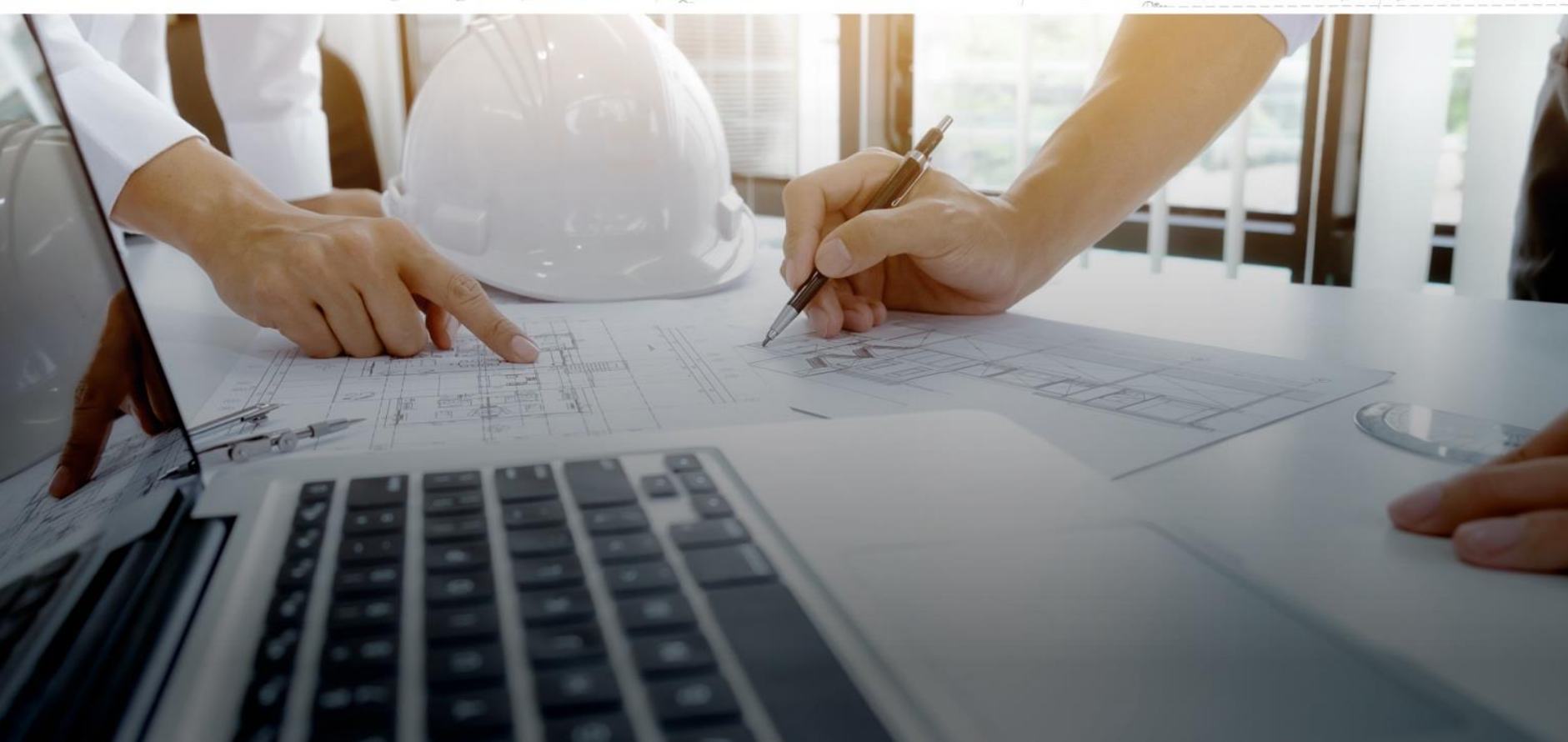


Secura Design Proposal

Client: Campbell Reith
Site: Pyramid Park Enabling Works
Date: 02/01/2025
Reference: TSE-01414-Rev C



HAPAS

Tobermore Concrete Products Ltd

2 Lisnamuck Road
Tobermore
Co Londonderry BT45 5QF

Tel: 028 7964 2411 Fax: 028 7964 4145

e-mail: sales@tobermore.co.uk

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HAPAS Certificate

15/H230

Product Sheet 1

TOBERMORE RETAINING WALL SYSTEM

SECURA GRAND CONCRETE BLOCK WALL SYSTEM FOR REINFORCED SOIL RETAINING WALLS AND BRIDGE ABUTMENTS

This HAPAS Certificate Product Sheet⁽¹⁾ is issued by the British Board of Agrément (BBA), supported by National Highways (acting on behalf of the Overseeing Organisations of the Department for Transport; Transport Scotland; the Welsh Government and the Department for Infrastructure, Northern Ireland), the Association of Directors of Environment, Economy, Planning and Transport (ADEPT), the Local Government Technical Advisers Group and industry bodies. HAPAS Certificates are normally each subject to a review every three years.

(1) Hereinafter referred to as 'Certificate'.

This Certificate relates to the Secura Grand Concrete Block Wall System for reinforced soil retaining walls and bridge abutments, comprising modular concrete block facing units, Fortrac Geogrids, graded granular material and compacted fill. The system is used for the construction of reinforced soil retaining walls and bridge abutments up to a maximum height of 9 metres.

CERTIFICATION INCLUDES:

- factors relating to compliance with HAPAS requirements
- factors relating to compliance with Regulations where applicable
- independently verified technical specification
- assessment criteria and technical investigations
- design considerations
- installation guidance
- regular surveillance of production
- formal three-yearly review.

KEY FACTORS ASSESSED

Mechanical properties — the method of connection between the geogrids and concrete block facing units has been assessed and long-term connection strength values determined for various wall heights and concrete block/geogrid combinations. The interface shear capacity between adjacent concrete block facing units in between layers of geogrid reinforcement has been assessed and is satisfactory (see section 7).

Performance of geogrids — the short- and long-term tensile strength of the geogrids, resistance to installation damage, weathering and environmental effects, and soil/geogrid interaction have been assessed. Data and reduction factors for use in design are given in Certificate 13/H197, Product Sheet 1 (see section 7).

Durability — when designed and installed in accordance with the provisions of this Certificate, the system will have adequate durability for its intended use as a retaining wall or bridge abutment (see section 9).

The BBA has awarded this Certificate to the company named above for the system described herein. This system has been assessed by the BBA as being fit for its intended use provided it is installed, used and maintained as set out in this Certificate.

On behalf of the British Board of Agrément

Date of Third issue: 12 May 2022

Originally certificated on 18 March 2015

Hardy Giesler
Chief Executive Officer

The BBA is a UKAS accredited certification body – Number 113.

The schedule of the current scope of accreditation for product certification is available in pdf format via the UKAS link on the BBA website at www.bbacerts.co.uk. Readers MUST check the validity and latest issue number of this Agrément Certificate by either referring to the BBA website or contacting the BBA directly.

Any photographs are for illustrative purposes only, do not constitute advice and should not be relied upon.

British Board of Agrément

Bucknalls Lane
Watford
Herts WD25 9BA

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tel: 01923 665300
clientservices@bbacerts.co.uk
www.bbacerts.co.uk

Securely Engineered

3X LOCK

Secura benefits from a three-way lock which provides connections through the wall for exceptional structural stability.

1. Aggregate Action

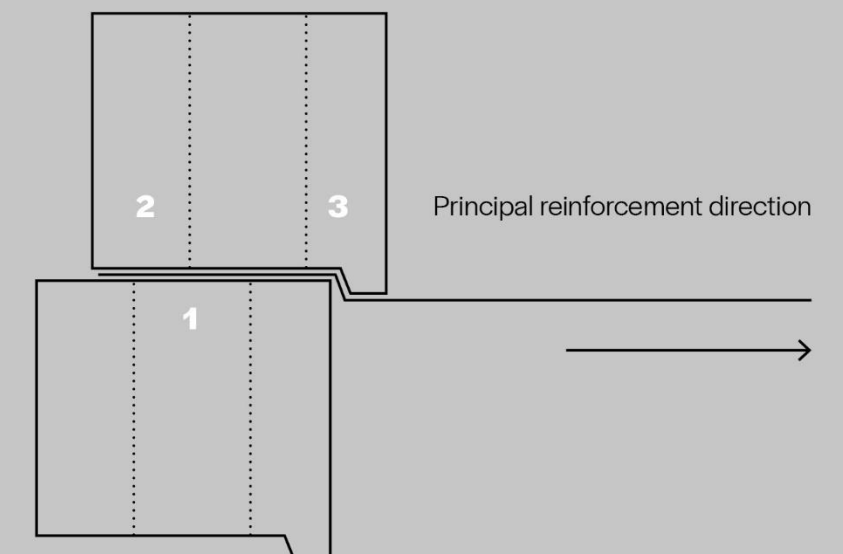
The granular aggregate fill in the hollow core of the Secura Grand blocks plays an important role in the integrity of the wall. Interaction between the geogrid and the aggregate acts as a lock, resisting movement.

2. Friction Lock

Under loading, the geogrid's ribbed texture grips the coarse surface of the Secura block creating friction to further resist movement.

3. Nib Lock

Secura's rear retaining nib, which effectively resists forward movement of the block, also acts as a clamp when under load, maintaining the engagement with the geogrid.



Secura's geogrid reinforced wall design provides the perfect balance between performance, buildability and long-term durability.

Tobermore – Secura Design Proposal

Client: Campbell Reith
Site: Pyramid Park Enabling Works
Date: 02/01/2025
Reference: TSE-01414-Rev C

Dear Sir / Madam,

The following is our proposal for the above project. We have been asked to provide estimated quantities and indicative sections for the retaining walls at the proposed '**Pyramid Park Enabling Works**' site.

We propose a Tobermore Secura Grand retaining solution and have considered Secura Grand retaining walls with a maximum retained height of **3.6m**.

We have included concept sections indicative of the retained heights of **1.2m to 3.6m** for the Tobermore Secura Grand retaining walls these can be seen within this document. We have also included any specific construction details that we have identified within the site.

These concept drawings **do not take into consideration site specific soil conditions or slope geometry**, any specific concerns about site conditions are to be discussed at formal design stage.

For external corners Secura Grand corner blocks would be required in addition of Secura Grand Blocks. Coping blocks are optional but highly recommended for aesthetic purposes.

The quantities provided in this document are an approximate preliminary estimate of the proposed wall dimensions based off the provided information. All wall details should be confirmed prior to any appointment of a formal design with one of our engineering partners. This document **does not take into consideration wastage**, additional material should be considered within procurement, **contractors are responsible for their own procurement** and must review quantities prior to ordering.

Tobermore – Secura Design Proposal

Site Specific Comments:

After reviewing the provided information and producing this document we have provided comments on details we believe to be of use to the wall installer and client. These comments can be found below.

1. We have based this proposal and quantities on limited levels information for the proposed walls. If detailed top of wall and bottom of wall levels can be provided, then elevations and wall plan views can be provided along with accurate quantities.
2. Wall sections under 1m of retained height with no additional loading or surcharge could possibly be constructed as a gravity wall. This would be confirmed by a geotechnical engineer, at formal design stage, after site conditions have been reviewed.
3. If using the geogrid reinforcement method, the geogrid used in construction must match that as specified by the appointed geotechnical engineer at formal design stage.

Assumptions:

This document, and the designs within, have been produced based on the following assumptions. Any specific concern about site specific conditions are to be looked at on appointment of a formal design with one of our partner geotechnical engineers.

Assumption	Notes
1	Foundation and retained material are assumed to be founded on inorganic clays, low to medium plasticity, gravelly, sandy, silty, lean clays with a friction angle of 28° .
2	We have not reviewed any provided SI report for the purpose of this preliminary design. Any specific concerns regarding ground conditions will be accommodated at formal design stage.
3	Maximum load of 10kPa offset 300mm from the rear of the upper course of blocks.
4	MAX 1:10 crest slopes present.
5	MAX 1:10 toe slopes present.
6	Any building or structure in a retained zone does not impart loading onto the wall.

Tobermore – Secura Design Proposal

Wall Quantities:

The estimated total quantities for the walls are as follows:

Total Wall Estimate:

527.0m² of Tobermore Secura Grand Blocks and **217.0m** of Secura Grand Copings (optional)

Main Wall Breakdown:

Wall ID	Length (m)	Max Retained Height (m)	Area (m ²)	Geogrid (m ²)	Concrete Backfill (m ³)
Wall 1	115.0	3.60	295.0	1649.5	-
Wall 2	102.0	3.60	232.0	1301.3	-

Totals	217.0		527.0	2950.8	-
--------	-------	--	-------	--------	---

Aggregate Quantities:

Wall ID	Levelling Pad (m ³)	Reinforced Fill (m ³)	Drainage Fill (m ³)	Concrete Backfill (m ³)	Retained Fill (m ³)
Wall 1	20.7	524.4	117.4	-	125.3
Wall 2	18.4	408.3	92.3	-	94.7

Totals	39.1	932.7	209.7	-	220.0
--------	------	-------	-------	---	-------

Notes:

- 'Reinforced Fill' quantities are for use on geogrid walls only, the specification of fill will be confirmed by a geotechnical engineer at formal design stage. Class 6i granular material is the standard specification of reinforced fill.
- Retained Fill has been calculated from a 75° cut angle and is to be backfilled with site won material.
- These quantities have been provided on a preliminary basis only and must not be used for procurement purposes. This document does not take into consideration wastage, additional material should be considered within procurement. Contractors are responsible for their own procurement.

Tobermore – Secura Design Proposal

What are EPDs?

An EPD is a document that lays out the environmental performance or impact of a construction product or material over time.

EPDs allow construction industry professionals to compare the environmental impact of different products and materials and make informed decisions about which to choose for their project.

For us here at Tobermore, it also means we can use the data from an EPD assessment to reduce the impact of our products and deliver ever-more sustainable options for the industry. We have calculated the estimated manufacturing and transport carbon for this specific project which is as follows:

This project generates a total manufacturing + transport carbon of 27,527.36kgs or 27.5tonnes.



Formal Design Appointment:

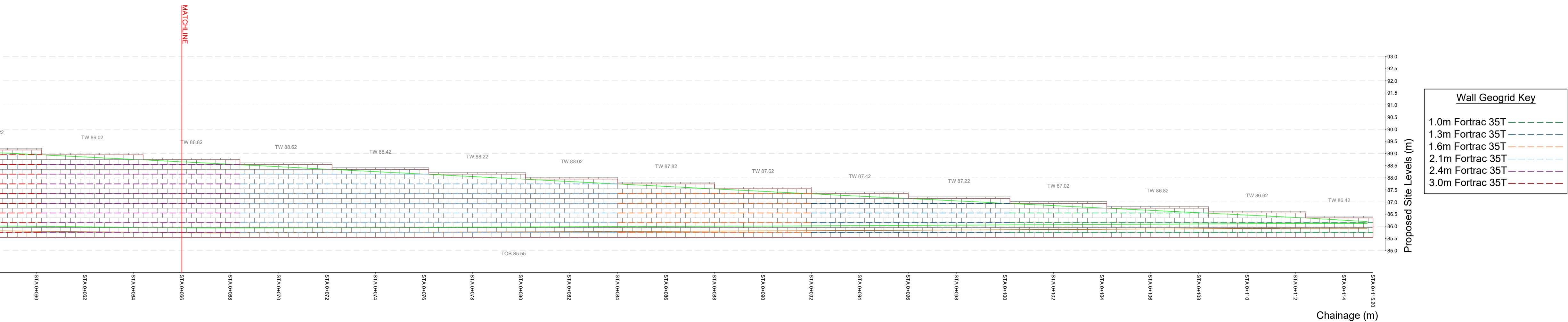
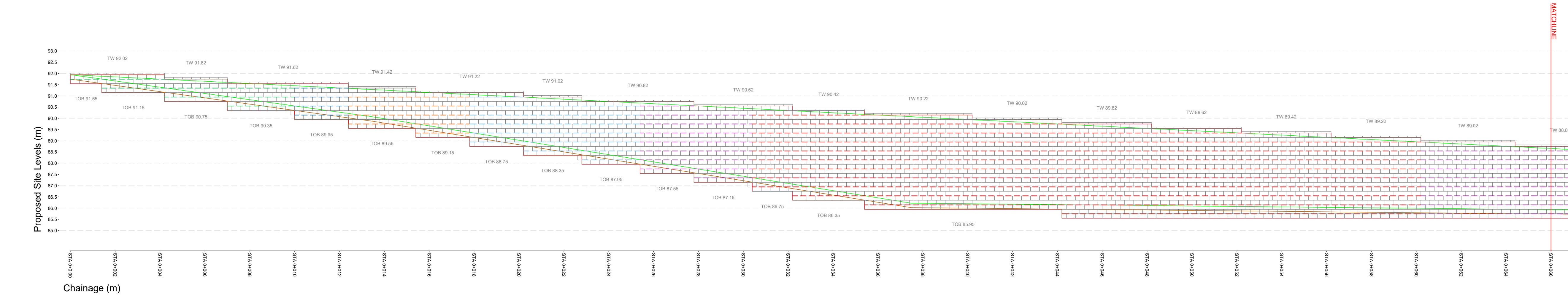
This document is not for construction and is provided on a preliminary basis - We are partnered with a network of Geotechnical Engineers who can be commissioned to produce full construction drawings.

Tobermore can provide a fee for an indemnified formal design upon request and can put customers in contact with the assigned engineer to progress the designs. An indemnified formal design can include wall elevations, location plan, bespoke cross-sections, and all relevant calculations.

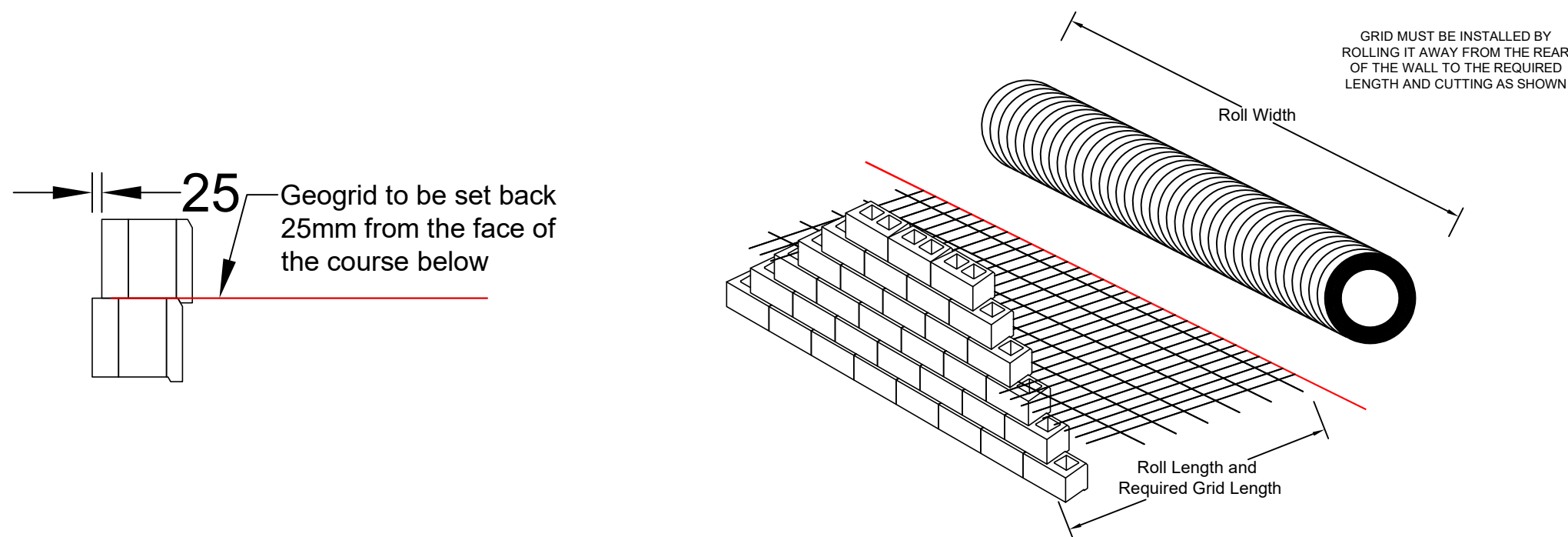
Drawings:

In addition to the provided wall quantities, we have produced the below drawings to aid with the design process.

We have also included relevant drawings depicting specific construction details to aid with the design process, indicative locations of any details have been denoted on the attached wall location plan.



Geogrid Placement Detail:



Geogrid Placement Rules:

- The first layer of geogrid must be placed on the 1st course of Secura Grand.
- Ascending layers of geogrid must not be spaced more than 600mm apart or 3 courses of Secura Grand.
- The final layer of geogrid must be placed no further than 400mm or 2 courses of Secura Grand from the finished ground level.
- Where layers of geogrid step up or down there should be an overlap of geogrid layers to ensure all of the wall is reinforced. Where corners and curves are present placement of geogrid should be done as per Tobermore's installation guidelines.
- Geogrid tail lengths for higher panels of wall should be used for intermediate panels of wall.
- Geogrid must be installed by rolling it out perpendicular to the wall and cutting to the required length, the grid must not be rolled out longitudinally along the wall.

Disclaimer:
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2- FOR INSTALLATION REFER TO THE TECHNICAL GUIDE AVAILABLE FROM www.Tobermore.co.uk
3- ALL REFERENCES ARE TO THE LATEST BRITISH STANDARD AND EUROPEAN STANDARDS.
4- ALL DESIGNS SHOULD BE CHECKED BY A QUALIFIED ENGINEER.
5- SPECIALIST DESIGN ADVICE SHOULD BE SOUGHT PRIOR TO CONSTRUCTION.
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B	14/03/2024	GD	-
A	12/03/2024	GD	-
REV	DATE	BY	APPROVED

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CONSTRUCTION-

Designer:



Customer:

Campbell Reith

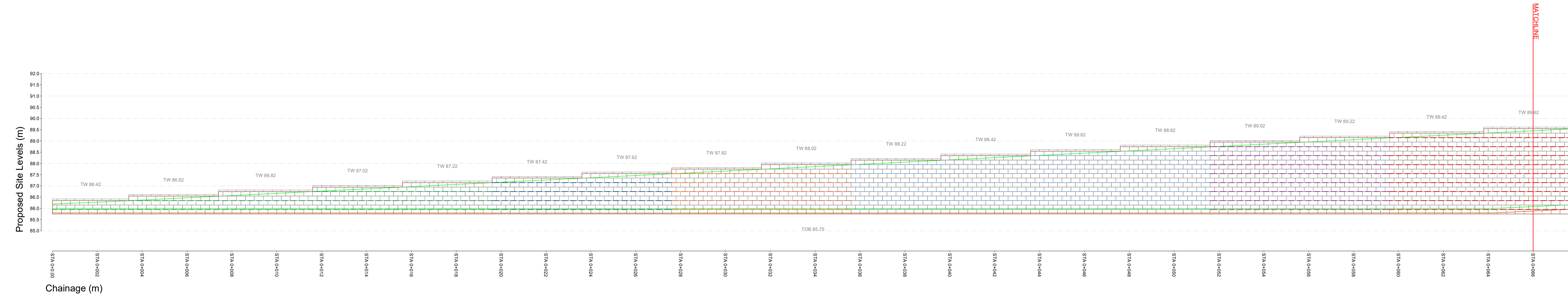
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Pyramid Park Enabling Works

Drawing Title:

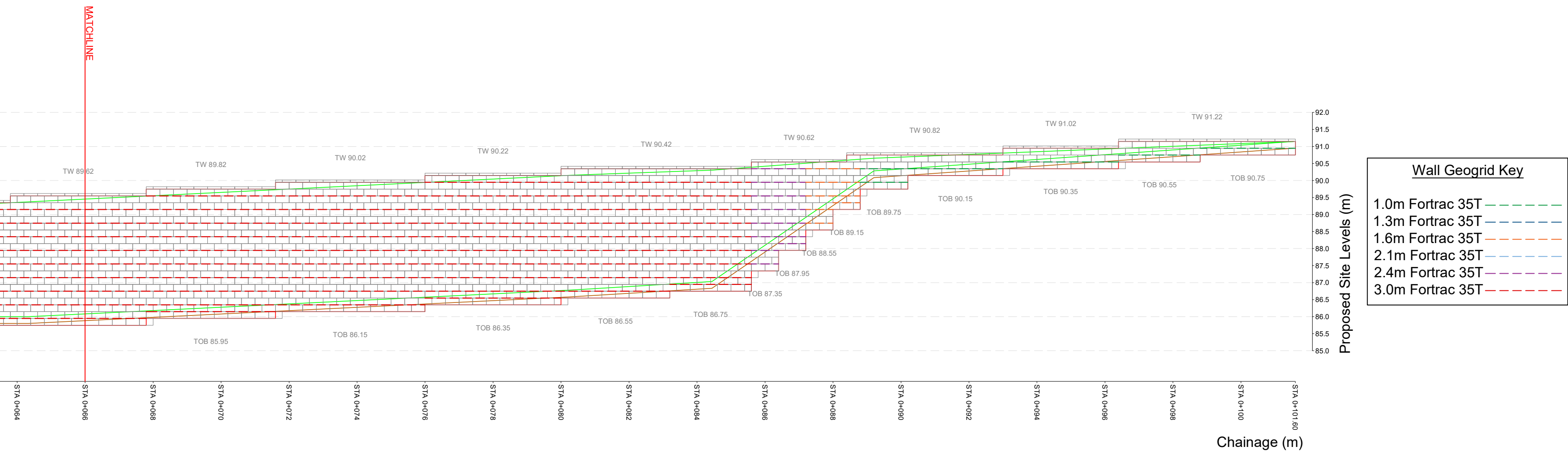
Tobermore Secura Grand
Retaining Wall Details

Page: Sheet 1 of 3	Drawn: GD
Ref: TSE-01414-A	Rev: C
Date: 22/01/2024	
Scale 1:300 @ A1	



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Designer:



Customer:

Campbell Reith

Project Title:

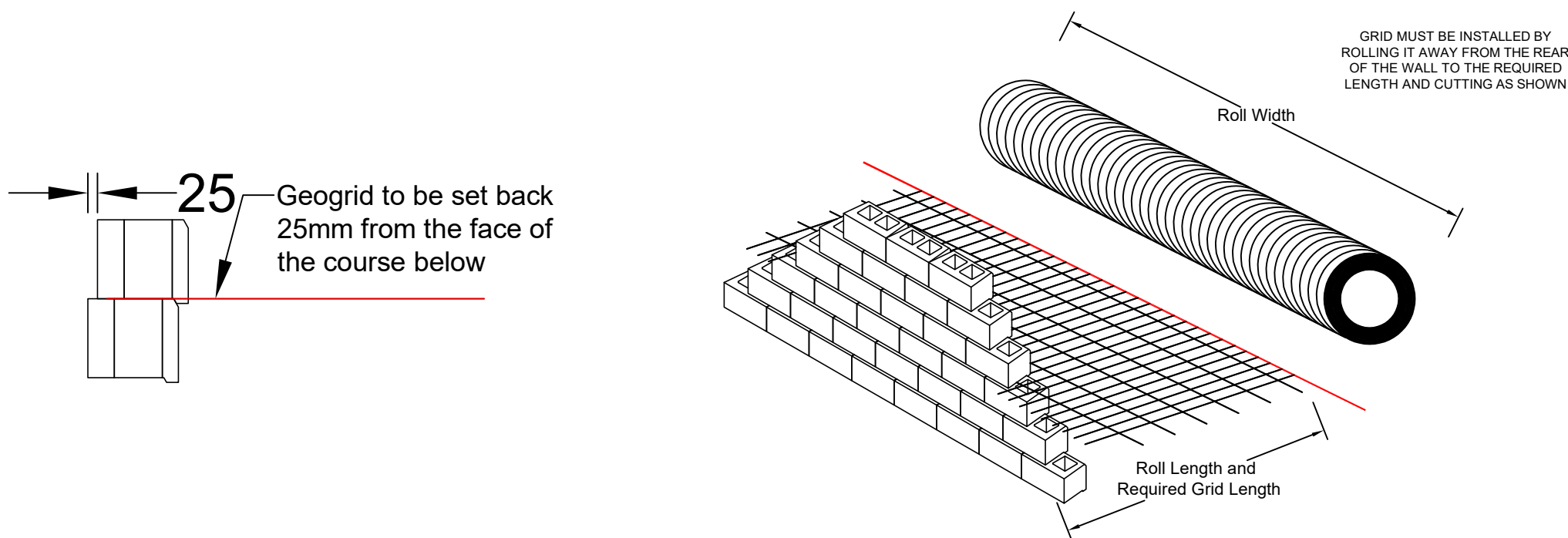
Pyramid Park Enabling Works

Drawing Title:

Tobermore Secura Grand
Retaining Wall Details

Page:	Sheet 2 of 3	Drawn:	GD
Ref:	TSE-01414-A	Rev:	C
Date:	22/01/2024		
Scale	1:300 @ A1		

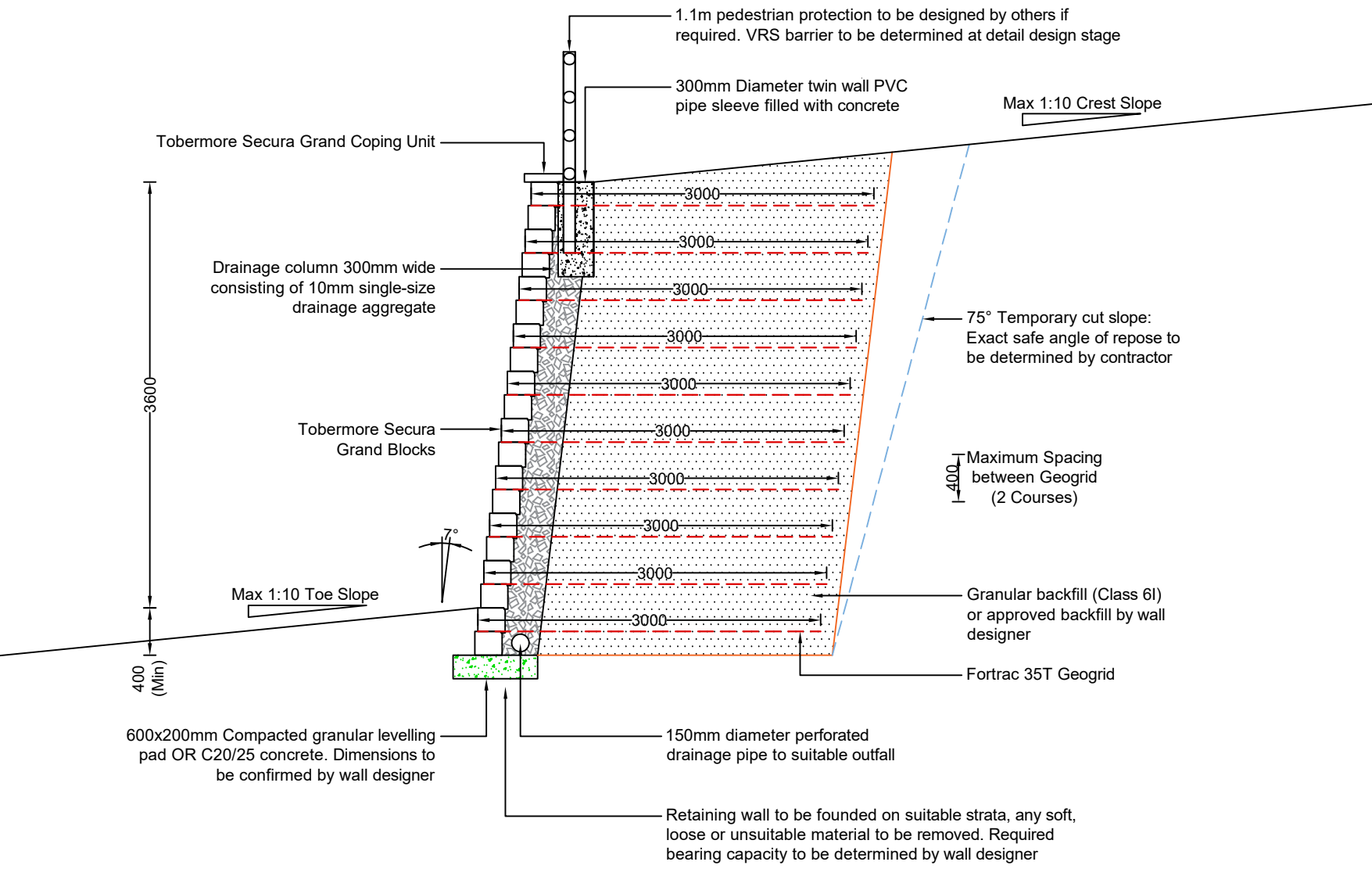
Geogrid Placement Detail:



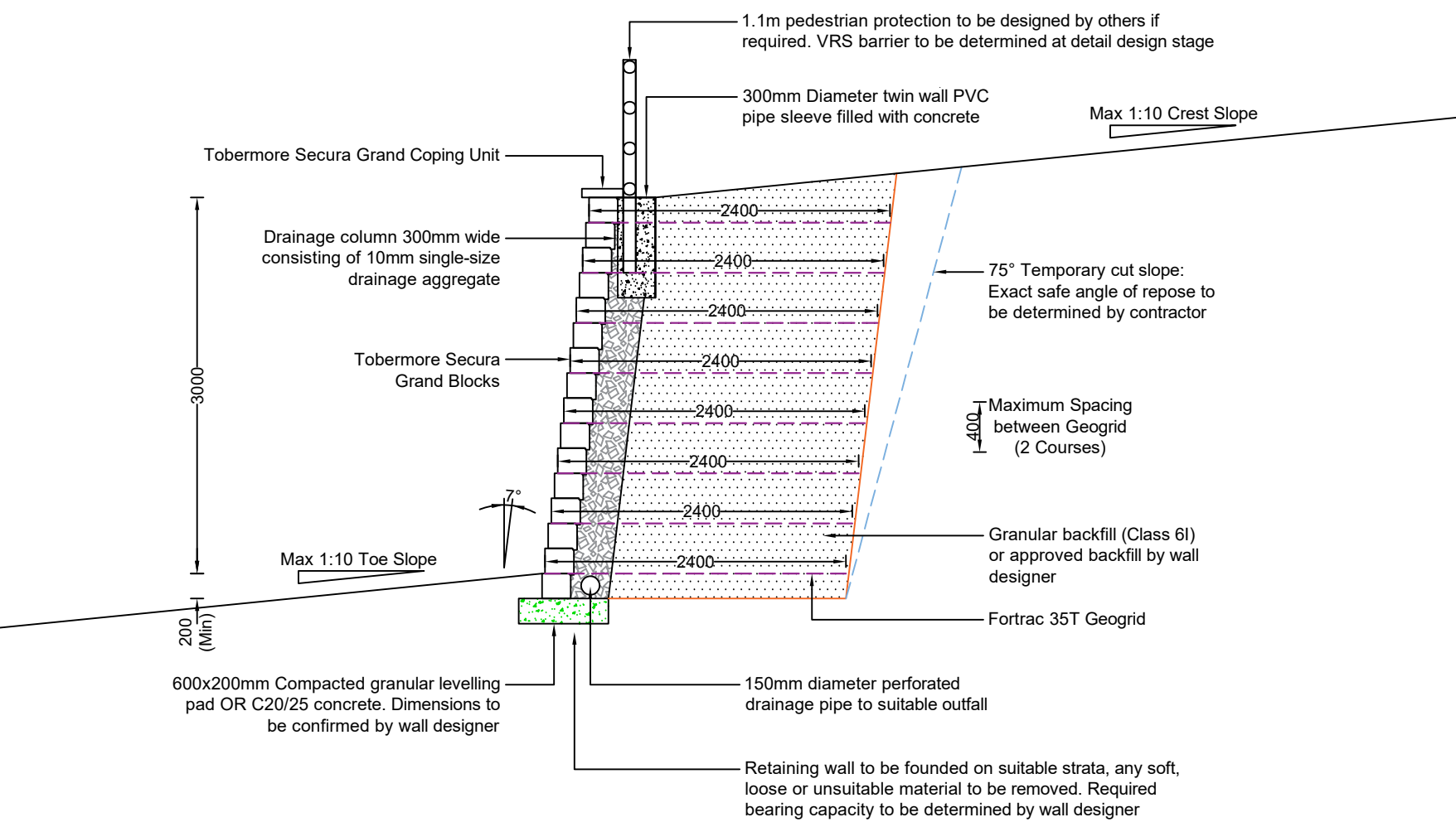
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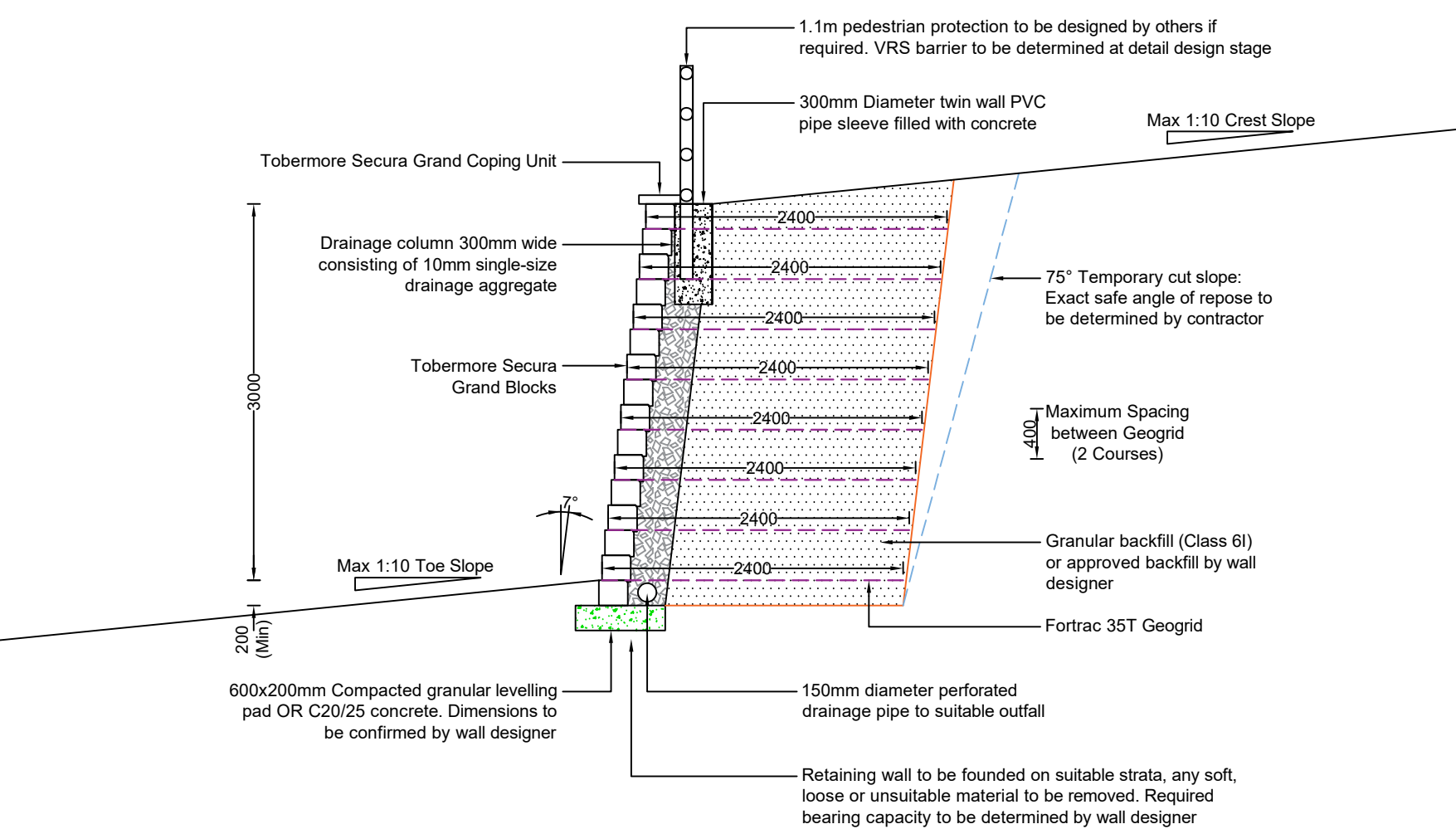
Indicative Section A-A,
3.6m Geogrid Reinforced Wall
1:50



Indicative Section B-B,
3.0m Geogrid Reinforced Wall
1:50



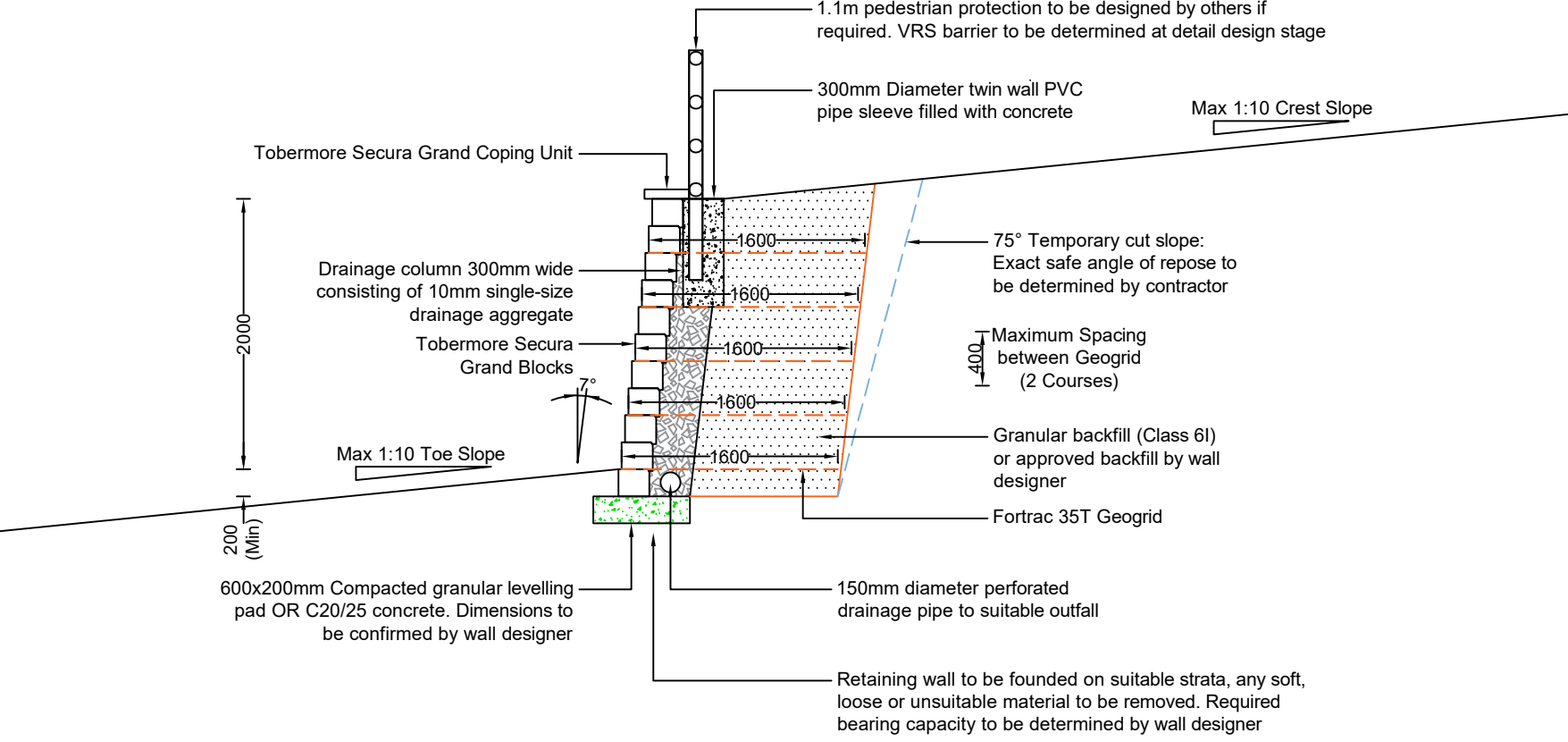
Indicative Section C-C,
2.6m Geogrid Reinforced Wall
1:50



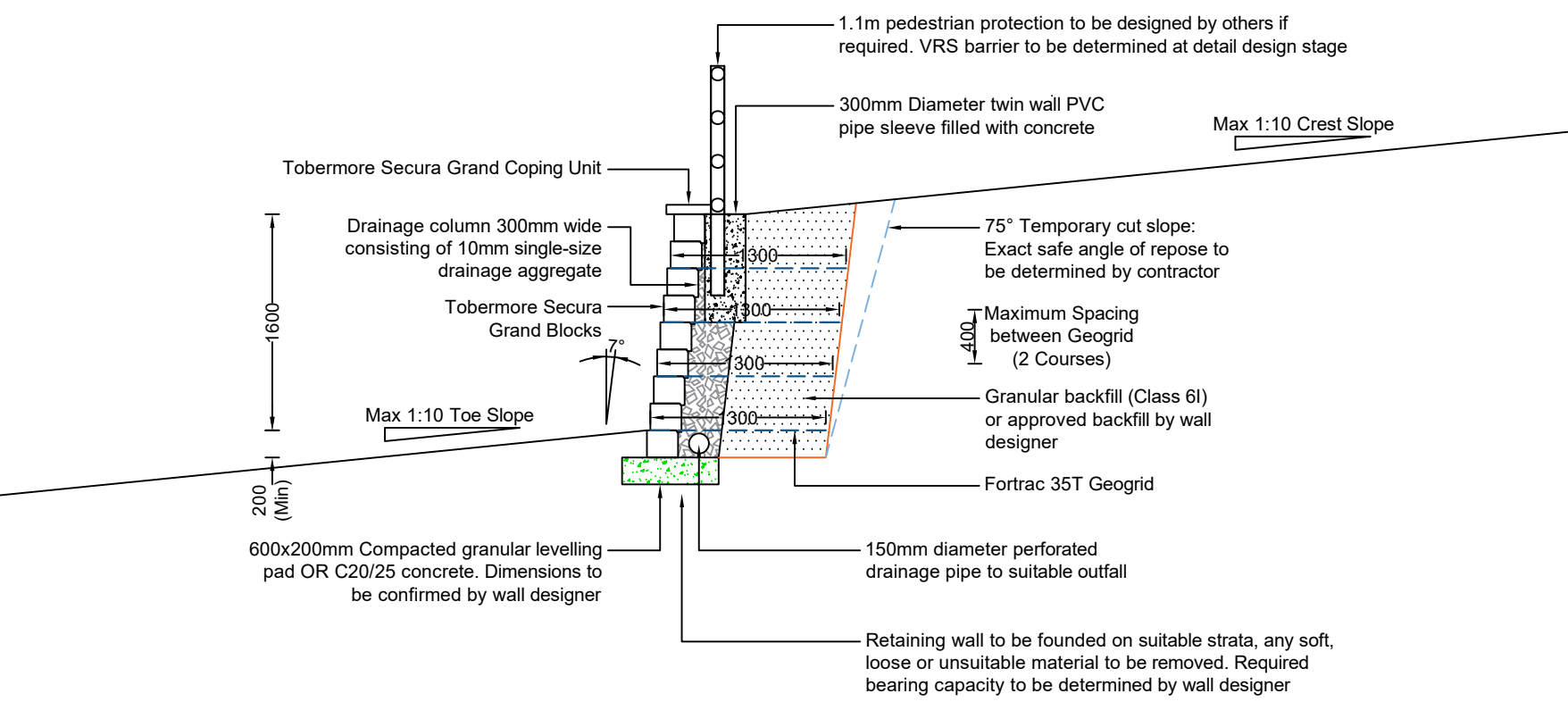
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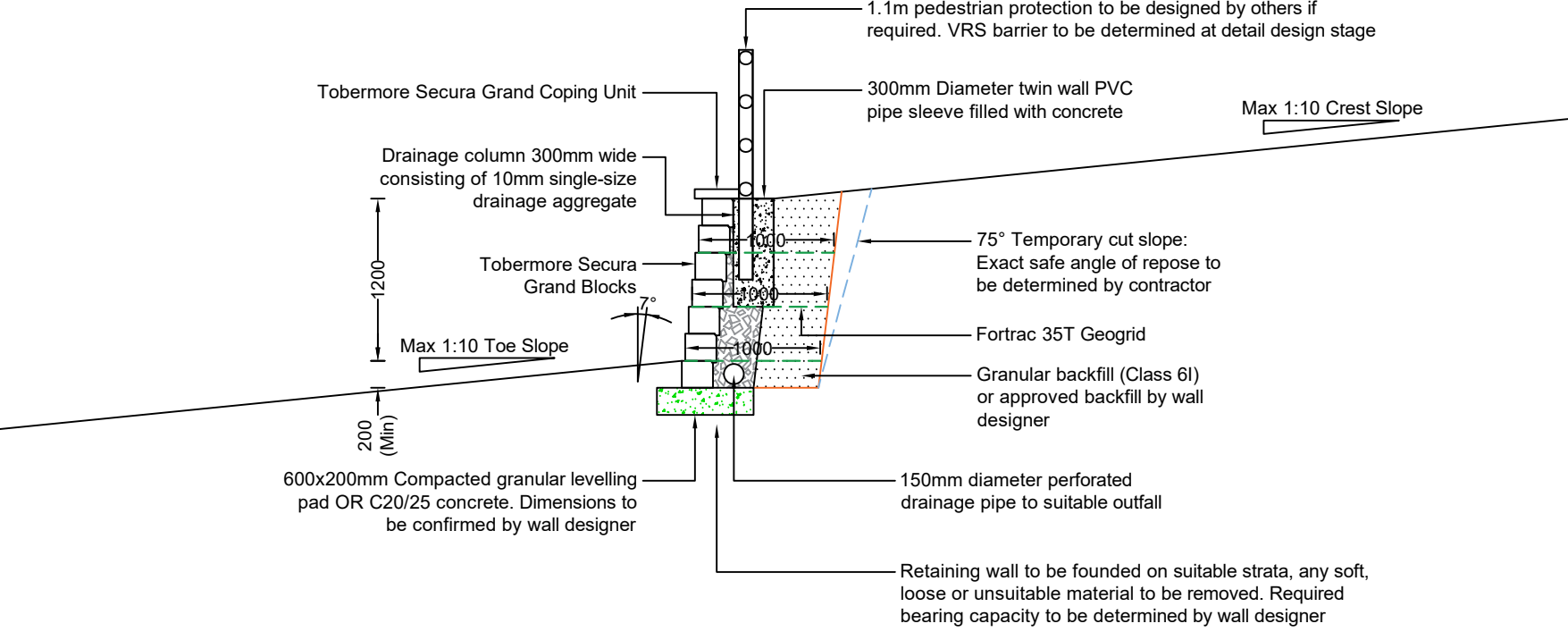
Indicative Section D-D,
2.0m Geogrid Reinforced Wall
1:50



Indicative Section E-E,
1.6m Geogrid Reinforced Wall
1:50



Indicative Section F-F,
1.2m Geogrid Reinforced Wall
1:50



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A	12/03/2024	GD	-
REV	DATE	BY	APPROVED

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CONSTRUCTION-

Designer:



Customer:

Campbell Reith

Project Title:

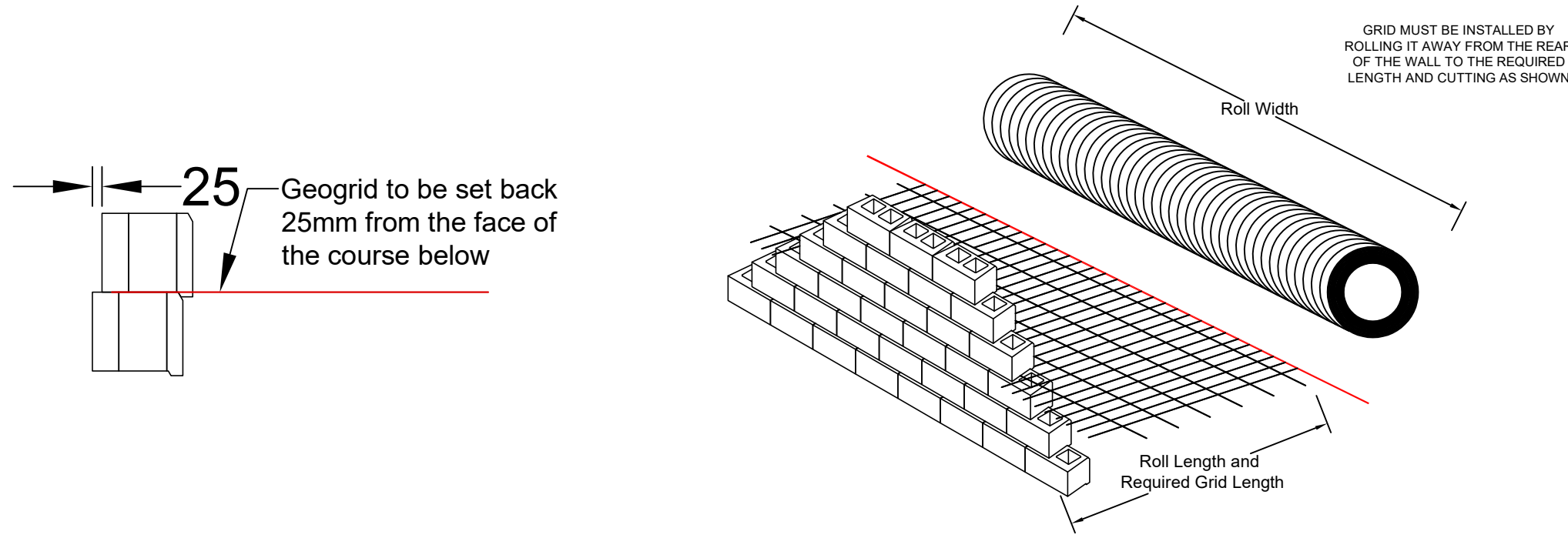
Pyramid Park Enabling Works

Drawing Title:

Tobermore Secura Grand
Retaining Wall Details

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Ref: TSE-01414-A	Rev: C
Date: 22/01/2024	
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Geogrid Placement Detail:



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Indicative Tobermore Secura Grand Wall Locations

All slope geometry, setting out and required offsets to be confirmed by the Principal Contractor and/ or Client's Consulting Engineer prior to construction. The Principal Contractor and/ or Client's Consulting Engineer must also confirm the locations of all services prior to construction and ensure that none will be affected by the wall and its installation.

Wall Location Plan Key:

Tobermore Walls

Tobermore Secura Grand Wall Overlay

The site plan illustrated within this document has been marked with the location of the proposed Tobermore Secura Grand retaining walls. Wall 1/2 has been overlaid with a more representative footprint of the Secura Grand wall by retained height. The bottom of the wall has been illustrated with the first pink line. The illustrated wall location is provided to aid with preliminary setting out, actual wall footprint may vary at formal design stage.

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REV	DATE	BY	APPROVED

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Designer:



Customer:

Cambell Reith

Project Title:

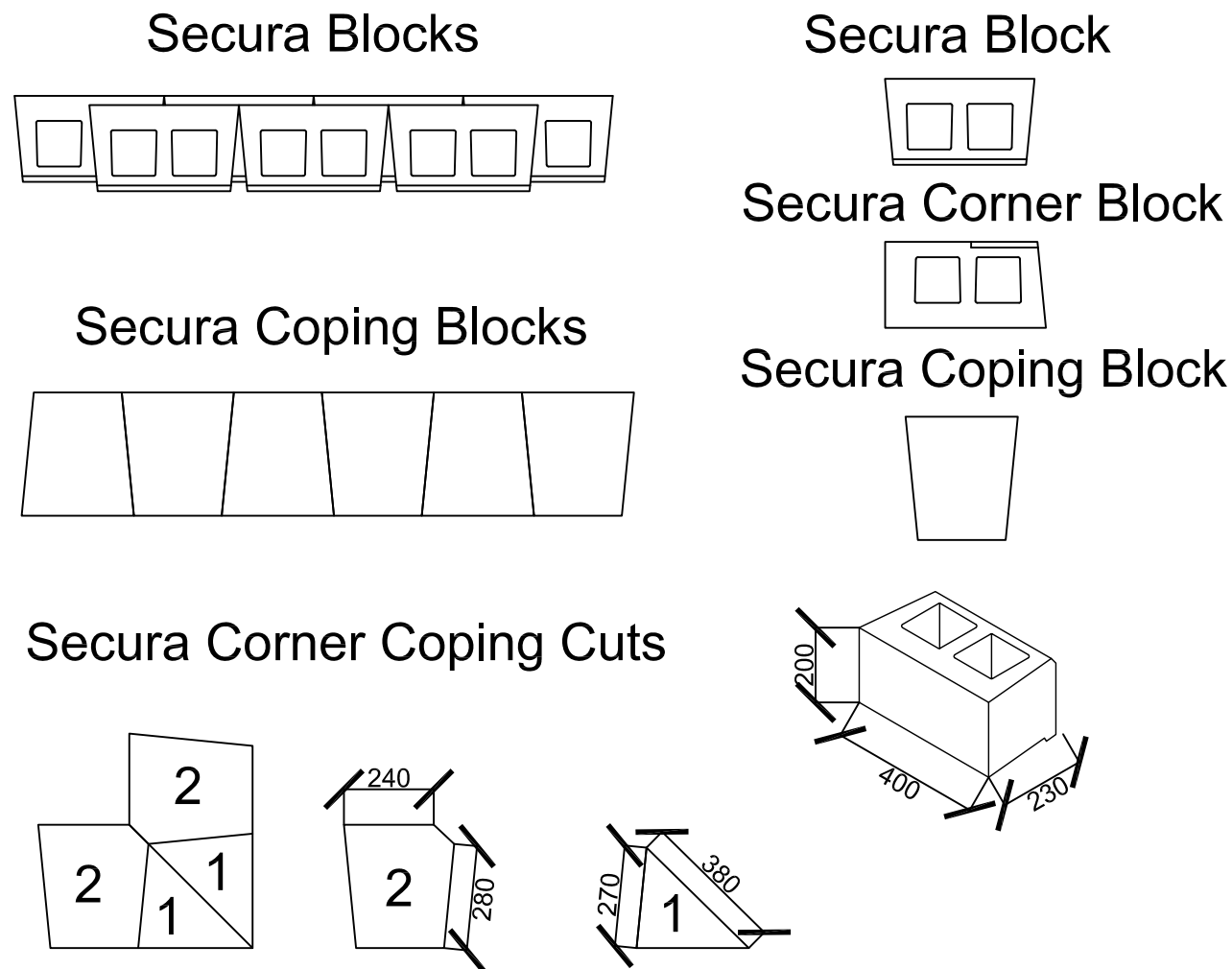
Pyramid Park Enabling Works

Drawing Title:

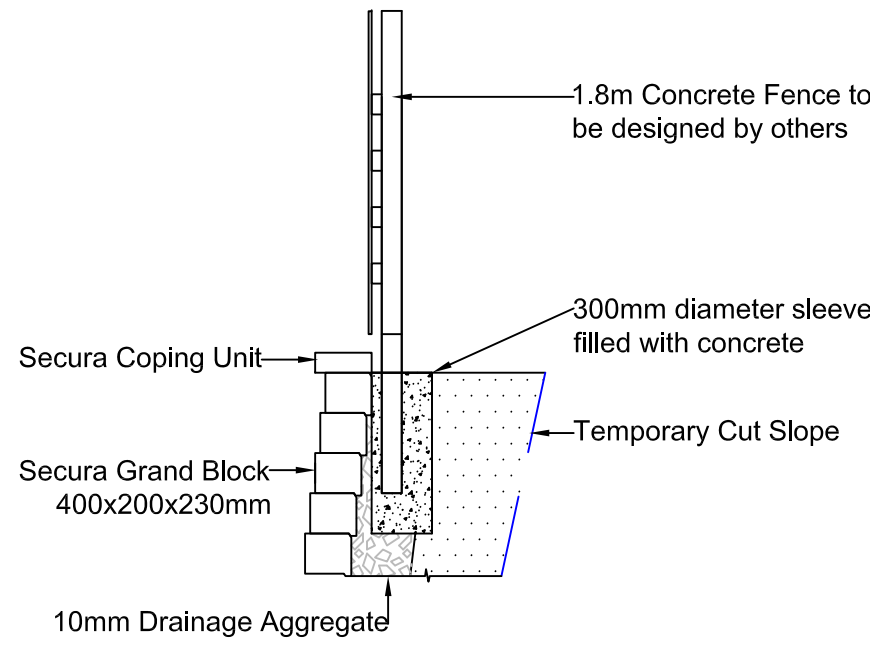
Tobermore Secura Grand Retaining Wall Location Plan

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Tobermore Secura Grand Blocks



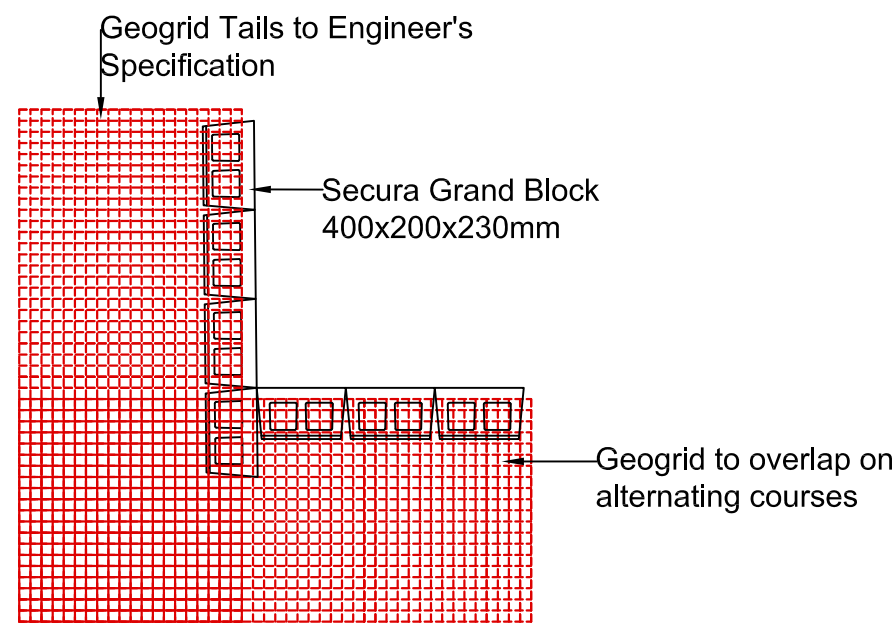
Standard Fence Detail



Edge protection details are common at the crest of Secura Grand retaining walls and should be considered during wall design. 300mm void formers filled with c20/25 structural concrete are often specified for these details. Depth of void formers are as specified by the wall designer.

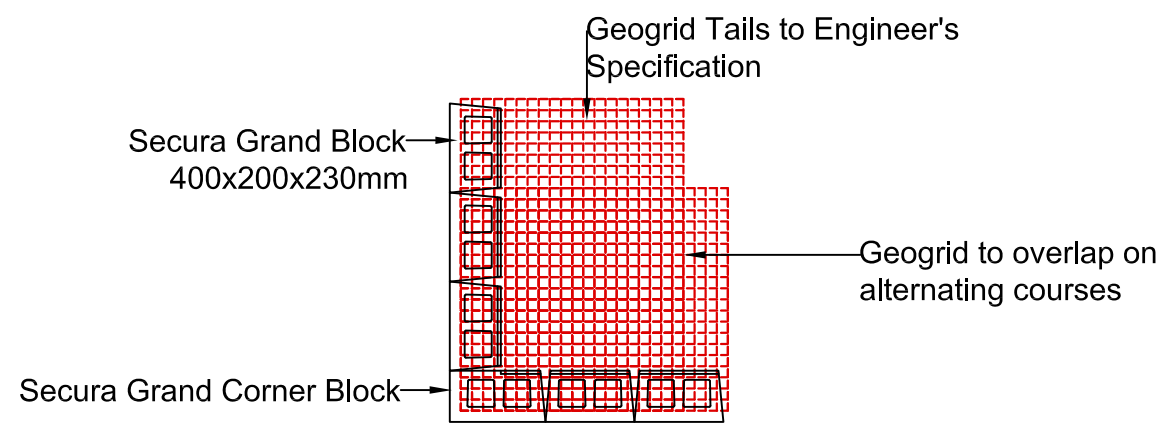
Internal Corner Detail

Secura Grand internal corners are constructed by overlapping alternating courses of blocks. The setback in Secura blocks creates a corner effect which means that action is required to maintain running bond.

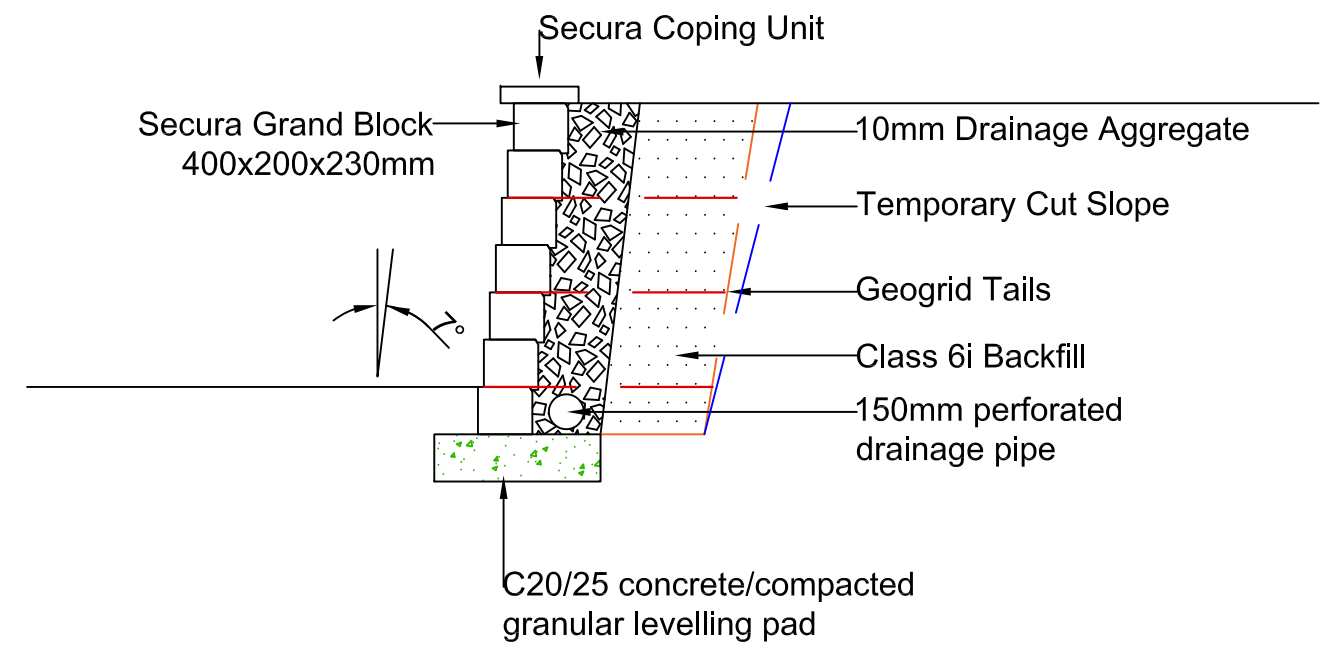


External Corner Detail

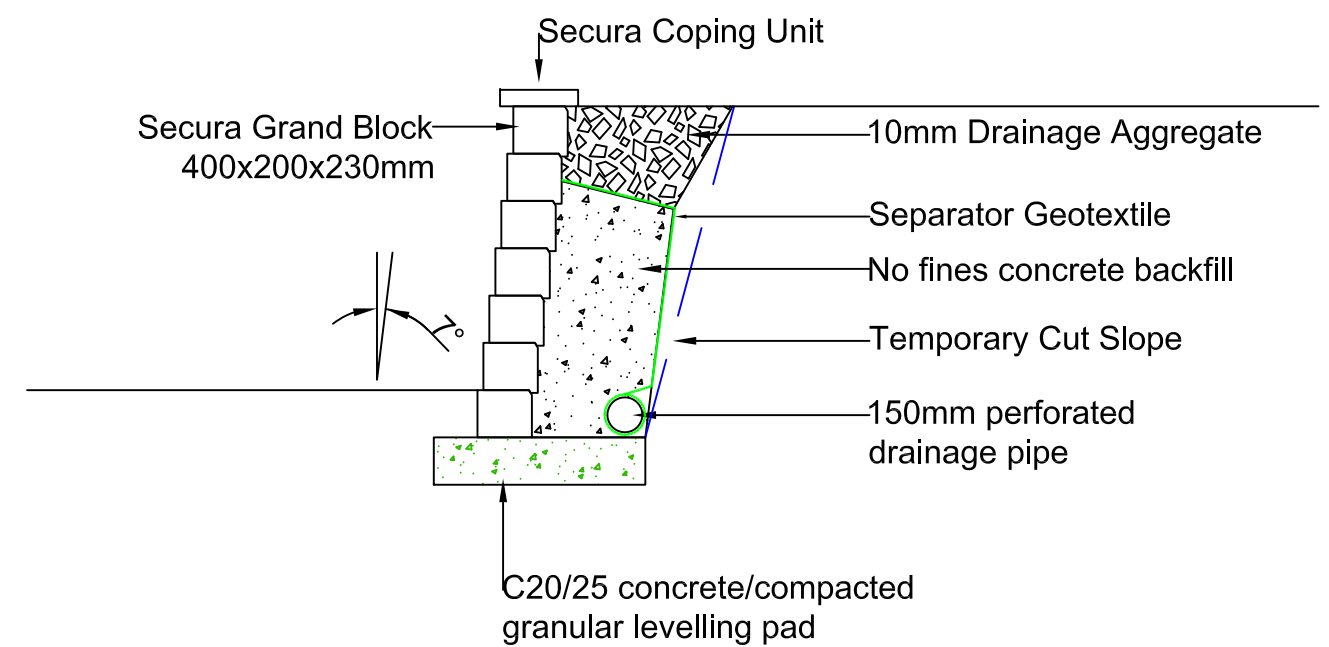
The aesthetics of external corners will be enhanced by using Secura corner blocks. Start construction of walls from the corner block outwards, using left and right corner blocks alternatively. Corner blocks are longer than Secura blocks, this combined with the corner effect means that action is required to maintain running bond.



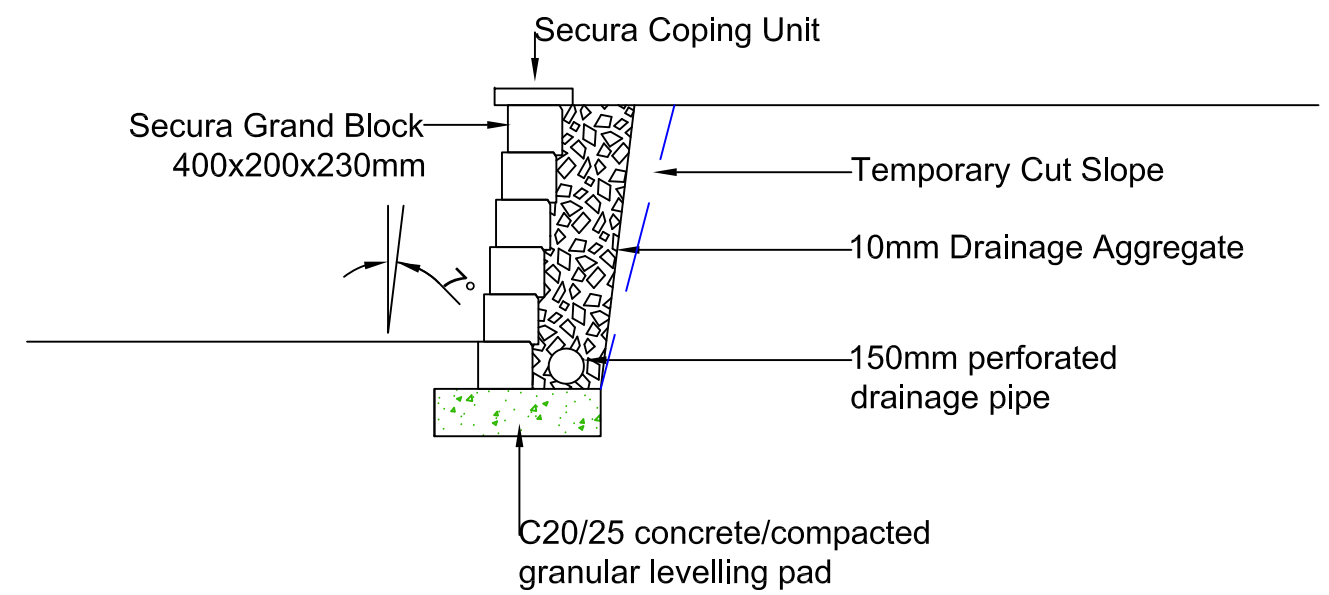
Example Geogrid Wall



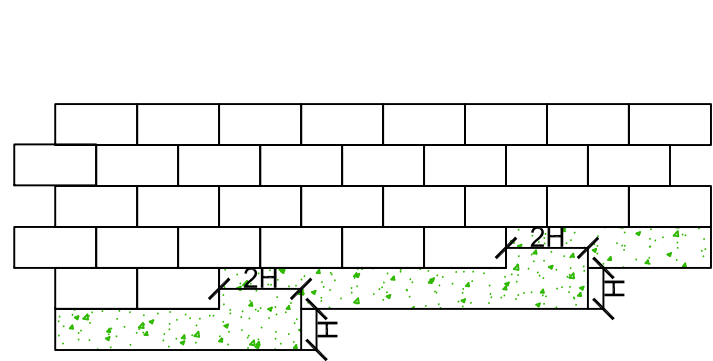
Example Concrete Wall



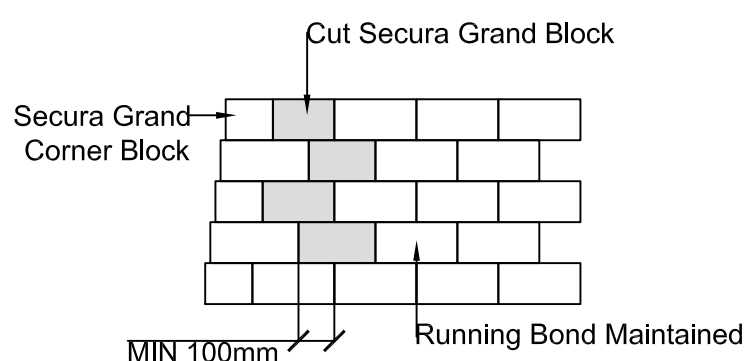
Example Gravity Wall



Base Stepping Detail

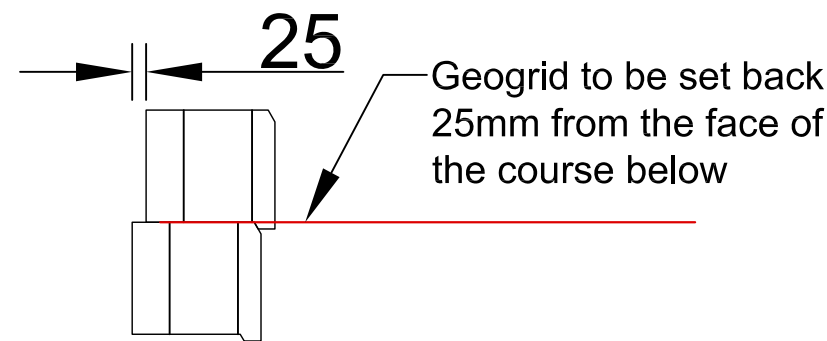


Running Bond Detail

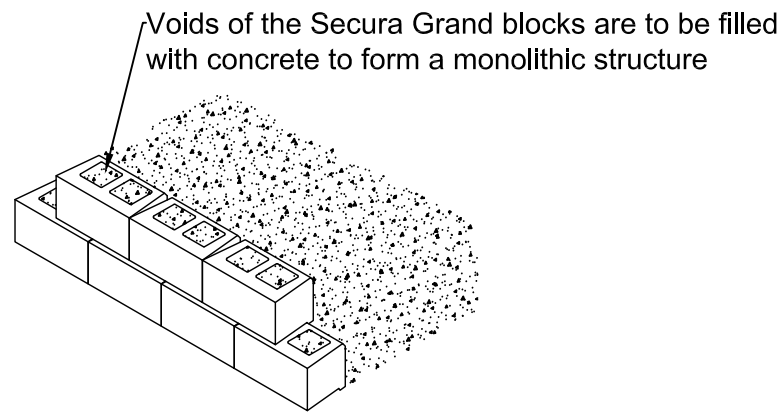


Where corners, curves or abutments are present on site the running bond of Secura Grand walls will come out of alignment. Care should be taken to ensure a minimum overlap of 100mm is achieved on every block. We recommend cutting blocks at corners, curves and abutments to maintain a running bond.

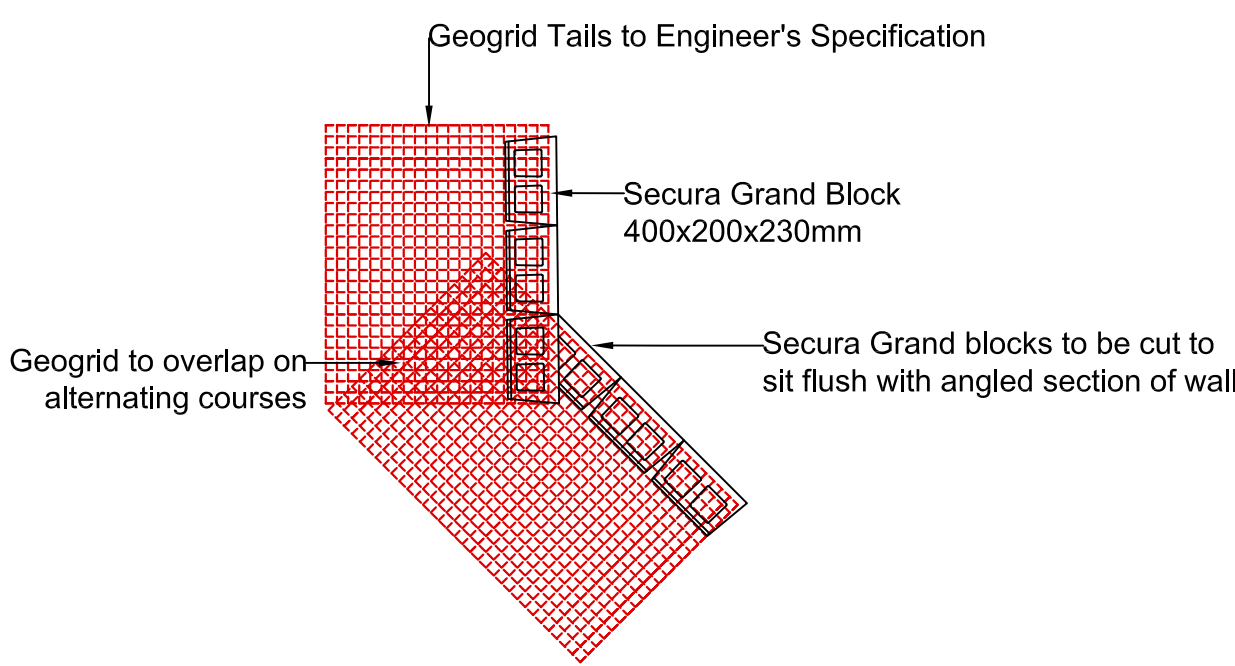
Geogrid Placement



Concrete Detail

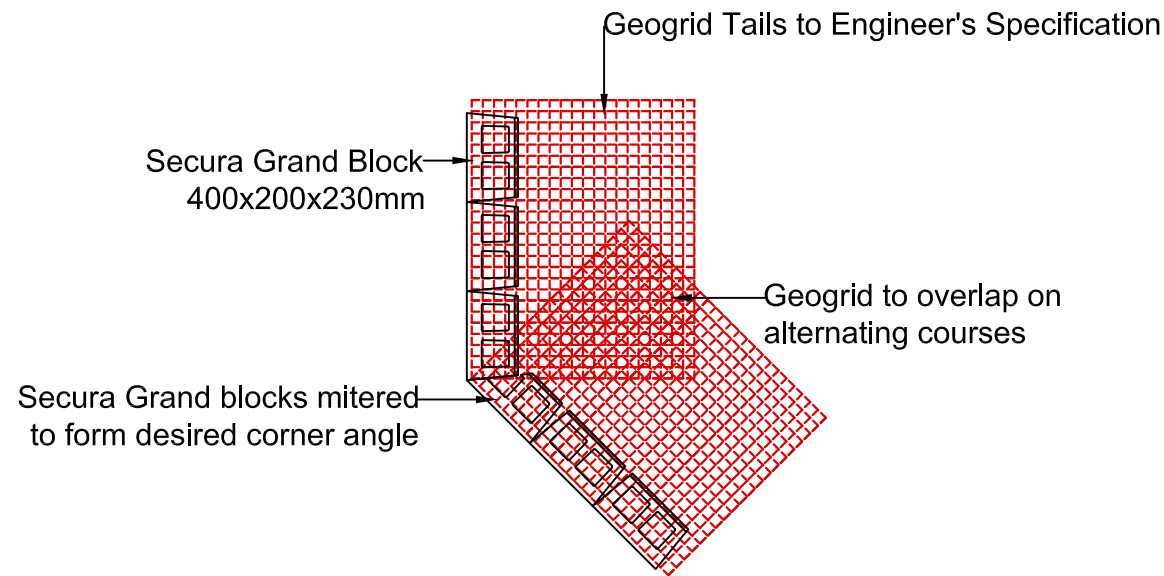


Best practice on site is to remove any requirement for obtuse corners by curving Secura Grand walls but sometimes they are unavoidable. Secura Grand obtuse internal corners are constructed by overlapping alternating courses of blocks. Unlike 90° internal corners the splay of the wall requires an angled cut to a Secura Grand block to archive the required angle of corner.



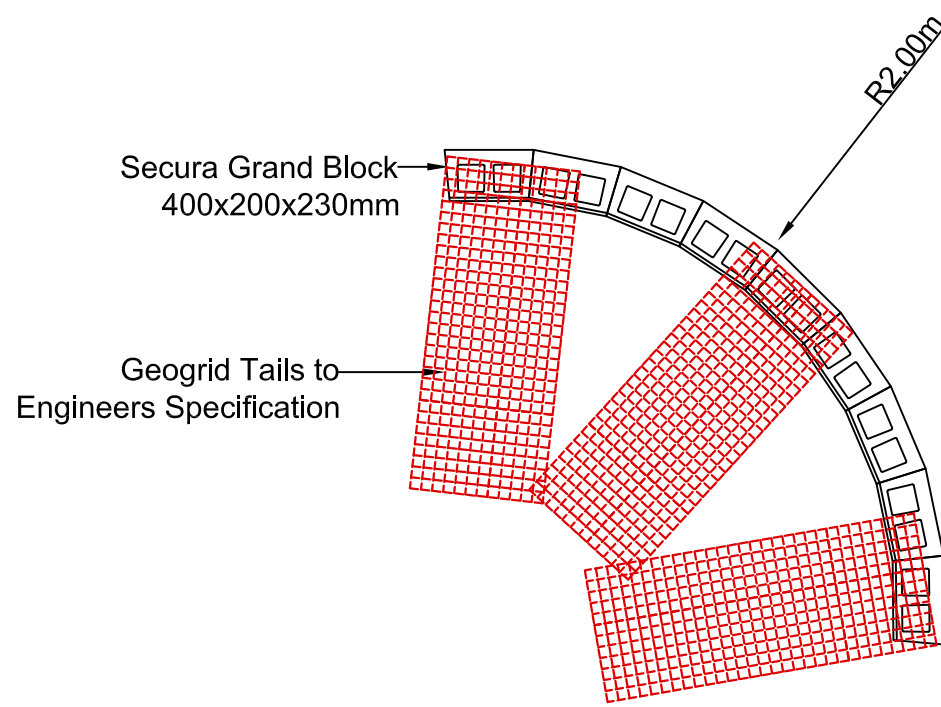
Obtuse External Corner Detail

Best practice on site is to remove any requirement for obtuse corners by curving Secura Grand walls but sometimes they are unavoidable. Unlike 90° external Secura Grand corners, obtuse corners do not benefit from a Secura Grand corner block. Blocks are instead mitered on site to archive the desired angle of corner.



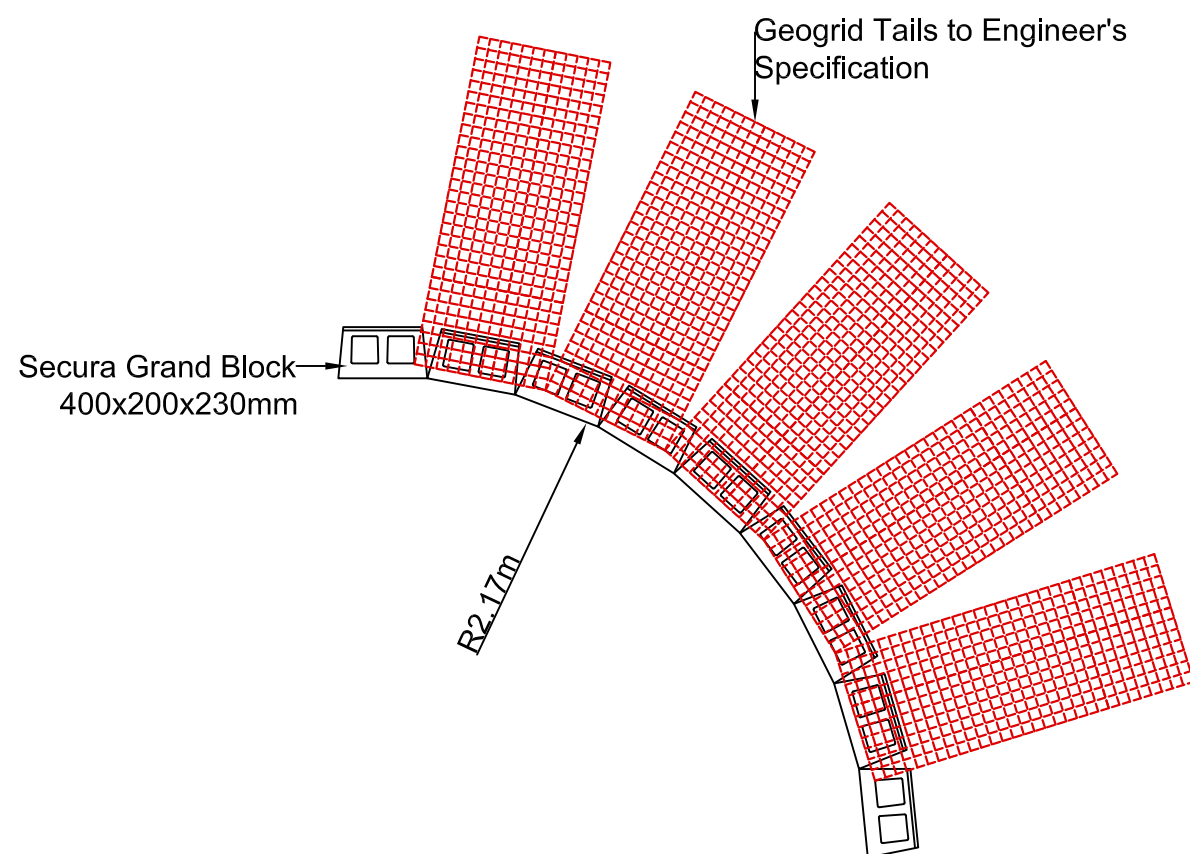
External Curve Detail

External curved Secura Grand walls will taper inwards as the height increases. The table (Left) indicates the minimum radius which should be built for a given wall height.



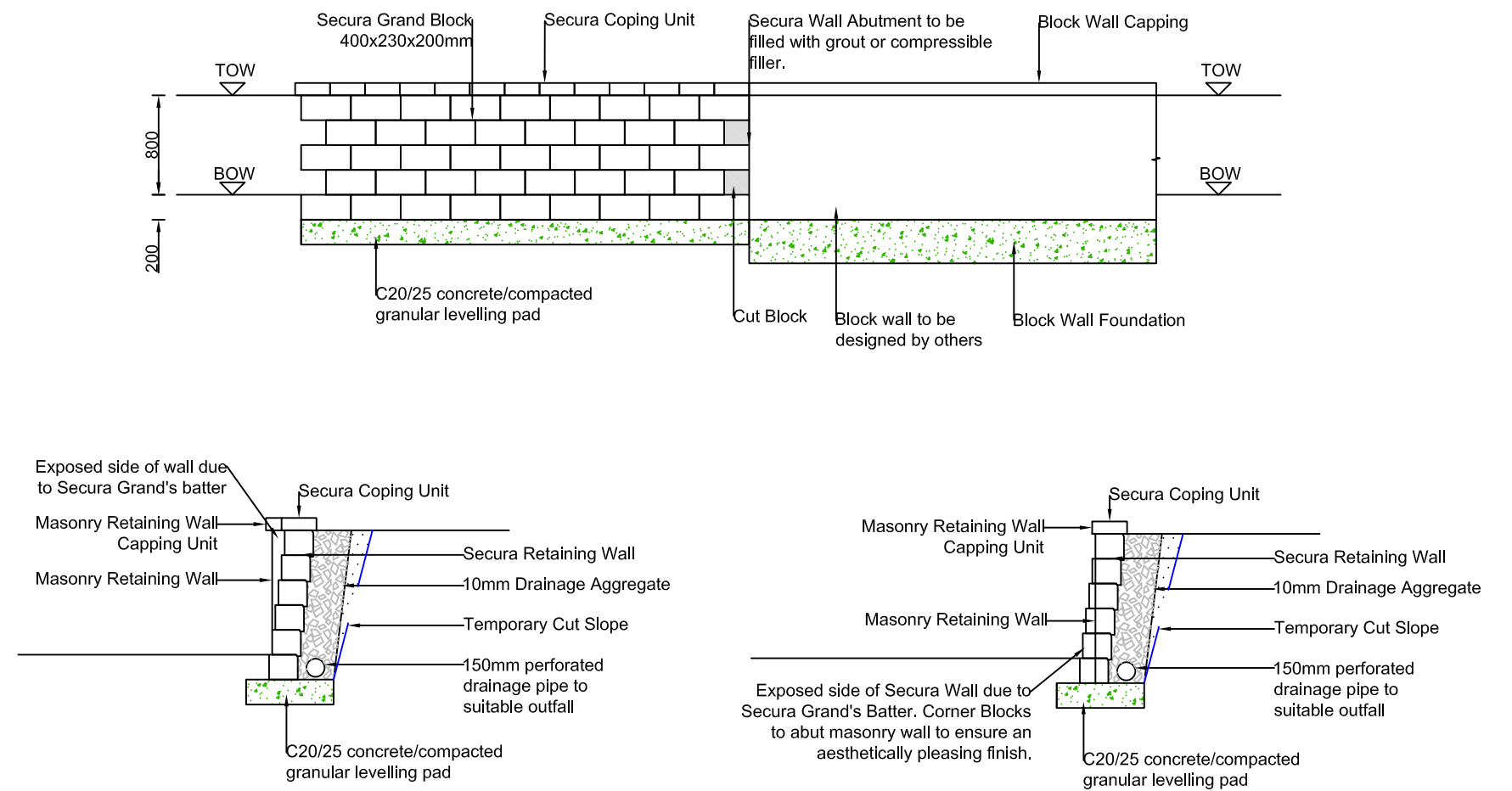
Internal Curve Detail

The minimum radius possible for an internal curve on a Secura Grand wall is 2.4m, when measured to the back of the base course blocks (2.17m to the front of the block).

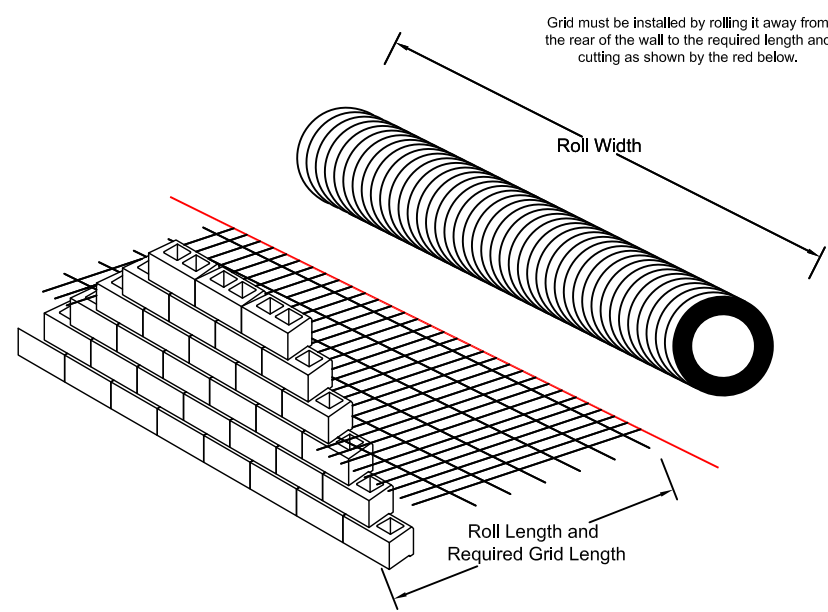


Standard Abutment Detail

Care should be taken when setting out for Secura Grand walls that have abutments to/from other structures. The batter of a Secura Grand wall must be taken into consideration to achieve the desired aesthetic finish of the wall. Structures must remain independent of each other and not impart loadings to the Secura Grand wall.



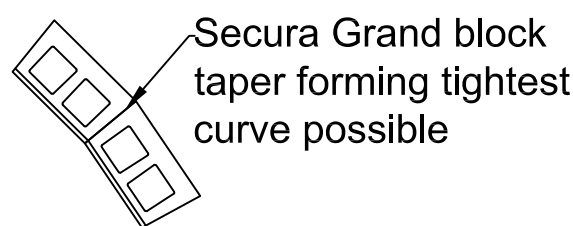
Geogrid Orientation Detail



External Corner Radius Examples	
Wall Height (Including Base Course) (m)	Minimum Radius (To The Back Of The Base Course Block) (m)
1.2	2.00
1.4	2.03
1.6	2.07
1.8	2.10
2.0	2.15
2.2	2.20
2.4	2.30
2.6	2.35
2.8	2.40
3.0	2.50
3.2	2.50
3.4	2.70
3.6	2.80

Taper Detail

Secura Grand blocks taper from the face of the block to the back, this feature allows for external curves to be formed.



For geogrid reinforced walls, geogrid must be placed 25mm back from the face of the block below. Geogrid must be rolled out perpendicular to the face of the Secura Grand wall and cut to the required length as specified by the wall designer.

Exclusion zone guidance for plant and heavy machinery is to be referenced from the latest and most up to date versions of BS8006 & 600SHW.

Disclaimer:

1. ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE SPECIFIED.
2. FOR INSTALLATION REFER TO THE TOBERMORE TECHNICAL GUIDE.
3. ALL REFERENCES ARE TO THE LATEST BRITISH STANDARD AND EUROPEAN STANDARDS.
4. ALL DESIGNS SHOULD BE CHECKED BY A QUALIFIED ENGINEER.
5. SPECIALIST DESIGN ADVICE SHOULD BE SOUGHT PRIOR TO CONSTRUCTION.
6. TOBERMORE CONCRETE Ltd WILL NOT BE LIABLE FOR ANY LOSS OR DAMAGE RESULTING FROM THE USE OR RELIANCE ON THIS DRAWING.
7. REFER TO THE SUPPORTING DOCUMENTATION: PLEASE VISIT WWW.TOBERMORE.CO.UK OR ASK YOU LOCAL SALES REP FOR MORE INFORMATION
8. THIS DOCUMENT IS FOR PRELIMINARY USE ONLY. FULL CONSTRUCTION DRAWINGS CAN BE COMMISSIONED THROUGH ONE OF TOBERMORE'S ENGINEERING PARTNERS. IF YOU WOULD LIKE A QUOTE TO COMPLETE THIS WORK PLEASE CONTACT YOUR LOCAL TOBERMORE REPRESENTATIVE.

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Tobermore Secura Grand
Retaining Wall Specification Sheet

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Ref: T-SG-SPEC
Date: 08/12/2022

Scale As Indicated @ A1

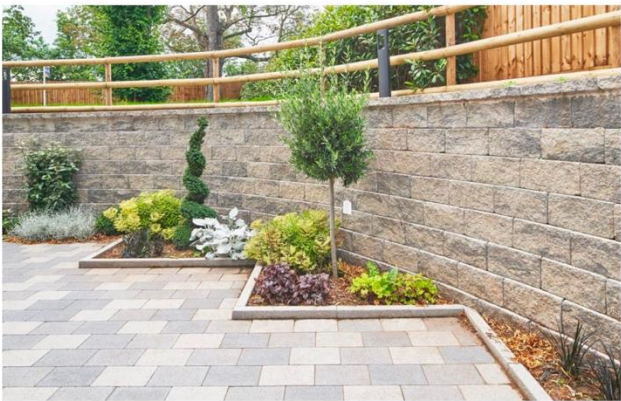
Secura Maintenance Overview

Secura segmental retaining walls are an excellent choice due to the requirement of very little maintenance. However, where any specific requirements have been set out in the project engineers wall design, these should be adhered to. Such requirements are as follows:

- Routine cleaning of the drainage pipe at the rear of the wall is important, to ensure free drainage.
- Routine inspections should ensure copings are soundly secured and any loose copings should be suitably re-fixed.
- Visual inspection for any movement in the wall should be included in the site maintenance regime

Comparison against Concrete Crib, Wood Crib, Root Lok and Gabion:

Benefits	Secura Grand	Masonry	Reinforced concrete wall	Gabion wall	Crib Wall
Attractive stone finish	✓	X	X	X	X
Mortarless option	✓	X	X	✓	✓
Maintenance free	✓	X	X	✓	✓
Speed of construction	✓	X	X	X	X
Cost effective	✓	X	X	✓	X
Simplicity on-site	✓	X	✓	✓	X
Reduced efflorescence	✓	X	X	✓	✓



Secura Grand

Technical excellence lies at the core of the Secura segmental retaining wall system and Tobermore have engineered every aspect of its design to provide total assurance for the specifier. Secura's innovative segmental block format delivers many benefits in addition to its core functionality.

Why Secura Retaining Walls?

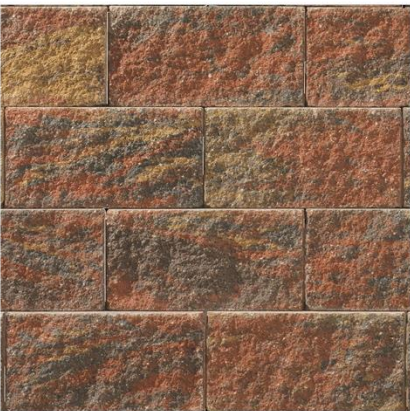
- ✓ Cost effective retaining wall product
 - ✓ Quick to install
 - ✓ Mortar-free installation
 - ✓ Builds up to 9m retained height
 - ✓ Engineered for strength
- ✓ Attractive stone finish with a range of colour options
 - ✓ Vibrant long-lasting colours
 - ✓ Full design and technical support available
 - ✓ BBA HAPAS approved
 - ✓ Can be combined with Geogrid to form reinforced soil walls for retaining structures

Colours, Size and Accreditation

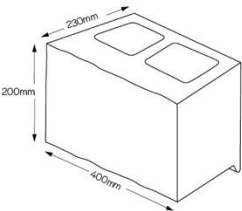
Bracken



Heather



Slate



Disclaimer

The design of any retaining wall requires the input of an engineer to assess the unique conditions of every site in respect of loads in conjunction with site and soil conditions. The advice and typical wall designs included here are for information only to assist estimating and initial planning but should not be used for construction.

This document has been prepared based on the information provided by you. As such, this document is provided without liability on the part of Tobermore Concrete Products Limited (Tobermore) to the extent that any such information is inaccurate, incorrect, or incomplete.

You are strongly advised NOT to progress with construction as contemplated by this document until a detailed design drawing has been prepared by a qualified engineer or architect based on a detailed site survey. If the design contemplated in this document is constructed, this will be entirely at your own risk, and without liability on the part of Tobermore.

Tobermore does not exclude or limit in any way its liability to you where it would be unlawful to do so. This includes liability for death or personal injury caused by our negligence and for fraud or fraudulent misrepresentation. In all other respects, Tobermore excludes and/or limits its liability to the maximum possible extent permitted under applicable law. In no circumstances shall Tobermore be liable to you for any loss of profit, loss of business, business interruption, loss of business opportunity, or any indirect or consequential loss or damage whatsoever, arising under or in connection with this preliminary design, even if Tobermore was aware of the possibility that such loss or damage might be incurred by you.

Thank you for considering Tobermore, Secura Grand for your site.

Regards, Tobermore.





Get in touch

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Through great
products, & great
experiences ”