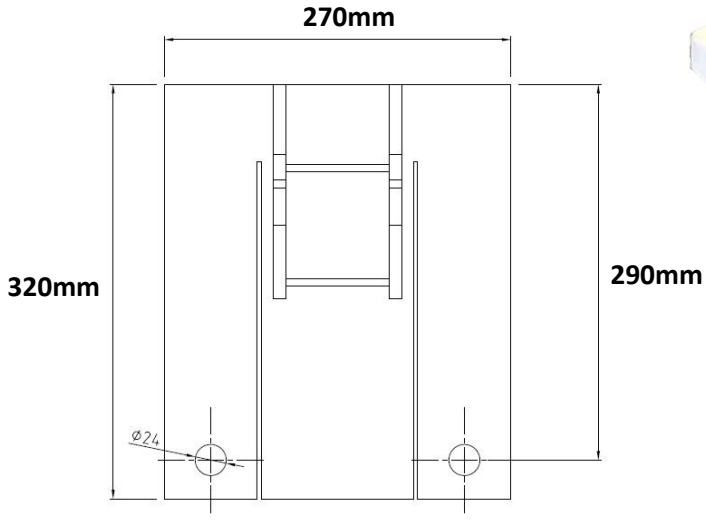
*Chemical anchor options available upon request

RHINO-STOP® 240

Modular Vehicle Impact Barriers

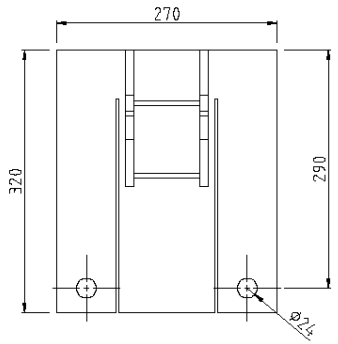


RSP240

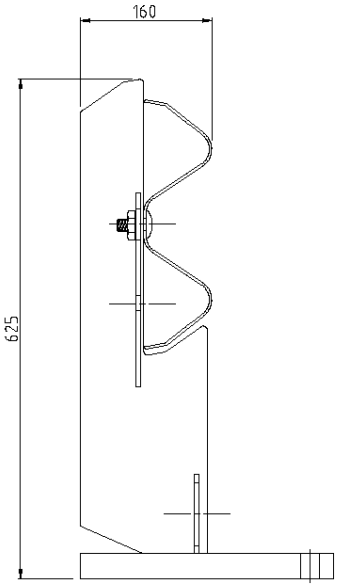


RHINO-POST® 240 Post & Base Plate Dimensions

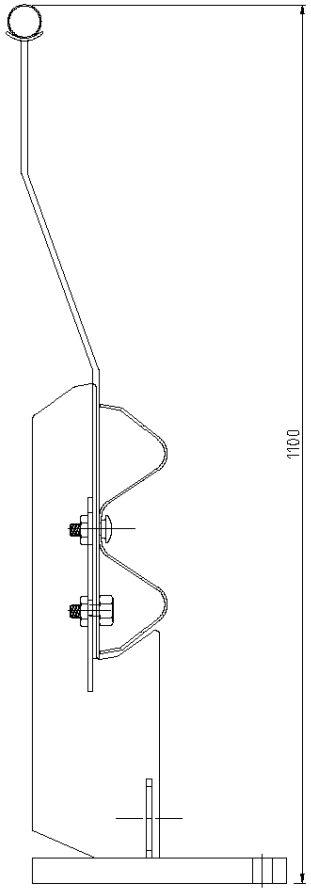
Rhino-Stop 240 with posts spaced at 800mm centres has been assessed to withstand the 240kN impact load as described in AS/NZS 1170.1 for end of ramp locations in light traffic areas



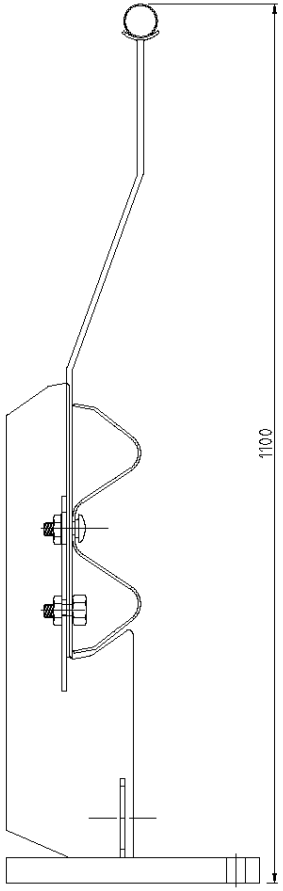
BASE PLATE DETAIL



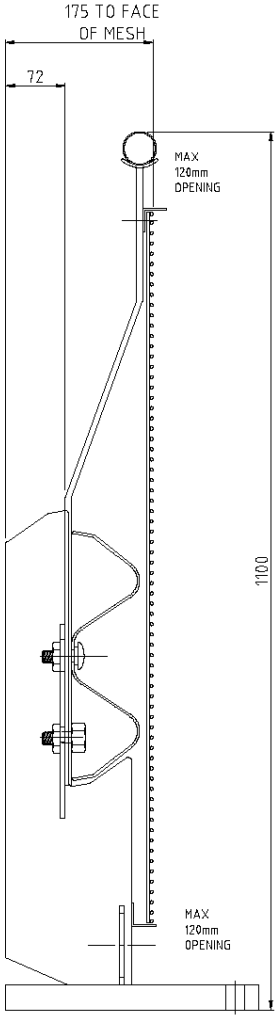
RHINO- STOP 240 TYPE 1
GUARDRAIL



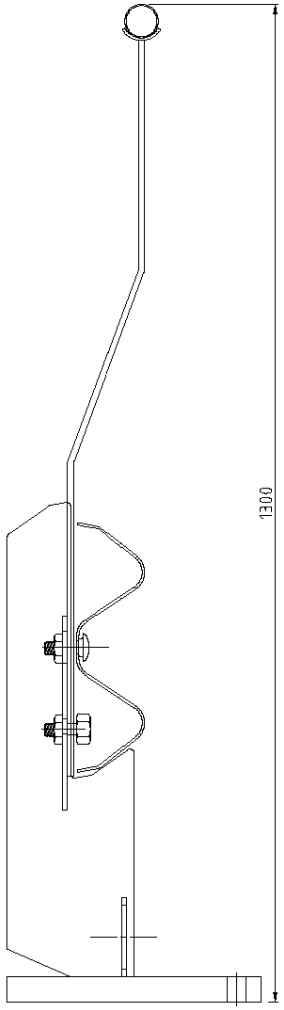
RHINO-STOP 240 TYPE 2
GUARDRAIL &
OFFSIDE BALUSTRADE



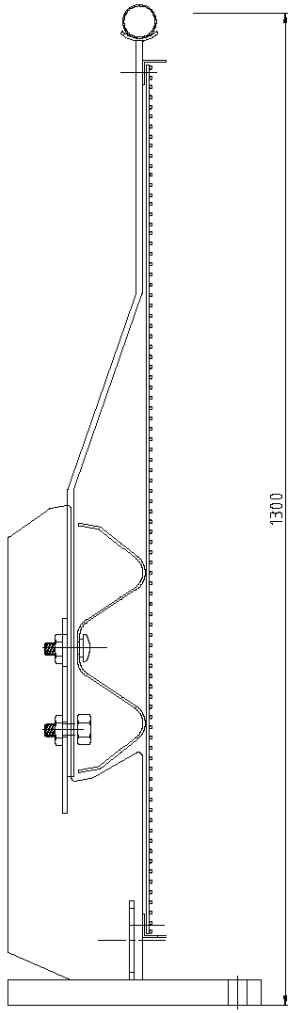
RHINO-STOP 240 TYPE 3
GUARDRAIL &
NEARSIDE BALUSTRADE



RHINO-STOP 240 TYPE 4
GUARDRAIL, BALUSTRADE &
ANTI-CLIMB MESH



RHINO-STOP 240 TYPE 5
GUARDRAIL &
SIGHT RAIL



RHINO-STOP 240 TYPE 6
GUARDRAIL, BALUSTRADE,
ANTI-CLIMB MESH & SIGHT RAIL

REVISIONS						REVISIONS					
B	18.03.16	NEW EXTENSION ADDED	MS	TC							
A	18.05.15	INITIAL ISSUE	MS	TC							
REV	DATE	DESCRIPTION	DRAWN	APPRD.		REV	DATE	DESCRIPTION	DRAWN	APPRD.	

SAFE DIRECTION

DRAWING DESCRIPTION	RHINO-STOP 240 ASSEMBLY TYPES			
DRAWING REFERENCE	GR-WB-066	DRAWN BY	AUSTEC DRAFTING	DIMENSIONS mm
		CHECKED	H. WALLACE	SCALE NTS
		APPROVED	T. COLQUHOUN	

RHINO-STOP® 240

Modular Vehicle Impact Barriers

RHINO-STOP® Elite

Modular Vehicle Impact Barriers

7.0 RHINO-STOP® Elite

Providing superior architectural design, RHINO-STOP® Elite is next generation in car park safety barrier designs providing compliance to the 30kN impact force described in AS/NZS 1170.1: Structural Design Actions.

RHINO-STOP® Elite is fully modular, comprising energy-absorbing posts at 2.3m centres supporting heavy duty panels that provide vehicle impact resistance and fall protection for pedestrians.

The controlled absorption of vehicle impact energy by the specially-engineered posts reduces the impact load transferred to the substrate thereby only requiring two (2) M20 anchors per post. The absorption of impact energy prevents damage to the substrate – an important consideration for car park designers and owners.

RHINO-STOP® Elite contains fewer components facilitating rapid installation and minimising disruption to traffic. The smooth lines and narrow width of RHINO-STOP® Elite makes it the ideal safety barrier for areas with frequent pedestrian activity.

RHINO-STOP® Elite provides an aesthetic solution, facilitates cross-flow ventilation and is manufactured from hot dip galvanised components with the option of powder-coating.

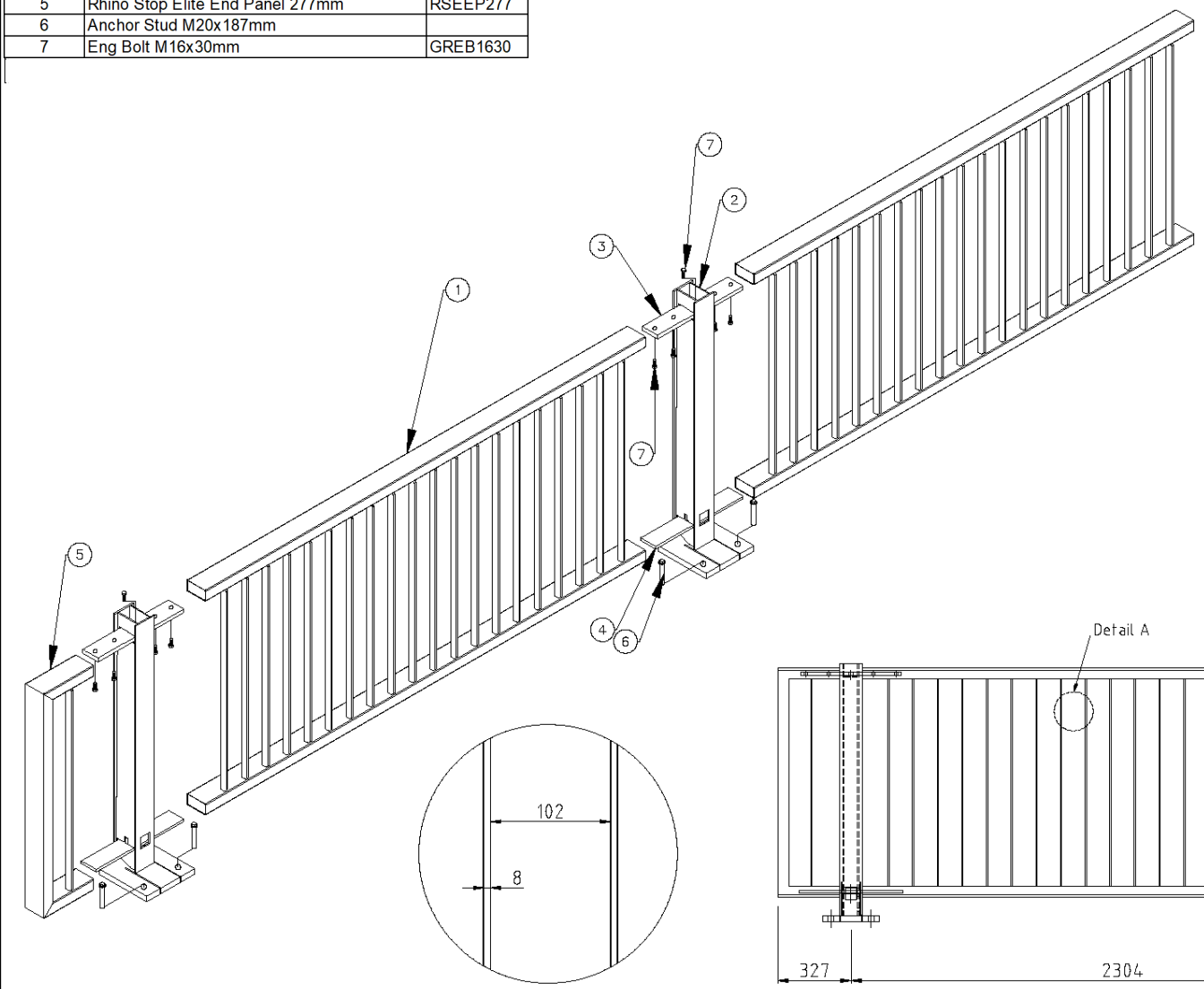
7.1 RHINO-STOP® Elite Specifications

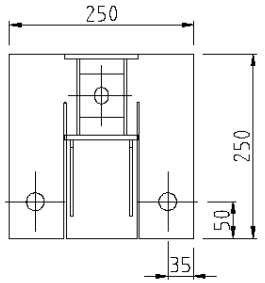
Compliance:	AS/NZS 2890.1 AS/NZS 1170.1 30kN - Type F (Light Traffic) Building Code of Australia
System height:	1100mm
Baluster spacing:	110mm
Base plate:	250mm x 250mm
System width:	120mm
Post spacing:	2.3m centres (max.)
Anchor type*:	M20 x 160mm Clawbolt
Anchors per post:	2 off
Hole diameter:	20mm
Substrate Thickness:	200mm minimum (32Mpa)
Bolt Embedment:	100mm minimum
Bolt Edge Distance:	125mm minimum
Min. number of posts:	2 off per installation
Available attachments:	Customised infill panels 1300mm Sight rail
Finish:	Hot dip galvanised

*Chemical anchor options available upon request

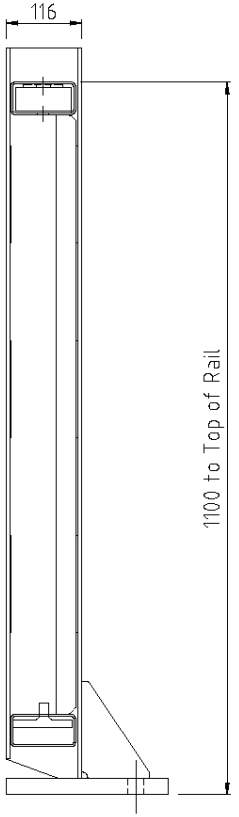
BILL OF MATERIALS		
ITEM	DESCRIPTION	OUR CODE
1	Rhino Stop Elite Intermediate Panel 2204mm	RSEIP2204
2	Rhino Stop Elite Post 1150mm	RSEP1150
3	Rhino Stop Elite Top Join Plate	RSETJP
4	Rhino Stop Elite Bottom Join Plate	RSEBJP
5	Rhino Stop Elite End Panel 277mm	RSEEP277
6	Anchor Stud M20x187mm	
7	Eng Bolt M16x30mm	GREB1630

RHINO–STOP ELITE HAS BEEN ASSESSED TO EXCEED THE 30kN IMPACT LOAD AS DESCRIBED IN AS/NZS 1170.1 FOR LIGHT TRAFFIC AREAS.



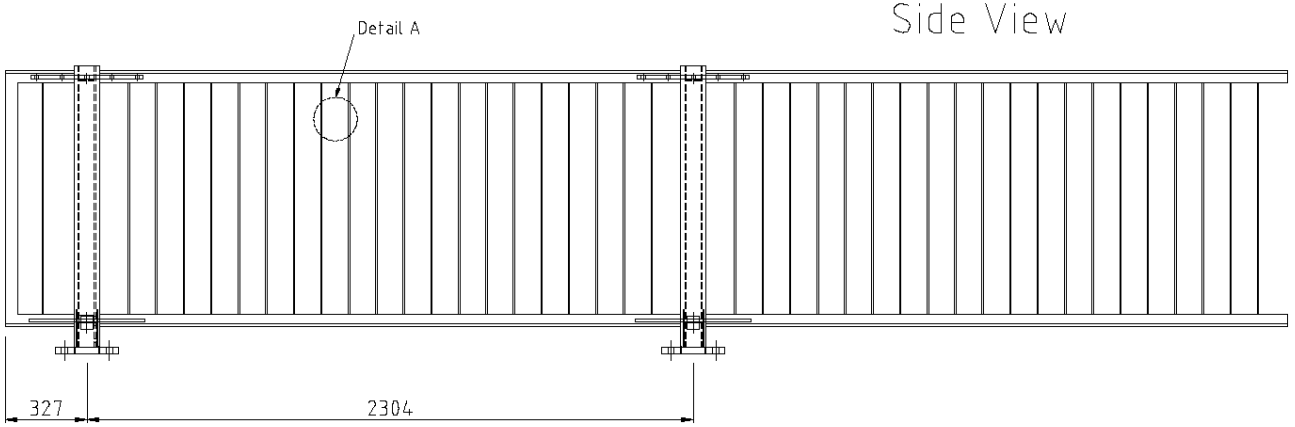


Baseplate Detail



Side View

Detail A



Elevation View

REVISIONS						REVISIONS					
REV	DATE	DESCRIPTION	DRAWN	APPRD.		REV	DATE	DESCRIPTION	DRAWN	APPRD.	
A	06.01.16	INITIAL ISSUE	MS	TC							

SAFE DIRECTION

DRAWING DESCRIPTION: **RHINO STOP ELITE ASSEMBLY DRAWING**

DRAWING REFERENCE: **GR-RE-101**

DRAWN BY	M. SEAL	DIMENSIONS	mm
CHECKED	H. WALLACE	SCALE	NTS
APPROVED	T. COLQUHOUN		

RHINO-STOP® Elite

Modular Vehicle Impact Barriers

RHINO-STOP® Elite

Modular Vehicle Impact Barriers

8.0 RHINO-STOP® Screen

Providing floor to ceiling protection, RHINO-STOP® Screen complies with the 30kN impact force described in AS/NZS 1170.1: Structural Design Actions.

RHINO-STOP® Screen is fully modular, comprising energy-absorbing posts at 2.0m centres and infill panels providing fall protection for pedestrians.

The controlled absorption of vehicle impact energy by the specially-engineered posts reduces the impact load transferred to the substrate. The absorption of impact energy prevents damage to the substrate – an important consideration for car park designers and owners.

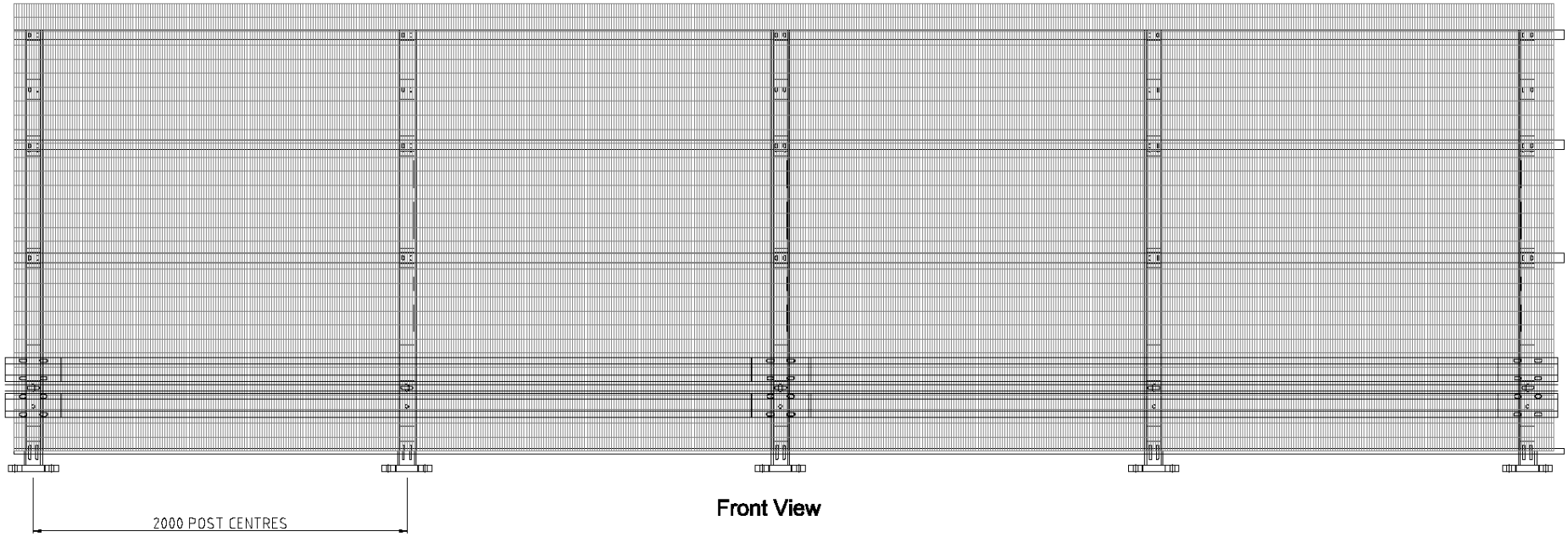
RHINO-STOP® Screen can be configured to a system height of 1900mm, 2100mm or 2500mm.

RHINO-STOP® Screen is available with standard security mesh panels, or with perforated, customised panels for a site specific finish.

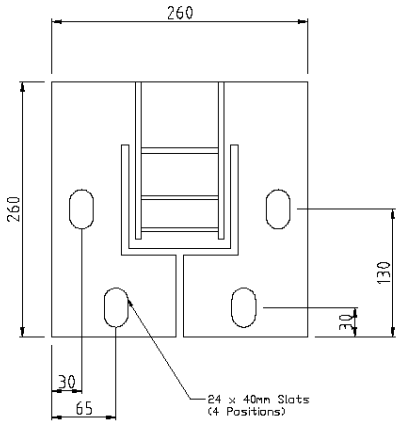
8.1 RHINO-STOP® Screen Specifications

Compliance:	AS/NZS 2890.1 AS/NZS 1170.1 30kN - Type F Light Traffic Areas Building Code of Australia
System height:	1900mm, 2100mm or 2500mm
Base plate:	260mm x 260mm
System width:	180mm
Post spacing:	2.0m centres (max.)
Anchor type*:	M20 x 160mm Clawbolt
Anchors per post:	4 off
Hole diameter:	20mm
Substrate Thickness:	200mm minimum (32Mpa)
Bolt Embedment:	100mm minimum
Bolt Edge Distance:	125mm minimum
Min. number of posts:	3 off per installation
Finish:	Hot dip galvanised

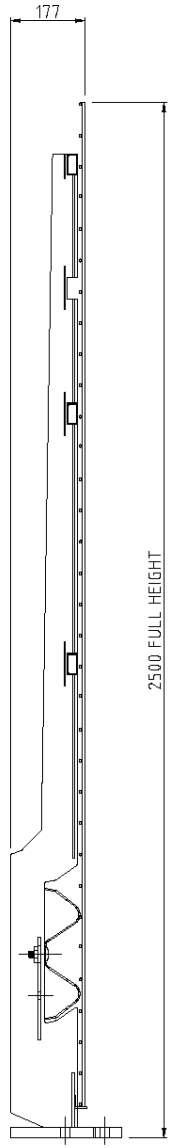
*Chemical anchor options available upon request



Front View



Baseplate Detail



Side View

REVISIONS						REVISIONS					
A	07.04.16	INITIAL ISSUE	MS	TC							
REV	DATE	DESCRIPTION	DRAWN	APPRD.		REV	DATE	DESCRIPTION	DRAWN	APPRD.	

SAFE DIRECTION

DRAWING DESCRIPTION	RHINO-STOP SCREEN ASSEMBLY				
DRAWING REFERENCE	GR-WB-112	DRAWN BY	M. SEAL	DIMENSIONS	mm
		CHECKED	H. WALLACE	SCALE	NTS
		APPROVED	T. COLQUHOUN		

RHINO-STOP® Screen

Modular Vehicle Impact Barriers

RHINO-STOP® Projects


RHINO
STOP


SKY
EDGE


240


Elite


SCREEN