

Wall Characteristics

TYPE OF BLOCK	INSTALLATION	MAXIMUM HEIGHT AT THE TOP OF WALL INCLUDING BURIED UNIT WITHOUT OVERLOAD		MINIMUM POSSIBLE RADIUS		WALL ANGLE	AMOUNT OF WALL UNITS REQUIRED	
		FT	M	FT	M		/FT ²	/M ²
Tandem System (Lafitt, Melville)	Angled	3.5	1.1	4.0	1.2	9	variable	variable
	Vertical	2.2	0.67	4.0	1.2	0	variable	variable
Celtik® 90 Wall	Angled	3.5	1.1	3.0	0.9	9	variable	variable
	Vertical	2.2	0.67	3.0	0.9	0	variable	variable
Grande Wall (see note)	375, 750, 1125 units	8.5	2.6	65	20	0	5	0.46
	375, 750, 1125 units	10.5	3.2	65	20	9	5	0.46
	375, 750, 1125 units	13.1	4.0	65	20	17	5	0.46
Keystone Wall (see note)	Compact	3.0	0.9	4.0	1.2	0 or 9	22 and/or 11	2 and/or 1
Orion Wall	Vertical	2.3	0.72	-	-	0	variable	variable
RB wall	Angled	2.4	0.60	-	-	9.6	3.10	33.40
Split-face Universal* Slope Block Wall	Without joints	5.0	1.5	5.0	1.5	10	35	3.2
	50 mm - 2 in. joints	4.25	1.3	5.0	1.5	10	28	2.6
	100 mm - 4 in. joints	3.7	1.1	5.0	1.5	10	24	2.2
Universal* Slope Wall	Without joints	4.00	1.20	5.0	1.5	15	35	3.2
	50 mm - 2 in. joints	3.25	1.00	5.0	1.5	15	28	2.6
	100 mm - 4 in. joints	2.75	0.80	5.0	1.5	15	24	2.2
Urbano Wall	Angled	2.4	0.72	-	-	3	variable	variable
	Vertical	2	0.60	-	-	0	variable	variable
Vario Wall (90 - 180 mm)	Angled	3.5 - 2.3	1.08 - 0.72	-	-	9.46	variable	variable
	Vertical	2.3 - 1.75	0.72 - 0.54	-	-	0	variable	variable
Wallstone Wall	Angled	16	0.40	-	-	14	3.10	33.40
	Vertical	16	0.40	-	-	0	3.10	33.40
Wedgestone Wall	Angled	16	0.40	2.0	0.6	14	variable	variable
	Vertical	16	0.40	2.0	0.6	0	variable	variable

NOTE: The walls can be installed with other height and overload specifications than those above. Specific designs for special project conditions are available. Consult your Permacon Sales Representative for details.

The information contained in these technical documents is supplied for information purposes only. Any application of the information is the sole responsibility of the installer. The installer must ensure that the installation and use of retaining wall projects comply with local regulations and code requirements. A qualified engineer must be consulted for final design for construction purposes. Oldcastle Building Products Canada, Inc. and its affiliates cannot be held responsible for the improper use of information contained in these technical documents.

Grande® Wall

DESCRIPTION



The durable Grande® retaining wall comes in two architectural finishes: split face or smooth face.

The units that make up the Grande® wall are based on a unique tongue and groove interlocking technology. This provides greater flexibility, allowing you to build walls of virtually any height, with vertical setback or slope, relying on gravity or reinforced geogrid solutions.

BENEFITS:

- > Finish options: split or smooth
- > Quick and easy mechanical installation
- > Curved applications using Grande Wedge units
- > Ideal for large-scale retaining walls
- > Gravity or reinforced with geogrid installation, according to each project needs
- > No hardware required, thanks to its tongue and groove system
- > Several Grande Wall units suitable for different projects: standard wall unit, corner unit, step, capping and more



Since the design of a Grande Wall varies from one project to another, depending on the specifications of each, Permacon is able to provide a custom cross-section. For more information, please contact your Permacon representative or send an inquiry directly to our website.

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GRANDE SMOOTH WALL STANDARD UNITS

ISOMETRIC VIEW

375 STANDARD

1000 mm
39 3/8 in.

200 mm
7 7/8 in.

375 mm
14 3/4 in.

750 STANDARD

1000 mm
39 3/8 in.

200 mm
7 7/8 in.

750 mm
29 1/2 in.

1125 STANDARD

1000 mm
39 3/8 in.

200 mm
7 7/8 in.

1125 mm
44 5/16 in.

TYPICAL ROW - TOP VIEW

ISOMETRIC VIEW

CORNER UNIT

1000 mm
39 3/8 in.

200 mm
7 7/8 in.

500 mm
19 11/16 in.

STEP 175

1000 mm
39 3/8 in.

175 mm
6 7/8 in.

438 mm
17 1/4 in.

CAPPING 438

1000 mm
39 3/8 in.

200 mm
7 7/8 in.

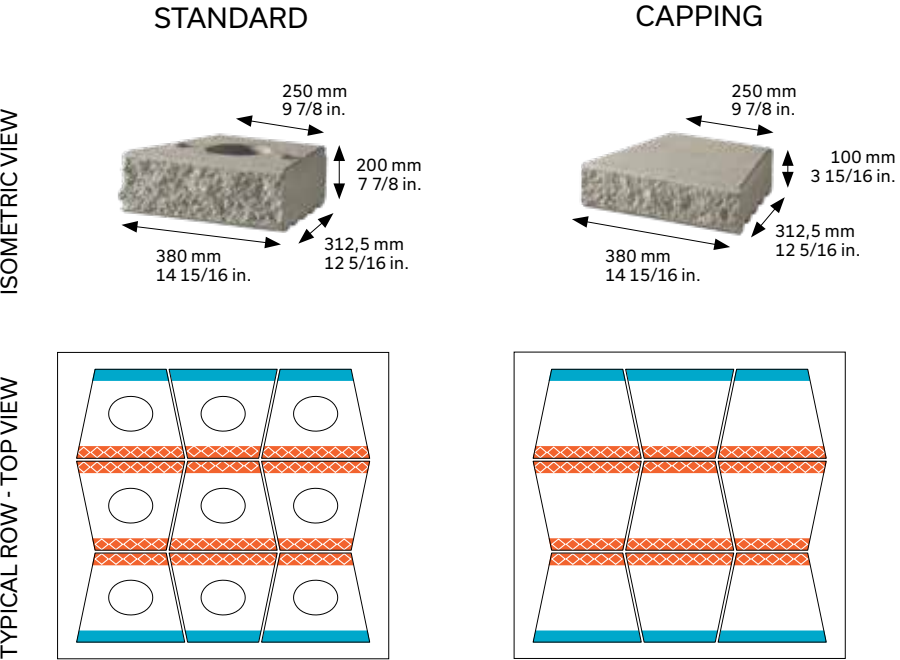
438 mm
17 1/4 in.

TYPICAL ROW - TOP VIEW

Left corner

Right corner

GRANDE WALL WEDGE UNITS



Please note that Grande Wedge Wall is available in split face finish only, with one split face, and one smooth face on each unit.

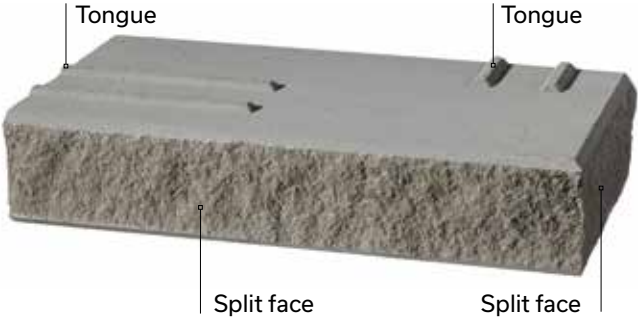
LEGENDE Smooth face Split face

BASIC PRINCIPLES

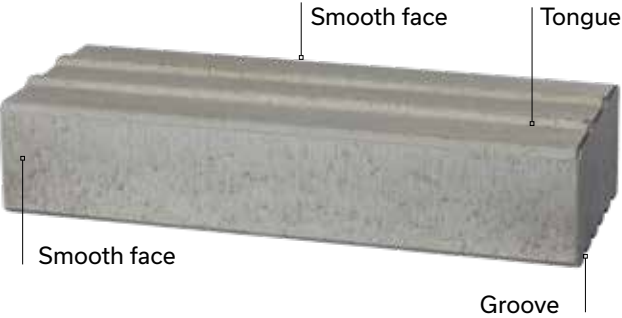
Grande 375 Standard Unit



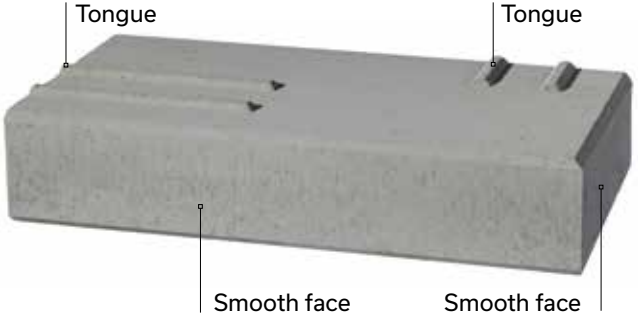
Grande Corner Unit (right)



Grande Smooth 375 Standard Unit



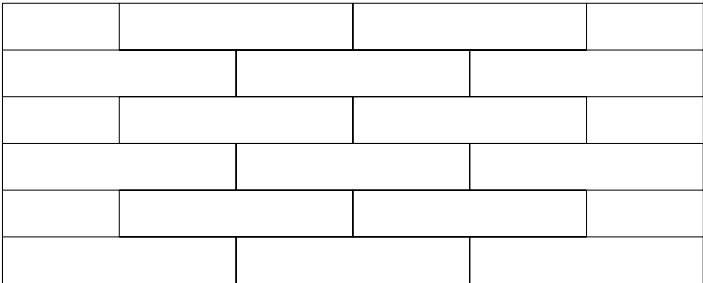
Grande Smooth Corner Unit (right)



GRANDE WALL - INSTALLATION

LAYING PATTERN

RUNNING BOND PATTERN



CREATING OUTER AND INNER CORNERS

It is recommended to always begin the construction of a retaining wall with a corner in order to avoid cuts and an alignment of vertical joints from one row to another.



ISOMETRIC VIEW - OUTER CORNER



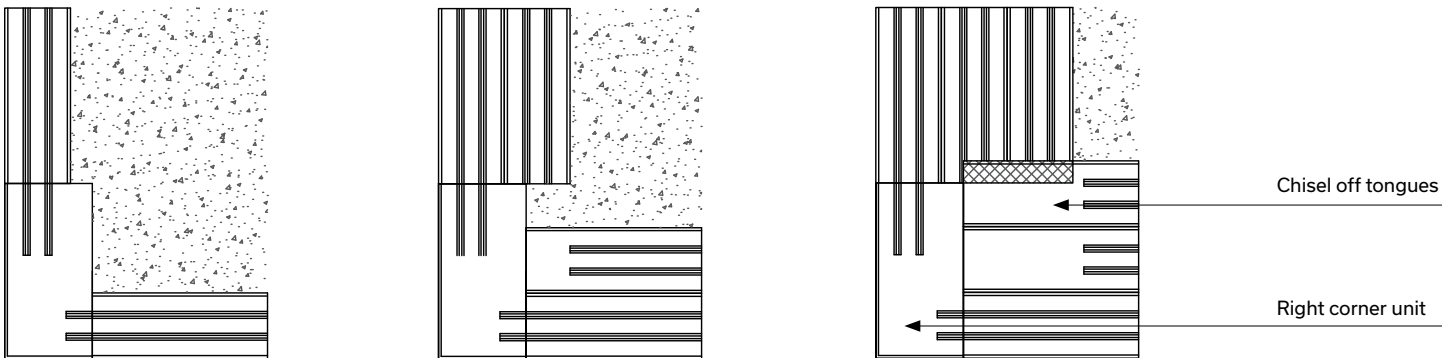
ISOMETRIC VIEW - INNER CORNER

OUTER 90° CORNER

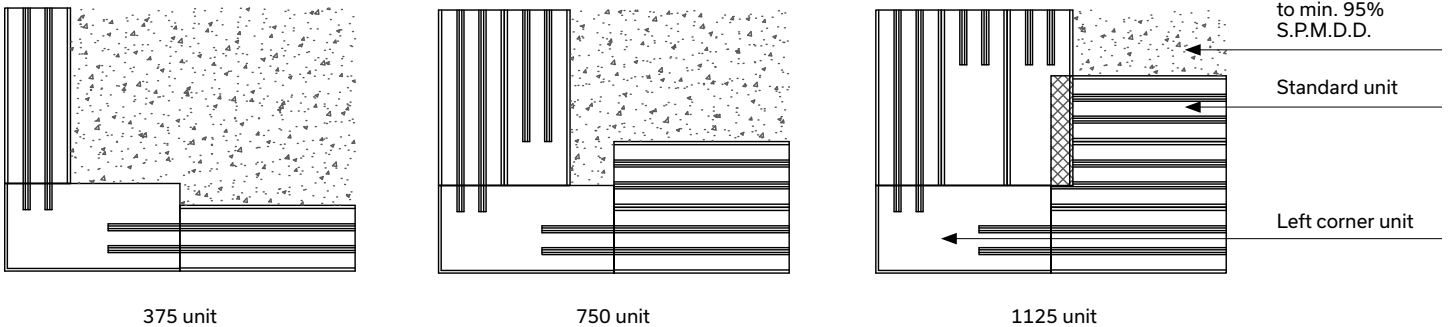
To create a 90° outer corner, follow these instructions:

- 1** - Begin the construction of a retaining wall with a corner in order to avoid cuts and an alignment of vertical joints from one row to another
- 2** - Alternate each row
- 3** - It is possible to start with a right corner or a left corner, as desired
- 4** - Use Techniseal concrete adhesive between each corner unit to ensure increased stability
- 5** - Units requiring cutting should be cut at least 125 mm - 5 in.
- 6** - Part of the corner units tongues should be chiseled off to allow interlocking with the upper rows

Plan view - Odd rows



Plan view - Even rows

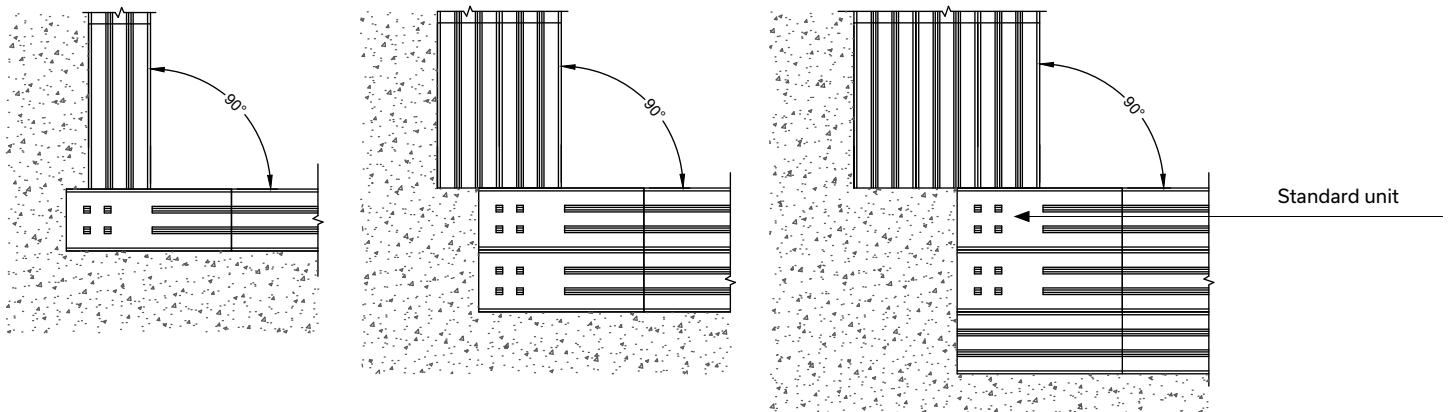


INNER 90° CORNER

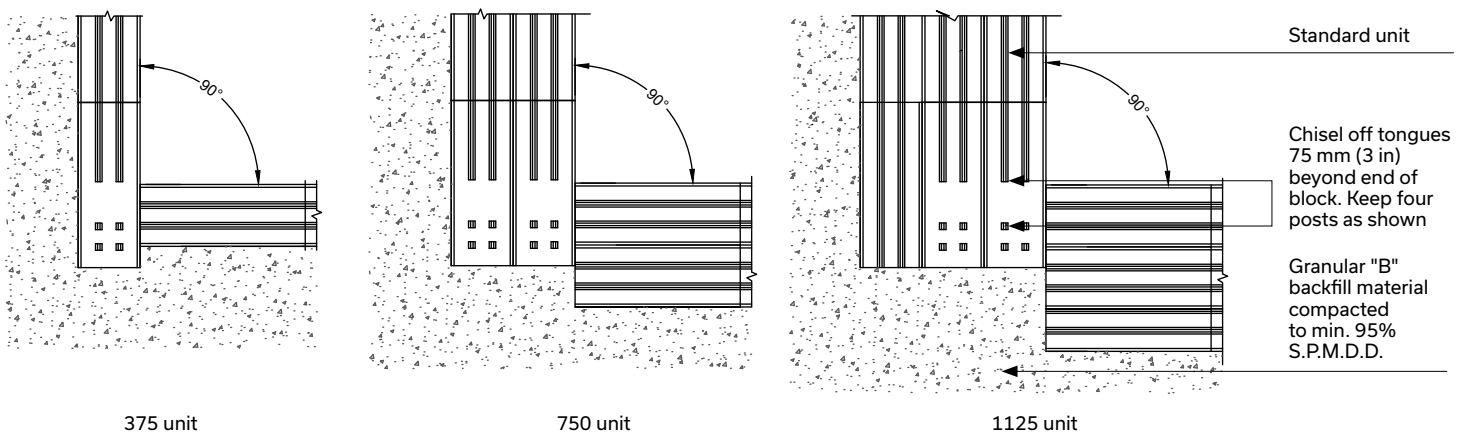
To create a 90° inner corner, follow these instructions:

- 1 - Begin the construction of a retaining wall with a corner in order to avoid cuts and an alignment of vertical joints from one row to another
- 2 - Alternate each row
- 3 - It is possible to start with a right corner or a left corner, as desired
- 4 - Use Techniseal concrete adhesive between each corner unit to ensure increased stability
- 5 - Part of the corner units tongues should be chiseled off to allow interlocking with the upper rows

Plan view - Odd rows



Plan view - Even rows

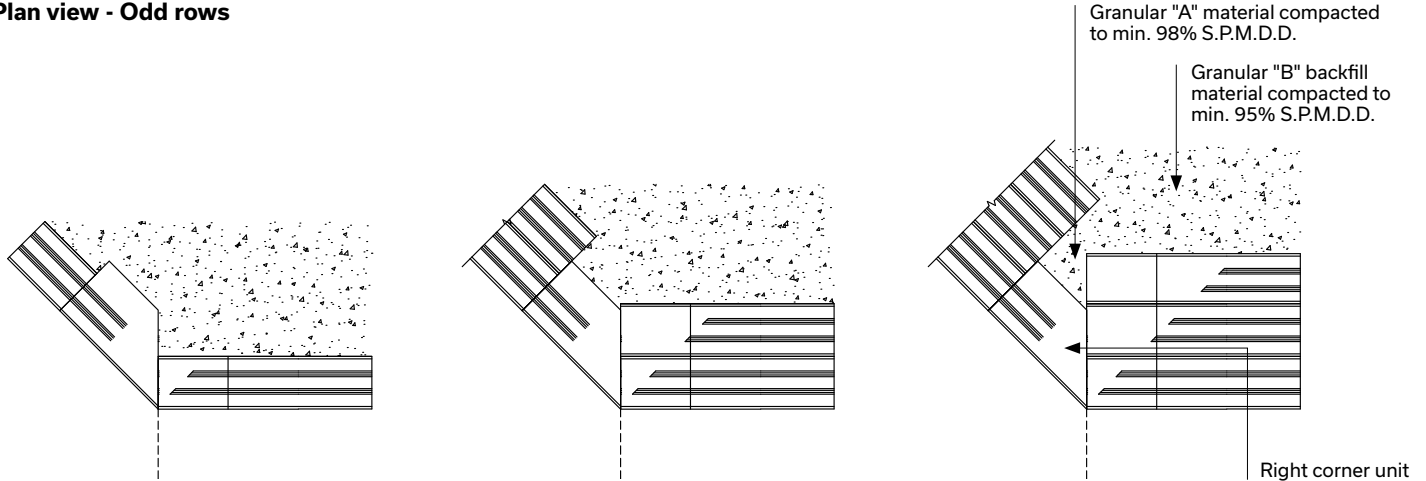


OUTER ANGLE CORNER

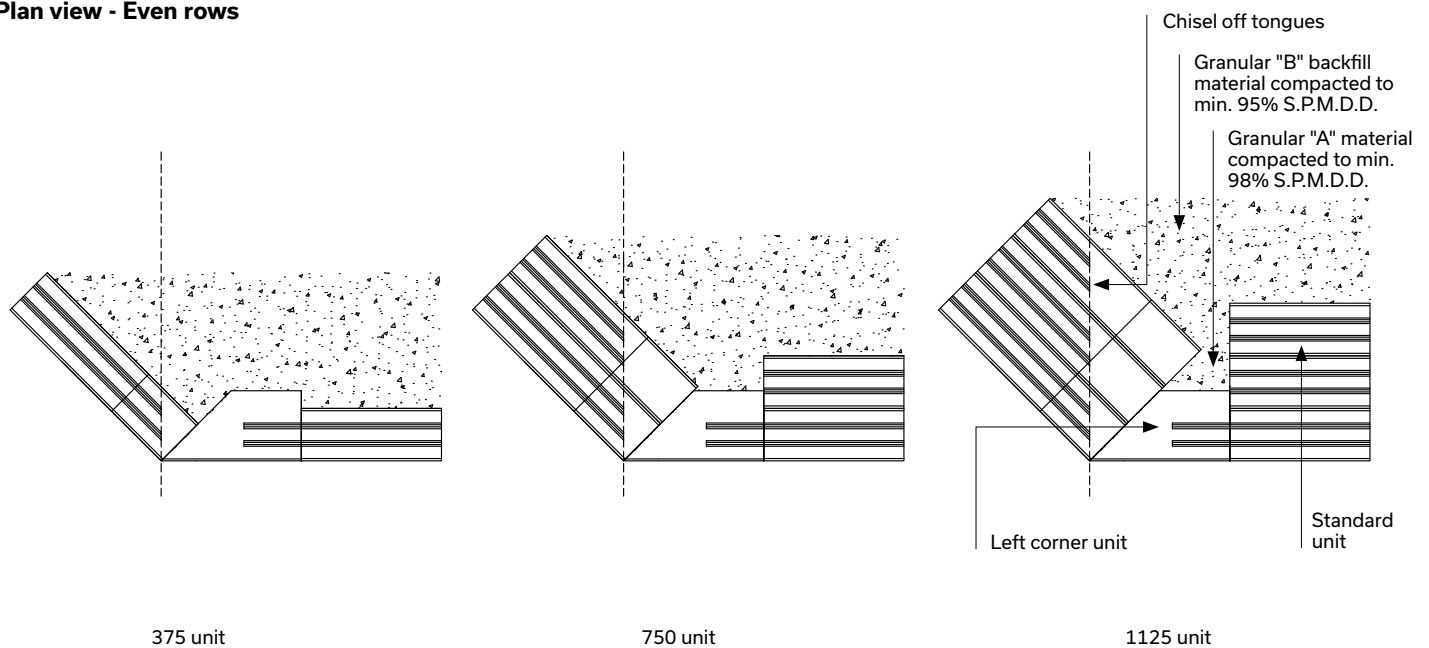
To create an outer angle corner, follow these instructions:

- 1** - Begin the construction of a retaining wall with a corner in order to avoid cuts and an alignment of vertical joints from one row to another
- 2** - Alternate each row
- 3** - It is possible to start with a right corner or a left corner, as desired
- 4** - Use Techniseal concrete adhesive between each corner unit to ensure increased stability
- 5** - Part of the corner units tongues should be chiseled off to allow interlocking with the upper rows

Plan view - Odd rows



Plan view - Even rows

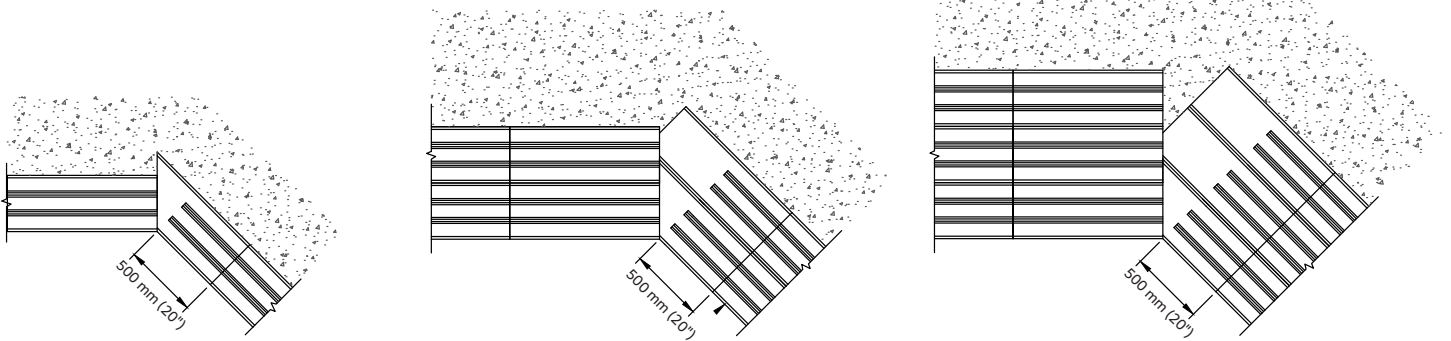


INNER ANGLE CORNER

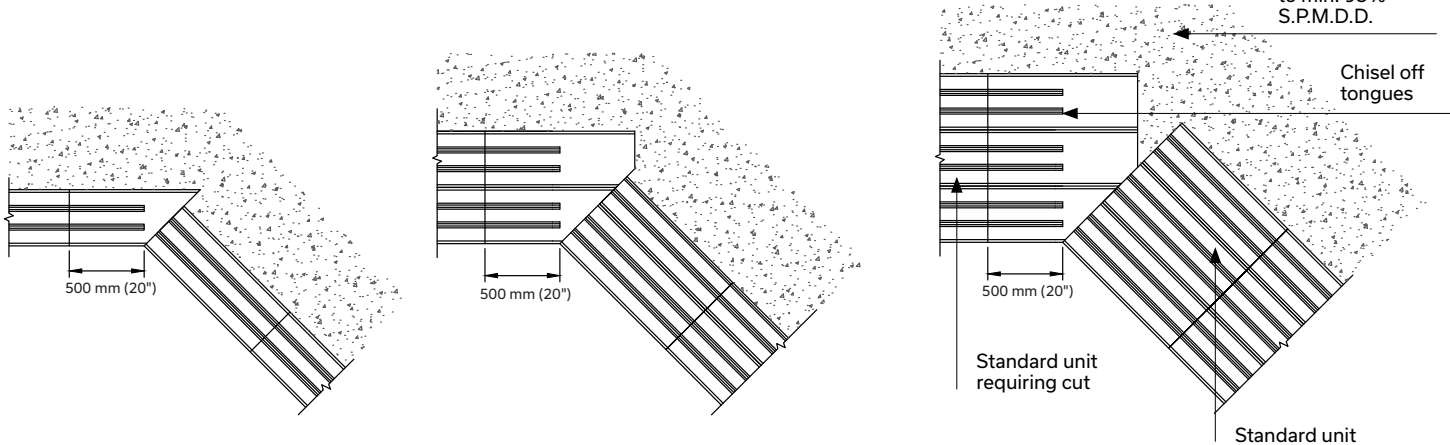
To create an inner angle corner, follow these instructions:

- 1** - Begin the construction of a retaining wall with a corner in order to avoid cuts and an alignment of vertical joints from one row to another
- 2** - Alternate each row
- 3** - It is possible to start with a right corner or a left corner, as desired
- 4** - Use Techniseal concrete adhesive between each corner unit to ensure increased stability
- 5** - Units requiring cutting should be cut in a way to have a unit of at least 500 mm - 20 in. in length

Plan view - Odd rows



Plan view - Even rows



375 unit

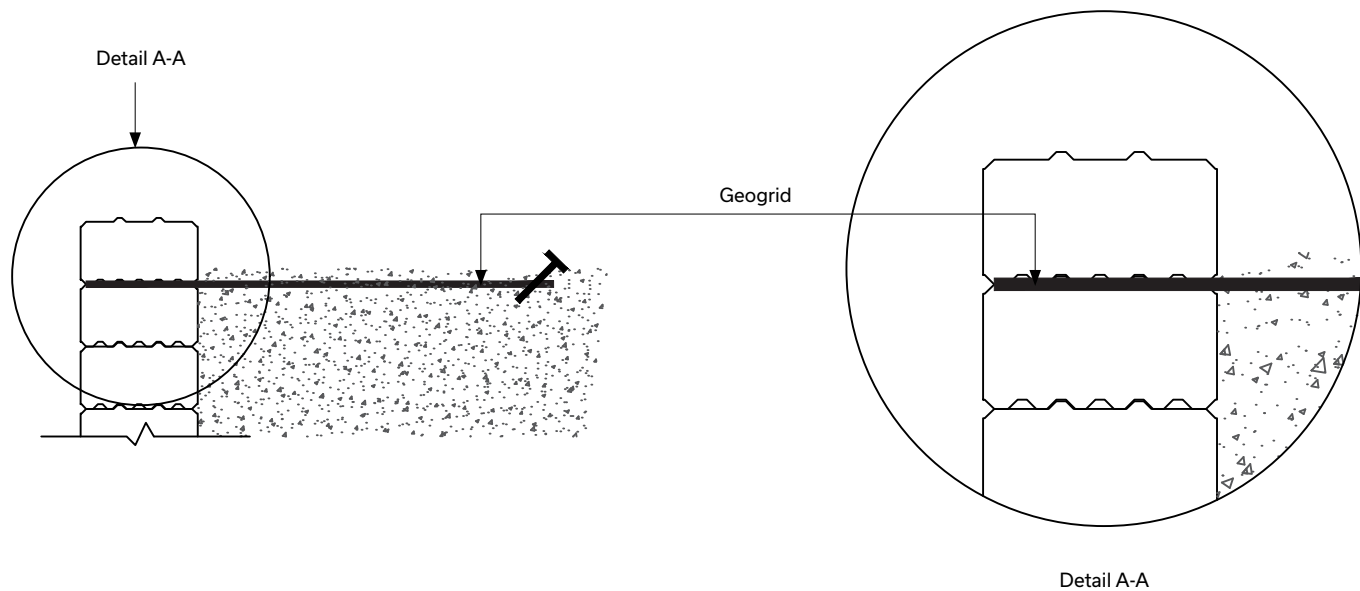
750 unit

1125 unit

GEOGRID INSTALLATION

Instructions to follow for installing geogrids:

- > Follow the geogrid manufacturer instructions. Recommended type: Mirafi
- > Make sure the granular material is leveled with the geogrid once compacted
- > Place the geogrid by hand
- > Ensure the geogrid is oriented perpendicularly to the Grande Wall face
- > Pull tight on the geogrid while laying it down on the granular material to prevent wrinkles
- > Stake the geogrid down (on the granular material) before adding another layer of granular material

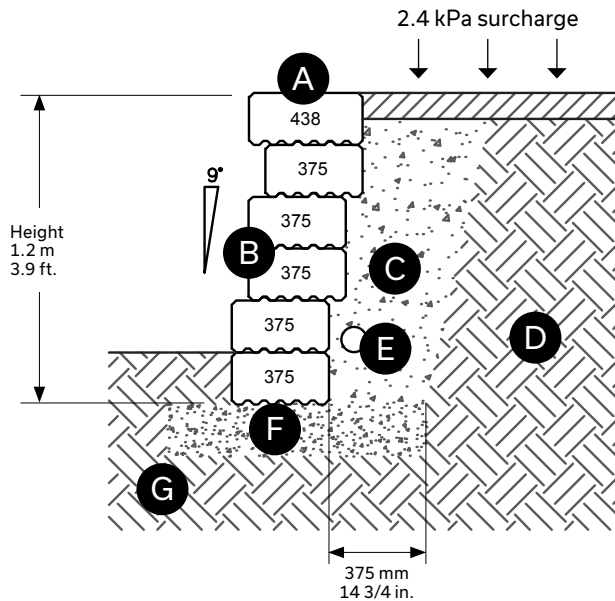


GRANDE WALL - INSTALLATION

CROSS-SECTION - GRANDE WALL 9° SETBACK GRAVITY 6 ROWS

Grande Wall 6 rows high (1.2 m or 3.9 ft.), including capping

- > 9° setback
- > Gravity
- > With 2.4 kPa surcharge
- > No slope behind the wall



- Ⓐ Grande Wall – Capping 438 unit
- Ⓑ Grande Wall – 375 Standard: 5 rows high
- Ⓒ Granular "B" backfill material compacted to min. 95% S.P.M.D.D.
Width: 375 mm - 14 3/4 in. behind the wall
- Ⓓ Undisturbed soil
- Ⓔ Perforated drain connected to services: 100 mm Ø - 4 in.
- Ⓕ Granular "A" material compacted to min. 98% S.P.M.D.D.
Depth: 200 mm - 8 in. minimum
- Ⓖ Undisturbed soil or compacted granular foundation: 0 to 20 mm
- 0 to 3/4 in. to obtain a min. bearing capacity of 150 kPa

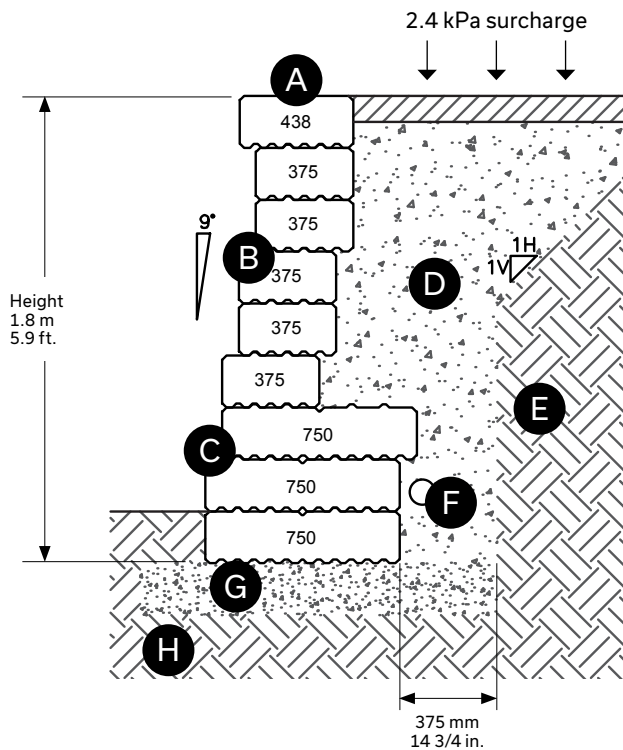
Maximum gravity wall heights assume no slopes or surcharge behind the wall and that the wall retains sand or gravel ($\phi = 34$ degrees, $\gamma = 21 \text{ kN/m}^3$)

GRANDE WALL - INSTALLATION

CROSS-SECTION - GRANDE WALL 9° SETBACK GRAVITY 9 ROWS

Grande Wall 9 rows high (1.8 m or 5.9 ft.), including capping

- > 9° setback
- > Gravity
- > With 2.4 kPa surcharge
- > No slope behind the wall



- A Grande Wall – Capping 438 unit
- B Grande Wall – 375 Standard: 5 rows high
- C Grande Wall – 750 Standard: 3 rows high
- D Granular "B" backfill material compacted to min. 95% S.P.M.D.D. Width: 375 mm - 14 3/4 in. behind the wall
- E Undisturbed soil
- F Perforated drain connected to services: 100 mm Ø - 4 in.
- G Granular "A" material compacted to min. 98% S.P.M.D.D. Depth: 200 mm - 8 in. minimum
- H Undisturbed soil or compacted granular foundation: 0 to 20 mm - 0 to 3/4 in. to obtain a min. bearing capacity of 150 kPa

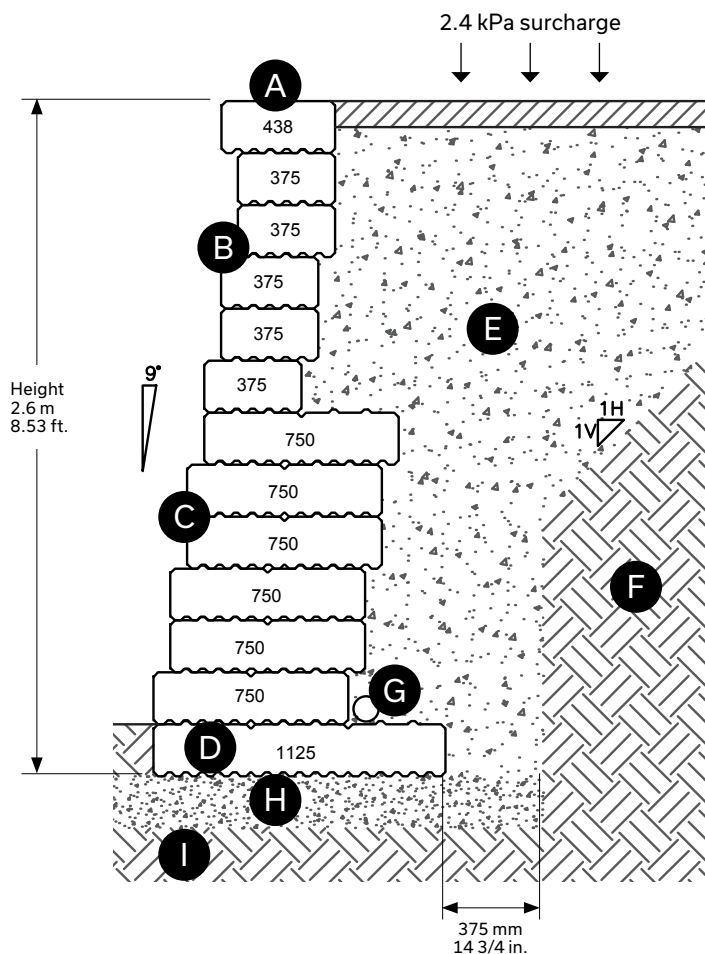
Maximum gravity wall heights assume no slopes or surcharge behind the wall and that the wall retains sand or gravel ($\phi = 34$ degrees, $\gamma = 21 \text{ kN/m}^3$)

GRANDE WALL - INSTALLATION

CROSS-SECTION - GRANDE WALL 9° SETBACK GRAVITY 13 ROWS

Grande Wall 13 rows high (2.6 m or 8.53 ft.), including capping

- > 9° setback
- > Gravity
- > With 2.4 kPa surcharge
- > No slope behind the wall

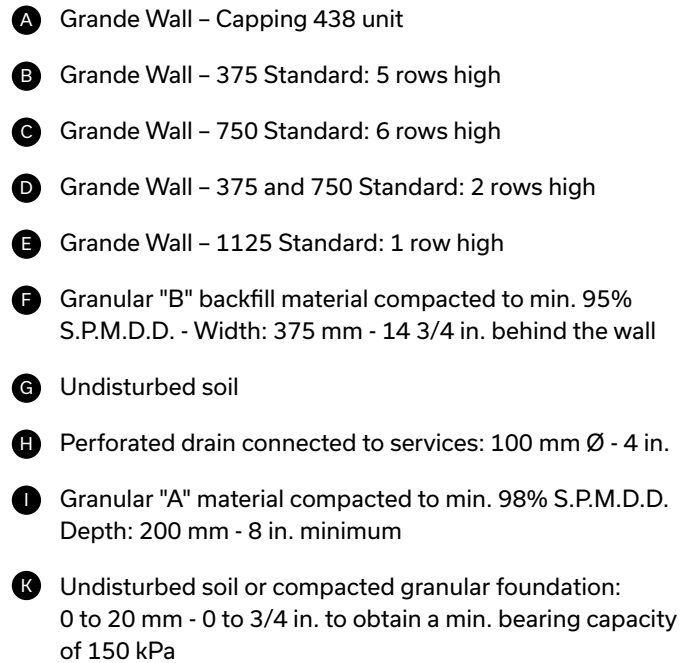


- A Grande Wall – Capping 438 unit
- B Grande Wall – 375 Standard: 5 rows high
- C Grande Wall – 750 Standard: 6 rows high
- D Grande Wall – 1125 Standard: 1 row high
- E Granular "B" backfill material compacted to min. 95% S.P.M.D.D. - Width: 375 mm - 14 3/4 in. behind the wall
- F Undisturbed soil
- G Perforated drain connected to services: 100 mm Ø - 4 in.
- H Granular "A" material compacted to min. 98% S.P.M.D.D. Depth: 200 mm - 8 in. minimum
- I Undisturbed soil or compacted granular foundation: 0 to 20 mm - 0 to 3/4 in. to obtain a min. bearing capacity of 150 kPa

Maximum gravity wall heights assume no slopes or surcharge behind the wall and that the wall retains sand or gravel ($\phi = 34$ degrees, $\gamma = 21 \text{ kN/m}^3$)

CROSS-SECTION - GRANDE WALL 9° SETBACK GRAVITY 15 ROWS

- > 9° setback
- > Gravity
- > With 2.4 kPa surcharge
- > No slope behind the wall



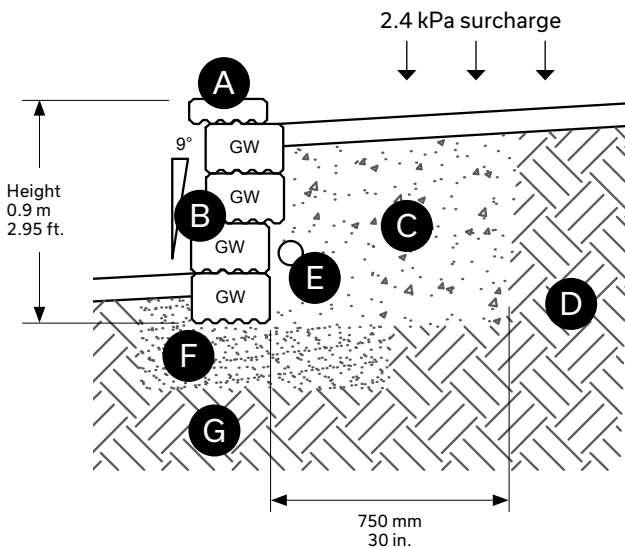
156 Installation Guide

GRANDE WALL - INSTALLATION

CROSS-SECTION - GRANDE WEDGE WALL 9° SETBACK GRAVITY 5 ROWS

Grande Wedge Wall 5 rows high (0.9 m or 2.95 ft.), including capping

- > 9° setback
- > Gravity
- > With 2.4 kPa surcharge
- > No slope behind the wall
- > Fill the cavities of the Grande Wedge units with clean stone



- Ⓐ Grande Wall – Capping 438 unit
- Ⓑ Grande Wall – Wedge Standard: 4 rows high
- Ⓒ Granular "B" backfill material compacted to min. 95% S.P.M.D.D. Width: 750 mm - 29 1/2 in. behind the wall
- Ⓓ Undisturbed soil
- Ⓔ Perforated drain connected to services: 100 mm Ø - 4 in.
- Ⓕ Granular "A" material compacted to min. 98% S.P.M.D.D. Depth: 200 mm - 8 in. minimum
- Ⓖ Undisturbed soil or compacted granular foundation: 0 to 20 mm - 0 to 3/4 in. to obtain a min. bearing capacity of 150 kPa

Grande Wedge Wall units are required to create curves with Grande Wall. Permacon is able to provide you with a customized standard cut. For more information, please contact your Permacon representative or send an inquiry directly to our website.

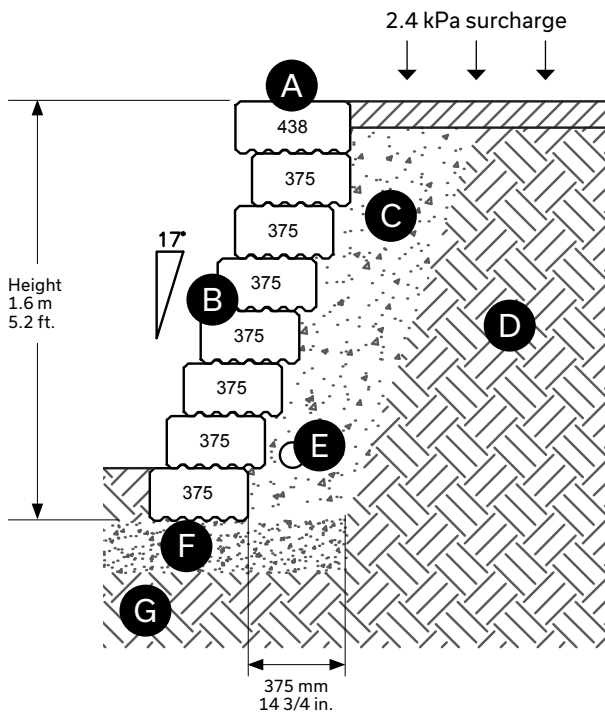
Maximum gravity wall heights assume no slopes or surcharge behind the wall and that the wall retains sand or gravel ($\phi = 34$ degrees, $\gamma = 21 \text{ kN/m}^3$)

GRANDE WALL - INSTALLATION

CROSS-SECTION - GRANDE WALL 17° SETBACK GRAVITY 8 ROWS

Grande Wall 8 rows high (1.6 m or 5.2 ft.), including capping

- > 17° setback
- > Gravity
- > With 2.4 kPa surcharge
- > No slope behind the wall

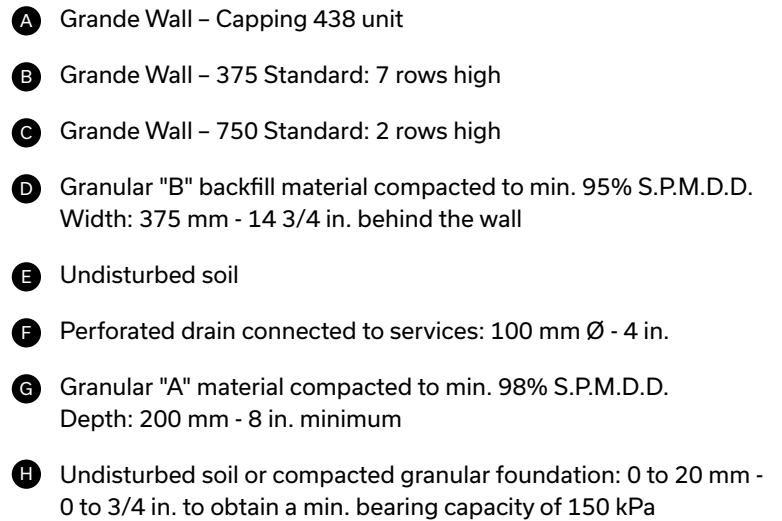


- A Grande Wall – Capping 438 unit
- B Grande Wall – 375 Standard: 7 rows high
- C Granular "B" backfill material compacted to min. 95% S.P.M.D.D. Width: 375 mm - 14 3/4 in. behind the wall
- D Undisturbed soil
- E Perforated drain connected to services: 100 mm Ø - 4 in.
- F Granular "A" material compacted to min. 98% S.P.M.D.D. Depth: 200 mm - 8 in. minimum
- G Undisturbed soil or compacted granular foundation: 0 to 20 mm - 0 to 3/4 in. to obtain a min. bearing capacity of 150 kPa

Maximum gravity wall heights assume no slopes or surcharge behind the wall and that the wall retains sand or gravel ($\phi = 34$ degrees, $\gamma = 21 \text{ kN/m}^3$)

CROSS-SECTION - GRANDE WALL 17° SETBACK GRAVITY 10 ROWS

- > 17° setback
- > Gravity
- > With 2.4 kPa surcharge
- > No slope behind the wall



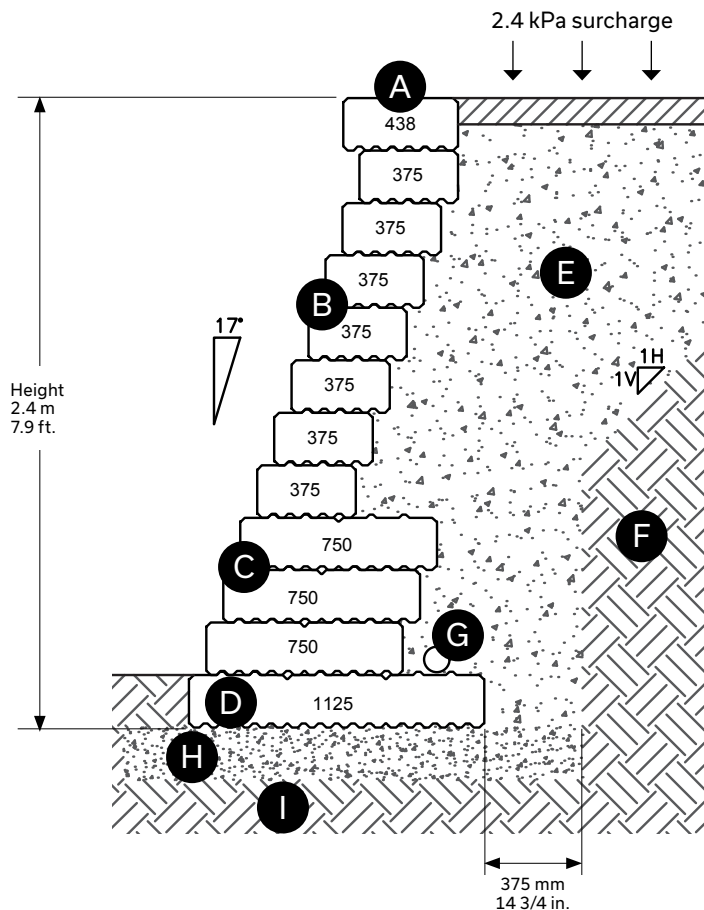
Installation Guide 159

GRANDE WALL - INSTALLATION

CROSS-SECTION - GRANDE WALL 17° SETBACK GRAVITY 12 ROWS

Grande Wall 12 rows high (2.4 m or 7.9 ft.), including capping

- > 17° setback
- > Gravity
- > With 2.4 kPa surcharge
- > No slope behind the wall

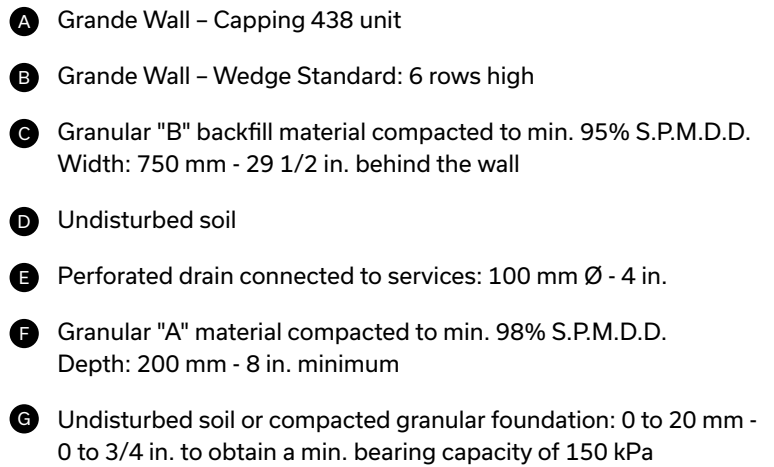


- A** Grande Wall - Capping 438 unit
- B** Grande Wall - 375 Standard: 7 rows high
- C** Grande Wall - 750 Standard: 3 rows high
- D** Grande Wall - 1125 Standard: 1 row high
- E** Granular "B" backfill material compacted to min. 95% S.P.M.D.D. - Width: 375 mm - 14 3/4 in. behind the wall
- F** Undisturbed soil
- G** Perforated drain connected to services: 100 mm Ø - 4 in.
- H** Granular "A" material compacted to min. 98% S.P.M.D.D. Depth: 200 mm - 8 in. minimum
- I** Undisturbed soil or compacted granular foundation: 0 to 20 mm - 0 to 3/4 in. to obtain a min. bearing capacity of 150 kPa

Maximum gravity wall heights assume no slopes or surcharge behind the wall and that the wall retains sand or gravel ($\phi = 34$ degrees, $\gamma = 21 \text{ kN/m}^3$)

CROSS-SECTION - GRANDE WEDGE WALL 17° SETBACK GRAVITY 7 ROWS

- > 17° setback
- > Gravity
- > With 2.4 kPa surcharge
- > No slope behind the wall
- > Fill the cavities of the Grande Wedge units with clean stone



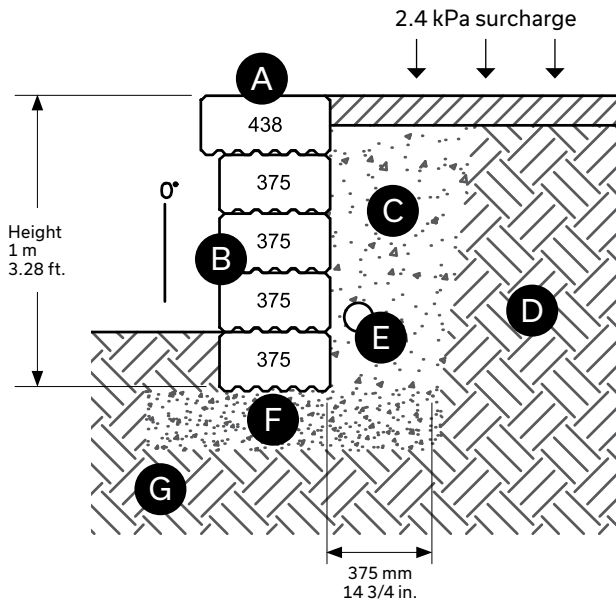
Maximum gravity wall heights assume no slopes or surcharge behind the wall and that the wall retains sand or gravel ($\phi = 34$ degrees, $\gamma = 21 \text{ kN/m}^3$)

GRANDE WALL - INSTALLATION

CROSS-SECTION - GRANDE WALL STRAIGHT GRAVITY 5 ROWS

Grande Wall 5 rows high (1 m or 3.28 ft.), including capping

- > Straight
- > Gravity
- > With 2.4 kPa surcharge
- > No slope behind the wall



- Ⓐ Grande Wall – Capping 438 unit
- Ⓑ Grande Wall – 375 Standard: 4 rows high
- Ⓒ Granular "B" backfill material compacted to min. 95% S.P.M.D.D. Width: 375 mm - 14 3/4 in. behind the wall
- Ⓓ Undisturbed soil
- Ⓔ Perforated drain connected to services: 100 mm Ø - 4 in.
- Ⓕ Granular "A" material compacted to min. 98% S.P.M.D.D. Depth: 200 mm - 8 in. minimum
- Ⓖ Undisturbed soil or compacted granular foundation: 0 to 20 mm - 0 to 3/4 in. to obtain a min. bearing capacity of 150 kPa

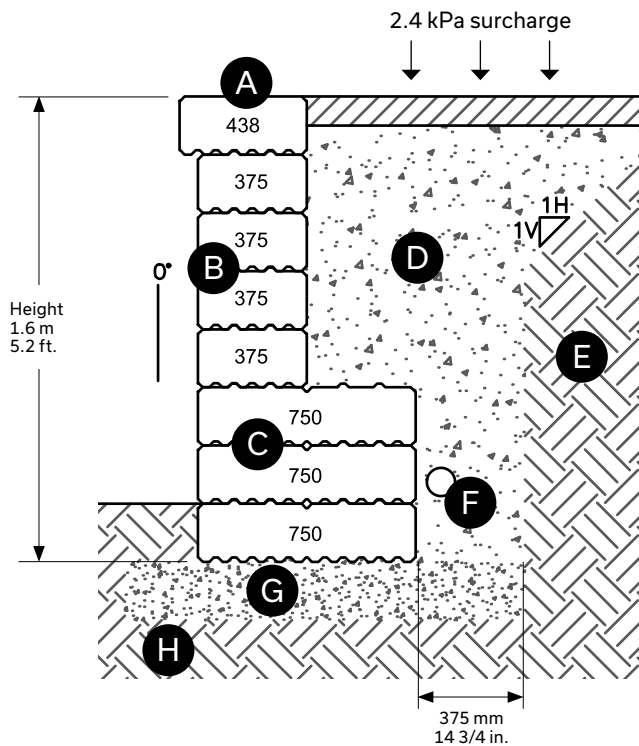
Maximum gravity wall heights assume no slopes or surcharge behind the wall and that the wall retains sand or gravel ($\phi = 34$ degrees, $\gamma = 21 \text{ kN/m}^3$)

GRANDE WALL - INSTALLATION

CROSS-SECTION - GRANDE WALL STRAIGHT GRAVITY 8 ROWS

Grande Wall 5 rows high (1.6 m or 5.2 ft.), including capping

- > Straight
- > Gravity
- > With 2.4 kPa surcharge
- > No slope behind the wall



- Ⓐ Grande Wall – Capping 438 unit
- Ⓑ Grande Wall – 375 Standard: 4 rows high
- Ⓒ Grande Wall – 750 Standard: 3 rows high
- Ⓓ Granular "B" backfill material compacted to min. 95% S.P.M.D.D. Width: 375 mm - 14 3/4 in. behind the wall
- Ⓔ Undisturbed soil
- Ⓕ Perforated drain connected to services: 100 mm Ø - 4 in.
- Ⓖ Granular "A" material compacted to min. 98% S.P.M.D.D. Depth: 200 mm - 8 in. minimum
- Ⓗ Undisturbed soil or compacted granular foundation: 0 to 20 mm - 0 to 3/4 in. to obtain a min. bearing capacity of 150 kPa

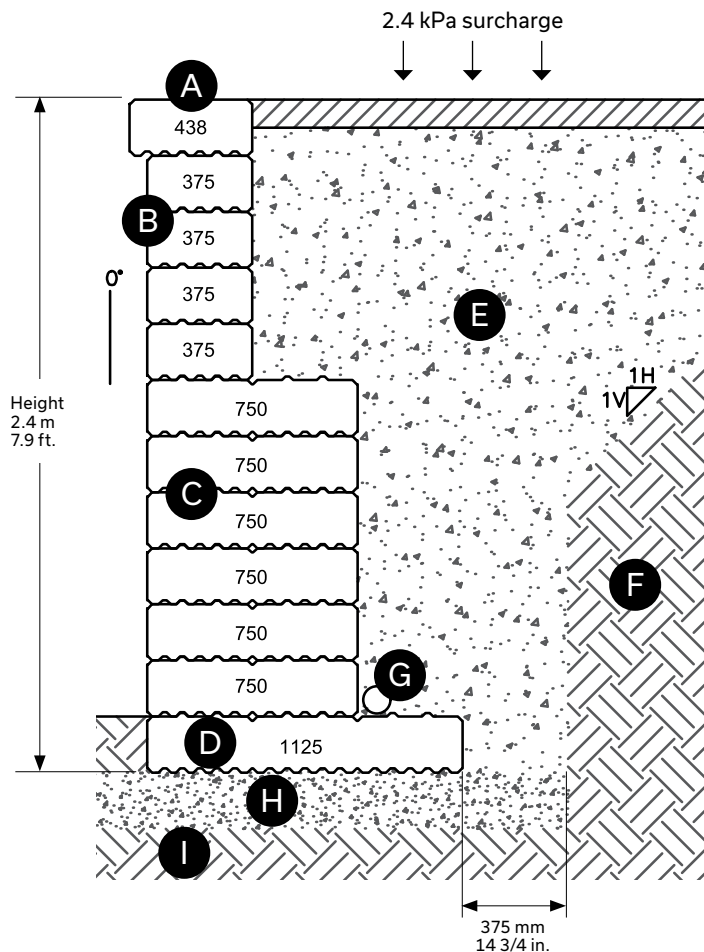
Maximum gravity wall heights assume no slopes or surcharge behind the wall and that the wall retains sand or gravel ($\phi = 34$ degrees, $\gamma = 21 \text{ kN/m}^3$)

GRANDE WALL - INSTALLATION

CROSS-SECTION - GRANDE WALL STRAIGHT GRAVITY 12 ROWS

Grande Wall 12 rows high (2.4 m or 7.9 ft.), including capping

- > Straight
- > Gravity
- > With 2.4 kPa surcharge
- > No slope behind the wall



- A** Grande Wall – Capping 438 unit
- B** Grande Wall – 375 Standard: 4 rows high
- C** Grande Wall – 750 Standard: 6 rows high
- D** Grande Wall – 1125 Standard: 1 row high
- E** Granular "B" backfill material compacted to min. 95% S.P.M.D.D. - Width: 375 mm - 14 3/4 in. behind the wall
- F** Undisturbed soil
- G** Perforated drain connected to services: 100 mm Ø - 4 in.
- H** Granular "A" material compacted to min. 98% S.P.M.D.D. Depth: 200 mm - 8 in. minimum
- I** Undisturbed soil or compacted granular foundation: 0 to 20 mm - 0 to 3/4 in. to obtain a min. bearing capacity of 150 kPa

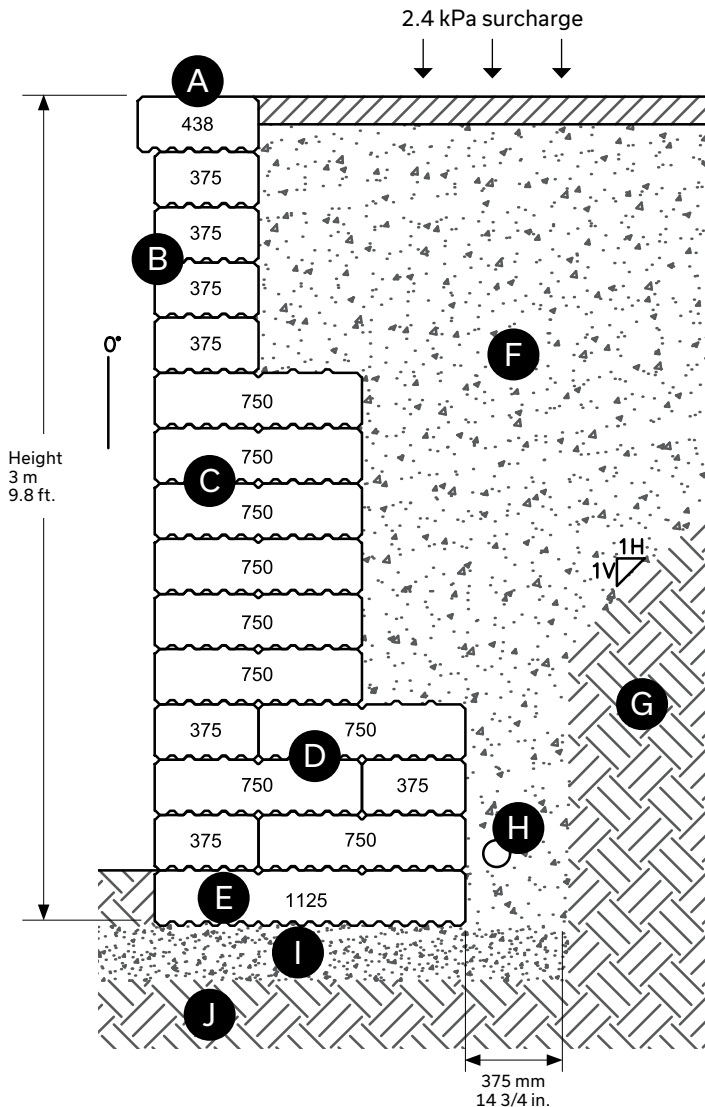
Maximum gravity wall heights assume no slopes or surcharge behind the wall and that the wall retains sand or gravel ($\phi = 34$ degrees, $\gamma = 21 \text{ kN/m}^3$)

GRANDE WALL - INSTALLATION

CROSS-SECTION - GRANDE WALL STRAIGHT GRAVITY 15 ROWS

Grande Wall 15 rows high (3 m or 9.8 ft.), including capping

- > Straight
- > Gravity
- > With 2.4 kPa surcharge
- > No slope behind the wall



- Ⓐ Grande Wall – Capping 438 unit
- Ⓑ Grande Wall – 375 Standard: 4 rows high
- Ⓒ Grande Wall – 750 Standard: 6 rows high
- Ⓓ Grande Wall – 375 and 750 Standard: 3 rows high
- Ⓔ Grande Wall – 1125 Standard: 1 row high
- Ⓕ Granular "B" backfill material compacted to min. 95% S.P.M.D.D. - Width: 375 mm - 14 3/4 in. behind the wall
- Ⓖ Undisturbed soil
- Ⓗ Perforated drain connected to services: 100 mm Ø - 4 in.
- Ⓘ Granular "A" material compacted to min. 98% S.P.M.D.D. Depth: 200 mm - 8 in. minimum
- Ⓚ Undisturbed soil or compacted granular foundation: 0 to 20 mm - 0 to 3/4 in. to obtain a min. bearing capacity of 150 kPa

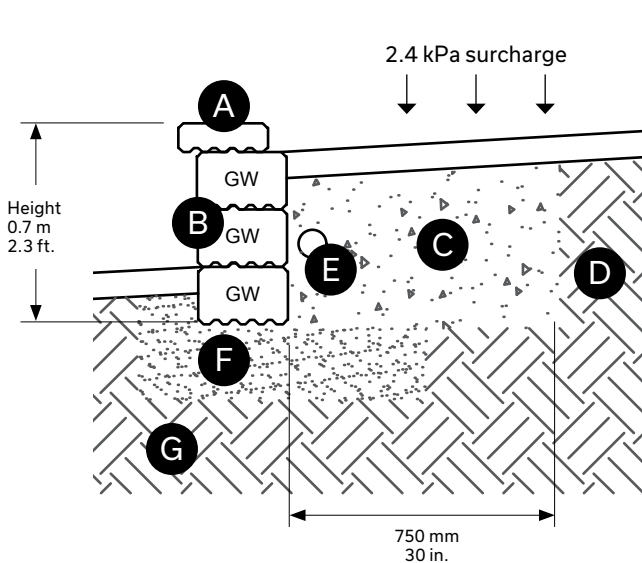
Maximum gravity wall heights assume no slopes or surcharge behind the wall and that the wall retains sand or gravel ($\phi = 34$ degrees, $\gamma = 21 \text{ kN/m}^3$)

GRANDE WALL - INSTALLATION

CROSS-SECTION - GRANDE WEDGE WALL STRAIGHT GRAVITY 4 ROWS

Grande Wedge Wall 4 rows high (0.7 m or 2.3 ft.), including capping

- > Straight
- > Gravity
- > With 2.4 kPa surcharge
- > No slope behind the wall
- > Fill the cavities of the Grande Wedge units with clean stone



- Ⓐ Grande Wall – Capping 438 unit
- Ⓑ Grande Wall – Wedge Standard: 3 rows high
- Ⓒ Granular "B" backfill material compacted to min. 95% S.P.M.D.D. - Width: 750 mm - 29 1/2 in. behind the wall
- Ⓓ Undisturbed soil
- Ⓔ Perforated drain connected to services: 100 mm Ø - 4 in.
- Ⓕ Granular "A" material compacted to min. 98% S.P.M.D.D. Depth: 200 mm - 8 in. minimum
- Ⓖ Undisturbed soil or compacted granular foundation: 0 to 20 mm - 0 to 3/4 in. to obtain a min. bearing capacity of 150 kPa

Grande Wedge Wall units are required to create curves with Grande Wall. Permacon is able to provide you with a customized standard cut. For more information, please contact your Permacon representative or send an inquiry directly to our website.

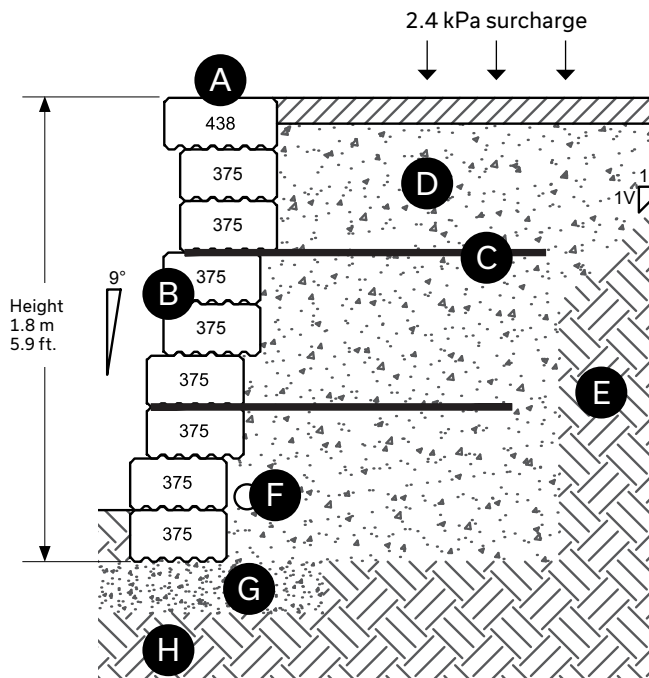
Maximum gravity wall heights assume no slopes or surcharge behind the wall and that the wall retains sand or gravel ($\phi = 34$ degrees, $\gamma = 21 \text{ kN/m}^3$)

GRANDE WALL - INSTALLATION

CROSS-SECTION - GRANDE WALL 9° SETBACK REINFORCED 9 ROWS

Grande Wall 9 rows high (1.8 m or 5.9 ft), including capping

- > 9° setback
- > Reinforced with geogrid. Recommended geogrid: Miragrid 3XT
- > With 2.4 kPa surcharge
- > No slope behind the wall



- A Grande Wall – Capping 438 unit
- B Grande Wall – 375 Standard: 8 rows high
- C Geogrid: 1.4 m - 4.6 ft. length
- D Granular "B" backfill material compacted to min. 95% S.P.M.D.D. Width: 375 mm - 14 3/4 in. behind the wall
- E Undisturbed soil
- F Perforated drain connected to services: 100 mm Ø - 4 in.
- G Granular "A" material compacted to min. 98% S.P.M.D.D. Depth: 200 mm - 8 in. minimum
- H Undisturbed soil or compacted granular foundation: 0 to 20 mm - 0 to 3/4 in. to obtain a min. bearing capacity of 150 kPa

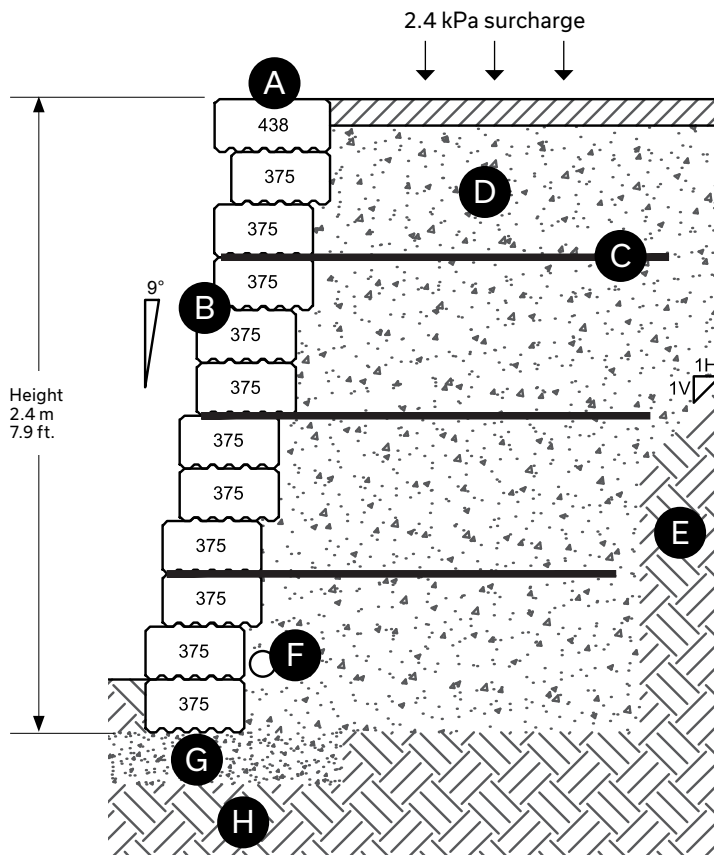
Maximum gravity wall heights assume no slopes or surcharge behind the wall and that the wall retains sand or gravel ($\phi = 34$ degrees, $\gamma = 21 \text{ kN/m}^3$)

GRANDE WALL - INSTALLATION

CROSS-SECTION - GRANDE WALL 9° SETBACK REINFORCED 12 ROWS

Grande Wall 12 rows high (2.4 m or 7.9 ft), including capping

- > 9° setback
- > Reinforced with geogrid. Recommended geogrid: Miragrid 3XT
- > With 2.4 kPa surcharge
- > No slope behind the wall

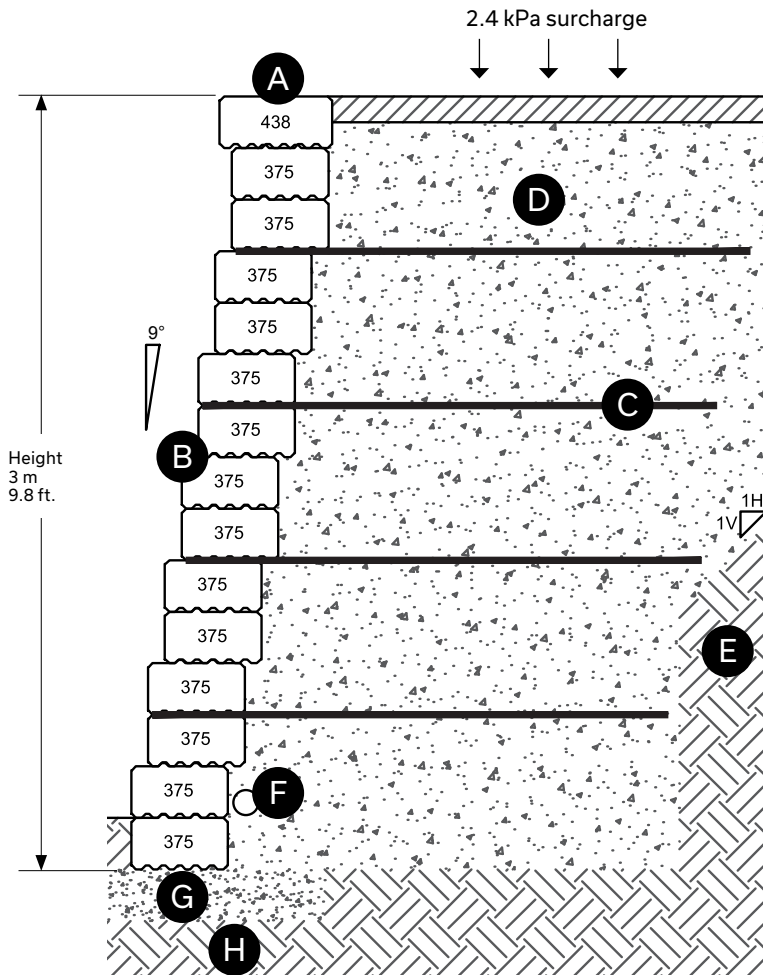


- A** Grande Wall – Capping 438 unit
- B** Grande Wall – 375 Standard: 11 rows high
- C** Geogrid: 1.7 m - 5.6 ft. minimum length
- D** Granular "B" backfill material compacted to min. 95% S.P.M.D.D. - Width: 375 mm - 14 3/4 in. behind the wall
- E** Undisturbed soil
- F** Perforated drain connected to services: 100 mm Ø - 4 in.
- G** Granular "A" material compacted to min. 98% S.P.M.D.D. Depth: 200 mm - 8 in. minimum
- H** Undisturbed soil or compacted granular foundation: 0 to 20 mm - 0 to 3/4 in. to obtain a min. bearing capacity of 150 kPa

Maximum gravity wall heights assume no slopes or surcharge behind the wall and that the wall retains sand or gravel ($\phi = 34$ degrees, $\gamma = 21 \text{ kN/m}^3$)

CROSS-SECTION - GRANDE WALL 9° SETBACK REINFORCED 15 ROWS

- > 9° setback
- > Reinforced with geogrid. Recommended geogrid: Miragrid 3XT
- > With 2.4 kPa surcharge
- > No slope behind the wall

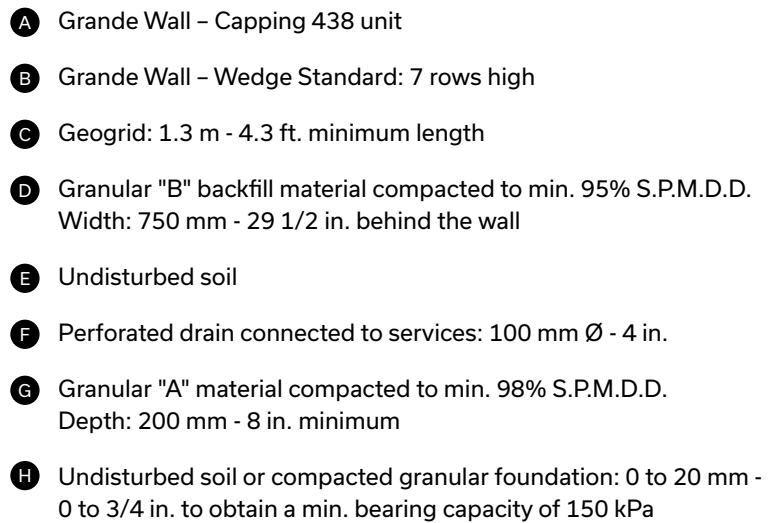


- A** Grande Wall – Capping 438 unit
- B** Grande Wall – 375 Standard: 14 rows high
- C** Geogrid: 2 m - 6,6 ft. minimum length
- D** Granular "B" backfill material compacted to min. 95% S.P.M.D.D. - Width: 375 mm - 14 3/4 in. behind the wall
- E** Undisturbed soil
- F** Perforated drain connected to services: 100 mm Ø - 4 in.
- G** Granular "A" material compacted to min. 98% S.P.M.D.D. - Depth: 200 mm - 8 in. minimum
- H** Undisturbed soil or compacted granular foundation: 0 to 20 mm - 0 to 3/4 in. to obtain a min. bearing capacity of 150 kPa

Installation Guide 169

CROSS-SECTION - GRANDE WEDGE WALL 9° SETBACK REINFORCED 8 ROWS

- > 9° setback
- > Gravity
- > With 2.4 kPa surcharge
- > No slope behind the wall
- > Fill the cavities of the Grande Wedge units with clean stone



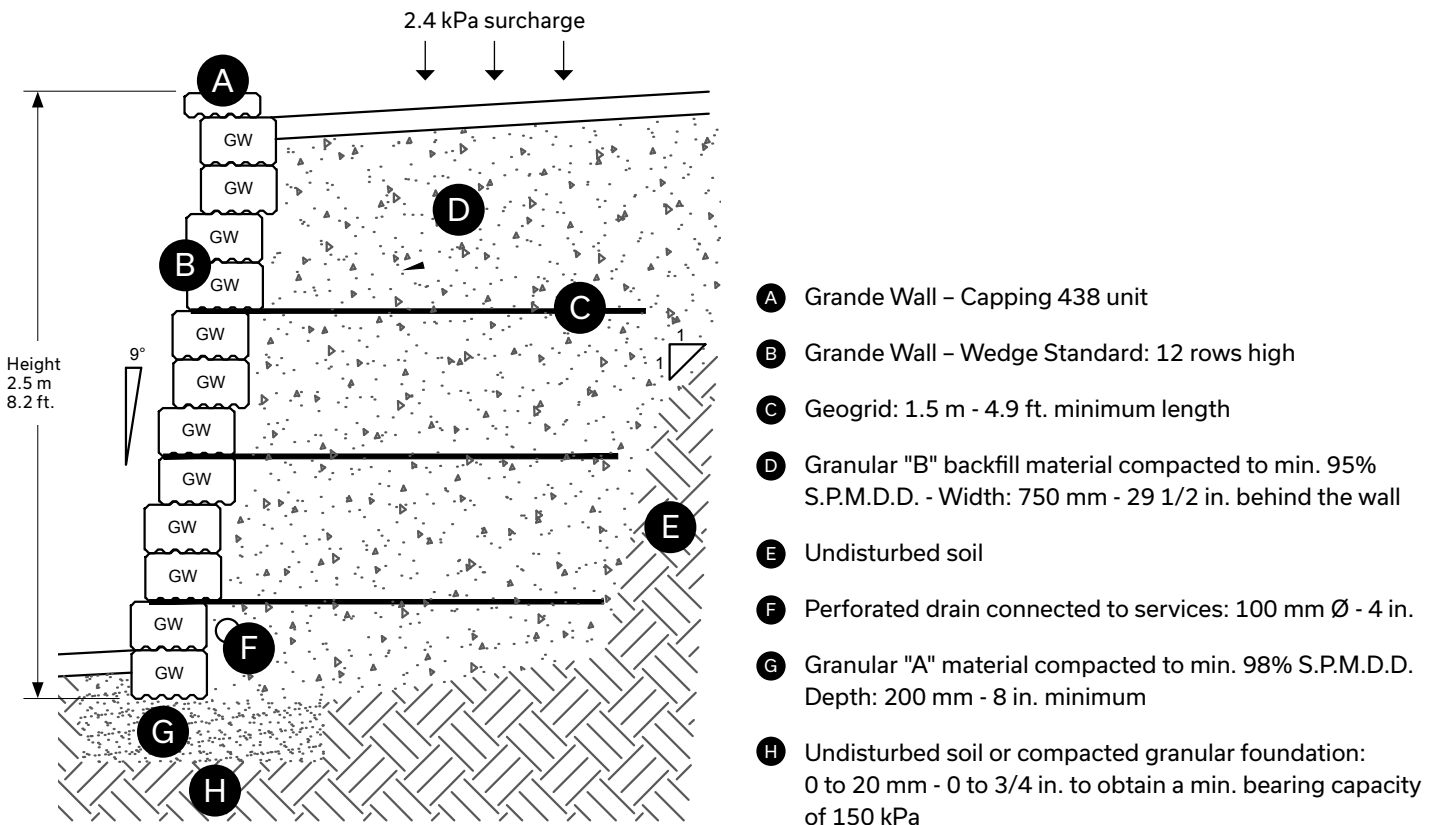
Maximum gravity wall heights assume no slopes or surcharge behind the wall and that the wall retains sand or gravel ($\phi = 34$ degrees, $\gamma = 21 \text{ kN/m}^3$)

GRANDE WALL - INSTALLATION

CROSS-SECTION - GRANDE WEDGE WALL 9° SETBACK REINFORCED 13 ROWS

Grande Wedge Wall 13 rows high (2.5 m or 8.2 ft.), including capping

- > 9° setback
- > Gravity
- > With 2.4 kPa surcharge
- > No slope behind the wall
- > Fill the cavities of the Grande Wedge units with clean stone



Grande Wedge Wall units are required to create curves with Grande Wall. Permacon is able to provide you with a customized standard cut. For more information, please contact your Permacon representative or send an inquiry directly to our website.

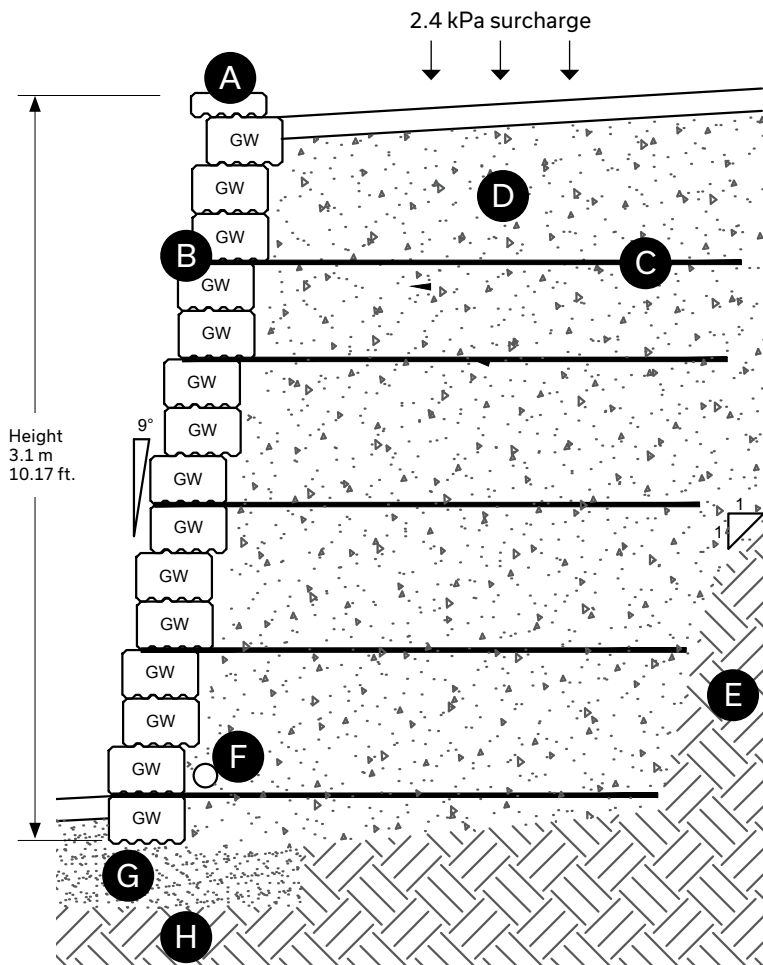
Maximum gravity wall heights assume no slopes or surcharge behind the wall and that the wall retains sand or gravel ($\phi = 34$ degrees, $\gamma = 21 \text{ kN/m}^3$)

GRANDE WALL - INSTALLATION

CROSS-SECTION - GRANDE WEDGE WALL 9° SETBACK REINFORCED 16 ROWS

Grande Wedge Wall 16 rows high (3.1 m or 10.17 ft.), including capping

- > 9° setback
- > Gravity
- > With 2.4 kPa surcharge
- > No slope behind the wall
- > Fill the cavities of the Grande Wedge units with clean stone



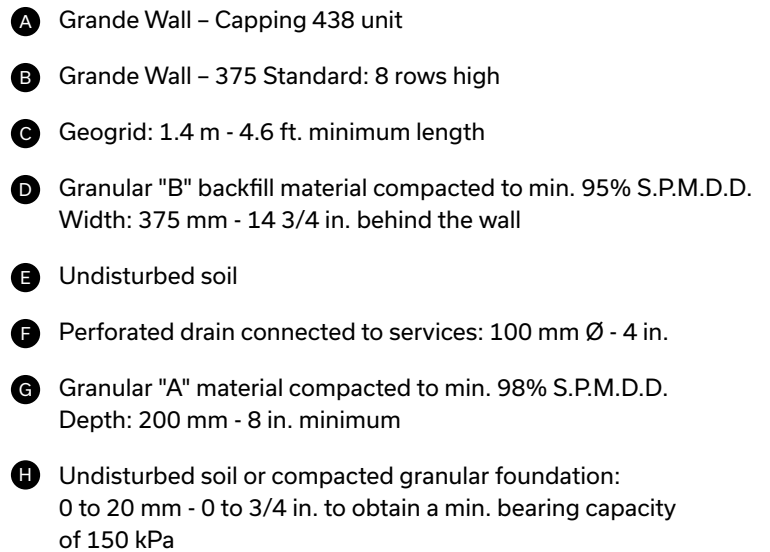
- A** Grande Wall – Capping 438 unit
- B** Grande Wall – Wedge Standard: 15 rows high
- C** Geogrid: 1.8 m - 5.9 ft. minimum length
- D** Granular "B" backfill material compacted to min. 95% S.P.M.D.D. - Width: 750 mm - 29 1/2 in. behind the wall
- E** Undisturbed soil
- F** Perforated drain connected to services: 100 mm Ø - 4 in.
- G** Granular "A" material compacted to min. 98% S.P.M.D.D. - Depth: 200 mm - 8 in. minimum
- H** Undisturbed soil or compacted granular foundation: 0 to 20 mm - 0 to 3/4 in. to obtain a min. bearing capacity of 150 kPa

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Maximum gravity wall heights assume no slopes or surcharge behind the wall and that the wall retains sand or gravel ($\phi = 34$ degrees, $\gamma = 21 \text{ kN/m}^3$)

CROSS-SECTION - GRANDE WALL 17° SETBACK REINFORCED 9 ROWS

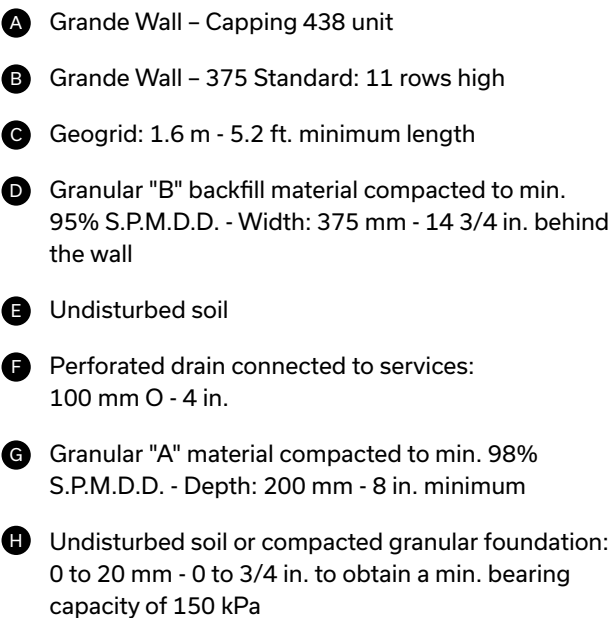
- > 17° setback
- > Reinforced with geogrid. Recommended geogrid: Miragrid 3XT
- > With 2.4 kPa surcharge
- > No slope behind the wall



Installation Guide 173

CROSS-SECTION - GRANDE WALL 17° SETBACK REINFORCED 12 ROWS

- > No slope behind the wall



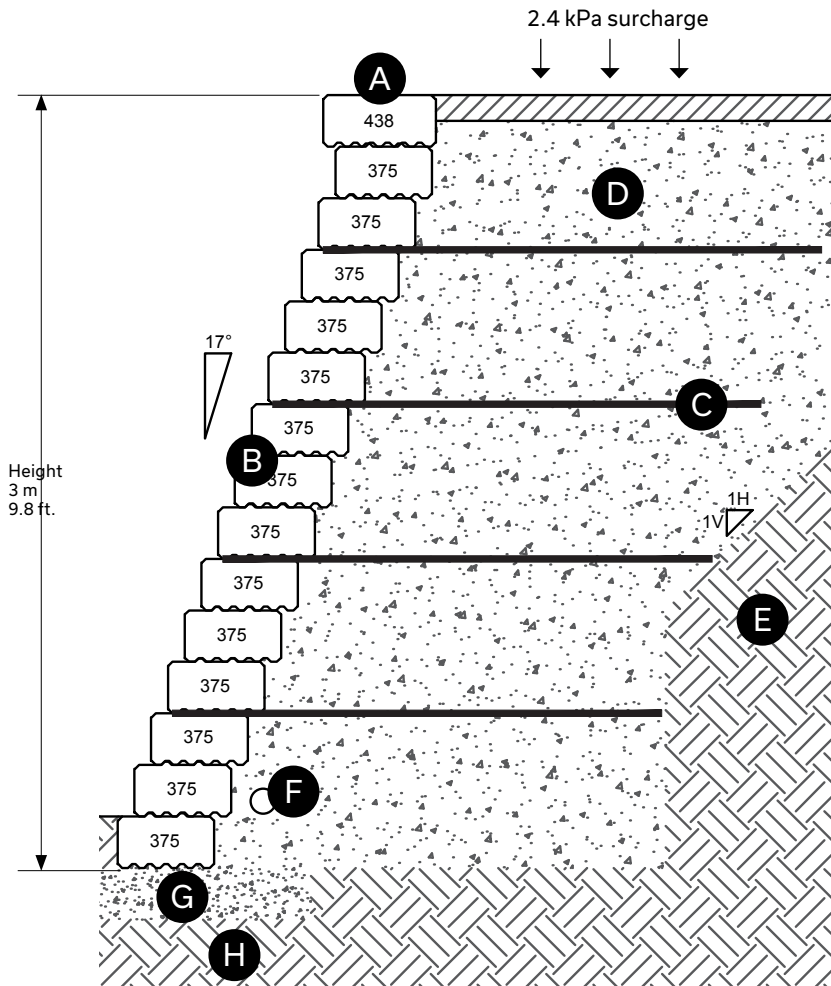
174 Installation Guide

GRANDE WALL - INSTALLATION

CROSS-SECTION - GRANDE WALL 17° SETBACK REINFORCED 15 ROWS

Grande Wall 15 rows high (3 m or 9.8 ft.), including capping

- > 17° setback
- > Reinforced with geogrid. Recommended geogrid: Miragrid 3XT
- > With 2.4 kPa surcharge
- > No slope behind the wall



- A** Grande Wall – Capping 438 unit
- B** Grande Wall – 375 Standard: 14 rows high
- C** Geogrid: 1.9 m - 6.2 ft. minimum length
- D** Granular "B" backfill material compacted to min. 95% S.P.M.D.D. - Width: 375 mm - 14 3/4 in. behind the wall
- E** Undisturbed soil
- F** Perforated drain connected to services: 100 mm O - 4 in.
- G** Granular "A" material compacted to min. 98% S.P.M.D.D. - Depth: 200 mm - 8 in. minimum
- H** Undisturbed soil or compacted granular foundation: 0 to 20 mm - 0 to 3/4 in. to obtain a min. bearing capacity of 150 kPa

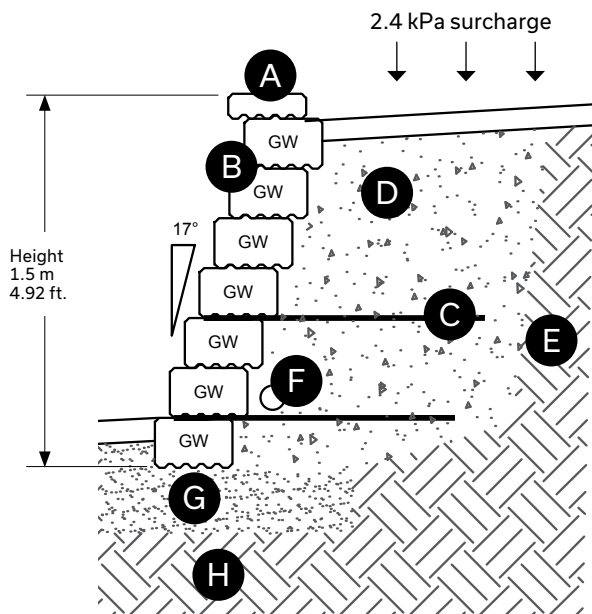
Maximum gravity wall heights assume no slopes or surcharge behind the wall and that the wall retains sand or gravel ($\phi = 34$ degrees, $\gamma = 21 \text{ kN/m}^3$)

GRANDE WALL - INSTALLATION

CROSS-SECTION - GRANDE WEDGE WALL 17° SETBACK REINFORCED 8 ROWS

Grande Wedge Wall 8 rows high (1.5 m or 4.92 ft.), including capping

- > 17° setback
- > Reinforced with geogrid. Recommended geogrid: Miragrid 3XT
- > With 2.4 kPa surcharge
- > No slope behind the wall
- > Fill the cavities of the Grande Wedge units with clean stone



- A Grande Wall – Capping 438 unit
- B Grande Wall – Wedge Standard: 7 rows high
- C Geogrid: 1.3 m - 4.3 ft. minimum length
- D Granular "B" backfill material compacted to min. 95% S.P.M.D.D. Width: 750 mm - 29 1/2 in. behind the wall
- E Undisturbed soil
- F Perforated drain connected to services: 100 mm Ø - 4 in.
- G Granular "A" material compacted to min. 98% S.P.M.D.D. Depth: 200 mm - 8 in. minimum
- H Undisturbed soil or compacted granular foundation: 0 to 20 mm - 0 to 3/4 in. to obtain a min. bearing capacity of 150 kPa

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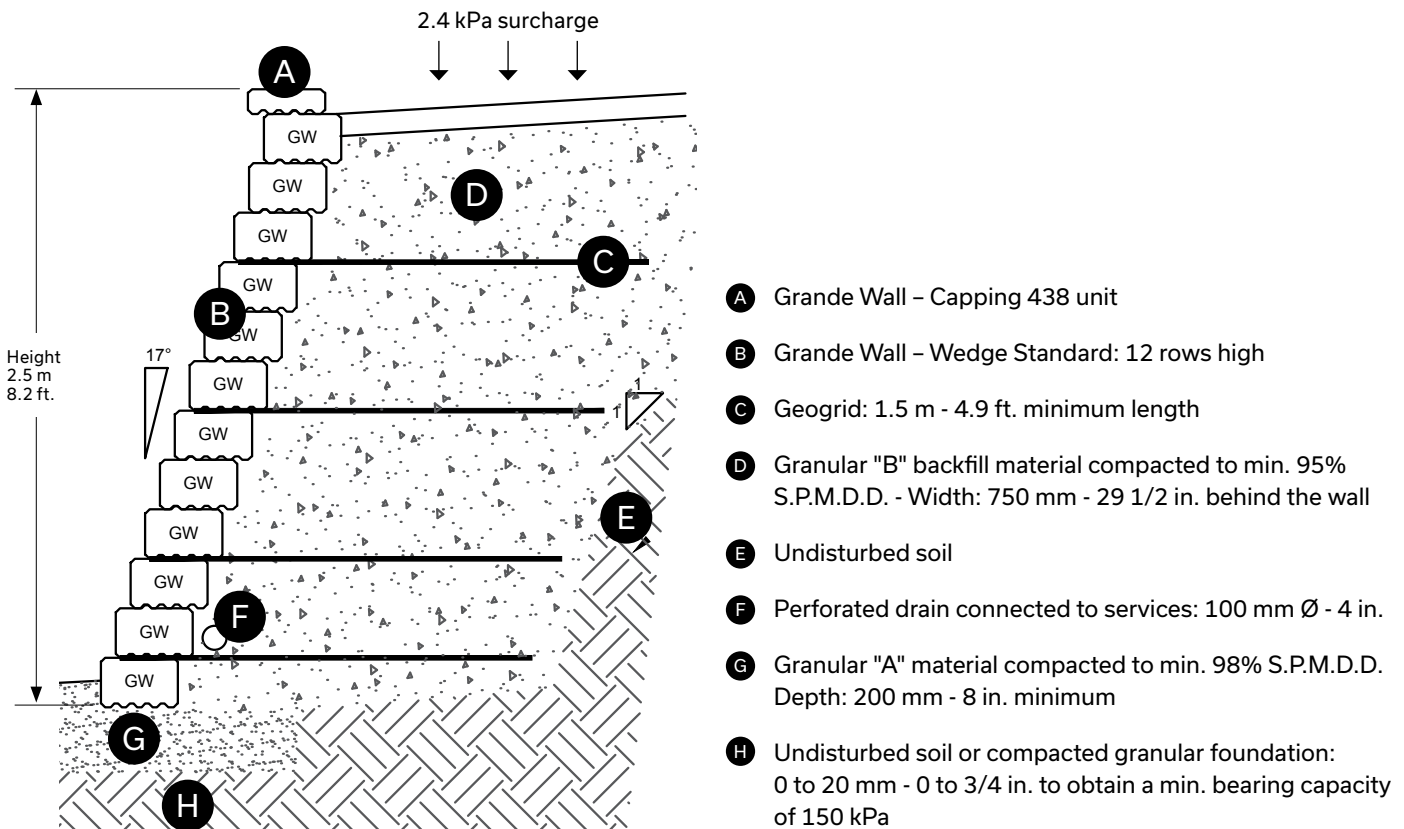
Maximum gravity wall heights assume no slopes or surcharge behind the wall and that the wall retains sand or gravel ($\phi = 34$ degrees, $\gamma = 21 \text{ kN/m}^3$)

GRANDE WALL - INSTALLATION

CROSS-SECTION - GRANDE WEDGE WALL 17° SETBACK REINFORCED 13 ROWS

Grande Wedge Wall 13 rows high (2.5 m or 8.2 ft.), including capping

- > 17° setback
- > Reinforced with geogrid. Recommended geogrid: Miragrid 3XT
- > With 2.4 kPa surcharge
- > No slope behind the wall
- > Fill the cavities of the Grande Wedge units with clean stone



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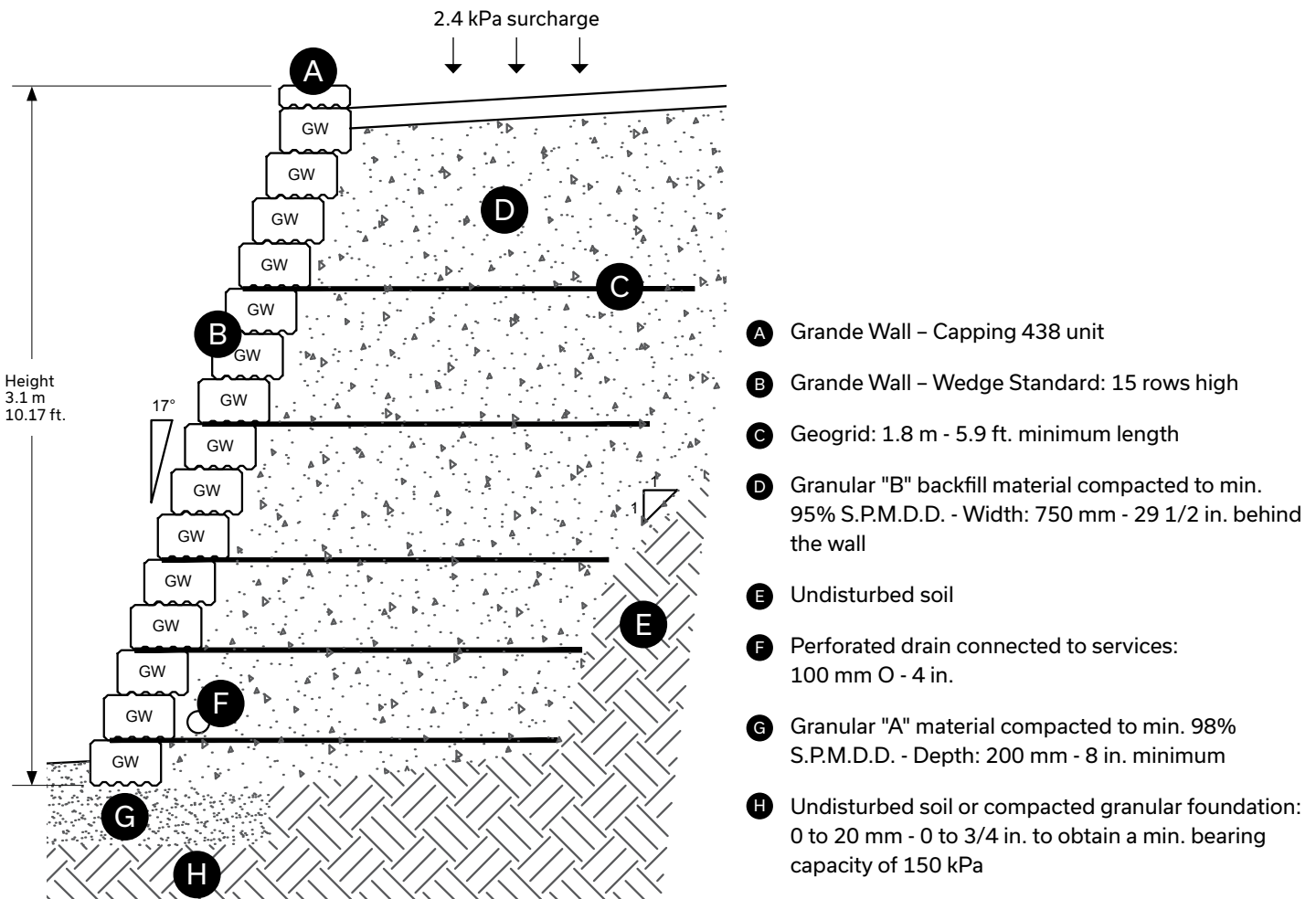
Maximum gravity wall heights assume no slopes or surcharge behind the wall and that the wall retains sand or gravel ($\phi = 34$ degrees, $\gamma = 21 \text{ kN/m}^3$)

GRANDE WALL - INSTALLATION

CROSS-SECTION - GRANDE WEDGE WALL 17° SETBACK REINFORCED 16 ROWS

Grande Wedge Wall 16 rows high (3.1 m or 10.17 ft.), including capping

- > 17° setback
- > Reinforced with geogrid. Recommended geogrid: Miragrid 3XT
- > With 2.4 kPa surcharge
- > No slope behind the wall
- > Fill the cavities of the Grande Wedge units with clean stone



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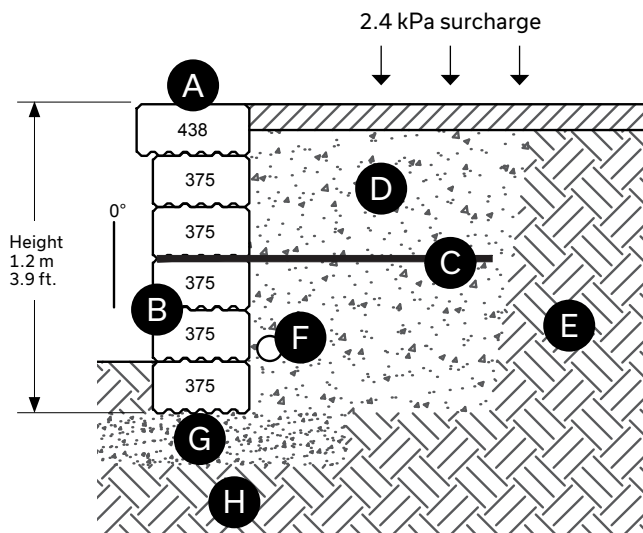
Maximum gravity wall heights assume no slopes or surcharge behind the wall and that the wall retains sand or gravel ($\phi = 34$ degrees, $\gamma = 21 \text{ kN/m}^3$)

GRANDE WALL - INSTALLATION

CROSS-SECTION - GRANDE WALL STRAIGHT REINFORCED 6 ROWS

Grande Wall 6 rows high (1.2 m or 3.9 ft.), including capping

- > Straight
- > Reinforced with geogrid. Recommended geogrid: Miragrid 3XT
- > With 2.4 kPa surcharge
- > No slope behind the wall



- (A) Grande Wall – Capping 438 unit
- (B) Grande Wall – 375 Standard: 5 rows high
- (C) Geogrid: 1.3 m - 4.3 ft. minimum length
- (D) Granular "B" backfill material compacted to min. 95% S.P.M.D.D. Width: 375 mm - 14 3/4 in. behind the wall
- (E) Undisturbed soil
- (F) Perforated drain connected to services: 100 mm Ø - 4 in.
- (G) Granular "A" material compacted to min. 98% S.P.M.D.D. Depth: 200 mm - 8 in. minimum
- (H) Undisturbed soil or compacted granular foundation: 0 to 20 mm - 0 to 3/4 in. to obtain a min. bearing capacity of 150 kPa

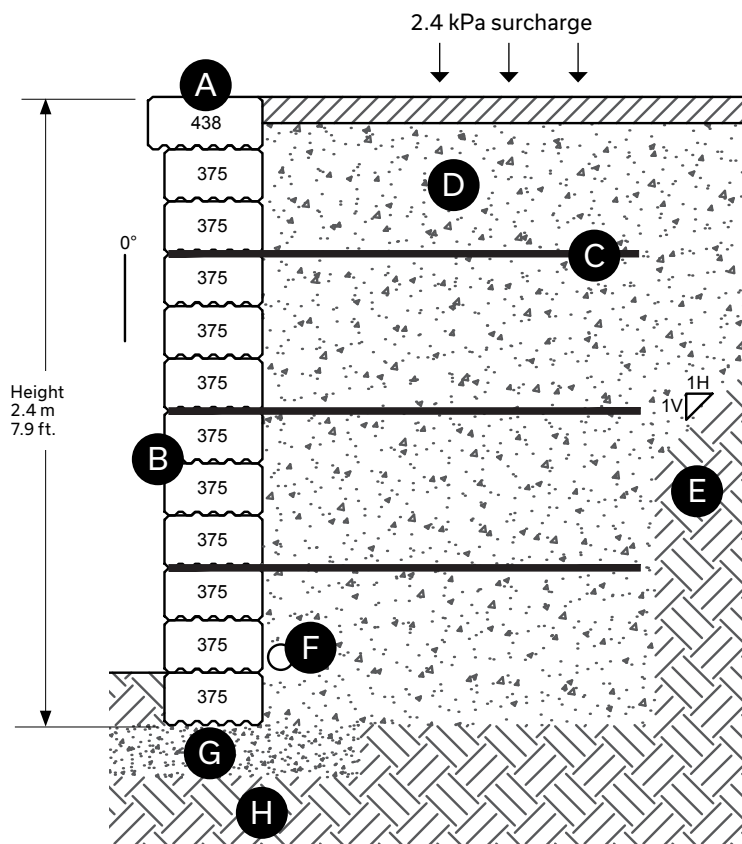
Maximum gravity wall heights assume no slopes or surcharge behind the wall and that the wall retains sand or gravel ($\phi = 34$ degrees, $\gamma = 21 \text{ kN/m}^3$)

GRANDE WALL - INSTALLATION

CROSS-SECTION - GRANDE WALL STRAIGHT REINFORCED 12 ROWS

Grande Wall 12 rows high (2.4 m or 7.9 ft.), including capping

- > Straight
- > Reinforced with geogrid. Recommended geogrid: Miragrid 3XT
- > With 2.4 kPa surcharge
- > No slope behind the wall



- A** Grande Wall – Capping 438 unit
- B** Grande Wall – 375 Standard: 11 rows high
- C** Geogrid: 1.8 m - 5.9 ft. minimum length
- D** Granular "B" backfill material compacted to min. 95% S.P.M.D.D. - Width: 375 mm - 14 3/4 in. behind the wall
- E** Undisturbed soil
- F** Perforated drain connected to services: 100 mm Ø - 4 in.
- G** Granular "A" material compacted to min. 98% S.P.M.D.D. - Depth: 200 mm - 8 in. minimum
- H** Undisturbed soil or compacted granular foundation: 0 to 20 mm - 0 to 3/4 in. to obtain a min. bearing capacity of 150 kPa

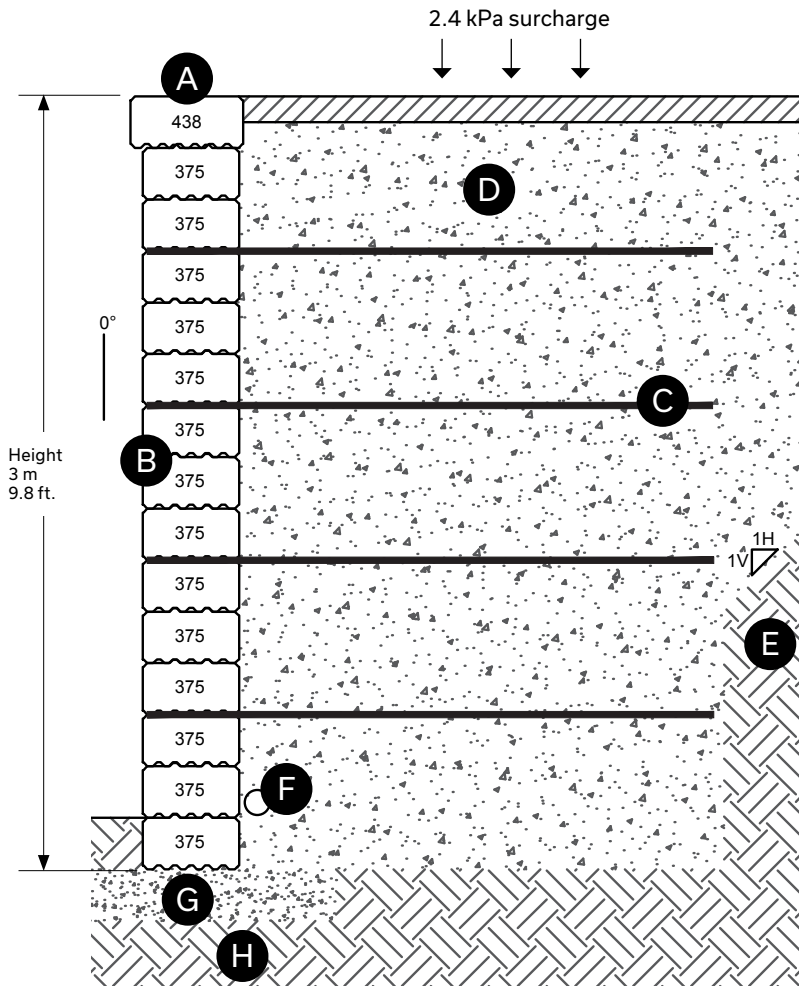
Maximum gravity wall heights assume no slopes or surcharge behind the wall and that the wall retains sand or gravel ($\phi = 34$ degrees, $\gamma = 21 \text{ kN/m}^3$)

GRANDE WALL - INSTALLATION

CROSS-SECTION - GRANDE WALL STRAIGHT REINFORCED 15 ROWS

Grande Wall 15 rows high (3 m or 9.8 ft.), including capping

- > Straight
- > Reinforced with geogrid. Recommended geogrid: Miragrid 3XT
- > With 2.4 kPa surcharge
- > No slope behind the wall



- A Grande Wall – Capping 438 unit
- B Grande Wall – 375 Standard: 14 rows high
- C Geogrid: 2.2 m - 7.2 ft. minimum length
- D Granular "B" backfill material compacted to min. 95% S.P.M.D.D. - Width: 375 mm - 14 3/4 in. behind the wall
- E Undisturbed soil
- F Perforated drain connected to services: 100 mm O - 4 in.
- G Granular "A" material compacted to min. 98% S.P.M.D.D. - Depth: 200 mm - 8 in. minimum
- H Undisturbed soil or compacted granular foundation: 0 to 20 mm - 0 to 3/4 in. to obtain a min. bearing capacity of 150 kPa

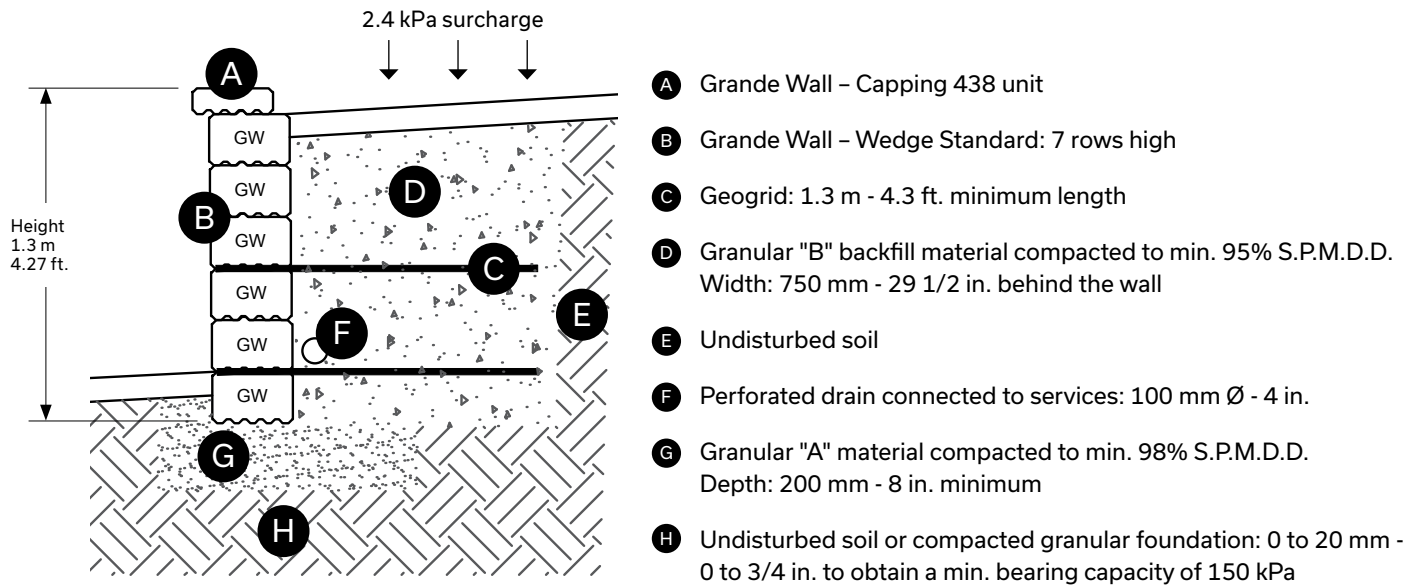
Maximum gravity wall heights assume no slopes or surcharge behind the wall and that the wall retains sand or gravel ($\phi = 34$ degrees, $\gamma = 21 \text{ kN/m}^3$)

GRANDE WALL - INSTALLATION

CROSS-SECTION - GRANDE WEDGE WALL STRAIGHT REINFORCED 8 ROWS

Grande Wedge Wall 8 rows high (1.3 m or 4.27 ft.), including capping

- > Straight
- > Reinforced with geogrid. Recommended geogrid: Miragrid 3XT
- > With 2.4 kPa surcharge
- > No slope behind the wall
- > Fill the cavities of the Grande Wedge units with clean stone

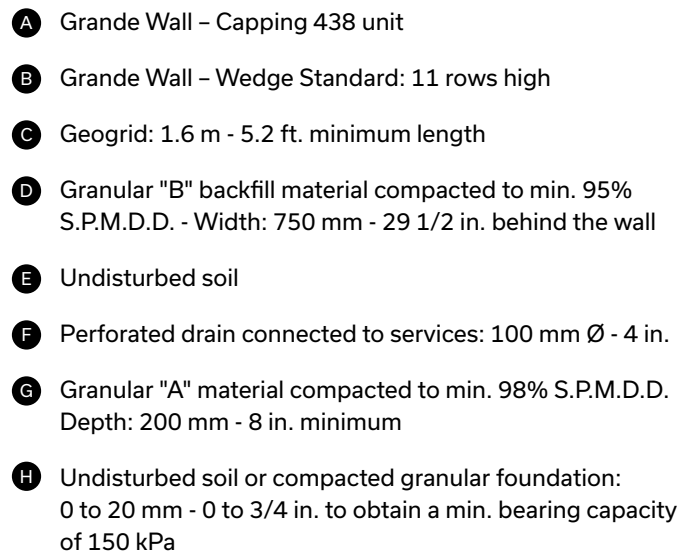


Grande Wedge Wall units are required to create curves with Grande Wall. Permacon is able to provide you with a customized standard cut. For more information, please contact your Permacon representative or send an inquiry directly to our website.

Maximum gravity wall heights assume no slopes or surcharge behind the wall and that the wall retains sand or gravel ($\phi = 34$ degrees, $\gamma = 21 \text{ kN/m}^3$)

CROSS-SECTION - GRANDE WEDGE WALL STRAIGHT REINFORCED 12 ROWS

- > Straight
- > Reinforced with geogrid. Recommended geogrid: Miragrid 3XT
- > With 2.4 kPa surcharge
- > No slope behind the wall
- > Fill the cavities of the Grande Wedge units with clean stone



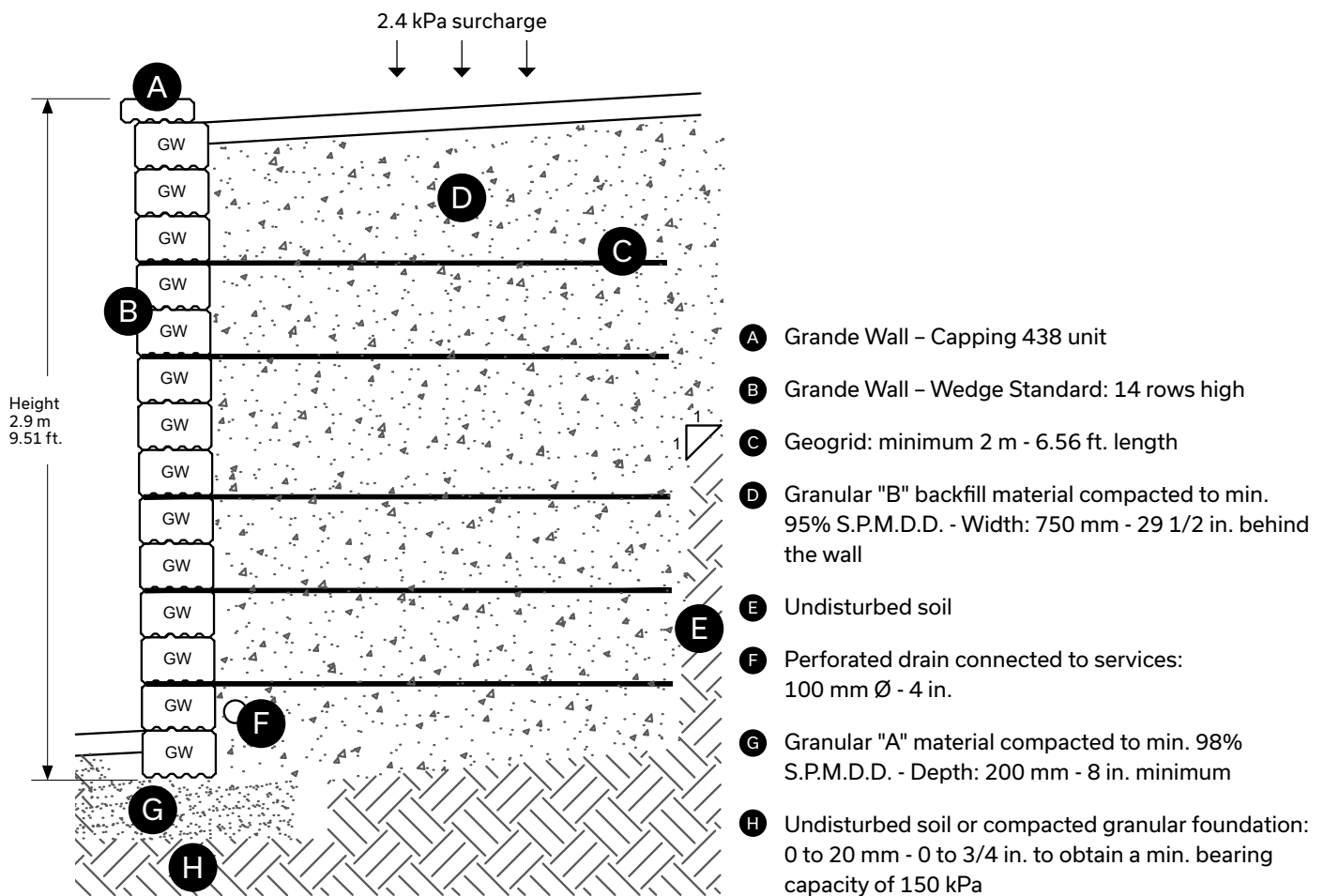
Maximum gravity wall heights assume no slopes or surcharge behind the wall and that the wall retains sand or gravel ($\phi = 34$ degrees, $\gamma = 21 \text{ kN/m}^3$)

GRANDE WALL - INSTALLATION

CROSS-SECTION - GRANDE WEDGE WALL STRAIGHT REINFORCED 15 ROWS

Grande Wedge Wall 15 rows high (2.9 m or 9.51 ft.), including capping

- > Straight
- > Reinforced with geogrid. Recommended geogrid: Miragrid 3XT
- > With 2.4 kPa surcharge
- > No slope behind the wall
- > Fill the cavities of the Grande Wedge units with clean stone



Grande Wedge Wall units are required to create curves with Grande Wall. Permacon is able to provide you with a customized standard cut. For more information, please contact your Permacon representative or send an inquiry directly to our website.

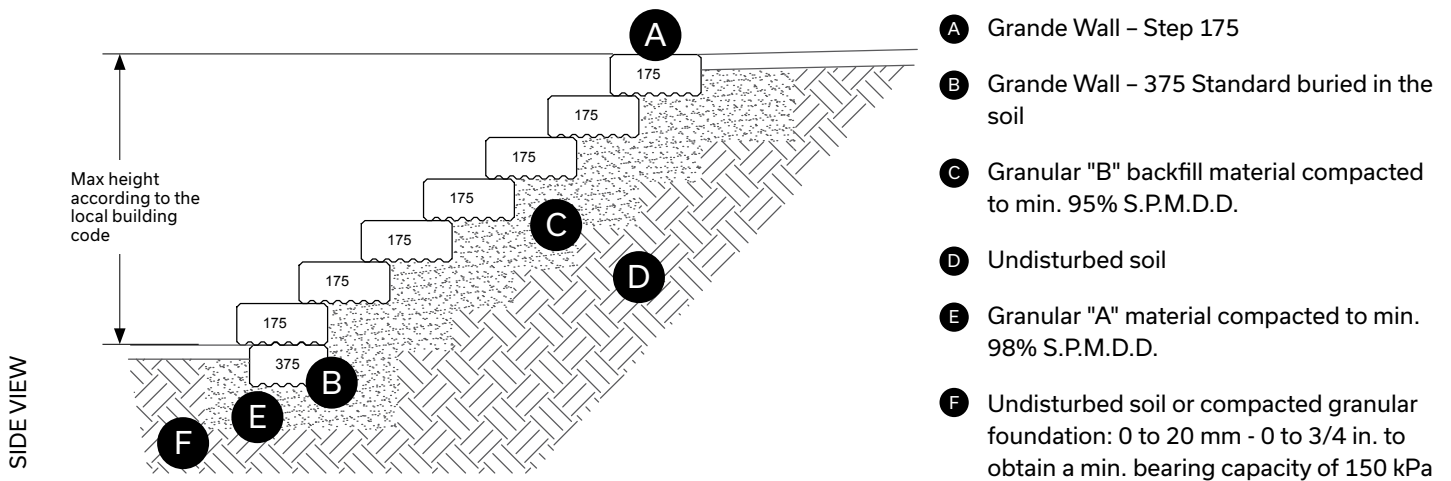
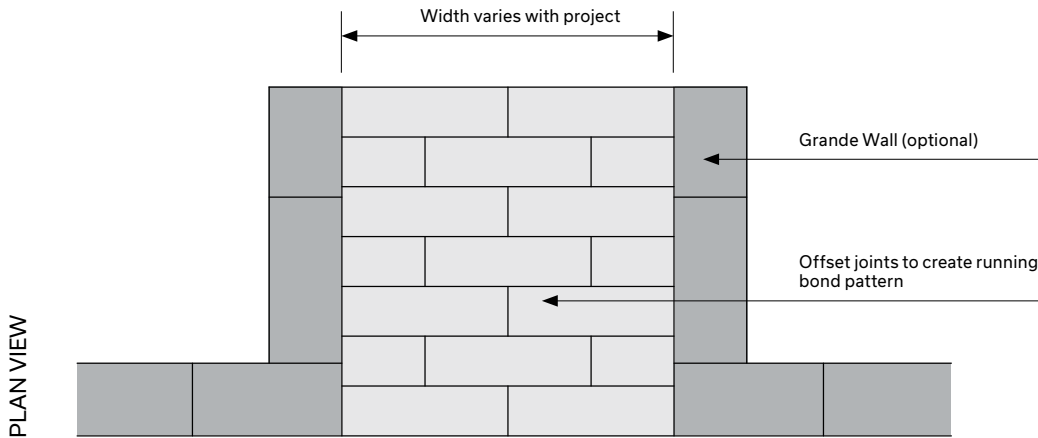
Maximum gravity wall heights assume no slopes or surcharge behind the wall and that the wall retains sand or gravel ($\phi = 34$ degrees, $\gamma = 21 \text{ kN/m}^3$)

GRANDE WALL - INSTALLATION

CROSS-SECTION - CREATING GRANDE WALL STEPS

To create steps, follow these instructions:

- > Start with a Grande Wall 375 Standard unit buried in the soil
- > Use Grande Step 175 units
- > Install the units in a way to create a running bond pattern with the steps
- > The stair width varies according to the local building code



Maximum gravity wall heights assume no slopes or surcharge behind the wall and that the wall retains sand or gravel ($\phi = 34$ degrees, $\gamma = 21 \text{ kN/m}^3$)

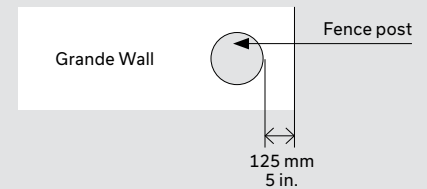
CROSS-SECTION - ADDITION OF A FENCE OR RAILING

GRANDE WALL FENCE

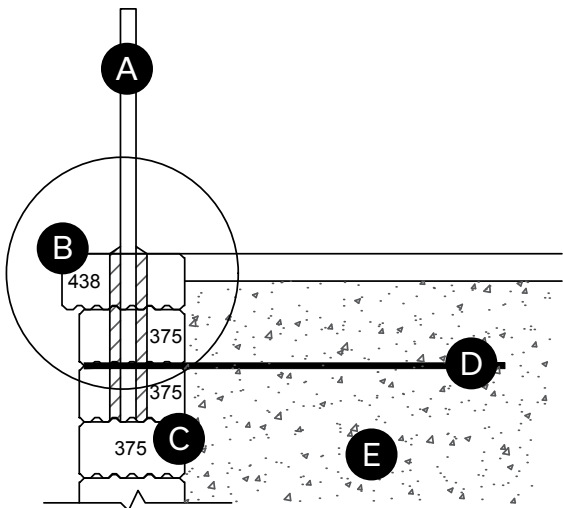
To build a fence using Grande Wall units, follow these instructions:

- > Use fence posts with a diameter of maximum 75 mm - 3 in.
- > Fill the core holes in Grande Wall, drilled to put in the fence, with non-shrink grout
- > The fence must be reinforced with geogrid or Grande Wall 750 Standard unit, as shown below
- > When using geogrid, the length of the geogrid should respect the cross-section shown in the guide, according to the wall height. Recommended geogrid: Miragrid 3XT
- > The depth of the posts core varies according to the fence used. Contact your Permacon representative for more information.

Install the fence or railing at a distance of at least 125 mm - 5 in. from Grande Wall units edge

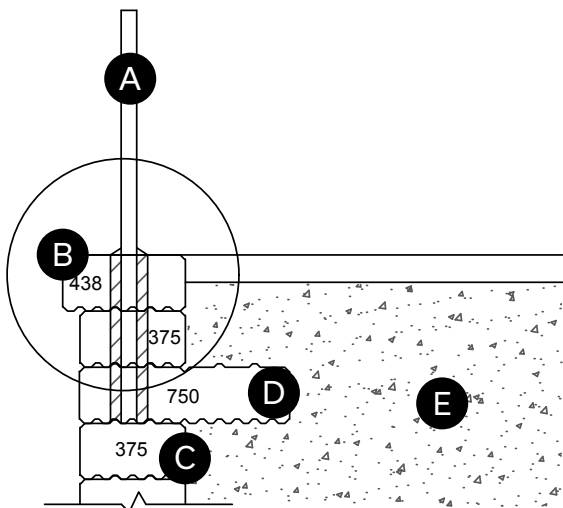


Grande Wall fence reinforced with geogrid



- Ⓐ Steel handrail or chain-link fence: posts core drilled in Grande Wall units (variable depth) with non-shrink grout.
Posts diameter: 75 mm - 3 in. maximum
Distance between the post holes and the edge of Grande Wall units: 125 mm - 5 in.
- Ⓑ Grande Wall – Capping 438
- Ⓒ Grande Wall – Standard 375
- Ⓓ Geogrid
- Ⓔ Granular "B" backfill material compacted to minimum 95% S.S.P.M.D.

Grande Wall fence reinforced with 750 Standard unit



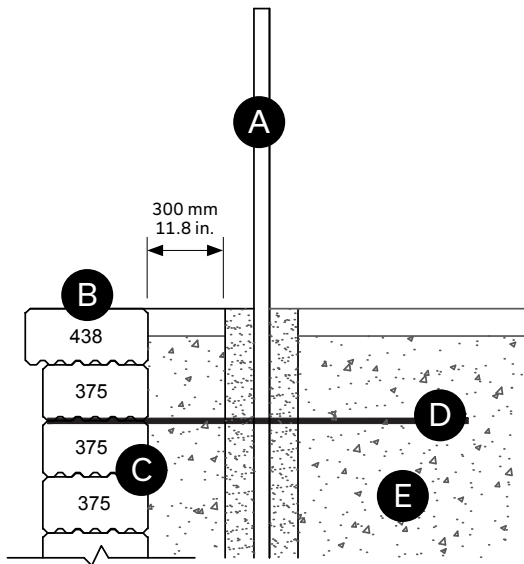
- Ⓐ Steel handrail or chain-link fence: posts core drilled in Grande Wall units (variable depth) with non-shrink grout.
Posts diameter: 75 mm - 3 in. maximum
Distance between the post holes and the edge of Grande Wall units: 125 mm - 5 in.
- Ⓑ Grande Wall – Capping 438
- Ⓒ Grande Wall – Standard 375
- Ⓓ Grande Wall – Standard 750
- Ⓔ Granular "B" backfill material compacted to minimum 95% S.S.P.M.D.

CROSS-SECTION - ADDITION OF A FENCE OR RAILING (CONT'D)

FENCE BEHIND GRANDE WALL

To build a fence behind the Grande Wall units, follow these instructions:

- > Install the fence or railing in a sonotube of minimum 1.2 m - 3.9 ft. in depth
- > The wall and fence must be reinforced with a geogrid. The length of the geogrid should respect the cross-section shown in the guide, according to the wall height. Recommended geogrid: Miragrid 3XT



- A** Handrail or fence cast in sonotube behind the Grande Wall
 Distance between the sonotube the edge of Grande Wall units:
 300 mm - 11.8 in.
 Sonotube depth: 1.2 m - 3.9 ft
- B** Grande Wall – Capping 438
- C** Grande Wall – Standard 375
- D** Geogrid
- E** Granular "B" backfill material compacted to minimum 95% S.S.P.M.D.

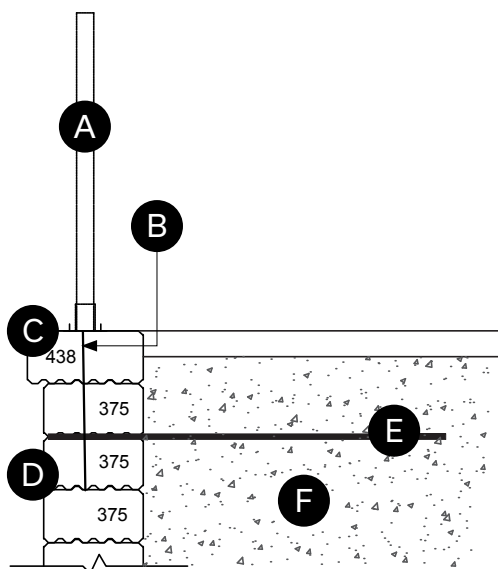
CROSS-SECTION - ADDITION OF A FENCE OR RAILING (CONT'D)

FENCE ON TOP OF GRANDE WALL

To build a fence on top of the Grande Wall units, follow these instructions:

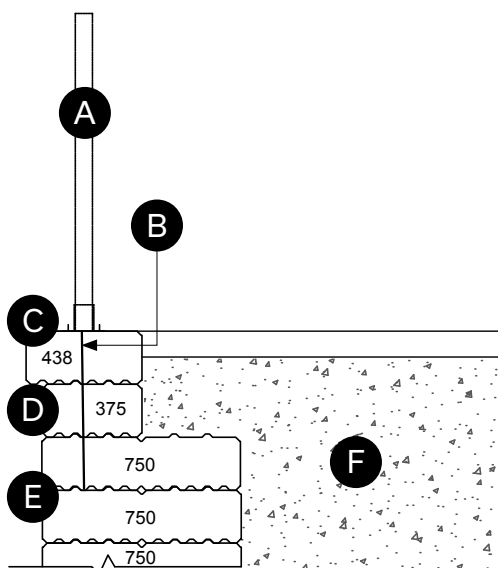
- > Use fence posts with a diameter of maximum 75 mm - 3 in.
- > Install the fence or railing at a distance of at least 125 mm- 5 in. from Grande Wall unit edge
- > To strengthen the fence or railing, insert bars coated with epoxy, in the Grande Wall units.
Recommended epoxy: HILTI-RE 500 V3

Fence on top of Grande Wall reinforced with geogrid



- A** Steel handrail or chain-link fence
- B** Bars coated with epoxy type: HILTI-RE 500 V3 or equivalent
Bars depth: minimum 3 rows of Grande Wall
Diameter of holes in Grande Wall units: 20 mm - 0.8 in.
Distance between the bars holes and the edge of Grande Wall units: 125 mm - 5 in.
- C** Grande Wall – Capping 438
- D** Grande Wall – Standard 375
- E** Geogrid
- F** Granular "B" backfill material compacted to minimum 95% S.S.P.M.D.

Fence on top of Grande Wall reinforced with 750 Standard unit



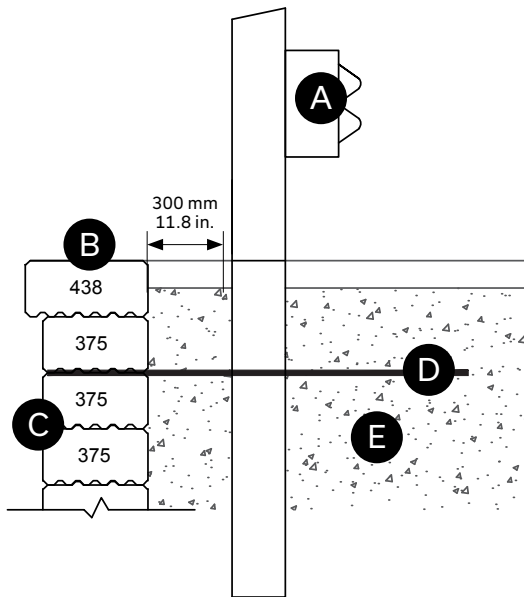
- A** Steel handrail or chain-link fence
- B** Bars coated with epoxy type: HILTI-RE 500 V3 or equivalent
Bars depth: minimum 3 rows of Grande Wall
Diameter of holes in Grande Wall units: 20 mm - 0.8 in.
Distance between the bars holes and the edge of Grande Wall units: 125 mm - 5 in.
- C** Grande Wall – Capping 438
- D** Grande Wall – Standard 375
- E** Grande Wall – Standard 750
- F** Granular "B" backfill material compacted to minimum 95% S.S.P.M.D.

CROSS-SECTION - ADDITION OF A FENCE OR RAILING (CONT'D)

VEHICULAR GUARD BEHIND GRANDE WALL

To build a vehicular guard behind Grande Wall units, follow these instructions:

- > Install the vehicular guard at a distance of at least 300 mm (11.8 in.) from Grande Wall units edge and at a depth of at least 1.2 m - 3.9 ft.
- > The wall and vehicular guard must be reinforced with a geogrid. The length of the geogrid should respect the cross-section shown in the guide, according to the wall height. Recommended geogrid: Miragrid 3XT



- A** Vehicular guard
Distance between the guard and the edge of Grande Wall units:
300 mm - 11.8 po
Depth of guard: 1.2 m - 3.9 ft. min.
- B** Grande Wall – Capping 438
- C** Grande Wall – Standard 375
- D** Geogrid
- E** Granular "B" backfill material compacted to minimum 95% S.S.P.M.D.

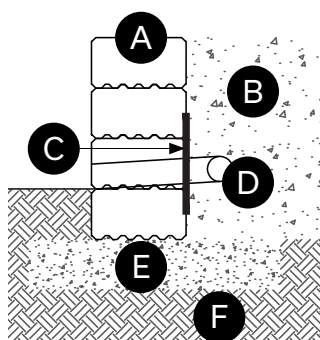
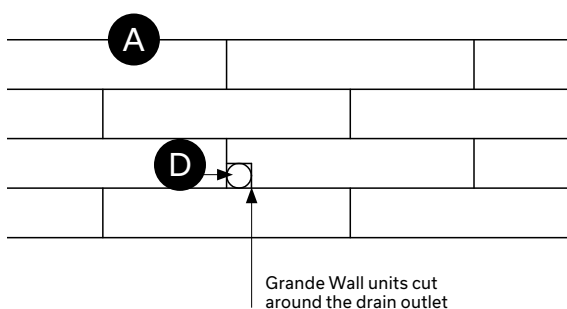
CROSS-SECTION - DRAIN

DRAIN OUTLET THROUGH GRANDE WALL

When not connected to services, the drain behind the Grande Wall must go through the Grande Wall units at every 15 m - 49.2 ft., according to these instructions:

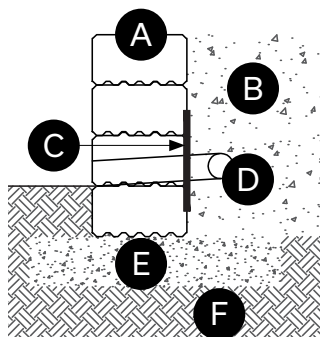
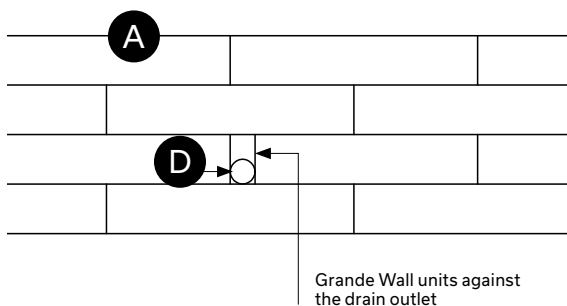
- > Install a filter fabric over the drain outlet to prevent migration of granular material through notch
- > There are two ways to create the hole in the Grande Wall:
 - Option 1: Cut the Grande Wall units around the drain outlet **OR**
 - Option 2: Install the Grande Wall units against the drain outlet, which leaves a hole above the drain outlet

Option 1: Grande Wall units cut around the drain outlet



- A** Grande Wall – Standard 375
- B** Granular "B" backfill material compacted to minimum 95% S.S.P.M.D
- C** Filter fabric over the drain outlet to prevent migration of granular material through notch
- D** Perforated drain Ø 100 mm - 4 in with a filter sock at the opening (Grande Wall face)
- E** Granular "A" material compacted to min. 98% S.P.M.D.D.
- F** Undisturbed soil

Option 2: Grande Wall units installed against the drain outlet



- A** Grande Wall – Standard 375
- B** Granular "B" backfill material compacted to minimum 95% S.S.P.M.D
- C** Filter fabric over the drain outlet to prevent migration of granular material through notch
- D** Perforated drain Ø 100 mm - 4 in with a filter sock at the opening (Grande Wall face)
- E** Granular "A" material compacted to min. 98% S.P.M.D.D.
- F** Undisturbed soil

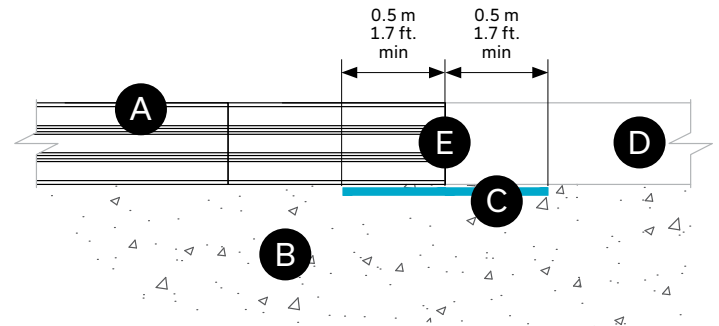
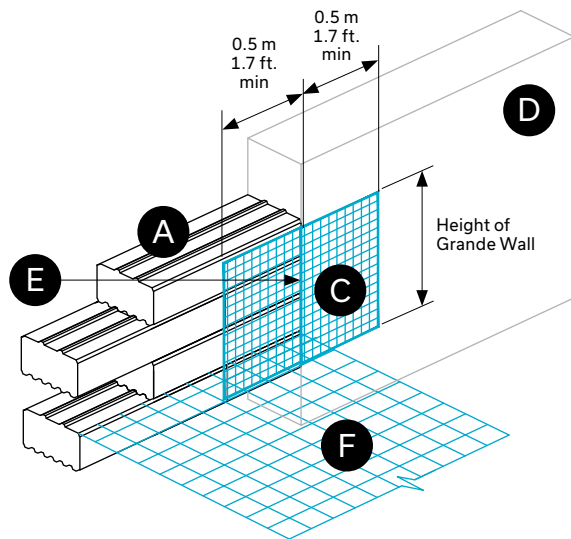
GRANDE WALL - INSTALLATION

CROSS-SECTION - GRANDE WALL AGAINST A BUILDING

To install the Grande Wall against an existing wall, follow these instructions:

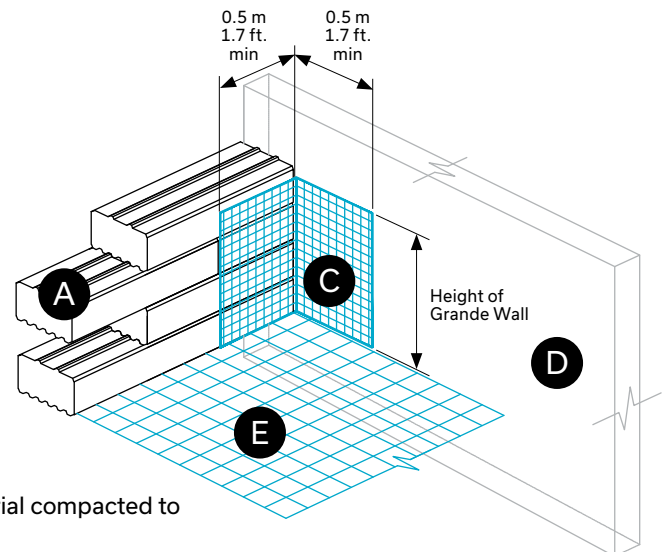
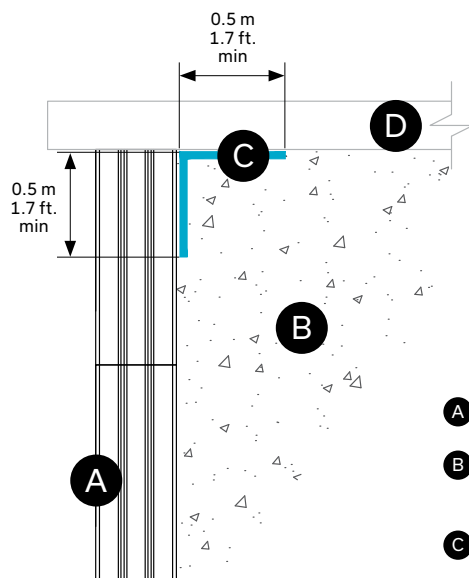
- > Install a filter fabric against the Grande Wall and the existing wall. Fabric length: 0.5 m - 1.7 ft. minimum on each structure - Grande Wall and existing wall. Fabric height: same as Grande Wall

Straight abutment



- A** Grande Wall
- B** Granular "B" backfill material compacted to minimum 95% S.S.P.M.D.
- C** Filter fabric
Length: 0.5 m - 1.7 ft. minimum on each structure
Height: same as Grande Wall
- D** Existing wall or building
- E** Grande Wall units cut against the existing building
- F** Geogrid if required

Corner abutment



- A** Grande Wall
- B** Granular "B" backfill material compacted to minimum 95% S.S.P.M.D.
- C** Filter fabric
Length: 0.5 m - 1.7 ft. minimum on each structure
Height: same as Grande Wall
- D** Existing wall or building
- E** Geogrid if required