



SITE: Fontwell Avenue, Fontwell, West Sussex

DEVELOPER: Dandara Southern

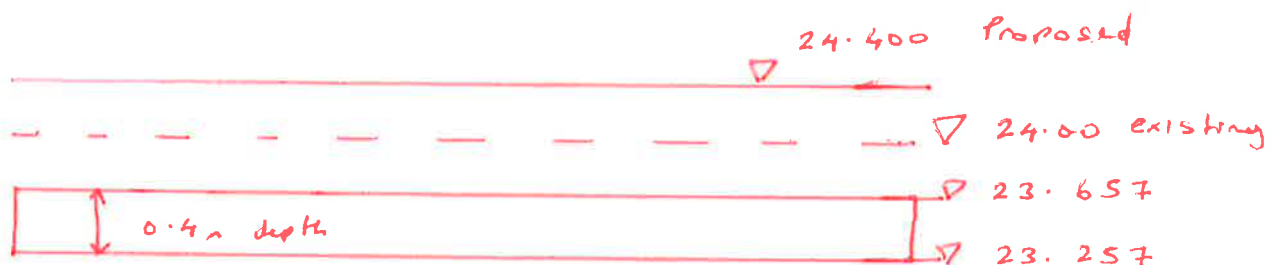
DOCUMENT: Buoyancy calculation check for below ground Storage Tanks

JON No.: DAN/E4736

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The purpose of the calculations is to provide a check against buoyancy for the 2no. Attenuation tanks situated in the lowest portions of the site by which the highest ground water levels were recorded. These recordings were in relative proximity to the tanks along a close contour line when reviewing the topographical survey. Note that all other tanks are not within close proximity to these high readings and as such calculations are not required when reviewing their proximity to other ground water level readings across the site.

1. Buoyancy calculation check for below ground Storage Tank Connected to S23



The following calculations provide a check on the potential impact or risk of flotation of the below ground surface water Cellular Storage connected to S23 on the Fontwell development site as a result of high groundwater level recordings in proximity to the tank. Ground Water was encountered at 0.67m bgl at Borehole WS102 (the closest in proximity to the tank) taken from LEAP's Phase 3, Fontwell Avenue Ground Investigation report reference LP01878 dated 24th May 2019.

Worst case scenario is assumed where the ground water strike is at existing ground level taken as 24.00

Existing ground level at location of proposed tank is approximately 24.000m AOD and therefore assumed existing ground water level is 24.000m AOD.

Base level of tank is specified at 23.257mAOD.

Top level of tank is specified at 23.657mAOD

Proposed minimum ground level over the top of the tanks is specified as 24.400m AOD.

Specific weight of water = 1000 kg/m³

Specific weight of soil = 1800kg/m³

Potential uplift buoyancy forces: $F_{uplift} = V \times W_g = 0.4 \times 43.5 \times 1000 = 17,400\text{kg/m}$

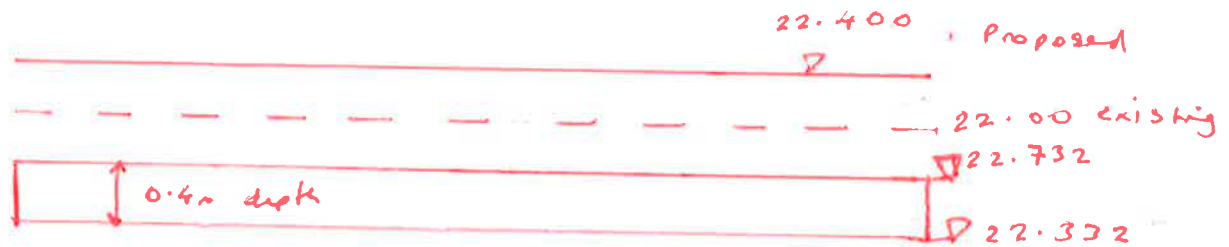
Weight of soil within groundwater extent:

$W_s = V \times W = 0.343\text{m} \times 43.5\text{m} \times (1800-1000) = 11,936\text{kg/m}$

Weight of soil above groundwater extent over tank= $V \times W = 0.4 \times 43.5\text{m} \times 1800 = 31,320\text{kg/m}$

Resultant downforce = $11,936 + 31,320/17,400 = \text{FOS of } 1.68$ which is deemed **acceptable**.

2. Buoyancy calculation check for below ground Storage Tank connected to S20



The following calculations provide a check on the potential impact or risk of flotation of the below ground surface water Cellular Storage connected to S20 on the Fontwell development site as a result of high groundwater level recordings in proximity to the tank. Ground Water was encountered at 0.88m bgl at Borehole WS105 (the closest in proximity to the tank) taken from LEAP's Phase 3, Fontwell Avenue Ground Investigation report reference LP01878 dated 24th May 2019.

Worst case scenario is assumed where the ground water strike is at existing ground level taken as 22.00

Existing ground level at location of proposed tank is approximately 22.000m AOD and therefore assumed existing ground water level is 22.000m AOD.

Base level of tank is specified at 21.332mAOD.

Top level of tank is specified at 21.732mAOD.

Proposed minimum ground level over the top of the tanks is specified as 22.400m AOD.

Specific weight of water = 1000 kg/m³

Specific weight of soil = 1800kg/m³

Potential uplift buoyancy forces: $F_{uplift} = V \times W_g = 0.4 \times 8.0 \times 1000 = 1,006\text{kg/m}$

Weight of soil within groundwater extent:

$W_s = V \times W = 0.268\text{m} \times 8\text{m} \times (1800-1000) = 1,715\text{kg/m}$

Weight of soil above groundwater extent over tank= $V \times W = 0.4 \times 8\text{m} \times 1800 = 5,760\text{kg/m}$

Resultant downforce = $1,715 + 5,760/1,006 = \text{FOS of } 7.43$ which is deemed **acceptable**.