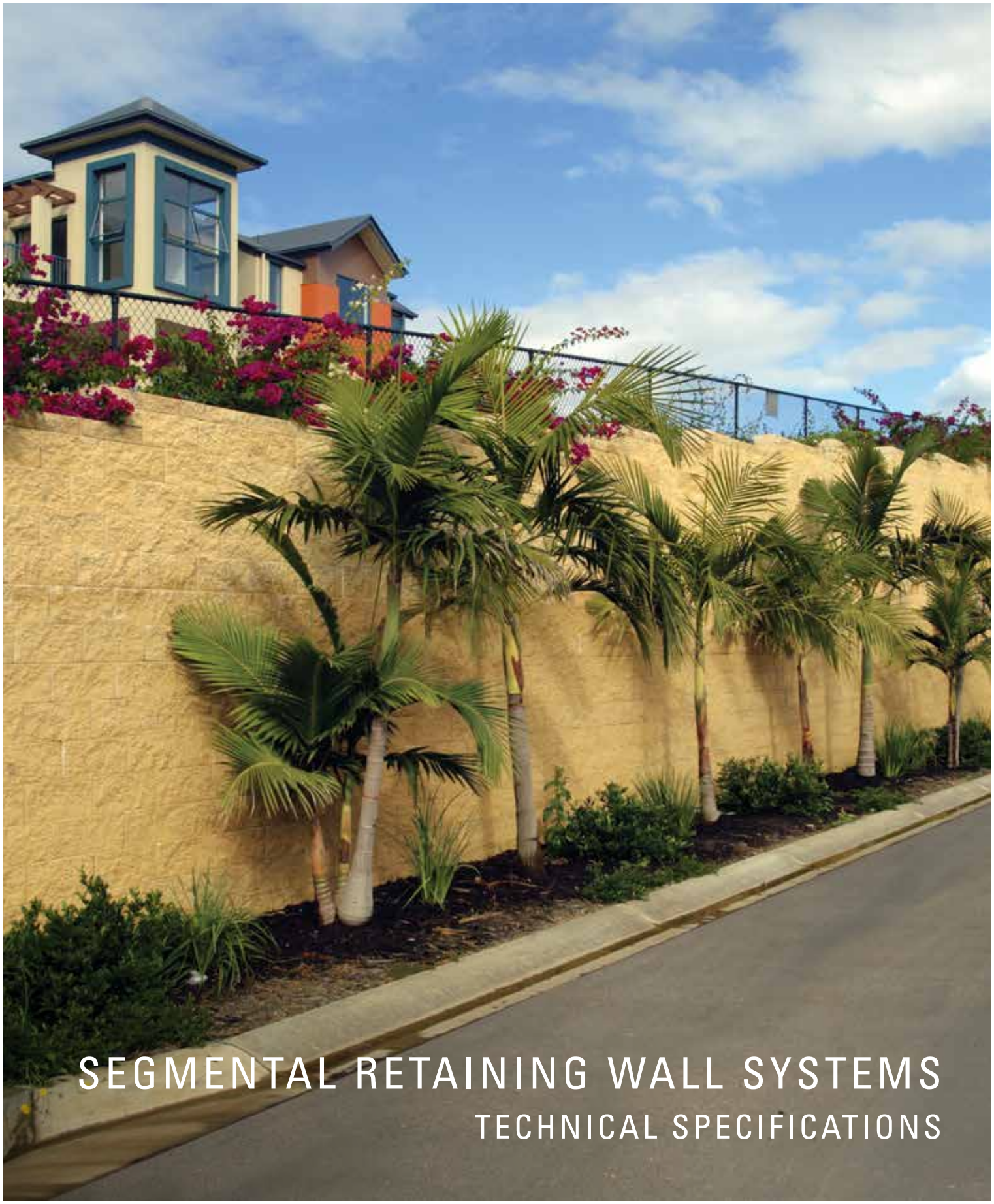
adbri MASONRY



SEGMENTAL RETAINING WALL SYSTEMS

TECHNICAL SPECIFICATIONS

Adbri Masonry

Adbri Masonry is Australia's leading masonry manufacturer supplying quality concrete bricks, blocks, pavers, retaining walls, erosion control products, architectural masonry solutions and reconstituted stone veneers from 15 sites throughout New South Wales, Queensland, Victoria, South Australia and Tasmania. Adbri Masonry is a wholly owned subsidiary of Adelaide Brighton Limited, a leading integrated construction materials and lime producing group of companies and a member of the S&P/ASX 200 Index.

Adbri Masonry first produced concrete Besser™ blocks in 1957 and since then has traded as many household brand names including Besser, Rocla Pavers and Masonry, Pioneer Building Products, Hanson Building Products Pty Ltd and C&M Brick before rebranding as Adbri Masonry in 2009.

In addition to supplying a full collection of quality concrete building and landscaping products, there are a range of valuable benefits to working with Adbri Masonry including;

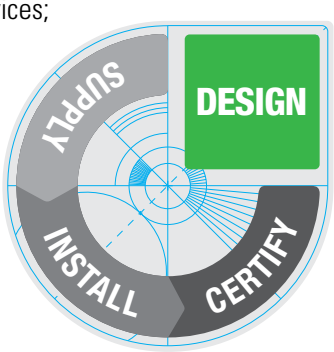
- Access to our Contracting Services Team (in-house design, supply, installation and certification team for commercial projects).
- Confidence that all product lines are tested for quality in our N.A.T.A accredited laboratory
- Our commitment to environmental sustainability and environmental building products.
- Support from experienced in-house engineers who can provide technical advice and design solutions for civil, commercial and industrial projects
- Service from dedicated architectural and engineering consultants
- The benefit of dealing with knowledgeable local sales teams
- The ability to create customised product and colour solutions specific to individual projects *(conditions apply)*.

Contracting Services

Adbri Masonry's Contracting Services Division has been providing solutions in the market for over 20 years. They offer a range of construction and project management services, including a complete design, supply, install and certification package for segmental retaining walls, pavements, erosion control and wall cladding products.

Operating on the East Coast the Adbri Masonry team can provide the following civil contracting services;

- The supply and installation of concrete masonry products
- Preliminary design and technical assistance
- Preliminary costings
- Certified design
- Ongoing project management

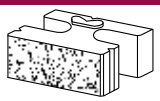
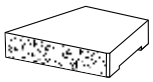
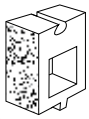
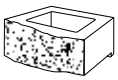
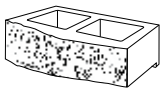
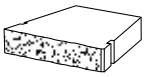
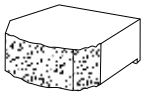
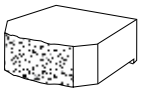
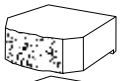
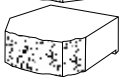
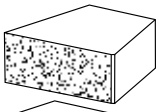


By utilising these services, the quality and structural adequacy of the finished project can be professionally managed and officially certified on your behalf.

QLD Building License Number - 61929

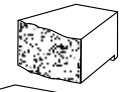
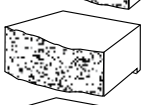
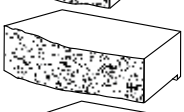
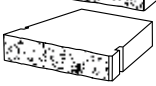
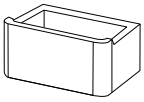
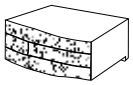
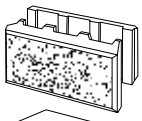
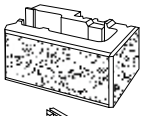
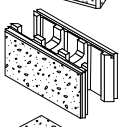
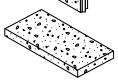
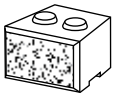
Please Note: These services are limited to commercial and industrial projects and are not available for residential works.

Quick Reference Guide

	Product	Dimensions w x d x h (mm)	No per m²	No per tonne	Unit Weight (kg)	Maximum Heights			Setback
						Residential Gravity Walls	No Fines	Geogrid	
	Vertica®	450 x 280 x 200	11.1	26.04	38.4	1000mm	2000mm	12000mm	1:14 (4°)
	Vertica® Cap	455 x 264 x 100	2.74 L/m	52.36	19.1				
	Landmark Full Tapered Component	200 x 320 x 380	13.16	27	37	950mm	1900mm	20000mm	1:14 (4°)
	Landmark Half Tapered Component	200 x 320 x 190	26.32	43.4	23				
	Diamond Pro™ 175 pair unit	175 x 300 x 200	5.55*	28.57*	35*	1000mm	2200mm	12000mm	1:8 (7.1°)
	Diamond Pro™ 275 pair unit	275 x 300 x 200	5.55*	28.57*	35*				
	Diamond Pro™ Full unit	450 x 300 x 200	5.55	28.57	35				
	Diamond Pro™ Capping Stone	455 x 264 x 100	2.20 L/m	52.36	19.1				
	Diamond®	395 x 305 x 150	16.9	34.13	29.3	2400mm	3000mm	8000mm	1:3 (18°)
	Cut Diamond®	450 x 305 x 150 (Nth QLD Only)	15	30.96	9.6				
	Balmoral	295 x 203 x 130	26.1	82.64	12.1	1040mm	1950mm	N/A	1:4 (14°)
	Windsor	295 x 203 x 130	26.1	72.46	13.8 (Tas)				
	Hampton Stone	435 x 203 x 150	15.32	38.46	26	1050mm	1950mm	8000mm	1:5.4 (10.5°)
	Hampton Stone Cap	450 x 250 x 70	2.3 L/m	59.38	16.84				

**175 and 275 units are sold together with equal numbers of each on a pallet.*

***150 and 250 units are sold together with equal numbers of each on a pallet.*

	Product	Dimensions w x d x h (mm)	No per m²	No per tonne	Unit Weight (kg)	Maximum Heights			Setback
						Residential Gravity Walls	No Fines	Geogrid	
	Meadow Stone 150 pair component	150 x 200 x 150	8.3 pairs**	66.67	9	750mm	1800mm	N/A	1:8 (7.1°)
	Meadow Stone 250 pair component	250 x 200 x 150	8.3 pairs**	111.1	15				
	Meadow Stone 400 full unit	400 x 200 x 150	8.3	50	20				
	Capping Stone	300 x 200 x 60	-	166.67	6				
	Eden Wall	390 x 190 x 168	10 *(with 200mm spaces)* 15.26 *(with no spaces)*	76.92	13	1350mm	N/A	N/A	1:2.75 (20°)
	Natural Impressions®	300 x 175 x 100	33.33	106.16	9.42	800mm	1500mm	N/A	1:5 (11.3°)
	Natural Impressions® Capping Unit	300 x 200 x 50	3.33 L/m	168.35	5.94				
	Versawall® Standard Unit	400 x 220 x 200	12.5	62.5	21.5	800mm	1400mm	N/A	0°
	Versawall® Capping Unit	300 x 240 x 60	3.3L/m	106	9.6				
	Versawall® Corner Unit	390 x 220 x 200	-	62.5	21.5				
	Versastone® Standard Unit	400 x 190 x 200	12.5	65	15.3	600mm	1400mm	N/A	0°
	Versastone® Capping Unit	390 x 190 x 40	2.5L/m	143	7.00	-	-	-	-
	Miniwall®	182 x 182 x 125	44 Semi Solid 51 Solid	227.28	4.4	500mm	875mm	N/A	0°
	Minicap™	182 x 182 x 125	8 L/m	227.28	4.4				

Nominated maximum heights are based on designs provided in this literature. Should you have any taller walls, or walls that fall outside the scope of the provided designs, please contact Adbri Masonry for assistance.

All specifications and assumed properties in this document (including those in Section 1.0 Technical Parameters) must be present and achieved on the site. Retaining walls must be installed in accordance with the instructions and requirements in this document and the directions of suitably qualified and experienced professionals. The information in this brochure is to be used only with the specific Adbri Masonry products shown.

The designs provided in this brochure are for gravity retaining wall systems designed in accordance with the requirements of AS4678 "Earth-retaining Structures".

In some instances, designs have been provided utilising no fines concrete (NFC) behind the retaining wall units to provide additional stability for the wall system, and to increase the maximum permissible design height.

The designs provided with no fines concrete are done within the limits of economy. Excessive amounts of no fines concrete (NFC) are expensive, and for our larger retaining wall systems it will become more cost effective to utilise a Geogrid reinforced wall system.

For information on Geogrid reinforced walls, please refer to page 55.

This brochure has been prepared by Adbri Masonry. All designs in this brochure have been checked and approved by Arlene Nardone, RPEQ 7777 and Wayne Holt CPEng, NPER, RPEQ 5510.

Disclaimer:

It is the responsibility of the customer to ensure that all assumed properties (Note 2 of Technical Parameters) are achieved on site, and that all retaining walls are installed as per requirements of designs and cross sectional details. Adbri Masonry accepts no liability for any walls outside the scope of designs included in this brochure, or for installation of the products contained within.

1.0 Technical Parameters

1. Designed in accordance with the following standards unless noted otherwise.

AS4678:2002	Earth retaining structures
AS1170.1:2002	Loading Code
AS3700:2011	Masonry Code
AS2870:1996	Residential Slabs and Footings
Concrete	Grade N20, min. 80mm slump, 20mm max.aggregate.
Aggregate	12 - 20mm max.
No Fines Concrete	6:1 ratio by volume of 20mm max size clean aggregate and cement. Water content should be such that the cement slurry evenly coats the aggregate and retains a wet/glossy appearance without excess slurry running off. This is typically around 40 litres per 100kg of cement.

2. The soil types and properties assumed in design are:

Material	Unit Weight (kN/m^3)	Internal Friction Angle (°)	Cohesive Strength
Insitu Material - Type 1	19	30	0
Insitu Material - Type 2	19	25	0
Gravel Backfill	19	37	0
Concrete	24	N/A	0
CGM	18	37	0
Foundation Replacement Zones	19	42	0
No Fines Concrete (NFC)	19	N/A	N/A

Type 1 soil denotes a sandy type material or better.

Type 2 soil denotes a clay, silty clay or sandy clay material exhibiting stiffness / firmness with maximum medium reactivity.

Notes: Where depth of aggregate exceeds 300mm, the aggregate infill material is deemed to be the material being retained. If natural material on site does not meet or exceed the 25º or 30º internal friction angle, you must use a foundation replacement zone and a H/2 aggregate infill material. NFC designs will not be applicable and further engineering advice will be required. A geotechical engineer will be able to assist you in evaluating your in-situ material.

No design consideration has been given for rock excavation. With the assumed founding soil properties, the allowable bearing capacity under a normal load has been taken at 100kPa.

The properties of the materials should be checked by a geotechnical engineer if doubt exists. Design has been based on assumed average conditions for a gravity retaining wall and is considered applicable to soils where the site is classified as S, M, H or E with "ys" less than 70mm, where the wall is founded on natural undisturbed material. The infill of the wall must be compacted to ensure against rotation of the wall backwards.

3. These details are not applicable to the following designs and require the specific design input of a registered professional engineer:
   (a) Wall heights greater than shown in the tables
   (b) Surface slopes greater than 1V:4H at top of wall (14º).
   (c) Site ground slopes greater than 1V:4H at toe of wall (14º).
   (d) Retained material properties differing from those assumed in the design.
   (e) Walls founded on fill.
   (f) Rock encountered in excavation of area for infill material.
   (g) Site classified as "E" Ys greater than 70mm or "P". For "E" sites where Ys exceeds 70mm a geotechnical engineer should be engaged. For "P" sites, you must ensure that a safe bearing capacity of 100kPa is achieved, and satisfy yourself that no long term settlement will occur.
   (h) Site has major drainage or seepage problems, is subject to water forces including flooding, or groundwater exists.
   (i) Lack of global stability. Global stability should be checked by a qualified geotechnical engineer.
   (j) The founding material has a bearing capacity less than 100kPa.
   (k) Where the possibility of failure of the toe of the wall exists due to location of building or service pipe trenches in front of the wall prior to or after construction of the retaining wall.
   (l) Where fences are detailed to be installed at the top of the wall which do not comply with the fence post installation detail included in this brochure.
   (m) Where replacement material zones are not able to be installed as detailed in the design tables.
   (n) Surcharge loads are higher than values nominated in design tables.
4. These conditions must be met for residential walls denoted by * as shown in design tables for residential walls to 1200mm max height:
   (a) All retaining walls are designed to CMAA document MA53 (Segmental Concrete Gravity Retaining Walls Design and Construction Guide).
   (b) All retaining walls shall comply with AS4678 Structure Classification A.
   (c) These tables are only applicable to retaining walls that incorporate a low permeability surface membrane and drainage system such that there can be no ingress of any water into the soil behind the retaining wall.
   (d) Structures that do not incorporate a low permeability surface membrane and drainage system such that there can be no ingress of any water into the soil behind the retaining wall are deemed to be outside the scope of this brochure.
   (e) These tables are applicable to cuts in insitu soils. The tables are not applicable to cohesive fill.
   (f) All retaining walls are designed for a maximum surcharge load of 2.5 kPa. If surcharge loads greater than 2.5 kPa are expected, these designs will not be appropriate.
   (g) CGM leveling pads consist of at least 5% cement-stabilised crushed rock with dimensions as detailed. Before the bottom course is positioned, the footing should be moistened to ensure bond between block and footing.
   (h) These walls have been designed in accordance with Rankine Bell Methodology.
5. The segmental retaining wall units in this brochure, with the exception of the Landmark system, have keys which are utilised for locating purposes only and are therefore not subject to the dimensional tolerances outlined in table 2.3 of AS4455.3:2008 "Segmental Retaining Wall Units". The Landmark system has been independently tested to ensure integrity of the structural key for the purpose of constructing geogrid reinforced walls up to 20m in height.

2.0 General Notes

1. Wall construction to be executed in accordance with the requirements of this brochure.
2. The walls have been designed for the following surcharge loads :
   - 1kPa (for garden walls) to 800mm maximum height.
   - 2.5kPa for walls between 800mm and 1500mm in height.
   - 5 kPa for walls exceeding 1500mm in height.
   - No Dead Loads have been allowed for.
   - Cohesion c=4kPa for residential walls denoted by * :

   Where there are any variations to the materials, soil conditions, loadings, drainage, geometry of the site or retaining wall, a registered engineer should be engaged to design the wall.
3. Where a fence is required at the top of the wall, the fence shall be installed in accordance with the detail in this manual.
4. Structures such as building footings, swimming pools, other retaining walls, storage facilities or solid panel fencing and loads such as from motor vehicle access must be kept clear such that the load is not placed within a line projected behind the wall from the founding level at 1V:1.5H for Type 1 soils and IV:2H for Type 2 soils. Where structures or driveways do intrude within this line a registered professional engineer should be engaged to design the wall.
5. Precautions must be taken where other building work or service trenches are excavated around the retaining wall, as it may be necessary to use bridging foundations or other alternatives.
6. In all wall units with voids, stability depends on the blocks being filled. For all the wall units, the first course should be installed with an embedment into the levelling pad and placed to give firm even bearings on the levelling pad, level front to back and side to side.
7. The base of the leveling pad excavation should be firm, dry and free of loose material. Any disturbed ground at the base of the trench should be compacted prior to footing construction. All retained material must be compacted by firm tamping using appropriate compaction equipment. Materials in front of the wall should be founding soil or equivalent and thoroughly compacted immediately after the wall is out of the ground.
8. If the insitu material is equal to or exceeds the properties of the proposed infill material, then the insitu material shall be substituted for the infill material.
9. Precautions should be taken if cutting back the existing bank to ensure such excavation does not destabilize the footing of another structure.
10. Walls may be constructed to greater heights in specific applications with special engineering design.
11. Check with your local council whether building approval is required.
12. It is recommended that the top course is adhered to the next course with a suitable waterproof construction adhesive as a precautionary measure. Check with manufacturer of adhesive for suitability of use.
13. Where these walls impose loads on other structures those other structures must be checked for strength and stability.
14. Where a foundation replacement zone is detailed, this will denote the removal of natural material where detailed, and replacement with CBR45 road base compacted to 98% Standard Relative Dry Density (RDD).
15. External interface friction angle is calculated as being equal to 2/3 of the internal interface friction angle.
16. Subsoil drains should be flushed at regular intervals to ensure continuous proper functioning of the retaining wall drainage system.
17. Subsoil drains shall have outlet points at maximum 20m centres for dry application and maximum 5m centres for wet application.

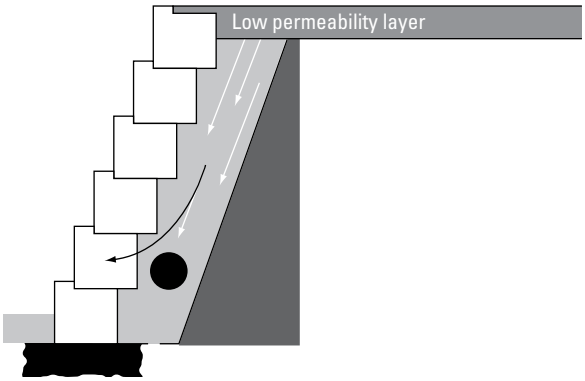
3.0 Typical Details for Segmental Retaining Walls

3.1 DRAINAGE OF BACKFILL

(Detailed using Eden Wall units, but information is applicable to all product types)

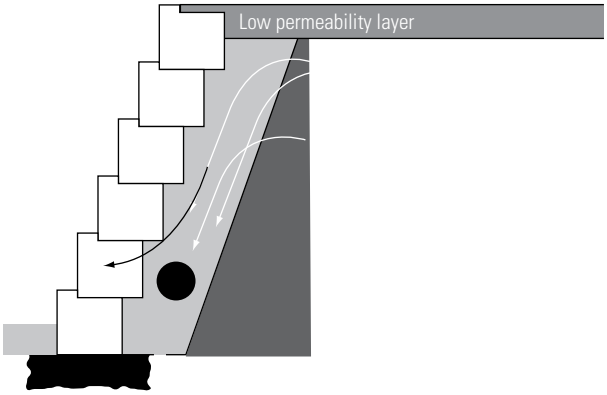
Before a segmental retaining wall is constructed consideration must be given to the need for and the means of drainage. Each individual site needs to be assessed and measures taken appropriate to the source and the volume of water expected behind the wall. The following general guidelines will assist in deciding on the type of drainage required, but are not intended to replace professional advice.

In the event of heavy rain before planting is established, the top of the wall should be covered with plastic sheets or tarpaulins to prevent the soil being scoured out



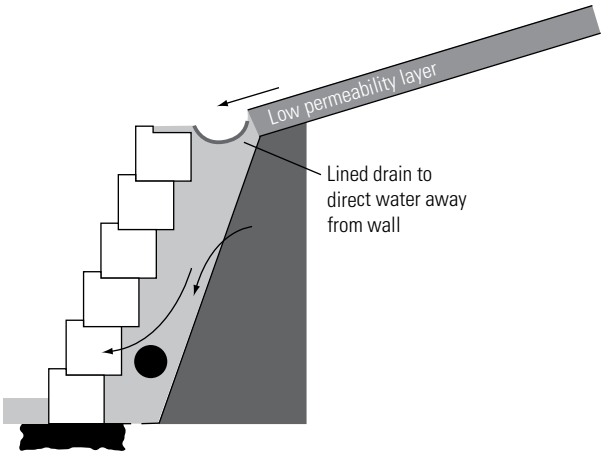
A. Only direct rain on backfill

Where there is a small width of backfill, it is sufficient that the backfill be composed of drainage aggregate to permit drainage through the wall. Where there is a large width of backfill, it must be sealed with a low permeability layer eg. clay layer, concrete slab etc, to prevent the backfill becoming saturated.



B. Sub-soil seepage entering backfill

In this case it will be necessary to intercept the water and direct it away. This can usually be achieved by providing a layer of gravel behind the wall to collect the water, and an agricultural pipe at the base to carry the water away.



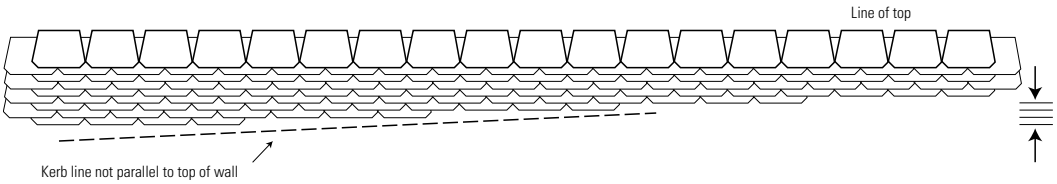
C. Areas of heavy rainfall or surface run-off water

In this case the surface must be sealed with a low permeability layer to prevent saturation of the backfill and a surface drain provided to direct water away in order to prevent scouring.

Diagrams not to scale

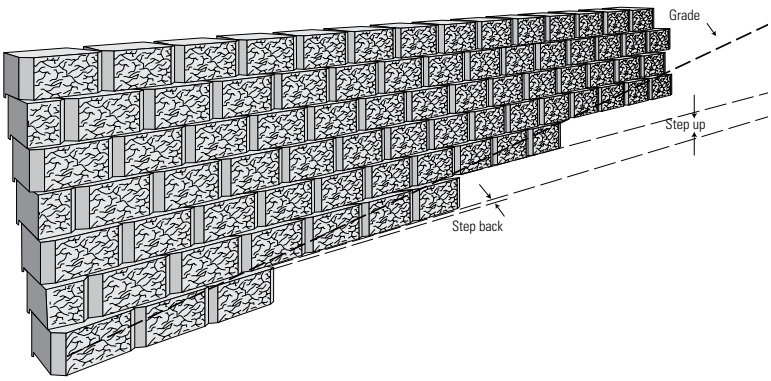
3.2 SET OUT ON SLOPING SITES

Plan on Wall



Offset the line in basecourse (each step back)	
Windsor	32mm
Diamond®/Cut Diamond®	50mm
Vertica®	14mm
Diamond Pro Stone Cut™	25mm
Hampton Stone	28mm
Meadow Stone	18.75mm
Eden Wall	62mm
Natural Impressions®	20mm
Versawall®	0mm
Miniwall®	0mm

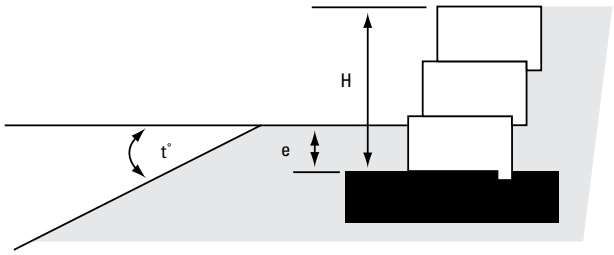
Elevation on Wall



Step back (each course)	
Windsor	32mm
Diamond®/Cut Diamond®	50mm
Vertica®	14mm
Diamond Pro Stone Cut™	25mm
Hampton Stone	28mm
Meadow Stone	18.75mm
Eden Wall	62mm
Natural Impressions®	20mm
Versawall®	0mm
Miniwall®	0mm

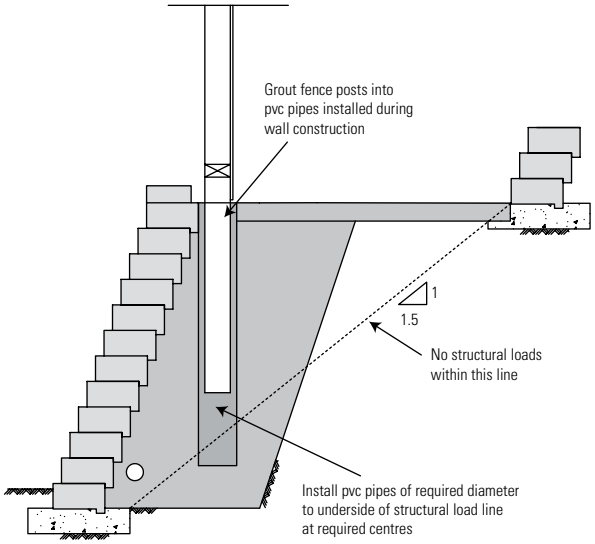
Step up (each course)	
Windsor	130mm
Diamond®/Cut Diamond®	150mm
Vertica®	200mm
Diamond Pro Stone Cut™	200mm
Hampton Stone	150mm
Meadow Stone	150mm
Eden Wall	168mm
Natural Impressions®	100mm
Versawall®	200mm
Miniwall®	125mm

Depth of Embedment



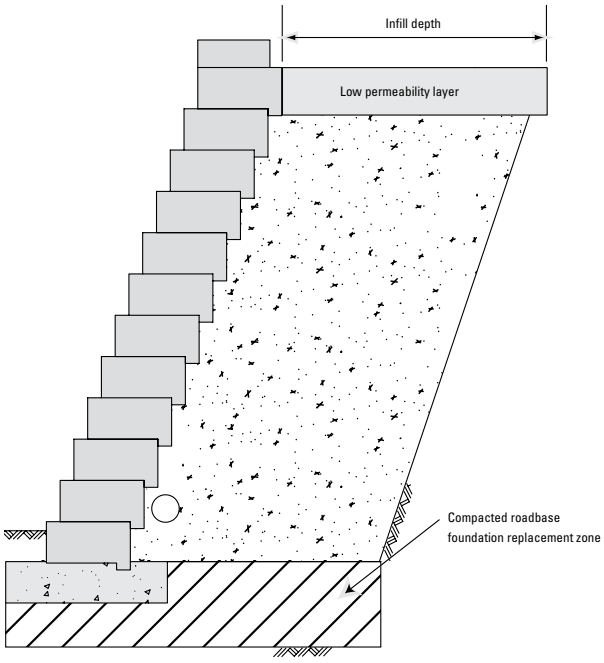
Depth of Embedment	
Toe Slope (t°)	e (mm)
0	H/20
1-18	H/10
18-27	H/7
27-35	H/5

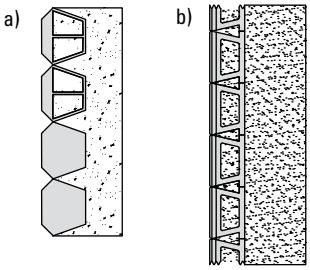
3.3 TYPICAL FENCE POST DETAIL



Fence posts may be driven once wall is installed, however they must remain at least 500mm off rear of wall. This applies where aggregate is used as infill material, or where width of no fines concrete does not encroach on fence location.

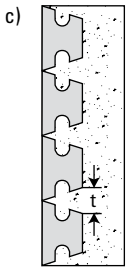
3.4 TYPICAL NO FINES CONCRETE INSTALLATION DETAILS





Place no fines concrete in single block lifts of 200mm or less (depending upon height of block). Ensure no fines is manipulated into V shaped void between units to ensure adequate bond between block and concrete mass.

If units are cored through, the no fines concrete must also completely fill the cored section of the block.

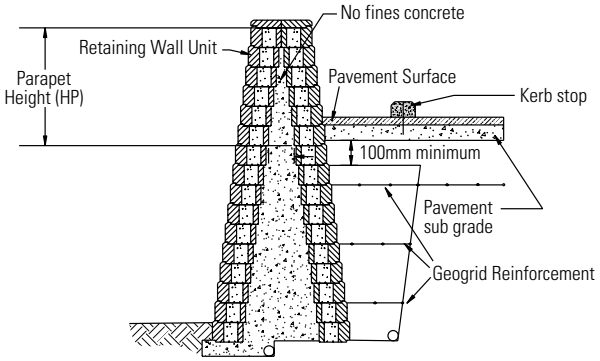


When using no fines concrete with the Vertica® system, ensure bond is achieved between wall units and no fines concrete. Ensure that no fines concrete is placed in voids between all units.

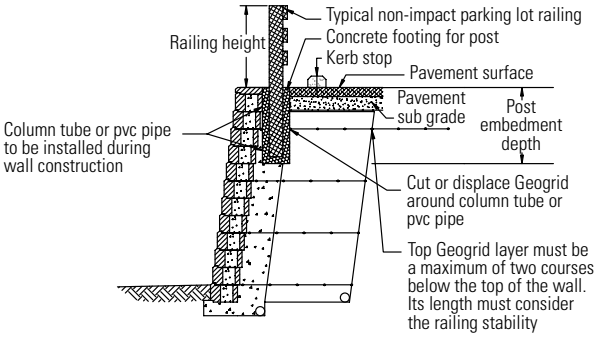
Throat width (t) of no fines concrete shall never be less than 50mm. Blocks shall be modified by contractors where necessary to accommodate this.

3.5 MISCELLANEOUS DESIGN DETAILS

Double Wall Parapet



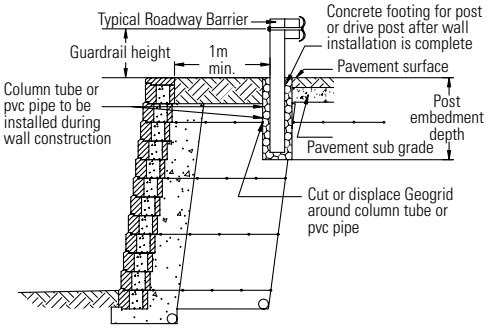
Non-impact Parking Railing



This detail does not account for extreme vehicle impact

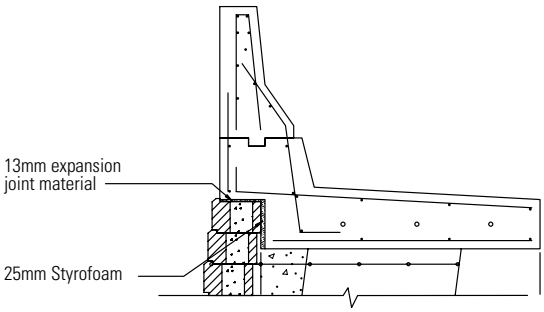
Parking Railing design and construction requires site specific analysis for every wall case. Please contact Adbri Masonry or a qualified local engineer for assistance

Impact Roadway or Parking Guard Rail



Cantilevered Jersey Barrier

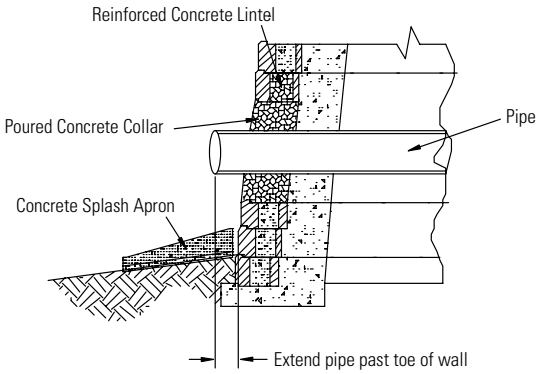
Ensure that Jersey Barrier Design is in accordance with local government specifications



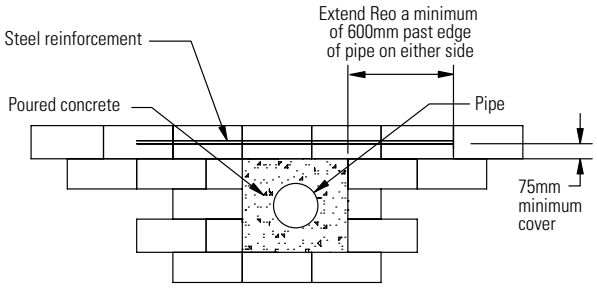
Concrete Construction Notes

1. Positive bond breaker and expansion joint material must be provided between cast in place slab and Retaining Wall Units.
2. Concrete minimum compressive strength f'c = 24 MPa minimum tensile strength fy = 45 MPa.
3. Caulk expansion joint.
4. Expansion joints are at 9m on centre maximum and 9m on centre minimum.
5. Control joints are at 3m on centre.

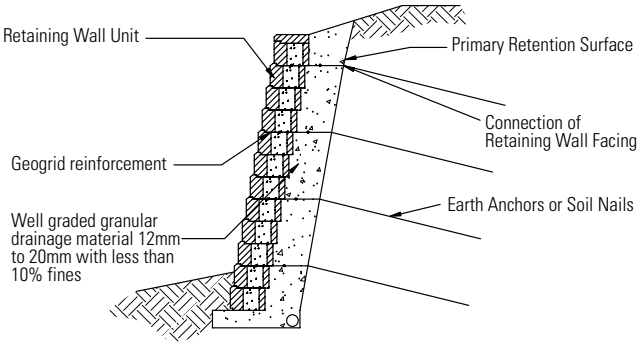
Concrete Collar Storm Water Pipe Outlet Section View



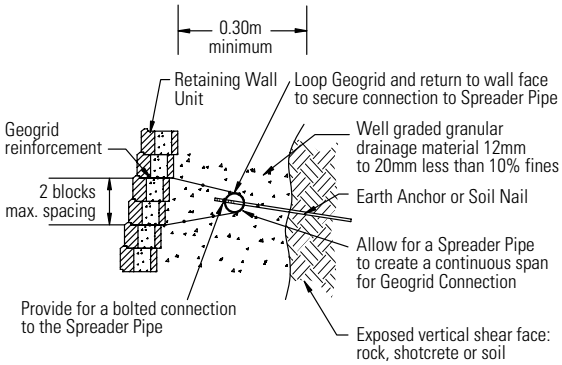
Concrete Collar Storm Water Pipe Outlet Elevation View



Veneer Typical Section



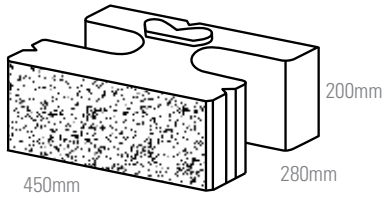
Facing to Earth Anchor Tiebacks



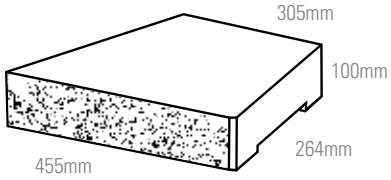
4.0 Design Cross Sections and Table of Heights for

4.1 VERTICA®

Vertica® can create near vertical walls without reinforcement up to 1m high, and is ideal for commercial tall wall construction. With the use of geogrid reinforcement, walls can be constructed up to 12m in height.



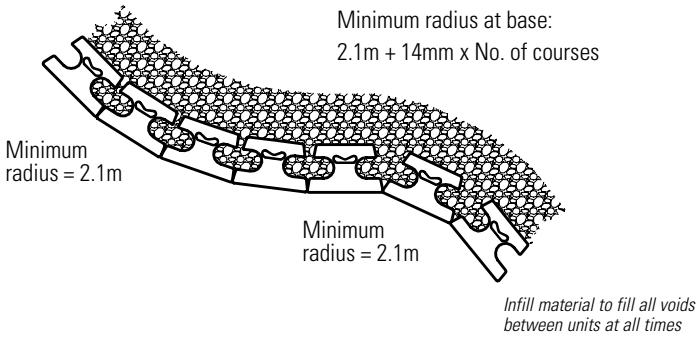
Vertica® Standard Unit



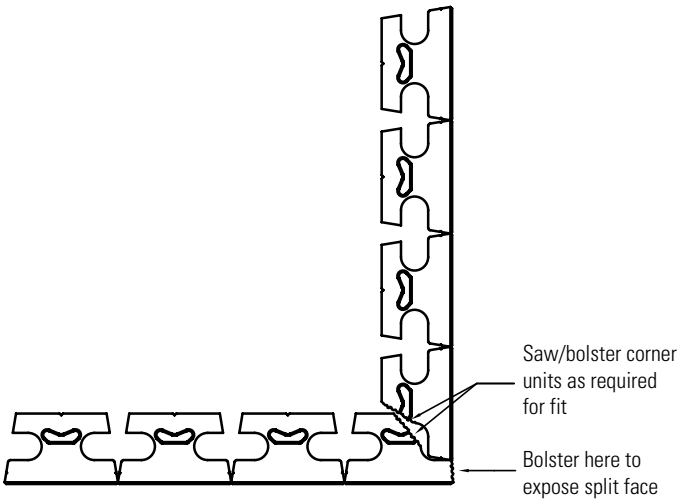
Vertica® Cap

Vertica® Technical Data	
No. Per m² of Wall	Vertica® 11.1
Approx Weight	Vertica® 38.4kg, Vertica® Cap 19.1kg
No. Per Lm of Wall	Vertica® Cap 2.74
Setback	1:14 (4°)

Vertica® Curves Detail

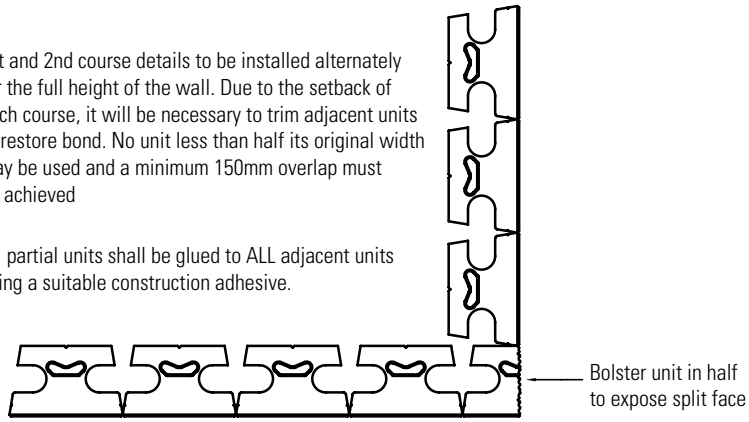


Vertica® Corners Detail



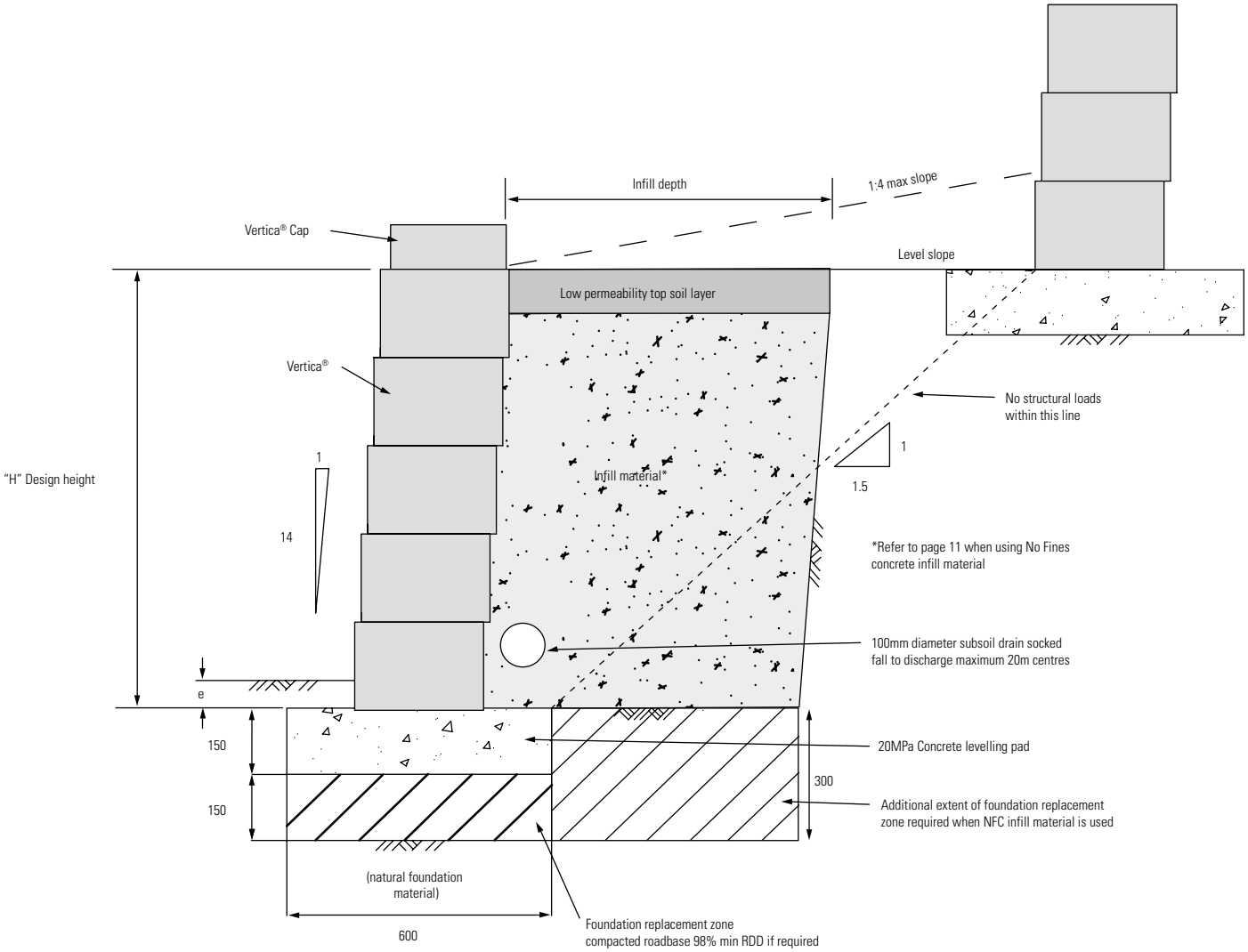
1st and 2nd course details to be installed alternately for the full height of the wall. Due to the setback of each course, it will be necessary to trim adjacent units to restore bond. No unit less than half its original width may be used and a minimum 150mm overlap must be achieved

All partial units shall be glued to ALL adjacent units using a suitable construction adhesive.



Segmental Retaining Walls

Vertica® Typical Wall Section



VERTICA® RETAINING WALL DESIGN HEIGHTS

Residential Retaining Walls (including residential subdivisions)

Design Height 'H' (mm)	Surface Slope	Surcharge Load (kPa)	Foundation Material	Infill Material	Infill Material Depth (mm)	
					Type 1	Type 2
2000	Level	5	Replacement Zone	NFC	600	800
1800	Level	5	Replacement Zone	NFC	550	750
1600	Level	5	Replacement Zone	NFC	450	650
1400	Level	2.5	Replacement Zone	NFC	300	450
1200	Level	2.5	Replacement Zone	NFC	300	350
1000*	Level	2.5	Natural Material	Aggregate	300	300
800*	Level	1	Natural Material	Aggregate	300	300
600*	Level	1	Natural Material	Aggregate	300	300
1800	1:4 Maximum	5	Replacement Zone	NFC	750	1050
1600	1:4 Maximum	5	Replacement Zone	NFC	650	950
1400	1:4 Maximum	2.5	Replacement Zone	NFC	450	700
1200	1:4 Maximum	2.5	Replacement Zone	NFC	350	550
1000	1:4 Maximum	2.5	Replacement Zone	NFC	300	450
800*	1:4 Maximum	1	Natural Material	Aggregate	300	300
600*	1:4 Maximum	1	Natural Material	Aggregate	300	300

Commercial Retaining Walls

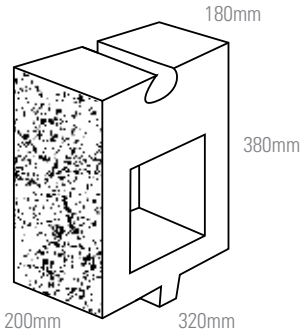
Design Height 'H' (mm)	Surface Slope	Surcharge Load (kPa)	Foundation Material	Infill Material	Infill Material Depth (mm)	
					Type 1	Type 2
2000	Level	5	Replacement Zone	NFC	600	800
1800	Level	5	Replacement Zone	NFC	550	750
1600	Level	5	Replacement Zone	NFC	450	650
1400	Level	2.5	Replacement Zone	NFC	300	450
1200	Level	2.5	Replacement Zone	NFC	300	350
1000	Level	2.5	Replacement Zone	Aggregate	500	500
1000	Level	2.5	Replacement Zone	NFC	300	300
800	Level	1	Replacement Zone	Aggregate	400	400
800	Level	1	Replacement Zone	NFC	300	300
600	Level	1	Replacement Zone	Aggregate	300	300
1800	1:4 Maximum	5	Replacement Zone	NFC	750	1050
1600	1:4 Maximum	5	Replacement Zone	NFC	650	950
1400	1:4 Maximum	2.5	Replacement Zone	NFC	450	700
1200	1:4 Maximum	2.5	Replacement Zone	NFC	350	550
1000	1:4 Maximum	2.5	Replacement Zone	NFC	300	450
800	1:4 Maximum	1	Replacement Zone	Aggregate	400	400
800	1:4 Maximum	1	Replacement Zone	NFC	300	300
600	1:4 Maximum	1	Replacement Zone	Aggregate	300	300

* Refer to section 4 of Technical Parameters for Conditions

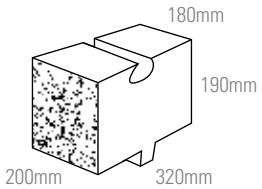
NFC denotes the used of No Fines Concrete. Refer to page 8 for clarification of Type 1 and Type 2 soils.

4.2 LANDMARK

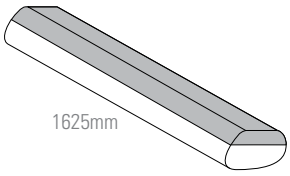
Landmark allows the design and construction of reinforced walls up to 20m in height. Lockbar provides positive connection between geogrid reinforcement and Landmark



Landmark Full Tapered Component



Landmark Half Tapered Component

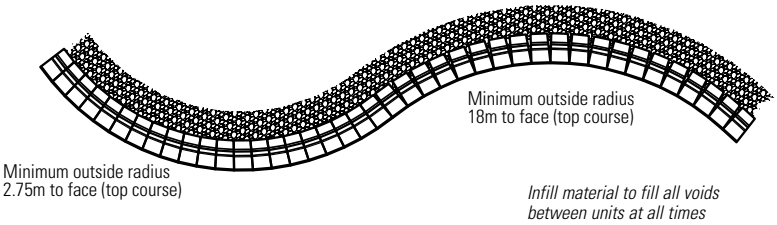


Locking Bar

Landmark Tapered Component Technical Data	
No. Per m^2 of Wall	13.16
Approx Weight	37kg
Setback	1:14 (4°)

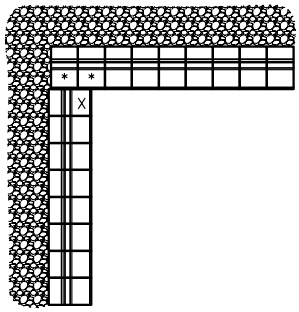
Landmark Half Tapered Component Technical Data	
No. Per m^2 of Wall	26.32
Approx Weight	23kg
Setback	1:14 (4°)

Landmark Curves Detail

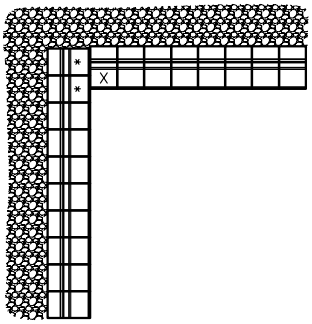


Landmark Corners Detail

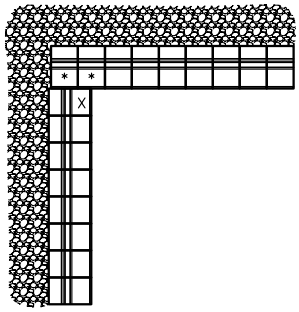
First Course



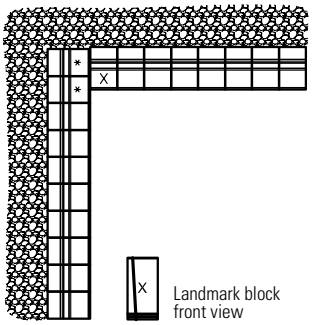
Second Course



Third Course



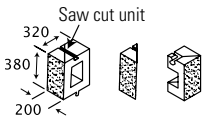
Fourth Course



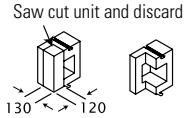
Notes
- Remove lower lock flanges from units marked with a (*) and use adhesive to attach to blocks below.
- Cut units marked with a (X) to maintain running bond, as shown to the right.

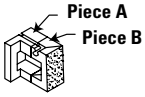
Landmark Corners Outside

Piece A

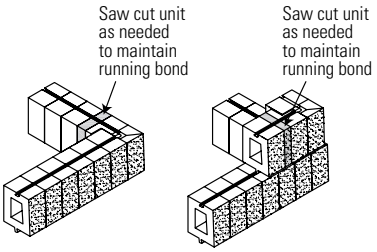


Piece B



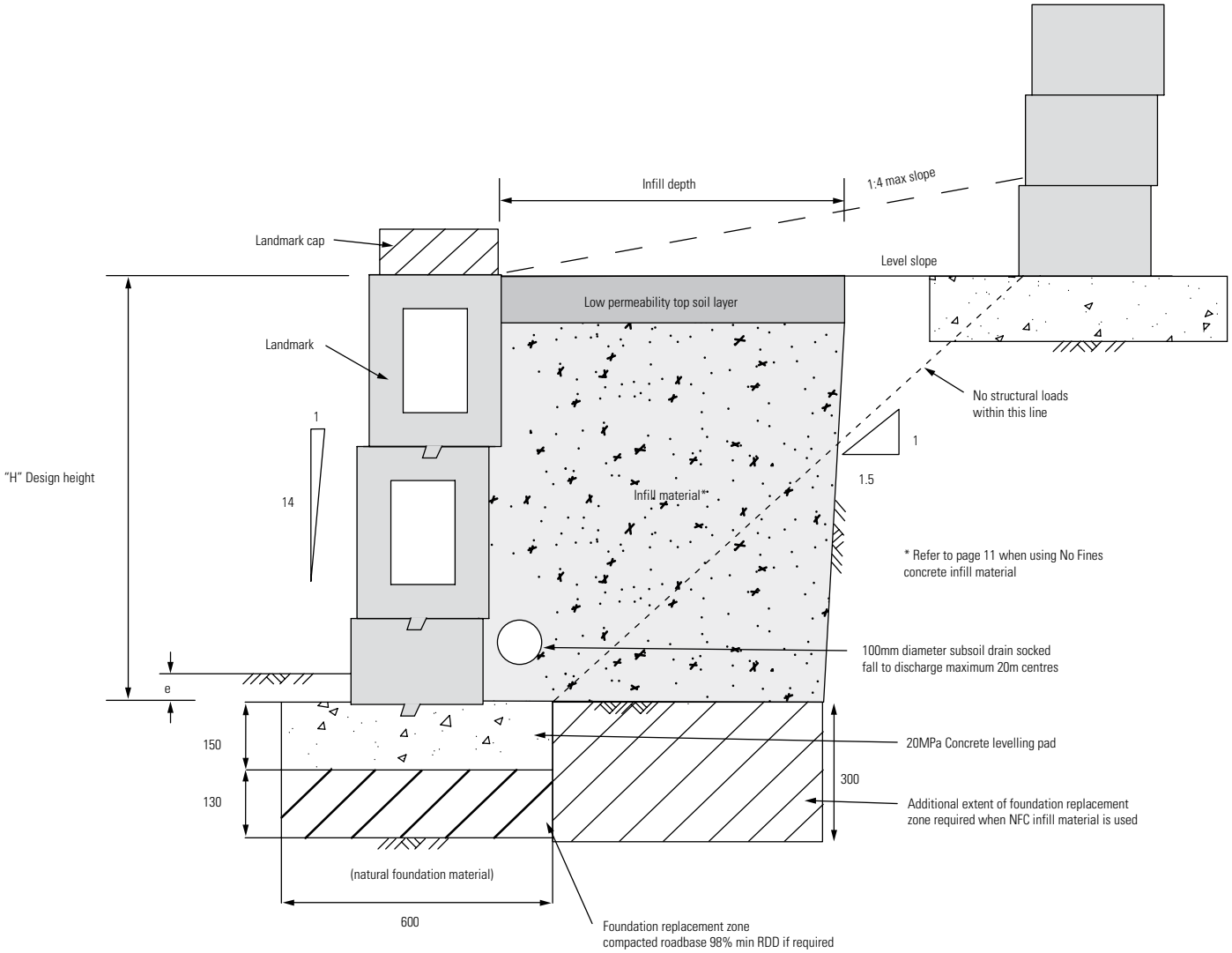


Pieces A and B



Notes - Adhere all partial or cut units to adjacent units using an approved construction grade adhesive.

Landmark Typical Wall Section



LANDMARK RETAINING WALL DESIGN HEIGHTS

Residential Retaining Walls (including residential subdivisions)

Design Height 'H' (mm)	Surface Slope	Surcharge Load (kPa)	Foundation Material	Infill Material	Infill Material Depth (mm)	
					Type 1	Type 2
1900	Level	5	Replacement Zone	NFC	575	750
1710	Level	5	Replacement Zone	NFC	500	650
1520	Level	5	Replacement Zone	NFC	425	600
1330	Level	2.5	Replacement Zone	NFC	300	350
1140	Level	2.5	Replacement Zone	NFC	300	300
950*	Level	2.5	Natural Material	Aggregate	300	300
760*	Level	1	Natural Material	Aggregate	300	300
570*	Level	1	Natural Material	Aggregate	300	300
1710	1:4 Maximum	5	Replacement Zone	NFC	725	1000
1520	1:4 Maximum	5	Replacement Zone	NFC	625	900
1330	1:4 Maximum	2.5	Replacement Zone	NFC	550	600
1140	1:4 Maximum	2.5	Replacement Zone	NFC	325	500
950	1:4 Maximum	2.5	Replacement Zone	NFC	300	400
760*	1:4 Maximum	1	Natural Material	Aggregate	300	300
570*	1:4 Maximum	1	Natural Material	Aggregate	300	300

* Refer to section 4 of Technical Parameters for Conditions
NFC denotes the used of No Fines Concrete. Refer to page 8 for clarification of Type 1 and Type 2 soils.

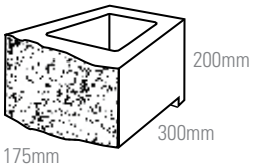
LANDMARK RETAINING WALL DESIGN HEIGHTS

Commercial Retaining Walls

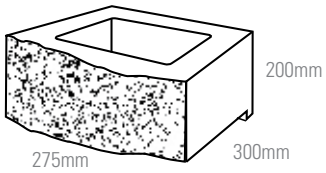
Design Height 'H' (mm)	Surface Slope	Surcharge Load (kPa)	Foundation Material	Infill Material	Infill Material Depth (mm)	
					Type 1	Type 2
1900	Level	5	Replacement Zone	NFC	575	750
1710	Level	5	Replacement Zone	NFC	500	650
1520	Level	5	Replacement Zone	NFC	425	600
1330	Level	2.5	Replacement Zone	NFC	300	350
1140	Level	2.5	Replacement Zone	NFC	300	300
950	Level	2.5	Replacement Zone	Aggregate	500	500
950	Level	2.5	Replacement Zone	NFC	300	300
760	Level	1	Natural Material	Aggregate	400	400
760	Level	1	Replacement Zone	NFC	300	300
570	Level	1	Natural Material	Aggregate	300	300
1710	1:4 Maximum	5	Replacement Zone	NFC	725	1000
1520	1:4 Maximum	5	Replacement Zone	NFC	625	900
1330	1:4 Maximum	2.5	Replacement Zone	NFC	550	600
1140	1:4 Maximum	2.5	Replacement Zone	NFC	325	500
950	1:4 Maximum	2.5	Replacement Zone	Aggregate	500	400
950	1:4 Maximum	2.5	Replacement Zone	NFC	300	400
760	1:4 Maximum	1	Natural Material	Aggregate	400	400
760	1:4 Maximum	1	Replacement Zone	NFC	300	300
570	1:4 Maximum	1	Natural Material	Aggregate	300	300

* Refer to section 4 of Technical Parameters for Conditions
NFC denotes the used of No Fines Concrete. Refer to page 8 for clarification of Type 1 and Type 2 soils.

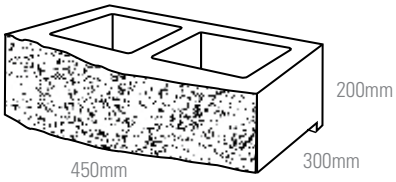
4.3 DIAMOND PRO STONE CUT™



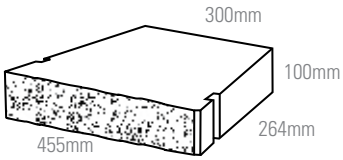
150 Pair Component



250 Pair Component



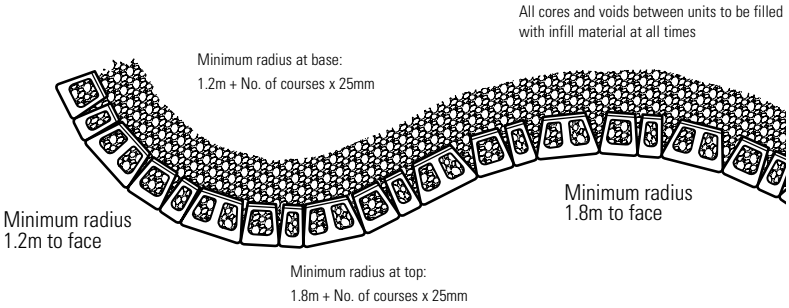
Full Unit



Cap

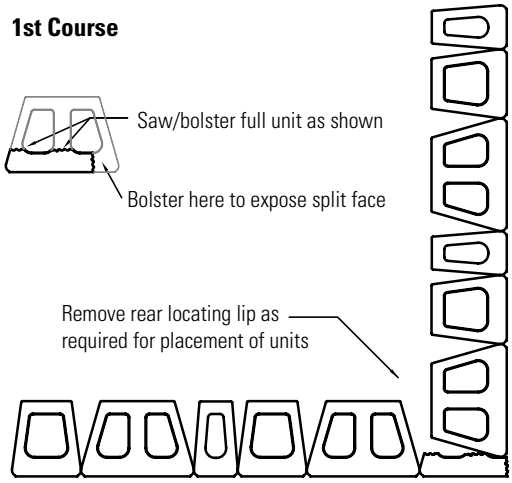
Diamond Pro Stone Cut™ Technical Data	
No. Per m² of Wall	5.55 full units & 5.55 pairs
Approx Weight	35kg (450 component), 35kg (175 & 275 pair), 19.1kg cap
Setback	1:8 (7.1°)

Diamond Pro Stone Cut™ Curves Detail



Diamond Pro Stone Cut™ Corners Detail

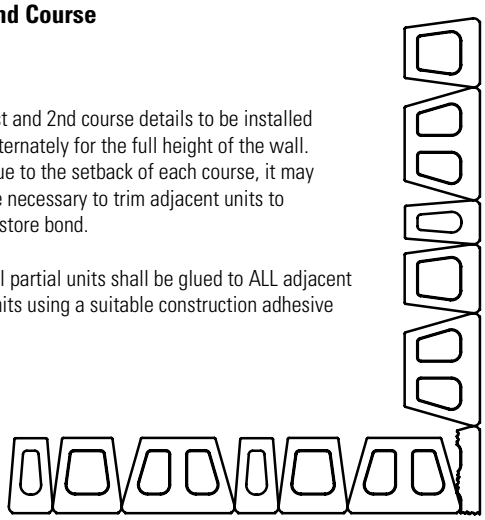
1st Course



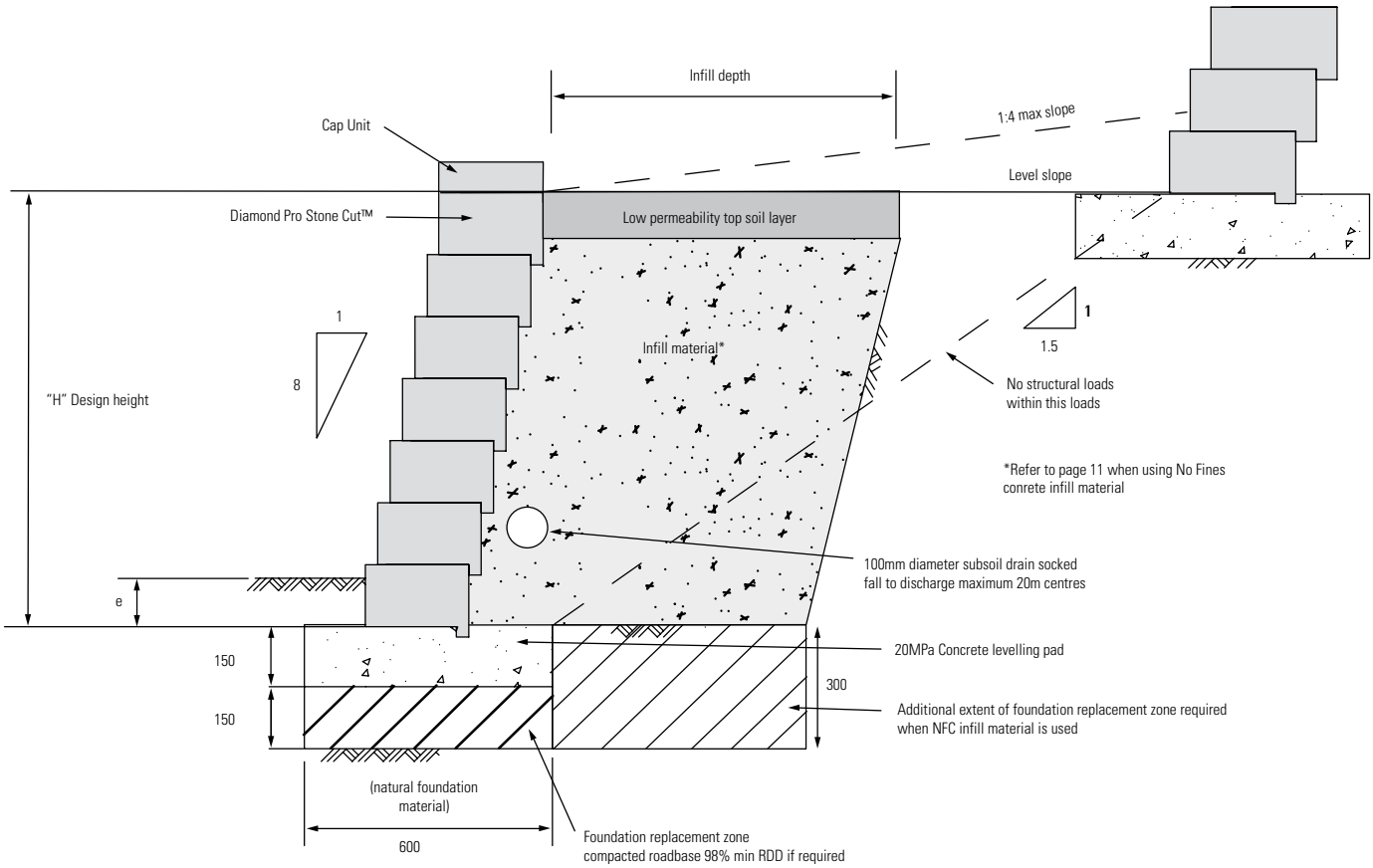
2nd Course

1st and 2nd course details to be installed alternately for the full height of the wall. Due to the setback of each course, it may be necessary to trim adjacent units to restore bond.

All partial units shall be glued to ALL adjacent units using a suitable construction adhesive



Diamond Pro Stone Cut™ Typical Wall Section



DIAMOND PRO STONE CUT™ RETAINING WALL DESIGN HEIGHTS

Residential Retaining Walls (including residential subdivisions)

Design Height 'H' (mm)	Surface Slope	Surcharge Load (kPa)	Foundation Material	Infill Material	Infill Material Depth (mm)	
					Type 1	Type 2
2200	Level	5	Replacement Zone	NFC	600	800
2000	Level	5	Replacement Zone	NFC	550	750
1800	Level	5	Natural Material	NFC	500	650
1600	Level	5	Natural Material	NFC	400	600
1400	Level	2.5	Natural Material	NFC	300	300
1200	Level	2.5	Replacement Zone	Aggregate	600	600
1000*	Level	2.5	Natural Material	Aggregate	300	300
800*	Level	2.5	Natural Material	Aggregate	300	300
2000	1:4 Maximum	5	Replacement Zone	NFC	750	1050
1800	1:4 Maximum	5	Replacement Zone	NFC	700	950
1600	1:4 Maximum	5	Replacement Zone	NFC	600	900
1400	1:4 Maximum	2.5	Replacement Zone	NFC	400	650
1200	1:4 Maximum	2.5	Replacement Zone	NFC	300	500
1000*	1:4 Maximum	2.5	Natural Material	Aggregate	500	500
800*	1:4 Maximum	2.5	Natural Material	Aggregate	400	400

Commercial Retaining Walls

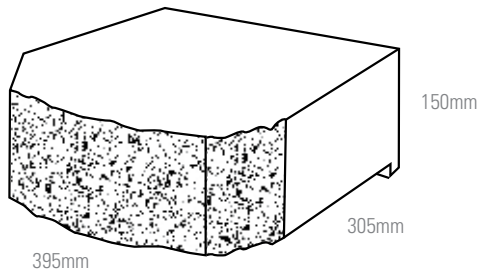
Design Height 'H' (mm)	Surface Slope	Surcharge Load (kPa)	Foundation Material	Infill Material	Infill Material Depth (mm)	
					Type 1	Type 2
2000	Level	5	Replacement Zone	NFC	550	750
1800	Level	5	Replacement Zone	NFC	500	650
1600	Level	5	Replacement Zone	NFC	400	600
1400	Level	2.5	Replacement Zone	NFC	300	350
1200	Level	2.5	Replacement Zone	NFC	300	300
1000	Level	2.5	Replacement Zone	Aggregate	500	500
800	Level	2.5	Replacement Zone	Aggregate	400	400
1800	1:4 Maximum	5	Replacement Zone	NFC	700	950
1600	1:4 Maximum	5	Replacement Zone	NFC	600	900
1400	1:4 Maximum	2.5	Replacement Zone	NFC	400	650
1200	1:4 Maximum	2.5	Replacement Zone	NFC	300	500
1000	1:4 Maximum	2.5	Replacement Zone	Aggregate	500	500
800	1:4 Maximum	2.5	Replacement Zone	Aggregate	400	400
600	1:4 Maximum	2.5	Natural Material	Aggregate	300	300

* Refer to section 4 of Technical Parameters for Conditions

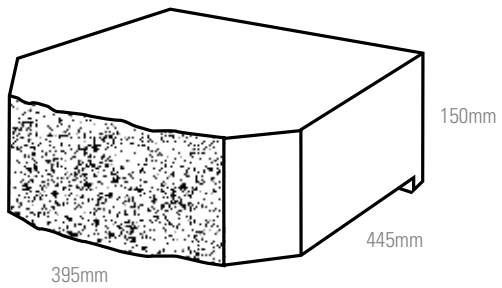
NFC denotes the used of No Fines Concrete. Refer to page 8 for clarification of Type 1 and Type 2 soils.

4.4 DIAMOND®/CUT DIAMOND®

Cut Diamond® and Diamond® can be constructed in excess of 2m in height as detailed, and with the use of geogrid reinforcement can be constructed to 8m in height.



Diamond®

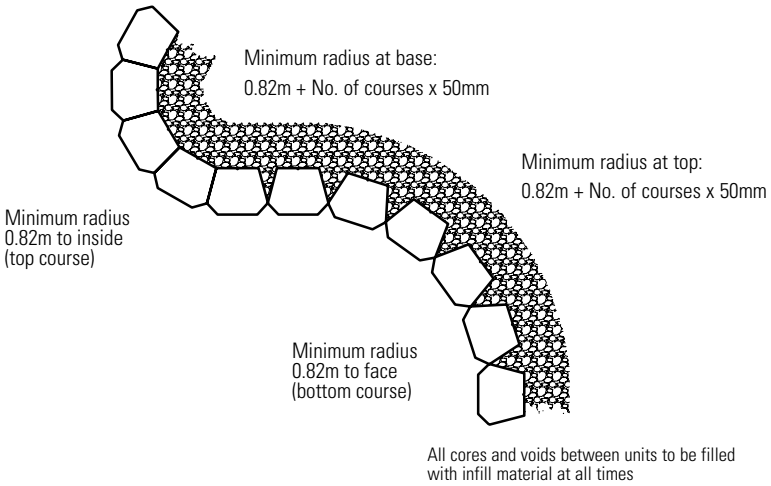


Cut Diamond®

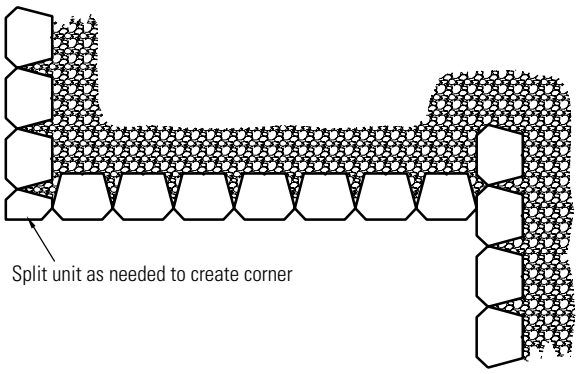
Diamond® Technical Data	
No. Per m² of Wall	16.9
Approx Weight	29.3kg
Setback	1:3 (18°)

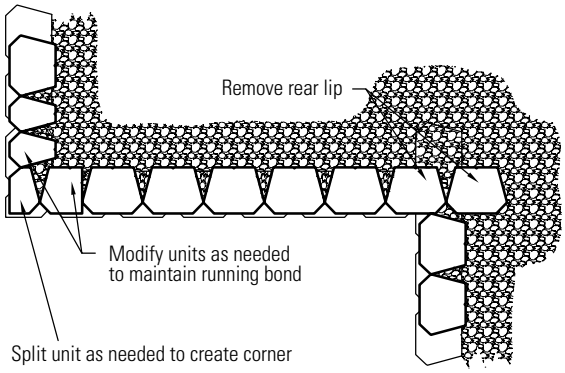
Cut Diamond® Technical Data (Nth QLD only)	
No. Per m² of Wall	15
Approx Weight	32.3kg
Setback	1:3 (18°)

Diamond®/Cut Diamond® Curves Detail

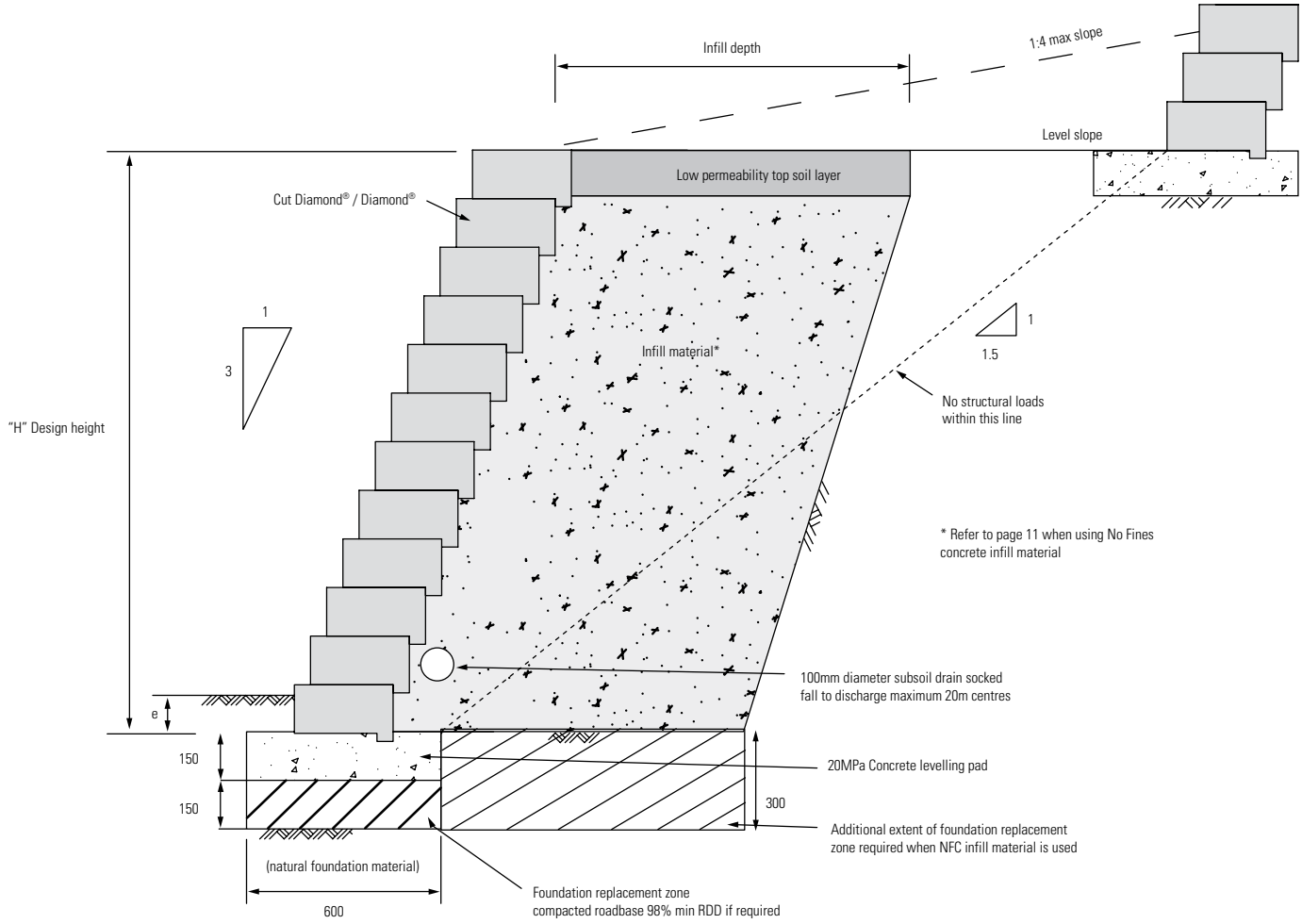


Diamond®/Cut Diamond® Corners Detail





Diamond®/Cut Diamond® Typical Wall Section



DIAMOND® / CUT DIAMOND® RETAINING WALL DESIGN HEIGHTS

Residential Retaining Walls (including residential subdivisions)

Design Height 'H' (mm)	Surface Slope	Surcharge Load (kPa)	Foundation Material	Infill Material	Infill Material Depth (mm)	
					Type 1	Type 2
2850	Level	5	Replacement Zone	NFC	550	800
2700	Level	5	Replacement Zone	NFC	500	750
2550	Level	5	Replacement Zone	NFC	500	750
2400	Level	5	Replacement Zone	NFC	450	700
2400	Level	5	Replacement Zone	Aggregate	1200	1200
2100	Level	5	Replacement Zone	Aggregate	1050	1050
2100	Level	5	Replacement Zone	NFC	400	600
1800	Level	5	Replacement Zone	Aggregate	900	900
1800	Level	5	Replacement Zone	NFC	300	500
1500	Level	2.5	Replacement Zone	Aggregate	750	750
1500	Level	2.5	Replacement Zone	NFC	300	400
1200*	Level	2.5	Natural Material	Aggregate	300	300
2550	1:4 Maximum	5	Replacement Zone	NFC	700	1050
2400	1:4 Maximum	5	Replacement Zone	NFC	650	950
2250	1:4 Maximum	5	Replacement Zone	NFC	600	900
2100	1:4 Maximum	5	Replacement Zone	NFC	550	850
2100	1:4 Maximum	5	Replacement Zone	Aggregate	1050	1050
1800	1:4 Maximum	5	Replacement Zone	Aggregate	900	900
1800	1:4 Maximum	5	Replacement Zone	NFC	450	750
1500	1:4 Maximum	2.5	Replacement Zone	Aggregate	750	750
1500	1:4 Maximum	2.5	Replacement Zone	NFC	350	600
1200	1:4 Maximum	2.5	Replacement Zone	Aggregate	600	600

* Refer to section 4 of Technical Parameters for Conditions
NFC denotes the used of No Fines Concrete. Refer to page 8 for clarification of Type 1 and Type 2 soils.

DIAMOND® / CUT DIAMOND® RETAINING WALL DESIGN HEIGHTS

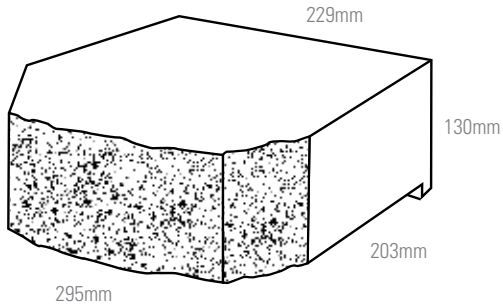
Commercial Retaining Walls

Design Height 'H' (mm)	Surface Slope	Surcharge Load (kPa)	Foundation Material	Infill Material	Infill Material Depth (mm)	
					Type 1	Type 2
2850	Level	5	Replacement Zone	NFC	550	800
2700	Level	5	Replacement Zone	NFC	500	750
2550	Level	5	Replacement Zone	NFC	500	750
2400	Level	5	Replacement Zone	NFC	450	700
2400	Level	5	Replacement Zone	Aggregate	1200	1200
2100	Level	5	Replacement Zone	Aggregate	1050	1050
2100	Level	5	Replacement Zone	NFC	400	600
1800	Level	5	Replacement Zone	Aggregate	900	900
1800	Level	5	Replacement Zone	NFC	300	500
1500	Level	2.5	Replacement Zone	Aggregate	750	750
1500	Level	2.5	Replacement Zone	NFC	300	400
1200	Level	2.5	Replacement Zone	Aggregate	600	600
1200	Level	2.5	Replacement Zone	NFC	300	300
900	Level	2.5	Replacement Zone	Aggregate	450	450
900	Level	2.5	Natural Material	NFC	300	300
600	Level	1	Natural Material	Aggregate	300	300
2550	1:4 Maximum	5	Replacement Zone	NFC	700	1050
2400	1:4 Maximum	5	Replacement Zone	NFC	650	950
2250	1:4 Maximum	5	Replacement Zone	NFC	600	900
2100	1:4 Maximum	5	Replacement Zone	NFC	550	850
2100	1:4 Maximum	5	Replacement Zone	Aggregate	1050	1050
1800	1:4 Maximum	5	Replacement Zone	Aggregate	900	900
1800	1:4 Maximum	5	Replacement Zone	NFC	450	750
1500	1:4 Maximum	2.5	Replacement Zone	Aggregate	750	750
1500	1:4 Maximum	2.5	Replacement Zone	NFC	350	600
1200	1:4 Maximum	2.5	Replacement Zone	Aggregate	600	600
1200	1:4 Maximum	2.5	Natural Material	NFC	300	350
900	1:4 Maximum	2.5	Natural Material	Aggregate	450	450
900	1:4 Maximum	2.5	Natural Material	NFC	300	300
600	1:4 Maximum	1	Natural Material	Aggregate	300	300

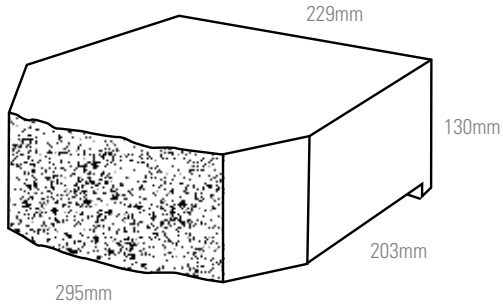
* Refer to section 4 of Technical Parameters for Conditions
NFC denotes the used of No Fines Concrete. Refer to page 8 for clarification of Type 1 and Type 2 soils.

4.5 WINDSOR

(Windsor is known as Balmoral in North Queensland)



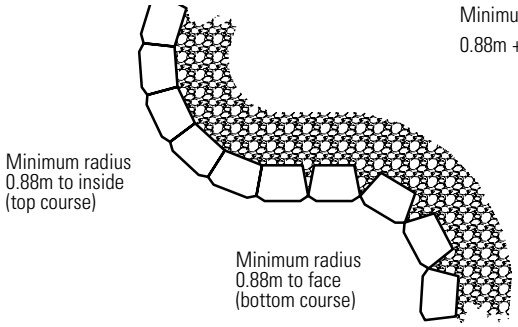
Windsor



Balmoral

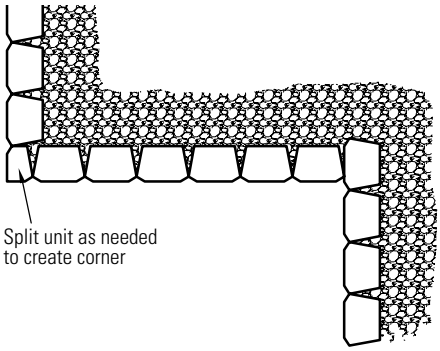
Windsor Technical Data	
No. Per m^2 of Wall	26.1
Approx Weight	12.1kg, 12.2kg (TAS only)
Setback	1:14 (14°)

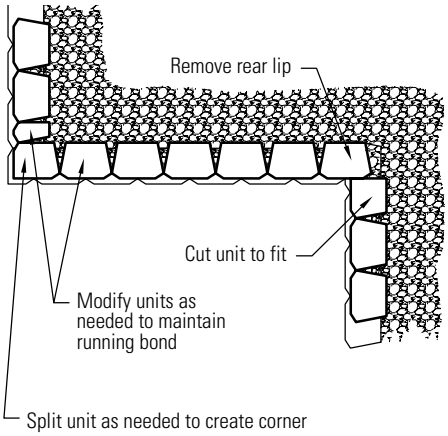
Windsor Curves Detail



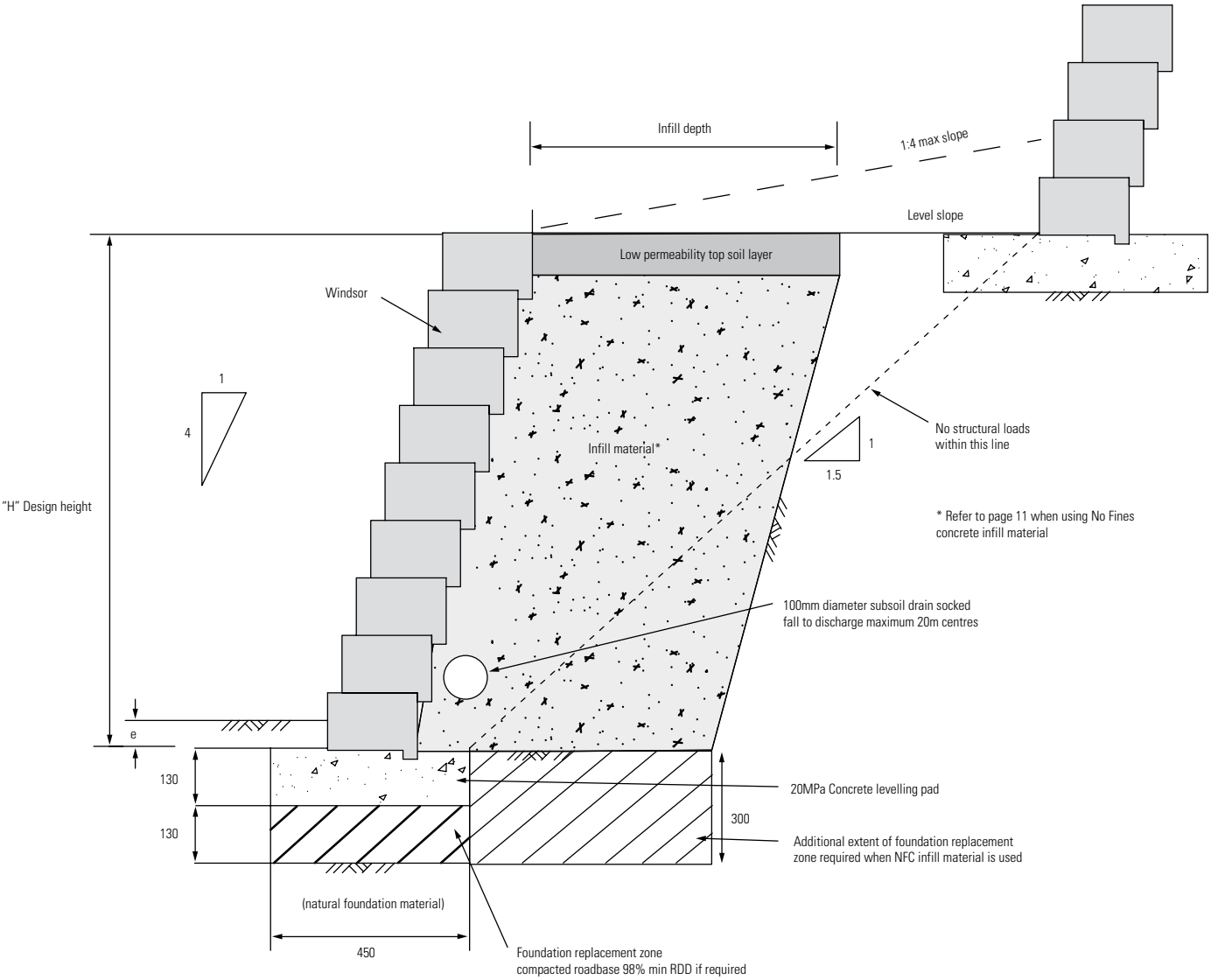
All cores and voids between units to be filled with infill material at all times.

Windsor Corners Detail





Windsor Typical Wall Section



WINDSOR RETAINING WALL DESIGN HEIGHTS

Residential Retaining Walls (including residential subdivisions)

Design Height 'H' (mm)	Surface Slope	Surcharge Load (kPa)	Foundation Material	Infill Material	Infill Material Depth (mm)	
					Type 1	Type 2
1950	Level	5	Replacement Zone	NFC	550	750
1820	Level	5	Replacement Zone	NFC	500	700
1690	Level	5	Replacement Zone	NFC	450	650
1560	Level	5	Replacement Zone	NFC	450	600
1430	Level	2.5	Replacement Zone	NFC	300	400
1300	Level	2.5	Replacement Zone	NFC	350	400
1170	Level	2.5	Replacement Zone	Aggregate	585	585
1170	Level	2.5	Replacement Zone	NFC	300	350
1040*	Level	2.5	Natural Material	Aggregate	300	300
910*	Level	2.5	Natural Material	Aggregate	300	300
780	Level	1	Natural Material	Aggregate	300	300
650	Level	1	Natural Material	Aggregate	300	300
1820	1:4 Maximum	5	Replacement Zone	NFC	650	950
1690	1:4 Maximum	5	Replacement Zone	NFC	650	900
1560	1:4 Maximum	5	Replacement Zone	NFC	600	850
1430	1:4 Maximum	2.5	Replacement Zone	NFC	450	650
1300	1:4 Maximum	2.5	Replacement Zone	NFC	400	600
1170	1:4 Maximum	2.5	Replacement Zone	NFC	350	550
1040	1:4 Maximum	2.5	Replacement Zone	Aggregate	520	520
1040	1:4 Maximum	2.5	Replacement Zone	NFC	300	300
780*	1:4 Maximum	1	Natural Material	Aggregate	300	300
650*	1:4 Maximum	1	Natural Material	Aggregate	300	300

* Refer to section 4 of Technical Parameters for Conditions
NFC denotes the used of No Fines Concrete. Refer to page 8 for clarification of Type 1 and Type 2 soils.

Commercial Retaining Walls

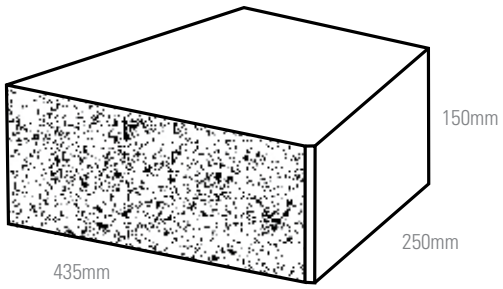
Design Height 'H' (mm)	Surface Slope	Surcharge Load (kPa)	Foundation Material	Infill Material	Infill Material Depth (mm)	
					Type 1	Type 2
1950	Level	5	Replacement Zone	NFC	550	750
1820	Level	5	Replacement Zone	NFC	500	700
1690	Level	5	Replacement Zone	NFC	450	650
1560	Level	5	Replacement Zone	NFC	450	600
1430	Level	2.5	Replacement Zone	NFC	300	400
1300	Level	2.5	Replacement Zone	NFC	300	400
1170	Level	2.5	Replacement Zone	Aggregate	585	585
1040	Level	2.5	Replacement Zone	Aggregate	520	520
1040	Level	2.5	Replacement Zone	NFC	300	300
780	Level	1	Replacement Zone	Aggregate	390	390
780	Level	1	Replacement Zone	NFC	300	300
520	Level	1	Natural Material	Aggregate	300	300
1820	1:4 Maximum	5	Replacement Zone	NFC	650	950
1690	1:4 Maximum	5	Replacement Zone	NFC	650	900
1560	1:4 Maximum	5	Replacement Zone	NFC	600	850
1430	1:4 Maximum	2.5	Replacement Zone	NFC	450	650
1300	1:4 Maximum	2.5	Replacement Zone	NFC	400	600
1170	1:4 Maximum	2.5	Replacement Zone	NFC	350	550
780	1:4 Maximum	1	Replacement Zone	Aggregate	390	390
708	1:4 Maximum	1	Replacement Zone	NFC	300	350
520	1:4 Maximum	1	Natural Material	Aggregate	300	300
520	1:4 Maximum	1	Replacement Zone	NFC	300	300
390	1:4 Maximum	1	Natural Material	Aggregate	300	300

* Refer to section 4 of Technical Parameters for Conditions

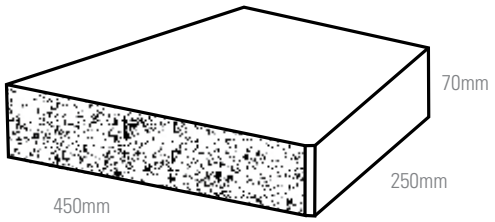
NFC denotes the used of No Fines Concrete. Refer to page 8 for clarification of Type 1 and Type 2 soils.

4.6 HAMPTON STONE

(Only available in Tasmania)



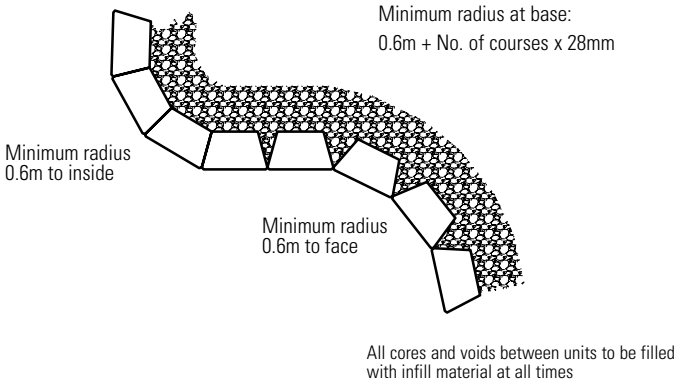
Hampton Stone



Hampton Stone Cap

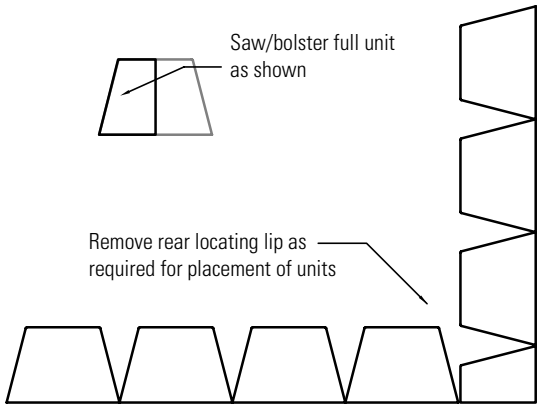
Hampton Stone Technical Data	
No. Per m² of Wall	15.32
Approx Weight	26kg
Setback	1:5.4 (10.5°)

Hampton Stone Curves Detail

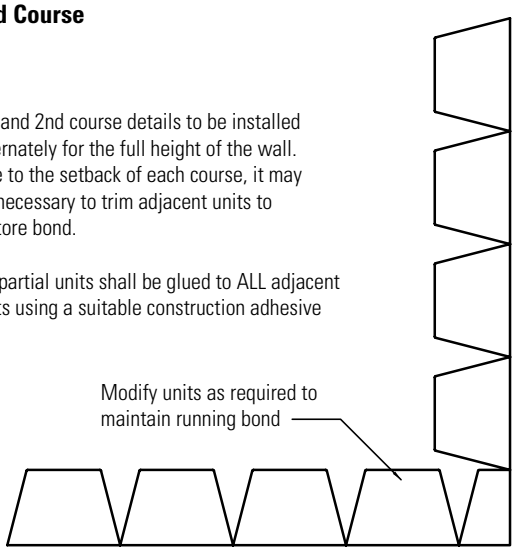


Hampton Stone Corners Detail

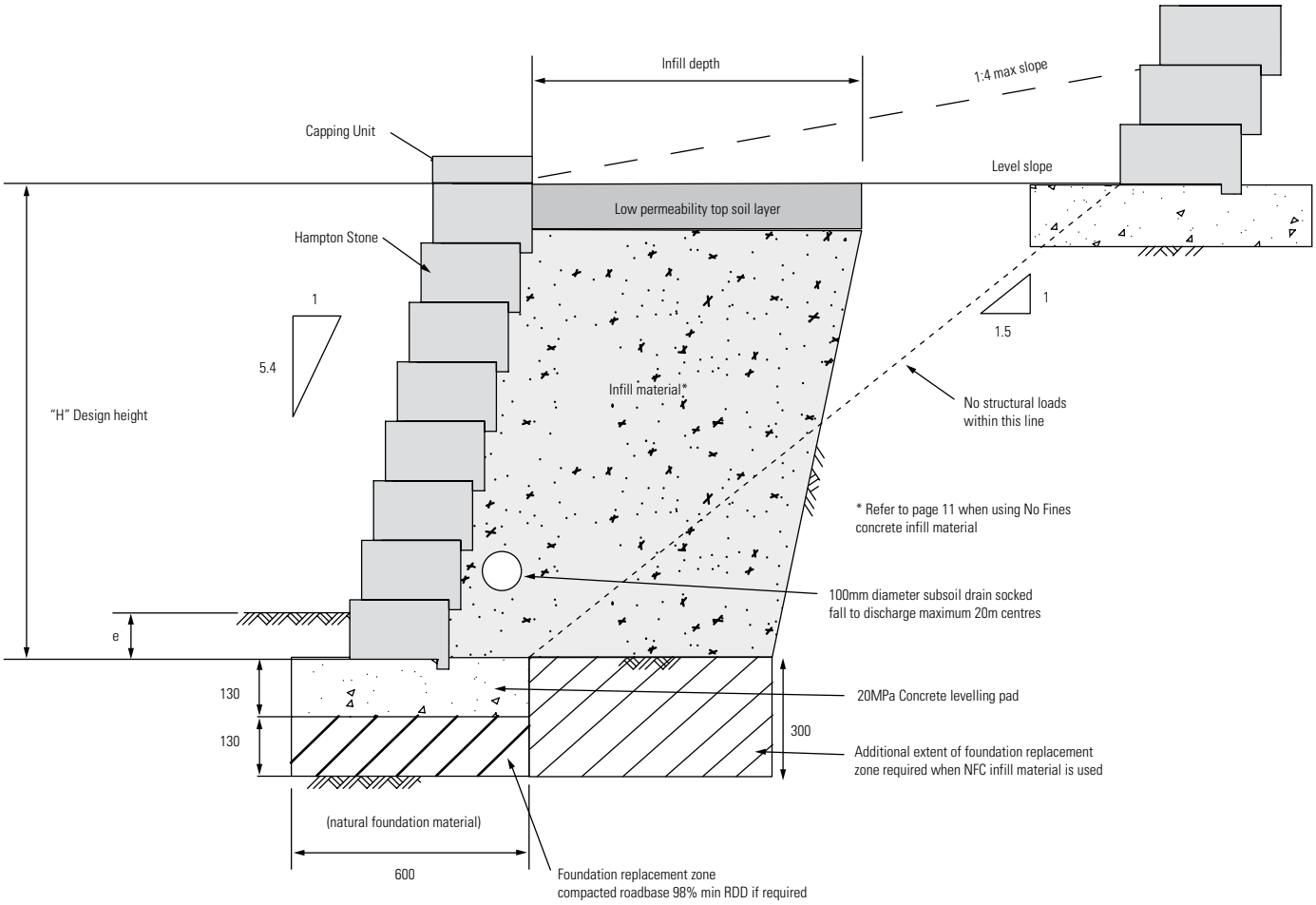
1st Course



2nd Course



Hampton Stone Typical Wall Section



HAMPTON STONE RETAINING WALL DESIGN HEIGHTS

Residential Retaining Walls (including residential subdivisions)

Design Height 'H' (mm)	Surface Slope	Surcharge Load (kPa)	Foundation Material	Infill Material	Infill Material Depth (mm)	
					Type 1	Type 2
1950	Level	5	Replacement Zone	NFC	500	750
1800	Level	5	Replacement Zone	NFC	500	700
1650	Level	5	Replacement Zone	NFC	450	650
1500	Level	2.5	Replacement Zone	NFC	400	600
1350	Level	2.5	Replacement Zone	NFC	300	400
1200	Level	2.5	Replacement Zone	NFC	600	600
1200	Level	2.5	Replacement Zone	Aggregate	300	350
1050*	Level	2.5	Natural Material	NFC	300	300
900*	Level	2.5	Natural Material	Aggregate	300	300
750*	Level	1	Natural Material	Aggregate	300	300
1950	1:4 Maximum	5	Replacement Zone	NFC	700	1050
1800	1:4 Maximum	5	Replacement Zone	NFC	650	950
1650	1:4 Maximum	5	Replacement Zone	NFC	600	900
1500	1:4 Maximum	2.5	Replacement Zone	NFC	550	850
1350	1:4 Maximum	2.5	Replacement Zone	NFC	400	600
1200	1:4 Maximum	2.5	Replacement Zone	NFC	300	550
1050	1:4 Maximum	2.5	Replacement Zone	Aggregate	525	525
900*	1:4 Maximum	2.5	Natural Material	Aggregate	300	300
750*	1:4 Maximum	1	Natural Material	Aggregate	300	300

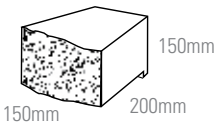
* Refer to section 4 of Technical Parameters for Conditions
NFC denotes the used of No Fines Concrete. Refer to page 8 for clarification of Type 1 and Type 2 soils.

Commercial Retaining Walls

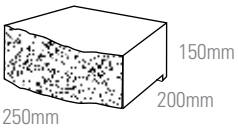
Design Height 'H' (mm)	Surface Slope	Surcharge Load (kPa)	Foundation Material	Infill Material	Infill Material Depth (mm)	
					Type 1	Type 2
1950	Level	5	Replacement Zone	NFC	500	750
1800	Level	5	Replacement Zone	NFC	500	700
1650	Level	5	Replacement Zone	NFC	450	650
1500	Level	2.5	Replacement Zone	NFC	400	600
1350	Level	2.5	Replacement Zone	NFC	300	400
1200	Level	2.5	Replacement Zone	Aggregate	600	600
1200	Level	2.5	Replacement Zone	NFC	300	350
1050	Level	2.5	Replacement Zone	Aggregate	525	525
1050	Level	2.5	Replacement Zone	NFC	300	300
900	Level	2.5	Replacement Zone	Aggregate	450	450
900	Level	2.5	Replacement Zone	NFC	300	300
750	Level	1	Replacement Zone	Aggregate	375	375
750	Level	1	Replacement Zone	NFC	300	300
600	Level	1	Natural Material	Aggregate	300	300
450	Level	1	Natural Material	Aggregate	300	300
1950	1:4 Maximum	5	Replacement Zone	NFC	700	1050
1800	1:4 Maximum	5	Replacement Zone	NFC	650	950
1650	1:4 Maximum	5	Replacement Zone	NFC	600	900
1500	1:4 Maximum	2.5	Replacement Zone	NFC	550	850
1350	1:4 Maximum	2.5	Replacement Zone	NFC	400	600
1200	1:4 Maximum	2.5	Replacement Zone	NFC	300	550
1050	1:4 Maximum	2.5	Replacement Zone	Aggregate	525	525
1050	1:4 Maximum	2.5	Replacement Zone	NFC	300	450
900	1:4 Maximum	2.5	Replacement Zone	Aggregate	450	450
900	1:4 Maximum	2.5	Replacement Zone	NFC	300	350
750	1:4 Maximum	1	Replacement Zone	Aggregate	375	375
750	1:4 Maximum	1	Replacement Zone	NFC	300	300
600	1:4 Maximum	1	Natural Material	Aggregate	300	300
450	1:4 Maximum	1	Natural Material	Aggregate	300	300

* Refer to section 4 of Technical Parameters for Conditions
NFC denotes the used of No Fines Concrete. Refer to page 8 for clarification of Type 1 and Type 2 soils.

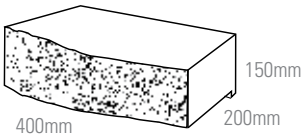
4.7 MEADOW STONE



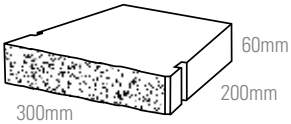
150 Pair Component



250 Pair Component



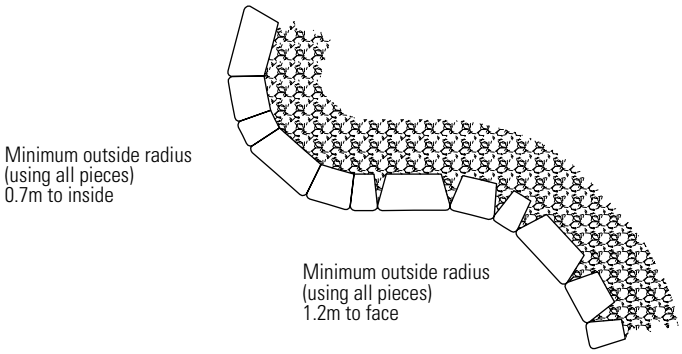
Full Unit



Cap

Meadow Stone Technical Data	
No. Per m^2 of Wall	8.3 full units & 8.3 pairs
Approx Weight	20kg (full unit), 15kg (250 pair component), 9kg (150 pair component) 6kg cap
Setback	1:8 (7.1°)

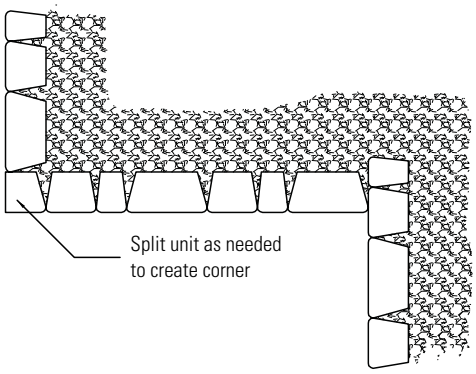
Meadow Stone Curves Detail



All cores and voids between units to be filled with infill material at all times

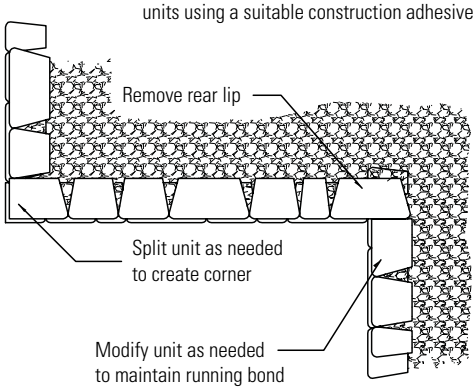
Meadow Stone Corners Detail

1st Course

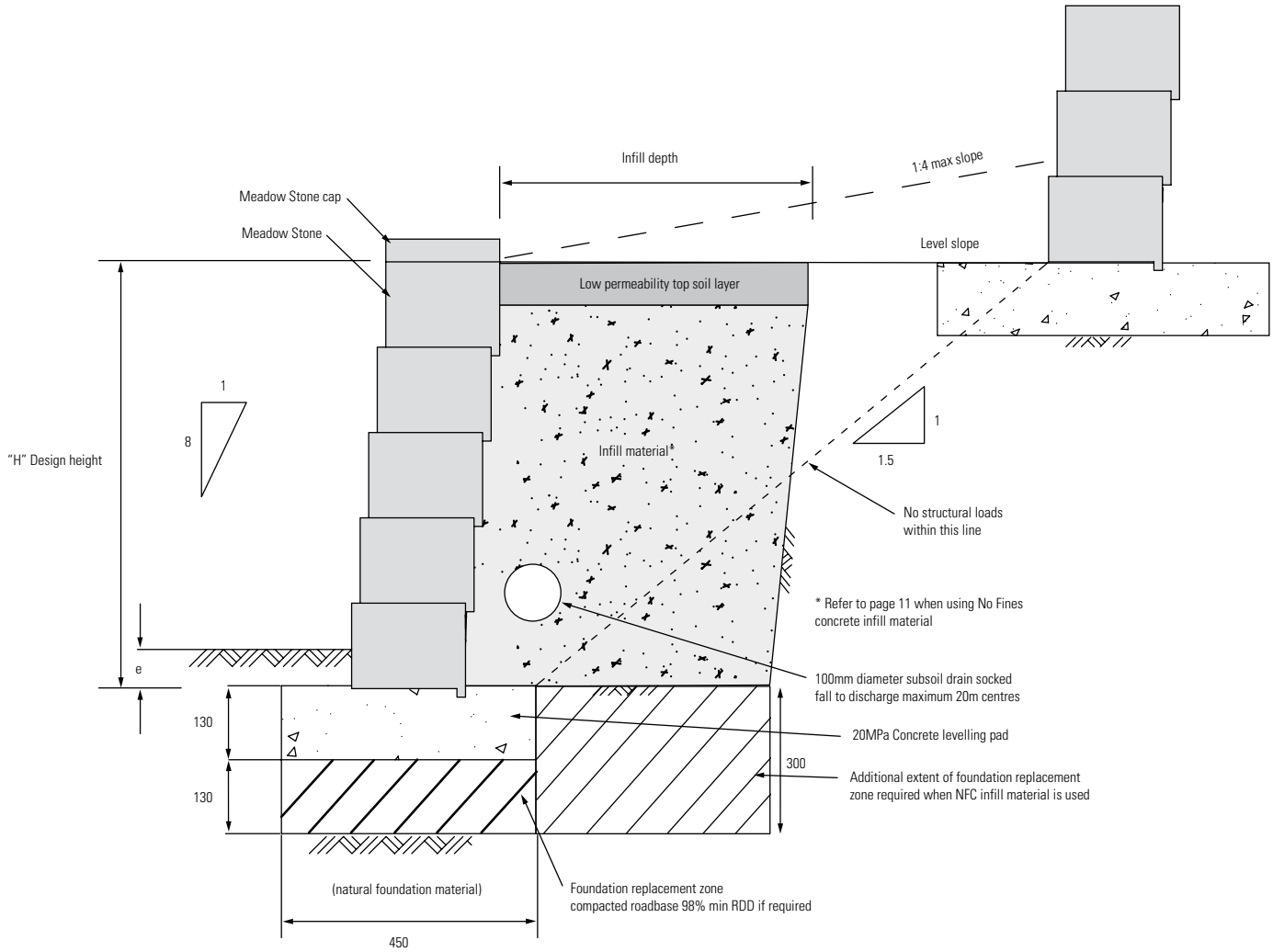


2nd Course 1st and 2nd course details to be installed alternately for the full height of the wall. Due to the setback of each course, it may be necessary to trim adjacent units to restore bond.

All partial units shall be glued to ALL adjacent units using a suitable construction adhesive



Meadow Stone Typical Wall Section



MEADOW STONE RETAINING WALL DESIGN HEIGHTS

Residential Retaining Walls (including residential subdivisions)

Design Height 'H' (mm)	Surface Slope	Surcharge Load (kPa)	Foundation Material	Infill Material	Infill Material Depth (mm)	
					Type 1	Type 2
1800	Level	5	Replacement Zone	NFC	600	800
1650	Level	5	Replacement Zone	NFC	550	750
1500	Level	2.5	Replacement Zone	NFC	500	700
1350	Level	2.5	Replacement Zone	NFC	350	500
1200	Level	2.5	Replacement Zone	NFC	300	450
1050	Level	2.5	Replacement Zone	NFC	300	400
900	Level	2.5	Replacement Zone	NFC	300	350
750*	Level	1	Natural Material	Aggregate	300	300
1650	1:4 Maximum	5	Replacement Zone	NFC	750	1050
1500	1:4 Maximum	5	Replacement Zone	NFC	700	1000
1350	1:4 Maximum	2.5	Replacement Zone	NFC	500	750
1200	1:4 Maximum	2.5	Replacement Zone	NFC	450	650
1050	1:4 Maximum	2.5	Replacement Zone	NFC	400	600
900	1:4 Maximum	2.5	Replacement Zone	NFC	350	500
750	1:4 Maximum	1	Replacement Zone	NFC	300	300
600*	1:4 Maximum	1	Replacement Zone	Aggregate	300	300

* Refer to section 4 of Technical Parameters for Conditions
NFC denotes the used of No Fines Concrete. Refer to page 8 for clarification of Type 1 and Type 2 soils.

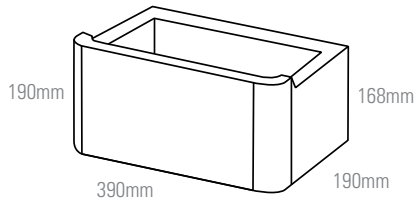
Commercial Retaining Walls

Design Height 'H' (mm)	Surface Slope	Surcharge Load (kPa)	Foundation Material	Infill Material	Infill Material Depth (mm)	
					Type 1	Type 2
1800	Level	5	Replacement Zone	NFC	600	800
1650	Level	5	Replacement Zone	NFC	550	750
1500	Level	2.5	Replacement Zone	NFC	500	700
1350	Level	2.5	Replacement Zone	NFC	350	500
1200	Level	2.5	Replacement Zone	NFC	300	450
1050	Level	2.5	Replacement Zone	NFC	300	400
900	Level	2.5	Replacement Zone	Aggregate	450	350
900	Level	2.5	Replacement Zone	NFC	300	300
750	Level	1	Replacement Zone	Aggregate	375	375
750	Level	1	Replacement Zone	NFC	300	300
600	Level	1	Natural Material	Aggregate	300	300
1650	1:4 Maximum	5	Replacement Zone	NFC	750	1050
1500	1:4 Maximum	5	Replacement Zone	NFC	700	1000
1350	1:4 Maximum	2.5	Replacement Zone	NFC	500	750
1200	1:4 Maximum	2.5	Replacement Zone	NFC	450	650
1050	1:4 Maximum	2.5	Replacement Zone	NFC	400	600
900	1:4 Maximum	2.5	Replacement Zone	NFC	350	500
750	1:4 Maximum	1	Replacement Zone	NFC	300	300
600	1:4 Maximum	1	Replacement Zone	Aggregate	300	300

* Refer to section 4 of Technical Parameters for Conditions
NFC denotes the used of No Fines Concrete. Refer to page 8 for clarification of Type 1 and Type 2 soils.

4.8 EDEN WALL

Eden Wall can be installed in a staggered pattern where voids can be planted out, or can be installed as a solid wall system.



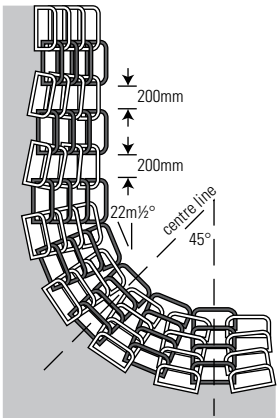
Eden Wall

Eden Wall Technical Data	
No. Per m² of Wall	10 (with 200mm spaces) 15.26 (with no spaces)
Approx Weight	13kg
Setback	1:2.75 (20°)

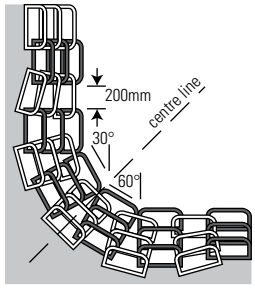
Eden Wall Bottom Course Shorter Detail

1. The units on the first course at the corner should be laid with the corners touching. There should be;
   - A total of 3 units touching for a wall 1 to 3 courses high.
   - A total of 4 units touching for a wall 4 to 6 courses high.
   - A total of 5 units touching for a wall 7 to 8 courses high.
2. The normal step back is increased at the corners as illustrated.

7 - 8 course high wall



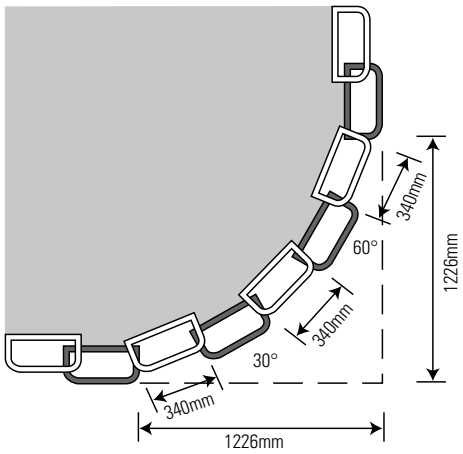
4 - 6 course high wall



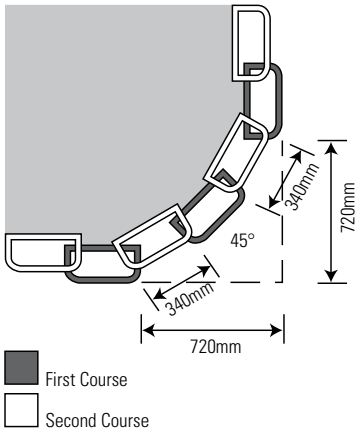
Eden Wall 90˚ Corner Detail

How to lay blocks to turn 90˚ corners as tightly as possible.

7 - 8 course high wall

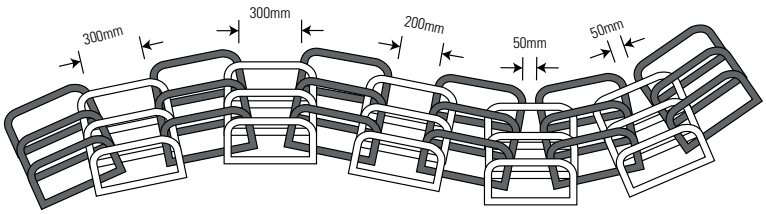


4 - 6 course high wall

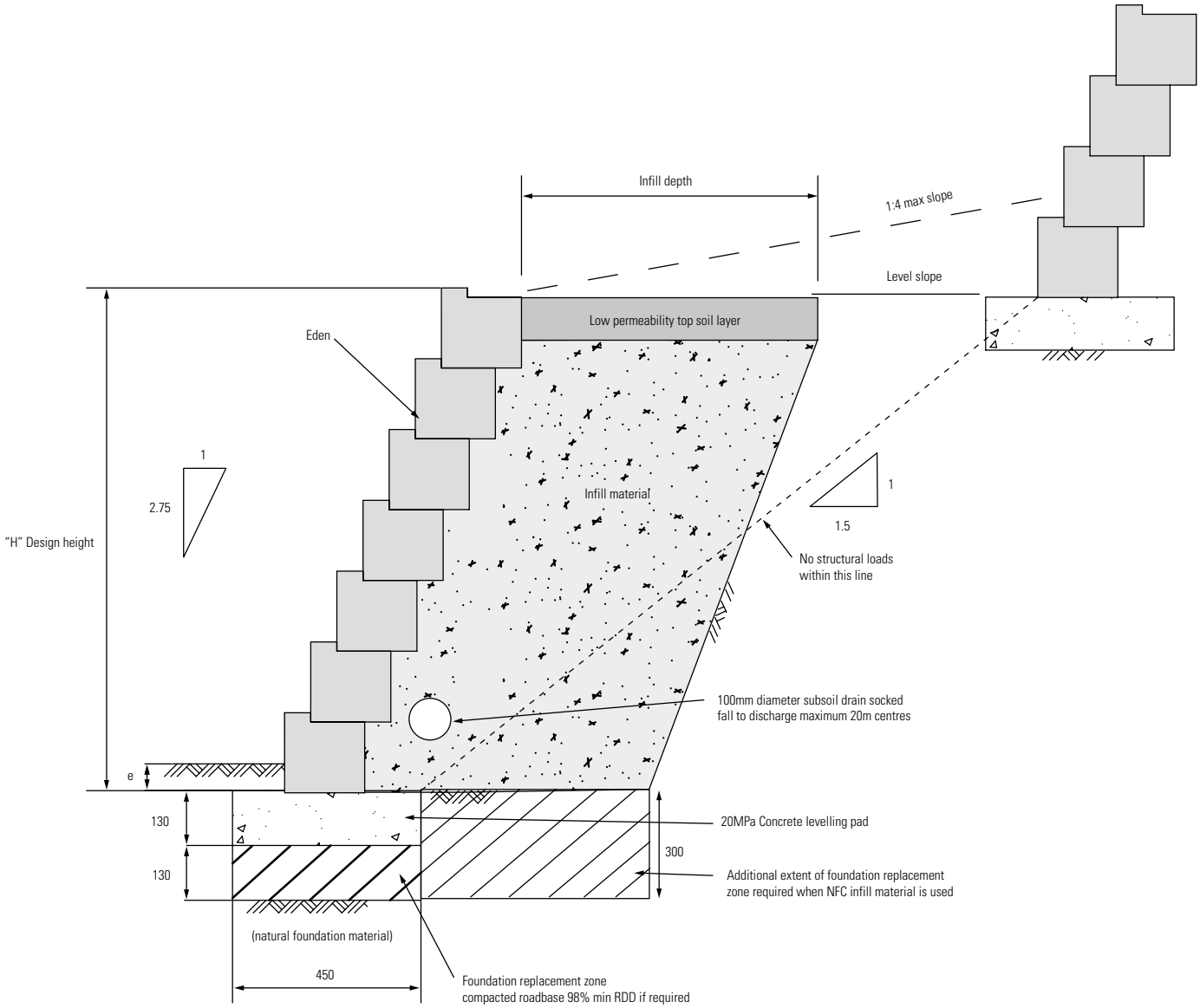


Eden Wall Curves Detail

Following Curves - For more than 8 courses seek Engineers' advice.



Eden Wall Typical Wall Section



EDEN WALL RETAINING WALL DESIGN HEIGHTS

Residential Retaining Walls (including residential subdivisions)

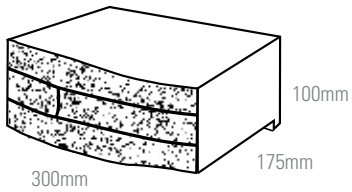
Design Height 'H' (mm)	Surface Slope	Surcharge Load (kPa)	Foundation Material	Infill Material	Infill Material Depth (mm)	
					Type 1	Type 2
1350	Level	2.5	Replacement Zone	Aggregate	675	675
1180	Level	2.5	Replacement Zone	Aggregate	590	590
1010*	Level	2.5	Natural Material	Aggregate	300	300
840*	Level	2.5	Natural Material	Aggregate	300	300
670*	Level	1	Natural Material	Aggregate	300	300
510*	Level	1	Natural Material	Aggregate	300	300
340*	Level	1	Natural Material	Aggregate	300	300
1180	1:4 Maximum	2.5	Replacement Zone	Aggregate	590	590
1010	1:4 Maximum	2.5	Replacement Zone	Aggregate	505	505
840*	1:4 Maximum	2.5	Natural Material	Aggregate	300	300
670*	1:4 Maximum	1	Natural Material	Aggregate	300	300
510*	1:4 Maximum	1	Natural Material	Aggregate	300	300
340*	1:4 Maximum	1	Natural Material	Aggregate	300	300

Commercial Retaining Walls

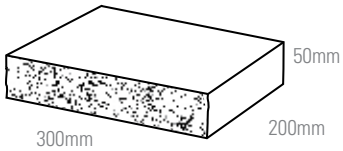
Design Height 'H' (mm)	Surface Slope	Surcharge Load (kPa)	Foundation Material	Infill Material	Infill Material Depth (mm)	
					Type 1	Type 2
1350	Level	2.5	Replacement Zone	Aggregate	675	675
1180	Level	2.5	Replacement Zone	Aggregate	590	590
1010	Level	2.5	Replacement Zone	Aggregate	505	505
840	Level	2.5	Natural Material	Aggregate	420	420
670	Level	1	Natural Material	Aggregate	335	335
510	Level	1	Natural Material	Aggregate	300	300
340	Level	1	Natural Material	Aggregate	300	300
1180	1:4 Maximum	2.5	Replacement Zone	Aggregate	590	590
1010	1:4 Maximum	2.5	Replacement Zone	Aggregate	505	505
840	1:4 Maximum	2.5	Natural Material	Aggregate	420	420
670	1:4 Maximum	1	Natural Material	Aggregate	335	335
510	1:4 Maximum	1	Natural Material	Aggregate	300	300
340	1:4 Maximum	1	Natural Material	Aggregate	300	300

* Refer to section 4 of Technical Parameters for Conditions
NFC denotes the used of No Fines Concrete. Refer to page 8 for clarification of Type 1 and Type 2 soils.

4.9 NATURAL IMPRESSIONS®



Natural Impressions®



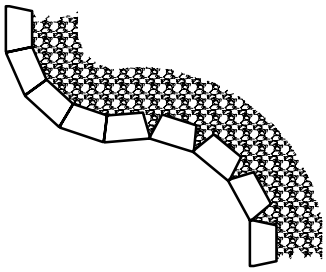
Natural Impressions® Cap

Standard Unit Technical Data	
No. Per m² of Wall	33.33
Approx Weight	9.42kg
Setback	1:5 (11.3°)

Minimum outside radius (without cuts) = 762mm

Capping Unit Technical Data	
No. Per m² of Wall	3.33
Approx Weight	5.94
Setback	1:5 (11.3°)

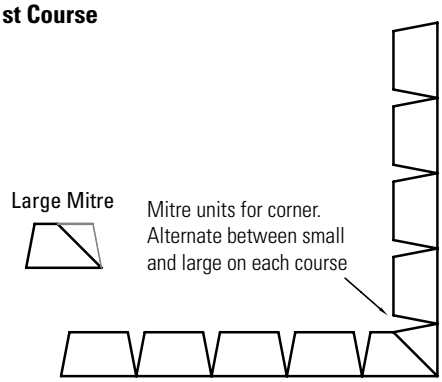
Natural Impressions® Curves Detail



All cores and voids between units to be filled with infill material at all times

Natural Impressions® Corners Detail

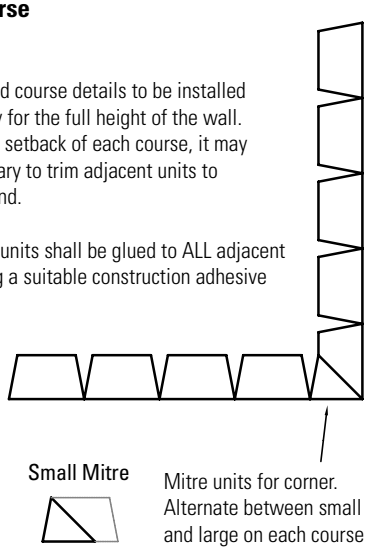
1st Course



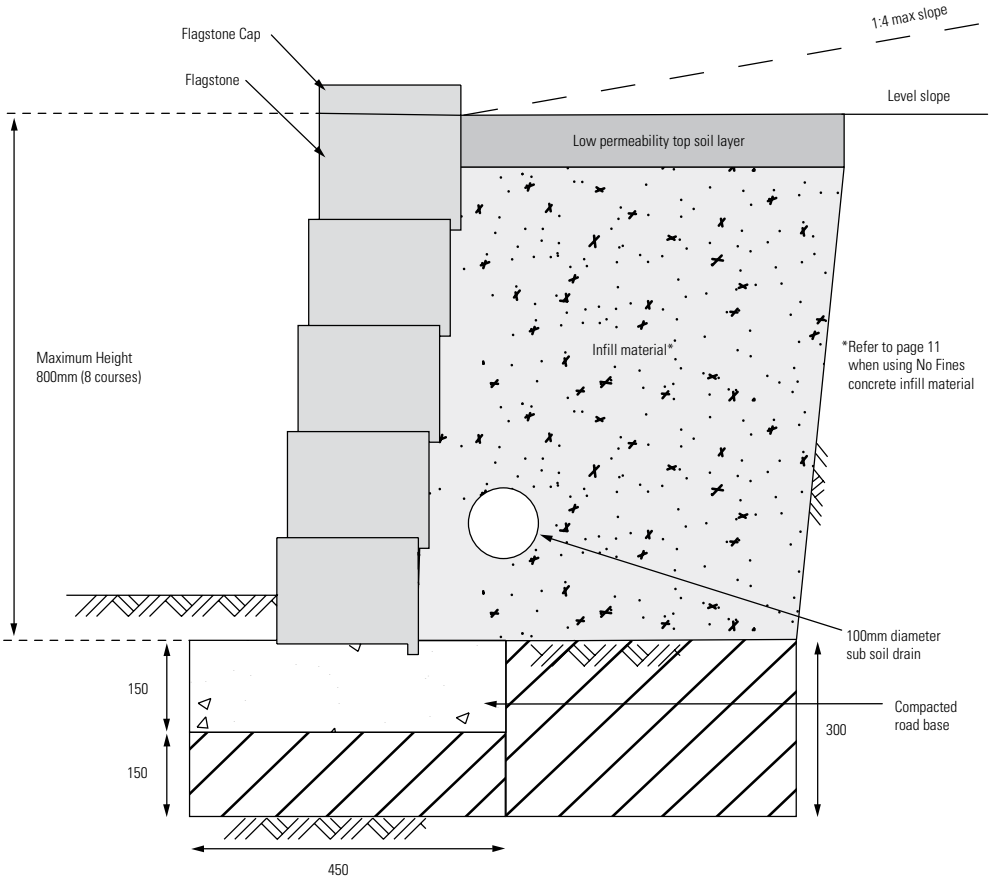
2nd Course

1st and 2nd course details to be installed alternately for the full height of the wall. Due to the setback of each course, it may be necessary to trim adjacent units to restore bond.

All partial units shall be glued to ALL adjacent units using a suitable construction adhesive



Natural Impressions® Typical Wall Section



To achieve the 'Natural Impressions®' look, the product should be laid randomly throughout the entire wall ie working down the sides of the pallet rather than across

NATURAL IMPRESSIONS® RETAINING WALL DESIGN HEIGHTS

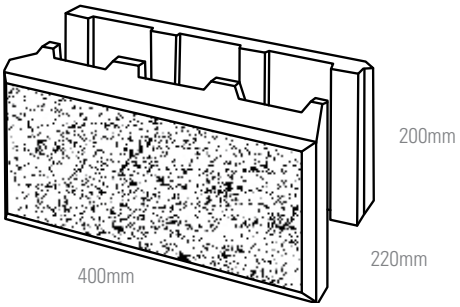
Residential and Commercial Retaining Walls

Design Height 'H' (mm)	Surface Slope	Surcharge Load (kPa)	Foundation Material	Infill Material	Infill Material Depth (mm)	
					Type 1	Type 2
1500	Level	5	Replacement Zone	NFC	450	650
1400	Level	2.5	Replacement Zone	NFC	350	500
1300	Level	2.5	Replacement Zone	NFC	300	450
1200	Level	2.5	Replacement Zone	NFC	300	400
1100	Level	2.5	Replacement Zone	NFC	300	350
1000	Level	2.5	Replacement Zone	NFC	300	300
900	Level	2.5	Replacement Zone	Aggregate	450	450
800	Level	1	Natural Material	Aggregate	300	300
1400	1:4 Maximum	2.5	Replacement Zone	NFC	600	700
1300	1:4 Maximum	2.5	Replacement Zone	NFC	500	650
1200	1:4 Maximum	2.5	Replacement Zone	NFC	400	600
1100	1:4 Maximum	2.5	Replacement Zone	NFC	350	550
1000	1:4 Maximum	2.5	Replacement Zone	NFC	300	500
900	1:4 Maximum	2.5	Replacement Zone	NFC	300	450
800	1:4 Maximum	1	Replacement Zone	NFC	300	400
700	1:4 Maximum	1	Replacement Zone	Aggregate	350	350
600	1:4 Maximum	1	Natural Material	Aggregate	300	300
500	1:4 Maximum	1	Natural Material	Aggregate	300	300

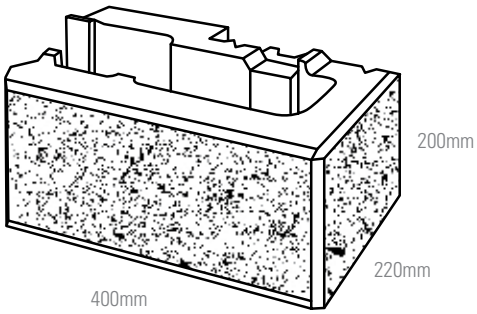
* Refer to section 4 of Technical Parameters for Conditions
NFC denotes the used of No Fines Concrete. Refer to page 8 for clarification of Type 1 and Type 2 soils.

4.10 VERSAWALL®

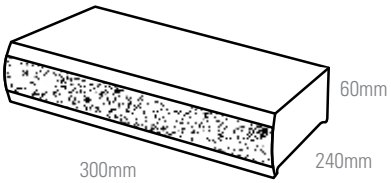
Versawall® can create totally vertical walls without reinforcement up to 800mm in height. The wall units can also be used with no fines concrete infill material to achieve greater heights.



Versawall®



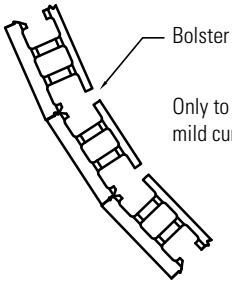
Versawall® Corner



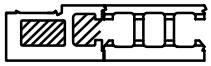
Versawall® Cap

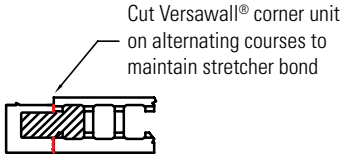
Versawall® Technical Data	
No. Per m² of Wall	12.5
Approx Weight	21.3kg
No. Per Lm of Wall	3.33
Setback	0°

Versawall® Curves Detail



Versawall® Stop End Detail

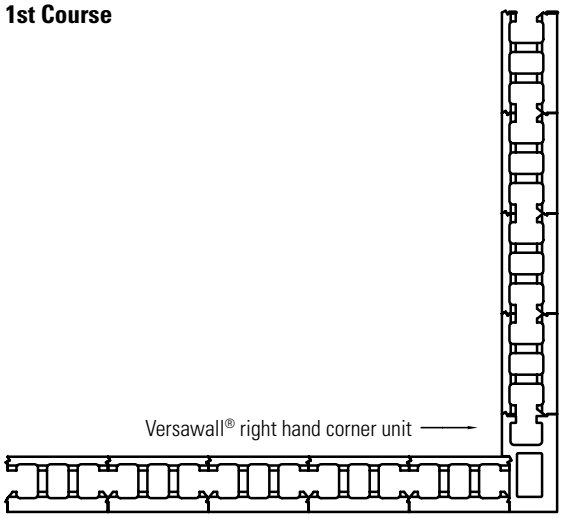




End units to be adhered together and core filled with no fines concrete

Versawall® Corners Detail

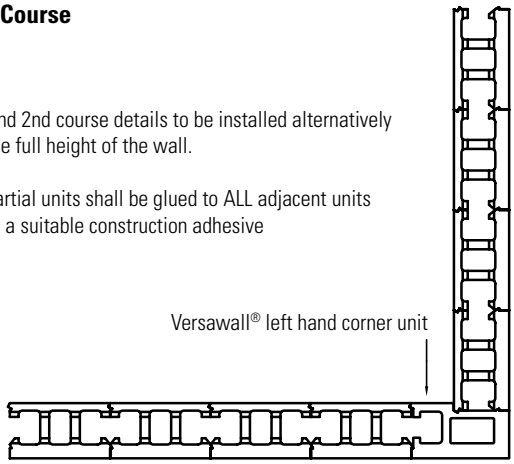
1st Course



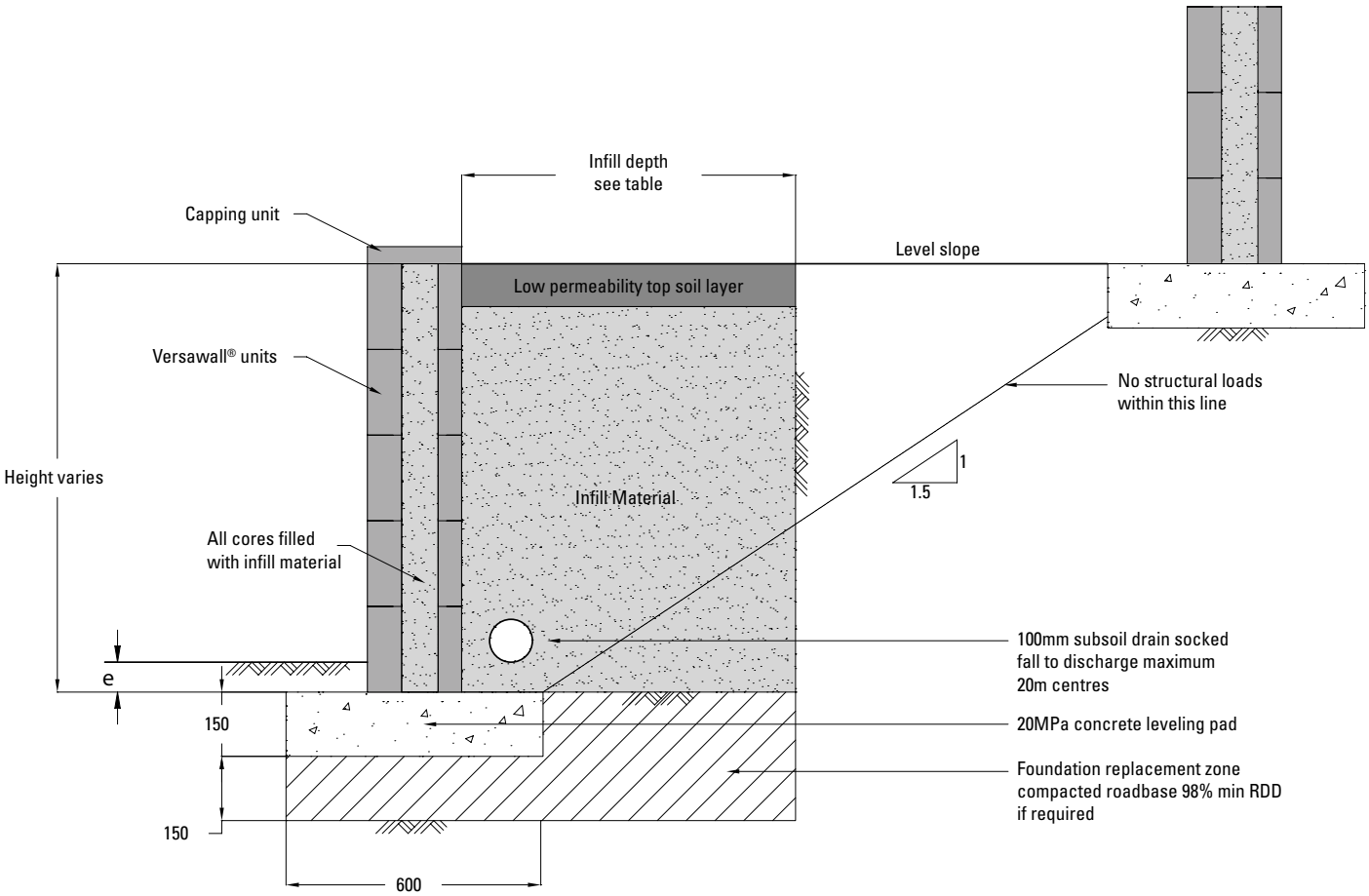
2nd Course

1st and 2nd course details to be installed alternatively for the full height of the wall.

All partial units shall be glued to ALL adjacent units using a suitable construction adhesive



Versawall® Typical Wall Section



VERSAWALL® RETAINING WALL DESIGN HEIGHTS

Residential Retaining Walls (including residential subdivisions)

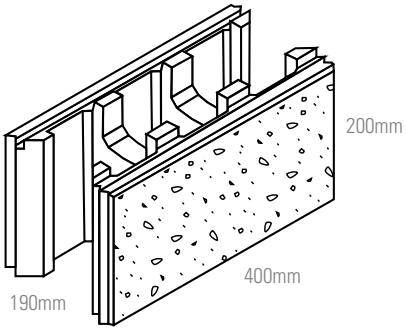
Design Height 'H' (mm)	Surface Slope	Surcharge Load (kPa)	Foundation Material	Infill Material	Infill Material Depth (mm)	
					Type 1	Type 2
1400	Level	2.5	Replacement Zone	NFC	450	550
1200	Level	2.5	Replacement Zone	NFC	350	500
1000	Level	2.5	Replacement Zone	NFC	300	400
800**	Level	1	Natural Material	Aggregate	300	300
600**	Level	1	Natural Material	Aggregate	300	300
1400	1:4 Maximum	2.5	Replacement Zone	NFC	550	800
1200	1:4 Maximum	2.5	Replacement Zone	NFC	500	700
1000	1:4 Maximum	2.5	Replacement Zone	NFC	350	550
800	1:4 Maximum	2.5	Replacement Zone	NFC	300	450
600	1:4 Maximum	2.5	Replacement Zone	NFC	300	300

Commercial Retaining Walls

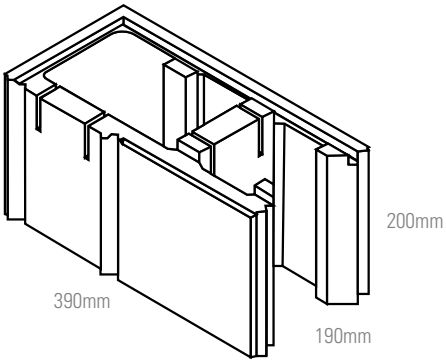
Design Height 'H' (mm)	Surface Slope	Surcharge Load (kPa)	Foundation Material	Infill Material	Infill Material Depth (mm)	
					Type 1	Type 2
1400	Level	2.5	Replacement Zone	NFC	450	550
1200	Level	2.5	Replacement Zone	NFC	350	500
1000	Level	2.5	Replacement Zone	NFC	300	400
800	Level	2.5	Replacement Zone	NFC	300	300
600	Level	2.5	Natural Material	Aggregate	300	300
1400	1:4 Maximum	2.5	Replacement Zone	NFC	550	800
1200	1:4 Maximum	2.5	Replacement Zone	NFC	500	700
1000	1:4 Maximum	2.5	Replacement Zone	NFC	350	550
800	1:4 Maximum	2.5	Replacement Zone	NFC	300	450
600	1:4 Maximum	2.5	Replacement Zone	NFC	300	300

* Refer to section 4 of Technical Parameters for Conditions.
NFC denotes the used of No Fines Concrete. Refer to page 8 for clarification of Type 1 and Type 2 soils.

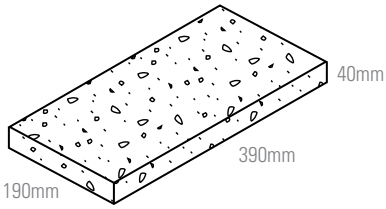
4.10 VERSASTONE®



Versastone®



Versastone® Corner

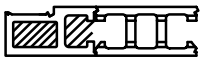


Versastone® Cap

Versastone® Technical Data	
No. Per m² of Wall	12.5
Approx Weight	15.27kg
No. Per Lm of Wall	2.5
Setback	0°

PLEASE NOTE VERSASTONE® IS NOT RECOMMENDED FOR CURVED WALLS

Versastone® Stop End Detail



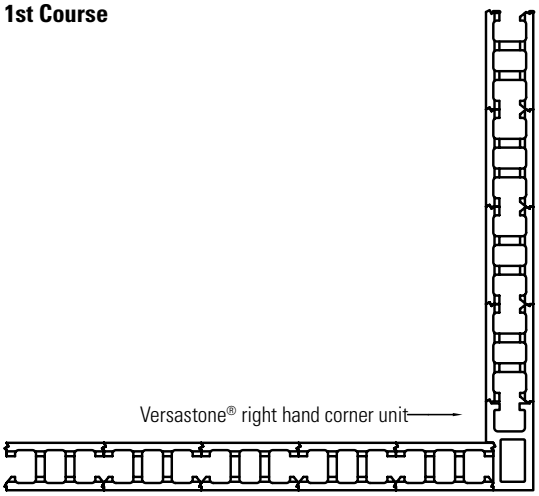
FACE

Cut Versastone® corner unit on alternating courses to maintain stretcher bond

End units to be adhered together and core filled with no fines concrete

Versastone® Corners Detail

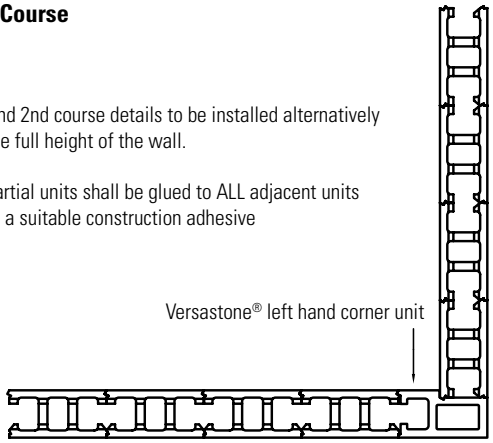
1st Course



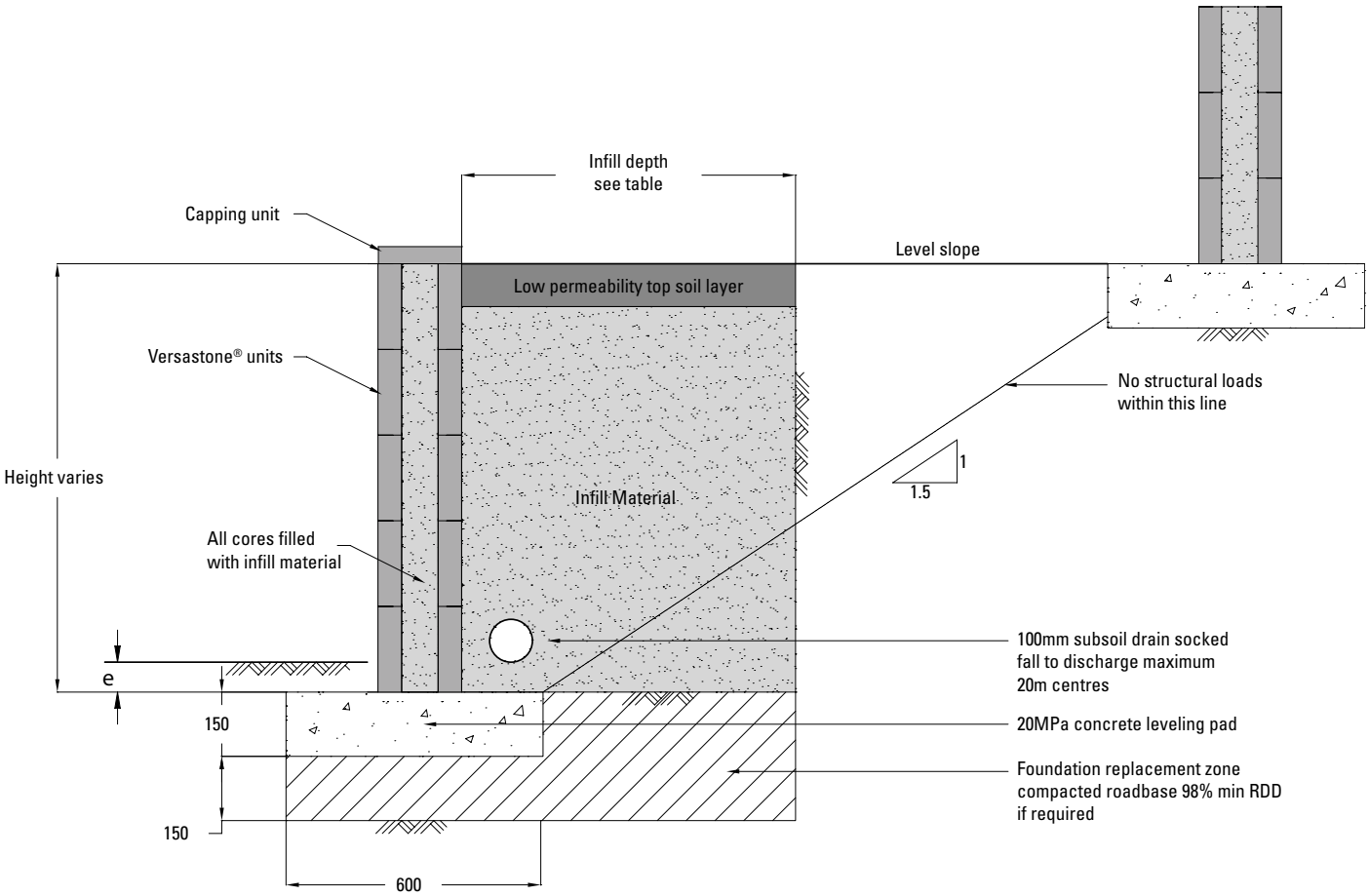
2nd Course

1st and 2nd course details to be installed alternatively for the full height of the wall.

All partial units shall be glued to ALL adjacent units using a suitable construction adhesive



Versastone® Typical Wall Section



VERSASTONE® RETAINING WALL DESIGN HEIGHTS

Residential Retaining Walls (including residential subdivisions)

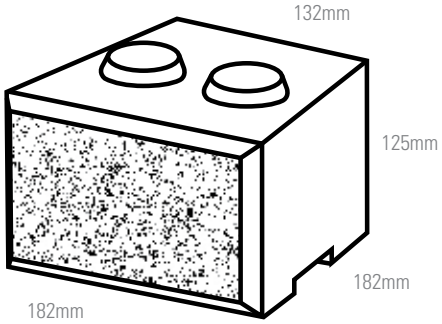
Design Height 'H' (mm)	Surface Slope	Surcharge Load (kPa)	Foundation Material	Infill Material	Infill Material Depth (mm)	
					Type 1	Type 2
1400	Level	2.5	Replacement Zone	NFC	475	575
1200	Level	2.5	Replacement Zone	NFC	375	525
1000	Level	2.5	Replacement Zone	NFC	325	425
800**	Level	2.5	Replacement Zone	NFC	300	325
600**	Level	1	Natural Material	Aggregate	300	300
1400	1:4 Maximum	2.5	Replacement Zone	NFC	575	825
1200	1:4 Maximum	2.5	Replacement Zone	NFC	525	725
1000	1:4 Maximum	2.5	Replacement Zone	NFC	375	575
800	1:4 Maximum	2.5	Replacement Zone	NFC	325	475
600	1:4 Maximum	2.5	Replacement Zone	NFC	300	325

Commercial Retaining Walls

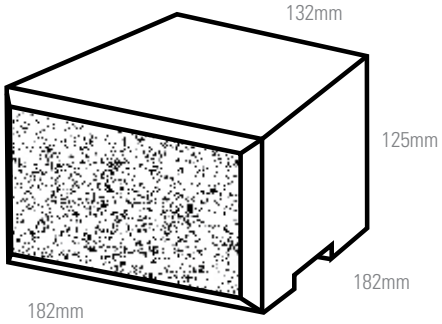
Design Height 'H' (mm)	Surface Slope	Surcharge Load (kPa)	Foundation Material	Infill Material	Infill Material Depth (mm)	
					Type 1	Type 2
1400	Level	2.5	Replacement Zone	NFC	450	550
1200	Level	2.5	Replacement Zone	NFC	350	500
1000	Level	2.5	Replacement Zone	NFC	300	400
800	Level	2.5	Replacement Zone	NFC	300	300
600	Level	2.5	Natural Material	Aggregate	300	300
1400	1:4 Maximum	2.5	Replacement Zone	NFC	550	800
1200	1:4 Maximum	2.5	Replacement Zone	NFC	500	700
1000	1:4 Maximum	2.5	Replacement Zone	NFC	350	550
800	1:4 Maximum	2.5	Replacement Zone	NFC	300	450
600	1:4 Maximum	2.5	Replacement Zone	NFC	300	300

* Refer to section 4 of Technical Parameters for Conditions.
NFC denotes the used of No Fines Concrete. Refer to page 8 for clarification of Type 1 and Type 2 soils.

4.12 MINIWALL®



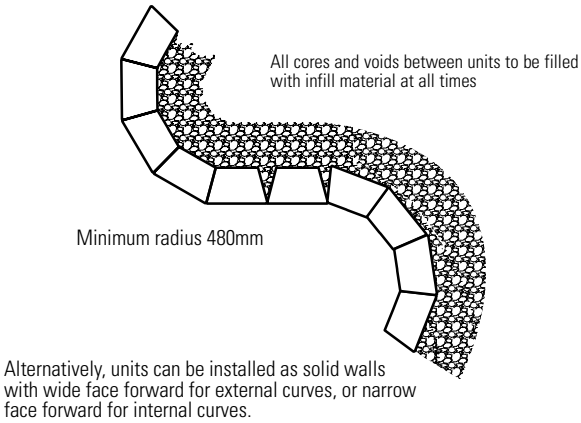
Miniwall®



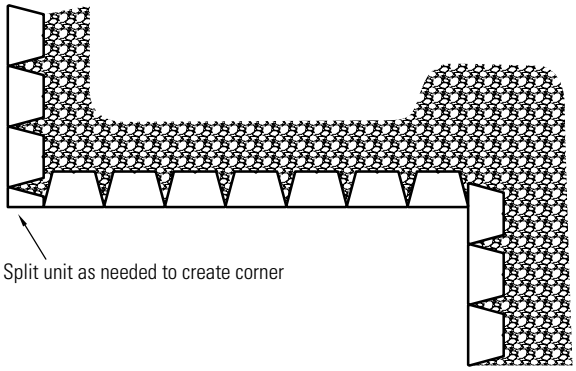
Minicap™

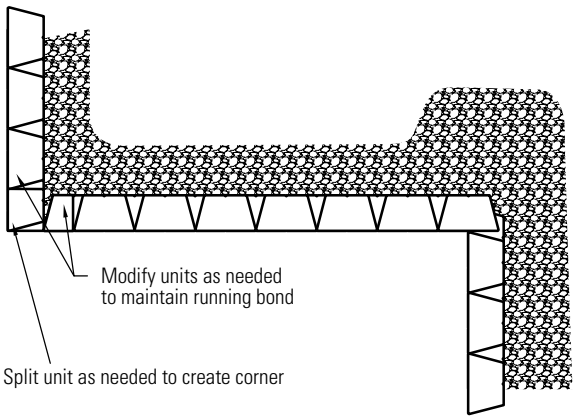
Miniwall® Technical Data	
No. Per m² of Wall	44 Semi Solid Wall 51 Solid Wall
Approx Weight	4.4kg
Setback	0°

Miniwall® Curves Detail

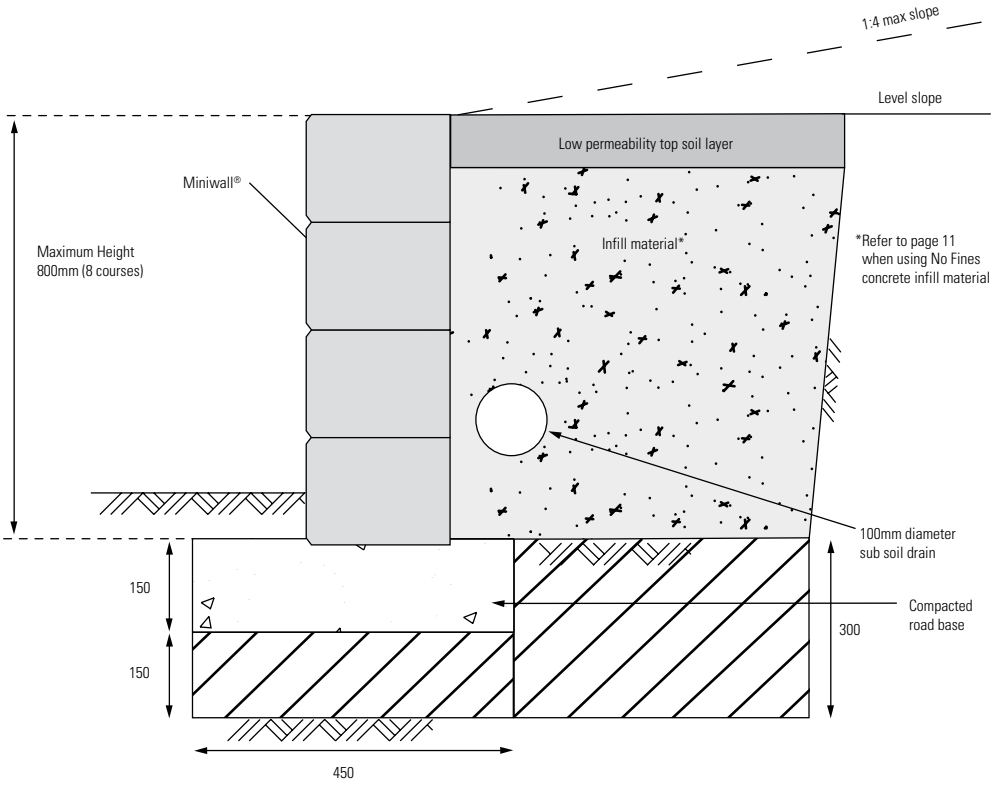


Miniwall® Corners Detail





Miniwall® Typical Wall Section



MINIWALL® RETAINING WALL DESIGN HEIGHTS

Residential Retaining Walls (including residential subdivisions)

Design Height 'H' (mm)	Surface Slope	Surcharge Load (kPa)	Foundation Material	Infill Material	Infill Material Depth (mm)	
					Type 1	Type 2
875	Level	2.5	Replacement Zone	NFC	300	400
750	Level	1	Replacement Zone	NFC	300	300
625	Level	1	Replacement Zone	NFC	300	300
500**	Level	1	Natural Material	Aggregate	300	300
375**	Level	1	Natural Material	Aggregate	300	300
875	1:4 Maximum	2.5	Replacement Zone	NFC	400	650
750	1:4 Maximum	1	Replacement Zone	NFC	300	550
625	1:4 Maximum	1	Replacement Zone	NFC	300	350
500	1:4 Maximum	1	Replacement Zone	NFC	300	300
375	1:4 Maximum	1	Replacement Zone	NFC	300	300

Commercial Retaining Walls

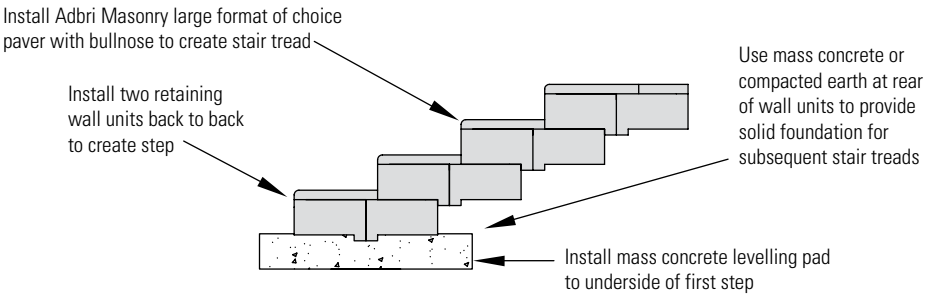
Design Height 'H' (mm)	Surface Slope	Surcharge Load (kPa)	Foundation Material	Infill Material	Infill Material Depth (mm)	
					Type 1	Type 2
875	Level	2.5	Replacement Zone	NFC	300	400
750	Level	1	Replacement Zone	NFC	300	300
625	Level	1	Replacement Zone	NFC	300	300
500	Level	1	Replacement Zone	NFC	300	300
375	Level	1	Replacement Zone	NFC	300	300
875	1:4 Maximum	2.5	Replacement Zone	NFC	400	650
750	1:4 Maximum	1	Replacement Zone	NFC	300	550
625	1:4 Maximum	1	Replacement Zone	NFC	300	350
500	1:4 Maximum	1	Replacement Zone	NFC	300	300
375	1:4 Maximum	1	Replacement Zone	NFC	300	300

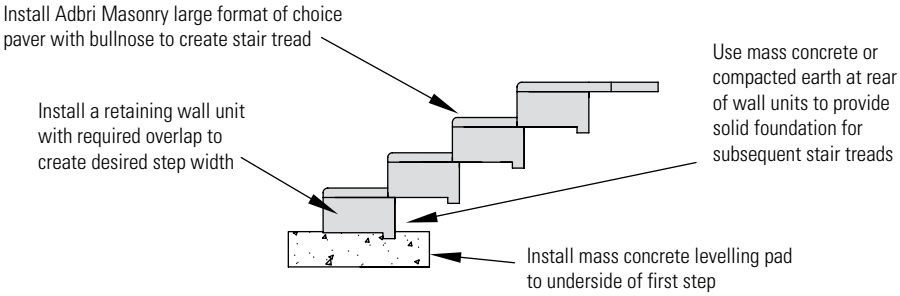
** Refer to section 4 of Technical Parameters for Conditions.

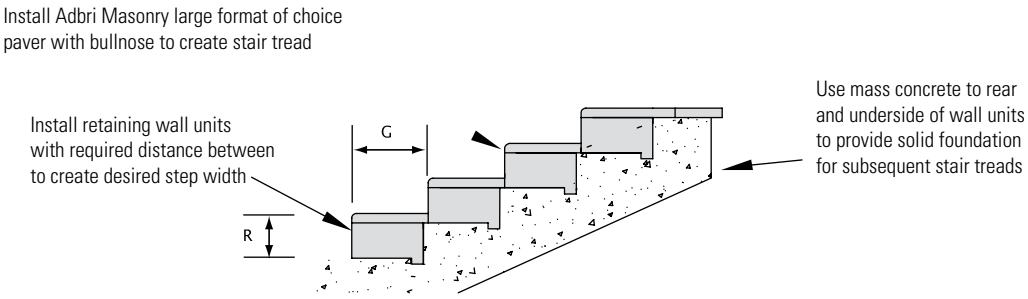
NFC denotes the used of No Fines Concrete. Refer to page 8 for clarification of Type 1 and Type 2 soils.

Where Miniwall® units are used with No Fines Concrete, and the rear face of the miniwall® units are solid, a brick tie at now more than 400mm x 400mm spacings should be utilised between the blocks and the no fines concrete mass to ensure bond.

5.0 Typical Details for Creating Steps and Stairs







Permissible Step Dimensions (in accordance with BCA requirements)

R		G		2R + G	
Maximum	Minimum	Maximum	Minimum	Maximum	Minimum
190	115	355	250	700	550

NOTE - Adbri designs are for step tread dimensions and layout only, and do not consider handrail or landing platform requirements. Consult relevant Australian Standards.

6.0 Overview of Geogrid Reinforced Walls

Reinforced soil retaining walls are essentially gravity wall structures that depend on the mass of the reinforced soil zone behind the retaining wall units to resist destabilising forces due to retained soil and surcharge loadings.

Landmark, Diamond®, Hampton Stone or Vertica® masonry segmental blocks in combination with polyester Geogrid provides a proven aesthetically pleasing and cost effective method of constructing high retaining walls.

Geogrid provides connection of the reinforced soil to the Adbri Masonry segmental retaining wall blocks. The combination of retaining wall blocks with Geogrid has the capacity to form a mechanical connection.

Geogrid was chosen as the preferred reinforcing element because of it's light, flexible nature, ease of handling, superior creep resistance and long term load carrying capacity compared to other products on the market, and it's maintained strength/ creep characteristics when subjected to elevated surface temperatures commonly experienced in block retaining system applications.

Landmark, Diamond®, Hampton Stone or Vertica® blocks units feature "cast in" shear keys which provide automatic setback corresponding to the blocks selected and do not require the use of additional dowels to provide block shear capacity. Landmark, Diamond®, Hampton Stone or Vertica® blocks, due to their unique construction, are extremely quick and easy to lay. They come in a variety of face finishes and a wide array of colour options to complement existing surroundings. Special colours can be formulated to match into existing works or create that special effect.

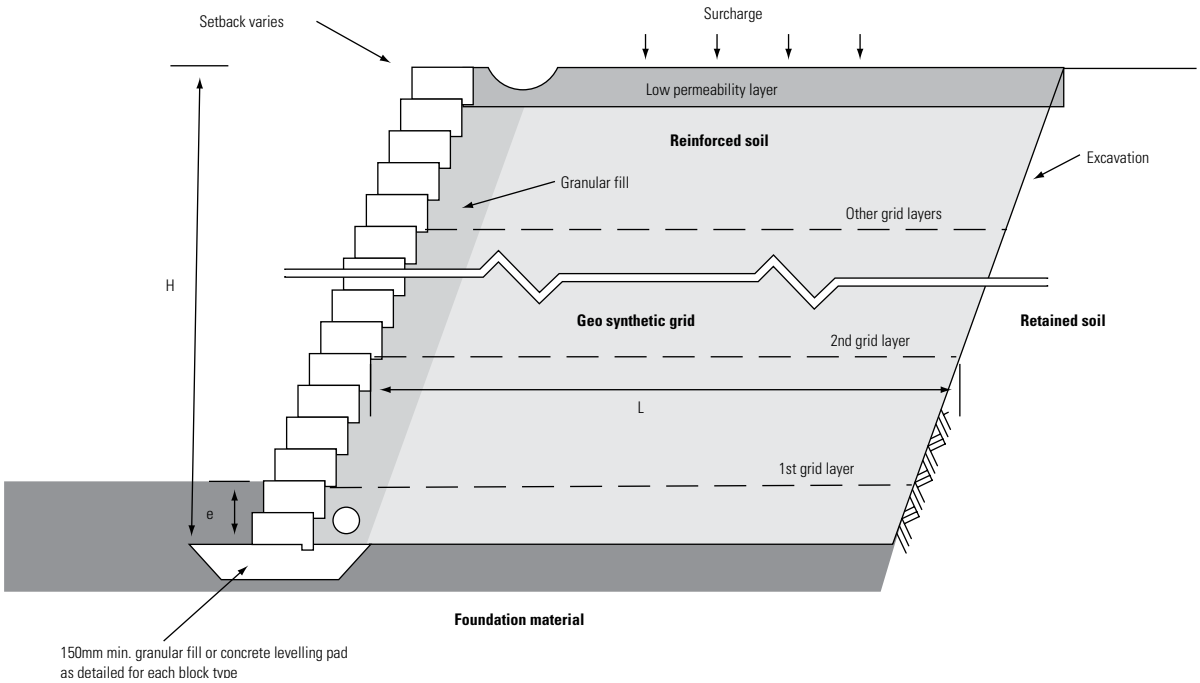
The combination of retaining wall blocks with Geogrid has been accepted by major construction authorities in Australia for use in structures with a design life of 100 years.

Retaining wall design software is available free of charge to engineers to allow the optimum use of Geogrid and retaining wall products. We can also provide contracting services for all types of retaining wall projects.

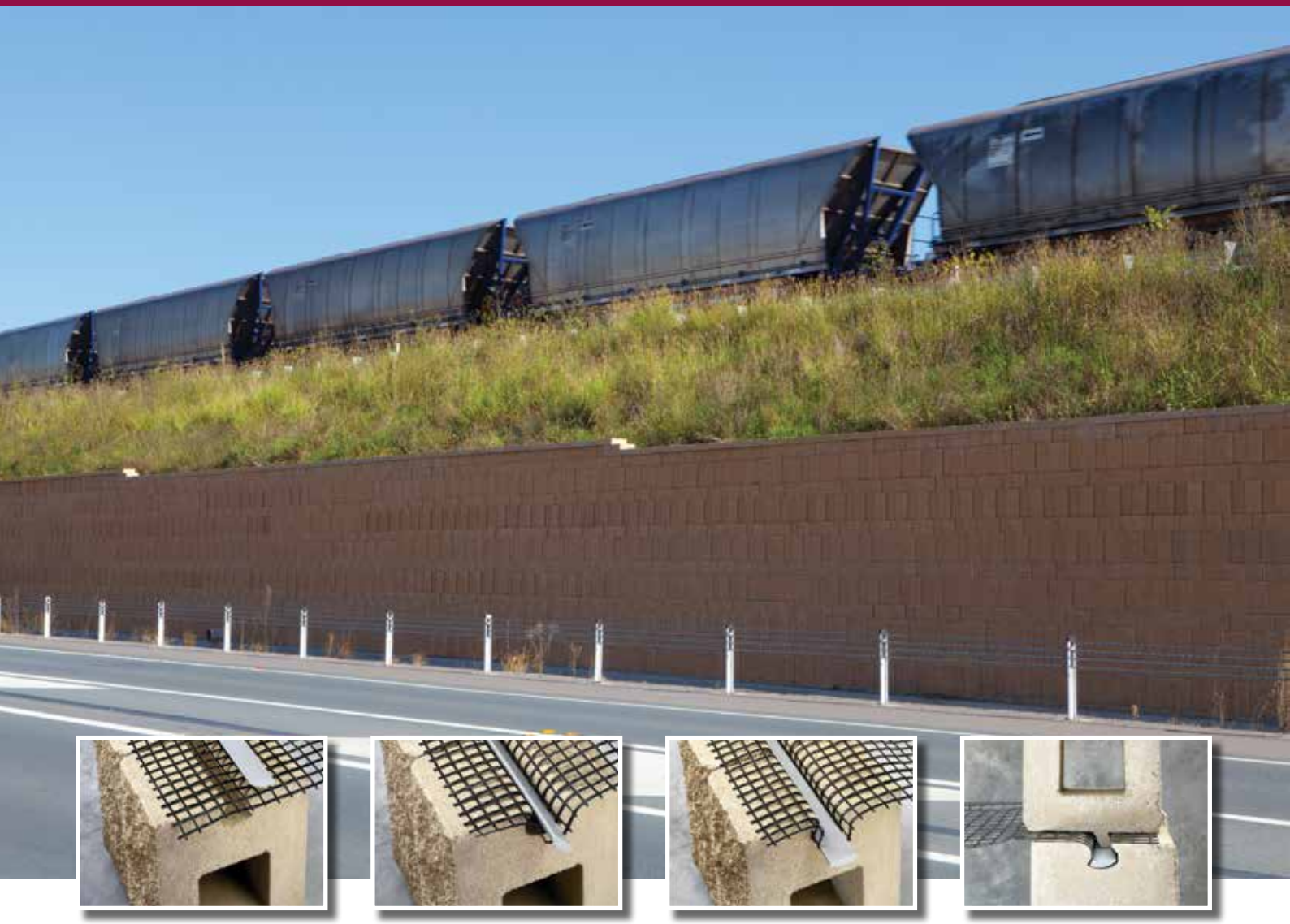
Landmark, Vertica® and Diamond® are all R57 and MRS11.06 approved products.

For a copy of the Anchor wall Program go to adbrimasonry.com.au and send a request to the company. The program is AutoCAD compatible.

Reinforced Wall Cross Section



Landmark Positive Mechanical Connection System



Landmark™ offers an innovative solution for retaining wall construction. The unique system features a positive mechanical connection between the facing blocks and the reinforcement material that bolsters the wall's ability to withstand the forces of earth pressures, surcharges and seismic loads as it retains the surrounding soil.

How does the uniquely shaped Landmark system fasten to the reinforcement materials? A lock bar made from an engineered polymer, fits into a specially designed channel built into the blocks. This locking system mechanically and positively connects the block to a layer of reinforcing material. Uniquely shaped flanges establish a uniform course-to-course set back and ensure a strong resistance to shear forces.

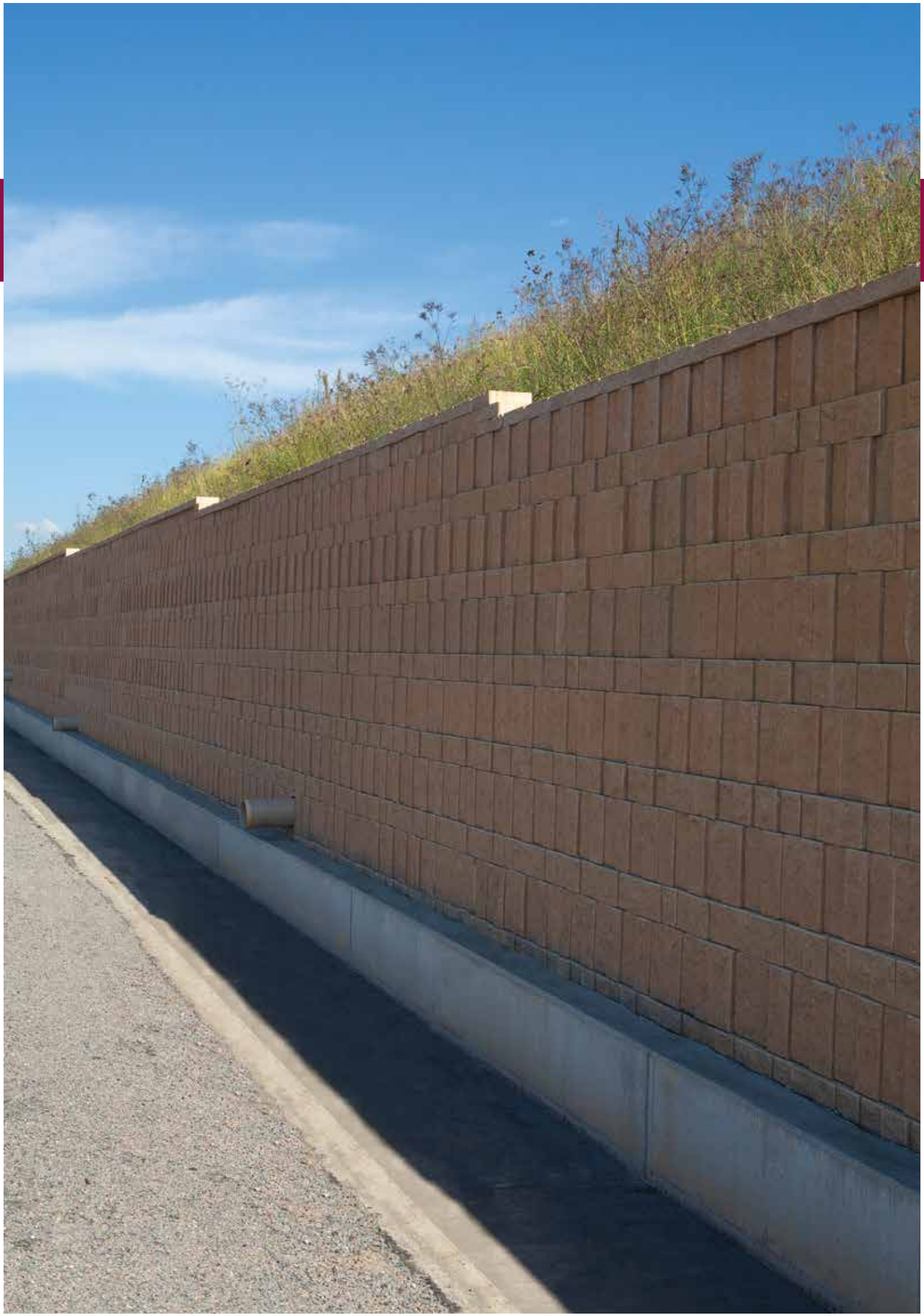
Never before has a segmental retaining wall system demonstrated this level of strength with polyester reinforcements. The Landmark system was designed specifically for challenging projects such as tall walls over 4.5m, high load-bearing walls of any height, transportation applications and structures located in seismic regions. The performance features of the Landmark system enable cost effective design solutions

Tested to outperform the competition

The positive mechanical connection ensures that the reinforcement will not pull out of the block channel. Tests demonstrate the connection system is capable of withstanding loads in excess of 300 percent of the reinforcement's allowable design strength. Overturning test results performed on the Landmark system demonstrate that the conservative overturning resistance is 450 percent greater than the overturning resistance of similar depth conventional segmental retaining wall units. Finite Element Analysis performed on the Anchor lock bar confirms its ability to sustain the most severe loads even under extreme temperature conditions.

A cost effective solution for your tall wall needs

This positive mechanical connection system requires fewer layers of reinforcement material and provides greater flexibility in choosing the strength of reinforcement products. The result is lower material and installation costs.



Other Adbri Masonry Solutions

Designer Paving

Versaloc® Walling System

Industrial Masonry

Pick up your copy in store or download from adbrimasonry.com.au

Contact Us

adbrimasonry.com.au

1300 365 565

enquiries@adbri.com.au

masonrytech@adbri.com.au

We will not accept any returns or claims more than 7 days after delivery or after products have been installed. We will not accept returns unless transport arrangements have been agreed and the products are in 'as received' condition and accessible for collection. We will only accept returns as follows:

- Paving and Retaining Walls - returns accepted only in full pallets stacked in original configuration.
- No returns accepted for any made to order product.

Free pallet collection service freecall 1800 674 961 or drop pallets back to place of purchase or lodge your pallet pick up online at adbrimasonry.com.au

Pallets remain Adbri Masonry property. Please telephone us for collection of pallets and keep pallets empty and stacked in a safe and accessible area for collection.

For all technical enquiries please email masonrytech@adbri.com.au and speak directly with our in-house Technical and Engineering Teams.

Anchor Segmental Retaining Wall Systems

June 2015

Adbri Masonry Pty Ltd
ABN: 31 009 687 521

adbri MASONRY