

NYMNP

27/03/2024



**LADYCROSS PLANTATION CARAVAN PARK
PUMP STATION TECHNICAL DOCUMENT**

PROJECT: LADYCROSS PLANTATION CARAVAN PARK

Prepared for:

Ladycross Plantation
Egton,
Whitby,
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Prepared by:

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Date:

23rd March 2024

Rev A04



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Amendment Record

Issue No.	Date	By	Ch'd	Description
A01	27/09/23	LC	SH	Original Issue for Comment / Approval
A02	10/10/23	SH	CS	Septicity Calculation Added
A03	19/10/23	LC	SH	Population Total Amended
A04	24/03/24	SH	SH	Park Residency Levels Added



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- 14) Ladders/ Access**
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 - B) Pumping Station Drawings**



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1. Specification

Our proposal is based on equipment complying with the Building Regulations and to a safe and serviceable standard for maintenance and operations.

2. Hazardous Area Classification

We have not classified the pumping station as a hazardous area.

3. Design Inflow and Proposed Discharge

We have based our calculations on the pumping station serving the following;

- 148 caravans
- 48 lodges
- 2 amenity blocks
- 1 shop
- 1 house
- 1 office

4. Rising Main

Our design is based on utilising a 1000m long, 63mm OD MDPE pipe with an internal diameter of 50mm for the foul water pumping station.

As the rising main is of a simple profile and presented no previous issues, surge analysis will not be required.

Dry Weather Flow (dwf) = PG + E + I

Where; P = Population (@ 2.4 / dwelling)
G = Consumption rate (160 l/hd/day)
E = Industrial & Commercial (0 l/sec)
I = Infiltration (10%)

$$(201 \text{ dwellings} \times 2.4) \times 160 + 0 + 10\% = 84,902.4 \text{ l/day} \\ = 0.98 \text{ l/sec}$$

Based on the rising main retaining a volume of approximately 2,000 litres and the pumping station wet well retaining 1,000 litres, giving a total system volume of 3,000 litres.

$$\text{Time in System} = \frac{\text{Volume}}{\text{Flow}} = \frac{3,000}{0.98} = 3,061 \text{ secs} = 51 \text{ mins}$$

Based on the calculation above, the flows should clear the system within 1 hour during 100% occupancy which is below the recognised figure of 6 hours where septicity would be considered an issue. As such we do not propose to equip the pumping station with chemical dosing.



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Seasonal Occupancy. Detailed below are the occupancy rates for 2023 and how this relates to the system retention times. As can be seen, the worst case scenario would occur during January where occupancy would be at only 20%. The risk of septicity however, even at this point is still relatively low with the system being cleansed every 4.25 hours and the added benefit of lower ambient temperatures.

Month	Occupation Level	System Retention Time
Benchmark	100%	51 mins (0.85 hrs)
Jan	20%	255 mins (4.25 hrs)
Feb	25%	204 mins (3.4 hrs)
Mar	55%	92 mins (1.55 hrs)
Apr	60%	85 mins (1.4 hrs)
May	65%	78 mins (1.3 hrs)
Jun	70%	73 mins (1.2 hrs)
Jul	75%	68 mins (1.1 hrs)
Aug	90%	57 mins (0.95 hrs)
Sep	75%	68 mins (1.1 hrs)
Oct	55%	92 mins (1.55 hrs)
Nov	30%	170 mins (2.8 hrs)
Dec	35%	145 mins (2.4 hrs)

5. Pump Duty and Selections

From the levels detailed in the site drainage plan and taking a mid-point between the pump start and stop level we propose the selection of a Flygt pump fitted with a macerator impeller and 1.9kW motor. The existing supply operates 2No. MP3068HT's. The supply is single phase, but should be adequate for the new pumps.

6. Pumping Station Layout

The Pumps, pipework and valves would be installed within a GRP chambers to the layout as shown on the Advantage drawing, appended to this document.

The tank will be installed with a nominal fall across the tank of between 1:80 and 1:150.

The system will be fitted with PVC non-return valves and a PVC isolation wedge gate valves on the common discharge pipework.

Advantage would terminate a short distance outside the wet well in a 90mm compression fitting from where provision of the rising main and connecting it to the pump station pipework would be the responsibility of others.



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7. Flow Meter / Flow Monitoring

We do not propose to equip the pumping station with a flow meter unless otherwise specified by the client.

8. Power and Control Cabling

Power and control cabling will be wired directly back to the control panel via 100mm cable ducts which will be sealed with RISE fire retardant duct sealant (or similar approved).

9. Control Equipment

Automatic level control would be provided via 4no level control float switches all wired back to a single-compartment control panel installed within a GRP Kiosk 1200mm wide x 1250mm high x 450mm deep which has space for the meter.

10. Telemetry Equipment

Advantage Pumping Solutions can supply and install a GSM alert unit to provide alerts on system/pump faults via a SIM card.

11. Access Covers

Single unit galvanised mild steel lids will be required for the pumping station provided with a clear opening of 1000mm x 800mm.

12. Lifting Equipment

We propose that no permanent lifting equipment is to be fitted to the system and the use of portable equipment will be utilised.

13. Penstock

The pumping station will not be provided with a means of isolation as standard. An isolation penstock can be fitted if required.

14. Ladders / Access

No form of access into the wet well via a ladder or either will not be installed.

15. Wet Well Ventilation

Not required wet well would be ventilated via upstream sewer if required.

16. Appendices

- A. Hydraulic Calculations and Pump Selections
- B. Pumping Station Drawings



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**Appendix 18.A
Hydraulic Calculations and Pump Selections**

Foul Water Specification Sheet

Product:	Advantage PPS18-50 R80H TWIN
Pumped Liquid:	Foul Water
Total Head:	TBC
Pumped Rising Main:	Approx 1,000m of 63mm OD PE pipework
Total Tank Capacity:	35,000 litres
Tank Size:	2.5 dia x 8.0m long
Tank Material:	GRP tank
Pumps:	Heavy duty None standard Flygt
System Voltage:	230V
Pumped Flow Rate:	2 l/sec
Pump Configuration:	Duty / Standby
Mounting Arrangement:	Guide rail mounted
Lifting Chain:	3 metres of galvanised chain per pump
Internal Pipework:	2" Upvc
Outlet Connection:	63mm OD PE Pipework Compression Fitting
Control Panel:	Twin pump panel, DOL starting, mild steel coated panel
Control Method:	Float switch control
Control Panel Distance from Wet Well:	5 metres
Inlet 1 Depth Below Lid:	Approx 1m
Inlet 1 Pipe Type/Orientation:	150mm

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Pump Technical Specification

MP 3085 HT 1~249

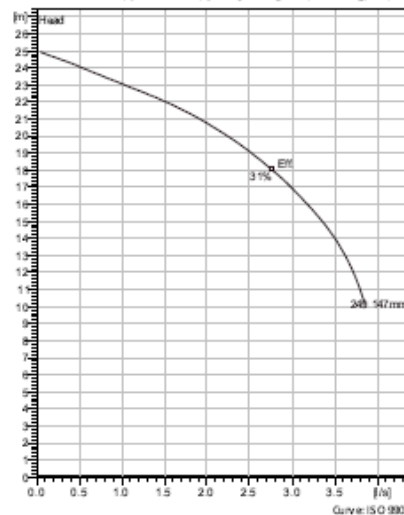
Semi-open multi-channel impellers with integral grinder/cutter in single volute casing for liquids containing solids and fibres.



Technical specification



Curves according to: Water, pure Water, pure [100%], 4 °C, 999.9 kg/m³, 1.5692 mm²/s



Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances. Please consult your local Flygt representative for performance guarantees.

Configuration

Motor number	Installation type
M3085.172 1S-09-2 GL-W	P - Semi permanent, Wet
1.9 KW	
Impeller diameter	Discharge diameter
147 mm	40 mm

Pump information

Impeller diameter
147 mm
Discharge diameter
40 mm
Inlet diameter
40 mm
Maximum operating speed
2915 rpm
Number of blades
6

Material

Impeller
Grey cast iron
Stator housing material
Grey cast iron

Max. fluid temperature
40 °C

Project Xylect-21166677

Created by Steven Hewitt

Created on 9/20/2023 Last update 9/20/2023



LADYCROSS PLANTATION CARAVAN PARK PUMP STATION TECHNICAL DOCUMENT

MP 3085 HT 1~ 249

Performance curve

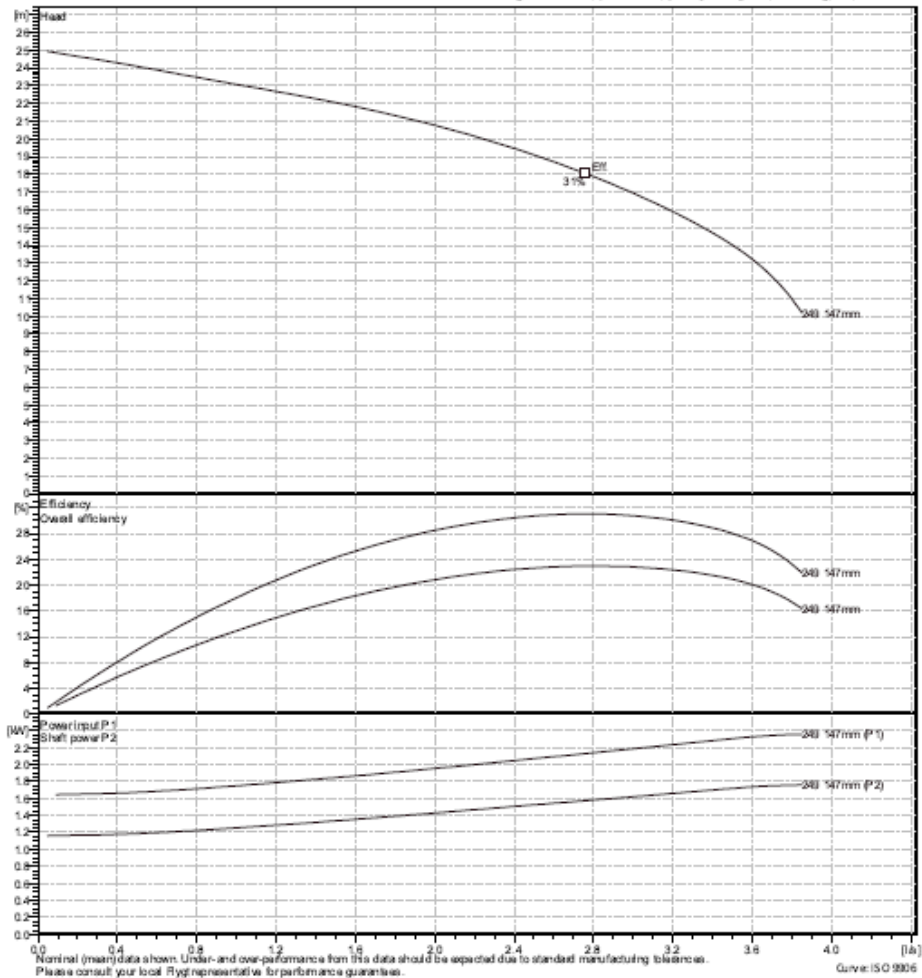
Duty point



Flow

Head

Curves according to: Water, pure Water, pure [100%] 4 °C, 999.9 kg/m³, 1.5652 mm²/s



Xylem: 21166677

Steven Hewitt

Created on 9/20/2023 Last update 9/20/2023

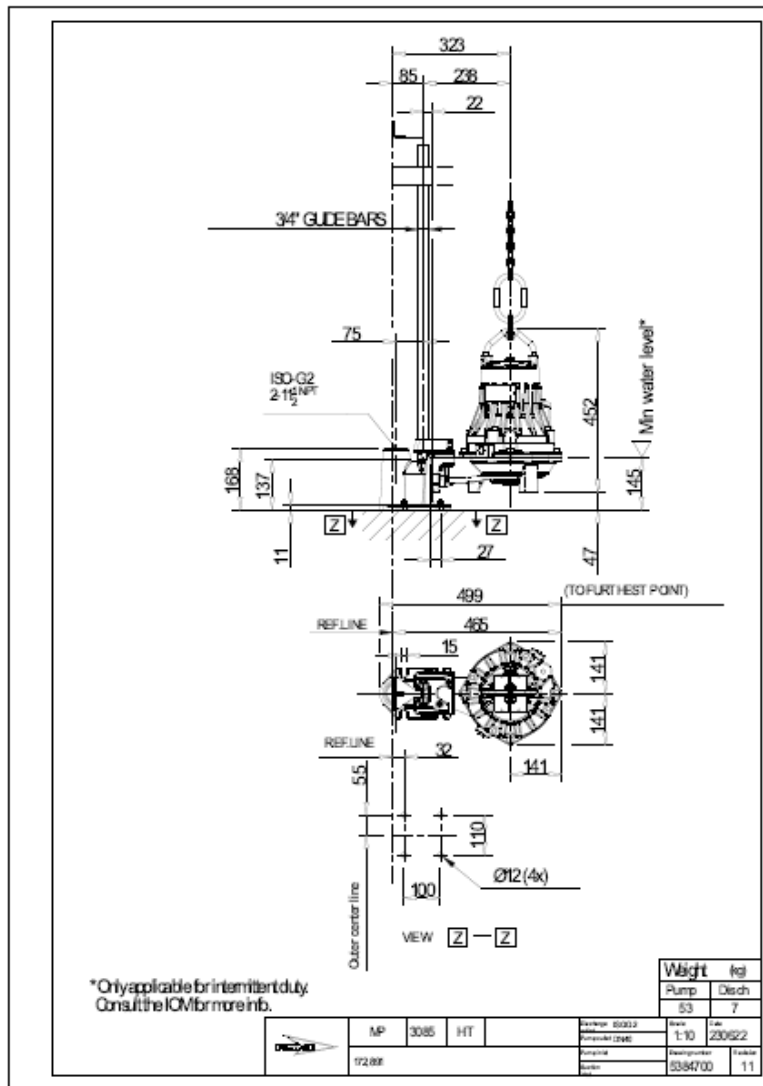


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Pump Dimensional Drawing

MP 3085 HT 1~ 249

Dimensional drawing



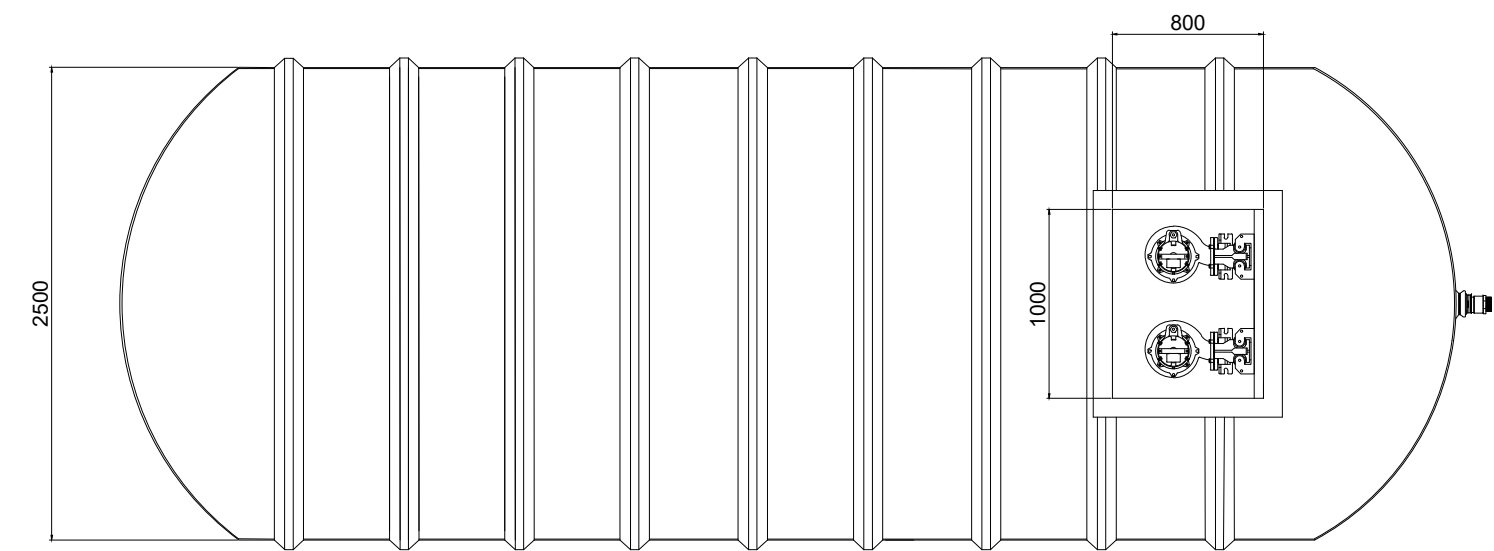
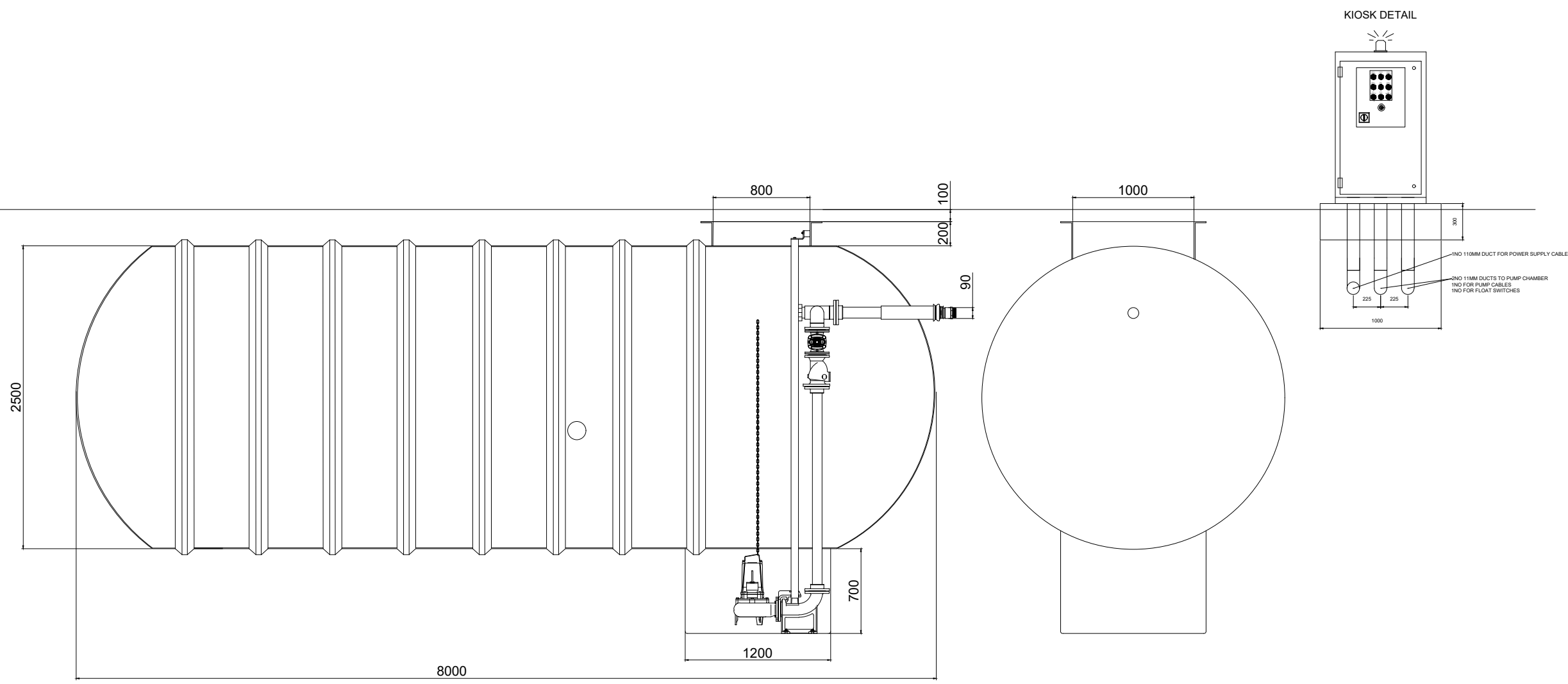
Project: Xylect:21166677 Created by: Steven Hewitt
 Block: Created on: 9/20/2023 Last update: 9/20/2023



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PUMP STATION TECHNICAL DOCUMENT**

**Appendix 18.B
Pumping Station Drawings**

NOTES:
All Dimensions Are In Millimeters (Except Where Otherwise Stated).



REV	DESCRIPTION	BY	CHKD	DATE
A01	FOR APPROVAL	LC	SH	13/09/2023



CLIENT: LADYCROSS PLANTATION

PROJECT: LADYCROSS PLANTATION CARAVAN PARK

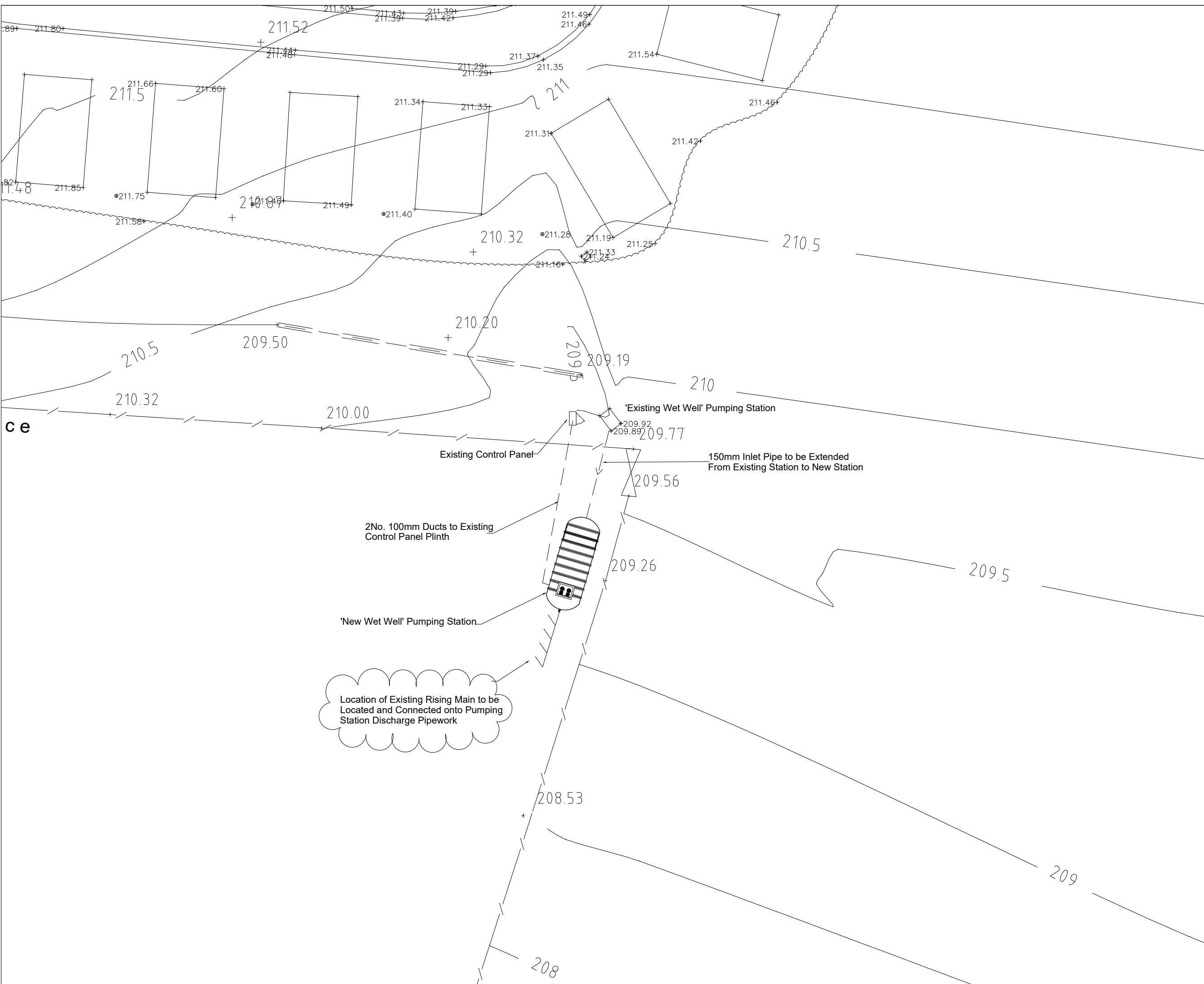
DRAWING TITLE: PUMP STATION GENERAL ARRANGEMENT

SCALE: 1:40	DRAWN: LC	CHECKED: SH	DATE: 13/09/2023
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DRAWING NUMBER: XXXXX-GA-0002	REVISION: A01
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NOTES:
All Dimensions Are In Millimeters (Except Where Otherwise Stated).



A01	FOR APPROVAL	LC	SH	27/09/2023
REV	DESCRIPTION	BY	CHKD	DATE



CLIENT:
LADYCROSS PLANTATION

PROJECT:
LADYCROSS PLANTATION CARAVAN PARK

DRAWING TITLE:
PUMP STATION
PROPOSED SITE LAYOUT

SCALE: 1:250	DRAWN: LC	CHECKED: SH	DATE: 27/09/2023
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DRAWING NUMBER: XXXXX-GA-1001	REVISION: A01
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