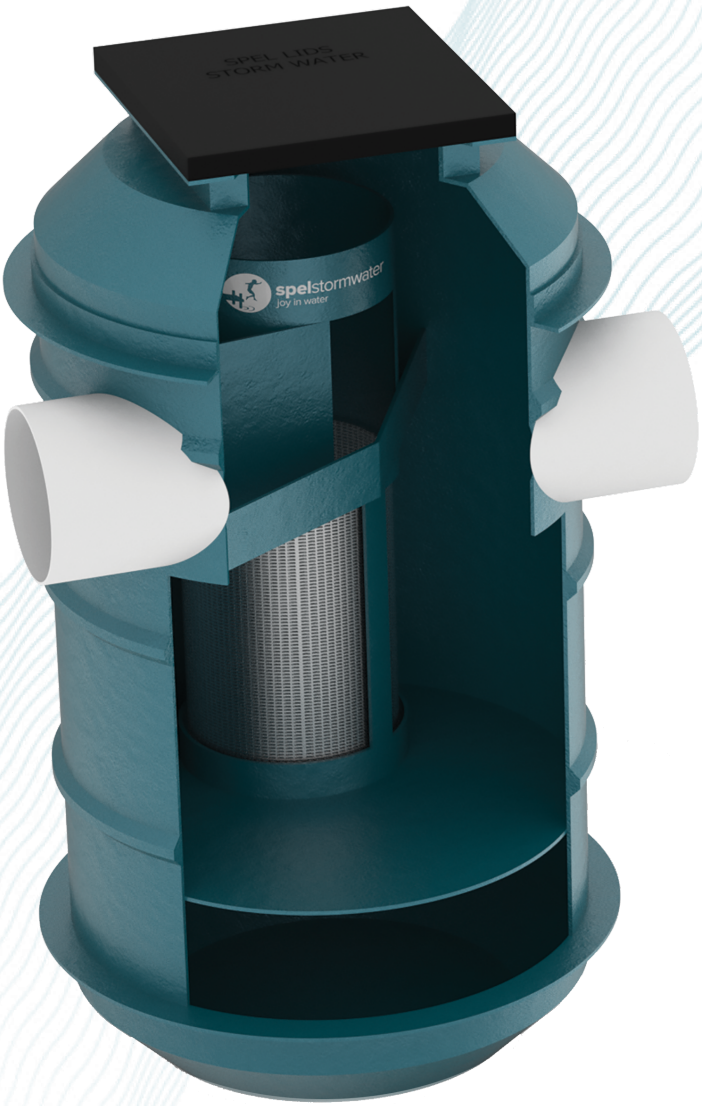
spelstormwater
joy in water

Installation Manual

SPEL Vortceptor®



spel.com.au

CONTENTS

INTRODUCTION

INTRODUCTION

These instructions, while using the word “wetwell”, will pertain to all wetwells, lift stations, vertical pump vaults and basins.

SAFETY

SAFETY

These instructions should not be interpreted in any way to put one’s health at risk, or to harm property and/or the environment. The following definitions will serve as a guide when reading this manual:

WARNING
Indicates a potentially hazardous situation, which if not avoided could result in death or serious injury.

CAUTION
- Indicates a potentially hazardous situation, which if not avoided may result in minor or moderate injury.
- A caution without the safety alert symbol indicates a potentially hazardous situation, which if not avoided may result in property damage.

IMPORTANT INFORMATION

Proper installation of each wetwell is essential:
- To ensure the safety of all the individuals involved in the installation.
- To prevent wetwell damage and/or failure, which could lead to product loss and environmental contamination.
- To validate the wetwell warranty.

GENERAL INFORMATION

WARNING
Wetwells are a confined space per OHS guidelines. Follow proper confined space safety procedures.

SPEL fibreglass wetwells are designed for installation with concrete top pad and bottom slabs. The following instructions reflect the approved methods for installing wetwells. Follow all OHS, Federal, State or Local, safety and environmental codes and regulations

WETWELL WARRANTY ACTIVATION

- These instructions must be followed.
- The Wetwell Installation Checklist must be properly completed and signed by the owner’s representative and the installing contractor.
- The Wetwell Installation Checklist, these instructions, and any correspondence related to the wetwell installation must be retained by the owner and provided to GA to validate any future warranty claim. The warranty in effect at the time of delivery will apply and is available from SPEL Environmental.

GETTING STARTED

BEFORE YOU BEGIN

- Read, understand and follow these instructions.
- Barricade the work area.
- Review and prepare to complete the installation checklist as the installation progresses.

If you have questions on other wetwell installation details, call Technical Support at +61 2 8705 0255

INSTALLATION CHECKLIST

Site Preparation	It is best practice to prepare the excavation for the Vortceptor separation chamber first. The Vortceptor separation chamber is the blue fibreglass vertical tank, which we will refer to as 'the Vortceptor'. The excavation for the Diversion Chamber (the rectangular precast concrete chamber) follows afterwards.	YES / NO
	Prior to installation, the inlet pipe run would typically be installed, within one or two pipe lengths prior to the diversion chamber.	YES / NO
Vortceptor Installation	Always physically check measurements on the Vortceptor prior to installation.	YES / NO
	The Vortceptor excavation should be no greater than required, this would be 1000mm oversized or to suit shield sizing. This is with due regard to the amount of backfill to be used under and around the tank.	YES / NO
	Install a 150mm thick, compacted base. This can be either a concrete blinding or compacted crushed rock layer.	YES / NO
	Lower the Vortceptor into the excavation, ensure no rocks or sharp objects fall into the hole and damage the tank.	YES / NO
	Level and adjust the Vortceptor to suit the main drain pipework and the Diversion Chamber inlet void. The invert levels of the inlet and outlet pipework is to match the invert of the inlet and outlet chute of the Vortceptor. (The inlet and outlet chute is the rectangular flanged opening on the side of the Vortceptor)	YES / NO
	Fill the tank with water up to the invert of the inlet - the volume will depend on the specific Vortceptor.	YES / NO
	Encase & backfill the outside of Vortceptor with an engineer specified material – such as graded gravel aggregate, or crushed recycled concrete, or cement stabilised sand.	YES / NO
	In installations when the tank is located in an area subject to high water table or trapped ground water, the tank must be completely encased in unreinforced concrete, up to the specified height above the Vortceptor base, and at the minimum specified width beyond the perimeter of the Vortceptor base. Refer to SPEL Stormwater for recommended concrete dimensions and volumes to withstand buoyancy forces.	YES / NO

Diversion Chamber Installation	Always physically check measurements on the diversion chamber prior to installation.	YES / NO
	Prepare the diversion chamber excavation, this is to be benched or battered to suit the site constraints.	YES / NO
	Ensure sufficient room is left to install inlet pipe (Remember you will need to angle the pipe to feed it in).	YES / NO
	Lift the Diversion Chamber into the excavation - ensure site specific safety requirements are adhered to.	YES / NO
	Adjust the Diversion Chamber to a correct level so the rectangular opening matches the Vortceptor. The inlet and outlet block outs are to match the drainage line.	YES / NO
	Use the template provided with the Vortceptor to drill the bolt holes into the diversion chamber rectangular void.	YES / NO
	Use Sikaflex or silicone (by others) to seal the Vortceptor to the Diversion Chamber, use 8.5mm 4 cutter SDS bit to drill the bolt holes.	YES / NO
	Use M8 x 100mm Galvanised screw bolts to fix the Vortceptor to the Diversion Chamber.	YES / NO
Associated Drainage & Finishing Works	Install upstream and downstream drainage pipework.	YES / NO
	Connect the pipework (by others) to the Diversion Chamber, concrete bandage the inlet and outlet pipes to the Diversion Chamber.	YES / NO
	Internally render the inlet and outlet pipework with C-Crete or similar render.	YES / NO
	Use low slump concrete to mass infill and bench the base of the diversion chamber and weir. This is to direct the flow and remove any dead zones in the diversion chamber.	YES / NO
Cover Slab Installation	Use a Sikaflex bead around the rebate on the top of the Diversion Chamber to ensure a satisfactory seal between cover slab (Lid) and chamber.	YES / NO
	Lift and install cover slab, ensure manhole void / cover is on Vortceptor side of the chamber.	YES / NO
	Use Sikaflex and screw bolts to secure fibreglass manhole riser to cover slab.	YES / NO
	Tie in the manhole covers as per lid manufacturers installation guidelines, to achieve Finished Surface level.	YES / NO

A. HANDLING & PREPARATION

WARNING
Do not stand on or under wetwell while it is being lifted. This could result in personal injury or death.

- Do not drop or impact the wetwell.
- Wetwells should be stored horizontally and chocked, using only appropriate materials such as sandbags, tires, or other soft or pliable materials.
- Upon wetwell delivery and when lifting wetwell, visually inspect entire exterior surface of the wetwell for shipping or handling damage.
- If the wetwell must be moved by rolling, ensure that ground to be traversed is smooth and free of rocks, debris, or other hard objects.
- Do not roll or set the wetwell on any pipe stubout, accessory or appurtenance installed on the wetwell.
- The contractor is responsible for rigging, unloading and securing the wetwell.
- When lifting the wetwell in the horizontal position, use two slings with a spreader bar.
- Use a minimum of two lift lugs when pivoting the wetwell from horizontal to vertical.
- Utilize all lift lugs provided at the wetwell top for vertical lifting.
- Only a pliable strap or rope should contact the wetwell, do not use chains, steel cables or hard metallic slings.

B. SITE PREPARATION

Dimensions of the excavation should be wide enough to provide sufficient working room around the wetwell. Minimum anti floatation ring and ballast dimensions are speci- fied in (table 1).

Anti floatation ring and ballast designs in (Table 1) meet Australian Standard Code S3600A.

(Dead load resisting floatation have a factor of safety of 0.9 applied.)

C. ANTI FLOTATION BALLAST FRP WETWELLS

WARNING
Collapsing excavation walls can cause injury or death. Do not enter the wetwell excavation unless necessary and in compliance with OHS regulations. Follow OHS guidelines for excavations.

WETWELLS

- Lower Wetwell onto Compacted Base then place Wet concrete around the Unit covers 2 x Ribs plus meets the Ballast Quantity in (table 1 and figure 1).

Cold concrete joints are not allowed. Fibreglass solid bot- tom wetwells with external reinforcing ribs must be installed in a continuous and monolithic concrete pour. Concrete must extend 75mm above the second rib from the wetwell bottom, and around the entire circumference of the wetwell. (Refer to figure 1.)

- Concrete slab must fill all gaps and voids in and around the external tank reinforcing ribs.
- It may be necessary to add ballast (water) inside the wetwell to counteract buoyancy until the concrete is cured.

ANTI FLOATATION RING CONCRETE SLAB
Use minimum 20 mpa concrete for anti floatation and ballast Final concrete depth, size, thickness and reinforcements shall meet the minimum requirements in these instructions and applicable tables. Anti floatation ring should extend a minimum of (refer to table 1) in all directions from the wetwell outer diameter.

CAUTION
Voids in the concrete slab around external structural anchors will result in product damage and environmental contamination.

D. BED AND BACKFILL

Proper backfill selection and compaction is required for a proper installation. The allowed backfills are shown in Table D-1 along with the degree of compaction required.

TABLE D-1

BED AND BACKFILL COMPACTION	
Soil type-pipe bedding material (Unified Soil Classification System - see Table D-2)	Minimum Degree of Compaction Required*
Fine - grained soils (Liquid Limit < 50) with medium to no plasticity with less than 25% coarse grained particles. CL, ML, ML - CL	High
Fine grained soils (Liquid Limit < 50) with medium to no plasticity with more than 25% coarse grained particles. CL, ML, ML - CL	Moderate
Coarse grained soils containing more than 12% fines. GM, GC, SM, SC	Moderate
Coarse grained soils with less than 12% fines. GW, GP, SW, SP	Slight
Coarse grained soils with less than 12% fines. GW, GP, SW, SP	Dumped

* Degree of compaction:

- Dumped - No compaction effort.
- Slight - Some compactive effort. In-place density <85% standard compaction. Or < 40% modified compaction.
- Moderate - Intermediate level of compactive effort, In-place density >/=85% and < 95% standard compaction, or >/=40% and <70% modified compaction.
- High - Considerable compactive effort. In-place density >/= 95% standard compaction, or >/= 70% modified compaction
- The difference in the “dumped” and “slight” degree of compaction values are significant and are based on the method of construction, not the measured densities.
- “Dumped” means that there is absolutely no compaction of the embedment soil.“Slight” means there was something done that increased the soil density, even if minor, such as water settling, jetting, flooding, equipment travel, and in some cases, foot traffic.
- For stable soils (cohesion ≥ 36 kpa and / or a bearing capacity ≥ 170 kpa a minimum 300mm of backfill must be placed around the wetwell.
- For unstable soils (cohesion ≤ 36kpa and ultimate bearing capacity ≤ 170 kpa).
  - Wetwells 1200mm diameter or smaller require a minimum 600mm of backfill around the entire circumference of the wetwell.
  - Wetwells larger than 1200mm diameter require a minimum backfill of ½ the wetwell diameter around the entire circumference of the wetwell.
- If muck, bog or peat are present, consult with a Geotechnical Engineer for backfill and excavation requirements.
- For permafrost conditions, consult with a Geotechnical Engineer for backfill and excavation requirements.

Keep backfill dry and free of ice in freezing conditions. Ensure that no foreign objects such as large stones, concrete clumps, tree roots/limbs, or debris is in the backfill surrounding the wetwell.

Prevent large surges of backfill from displacing the wetwell.

TABLE D-2

LETTER AND DEFINITION		SECOND LETTER AND DEFINITION	
G	Gravel	P	Poorly Graded (uniform particle sizes)
S	Sand	W	Well Graded (diversified particle sizes)
M	Silt	H	High Plasticity
C	Clay	L	Low Plasticity
O	Organic		

E. WETWELL INSTALLATION WITH A FIBREGLASS UNDERGROUND TANK

CAUTION
Not using approved backfill material may result in tank failure and environmental contamination.

If the wetwell is installed in the same excavation as an underground fibreglass tank, the backfill around the wetwell must also meet the tank backfill requirements so as to not compromise the tank installation. Tank backfill requirements are more restricted and strict conformance to the tank backfill requirments in MAN 600 must be met for both the wetwell and tank.

F. PIPING PENETRATIONS/ FITTINGS

CAUTION
Always wear safety glasses and protective clothing when cutting on the wetwell, failure to do so can result in personal injury.

- Pipe penetration cutouts should be round holes and should be no larger than the pipe diameter plus 25mm.
  - Make cuts using a saw with a masonry or diamond grit blade.
  - Do not use an axe or other impact type tools.
- Accessories must be installed and used in strict accordance with the manufacturer's instructions.
- All piping must have a flexible connector installed directly on the fitting or accessory to allow for a minimum 15mm differential settlement between the wetwell and the pipe.
  If more than 15mm differential settlement is expected, choose a flexible connector designed for the expected settlement.
  Do not backfill around the wetwell until the concrete slab has hardened.
  Add backfill in maximum 900mm lifts evenly around the wetwell to avoid uneven backfill loads.
- A flexible joint on each connecting pipe is required to relieve stresses from differential backfill movement or soil consolidation. Backfill should be added to the invert elevation of each connecting pipe, the connection made and sealed, before continuing to backfill.

WARNING
To prevent fire or explosion hazard, GA recommends air driven tools whenever possible. DO NOT use power tools where flammable vapors or liquids exist. Also, when electric hand tools are used, be aware of potential shock hazards.Wear protective clothing and eye protection.

Wetwells may be a confined space. Follow proper safety procedures.

G. INVERT

Invert specified by Certified Engineer. The invert may be at any angle and may project up the wetwell any distance.

H. TOP PAD

The wetwell is designed to support the dead weight of an 200mm thick square pad 600mm larger than the diameter of the wetwell (centered on the wetwell) along with a dynamic T-44 traffic load as long as the pad is designed to distribute the loads on the wetwell perimeter and not on the interior of the lid.

If the static load will exceed the 200mm pad weight or the traffic load will exceed T-44, the pad must be 1200mm larger than the wetwell diameter (centred on the wetwell) and all of the pad and / or traffic loads must be supported by the soil around the wetwell and not by the wetwell itself.

Fibreglass flat tops 1000mm through 2500mm diameter are designed to support 200mm concrete pads without internal supports while the concrete cures.

The concrete pad must be designed to be self supporting after cured.

The pad shall be specified by the Certified Engineer.

FIBREGLASS FLAT TOPS WITHOUT TRAFFIC LOAD (See Figure H-1)

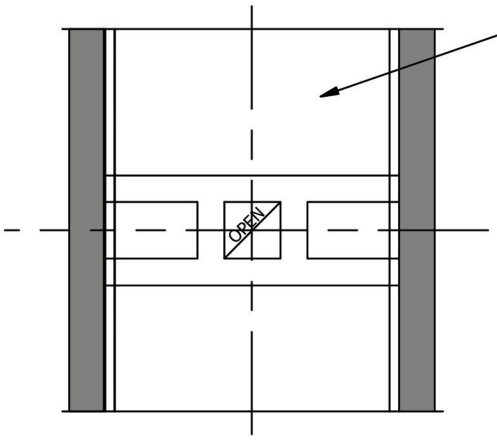
- The pad must be larger than the wetwell a minimum of 300mm in all directions.
- Maximum 200mm concrete pad thickness.

FIBREGLASS FLAT TOPS WITH TRAFFIC LOAD
(See Figure H-2)

- The pad must be larger than the wetwell a minimum of 600mm in all directions.
- The Certified Engineer shall specify the pad strength and reinforcement so that the static weight of an 200mm thick square pad (no more than 600mm larger than the diameter of the wetwell centred on the wetwell) along with a dynamic T-44 traffic load must be distributed on the wetwell perimeter and not on the interior of the lid.
- If either the static pad load or the dynamic traffic load is ex- ceeded, all of the pad and / or traffic loads must be supported by the soil around the wetwell and not by the wetwell itself.

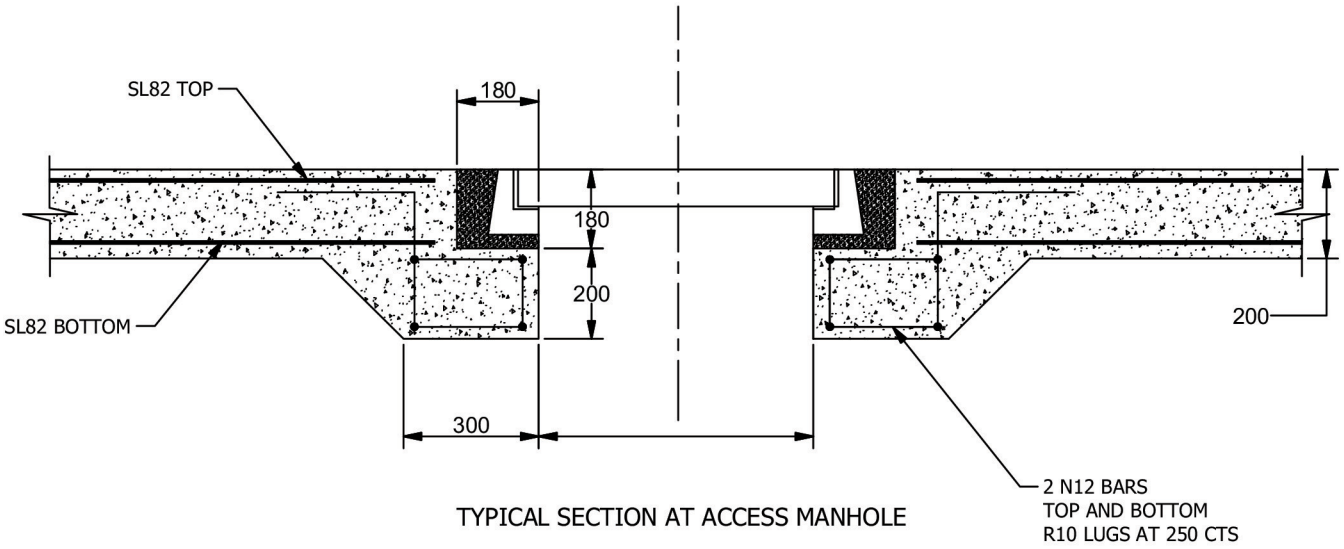
TRAFFICABLE MANHOLE
Ensure cover is installed to manufacturers instructions. SPEL drawing is a guide (page 9).

TYPICAL LID AND CONCRETE SLAB DETAILS
LOAD RATING: CLASS "D" – AS3996 – 210KN.
HIGHER LOAD RATING AVAILABLE.



OPTION: REFER TO CLIENT DRAWINGS FOR RAISED LID SECTION FOR WATER TO DRAIN AWAY.

PART PLAN LAYOUT



TYPICAL SECTION AT ACCESS MANHOLE

- APPLICABLE FOR ALL LID TYPES AND SIZE – CIRCULAR / RECTANGULAR
- REFER TO CLIENT DRAWINGS
- FITTED TO MANUFACTURERS DETAIL

Page-Green & Associates Pty Ltd
CONSULTING ENGINEERS
5 Villamanta St, Geelong West
Phone: (03) 5222 1899 Fax: (03) 5229 8382
Email: pga@pipeline.com.au

Project

Location

Typical Section at Access Manhole

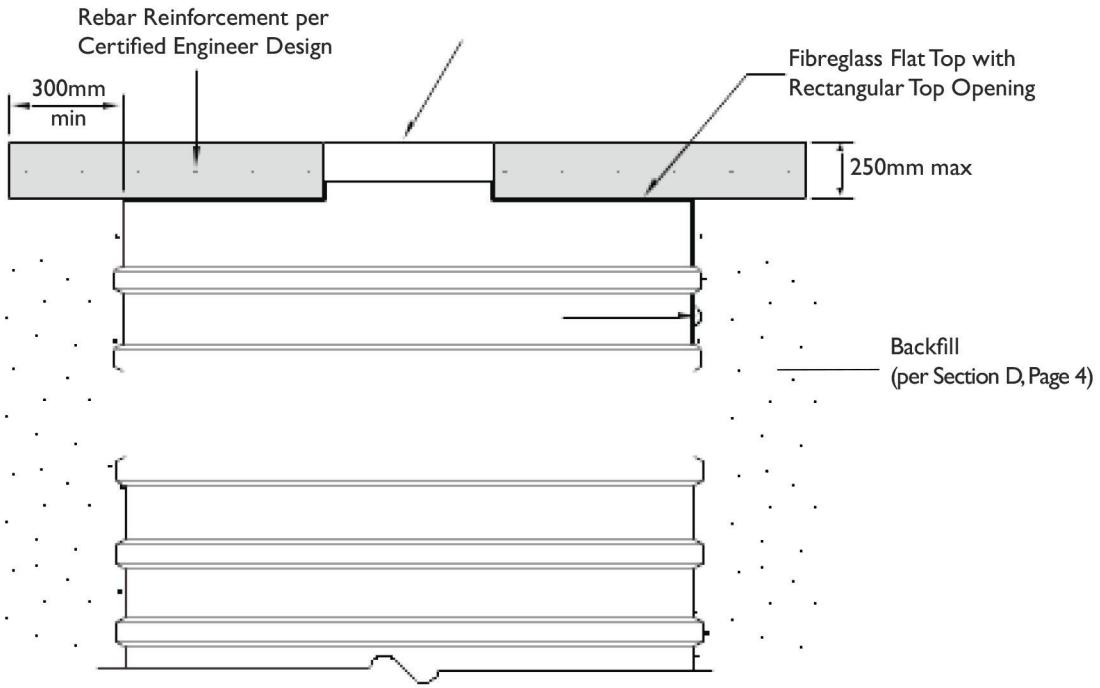
spelstormwater
joy in water

Design	Drawn
d.c.g.	a.h.
Date: April 09	Scale: N.T.S

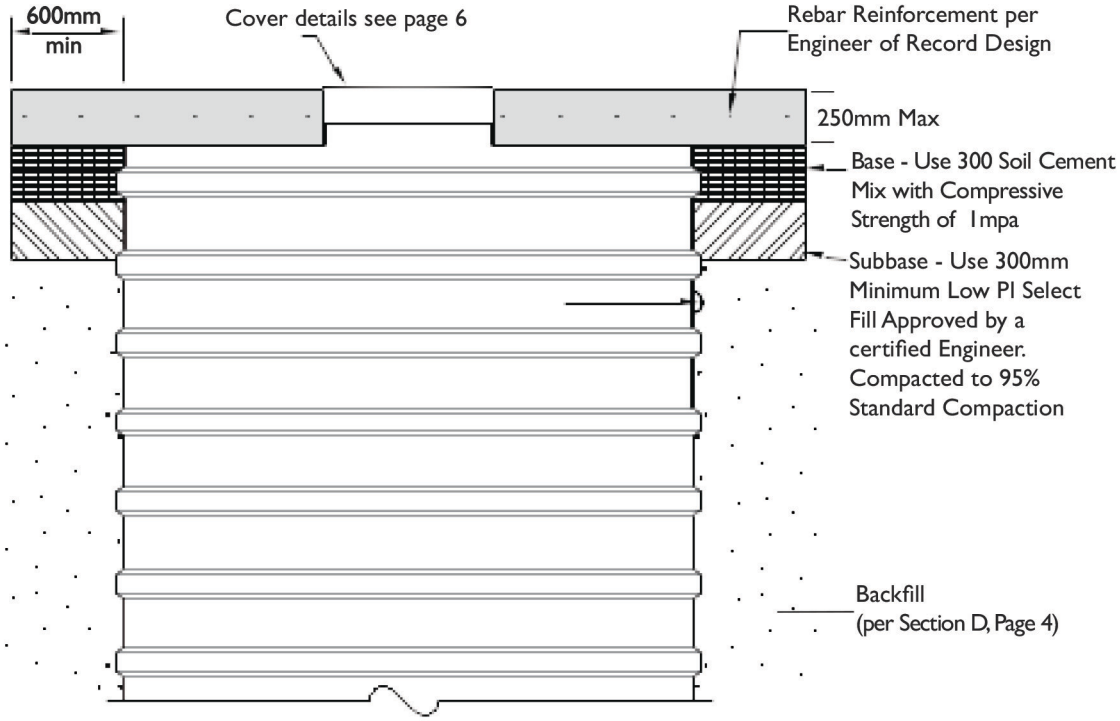
AutoCad Filename: 11500-7

Ref No: 11500-7

NON-TRAFFIC LOAD (Figure H-1)



TRAFFIC LOAD COVER (Figure H-2)



J. WET HOLE INSTALLATION

CAUTION
Never allow an empty tank to remain in a wet hole, or a dry hole that may become wet unless anchoring and backfilling have been completed. Failure to anchor and backfill may damage the tank or surrounding property.

Firstly make site preparation as per section B.

Pump the water from the hole to maintain minimum water level. Add a minimum of 300mm of well-placed backfill material (MUST be crushed gravel) to the hole, and level the bed to assure uniform bottom support for the tank. Position the tank in the hole.

Partially ballast tank using water until it settles firmly on the prepared bed. Ballast level in a tank must never exceed water level in hole during installation. Use only enough ballast to sink the tank.

One tank is level and ballasted, carefully place concrete ballast as per section C then processed to sections D, E (if applicable), F, G and H.

TABLE 1

External Anti Floatation Ribs:

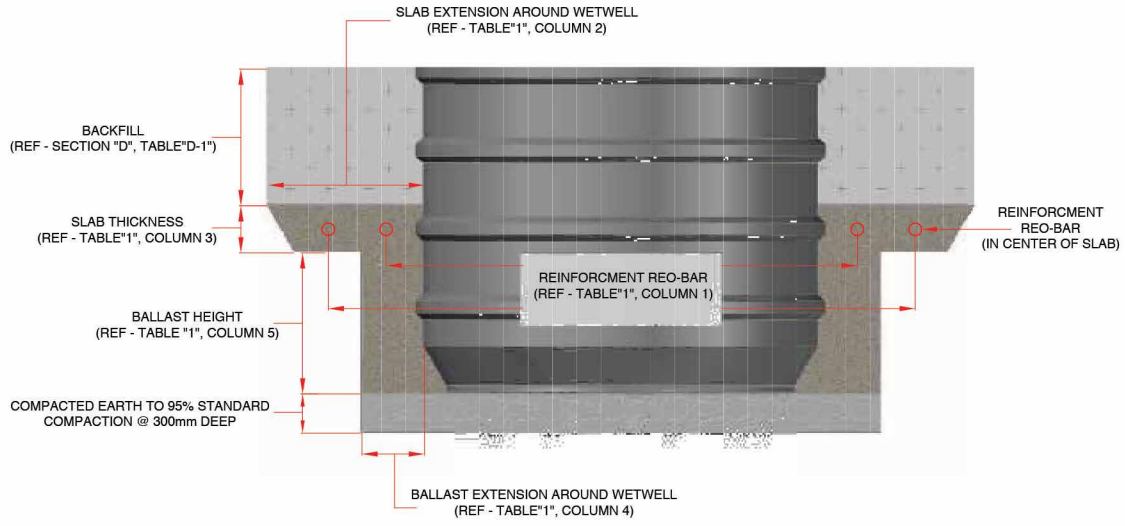
The wetwell bottom is designed to BS4994 to any resist buckling of the wetwell bottom from external water pressure and internal pressure, in the installed condition with a compacted base to (Figure 1, below) and the perimeter of the wetwell including the anti-floatation Ribs embedded in concrete.

This table must be followed for the concrete slab design for all wetwalls with fibreglass external ribs.

- These slabs are designed to AS3600.
- In some cases the slab and/or reinforcing design is controlled by temperature requirements and in other cases by flexure.
- Use minimum 20Mpa concrete.
- Since some of the slab designs are controlled by temperature, the slab thickness should not be increased without the approval of a Design Engineer.

	COLUMN 1	**COLUMN 2**	**COLUMN 3**	**COLUMN 4**	**COLUMN 5**
Wetwell Dia. mm	Reinforcement REO BAR (In Center of Slab, Ref-Figure 1.)	Required Slab Extension Around Wetwell (mm)	Slab Thickness (mm)	Required Ballast Extension Around Wetwell (mm)	Ballast Height (mm)
1200	1 @ 1800mm Dia. N12	400	200	300	400
1520	1 @ 1920mm Dia. N12	500	200	350	500
1850	1 @ 2250mm Dia. N12 & 1 @ 2650mm Dia. N12	550	200	400	600
2200	1 @ 2600mm Dia. N12 & 1 @ 3000mm Dia. FN12	700	200	500	700
2470	1 @ 2900mm Dia. N16 & 1 @ 3300mm Dia. N16	800	250	500	800
3000	1 @ 3400mm Dia. N16 & 1 @ 3800mm Dia. N16	900	300	700	1000
3500	1 @ 3900mm Dia. N20 & 1 @ 4800mm Dia. N20	1000	300	700	1200
4000	1 @ 4400mm Dia. N20 & 1 @ 4900mm Dia. N20	1100	350	750	1400

FIGURE 1



Installation Manual

SPEL Vortceptor®

NSW HEAD OFFICE 100 Silverwater Rd, Silverwater NSW 2128 PO Box 7138, Silverwater NSW 1811 P: +61 2 8705 0255 P: 1300 773 500 E: nsw.sales@spel.com.au	**QLD MAIN OFFICE** 130 Sandstone Pl, Parkinson QLD 4115 P: +61 7 3271 6960 P: 1300 773 500 I E: qld.sales@spel.com.au **QLD SUNSHINE COAST BRANCH** 19-27 Fred Chaplin Circuit, Bells Creek, QLD 4551 P: 1300 773 500 I E: qld.sales@spel.com.au	**VIC & TAS OFFICE** 897 Wellington Rd Rowville VIC 3178 P: +61 3 5274 1336 P: 1800 810 139 I E: sales@spel.com.au **VIC GEELONG BRANCH** 70 Technology Close, Corio, P: +61 3 5274 1336 P: 1800 810 139 I E: sales@spel.com.au
SA OFFICE 9 Hampden Road, Mount Barker SA 5251 P: 1300 773 500 E: sales@spel.com.au	**WA OFFICE** 2 Modal Crescent Canning Vale WA 6155 P: +61 8 9350 1000 P: 1800 335 550 E: sales@spel.com.au	**NZ OFFICE AUCKLAND** 100 Montgomerie Road Airport Oaks P: +64 9 276 9045 E: sales@spel.com.au
NZ OFFICE WANGANUI 43 Heads Road Wanganu New Zealand P: +64 6 349 0088 I E: sales@spel.com.au	**NZ OFFICE WELLINGTON** 41 Raiha St Porirua Wellington New Zealand P: +64 4 239 6006 I E: sales@spel.com.au	**PHILIPPINES OFFICE METRO MANILA** Unit 2210 Lumiere Residences Pasig Boulevard, Pasig City P: +61 2 8705 0255 P: 1300 773 500 E: sales@spel.com.au
SINGAPORE OFFICE 512 Chai Chee Lane, #06-04 Bedok Industrial Estate, Singapore 469028 P: +61 2 8705 0255 P: 1300 773 500 I E: sales@spel.com.au	**UK OFFICE UNITED KINGDOM** Lancaster Rd Shrewsbury SY1 3NQ UK P: +44 (0)1743 445200 I E: sales@spel.com.au	**USA OFFICE CLEVELAND** 4548 Industrial Parkway Cleveland, Ohio 44135 P: +61 2 8705 0255 P: 1300 773 500 E: sales@spel.com.au

We believe clean water is a right not a privilege and we work to ensure a joy in water experience for you with your children and grandchildren.

spelstormwater
joy in water

100 Silverwater Rd, Silverwater NSW 2128 Australia
Phone: (02) 8705 0255
Email: sales@spel.com.au
spel.com.au