GG-Rootlok-IG-UK23

Rootlok®

Installation Guidelines

Rootlok Vegetated Wall System

#BuildingGreener

Rootlok® is a product developed, manufactured and supplied by

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MADE IN THE UK

Rootlok Vegetated Wall System

A vegetated, soft engineered system for building greener infrastructure.

Structural Design

The design of any retaining wall requires the input of an engineer to assess the unique conditions present on site, in terms of site and soil conditions. This guide is for information only and should not be used without the input of an engineer beforehand.

It is the installer's responsibilty to ensure the design and guidleines are executed as closely as possible. It is the engineer's and owner's responsibility to ensure that the installation has been executed properly.

Safety Considerations

All filled Rootlok bags weigh approximately 35kg. Handling of bags should be undertaken in accordance with the Manual Handling Regulations 1992. This concludes that there is a high risk of injury to individuals repetitively manually handling units in excess of 20kg.

All persons are reminded that a suitable and sufficient assessment of risks must be made of all tasks to be carried out in accordance with the relevant Statutory and Regulatory requirements prior to construction.

IMPORTANT! Temporary Works

Temporary works should be considered before commencing the works.

- Temporary works requirements must be assessed by a qualified person and a suitable temporary works design in place prior to excavation if deemed necessary
- Only expose the required lengths of excavations that have been assessed as safe to do so.
- Avoid leaving cut faces exposed for prolonged periods or in extreme weather.
- Temporary excavations are to be checked regularly for stability.
- Any water egress should be diverted with suitable drainage prior to entering the backfill.

Always consult GeoGrow design drawings for information specific to solution that is being constructed.

Installation Guidelines

This document is intended for use as a general guidline for the installation of the Rootlok Vegetated Wall System.

It provides general guidelines for the construction of gravity, tie-back and geogrid reinforced walls.

It is recommended that a site specific design is followed alongside these guidelines.

Fig 1. Setting out the toe of wall.

Excavating and Preparing the Foundation

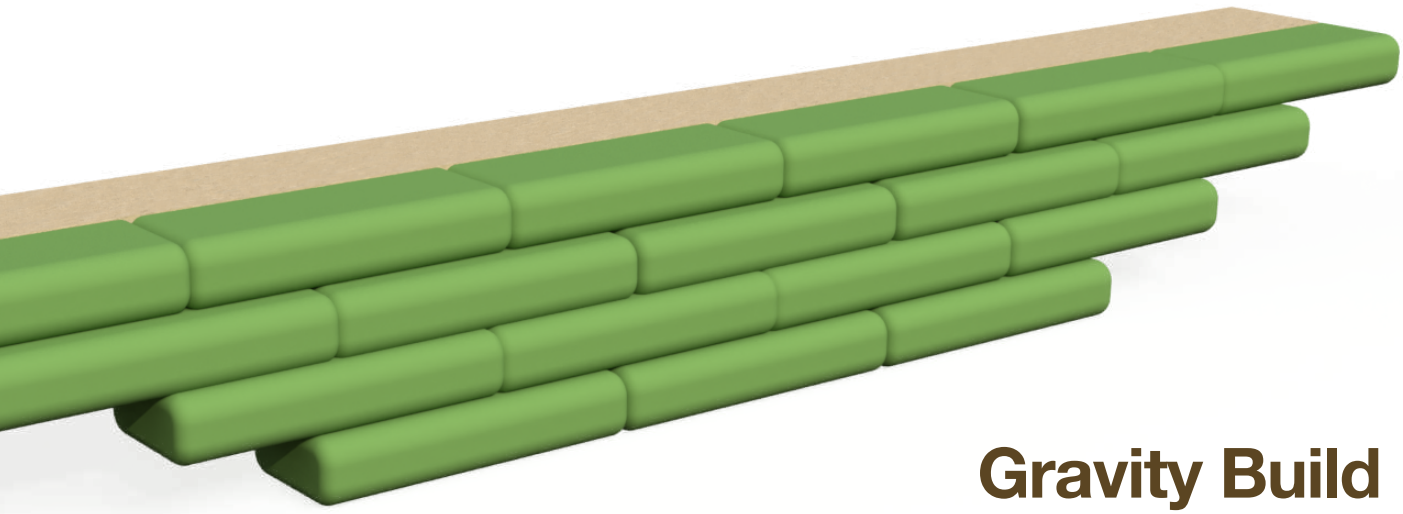
- Mark/set out the toe of the wall (see Fig 1.)
- Prepare the back slope of the wall to a safe angle ensuring suitable space from the toe can be achieved as per the design.
- Excavate the foundation to the required depth and extents. (Allow space at the toe of the wall to place the bags flush with the string line - this may require the foundation to be excavated further forward than the marked out line, especially in walls which have a toe of stone protruding in the foundation.)
- Where the wall has multiple base steps, begin excavations at the lowest point. Build up and out in layers. Subsequent steps can be lined up with the top of the previous layer to achieve a smooth, linear finish. (see Fig 2.)
- Inspect the foundation to confirm design assumptions represent the ground conditions. (If ground conditions or environmental factors vary significantly from the design, contact GeoGrow as a design review may be required.)
- Test to confirm bearing capacity of foundation material if required. This can be done with a Hand Shear Vane (if suitable cohesive “clay” material)/Plate Bearing Test or another approved testing method.
- Ensure foundation is free of standing and running water, any water egress should be taken via suitable outlets away from the foundation.
- Place engineered fill as per the design requirements to form the foundation at the required thickness (usually 150mm). Verify this with an engineer or a laser level set to the correct depth. The fill will need to be laid slightly proud to allow for loss of height during compaction (see Fig 3).
- Compact the material using a suitable compaction plant and ensure >90% compaction is reached.
- Re-measure the level and add or remove fill until a consistent and flat surface is achieved.
- If necessary, re-mark out the toe of the wall after the foundation has been constructed.

Fig 2. Excavating multiple steps.

Fig 3. Compacting the foundation.

Rootlok Build Types

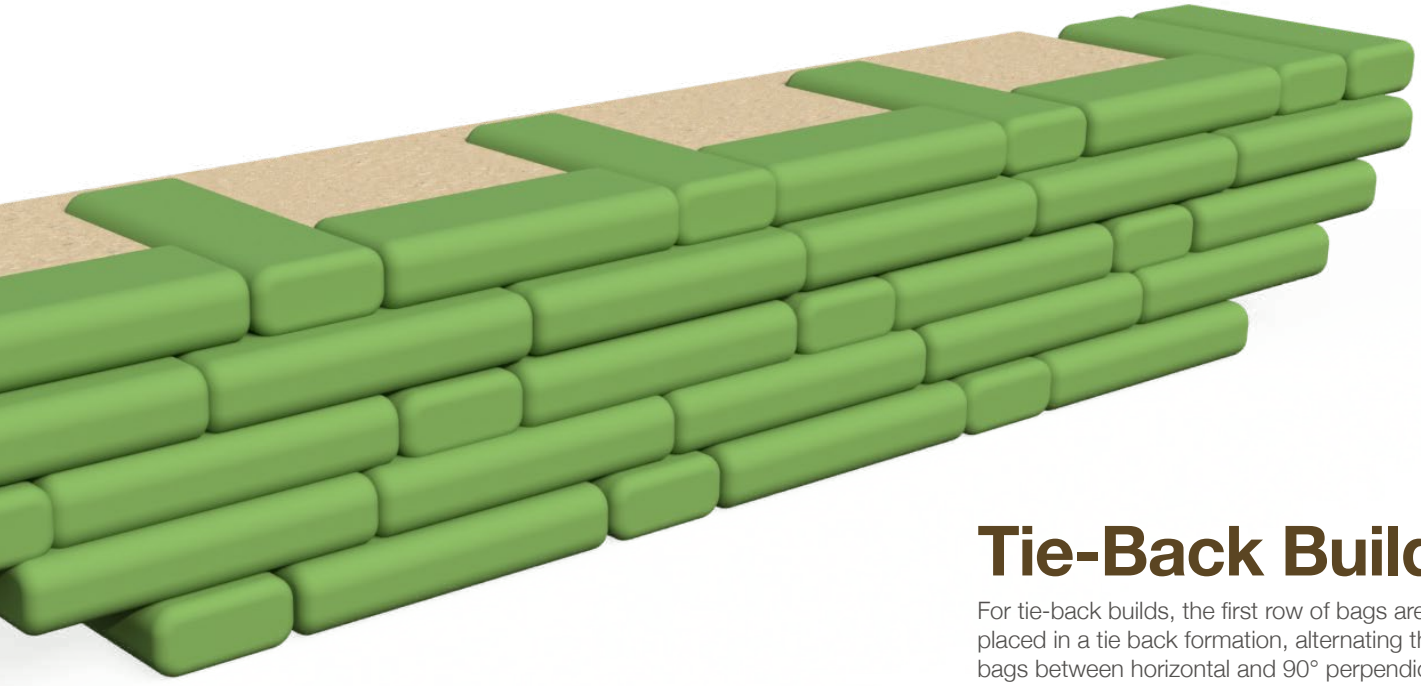
Rootlok systems can be laid in two formations - gravity or tie-back. The type of lay is detailed on the drawings provided for each specific drawing or as specifiied by an engineer.



Gravity Build

For gravity builds all layers should be laid end-to-end with no bags returned back into the system. This type of solution is typically used for low height walls or when geogrid with wraparound is used (see Fig 4).

Fig 4. Gravity walls.



Tie-Back Build

For tie-back builds, the first row of bags are placed in a tie back formation, alternating the bags between horizontal and 90° perpendicular (see Fig 5). The next layer of bags is laid end-to-end and then the tie-back pattern is repeated on the next row, alternating between tie back and end-to-end rows until the build is completed.

Fig 5. Tie-back walls.

Constructing the Wall

- When laying bags shake them before laying to break up the contents and reset to original shape.
- Place the first row of interlocking plates along the central line of where the bags will be laid, spacing them out to ensure one plate is laid below each bag (see Fig 6).
- Lay first row of bags either as tie back or gravity method as shown in the design (see Fig 7).
- Using a string line, check the first layer of bags is straight or follows the required shape of the wall.
- Place backfill material behind the laid bags and fill to a thickness roughly 0-10mm above the top of the recently laid bags to allow the fill to be level with the top of the bags after compaction (see Fig 8).
- Compact in accordance with the MCHW Specification for Highway Works, Series 600, Table 6/4 Method 2 with a suitable compaction plant. The front of the wall and bags will need to be compacted with a light whacker plate (Approximately 300mm base plate). Beyond 1m from the front of the bag can be compacted with progressively larger plant to achieve the required >90% compaction.
- Check design for any geogrid required, if so place geogrid to required length (see section regarding geogrid installation.)
- The Rootlok plates for the next layer can now be laid on top of the previous layer. One plate can be used to span each joint between the bags on the last layer (see Fig 7). Plates should be placed with the 8 spikes facing down.
- Lay the next layer of bags end-to-end and then repeat the pattern, (alternating between tie back and end-to-end with each row for tie-back builds).
- Ensure the bags on adjacent layers are vertically offset so bag joints don't coincide on consecutive layers, and keep the midpoint of the bag as close above and below as possible – similar to a brick wall.
- Bags on subsequent layers need to be offset from the one below to maintain a staggered slope angle. (See offset calculator in Table 1). Place the bag at the specified distance away from the front of the bag below, bringing it closer to the rear of the wall. The wall slope should be assessed every 500mm gain in height with an electronic protractor/inclinometer to confirm that the wall slope is on target. Significant deviations <+-2° from the target slope angle may require sections of wall to be rebuilt.
- If applicable, place the land drain in the layer indicated in the design (see Fig 9). This may have to be held in place whilst the backfill is poured over in the next step. Ensure the land drain has a positive fall to the outlets and is roddable to allow for maintenance. Multiple outlets can be installed if needed.
- Lay the next layer of bags and repeat these steps up to the required height.

If geogrid is specified in the drawing, see section overleaf. If not, skip to the section referring to the installation of fence post sleeves and finishing of the wall build.

Wall Slope Angle (°)	85	80	75	70	65	60
Required Bag Offset (mm)	12	25	38	51	65	81

Table 1. Bag Offset Distances

Fig 6. Laying the first row of interlocking plates.

Fig 7. Laying first row of bags and second row of interlocking plates.

Fig 8. Placing the backfill material.

Fig 9. Laying drainage pipe.

Geogrid Reinforcement

Check your design drawing to ascertain whether geogrid is required and if so, which type - wrap around or non-wrap around. Design drawings will indicate what rows geogrid should be installed.

Fig 10. Geogrid placement.

Geogrid standard

- Measure out and cut the geogrid into lengths as required in the design. The thicker edges on the two sides must be perpendicular to the wall face. The strength of the geogrid lies in the direction it is rolled – be sure to roll it toward the back of the wall, ensuring that the principal reinforcement direction is perpendicular to it (see Fig 10).
- Ensure a minimum overlap of 300mm is between the layers of grid.
- The first layer should be no higher than top of the 1st course of Rootlok bags.
- Top layer to be max 420mm (3 blocks) below finished ground level.
- Where a geogrid layer steps up/down one course, there should be a minimum overlap of 375mm (half a Rootlok bag width).
- Geogrid lengths from the higher sections should be used for intermediate wall heights.
- Tension must be applied to the geogrids before fill is placed over them.
- When filling over the geogrid, a minimum of 100mm of fill must be placed over the geogrid before driving plant over it.
- Geogrid is to be placed below the plate ensuring the grid extends beyond the plate (see Fig 11).
- Do not used damaged grid.

Fig 11. Interlocking plate placement.

Geogrid wrap-around

This is when the geogrid is wrapped around the front of the wall (see Fig 12).

- Cut the geogrid to the required length, taking into consideration the base length, height of wrap and length of tail.
- Place geogrid layer as per standard method leaving enough length available to bring the grid up in front of the bags and to return into the system (see Fig 13).
- Lay bags rows as per standard method.
- After the bags have been laid on the layer of wrap around indicated in the drawing, wrap the geogrid over the top of the bags and onto the backfill. Achieve better tension by using a small whacker plate on the bags prior to wrapping. Use a small amount of fill to weigh the grid and keep it under tension whilst the rest of the backfill is poured for that layer. Compact as usual.
- Ensure geogrid is returned into the backfill as specified in the design drawings.

Fig 12. Geogrid wrap-around.

Fence Post Sleeves

If required, fencing can be installed at the top of the Rootlok wall by installing post sleeves into the backfill of the wall during construction. Fence posts should be concreted into the sleeves later.

- Consult a fencing designer to determine the fencing design, size of post sleeves and the distance between fence posts.
- Fence sleeves should be installed at a depth which allows the top of the sleeve to be flush with the wall top. Ensure sleeves are straight during wall construction using a spirit level.
- Fence post sleeves should be inset from the face of the wall by a sufficient distance to avoid fouling the bags during construction of subsequent layers (see Fig 14).
- A minimum offset of 500mm should be maintained between the front of the bags and the front of the post sleeve to ensure adequate compaction of fill around the sleeve (see Fig 15).

Finishing and Maintenance

Where pre-seeded bags are used within the wall build minimal maintenance is required. Alternatively it is recommended that the wall is hydroseeded as soon as possible after completion.

After hydroseeding / post construction if pre-seeded bags are used, ensure bags are kept damp to promote germination and vegetation establishment, especially during dry weather. Achieve this using irrigation or indirect watering. Ensure that watering is kept to a very low pressure to avoid dislodging newly-sown seeds.

Follow design specific maintenance guide for more information.

Fig 13. Geogrid wrap-around placement.

Fig 14. Placement and backfilling of post sleeves.

Fig 15. Compacting the backfill.

Fig 16. Watering the wall.

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