



INSTALLATION & SAFETY GUIDE FOR TUFFPOLY STRUCTURAL RETAINING WALL SYSTEM

TUFFPOLY SLEEPERS & POSTS

1. Information contained in this installation guide is offered as general advice only.
2. Design is in accordance with the following standards:
 - AS4678:2002 – Earth Retaining Structures
 - AS1170.0.2002 – General Principles
 - AS1170.1.2002 – Imposed Loads
 - AS1170.2.2011 – Wind Loads
3. 60-year design life span.
4. Design allows for a lightweight 1.8m Colorbond or treated pine timber fence, wind loads for Region B, Terrain Category 3
5. The retaining wall has been designed with a minimum of 50mm per 1.0m high back lean.
6. Retained soil is free draining and the water table is below the underside of the cantilever posts.
7. Ground in front of the wall to have a maximum slope of 1:4 (14 degrees) for the first metre away from the wall.
8. Ground above the wall to have a maximum slope of 1:10.
9. Founding material to be minimum stiff clay, dense sand/gravel or weathered rock, with a minimum allowable load-bearing capacity of 75 kPa for non-cohesive (dense sand/gravel or weathered rock) and 150 kPa for cohesive soils (stiff clay) or greater.
10. Assumed retained soil unit weight and soil friction angle are:
 - cohesive (stiff clay) - 18kn/m³ & 23°
 - non-cohesive (dense sand) - 18.5kn/m³ & 35°. Where there are any variations to the materials, soil conditions, loadings, drainage, and geometry of the site or retaining wall, a registered qualified engineer should be engaged to design the wall.
11. No excavation shall be carried out within 1.5m of the base of the wall.
12. No excavation or additional surcharge shall be carried out or placed within the zone of influence of the retaining wall.
13. Drainage & free draining material with geotextile fabric to be installed between the cut face and drainage gravel backfill behind the wall.
14. No highly or extremely reactive material is to be used in the backfill zone & no clay or sand can be used in the drainage zone.
15. No allowance has been made for imposed loads from adjacent structures, houses, driveways, sheds etc. Structures in the line of influence are to be designed by a registered qualified engineer.
16. All heavy vehicles and plant equipment must be kept at a clear distance of 1.5x wall height or 2.0m whichever is greater.
17. Local Councils require retaining walls to have building approval when they are over a certain height. This varies from region to region and typically ranges from 0.6m to 1.0m in height from natural ground level. Check with your local Council to confirm.
18. It is recommended that all walls over 0.8m tall require engineering certification.
19. All walls should be assessed by a competent person or a certified engineer.
20. Large trees and shrubs are not to be planted within 1x wall height of the retaining wall.
21. No allowance has been made for water pressure behind the wall. Retaining walls are to be installed with appropriate drainage behind the wall and across the site.

Construction Notes

- All pier holes, posts & fences must be wholly contained within the retaining wall owner's lot.
- If cutting back the existing bank, care is to be taken to ensure no footings/structures are destabilised.
- It is the contractor's responsibility to ensure all excavations, trenches and piers are fenced off with safety barriers.
- Ensure 50mm cover to all post reinforcement.
- All pier holes shall be firm, dry and free from loose material prior to placement of concrete.
- Ensure site adequate drainage with sub-soil drain outlets installed to the retaining wall at 30m centres.
- Sub-soil drains should be regularly flushed/inspected by a qualified person to ensure the proper function of the drainage system.

SAFETY & WORKING WITH TUFFPOLY

TUFFPOLY is a composite material or fibre reinforced polymer made of a resin reinforced by glass fibres. The product can also contain fire retardants and colour pigments.

The product is not classified as Hazardous according to the criteria of the NOHSC Australia. The content of this guide is general in nature.

Cutting, drilling or machining TUFFPOLY produces dust that can cause irritation to the eyes, skin, nose and throat.

Workers should take steps to reduce their exposure to dust by using suitable personal protective gear and working in well-ventilated areas. Use dust extraction in poorly ventilated areas.

It is recommended that the following PPE be worn:

Gloves, long sleeve shirt with closed collar and long pants.

Particulate respirator which complies with AS/NZ 1716:2012.

Eye protection (safety glasses).

Hearing protection when/if required.

Protective footwear (safety toe)

Use personal protection equipment to minimize skin, respiratory and eye exposure to dust and fumes when cutting or grinding products. Wash all exposed skin areas thoroughly after cutting or grinding. Launder work clothing separately.

CUTTING OR DRILLING

TUFFPOLY can be cut using common woodworking tools. It is recommended that all blades, discs and bits are Diamond coated as TUFFPOLY is very hard/abrasive and will wear normal tools very quickly. For smaller cutting jobs a Multi-blade may be suitable.

When cutting, it is recommended to use a wet saw to reduce the dust. For smaller cutting jobs, we recommend a cordless saw similar to a Makita 18v Cordless (Model - DCC501ZX1) and for larger cutting jobs a cordless saw similar to DeWalt 54v Cordless (Model - DCS690).

CUTTING

When cutting, use light evenly applied pressure. Excessive pressure tends to shorten the life of the blade. Cutting speed is very important and should be cut at a speed similar to cutting hardwood timber. Cutting too fast could damage the edge of the material and may cause it to turn black.

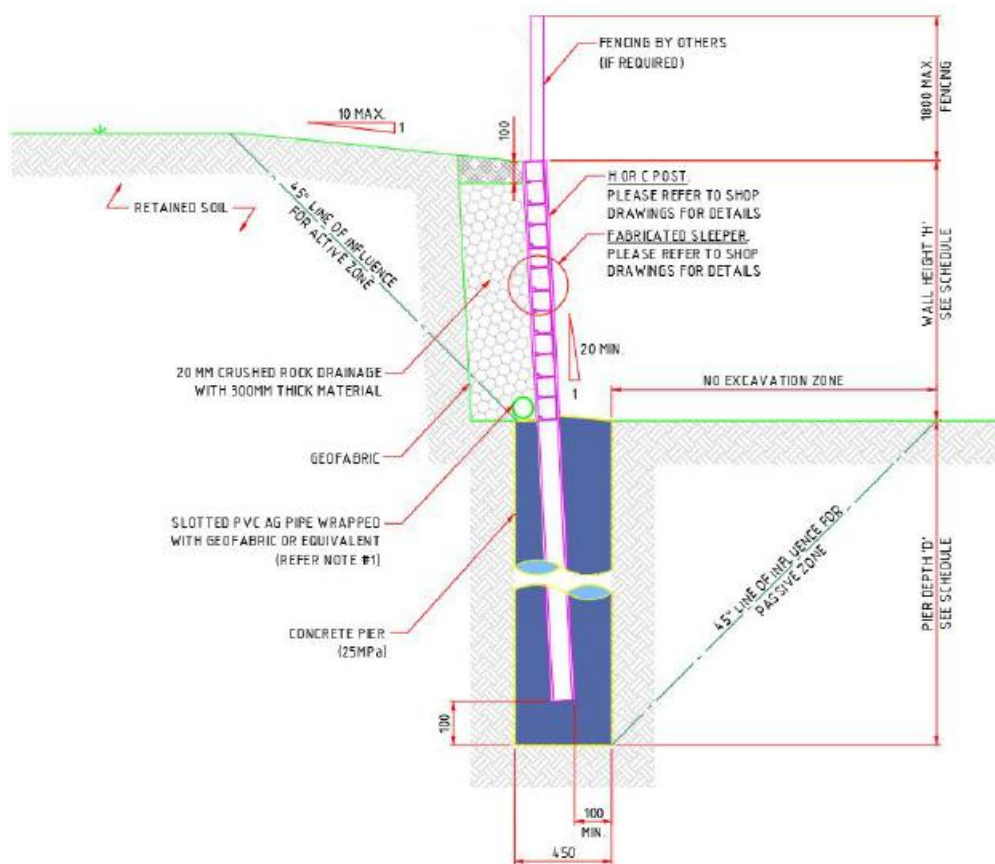
DRILLING & HOLE SAWING

Any standard high-speed steel drill bit can be used for smaller jobs, but it will require frequent sharpening. For larger jobs, we recommend tungsten carbide drill bits. For hole sawing, a diamond-coated hole saw is ideal for cutting larger diameter holes. Take care not to overheat the hole saw as it will diminish the life of the bit. The drill speed should be equivalent to that used for drilling hardwood. For large holes, a wood backup plate will reduce breakout on the back side of the hole.

PAINTING

TUFFPOLY does not require painting and is available in pre-finished colours suitable for exterior use. (Note - painting will cover the timber grain pattern). Prior to painting, the product must be cleaned appropriately. We recommend cleaning with thinners. It may not accept the paint if not prepped properly or it will soon peel. Wipe down and remove any dust with water and allow to dry. It is recommended to use a primer before applying the finish coat, similar to Zinsser Extreme Adhesion Primer. Exterior Acrylic Paint for domestic applications (non-harsh environments) or a 2-Pack Polyurethane Base and Hardener for commercial applications (harsh environments)

TYPICAL TUFFPOLY RETAINING WALL DETAILS



TYPICAL RETAINING WALL DETAIL

NOTES: SCALE 1:20

1. THE DRAINAGE PIPE SHALL BE LAID TO A UNIFORM GRADE OF 1 IN 100 WITH MAX. 30M LENGTH. THE LOW END OF EACH RUN IS TO BE DRAINED TO A STORM WATER SYSTEM APPROVED BY THE COUNCIL AS LAWFUL POINTS OF DISCHARGE

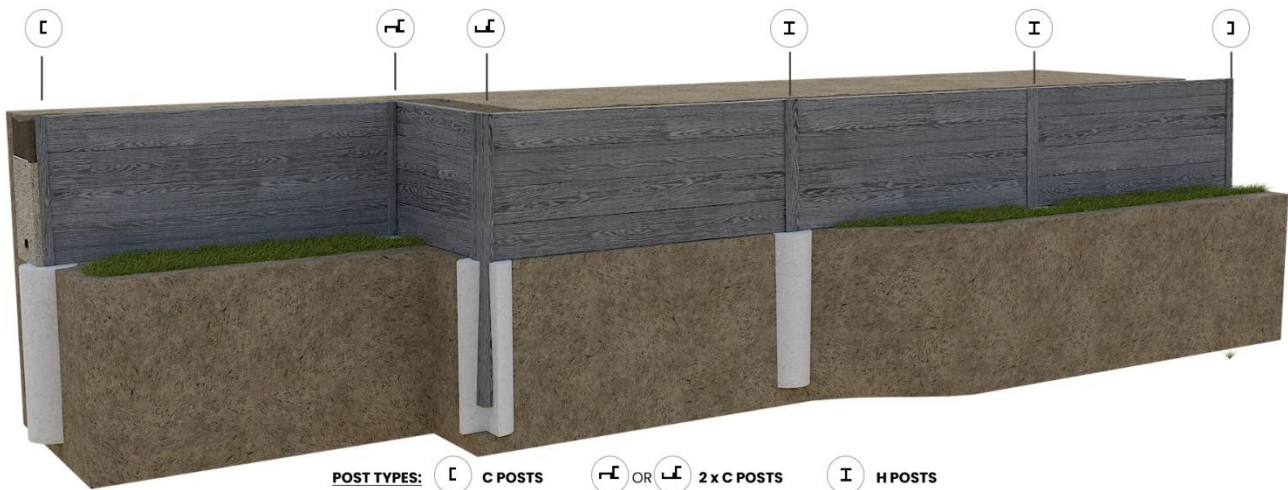
Single Tier – Retaining Residential Lot

SPAN TABLE – WALL HEIGHT - POSTS & SLEEPERS REQUIRED

Wall Height (H) (mm)	Pier Depth (D) (mm)	H or C Posts Post Length (mm)	Pier Dia. (B) (mm)	Post Centres (C) & Sleeper Length (L) in (mm)		
				1600 (C) / 1585 (L)	2000 (C) / 1985 (L)	2400 (C) / 2385 (L)
400	650	800	450	✓ *	✓ *	✓ *
600	750	1200	450	✓ *	✓ *	✓ *
800	950	1600	450	✓ *	✓ *	✓ *
1000	1150	2000	450	✓ *	✓ *	✓
1200	1350	2400	450	✓ *	✓	-
1400	1550	2800	450	✓ *	-	-

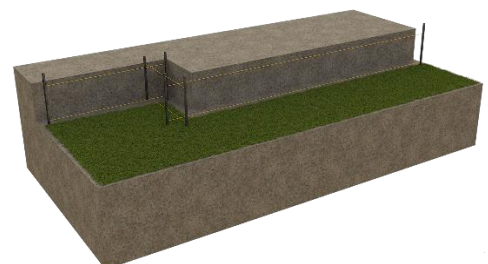
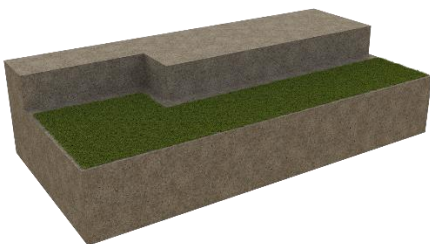
✓ Acceptable * With 1.8m fence. Note: Council Approval & Engineering Cert. may be needed depending on height & location

- If the wall is located within 1.5m of a building or another retaining wall, please contact a structural engineer or landscaper.
- Always check local council regulations in the planning phase of your project.
- Retaining wall construction is a specialised field, if unsure at any stage, please contact a structural engineer or landscaper.
- This document is intended as a guide only, to suit most general residential installations.



INSTALLATION STEPS

1. **Prepare the Area** - Clear and level the site where you plan to build the retaining wall. Ensure you leave 300mm behind the retaining wall area for backfill.
2. **Alignment** - Place a star picket or peg at both ends of the proposed wall. Attach two string lines at each end of the wall, top and bottom, to keep your wall aligned.



3. **Mark Out Hole Positions** - Starting from one end of the wall, mark a cross on the ground at intervals that suit the sleeper length required. For example: If you are using 1985mm sleepers the hole centres should be 2000mm apart.



4. **Auger Holes, Pour Concrete and Set Posts** - Auger holes as per the span table (for landscaping walls only) or your engineer's specifications as approved by the Council. Pour concrete into holes, one at a time. Make the concrete stiff. If using ready mix concrete, order 20/20, 80 slump. Set your post by lowering it into the wet concrete until level with the top string lines. Ensure there is a minimum lean back of 50mm for every 1.0m in height. The hole depth should be an extra 150mm deeper than the wall height to allow the concrete to encase the post. Once the concrete is firming up, measure down each post the desired height of the finished wall height and create a level pad on the footing for future placement of the bottom sleeper. Allow the concrete to dry overnight before installing sleepers. *Handy Tip:* Cut a piece of timber to use as a measuring guide to slide down in between post profiles to check for future sleeper placement. For 1600mm post centres use 1593mm, 2000mm post centres use 1993mm & 2400mm posts centres use 2393mm.



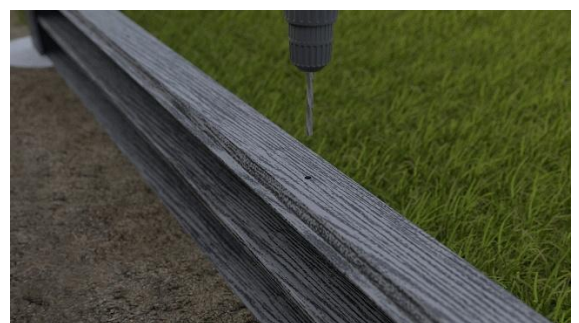
5. **Installing Sleepers** - Simply lift the 1st sleeper by hand and position it in between H or C post with the angled side flange to the top.



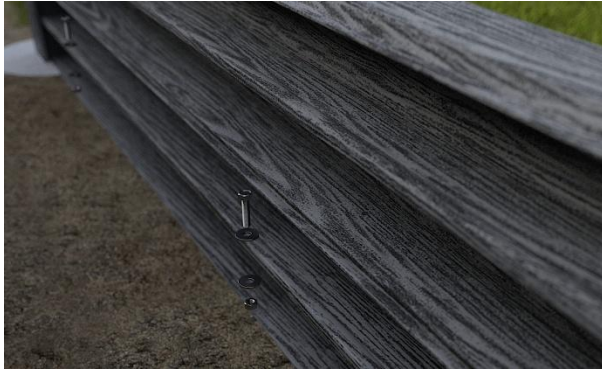
Place 2nd sleeper on top and through the two pre-drilled holes mark positions onto 1st sleeper with a felt tipped pen.



Remove 2nd sleeper and drill holes with a 7mm drill bit into 1st sleeper.



Re-install 2nd sleeper and bolt together with 6mm x 25mm Stainless Steel Hex bolts using a washer on either side of the sleeper flanges. Do not overtighten.



Repeat this step for all sleeper up to the desired height. Ensure the sleepers are installed with the angled side flange to the top. Note: No heavy lifting machinery or equipment is required to set sleepers – Easy!

6. **Ag Pipe and Backfill** - Allow the concrete to cure for two to three days. Lay Geotextile fabric in place at the base of the wall. - Place slotted ag pipe at the base in max 30m lengths with a fall of 1 in 100. The low end of each run is to be drained to a system approved by the local council as a lawful point of discharge. Backfill with gravel to 200mm from the top. Ensure Geotextile fabric wraps around the drainage gravel with a 100mm lap on top and bottom.



7. **Soil Plug** - Place a soil plug on top of the wrapped gravel drainage layer and hand compact to prevent silt intrusion. Enjoy your new TUFFPOLY retaining wall!



Optional - Installing a Fence

1. Fence Brackets. It can be installed after the top sleeper has been installed. Slide fence brackets into place between the end of the top sleeper and the H post, making sure to align the holes in the posts with the fence bracket holes.
2. Installing Bolts. Firmly bolt the fence brackets to the posts using 2x galvanized bolts. Fence by others.



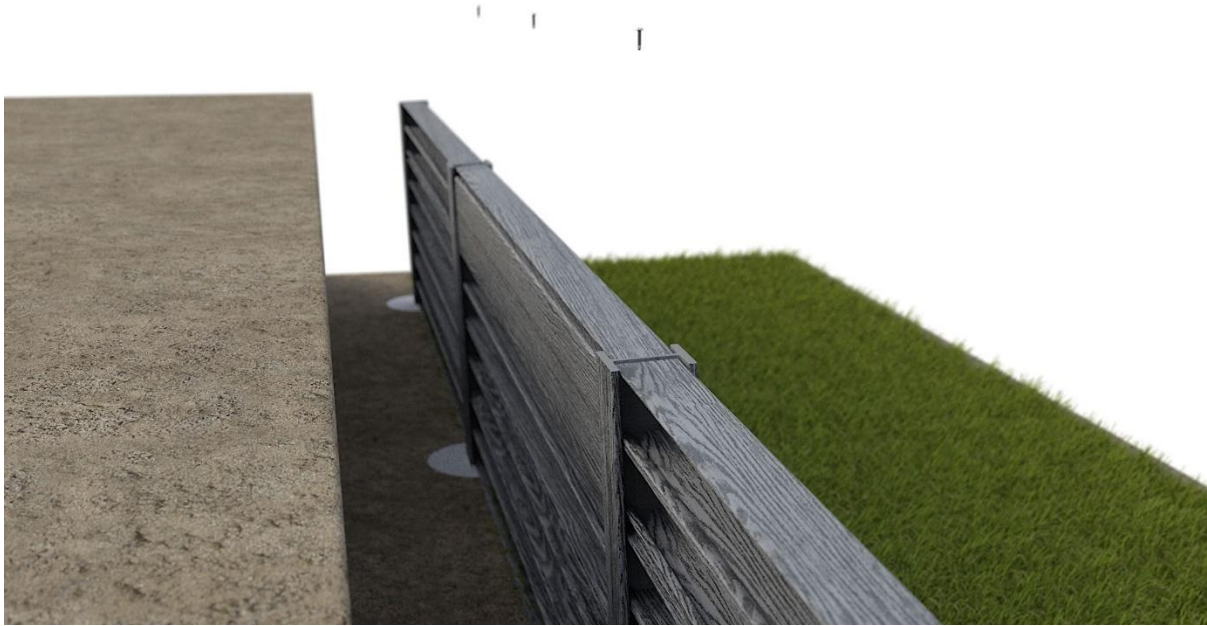
Optional – Installing C Post as Capping

1. Install C Post as capping. Set H posts 45mm lower or cut them while in position so the sleeper sits proud 45mm ready for capping. Place a bead of flexible polyurethane adhesive on the top edge of the top sleeper, Install C post capping and secure with self-tapping metal screws. C posts at a corner or the end of a wall can be left at finish height and cut at a 45-degree mitre for a nicer finish when the capping piece is installed. C post capping should butt join in the centre of a H Joiner post. Use 3x metal self-tapping galvanised or stainless steel screws to hold the capping in place to allow the adhesive to dry.



Optional - Adding Additional Top Backing Sleeper

1. Measure the distance between the two H posts for the backing sleeper.
2. Cut the sleeper to the required length. Flip top sleeper of the retaining wall to have the flat flange facing to the top
3. Slide the backing sleeper under the top flange of the retaining sleeper and in between the top retaining sleeper and the next sleeper below. Use 3x metal self-tapping galvanised or stainless steel screws to hold the backing sleeper in place while the adhesive dries.



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