

Foul Water Network Design



**STINGRAY ENVIRONMENTAL
ENGINEERING**
Protect Our Water

Reference Number: SEE-S343

Register Reference: SD21B/0589

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

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February 2022

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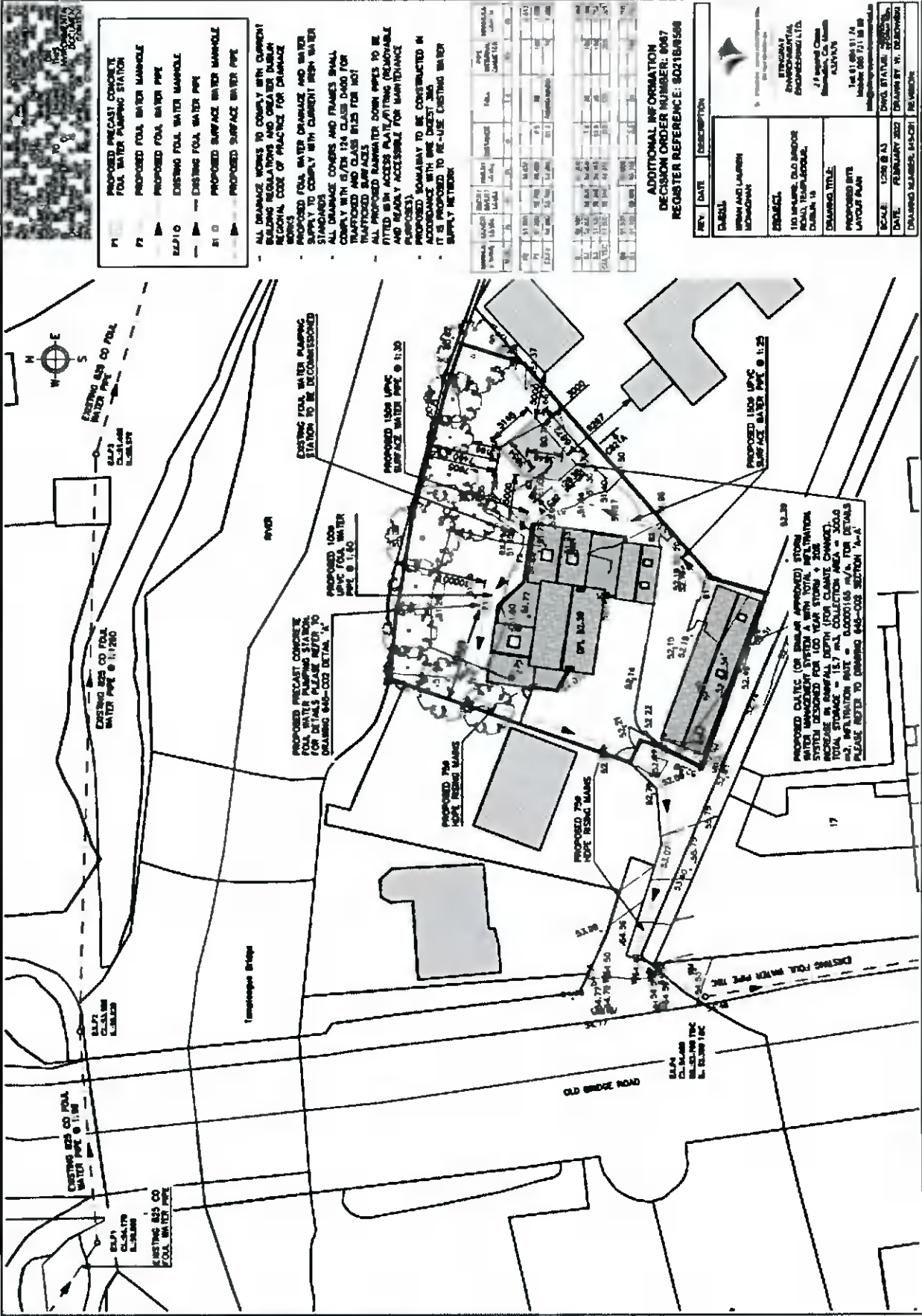
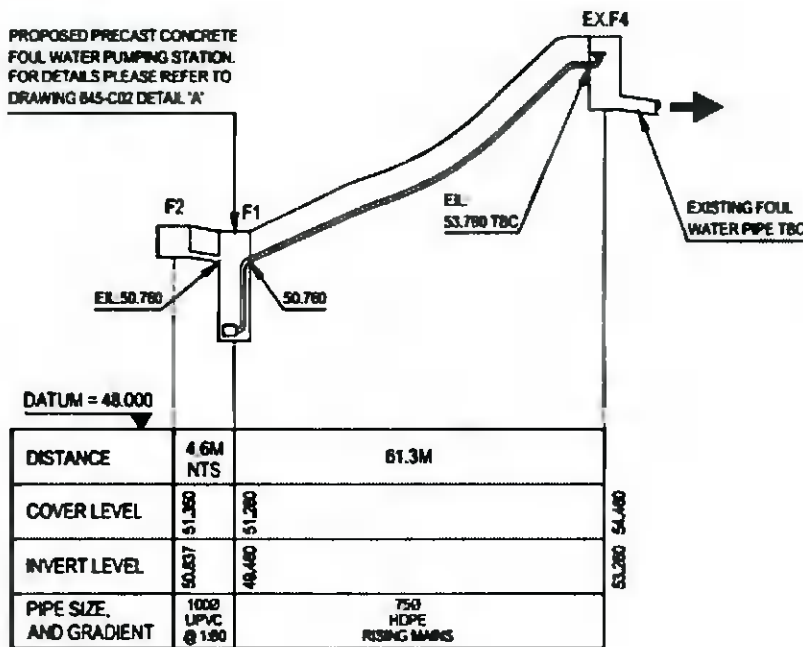


Fig 3. Proposed foul layout plan



**LONGITUDINAL SECTION
F2 TO EX.F4
SCALE: HORIZONTAL 1:1000
/ VERTICAL 1:100 @ A2**

Fig 4. Proposed rising mains Long Section

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 condition and discharge route of existing 50mm HDPE rising mains is unknown. 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.

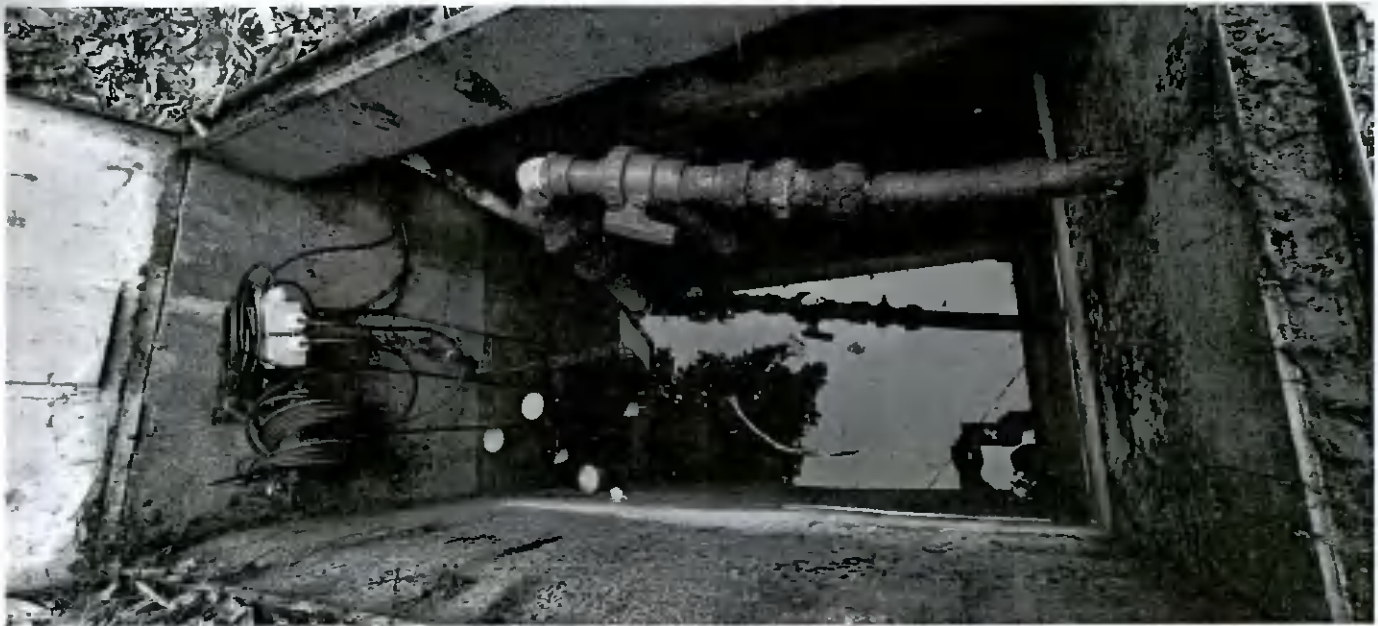


Fig 5. Existing pump chamber



Fig 6. Existing pump chamber access manhole



Fig 7. Control panel

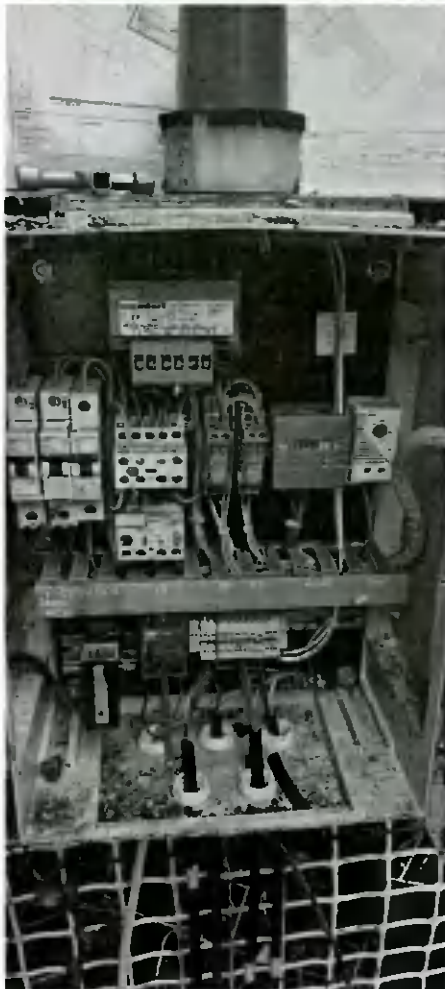


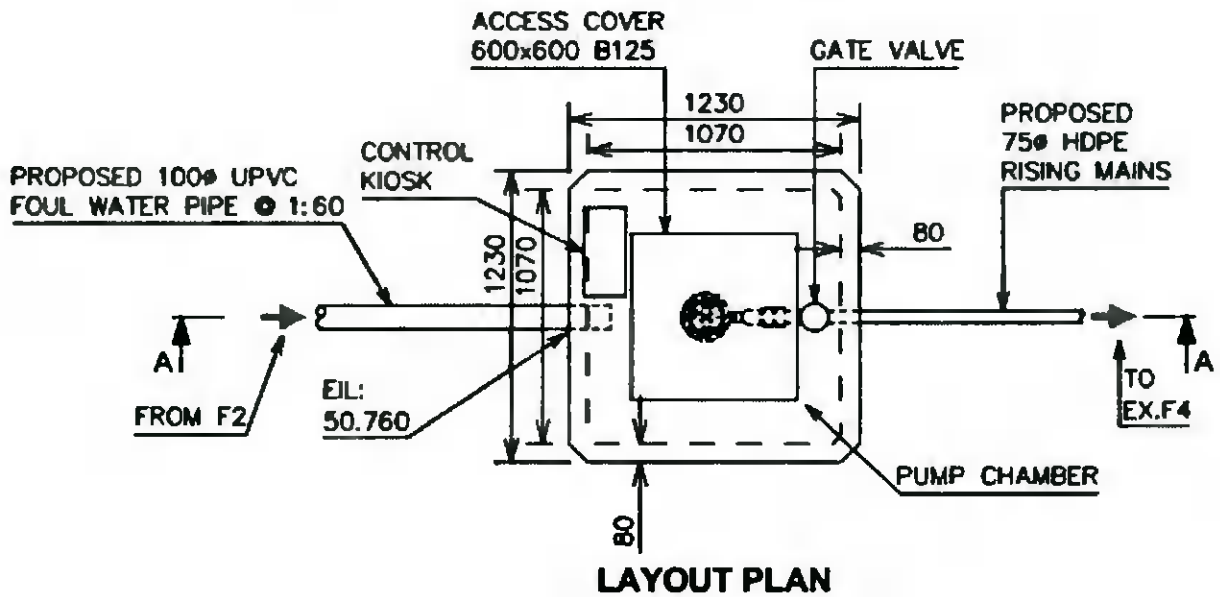
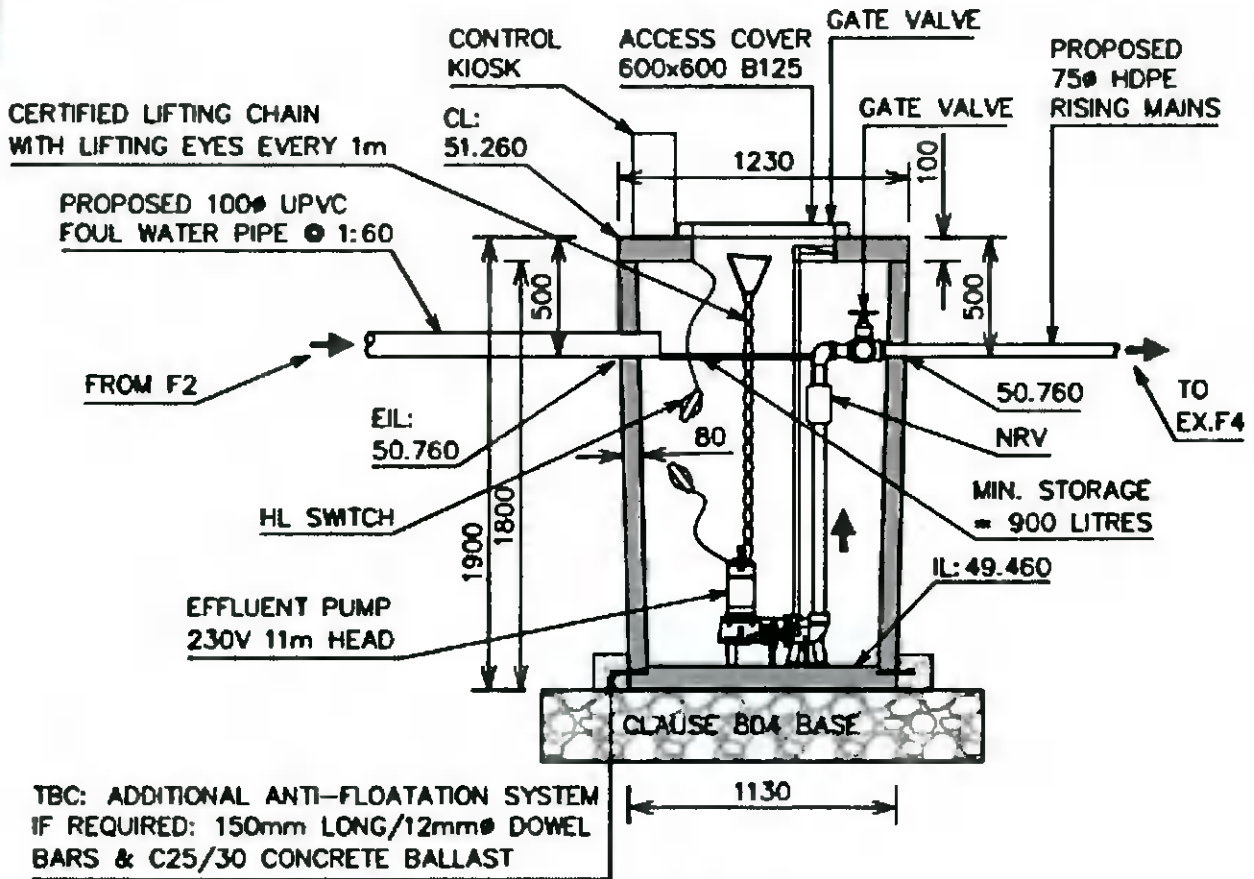
Fig 8. Control Panel

c). Foul Pump Station-proposed

For details, please refer to drawings 645-C02- 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.**
- Single pump system with designated mounting system (pedestals, guiderails, SS 314 chain and shackles)
- 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
- Rising mains 75mm (ID70mm) HDPE. Approximate Length 61.3m.
- Total Head 6.3m
 - ✓ 4.3m Static Head
 - ✓ 1.3m Head Loss for 75mm 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 75mm (ID70mm) 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

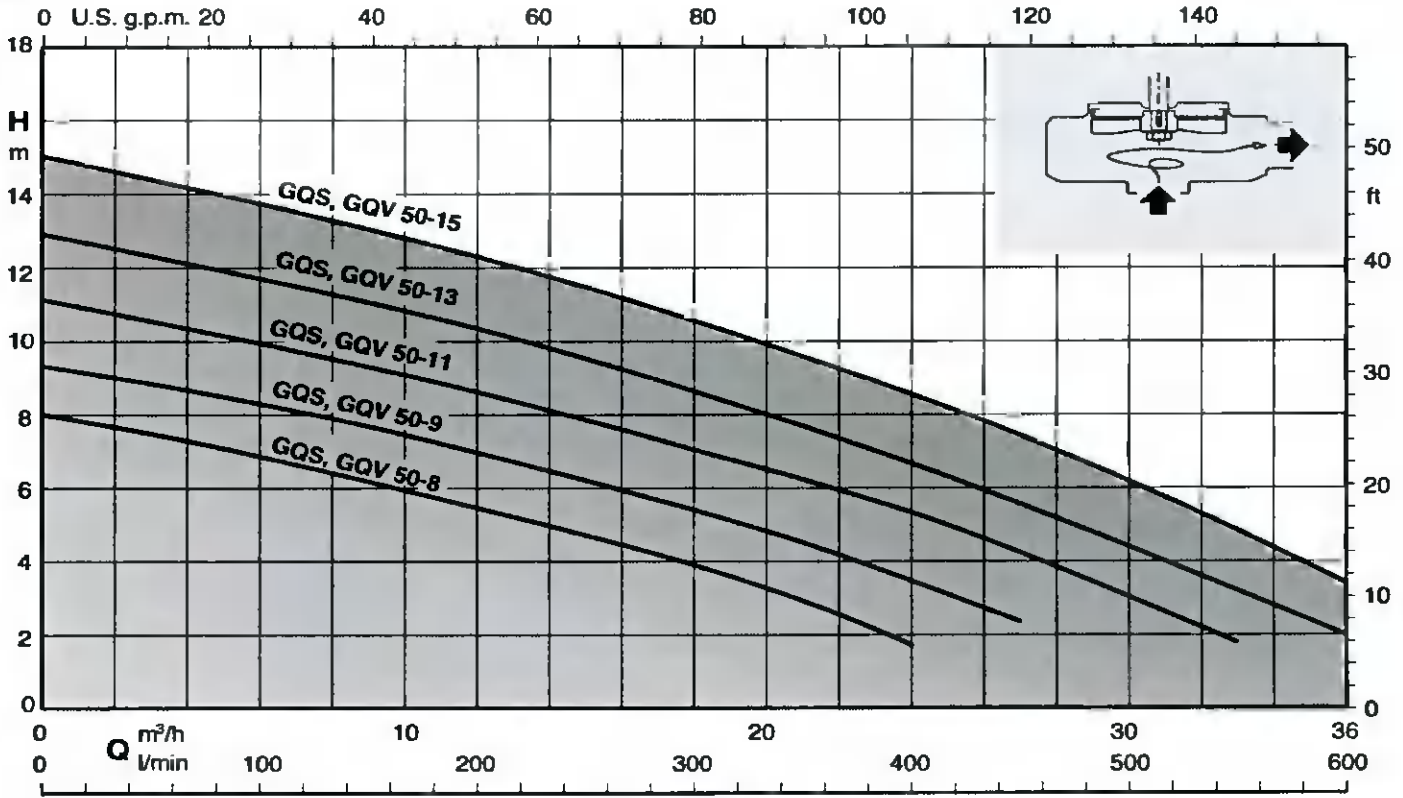


Fig 10. Calpeda GQVM 50-11 characteristics

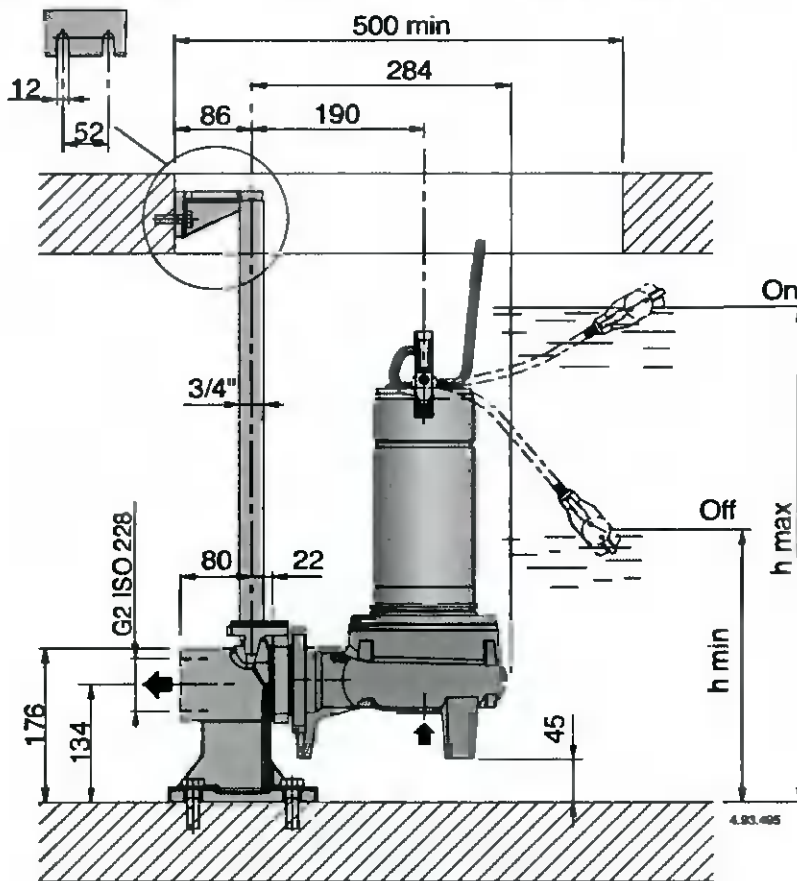


Fig 11. Calpeda GQVM mounting system

Number of Discharge Units per Dwelling: 14
 Self cleansing velocity when flowing half full: 0.75 to 3 m/s
 Pipe Roughness Co-efficient (K_s): 0.6 for < 30 units
 1.5 for > 30 units

Fig 12. Foul network design-calculations

Pipe No.	Accumulative No. of residential units	Irish Water		Building Regulations		BS 8301:1985		Number of Discharge units	Actual		Full Bore		Proportional flow	Discharge Velocity	Proportional Depth
		Gradient	Diameter	Gradient	Diameter	Gradient	Diameter		Flow Q	Velocity v	Flow Q _p	Velocity v _p	Q/Q _p		
P	No.	1 in	mm	1 in	mm	1 in	mm	units	l/s	m/s	l/s	m/s	OK?	OK?	OK?
F2 - F1	1	60	100	60	100	95	100	14	2.59	0.75	6.18	0.79	OK	OK	OK

MANHOLE NAME	COVER LEVEL	ENTRY INVERT LEVEL	INVERT LEVEL	DISTANCE	FALL	PIPE INTERNAL DIAMETER	MANHOLE DEPTH
M (X)	m	m	m	m	1: x	mm	m
F2	51.350		50.837				0.513
F1	51.260	50.760	49.460	4.6	60	100	1.800
EX.F4	54.460	53.760	53.260	61.3	RISING MAINS	75	1.200

Fig 13. Foul network design - levels

2. 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.
- ✚ Further investigation of existing DN50 rising mains including camera survey, pressure test and partial exposure would be recommended prior construction work stakes place. Existing DN50 rising mains if found in good working order can be incorporated into alternative design using Grinder/Macerator type of pump, thus minimising disruption to the public road, and reducing the overall installation cost.

3. 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.

4. 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.
- ✚ New 75mm HDPE rising mains, 61.3m long to be installed.

Signed: *Waldemar Debowski* Date: 8 February 2022

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



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