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# RETAINING WALL SYSTEMS

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# THE COMPLETE RANGE OF RETAINING WALLS

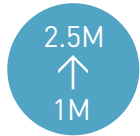
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Rebuild Right™. Choose from our proven range of modular concrete retaining wall solutions available for DIY residential jobs through to highly engineered civil structures. The appropriate wall for your situation will depend on a number of things, a critical criteria being the height of the wall. This document provides solutions in three height categories:



LOW  
RETAINING  
WALLS



MEDIUM  
RETAINING  
WALLS



HIGH  
RETAINING  
WALLS

For the residential market, modular concrete retaining wall systems such as the Keystone® range and masonry blocks offer many advantages including:

- Long life - concrete products are renowned for their durability, they will not rot or rust
- Low maintenance
- Attractive finish – choose from a variety of colours and textures
- You can create vertical uninterrupted walls
- Ease of construction
- Standard designs

The following steps will lead you to answers determining the height of your retaining wall, whether you require a building consent before you proceed, if you can build a retaining wall yourself, or whether you need to call in an engineer and qualified builder.

# WILL I NEED A BUILDING CONSENT?

## NO

- If the height of the retained soil is less than 1.5m high (measure or calculate the difference in elevation from the top of the soil behind the wall and in front of the wall. It needs to be always less than 1.5m), and
- If there will be no vehicles coming within 1.5m of the top of the retaining wall, and
- If there are no foundations within 1.5m of the top of the retaining wall, and
- If the ground behind and in front of the wall is horizontal
- The wall needs to be built on and supporting competent soils. By this we mean, if difficult soil conditions are encountered (expansive soils, peats, uncontrolled fill, weak/soft materials) engineering advice should be sought.

**NOTE:** Your local district plan should be consulted. For example, the Auckland District plan defines any retaining wall that exceeds 1.0m in height is regarded as a building. Therefore all requirements under the district plan relating to a building apply to a retaining wall that exceeds 1.0m in height. This may mean that resource consent is required even if a building consent is not. A resource consent will also be required if the extent of the excavation exceed specified limits. If you are unsure, always ask your local Council for guidance.

### CAN I BUILD THE RETAINING WALL MYSELF?

Small walls not requiring a building consent can be constructed by the home owner but will need to be built fully in accordance with the manufacturer's instructions. Be aware that many of the components of a retaining wall are heavy and therefore a high degree of fitness will be required.

### DOES THIS MEAN I CAN BUILD WHATEVER I LIKE?

Although a building consent may not be required, any building work conducted must comply with the Building Code. The wall must be durable and structurally sound. The best way of ensuring this is to use standard solutions provided by manufacturer's such as Firth.

## YES

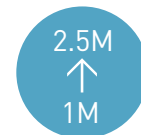
- If the height of the retained soil is more than 1.5m high (measure or calculate the difference in elevation from the top of the soil behind the wall and in front of the wall), or
- If there will be vehicles coming within 1.5m of the top of the retaining wall, or
- If there are foundations within 1.5m of the top of the retaining wall, or
- If the ground behind and in front of the wall is sloping
- The wall needs to be built on and supporting competent soils. By this we mean, if difficult soil conditions are encountered (expansive soils, peats, uncontrolled fill, weak/soft materials) engineering advice should be sought.

### CAN I BUILD THE RETAINING WALL MYSELF?

**UNLIKELY.** If the retaining wall supports a building then the wall will need to be supervised by a builder who is a Licensed Building Practitioner (LBP). The LBP has to provide a certificate upon completion that the work has been built in accordance with the building consent documentation. Keystone® walls are relatively easy to construct so a LBP may accept an agreement where the home owner assists with the laying of blocks under their supervision to reduce construction costs.

However, if the wall requires a consent but does not support a structure then the opportunity for the home owner to construct the wall exists.

GO TO THE MEDIUM OR HIGH RETAINING WALL GUIDES

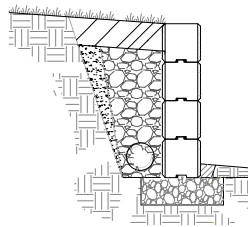


GO TO THE LOW RETAINING WALL GUIDE

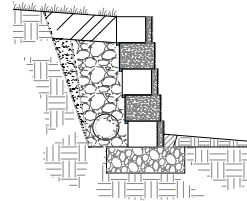


**THESE OPTIONS ASSUME GOOD GROUND CONDITIONS AND NO REINFORCEMENT OF THE SOIL OR SOIL ANCHORS**

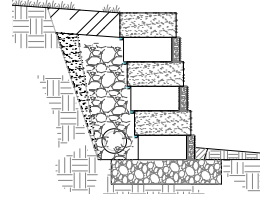
## FIRTH EZI WALL™



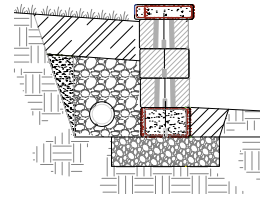
## KEYSTONE® SEDONA STONE®



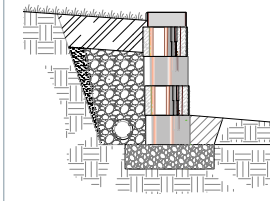
## KEYSTONE® GARDEN WALL



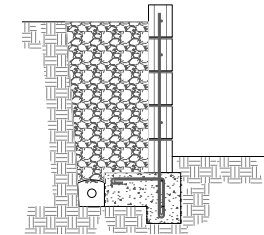
## KEYSTONE® COUNTRY MANOR®



## KEYSTONE® COMPAC IV



## FIRTH MASONRY



### Description

Light weight interlocking tongue and groove system. Built straight, concave or convex curved walls with capping unit. Split face texture on both sides of the wall.

Light shear lip system with a 6.8° batter for straight, curved or terraced walls. "KeyKut" texture to one face.

Medium size shear lip system with a 8° batter for straight, curved or terraced walls. Split face texture to one face.

Large, medium and small set units with capper unit can be built vertically or to a 9.5° batter using fibre glass pin connection between blocks. "KeyKut" finish to three sides. Can be built higher using geogrid soil reinforcement.

Large unit with corner block and capper can be built near vertical or two battered options 8.8° or 4.4° using fibre glass pins. Split face texture to one side in either Tri-Face/Bevelled or Straight-Face. Can be built higher using geogrid soil reinforcement.

Masonry retaining walls comprise of a concrete footing and a reinforced concrete masonry wall. Drainage gravel is provided behind the wall. For fast and easy erection the Firth mortarless masonry system (EsiBloc™) can be used. For walls up to 1m high a 140mm wide block can be used, however it is more common to use a 190mm block.

Refer to Firth website for our range of colours

Refer to Firth website for our range of colours

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### Maximum height is from top of foundation to top of wall with no surcharge

500mm  
(Embedment 50mm)

500mm  
(Embedment 50mm)

700mm  
(Embedment 50mm)

600mm if built vertical,  
900mm if built with 9.5° setback  
(Embedment 50mm)

Vertical 700mm  
8.8° Batter 900mm  
(Embedment 50mm)

Height limitations dictated by reinforcement and foundation size.

### Ability to Build Higher

✗

✗

✗

✓

✓

✓

### Access Requirements

Require access for excavation and compaction equipment. EziWall™ units arrive on a pallet but can be manhandled into place.

Require access for excavation and compaction equipment. Sedona Stone® elements arrive on a pallet but can be manhandled into place.

Require access for excavation and compaction equipment. Garden wall elements arrive on a pallet but can be manhandled into place.

Require access for excavation and compaction equipment. Country Manor® elements arrive on a pallet but can be manhandled into place.

Require access for excavation and compaction equipment. Compac IV elements arrive on a pallet but can be manhandled into place.

Require access for excavation and compaction equipment. Masonry blocks arrive on a pallet but can be manhandled into place. Will need access for concrete truck and pump to place concrete and fill blocks.

### Individual Unit Weight (Approx)

5.5kg

5.5kg

13.5kg

11kg, 18kg and 27kg

34 - 36.6kg

190mm wide block - (2016) 16kg

### Excavation Required

Minimal excavation required, comprising of the wall width plus 300mm to allow for a drainage layer plus what ever distance is required to ensure stability of the exposed excavated face.

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With the footing extending in front of the wall the excavation depth is typically the wall thickness (200mm) plus the width of drainage materials (300mm). Then what ever distance is required to ensure stability of the exposed excavated face. When the footing extends to the rear of the wall, the excavation outlined above is increased by the footing width.

### Reference Material visit [www.firth.co.nz](http://www.firth.co.nz)

Visit [www.firth.co.nz](http://www.firth.co.nz) for:  
Ezi Wall™ Flyer  
Video - How to build an Ezi Wall Raised Planter Kit

Visit [www.firth.co.nz](http://www.firth.co.nz) for:  
Keystone® DIY Brochure

Visit [www.firth.co.nz](http://www.firth.co.nz) for:  
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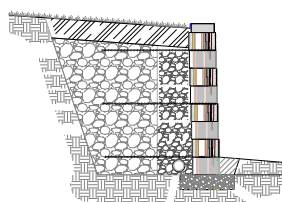
Visit [www.firth.co.nz](http://www.firth.co.nz) for:  
Keystone® DIY Brochure  
How to build a Country Manor: Square Planter Kit, Column Kit

Visit [www.firth.co.nz](http://www.firth.co.nz) for:  
Keystone® Compac IV Brochure  
Keystone® DIY Brochure

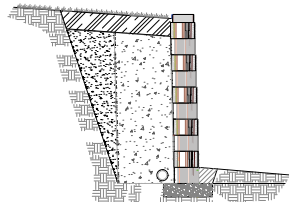
Visit [www.firth.co.nz](http://www.firth.co.nz) for:  
Cantilevered Masonry Retaining Walls  
EsiBloc™ Mortarless Masonry Brochure

THESE SOLUTIONS WILL REQUIRE SPECIFIC ENGINEERING DESIGN

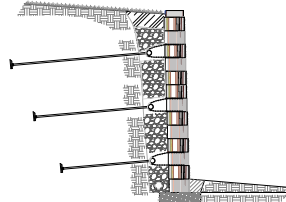
KEYSTONE® COMPAC IV WITH GEOGRIDS



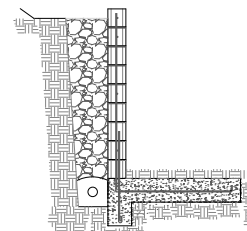
KEYSTONE® COMPAC IV WITH NO FINES CONCRETE BACKFILL



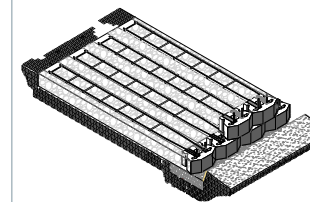
KEYSTONE® COMPAC IV WITH SOIL ANCHORS



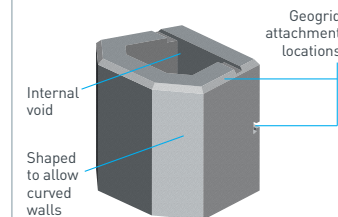
FIRTH MASONRY



KEYSTONE® KEYSTEEL® WITH STEEL LADDERS



HUMES ANCHORBLOC™



Description

Compac IV split face facing with geogrids maximum every 3rd course. Geogrid length typically height of wall. Walls can be constructed near vertical or two battered setback options of 8.8° and 4.4°. Can be built higher.

Refer to Firth website for our range of colours

Compac IV split face facing with Firth Permeable Concrete behind. Walls can be constructed near vertical or two battered setback options of 8.8° and 4.4°. Can be built higher.

Refer to Firth website for our range of colours

Compac IV split face facing with Manta Ray or similar earth anchors. Walls can be constructed near vertical or two battered setback options of 8.8° and 4.4°. Can be built higher.

Refer to Firth website for our range of colours

Masonry retaining walls comprise of a concrete footing and a reinforced concrete masonry wall. Drainage gravel is provided behind the wall. For fast and easy erection the Firth mortarless masonry system (EsiBloc™) can be used. For walls between 1 and 2.5m high, a 190mm wide block is required. Colour and texture of blocks can be provided by special order.

Keystone® KeySteel split face facing with galvanized steel ladder soil reinforcement. Split face texture to one side in either Tri-Face/Bevelled or Straight-Face. Seismic resilient low extension system. Can be built near vertical with either fibre glass or steel pins. Can be built higher using steel ladders.

Refer to Firth website for our range of colours

The blocks are 1.2m wide and 1m high. The hollow centre reduces the weight of the unit. The void being gravel filled after erection. The system is available in half height units and corner units. The face can be modified to achieve various decorative finishes, the most common being an exposed aggregate finish. The units are designed to accommodate geogrid.

Access Requirements

Require access for excavation and compaction equipment. Compac IV elements arrive on a pallet but can be manhandled into place.

Require access for excavation equipment. The non fines concrete backfill needs straight discharge from the truck or barrowed into position.

Require access for excavation equipment and light drilling equipment for earth anchoring system.

Require access for excavation and compaction equipment. Masonry blocks arrive on a pallet but can be manhandled into place. Will need access for concrete truck and pump to place concrete and fill blocks.

Require access for excavation and compaction equipment. Compac S elements arrive on a pallet but can be manhandled into place.

Require access for excavation, and compaction equipment, and access to allow delivery of the units.

Weight of Unit (Approximate)

34 - 36.6kg

34 - 36.6kg

34 - 36.6kg

190mm wide block - (2016) 16kg

42kg

The 1.5 tonne units can be lifted by standard excavation equipment.

Excavation Required

The length of the geogrids are typically similar to the height of the wall. The width of the excavation is therefore typically the height of the wall plus what ever distance is required to ensure stability of the exposed excavated face.

The width of the no fines concrete backfill is typically half the height of the wall. Therefore this solution can be used in more confined situations.

This solution is ideally suited for situations where the soil slope is naturally stable. This means that the excavation can be a little as 600mm wide to accommodate the heads of the earth anchors, gravel backfill and the Compac IV facing.

With the footing extending in front of the wall the excavation depth is typically the wall thickness (200mm) plus the width of drainage materials (300mm). Then what ever distance is required to ensure stability of the exposed excavated face. When the footing extends to the rear of the wall, the excavation required is increased by the footing width.

The length of the steel ladders are typically similar to the height of the wall. The width of the excavation, if required, is therefore typically the height of the wall plus what ever distance is required to ensure stability of the exposed excavated face.

The depth of the units is 900mm, so excavation is required to accommodate the units, drainage pipes, the length of any geogrid (when required) and what ever distance is required to ensure stability of the exposed excavated face.

Reference Material

Visit [www.firth.co.nz](http://www.firth.co.nz) for:  
Keystone® Compac IV Brochure  
Keystone® Construction Manual  
Keystone® Design Manual  
Keywall Software Package

Visit [www.firth.co.nz](http://www.firth.co.nz) for:  
Keystone® Compac IV Brochure  
Keystone® Construction Manual  
Keystone® Design Manual  
Keywall Software Package

Visit [www.firth.co.nz](http://www.firth.co.nz) for:  
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Keywall Software Package

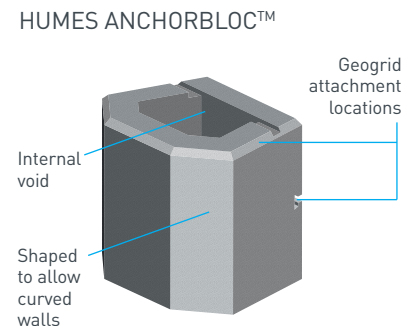
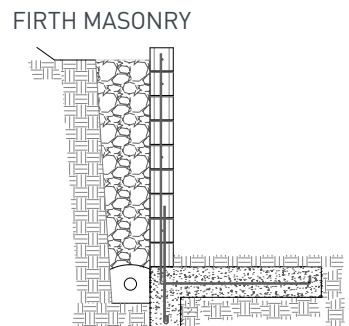
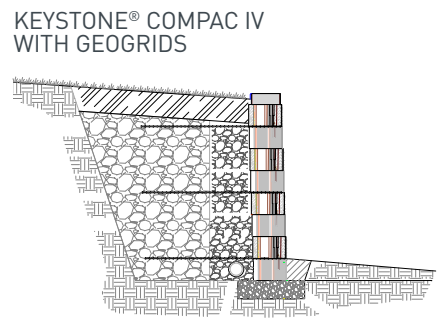
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EsiBloc Mortarless Masonry Brochure

Visit [www.firth.co.nz](http://www.firth.co.nz)

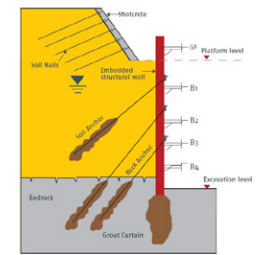
Visit [www.humes.co.nz](http://www.humes.co.nz) for:  
Humes Concrete Retaining Wall Brochure



THESE SOLUTIONS WILL REQUIRE SPECIFIC ENGINEERING DESIGN















SOIL NAILS & GROUND ANCHOR SYSTEMS



<p><b>Description</b></p>	<p>Keystone® Compac IV facing. Geogrid length typically height of wall. Walls can be built near vertical or two battered setback options of 8.8° and 4.4° can be built higher using geogrid soil reinforcement.</p>	<p>For walls greater than 2.5m high, 240mm wide blocks will be required. The components of the systems are essentially the same as for smaller walls however the amount of reinforcing and dimensions of footings are larger.</p>	<p>The blocks are 1.2m wide and 1m high. The hollow centre reduces the weight of the unit. The void being gravel filled after erection. The system is available in half height units and corner units. The face can be modified to achieve various decorative finishes, the most common being an exposed aggregate finish. The units are designed to accommodate geogrid.</p>	<p>Soil nails are used to form a stabilised block that is large enough to form a stable gravity structure. They are 75 – 150mm in diameter spaced at 1.0 – 1.5m vertically and horizontally. Facings include mesh, sprayed concrete, keystone and precast panels. Soil and rock anchors are stressed and used to tie back retaining wall structures. These are typically 150 – 250mm in diameter and use high strength pre-stressing strand or bar. Durability and routine monitoring need to be considered given their highly loaded condition.</p>
<p><b>Access Requirements</b></p>	<p>Require access for excavation and compaction equipment. Compac IV elements arrive on a pallet but can be manhandled into place.</p>	<p>Require access for excavation and compaction equipment. Masonry block arrive on a pallet but can be manhandled into place. Will need access for concrete truck and pump to place concrete and fill blocks.</p>	<p>Require access for excavation and compaction equipment, and will need access to allow delivery of the units.</p>	<p>The plant to install soil nails and rock anchors can range from hand held rope access tooling to specialised 12T tracked plant. The solution needs to be designed to suit the access requirements. Generally soil nails are shorter than rock anchors and can be installed with smaller plant and so suit limited access situations.</p>
<p><b>Weight Of Unit (Approximate)</b></p>	<p>35 - 45kg</p>	<p>240mm wide block - (2516) 19kg</p>	<p>The 1.5 tonne units can be easily lifted by standard excavation equipment.</p>	<p>Materials can be sized to suit access constraints; hand and rope access is possible.</p>
<p><b>Excavation Required</b></p>	<p>The length of the geogrids are typically similar to the height of the wall. The width of the excavation is therefore typically the height of the wall plus what ever distance is required to ensure stability of the exposed excavated face.</p>	<p>With the footing extending in front of the wall the excavation depth is typically the wall thickness (200mm) plus the width of drainage materials (300mm). Then what ever distance is required to ensure stability of the exposed excavated face. When the footing extends to the rear of the wall, the excavation required is increased by the footing width.</p>	<p>The depth of the units is 900mm, so excavation is required to accommodate the units, drainage pipes, the length of any geogrid (when required) and what ever distance is required to ensure stability of the exposed excavated face.</p>	<p>Soil nails and anchors are drilled into the retained soil mass either from the existing ground surface profile or as the final retained face is exposed, no excavation is required to provide stabilisation. Where the retained face is on or close to the boundary agreement of the adjacent property owner/easement will be required as the elements are likely to project beyond the boundary.</p>
<p><b>Reference Material</b></p>	<p>Visit <a href="http://www.firth.co.nz">www.firth.co.nz</a> for: Keystone® Compac IV Brochure Keystone® Construction Manual Keystone® Design Manual Keywall Software Package</p>	<p>Visit <a href="http://www.firth.co.nz">www.firth.co.nz</a> for: Cantilevered Masonry Retaining Walls Firth Masonry Brochure</p>	<p>Visit <a href="http://www.humes.co.nz">www.humes.co.nz</a> for: Humes Concrete Retaining Wall Brochure</p>	<p>Visit <a href="http://www.brianperrycivil.co.nz">www.brianperrycivil.co.nz</a> for: Foundations &amp; Retaining Walls Catalogue</p>



EMBEDDED  
SYSTEMS

	SOLDIER PILE WALL	CONTIGUOUS BORED PILE WALL	SHEET PILE WALL	SOIL MIX / SLURRY WALL	SECANT PILE WALL	DIAPHRAGM WALL
	 	 	 	 	 	 
<b>Description</b>	Spaced embedded structural elements and infill panels (timber, concrete or steel).	Series of bored pile installed at close spacing with concrete arches between.	Clutched steel sheet piles driven to depth.	Steel or precast concrete elements in a 0.6 – 1.0m wide soil mix/slurry wall.	A series of 0.6 – 1.5m dia. piles installed so that they overlap to form a wall.	A series of interlocking reinforced concrete panels to form a 0.6 – 1.2m thick wall.
<b>Access / Space Requirements</b>	Wide range of plant from excavator and pendulum borer for timber pole walls to hydraulic drilling rigs and handling crane for concrete bored pile options.	30 – 70T hydraulic drilling rigs and handling crane used to install bored piles. Access required for ready mix concrete and pile rebar cages delivery.	50 – 70T cranes are required to pitch and drive sheet piles using vibro or impact hammers. Space also required for delivery and storage of piles.	40T excavators, 70T crane and grab or Soil-mixing rig used to form trench. Grout mixing and pumping plant with access for cement delivery.	50 – 70T hydraulic drilling rigs and handling crane used to install bored piles. Access required for ready mix concrete and pile rebar cages delivery.	100T crane and grab used to excavate the panels. Support fluid mixing, conditioning and storage on site. Access required for delivery of concrete and rebar cages.
<b>Proximity to Boundaries / Structures</b>	Unstable ground or water inflows between piles can damage adjacent structures. Flexible wall layout means site area can be maximised.	Unstable ground or water inflows between piles can damage adjacent structures. Flexible wall layout means site area can be maximised.	Close to boundary possible but vibration may be an issue. Flexible wall layout needs special formed piles.	Close to boundary possible with no excavation. Ideally straight walls as layout governed by grab length.	Close to boundary possible with no excavation. Flexible wall layout means site area can be maximised.	Close to boundary possible with no excavation. Ideally straight walls as layout governed by grab length.
<b>Excavation Required / Spoil</b>	Limited excavation/backfill of retained material. 100% of the net wall volume.	Limited excavation/backfill of retained material. 100% of the net wall volume.	No excavation/backfill of retained material. No spoil is generated during installation.	No excavation/backfill of retained material. 30 - 80% of the net wall volume.	No excavation/backfill of retained material. 120% of the net wall volume.	No excavation/backfill of retained material. 100% of the net wall volume.
<b>Face Support</b>	Ground unsupported prior to the placement of panels.	Ground unsupported prior to sprayed concrete infill.	Retained face is protected and supported all times.	Retained face is protected and supported all times.	Retained face is protected and supported all times.	Retained face is protected and supported all times.
<b>Groundwater Control</b>	No groundwater control.	No groundwater control.	Groundwater seepage at pile clutches.	Limited groundwater seepage possible.	Groundwater seepage at cold joints between piles.	Waterbar across panel cold joints prevents groundwater seepage.
<b>Product Use and Durability</b>	Different material options can be selected to suit conditions and design life/durability requirements.	Conventional concrete in the ground design. Drainage cavity and internal wall for water seepage.	Re-useable sheet piles well suited to temporary works. Corrosion to be considered for permanent works.	Sacrificial steel and internal lining wall required for long-term water seepage.	Conventional concrete in the ground design. Internal lining wall may be required for water seepage.	Conventional concrete in the ground design. No internal lining wall necessary.

Reference Material

Visit [www.brianperrycivil.co.nz](http://www.brianperrycivil.co.nz) for: Foundations & Retaining Walls Catalogue



### I need a building consent, what do I need to do?

You will need to contact an engineer. Depending upon the complexity of the situation, the engineer likely needs to know:

- The engineering properties of the ground, this will probably necessitate some shallow geotechnical investigations.
- A topographical survey to determine the probable heights of retaining walls and slopes behind and in front of the proposed retaining walls.
- The location of any roads and structures relative to the proposed retaining wall.
- The desired appearance of the wall, ie. is it desired to be vertical, what are the preferences regarding colour and texture.
- Is the retaining wall on a boundary? Do consents exist to have items such as soil anchors that extend under the neighbouring property? If no consents exist the whole wall and excavation to construct the wall must be within the boundary.
- Do buried pipes or underground services exist which need protection?

### What can I expect from the retaining wall design engineer?

For most residential retaining walls designs, the following would be provided which can be used to obtain quotes for the construction of the wall and/or apply for a building consent.

- Drawings showing the location of the wall and typical cross sections.
- A statement on the construction methodology.
- Statements on the material properties of the components of the wall.
- Testing requirements (when applicable).
- Construction inspection requirements for the engineer.
- A producer statement – Design (referred to as a PS1).
- A memorandum from Licensed Building Practitioner certificate of design work. This form is required for a building consent application.

I'm keen to construct a retaining wall, where can I get more information?



visit: [www.firth.co.nz](http://www.firth.co.nz)  
call: 0800 800 576  
email: [firth.retainingwalls@firth.co.nz](mailto:firth.retainingwalls@firth.co.nz)



visit: [www.humes.co.nz](http://www.humes.co.nz)  
call: 0800 502 112 or 09 580 0808  
email: [jubran.naddaff@humes.co.nz](mailto:jubran.naddaff@humes.co.nz)



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call: 03 363 1704  
email: [nickw@fcc.co.nz](mailto:nickw@fcc.co.nz)  
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**I have received a payout from EQC or my insurance company as compensation for damage to retaining walls. Do I really need to spend the money on the walls?**

It is important that retaining walls are repaired or reconstructed. Failure to do so may invalidate future insurance claims. The Householders' Guide to EQCover states "EQC can refuse to pay a claim or part of a claim if an earlier claim on the property has been paid but the property has not been repaired or replaced and this has caused or help cause the damage". As many insurance policies for retaining walls are based upon indemnity value, it may mean that the property owner will have to contribute financially to the rebuilding of the wall.

**What life expectancy should I expect from the wall?**

To comply with the Building Code the wall should be serviceable for at least 50 years. Concrete products are ideally suited for this application as concrete in moist situations actually get stronger with age.

**Do I need a barrier/hand rail at the top of the wall?**

The rules on barriers can be found in section F4 of the NZ Building Code. Basically, barriers are required where people could fall greater than one metre, but this may not apply where the barrier is incompatible with the intended purpose. Where the wall is adjacent to a path or an area where people can gather it is likely that a barrier will be required. Where the drop is separated from access areas by a cultivated garden then a barrier may not be required. Check with your local Council.

**Do I need to allow for drainage behind the wall?**

Yes, definitely. The NZ Building Code requires a minimum diameter of 110mm for all drainage coils (clause E1). This prevents a build up of water pressure behind the wall. The outlet of this pipe must be located to prevent erosion downstream.

**What about underground services?**

When conducting earthworks, care will need to taken to locate and protect underground services.

**Are basement walls treated the same as retaining walls?**

Basement walls typically both support the building above and retain the soil. Engineering input will always be required. Reinforced concrete masonry is ideally suited for this task. Waterproofing basement walls requires careful consideration. Some standard solutions are available in the NZ Standard NZS4229, and in the NZ Concrete Masonry Association's Masonry Manual. Refer to the Firth website ([www.firth.co.nz](http://www.firth.co.nz)) for a link to the Masonry Manual. These designs assume that the water table behind the wall is drawn down by drains at the base of the wall. For this to work the drains need to be able to discharge under gravity (ie without the use of pumps).

**I'm a professional engineer, what resources are available to me to design a retaining wall system.**

A link is provided on the Firth website to Keystone® retaining wall systems. The following manuals are available:

- Keystone® Construction Manual - this covers how to construct Keystone® walls, some typical details, and some generic designs.
- Keystone® Design Manual - this provides detailed information on the design of Keystone® systems and information on the KeyWall® design software.

Also available is the KeyWall® design software.

For further details on this package email: [firth.retainingwalls@firth.co.nz](mailto:firth.retainingwalls@firth.co.nz)

The software is suitable only for professional engineers who have experience in the design of retaining walls.

For high retaining walls that are embedded or anchored, Brian Perry Civil can provide design and methodology advice to facilitate the development of cost effective bespoke solutions.

Technical support is available for professional engineers wishing to design Keystone®, Masonry, embedded and anchoring retaining walls.



visit: [www.firth.co.nz](http://www.firth.co.nz)  
call: 0800 800 576  
email: [firth.retainingwalls@firth.co.nz](mailto:firth.retainingwalls@firth.co.nz)

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