

Foul Water Network Design



**STINGRAY ENVIRONMENTAL
ENGINEERING**
Protect Our Water

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Decision Order: 0308 Clarification of Additional
Information

Site: Tig Mhuire, Old Bridge Road, Templeogue, D16,
D16W6F4, X312821, Y228559

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March 2022

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Introduction

As required by South Dublin County Council, this report provides recommendations for the foul water network design, in line with the requirements of *Irish Water (Site Development Works for Housing areas) and BS8301:1985*.

1. Site Specific Information

Information supplied by client /architect

- 1No. Proposed Dwelling 4 bedrooms
- Based on the information provided by the client we have calculated the maximum **900l/day** of domestic type sewage flow at the peak load for this development.

Please see full breakdown tabulated below.

Bedrooms	Population Equivalent PE	Hydraulic [Ltr] 1PE=150ltr/p.day Estimated
2 double	4PE	600
2 single	2PE	300
	6PE	900

Fig. 1. Wastewater loading rates-proposed development; theoretical calculations based on EPA 2021 COP recommendation

Foul Design

Location of the applicants dwelling and topography of the land surrounding the property are preventing gravity foul discharge into the existing sewer network. Therefore, proposed foul disposal system must include the sewage lift station and connection to the existing OD50mm HDPE rising mains connected to the nearest existing sewer manhole located along Old Bridge Road.

a). Foul connection Design Layout and details



Fig 2. Existing Manhole EX-F6 indicating end point of existing 50mm HDPE rising mains- opened and inspected by SDCC engineer Mr. Ronan Toft in March 2022

b). Foul Pump Station- existing

The existing foul pump station contain as follows

- ✚ 1No. precast concrete chamber with approx. volume measured below incoming pipe of 700ltr
- ✚ Service opening 600x1300mm with mild steel galvanised manhole cover.
- ✚ Single submersible duty vortex pump
- ✚ Small control panel with flow alarm system.

The existing pump is in poor working order with guider ail system, chain badly corroded. The existing control panel is not functional, and replacement of all electrical internal components would be required. Condition of the submersible pump is unknown as a result of malfunction of electrical control system. Possible ingress of ground/storm water was observed. Total volume of pump chamber 1.3m³, with approx. working volume of 700l (measured below incoming existing sewer pipe) which is below minimum 24hr emergency storage requirements. The pump in its current condition is not fit for purpose and would require complete mechanical and electrical overhaul, further structural inspection of concrete chamber, which seem not economically viable, thus the existing pump station would be classified for replacement.



Fig 4. Existing pump chamber



Fig 6. Existing pump chamber access manhole



Fig 7. Control panel



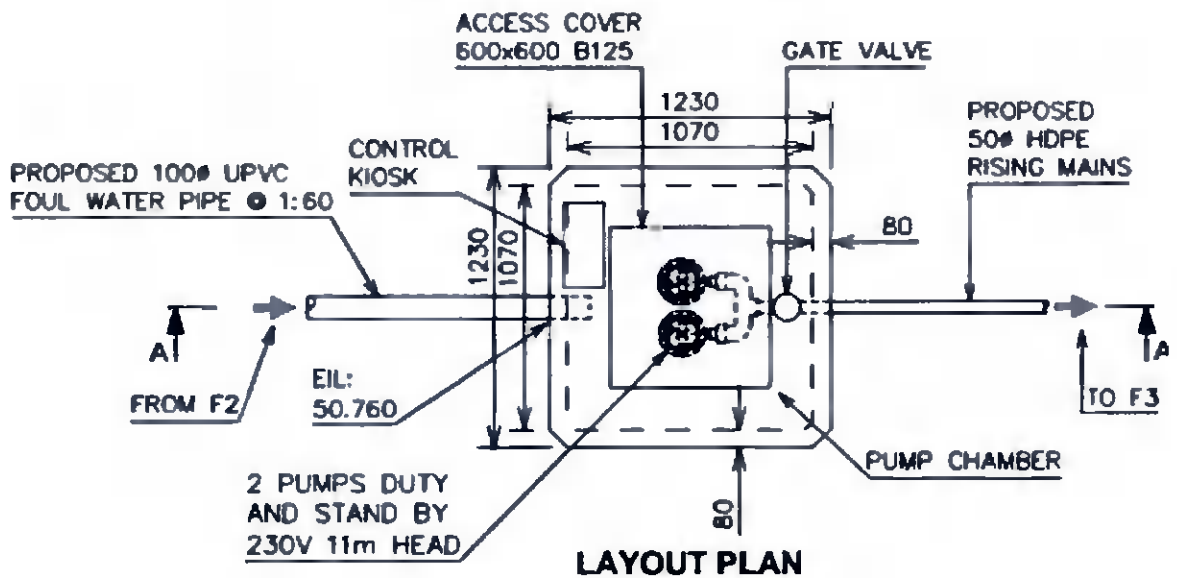
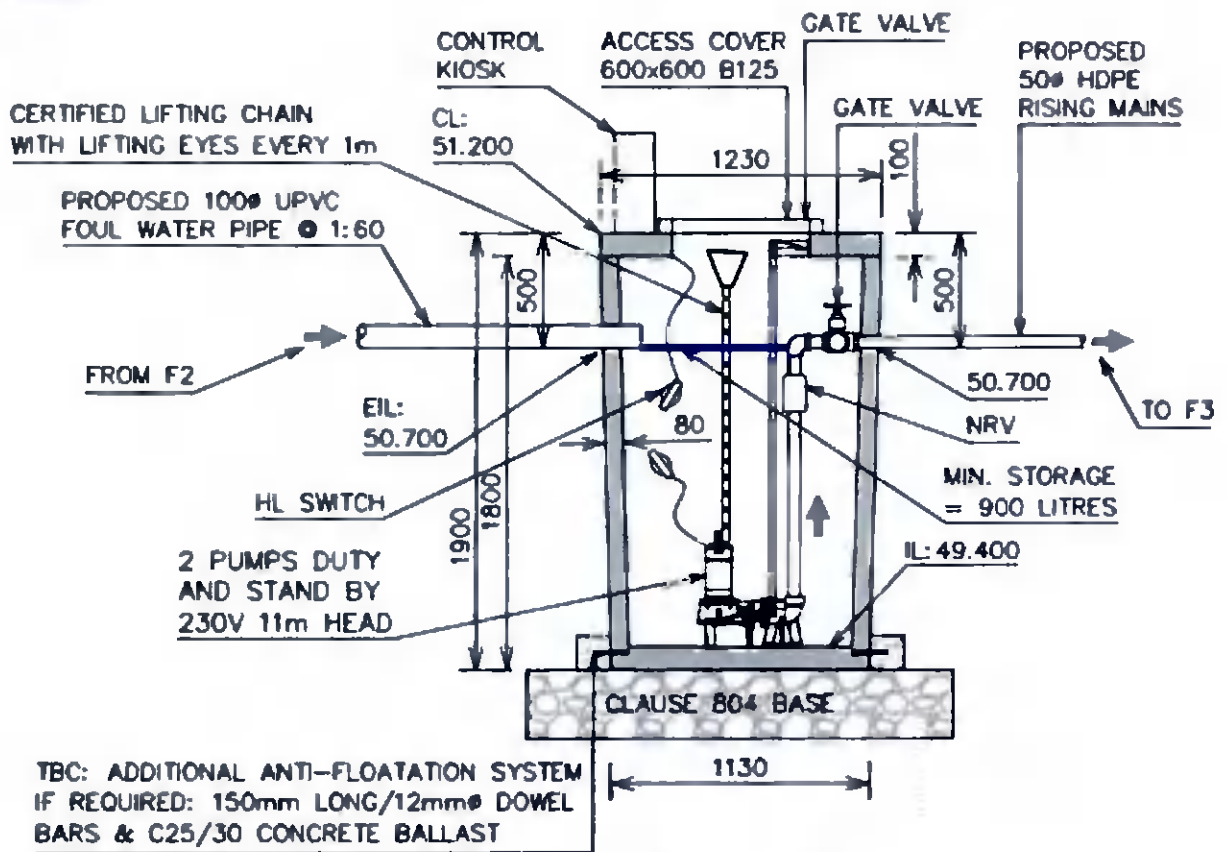
Fig 8. Control Panel

c). Foul Pump Station-proposed

For details, please refer to drawings 645-C02A- Detail A - Appendix B

Proposed Foul Pump station to include:

- Reinforced Precast Concrete Tank (0.9m³ Nominal capacity measured below incoming sewer pipe and 1.8m³ Total capacity including freeboard capacity) c/w 600 x 600 opening.
- Proposed tank is to ensure minimum of 24hr peak flow storage capacity, before backing up the drains and maximum of 48hrs peak flow capacity in case of power failure before overflowing into the surface.
- Service opening 600x600mm with secured B125 Ductile Iron Manhole cover.
- Twin pump system (duty-standby) with designated mounting system (pedestals, guiderails, SS 314 chain and shackles)
- 2No. Pump model Calpeda GQVM 50-11 230v/50Hz/1phase, n=2900rpm, 1.45kW, 6.6, Vortex impeller, max. head 11m
- Flow control system including NRV and Gate Valve
- Localised control panel 230V/50Hz/1 phase c/w audio/visual alarm system operated by HL float switch
- Vortex impeller type with 50mm free solids passage
- Duty selected for maximum projected flow (foul water) of 0.9m³/24hrs
- Existing Rising mains 50mm HDPE. Approximate Length 50m.
- Total Head 6.3m
 - ✓ 4.3m Static Head
 - ✓ 1.3m Head Loss for 50mm pipe and projected discharge of 200l/min (3.4l/sec)
 - ✓ 0.7m friction loss (2No. 90deg elbows, 1No. Gate Valve, 1No. Check valve, 1No. Pump fitting)
- Pump discharge adjusted with float switch for maximum 30sec PUMP-ON operation, with approx. discharge of 190l in 30sec @6.3m total head
- 1.65m/sec Flow Velocity calculated for 6.33m/sec and 50mm HDPE pipe
- Proposed FPS to be maintained on the annual basis by qualified service provider and monitored daily by house owner/occupier.



DETAIL 'A'
PROPOSED PRECAST CONCRETE
FOUL WATER PUMPING STATION
SCALE 1:25 @ A2

Fig 9. Proposed Foul Pumping station- Twin Pump Duty-Standby

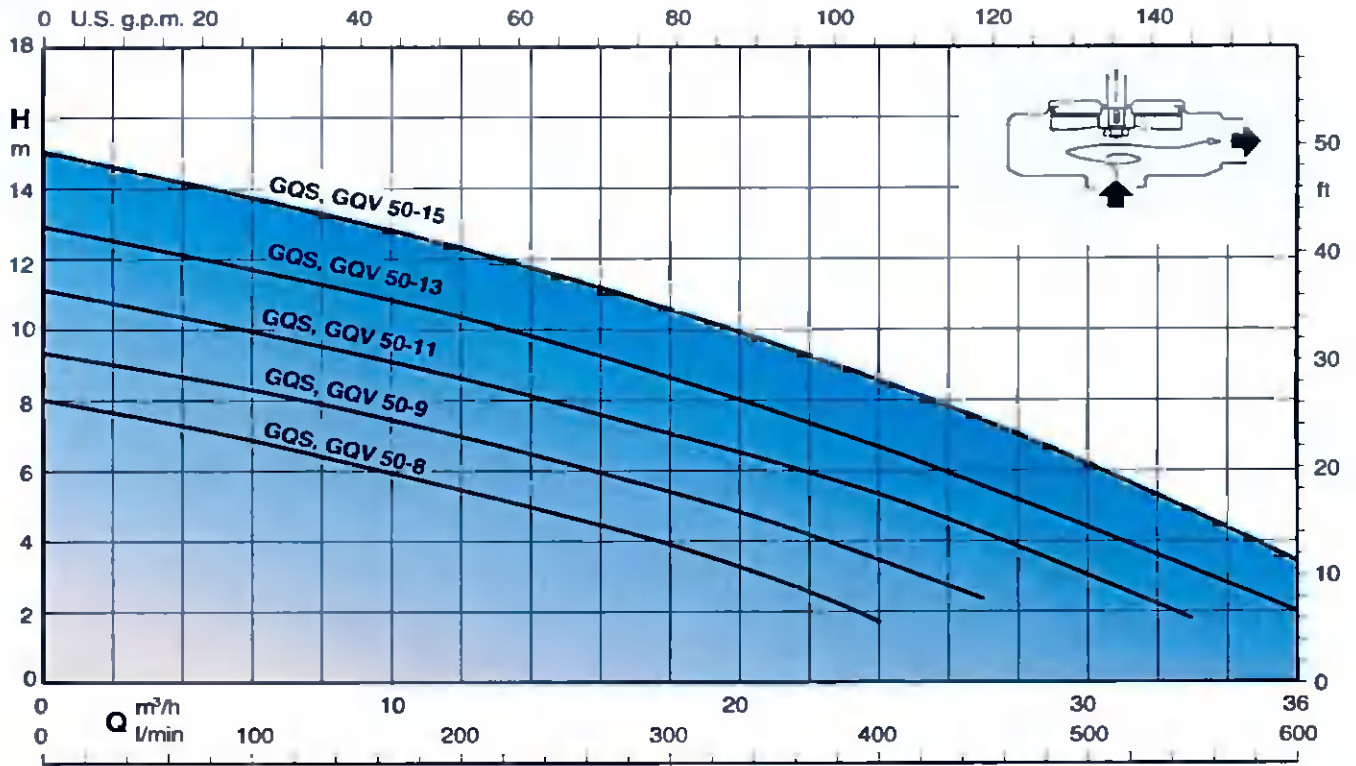


Fig 10. Calpeda GQVM 50-11 characteristics

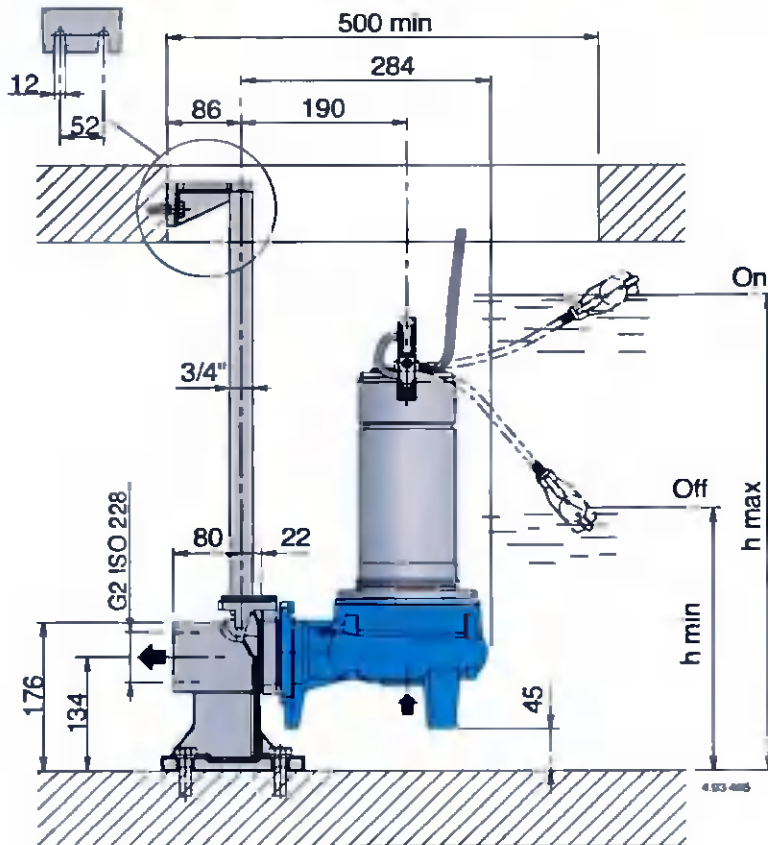


Fig 11. Calpeda GQVM mounting system

2. FPS Location

The location and configuration of the underground foul pumping station will depend on the topography, the presence of underground services, planning conditions, and on or other factors, whether existing, planned, or anticipated. The separation distances tabulated below are provided as a guide. Separation distances should be such that any excavation work required for the foul disposal system does not undermine adjacent features, such as buildings, roads, or walls.

Features	Required	Proposed Foul Pumping Station
Existing Flood Zone OPW	Outside zone	FPS located outside 1:1000year flood zone
Building/Structure	5m	5m FPS to existing/proposed dwelling
SUDS system	5m	>5m FPS to Cultec Storm system
Site Boundary	3m	>3m FPS to site boundary
Watercourse	10m	7.5m FPS to river Dodder- top of the bank*

Fig 8. Separation distances. * Due to site space restrictions, the minimum recommended separation distance cannot be met. We are looking for an exception due to the following reasons:

- The proposed underground FPS uses watertight reinforced plastic or precast concrete vessel with 24hrs emergency storage capacity thus reducing a risk of overflowing and minimizing the potential pollution to surface water during the hypothetical FPS breakdown
- The proposed underground FPS would replace an existing FPS that is in the same area that also does not meet the setbacks that are now required
- While the distance from the proposed underground FPS to the site boundary (River Dodder top of the bank) is only 7.5 metres, it is another approx. 5-6 metres from the site boundary to the normal flowing of the River Dodder. See images of the site boundary and the River Dodder with the distance between them.



Fig 9. River Dodder-Looking Up towards the site



Fig 10. River Dodder- site view

3. Recommendation

- ✚ It is the responsibility of the Project Supervisor (i.e. Engineer, Architect or other competent person) to ensure that the foul disposal system is located and installed in accordance with planning conditions and IW requirements.
- ✚ Prior to construction, the further investigation and CCTV drain survey of existing sewer network might be required.
- ✚ The existing DN50 HDPE rising mains to be utilized for proposed development. The end point of existing rising mains has been located, visually inspected, and tested by SDCC engineer Mr. Ronan Taft. Proposed Foul Pump Station to be taped into the existing rising mains via 50mm Philmac compression fitting

4. Important note

- ✚ This report is only valid on the time of site inspection. The author cannot be responsible for any changes that could occur as result of construction, remediation, adjustment works completed afterwards.

5. Summary

- ✚ The old existing foul pump station to be decommissioned by qualified and certified contractor.
- ✚ New pumping station with minimum working capacity of 900ltr to be supplied and installed.
- ✚ Client to sing annual maintenance contract with FPS supplier.
- ✚ The existing 50mm HDPE rising mains to be utilised and maintained for proposed foul connection.

Signed: *Waldemar Dehouwski* Date: 22 March 2022

Qualifications: B.Eng. P.Grad.Dips. FETAC Cert MIEI MIAH

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