

STRUCTURAL REPORT			
WAVIN Stormwater Management			
Structural Calculations are in accordance with CIRIA C880			
Client:	ABMH Ltd	Date:	24/05/2017
Site Name:	CRL Littlehampton	Project Reference:	S14667/A
		Designer:	Mark Herley
Installation Details		Unit Properties	
Height of Tank	0.800 m	AquaCell Type	Prime
Cover Depth	0.800 m	UCS* Vertical (kN/m²)	450
Depth to Base	1.330 m	UCS* Lateral (kN/m²)	70
Depth to Ground Water	10.000 m	Deflection (1mm per kN/m²)	64
Submerged Depth of Tank	0.000 m	Vertical	11
Concrete Slab Depth	0.000 m	Lateral	0.1607
Depth to Silt	0.000 m	Crew Deflection	0.1607
Design Life	50 Years	* Ultimate Compressive Strength	
Site Conditions (Topfill)		Partial Factors of Safety	
Soil Type		Ultimate limit state	Service Limit State
Unit Weight of Soil	12.60 kN/m³	lateral	lateral
Shear Angle	20°	Permanent load	1.4 1.35 1 1
Ground Slope	0°	Live load	1.8 1.5 1 1
Site Conditions (Sidelift)		Material factors:	
Fill Type		of Safety	2.75 2.75 1.5 1.5
Soilfill height	0.800 m		
Unit Weight of Soil	10.60 kN/m³	Uplift	Favourable Unfavourable
Shear Angle	20°		0.95 1.5
Site Conditions (Concrete Slab)		Deflection Limits (Material Only)	
Concrete Slab Depth	0.0 m	Vertical	5 mm
Concrete Weight	24 kN/m³	Lateral	10 mm
Surcharge Loading		Load Contact Area	
Vehicle Type	Vehicles up to 30,000kg	Length	0.400 m
Distributed Wheel Load	10 kN/m²	Width	0.200 m
Concentrated Wheel Load	50.0 kN	Concrete Slab Load Angle (1:1.5, HL)	58.30°
Load Spread Angle	26.6°		
Load Calculation Results			
Vertical loading (incl. safety)			
combination 1 (distributed load)	30.543 kN/m²	Pass	
combination 2 (concentrated load)	132.19 kN/m²	Pass	
Vertical deflection			
Combination 1 (distributed load)	0.234 mm	Pass	
Combination 2 (concentrated load)	1.723 mm	Pass	
Lateral stability			
Layer Number	Unit Type		
Layer 1 (Top Layer)	AquaCell Prime	13.390 kN/m²	Pass
Layer 2	AquaCell Prime	17.532 kN/m²	Pass
Lateral			
Lateral deflections		1.712 mm	Pass
Uplift			
Uplift force (factored)	0.000 kN/m²	Pass	
Dead weight (factored)	9.950 kN/m²		
Creep			
lifetime	50 Years		
Creep Deflection	5.671 mm		
Calculations are based on CIRIA C880 and are for guidance only. All calculations are subject to verification by a suitably qualified Structural Engineer.			
Assumptions made are:			
• Other planes or other weaknesses are not present within the structure of the soil.			
• Ground surface is horizontal.			

INSTALLATION METHOD

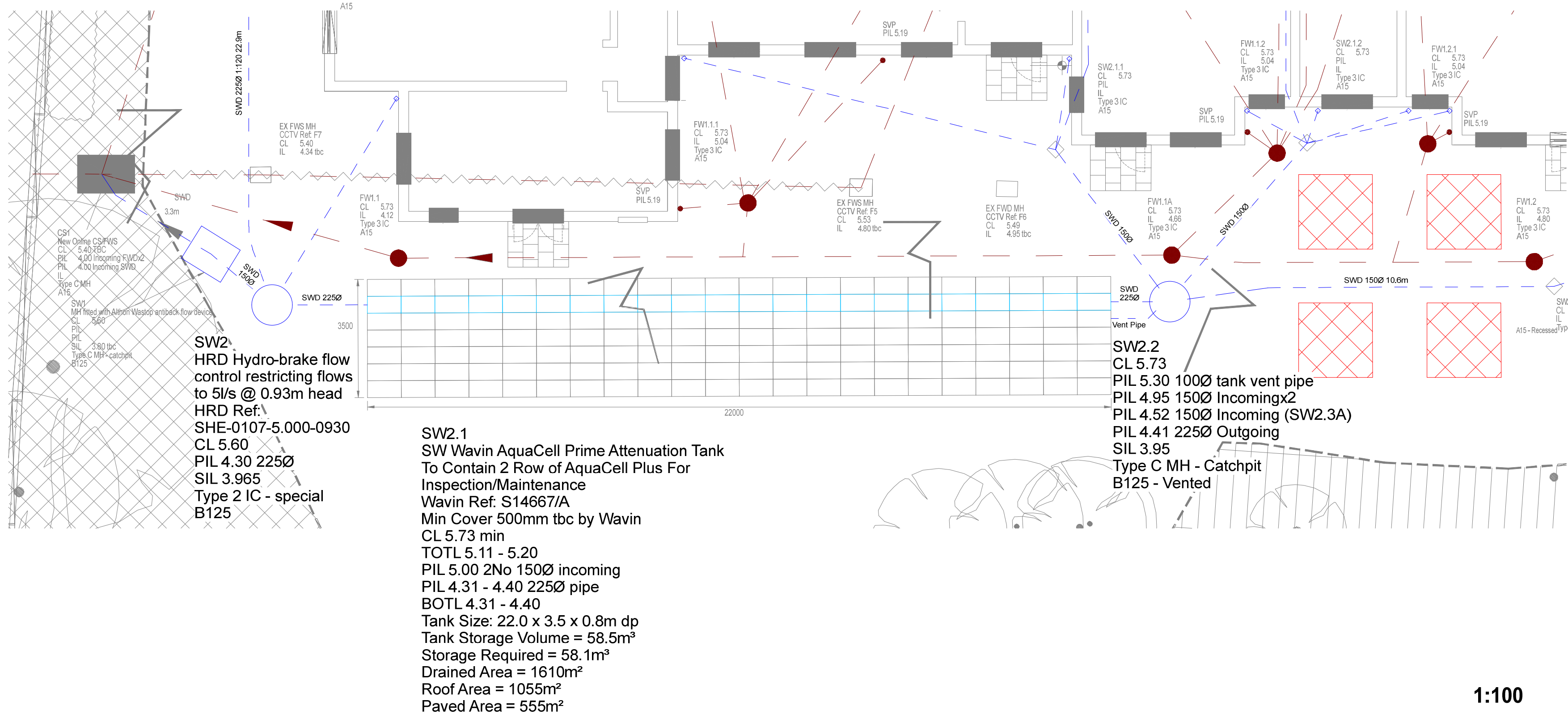
- Excavate the trench to the required depth ensuring that the plan area is slightly greater than that of the AquaCell Core/ Plus units.
- Lay 100mm bed of coarse sand, level and compact.
- Lay the geotextile over the base and up the sides of the trench.
- Lay the geomembrane on top of the geotextile over the base and up the sides of the trench.
- Lay the AquaCell units parallel with each other. In multiple layer applications, wherever possible, continuous vertical joints should be avoided. AquaCell units can be laid in a brick bonded formation (i.e. to overlap the joints below). For single layer applications use the AquaCell Clips and for multi layers use the AquaCell Clips and the AquaCell Shear Connectors (vertical rods).
- Place the Flange Adaptor into position (at a point other than the pre-formed socket) and fix using self tapping screws.
- Wrap the geomembrane around the AquaCell Core/ Plus structure and seal to manufacturers recommendations*. Cut appropriate holes for flange/pipe connections.
- In order to prevent silt from entering the tank, clogging inlet pipework and reducing storage capacity, it is recommended that a Silt Trap is installed prior to the inlet pipework.
- Wrap and overlap the geotextile covering the entire AquaCell/AquaCell Lite structure, to protect the geomembrane.
- Lay 100mm of coarse sand between the trench walls and the AquaCell Core/ Plus units and compact.
- Lay 100mm bed of coarse sand over the geotextile and hand compact. Backfill with suitable backfill material.

NB: A storage tank must be vented, and it is recommended that one vent pipe, 110mm in diameter is provided per 7,500 square metres of impermeable catchment area on a site.

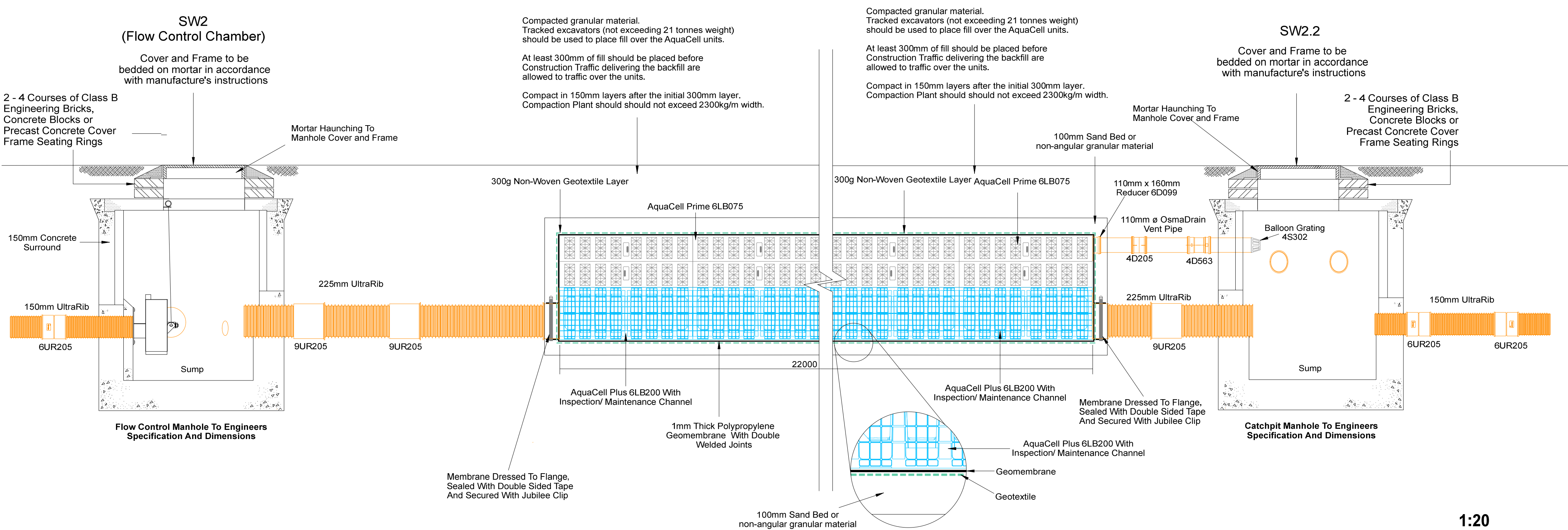
GEOMEMBRANE/GEOTEXTILE SPEC.

- Geomembrane:
- 1mm thick Polypropylene or 0.75mm LDPE geomembrane is recommended and joints should be sealed using proprietary welding techniques.
- Geotextile:
- 300g Non-woven with sewn or glued joints.
- It is crucial that the specified material will:
- Withstand the rigours of installation
 - Resist puncture
 - Resist multi-axial elongation stress and strains associated with settlement
 - Resist environmental stress cracking
 - Resist damage from in ground contaminants
 - Remain intact for the full design life of the AquaCell installation
- Geomembranes with a thickness less than 1mm thick Polypropylene or 0.75mm LDPE are unlikely to meet these criteria and are therefore not recommended for use with the AquaCell system in this application

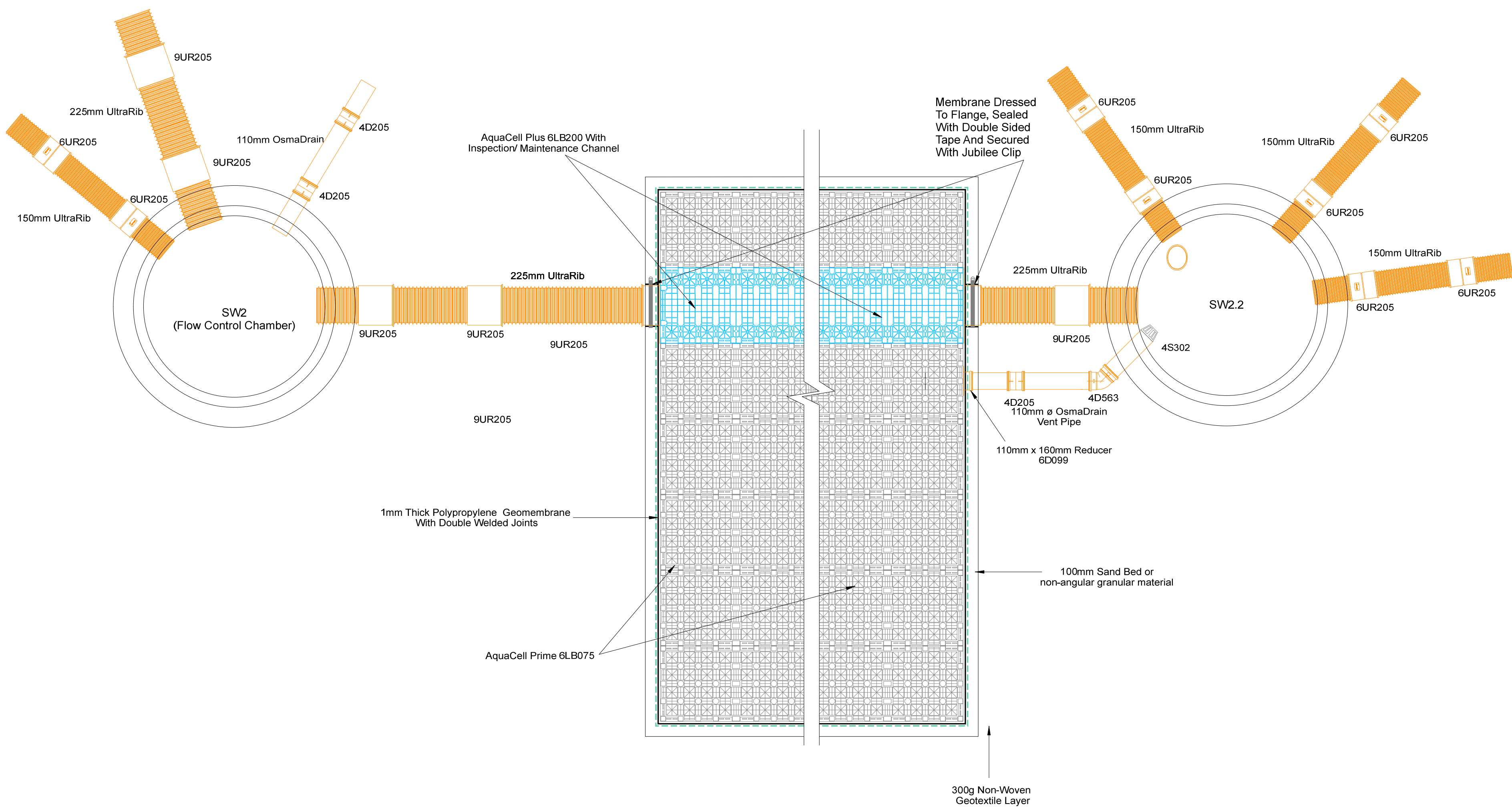
SITE PLAN



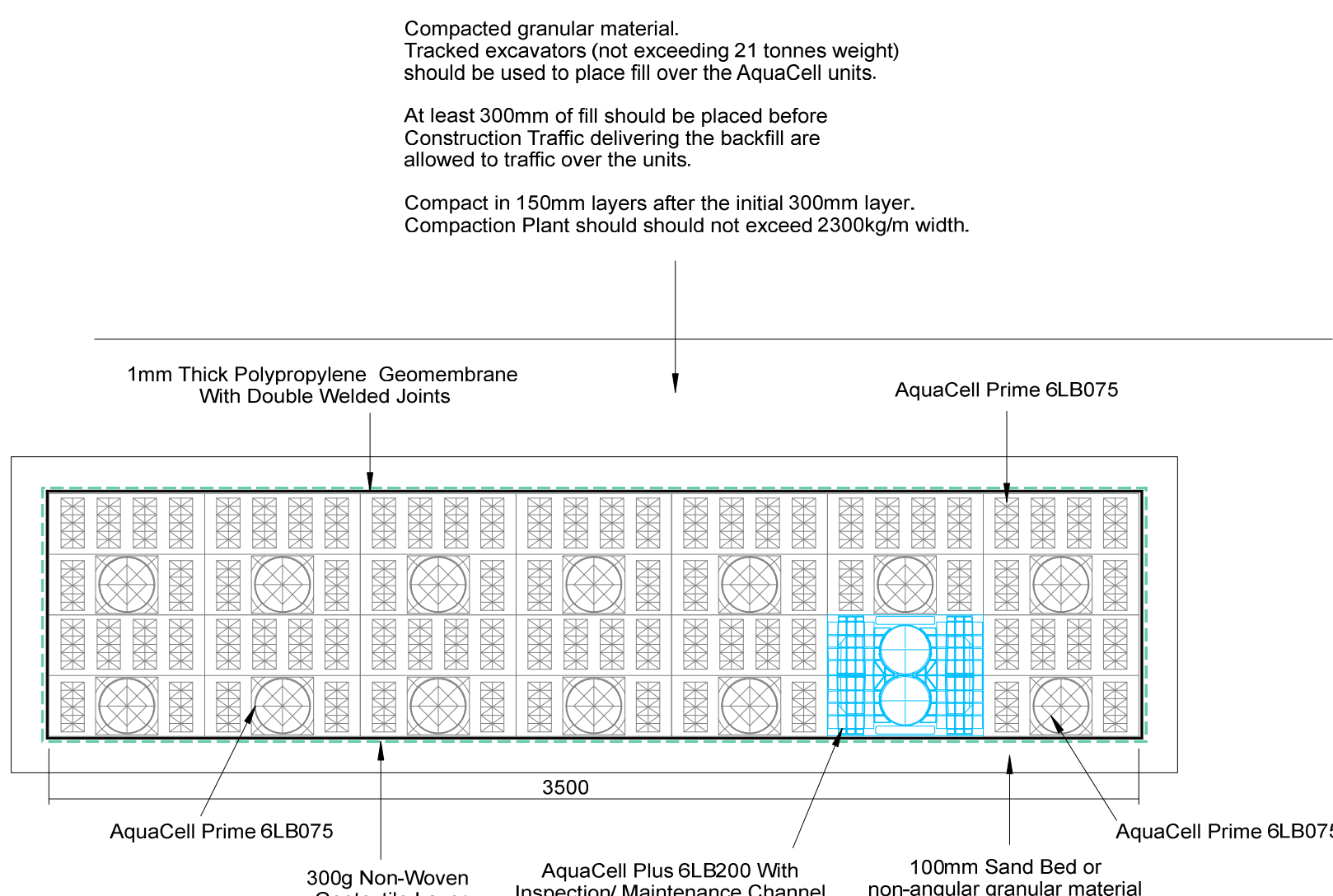
TANK LONG SECTION (Typical Installation)



TYPICAL CONECTION DETAILS



TANK CROSS SECTION (Typical Installation)



CONNECT TO BETTER



Notice: This drawing and accompanying schedule are provided subject to the following:-

The layout drawing and the accompanying schedule of products have been prepared only as an illustration.

The layout drawing illustrates a drainage system using Wavin's products. The schedule of products is merely an estimate of the Wavin products that might be needed to construct a drainage system in accordance with the layout drawing. The layout drawing should not be used for any other purpose. In particular, it should not be used as a plan for construction without further consultation with Wavin.

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OsmaDrain Key

A	PG	Tank repositioned to suit new crane base	23/06/17
Rev	By	Description	Date

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Drawing No	S14667	Revision	-	Scale	As Shown
Drawn by	MH	Checked by	PG	Date completed	02/02/17
				Sheet no	1 of 1