

Project	Sefter Road
Project ref	10768
Revision	Tank - Anti-Flotation Calculation
	V2 - 18.5.22

	<table><tr><th>Tank ref:</th><th>Tank 1</th><th>Tank 2</th><th></th></tr><tr><td>Tank Area at base (m2)</td><td>144.000</td><td>175.000</td><td></td></tr><tr><td>Top GW level(m AOD)</td><td>5.052</td><td>5.052</td><td>Obtain groundwater level from soil report</td></tr><tr><td>Tank base level(m AOD)</td><td>4.300</td><td>4.300</td><td></td></tr><tr><td>Depth GW- Base (m)</td><td>0.752</td><td>0.752</td><td></td></tr><tr><td>Ballast thickness (m)</td><td>0.000</td><td>0.000</td><td>Start with an assumed ballast depth, then adjust if FoS is less than 1.1</td></tr><tr><td>Depth of cover over tank</td><td>0.550</td><td>0.600</td><td></td></tr><tr><td>Depth below water table(m)</td><td>0.752</td><td>0.752</td><td>Bottom of ballast to top groundwater level</td></tr><tr><td>Volume for buoyancy (m³)</td><td>108.288</td><td>131.600</td><td></td></tr><tr><td>Tank Buoyancy force (kN)</td><td>1062.3</td><td>1291.0</td><td>9.81kN/m³ for water. Positive figure denotes uplift force, negative figure denotes downward force</td></tr><tr><td></td><td></td><td></td><td>Note: If a negative figure is shown above for tank buoyancy then no ballast is required</td></tr><tr><td>Ballast construction depth (m)</td><td>0.000</td><td>0.000</td><td></td></tr><tr><td>Ballast downward force (kN)</td><td>0.00</td><td>0.00</td><td>Unsaturated Clay = 1900Kg/m3 or 18.64kN/m3 - Saturated Clay = 2300Kg/m3 or 22.56kN/m3(Engineeringtoolbox.com)</td></tr><tr><td>Soil depth over tank (m)</td><td>0.550</td><td>0.600</td><td>Assumed topsoil. Change if different material/ surfacing</td></tr><tr><td>Soil downward force (kN))</td><td>1243.44</td><td>1648.50</td><td>Density of Dry Topsoil = 1600 Kg/m3 = 15.7kn/m3</td></tr><tr><td>Downward anchor forces (kN)</td><td>1243.44</td><td>1648.50</td><td></td></tr><tr><td>Net Buoyancy Force</td><td>181.13</td><td>357.50</td><td>Negative figure denotes uplift force, positive figure denotes downward force</td></tr><tr><td>Factor of safety</td><td>1.2</td><td>1.3</td><td>minimum acceptable value: 1.1</td></tr><tr><td></td><td>OK</td><td>OK</td><td></td></tr></table>	Tank ref:	Tank 1	Tank 2		Tank Area at base (m2)	144.000	175.000		Top GW level(m AOD)	5.052	5.052	Obtain groundwater level from soil report	Tank base level(m AOD)	4.300	4.300		Depth GW- Base (m)	0.752	0.752		Ballast thickness (m)	0.000	0.000	Start with an assumed ballast depth, then adjust if FoS is less than 1.1	Depth of cover over tank	0.550	0.600		Depth below water table(m)	0.752	0.752	Bottom of ballast to top groundwater level	Volume for buoyancy (m³)	108.288	131.600		Tank Buoyancy force (kN)	1062.3	1291.0	9.81kN/m³ for water. Positive figure denotes uplift force, negative figure denotes downward force				Note: If a negative figure is shown above for tank buoyancy then no ballast is required	Ballast construction depth (m)	0.000	0.000		Ballast downward force (kN)	0.00	0.00	Unsaturated Clay = 1900Kg/m3 or 18.64kN/m3 - Saturated Clay = 2300Kg/m3 or 22.56kN/m3(Engineeringtoolbox.com)	Soil depth over tank (m)	0.550	0.600	Assumed topsoil. Change if different material/ surfacing	Soil downward force (kN))	1243.44	1648.50	Density of Dry Topsoil = 1600 Kg/m3 = 15.7kn/m3	Downward anchor forces (kN)	1243.44	1648.50		Net Buoyancy Force	181.13	357.50	Negative figure denotes uplift force, positive figure denotes downward force	Factor of safety	1.2	1.3	minimum acceptable value: 1.1		OK	OK		
Tank ref:	Tank 1	Tank 2																																																																												
Tank Area at base (m2)	144.000	175.000																																																																												
Top GW level(m AOD)	5.052	5.052	Obtain groundwater level from soil report																																																																											
Tank base level(m AOD)	4.300	4.300																																																																												
Depth GW- Base (m)	0.752	0.752																																																																												
Ballast thickness (m)	0.000	0.000	Start with an assumed ballast depth, then adjust if FoS is less than 1.1																																																																											
Depth of cover over tank	0.550	0.600																																																																												
Depth below water table(m)	0.752	0.752	Bottom of ballast to top groundwater level																																																																											
Volume for buoyancy (m³)	108.288	131.600																																																																												
Tank Buoyancy force (kN)	1062.3	1291.0	9.81kN/m³ for water. Positive figure denotes uplift force, negative figure denotes downward force																																																																											
			Note: If a negative figure is shown above for tank buoyancy then no ballast is required																																																																											
Ballast construction depth (m)	0.000	0.000																																																																												
Ballast downward force (kN)	0.00	0.00	Unsaturated Clay = 1900Kg/m3 or 18.64kN/m3 - Saturated Clay = 2300Kg/m3 or 22.56kN/m3(Engineeringtoolbox.com)																																																																											
Soil depth over tank (m)	0.550	0.600	Assumed topsoil. Change if different material/ surfacing																																																																											
Soil downward force (kN))	1243.44	1648.50	Density of Dry Topsoil = 1600 Kg/m3 = 15.7kn/m3																																																																											
Downward anchor forces (kN)	1243.44	1648.50																																																																												
Net Buoyancy Force	181.13	357.50	Negative figure denotes uplift force, positive figure denotes downward force																																																																											
Factor of safety	1.2	1.3	minimum acceptable value: 1.1																																																																											
	OK	OK																																																																												
Assumed dry (liner below ballast)																																																																														

Tanks 1&2: Related boreholes BH203 (area between boreholes BH202 and BH203). Highest groundwater level recorded 5.052.