Odyssey, Burndell Road, Yapton
1.6m Precast Concrete Storm Water Attenuation Tank
- Preliminary Floatation Check
Project No: STS2477

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Revision:	Date:	Comment:
0	06.08.2019	Issued for Comment

Reference Documents:

IS EN 1990	Eurocode - Basis of Structural Design
IS EN 1997-1	Eurocode 7 - Geotechnical Design – General Rules

Design Assumptions:

Assumed Internal Water Level:	Assumed Empty for Floatation Check
Assumed Overburden Depth:	0.55m
Soil Bulk Density:	20 kN/m^3
Density of Groundwater:	9.81 kN/m^3
Assumed Concrete Density:	24 kN/m^3 (Mass Concrete) 14 kN/m^3 (Buoyant)
Assumed Ground Water Level:	1.0m below surface
Tank External Height:	2.075m

Tank Plan Area:		=	154.0 m^2
<u>Self Weight of Tank:</u>			
External Walls (51.7t):	51.7 x 9.81	=	507.2 kN
Internal Walls (16.5t):	16.5 x 9.81	=	161.9 kN
Dry Flow Channels (3.0t)	3.0 x 9.81	=	29.4 kN
Precast Roof Slabs (47.0t):	47.0 x 9.81	=	461.1 kN
Insitu Base Slab (34.0m^3):	34 x 25.0	=	850.0 kN
Insitu Wall Joints (3.2m^3):	3.2 x 25.0	=	80.0 kN
Insitu Roof Screed (19.7m^3):	19.7 x 25.0	=	<u>492.5</u> kN
			2582.1 kN
Factored Resistance to Uplift:	0.9 x 2582.1	=	2323.9 kN
Weight of overburden (550mm):	154 x 0.55 x 20	=	1694.0 kN
Factored Resistance to Uplift:	0.9 x 1694	=	1524.6 kN
Total Resistance to Uplift Factored:	2323.9 + 1524.9	=	4017.9 kN
Submerged Depth of Tank:	0.55 + 2.075 – 1.0	=	1.625m
Factored Uplift:	1.1 x 154.0 x 9.81 x 1.625	= 2700.4 kN < 4017.9 kN - ok	

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Localised Structural Uplift Check

Self Weight of Tank:

Roof Slab:	0.250 x 25.0	=	6.3 kN/m^2
S/W Internal Walls	(1.5 x 9.81) / (3.3 x 2.4)	=	1.9 kN/m^2
Inistu Base Slab:	0.225 x 25.0	=	5.6 kN/m^2
			13.8 kN/m^2

Weight of overburden (550mm):	0.55 x 20	=	11.0 kN/m^2
Total Resistance to Uplift:	13.8 + 11.0	=	24.8 kN/m^2
Submerged Depth of Tank:	0.55 + 2.075 – 1.0	=	1.625m
Factored Uplift:	1.1 x 9.81 x 1.625	= 17.5 kN/m^2 < 24.8 kN/m^2 - ok	