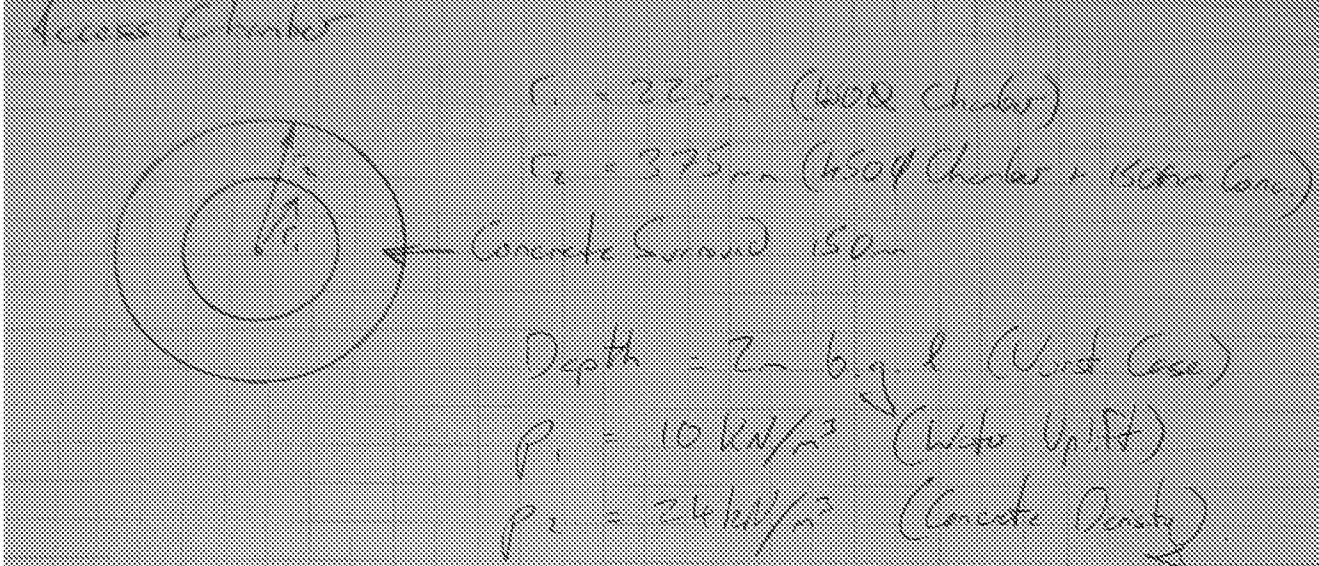


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REF	OUTPUT
 Access Chamber $r_1 = 225\text{mm}$ (600mm Chamber) $r_2 = 375\text{mm}$ (600mm Chamber + 150mm Concrete) Concrete Surround 150mm Depth = 2m b.g.l. (Worst Case) $p_1 = 10\text{ kN/m}^3$ (Water Uplift) $p_2 = 24\text{ kN/m}^3$ (Concrete Density)	

450dia. Access Chamber with 150mm thick Concrete Surround

Access Chamber Plan Area = 0.159 m²
Concrete Surround Plan Area = 0.441 m²
Max Depth = 2.00m BGL

$$\text{Uplift force} = 10\text{ kN/m}^3 * 0.441\text{m}^2 * 2.00\text{m} = 8.82\text{ kN}$$

$$\text{Concrete Slab \& Wall s/w} = 25\text{ kN/m}^3 * [(0.441\text{m}^2 * 0.225\text{m}) + [(0.441 - 0.159\text{m}^2) * 1.85\text{m}]]\text{m}^3 = 15.52\text{ kN}$$

$$\text{Check that } 0.9 * \text{s/w} > 1.50 * \text{UPL} \Rightarrow 0.90 * 15.52 = 13.97\text{ kN} > 1.5 * 8.82 = 13.23\text{ kN} \Rightarrow \text{OK}$$

1800dia. Manhole with 150mm thick Concrete Surround

Manhole Plan Area = 2.545 m²
Concrete Surround Plan Area = 4.155 m² (150mm concrete surround and 100mm chamber wall)
Max Depth = 2.00m BGL

$$\text{Uplift force} = 10\text{ kN/m}^3 * 4.155\text{m}^2 * 2.00\text{m} = 83.1\text{ kN}$$

$$\text{Concrete Slab \& Wall s/w} = 25\text{ kN/m}^3 * [(4.155\text{m}^2 * 0.225\text{m}) + [(4.155 - 2.545\text{m}^2) * 1.85\text{m}]]\text{m}^3 = 97.84\text{ kN}$$

$$\text{Check that } 0.9 * \text{s/w} > 1.50 * \text{UPL} \Rightarrow 0.90 * 97.84 = 88.06\text{ kN} > 1.5 * 83.1 = 124.6\text{ kN} \Rightarrow \text{FAILURE}$$

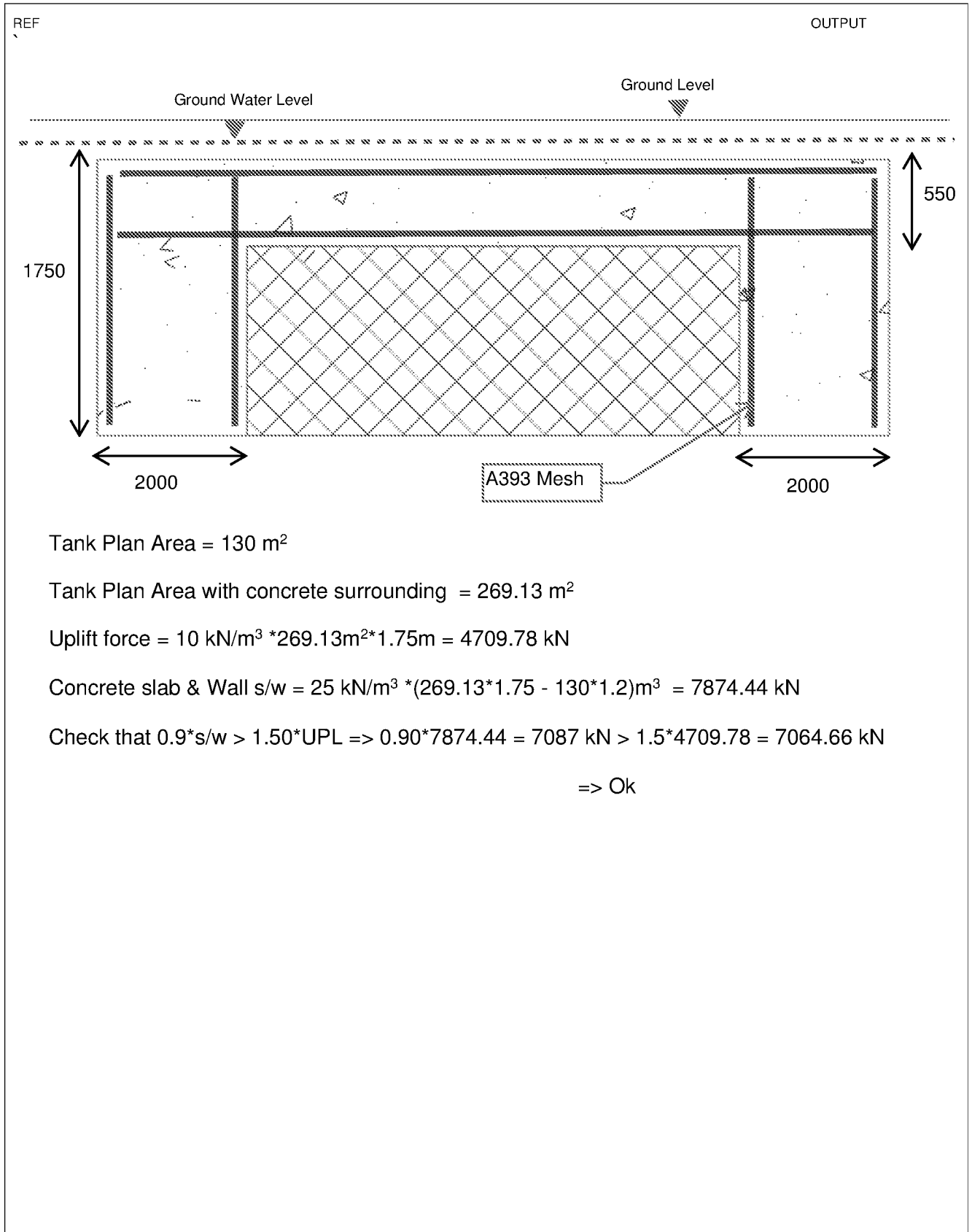
Increase Base Slab Depth to 900mm

$$\text{Uplift force} = 10\text{ kN/m}^3 * 4.155\text{m}^2 * 2.00\text{m} = 83.1\text{ kN}$$

$$\text{Concrete Slab \& Wall s/w} = 25\text{ kN/m}^3 * [(4.155\text{m}^2 * 0.900\text{m}) + [(4.155 - 2.545\text{m}^2) * 1.85\text{m}]]\text{m}^3 = 167.95\text{ kN}$$

$$\text{Check that } 0.9 * \text{s/w} > 1.50 * \text{UPL} \Rightarrow 0.90 * 167.95 = 151.16\text{ kN} > 1.5 * 83.1 = 124.65\text{ kN} \Rightarrow \text{OK}$$

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