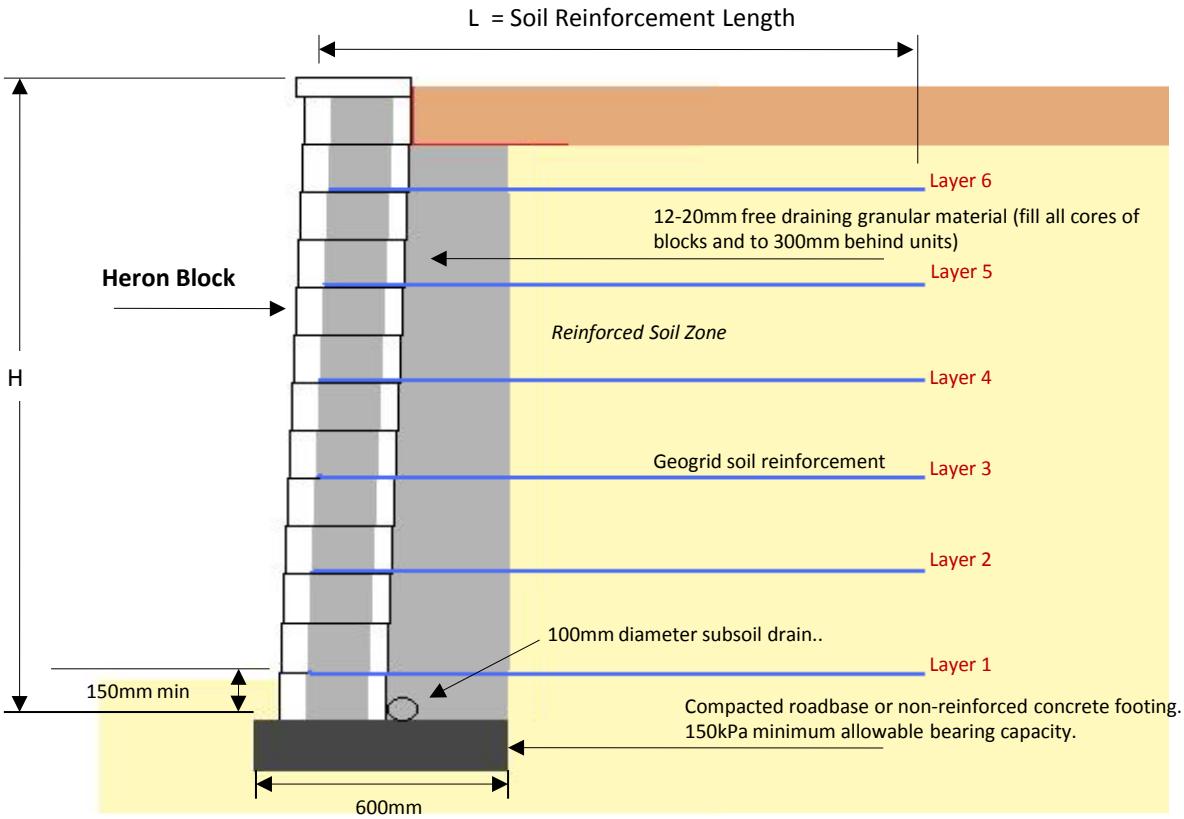
HERON RETAINING WALL SYSTEM
SOIL REINFORCED WALLS: GEOGRID TABLE

Austral Masonry's Heron segmental block retaining wall system utilizes its shape and weight in order to resist the lateral earth pressures. In combination with geogrid soil reinforcement, these walls can be built to substantial heights, without costly structural reinforced concrete footings.

Geogrid Requirements:

The length, location and grade strength of geogrid is dependent on the wall height, loading on top of the structure, and soil properties. The table below is in accordance with AS4678: 2002 – Earth Retaining Structures.

NOTE: Please consult with appropriate council for design and construction regulations. Councils in general require walls to be designed and certified by a suitably qualified engineer where the wall is over 500mm in height or a load such as a road, building or hydrostatic pressure is present. The suitability of the information contained in the table must be referred to a qualified consulting engineer. These tables are provided as a guide only.



Heron™ Wall Block

Specifications
Size(mm): 390L x 245W x 198H
Weight (each):
Heron™ Wall Block 22kg
Blocks per m²:
1m² wall = 13 blocks

Heron™ Capping Block

Specifications
Size(mm): 390L x 245W x 90H
Weight (each):
Heron™ Capping Block 16kg
Blocks per lineal metre:
2.56 blocks

Heron™ Corner Block
(Right-hand corner unit shown)

Specifications
Size(mm): 160L x 360W x 198H
Weight (each):
Heron™ Corner Block 20kg
Available in left or right

HERON RETAINING WALL SYSTEM
GEOGRID TABLE – GUIDE ONLY

Surcharge	Wall Height (m)	Geogrid Layers	Geogrid Placement above Levelling Pad						Geogrid Length L (mm)		
			Number of Geogrid layers						Soil Type (ϕ)		
			1	2	3	4	5	6	25	30	35
5kPa Driveway Surcharge	1.0	2	0.2	0.6					1.7	1.7	1.7
	1.2	2	0.4	0.8					1.7	1.7	1.7
	1.4	2	0.4	0.8	1.2				2.0	1.7	1.7
	1.6	3	0.4	0.8	1.2				2.2	1.7	1.7
	1.8	3	0.4	0.8	1.4				2.2	1.7	1.7
	2.0	4	0.4	0.8	1.4	1.8			2.3	2.0	2.0
	2.2	4	0.4	0.8	1.4	1.8			2.5	2.0	2.0
	2.4	4	0.4	0.8	1.4	2.0			2.6	2.1	2.0
	2.6	5	0.4	0.8	1.6	2.0			2.8	2.2	2.2
	2.8	5	0.4	0.8	1.4	2.0	2.6		2.9	2.5	2.4
	3.0	6	0.2	0.6	1.2	1.8	2.4	2.8	3.1	2.8	2.6

Soil Types

- **Poor (ϕ = 25°):** Soils with friction angle ≥ 25° , may include sandy clays, gravelly clays and sand. Expansive clays and organic soil MUST not be used within the soil reinforced zone.
- **Average (ϕ = 30°):** Soils with friction angle ≥ 30°, may include gravelly sands and well graded sands.
- **Good (ϕ = 35°):** Soils with friction angle ≥ 35°, may include gravels, sandy gravels, weathered sandstone and crushed sandstone.

Design Considerations

- Maximum wall heights table is based on a 5kPa surcharge load acting on top of the wall as per AS4678: 2002. This table is supplied as a guide only and must be referred to a qualified professional engineer. If imposed surcharge loads above 5kPa are applied, these designs are not appropriate.
- Based on a minimum Bearing Capacity of 200kPa
- Designs assume no hydrostatic loading.
- The minimum embedment of wall below ground level is assumed to be the greater of H/20 or 100mm.
- Designs are based on Geogrid strength of 55kN/m^2

HERON RETAINING WALL SYSTEM
CONSTRUCTION GUIDELINES

Construction Steps

Step 1: Excavation and Foundations

Excavate in accordance with the specific design requirements. Bench out site to allow for full length of geogrid as per design. Excavate levelling pad trench 600mm wide by a minimum 250mm deep. This allows for a 150mm deep levelling pad + 100mm minimum block embedment.

Step 2: Levelling Pad

The footing shall be 600mm wide x 150mm deep, of compacted roadbase or un-reinforced concrete.

Step 3: First Course

The first course is to be laid on the levelling pad and aligned using a string line along the back of the units. Ensure units are levelled side to side and front to back. It is critical that the first course is accurate and level in order to ensure acceptable horizontal and vertical tolerances. Sand or mortar can be used as a levelling aid on the first course.

Step 4: Drainage Materials

Place a 100mm agricultural drainage pipe for subsoil drainage behind the first course of blocks, with a minimum fall to the drainage outlet of 1:100. Fill all the voids within the blocks and extend 300mm behind the blocks with 12-20mm clean granular material, to the top of the first course.

Step 5: Placement of Geogrid

The geogrid must be placed between the blocks as specified on the drawings. Geogrids shall be cut to the required length. Place the next course of blocks on top of the geogrid. Gently pull taut to remove any slack in the geogrid. Secure the back end of the geogrid before repeating Step 3 and proceeding with Step 6.

Step 6: Backfill and Compaction

Place approved backfill material over the geogrids. Backfill shall be spread in a maximum of 200mm lifts, starting at the front of the wall (behind the drainage zone) to back of the soil reinforced zone. Compaction equipment must not make contact with the geogrids. Hand held plate compactors to be used within 1.5m from the front of the wall. Heavier compaction equipment may be used 1.5m away from the front of the wall face. Compaction to be 98% of Standard Maximum Dry Density. Surface drainage during and after construction of the wall shall be provided to minimise water infiltration in the compacted soil reinforced zone.

Step 7: Subsequent Courses

Repeat steps 4 through to 6. Ensure compaction lifts are kept at 200mm. Blocks need to be levelled after compacting each lift.

Step 8: Capping of wall

Install capping units and fix with concrete adhesive.

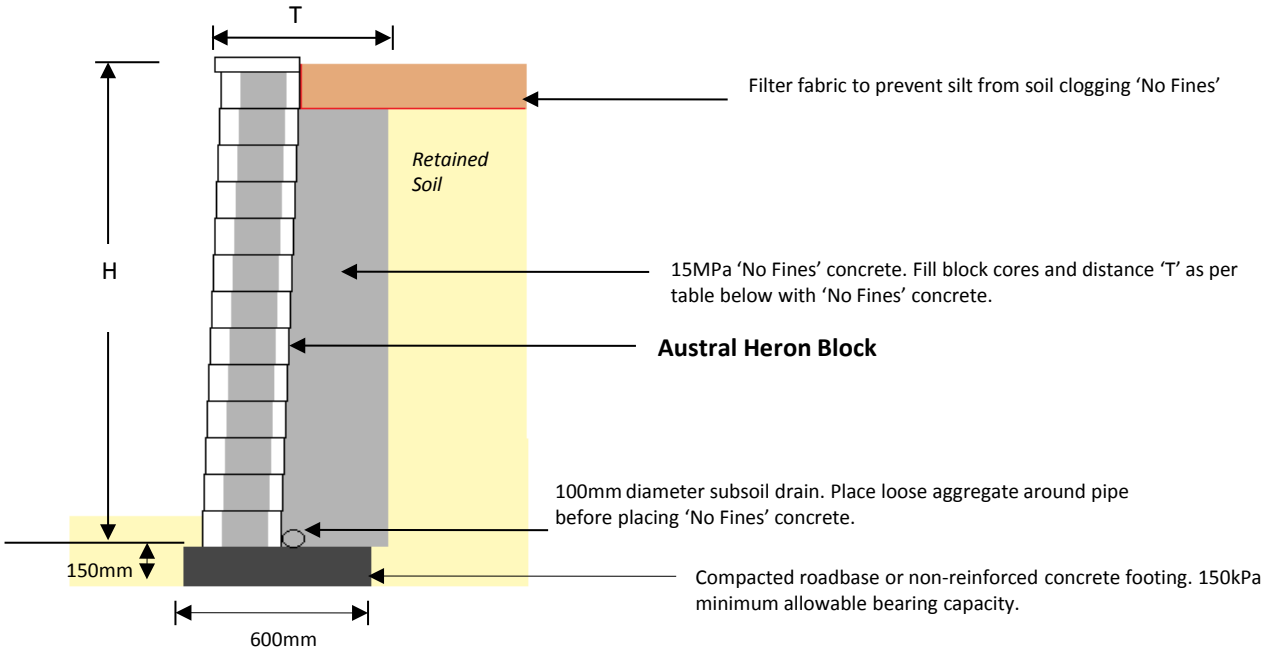
HERON RETAINING WALL SYSTEM
NO FINES CONCRETE

'No Fines' concrete is ideal for cut sites and boundaries, where the use of soil reinforcement and excavation of the backfill is impractical. The use of 'No Fines' adds mass to the Heron retaining wall system allowing for the overall height to be increased from a standard gravity wall without the need for geogrid reinforcement.

'No Fines' concrete specifications:

- 15MPa concrete with a 6:1 ratio (Gravel: Cement).
- Density range: 1800kg/m^3 to 2100kg/m^3.
- Void ratio of the mix is expected to be between 20% to 30% and should be free draining.

NOTE: Please consult with appropriate council for design and construction regulations. Councils in general require walls to be designed and certified by a suitably qualified engineer where the wall is over 500mm in height or a load such as a road, building or hydrostatic pressure is present.



Wall Height H (mm)	Retained Soil CLAY $\phi = 26^o$ (POOR) T (mm)	Retained Soil SAND $\phi = 30^o$ (AVERAGE) T (mm)	Retained Soil GRAVEL $\phi = 34^o$ (GOOD) T (mm)
900	500	500	500
1200	750	650	600
1600	950	850	800
2000	1100	1000	1000
2400	1400	1200	1100
2800	1900	1500	1400

HERON RETAINING WALL SYSTEM
NO FINES CONCRETE CONSTRUCTION GUIDELINES

Design Considerations

- The 'No Fines' concrete maximum wall heights table is based on a 5kPa surcharge load acting on top of the wall as per AS4678: 2002. This table is supplied as a guide only.
- For higher walls the use of geogrid soil reinforcement is recommended. Contact Austral Masonry for further details.
- This product has zero slump exerting similar pressures on the soil and formwork, as loosely poured aggregate.
- The vertical height of any pour of 'No Fines' concrete is to be limited to 3 blocks high (approx. 600mm). The concrete must be allowed to harden before pouring the next lift.
- Global stability should be checked by a suitably qualified engineer.
- The design assumes no ground water to be present. For site conditions where ground water exists, the wall must be re-designed by a suitably qualified engineer.

Construction Steps

STEP 1: EXCAVATION & LEVELLING PAD

Excavate a trench 600mm wide by a minimum of 250mm deep (150mm depth of concrete footing + 100mm minimum block embedment). Place 25MPa non-reinforced concrete to form the footing.

STEP 2: FIRST COURSE

Place blocks onto levelling pad and align with string line at the rear of units. Ensure blocks are level side to side and front to back tapping gently with rubber mallet to make the necessary adjustments. It is critical the first course be level.

STEP 3: 'NO FINES' CONCRETE BACKFILL

Fill block cores and backfill to the specified depth with 'No Fines' concrete. The vertical height of pour must not exceed 600mm. Alternatively the wall may be propped. Ensure the face of the wall is not stained with the concrete, as once set will be difficult to remove. The back wings of the blocks need to be removed to ensure the No Fines concrete and blocks monolithic mass.

STEP 4: ADDITIONAL COURSES

Brush any excess 'No Fines' concrete material from the top of the blocks (before it is allowed to harden). Place the next course of blocks and repeat steps 2 and 3 until the required wall height is reached.

STEP 5: CAPPING THE WALL

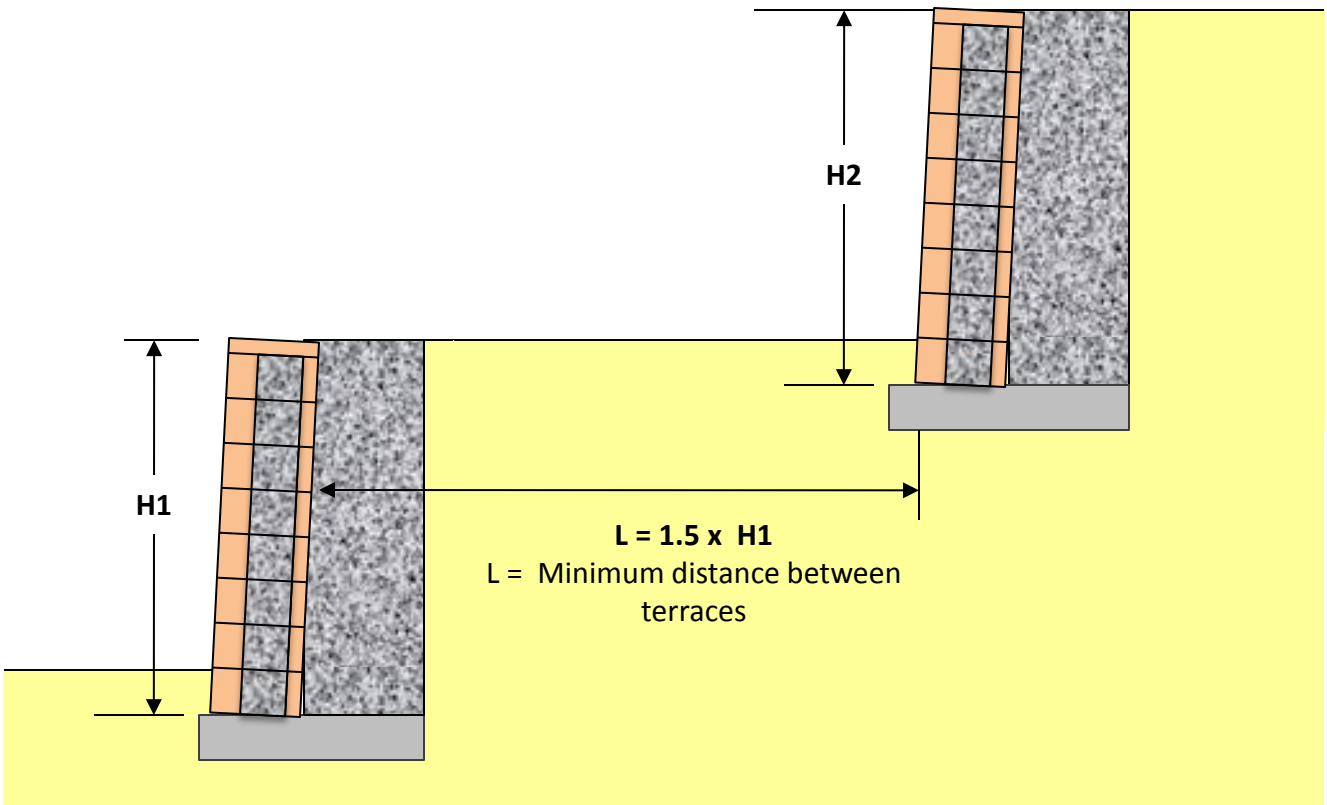
Secure capping units with a cement based flexible adhesive to finish the wall.

HERON RETAINING WALL SYSTEM
TYPICAL TERRACED WALL APPLICATION DETAILS

• Walls may be terraced for a number of reasons. To increase the aesthetic appeal of the retaining wall, to level off a sloping site, and in some instances to reduce the single wall heights to levels were they can behave as gravity walls, thus reducing the need to use geogrid or 'no fines' concrete. In the latter instances, it is important to remember that the upper terrace wall can put pressure on the lower terrace when the walls are built close together.

• As a general rule, for the terraces to act as individual retaining walls, the minimum distance between the wall terraces must be at least 1.5 times the height of the lower wall. Note, this rule does not address global stability issues where walls are built on steep sites or in poor soils. A Global stability analysis should be undertaken by a suitably qualified engineer where such conditions may exist.

• Where insufficient room exists on site to space the terraces at 1.5 x H1, the bottom terrace must be designed to accommodate the loading from the top terrace. The design analysis may model the structure as a single wall (i.e. H1 + H2) to allow for the additional load from the upper terrace wall on the lower terrace.



HERON RETAINING WALL SYSTEM
FENCING DETAILS

• When incorporating fences into the Heron Retaining wall system, the fence posts are to be placed behind the wall as shown.

• Fence posts should be embedded a minimum of 800mm from top of cap, and post encased with concrete. All other cores to be filled with gravel for drainage, or 'no fines' concrete as required. This embedment depth is for open fences only, where no wind loading is imposed on the wall and no impact loading is applied.

• Walls must be suitably designed to accommodate additional wind loading imposed on other types of closed fences; for example, increasing the embedment for the posts.