

TECHNICAL SUBMISSION

PROJECT

York Gardens, Gosberton

CLIENT

Gleeson Homes (Midlands)

PROJECT REFERENCE

2091-17881

ISSUE

A

Change History

Issue	Revision Description	Date	Engineer	Approved
A	Initial submission to Anglian Water for approval / comment	28.09.2021	E. Weeks	I. Handem

CONTENTS

- 1: Specification
- 2: Discharge Strategy
- 3: Hazardous Area Classification
- 4: Design Inflow and Proposed Discharge
- 5: Emergency Storage
- 6: Rising Main / Surge Analysis
- 7: Retention Times
- 8: Pump Duty and Selection
- 9: Pump Station Layout
- 10: Valve Chamber Drain and Isolation Valve
- 11: Pump and Level Control Cabling
- 12: Control Equipment
- 13: Telemetry Equipment
- 14: Access Covers
- 15: Lifting Equipment
- 16: Inlet Manhole Isolation Valve
- 17: Baffle Plate
- 18: Chamber Access
- 19: Compound Lighting
- 20: Services
- 21: Appendices
 - A. Summary
 - B. Hydraulic Calculations, System and Performance Curves and Pump Dimensions
 - C. Foul Water Emergency Storage Calculations
 - D. Hazardous Area Certification
 - E. Pump Station Drawings
 - F. Wiring Diagrams
 - G. Floodlight and Column
 - H. Anglian Water Local Practice Document Dated 22nd June 2020

1: Specification

Our proposal is based on equipment providing compliance with the Design and Construction Guidance (SSG) Approved Version 2.0, dated 10th March 2020 document as amended by the Anglian Water Local Practice for Pumping Stations document dated 22nd June 2020 as obtained from the Water UK website at the time of this submission. A copy of the Anglian Water Local Practice document is attached for reference in Appendix H.

2: Drainage Strategy

Foul and surface water pump stations are proposed for the site. These are installed in a common compound with a composite control panel for both systems housed in a common GRP kiosk. A single telemetry outstation with expansion card is proposed to communicate the alarm signals.

The foul water pump station is designed to deal with the inflow from 96 domestic dwellings. We propose a pump design discharge rate 4.75L/sec minimum self-cleansing.

For the surface water pump station, the discharge is restricted to 5L/sec. A hydrobrake would be required to be installed upstream of the pump station limiting the inflow to 5L/sec. We have selected pumps to discharge as close to this as possible from duty pump start level. The inflow and outflow therefore in theory match each other and a relatively constant discharge is provided.

A dual pump system is proposed for both pump stations operating on a duty / standby basis

3: Hazardous Area Applications

Application – Foul Water Pumping Station

The pump station is designed to serve the domestic gravity foul inflow from 96 domestic dwellings.

Sewage enters the pump station wet well via a foul water gravity network as designed by the client's consultants Stephen Daykin Consulting Ltd. Details of the foul water drainage including location of the foul water pumping station can be found on drainage layouts supplied under separate cover by them.

Surface water run-off from impermeable areas is being handled by a separate storm water drainage system which also includes a pump station located within the common compound. See following section.

The pumping station transfers the sewage/foul water via a rising main to the public sewer network.

The pumping station compound will have an area designed for the parking of maintenance vehicles/tankers. The pumping station hardstanding is designed to drain to the inlet manhole.

Application – Surface Water Pumping Station

The pump station is designed to serve the surface water from the site. It enters the pump station wet well via a surface water gravity network including attenuation pond as designed by the client's consultants Stephen Daykin Consulting Ltd. Details of the surface water drainage including location of the surface water pumping station can be found on drainage layouts supplied under separate cover by them.

The pumping station transfers the surface water via a rising main to the outfall location.

The pumping station compound will have an area designed for the parking of maintenance vehicles/tankers. The pumping station hardstanding is designed to drain to the foul water inlet manhole.

Flammable atmospheres

Decomposition of raw sewage is not considered a source of explosive atmosphere. The worst-case flammable atmosphere that may exist in a sewage pumping station is hydrocarbon contamination from industrial discharges or tanker spillages. As the actual contaminant is not known the content of the flammable atmosphere cannot be specific but will typically be the lighter more volatile hydrocarbons such as pentane from petrol.

Hazardous area classification

The pumping stations wet wells, and inlet manholes are designated as hazardous areas, due to the risk of contaminated sewage/liquid entering them. The inlet manholes and wet wells have been classified as zone 2 internally as its deemed "As a place in which an explosive atmosphere consisting of a mixture with air or flammable substances in the form of gas, vapours and mists are not likely to occur in normal operation but if it does occur it will only be present for a short period of time only". As the wet well and valve chamber are linked via the drainpipe and can potentially share an atmosphere, we have also classified the valve chamber as a Zone 2 environment.

A Zoning Plan is shown on drawing 2091-17881-008.

Equipment category and certification

All new equipment intended to be located in an area classified as zone 1, has to be certified as equipment **group II category 2 G** equipment (or better). For zone 2 the new equipment shall be certified as equipment **group II category 3 G** equipment (or better). Please refer to Appendix D for the manufacturer's certificates for the equipment within the Hazardous Area as defined.

4: Design Inflow and Proposed Discharge

Foul Water

The pump station is designed to deal with the foul water inflow from 96 domestic dwellings.

Based on the Anglian Water criteria of dry weather inflow equalling 125 litres per person with 2.35 persons per property plus a 25% allowance for infiltration we calculate the DWF per property to be 367.19 litres which for 96 properties equals 0.41L/sec. Anglian Waters required pump rate is 4 times Dry Weather Flow (DWF) which equates to a minimum pump discharge rate of 1.63L/sec.

For a scheme we propose a minimum discharge of 4.75L/sec in order to attain a self-cleansing velocity a 110mm OD PE100 SDR11 rising main with 89.1mm ID used in conjunction with 80mm nominal bore pump station pipework and valves.

Surface Water

A 5L/sec restricted discharge rate from the pump station has been requested. We have selected pumps to provide as close as this as possible at duty pump start level

Common

For both systems we are proposing fixed speed pumps so there will be a variance in discharge across the operating range. We would refer you to Section 6 which details the actual discharge rate from the pumps at key operating levels.

5: Emergency Storage

Foul Water

The Anglian Water design criteria requests the emergency storage be 4 hours at DWF. For 96 dwellings, this equates to 5.875m³.

Anglian Water preference is for storage to be provided within the adoptable system including pumping station below the invert level of the lowest private connected lateral at the adoptable end.

From the site data provided, we located the private manhole adjacent to plot 74 off the main adoptable manhole F5 with invert level of -0.042m. We have utilised this figure as the maximum storage level.

We would refer you to the storage calculations in Appendix C. There is 0.490m³ of storage in the manholes and no storage within the pipe runs. On the basis the wet well is sized for normal pump capacity plus the bulk of the storage, this would contribute a further 5.691m³. This gives a total storage of 6.181m³ which is approximately 5.2% more than the amount required.

Surface Water

Stephen Daykin Consulting Ltd have designed the surface water system and will provide supporting calculations for both emergency and attenuation storage.

6: Rising Main and Surge Analysis

Foul Water

Our proposal is based on the use of a 110mm OD PE100 SDR11 pressure pipe with an 89.1mm nominal bore.

The rising main is 170.15m long with a low point at a chainage of 29.649m, and a high point at the valve chamber.

Sewage Rated Air release valve will be installed in the valve chamber and a wash out chamber will be provided at the intermediate low point. Further details of the Air Valve and wash out pipework can be found on the PDAS drawings within Appendix E.

On the basis the rising main is less than 500m as referred to within the DCG Guidance we don't intend to prepare a surge analysis report in this instance.

Surface Water

Our proposal is based on the use of a 110mm OD PE100 SDR11 pressure pipe with an 89.1mm nominal bore.

The rising main is 192.074m long with a low point at a chainage of 23.971m, and high points at the valve chamber and at a chainage of 179.002m.

Sewage Rated Air Release Valves will be provided at the pipeline peaks and a wash out chamber will be provided at the intermediate low point. Further details of the Air Valves and wash out pipework can be found on the PDAS drawings within Appendix E.

On the basis the rising main is less than 500m as referred to within the DCG Guidance we don't intend to prepare a surge analysis report in this instance.

7: Retention Time

Foul Water

Our calculations indicate that with the development half completed the retention time in the system is 3.00 hours and when fully completed 1.50 hours.

Both are considerably less than the 6-hour period after which septicity is considered a problem, so we don't intend to install any septicity suppression equipment on this site. If problems are encountered with septicity in the early stages of the development, then they will be dealt with by temporary measures.

Surface Water

Septicity would not be an issue as not dealing with foul water.

8: Pump Duty and Selection

Foul Water

From the information provided we calculate the pump duty from pump stop to be a self-cleansing flow rate of 4.75L/sec against a total head of 6.07m for which we have selected submersible sewage pumps from the Sulzer XFP80C VX range which are fitted with vortex impellers capable of passing an 80mm solid and 2.2kW explosion-proof motors, designed to operate from a 400V, three phase and neutral power supply.

These pumps would provide the following theoretical discharge rates from key operating levels.

<i>Operating Level</i>	<i>Discharge Rate (L/sec)</i>
Pump Stop	4.96
Mid Water Level	5.10
Duty Pump Start	5.24
Standby Pump Start	5.36
High Level Alarm	5.44
Wet Well Inlet	6.15
Maximum Storage Level	6.33

Surface Water

From the information provided we calculate the pump duty from duty pump start to be 5L/sec against a total head of 6.32m for which we have selected submersible pumps from the Sulzer XFP80C VX range which are fitted with vortex impellers capable of passing an 80mm solid and 2.2W explosion-proof motors, designed to operate from a 400V, three phase and neutral power supply.

These pumps would provide the following theoretical discharge rates from key operating levels.

<i>Operating Level</i>	<i>Discharge Rate (L/sec)</i>
Pump Stop	5.59
Mid Water Level	5.67
Duty Pump Start	5.82
Standby Pump Start	5.88
High Level Alarm	5.94
Wet Well Inlet	6.12
Maximum Storage Level	n/a

Common

All pumps as standard are fitted with a seal leakage detection system monitored via relays in the control panel.

All pumps would be supplied with the Anglian Water's approved nylon rope lifting system.

We have attached our hydraulic calculations, system curves and pump performance details in Appendix B.

9: Pump Station Layout

The pumps, pipework and valves would be installed within concrete chambers constructed by the civil contractors to a layout as shown on drawings 2091-17881-001 to 011. Please refer to Appendix C for drawings.

The non-return valves would be fitted with levers, weights and guards and the gate valves would be fitted with extension spindles.

The pump stations pipework would terminate a short distance outside the valve chambers in a 100mm PN16 flange from where provision of the rising mains and connecting it to the pump stations pipework would be the responsibility of scheme civil contractor.

10: Valve Chamber Drain and Isolation Valve

An 80mm valve chamber drain would be installed with a gate valve with extension spindle installed over this in the valve chambers. It is intended in normal operation this gate valve would remain closed.

11: Pump and Level Control Cabling

Pumps and level controls for each station would be wired back to the control panel via above ground termination boxes as shown on our attached drawings.

12: Control Equipment

Automatic level control for each station would be via Pulsar Zenith ultrasonic level controllers augmented by 2 separate float switches (per station) for high level and back up control, all wired back to a composite multi compartment control panel complying with the Construction Design Guide as amended by the Anglian Water Addendum Local Practice.

The composite control panel would be installed within a roadside GRP kiosk of dimensions 3500mm wide x 750mm deep x 1750 high which would have a separate compartment to house the electricity board meters. Please refer to Appendix D for wiring diagrams and kiosk layout.

13: Telemetry Equipment

Anglian Waters latest MMIM Mk5 (MMIMGPRS1D+) telemetry outstation would be installed prior to adoption to monitor both pump stations. This unit uses GPRS communications to transmit the alarm signals and as part of the package offered direct by Anglian Water would include the SIM card and one-year tariff.

14: Access Covers

Steelway Prolift FACTA B access covers and frames would be provided for the wet wells and valve chambers. The access covers have torsion spring assisted lift lids and internal safety grids for fall protection. In line with the Anglian Water Local Practice Document, we don't intend to provide these covers with demountable barriers and posts.

For the inlet manholes we are proposing a D400 ductile iron cover.

The access cover dimensions are as follows.

<i>Chamber</i>	<i>Cover Type</i>	<i>Opening Dimensions</i>
Inlet Manholes	D400 Ductile Iron	675 x 675mm
Wet Wells	Steelway Prolift FACTA B	1500 x 900mm (Single Lid)
Valve Chambers	Steelway Prolift FACTA B	2400 x 1800mm (Multi Lid)

115: Lifting Equipment

Cast in type davit sockets suitable for a Reid Porta Davit rated for 500kg SWL would be supplied for installation by civil contractor in the position as shown on the PDAS drawings.

It is not intended to provide a dedicated davit for this site assuming would be carried on the service provider's maintenance vehicles.

16: Inlet Manhole Isolation Valve

A wall mounting cast iron penstock valve would be mounted in the inlet manhole over the outgoing 150mm sewer to the wet wells. The penstock will be complete with a non-rising spindle, spindle support brackets, tee key and top box.

17: Baffle Plate

A stainless-steel baffle plate will be installed over the inlet sewer in each of the wet wells.

18: Chamber Access

In accordance with Clause D7.7.5 of the Construction Design Guidance Document a pair of stainless-steel eyebolts would be provided in the inlet manholes and wet wells as restraints for temporary ladder access to the chambers.

A stainless-steel access ladder with retractable handhold would be installed in the valve chambers.

19: Compound Lighting

Energy efficient floodlights mounted on 4m poles would be supplied and positioned as shown on our drawings. Please see Appendix E for details. We are proposing the floodlight pole would be of the hinged type to ease ongoing maintenance.

20: Services

It would be the responsibility of our client to provide a suitably rated 400 volt 3 Phase and neutral power supply to the control panel.

The telemetry will use GPRS communications subject to there being suitable network coverage. Our drawings show a spare duct for the telecom line capped at the site boundary for future use if required should a GPRS signal not be available.

21: Appendices

Appendix A Summary

Data Summary - Foul Water Pump Station

Liquid Handled	Foul Water
Number of Pumps	2
Control Philosophy	Duty / Standby
Capacity per Pump (L/sec)	4.75
Head Generated (m)	6.07
Pump Manufacturer	Sulzer
Pump Type	XFP80C VX PE22/4
Impeller Type / Reference	Vortex / VX.4 (171mm)
Solids Handling (mm)	80
Hazardous Area Rating of Pump	EXP
Motor Rating (kW)	2.2
Speed (rpm)	1440
Electric Supply	230/400V 50Hz, 3 Phase
Full Load Current (Amps)	4.6
Method of Starting	Direct On Line
Length of Cables	20
Level Controls	Pulsar Zenith Ultrasonic plus high level and back up float switches
Wet Well Diameter (mm)	2400
Wet Well Depth (m)	5.6
Station Pipes and Valves (mm)	80
Station Final Discharge Pipe (mm)	80/100 PN16 Flanged
Pump Station Pipe Material	Ductile Iron
Rising Main	110mm OD PE100 SDR11 (89.1mm Bore)
Access Covers	Inlet Manhole 675 x 675mm D400 Ductile Iron Wet Well 1500 x 900mm Steelway Prolift FACTA B (Single Lid) Valve Chamber 2400 x 1800mm Steelway Prolift FACTA B (Multi Lid)
Inlet Penstock	150mm Cast Iron in inlet manhole
General Arrangement Drawings	2091-17881 – 001 - 011

Data Summary - Surface Water Pump Station

Liquid Handled	Surface Water
Number of Pumps	2
Control Philosophy	Duty / Standby
Capacity per Pump (L/sec)	5
Head Generated (m)	6.32
Pump Manufacturer	Sulzer
Pump Type	XFP80C VX PE22/4
Impeller Type / Reference	Vortex / VX.3 (180mm)
Solids Handling (mm)	80
Hazardous Area Rating of Pump	EXP
Motor Rating (kW)	2.2
Speed (rpm)	1440
Electric Supply	230/400V 50Hz, 3 Phase
Full Load Current (Amps)	4.6
Method of Starting	Direct On Line
Length of Cables	20
Level Controls	Pulsar Zenith Ultrasonic plus high level and back up float switches
Wet Well Diameter (mm)	2100
Wet Well Depth (m)	5.8
Station Pipes and Valves (mm)	80
Station Final Discharge Pipe (mm)	80/100 PN16 Flanged
Pump Station Pipe Material	Ductile Iron
Rising Main	110mm OD PE100 SDR11 (89.1mm Bore)
Access Covers	Inlet Manhole 675 x 675mm D400 Ductile Iron Wet Well 1500 x 900mm Steelway Prolift FACTA B (Single Lid) Valve Chamber 2400 x 1800mm Steelway Prolift FACTA B (Multi Lid)
Penstock	150mm Cast Iron in inlet manhole
General Arrangement Drawings	2091-17881 – 001 - 011

Materials Specification

Pump Station Type	Submersible – Guiderail Mounted Pumps
Base Specification	Design and Construction Guidance (SSG) Approved Version 2.0, dated 10th March 2020
Addendum	Anglian Water Local Practice for Pumping Stations document dated 22nd June 2020

PUMP:

Single stage fully submersible pump with cast iron case and impeller, which is securely locked to the fully protected motor shaft extension. Impeller as data section.

SEAL CHAMBER:

Buffer chamber between pump and motor, charged with oil retained by opposing seals.

MOTOR:

Squirrel cage induction motor of watertight IP68 enclosure suitable for continuous service and having Klixon lock out circuit for over-temperature protection on Explosion Proof motors.

CABLE:

Suitable length(s) of multi-core VRI PCP sheathed flexible cable connected through watertight gland(s) to the motor windings.

DUCKFOOT:

Cast iron floor fixing duckfoot bend (or pedestal with elbow) incorporating guiderail socket(s) and self locating boltless pump quick release coupling.

GUIDERAILS:

Galvanised Mild Steel rail(s) for attachment to cover slab or ground level steelwork and extending to duckfoot sockets. Complete with necessary location brackets.

LIFTING LOCATION SYSTEM:

Nylon lifting rope for pulling into position certified lifting chains carried by Anglian Water personnel.

REFLUX VALVE:

Fullway pattern delivery non-return valve.

SLUICE VALVE:

Fullway pattern isolating sluice valve with non-rising spindle and cap top.

PIPES:

From duckfoot through to defined point for rising main connection, incorporating the valves and, in case of multi-pump system, an appropriately sized manifold. All fitting connections appropriate to materials employed.

LEVEL CONTROLS: For Each Pump Station

Pulsar Zenith ultrasonic level control unit as data sheet complete with submersible transducer, bracket and cable to control panel, with float switches for ultrasonic backup control and high-level alarm functions.

JUNCTION BOX KIOSK: *For Each Pump Station*

GRP, floor fixing, single door weatherproof lockable enclosure in deep green textured finish, provisional dimensions 1250H x 750W x 400D containing a full sized backboard on which would be mounted / provided:-

- a) Individual junction boxes for Pump 1, Pump 2 and level controls.

COMMON MCC KIOSK:

GRP, floor fixing, three roadside type weatherproof lockable enclosure in deep green textured finish, provisional dimensions 1750H x 3500W x 750D containing a full sized backboard on which would be mounted / provided:-

- a) Anglian Water composite control panel as specified
- b) Anti condensation heater and thermostat
- c) Interior light and switch
- d) Set of suitably rated double insulated cable tails for connection to Electricity Board meters
- e) Space for the mounting of Electricity Board meters
- f) Anglian Water Telemetry MMIM Mk5 (MMIMGPRS1D+)

The whole of the above being suitably interconnected and earth bonded extended to all non-conductive steelwork within the pump station in 16mm² cable to provide a complete PME system.

GENERATOR EARTH:

Comprising a copper electrode to be driven into the ground adjacent to the control kiosk, a concrete inspection pit and interconnecting cable to the panel.

FLOODLIGHT AND COLUMN: *For Each Pump Station*

Energy efficient flood light mounted on a 4m high hinged lamp post complete with cabling back to the control panel a maximum 5m away

ACCESS COVERS: *For Each Pump Station*

Inlet Chamber – 675 x 675mm clear opening D400 Ductile Iron

Wet Well – Steelway Stamp Lock Prolift Access Cover and Frame providing a clear opening of 1500mm x 900mm (Single Lid) complete with torsion spring assisted lift galvanised steel lids, self-locating safety stays, recessed pad lock facility, 2 no turn catch locking devices, hinged internal safety grids for fall protection.

Valve Chamber – Steelway Stamp Lock Prolift Access Cover and Frame providing a clear opening of 2400mm x 1800mm (Multi Lid) complete with torsion spring assisted lift galvanised steel lids, self-locating safety stays, recessed pad lock facility, 2 no turn catch locking devices, hinged internal safety grids for fall protection.

LIFTING EQUIPMENT: *For Each Pump Station*

1 – Cast in Type Davit Socket and cover plate to suit Reid Porta-Davit 500kg SWL.

NOTE: *If lifting equipment is supplied site load testing of items cast into cover slab by ground-workers is excluded from our offer.*

INLET PENSTOCK: *For Each Pump Station*

Cast iron wall fixing penstock in accordance with BS7775 with copper alloy faces, rebate invert and stainless steel non rising screw stem terminating in a cap direct on frame. Plated mild steel construction bolts/nuts with Galvanised Mild Steel extension spindle and support brackets and surface box. Clockwise closing. Bitumen coated.

BAFFLE PLATE: *For Each Pump Station*

Stainless steel baffle plate of size to suit incoming sewer.

VALVE CHAMBER ACCESS LADDER: *For Each Pump Station*

Stainless steel access ladder with retractable hand hold and adjustable feet.

ANCILLARY EQUIPMENT: *For Each Pump Station*

1. Pressure tappings on pump discharge leg non-return valves
2. 100mm Female Bauer coupling on over pumping tee
3. Rubber matting in control panel kiosk
4. Sign indicating pump station data fitted within the control kiosk
5. Three copies of operating and maintenance manuals plus drawings or one electronic copy prepared in PDAS standard format encompassing both pumping stations
6. Air valve Double orifice sewage rated air release valve plus isolating gate valve with bevel gear box installed in the valve chamber and at rising main high point
7. Washout pipework for installation at the rising main low points

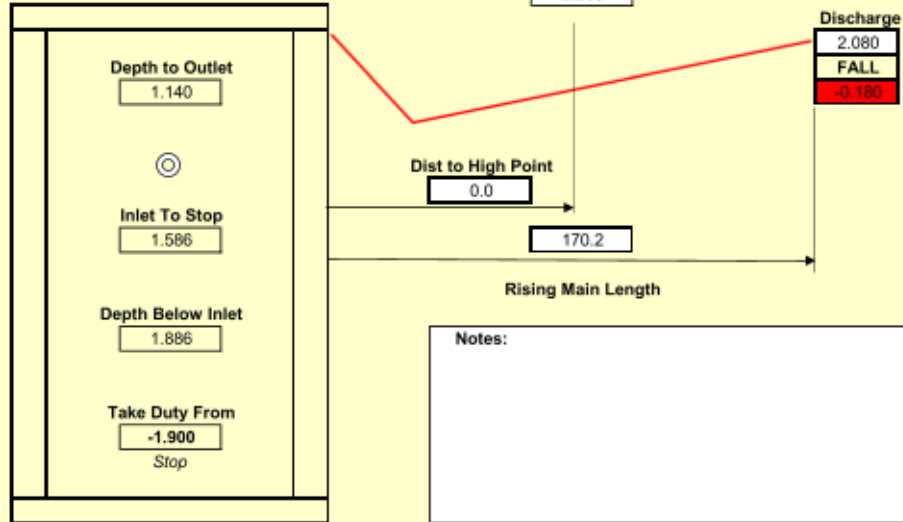
Appendix B
Hydraulic Calculations, System Curves and Performance Curves and Dimensional Data

Foul Water Pump Station

Client's Name	Gleeson Homes (Midlands)
Site Address	York Gardens, Gosberton
Adopting Authority	Anglian Water
Pump Station Type	Foul
Number of Dwellings	96
Non Domestic Area (m2)	
Non Domestic Rate (L/s Hectare)	
Number of Pumps	2
Number of Duty Pumps	1

Design Flow / Rising Main	
Dry Flow AWA	0.41 L/sec
Pump Discharge Rate AWA	1.63 L/sec
Pump Discharge Rate	4.75 L/sec
Rising Main Material	PE100
Rising Main Pressure Rating	SDR11
Rising Main O.D.	110 mm
Rising Main I.D.	89.1 mm
Velocity in Main	0.76 m/sec
Surge Analysis	NOT REQUIRED

Cover Level	3.400
VC Outlet	2.260
Max Storage	-0.042
Inlet	-0.314
HLA	-1.300
P2 Start	-1.400
P1 Start	-1.550
Mid Water	-1.725
Stop Level	-1.900
Dead Area	300
Base Level	-2.200



Wet Well	
Wet Well Diameter	2400 mm
Calc Chamber Depth	5.376 m
Volume Per M	4,523.89 litres
Depth Between Starts	150 mm
Actual Chamber Depth	5.600 m
Theoretical Op Volume	570.00 litres
Actual Op Volume	680.76 litres
Max Theoretical Starts	7.50
Actual Starts	6.56

Retention Calculations	
DWF Inflow Per Day	35,250.00 litres
Rising Main Volume	1,060.91 litres
Combined Main and Op Vol	1,741.66 litres
No. of Main Clears per Day	20.24
Retention Full Usage	1.19 Hours
Retention Half Usage	2.37 Hours

Retention calcs assume ascending rising main

Storage	
Domestic @ AWA Rates	5.875 m³
Industrial 1 Hr @ Design Flow	0.000 m³
Total Required Storage	5.875 m³
Capacity in Gravity System	0.490 m³
Capacity between HLA & inlet	4,460.56 litres

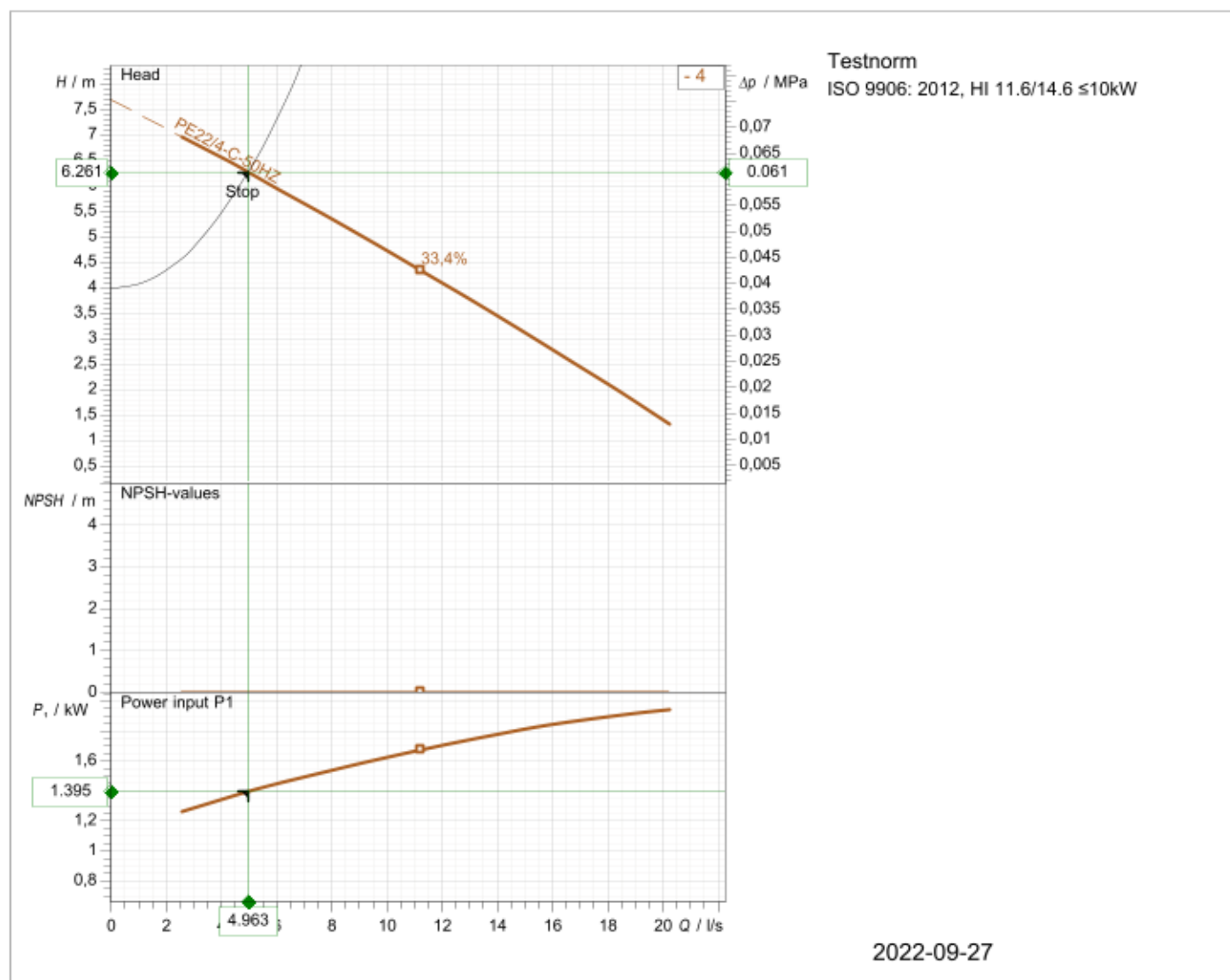
	Rising Main	Common 3	Common 2	Common 1	Individual 3	Individual 2	Individual 1
Flow Rate (L/sec)	4.75	4.75	4.75	4.75	4.75	4.75	4.75
Static Head (m)	3.98						
Pipe Diameter (mm)	89.10	100	80	80	80	80	80
Velocity (m/sec)	0.76	0.60	0.94	0.94	0.94	0.94	0.94
Roughness Factor	0.30	0.30	0.30	0.30	0.30	0.30	0.30
Pipe length (m)	170.15					9.460	
Duckfoot Bend							1
Short Radius Bends						1	
Long Radius Bends						1	
Tee Straight through		1				3	
Tee through branch							
Radial Tee thro Branch							
Sluice Valve						1	
Non Return Valve						1	
Bellmouth Inlet							
Sharp Taper							
Standard Taper						1	
Equivalent Pipe Length (m)	170.150	1.100	0.000	0.000	0.000	22.180	2.720
Reynolds Number	5.9E+04	5.3E+04	6.6E+04	6.6E+04	6.6E+04	6.6E+04	6.6E+04
Darcy-Weisbach Friction Factor	0.0290	0.0285	0.0296	0.0296	0.0296	0.0296	0.0296
Velocity Head	0.030	0.019	0.045	0.045	0.045	0.045	0.045
Hydraulic (Piezometric) gradient	0.0096	0.0053	0.0168	0.0168	0.0168	0.0168	0.0168
Friction Head Loss	1.639	0.006	0.000	0.000	0.000	0.373	0.046

Calc Duty Point	
Flow	4.75 L/sec
Static Head	3.98 m
Total Head	6.07 m

Pump Selection	
Pump Type	XFP80C VX PE22/4
Impeller	VX.4 (171mm)
kW Rating	2.2

Actual Duty	
Flow	4.96 L/sec
Head	6.26 m

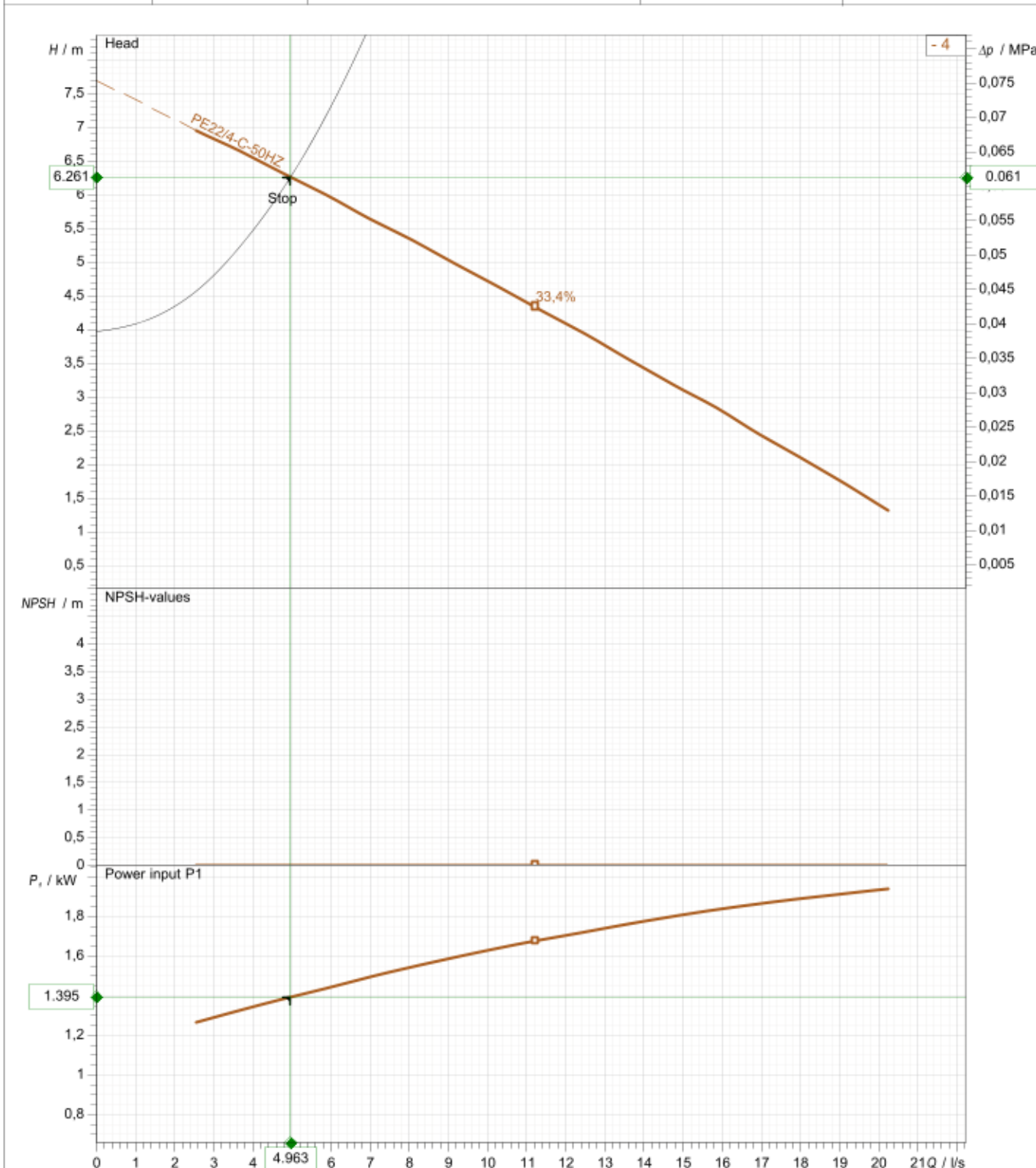
XFP 80C VX 50HZ



Operating data specification			
Flow	4,96 l/s	Head	6,26 m
Efficiency	23,6 %	Shaft power	1,22 kW
NPSH	0 m	Fluid	Water
Temperature	20 °C	Nature of system	Single head pump
No. of pumps	1		
Pump data			
Type	XFP 80C VX 50HZ	Make	SULZER
Series	XFP PE1-PE3	Impeller	Vortex impeller
N° of vanes	6	Impeller size	171 mm
Free passage	80 mm	Suction flange	DN80
Discharge flange	DN80	Type of installation	Wet Well installation with pedestal
Motor data			
Rated voltage	400 V	Frequency	50,0 Hz
Rated power P2	2,2 kW	Nominal Speed	1440 1/min
Number of poles	4	Efficiency	86,8 %
Power factor	0,8	Rated current	4,6 A
Starting current	29,8 A	Rated torque	14,6 Nm
Starting torque	21,2 Nm	Degree of protection	IP 68
Insulation class	H	No. starts per hour	15

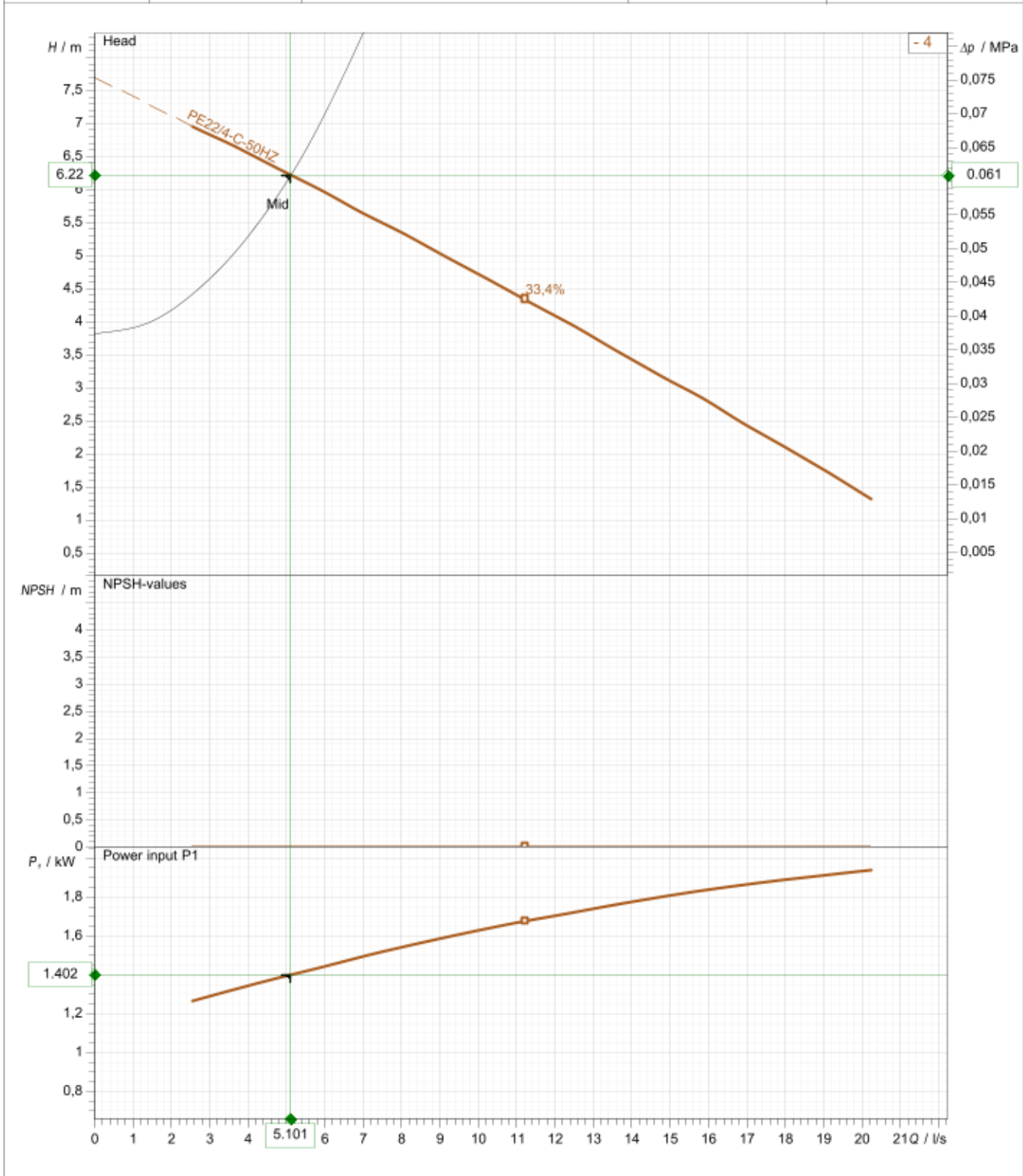
Curve number	Pump performance curves XFP 80C VX 50HZ			SULZER
Reference curve XFP80C-VX 50HZ				

			Discharge DN80	Frequency 50 Hz
Density 998,3 kg/m ³	Viscosity 1,005 mm ² /s	Testnorm ISO 9906: 2012, HI 11.6/14.6 ≤10kW	Rated speed 1471 1/min	Date 2022-09-27
Flow 4,96 l/s	Head 6,26 m	Rated power 1,22 kW	Hydraulic efficiency 23,6 %	NPSH 0 m



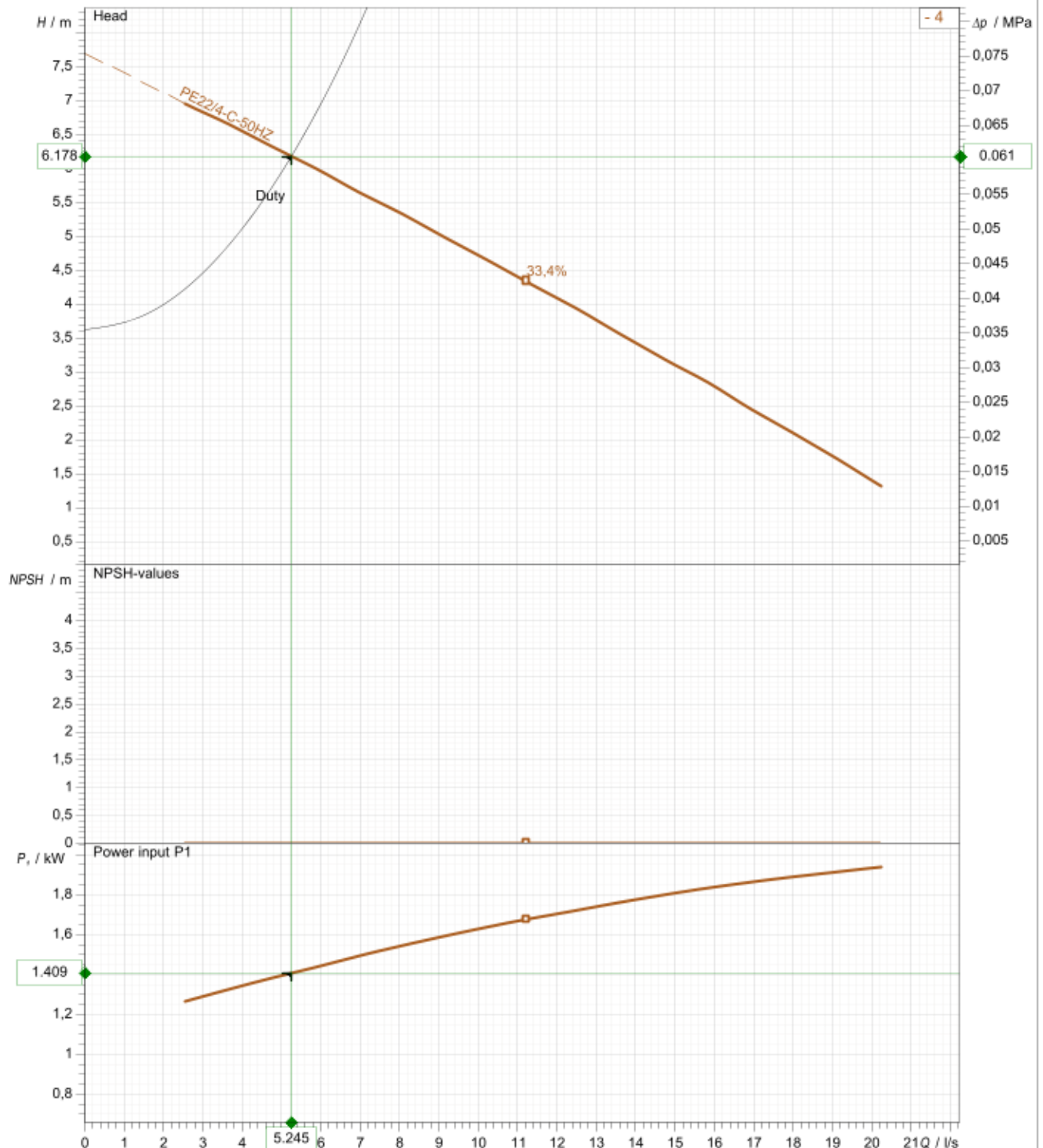
Impeller size 171 mm	N° of vanes 6	Impeller Vortex impeller	Solid size 80 mm	Revision
-------------------------	------------------	-----------------------------	---------------------	----------

Curve number		<div>Pump performance curves</div> <div>XFP 80C VX 50HZ</div> <div>SULZER</div>		
Reference curve XFP80C-VX 50HZ				
			Discharge DN80	Frequency 50 Hz
Density 998,3 kg/m³	Viscosity 1,005 mm²/s	Testnorm ISO 9906: 2012, HI 11.6/14.6 ≤10kW	Rated speed 1471 1/min	Date 2022-09-27
Flow 5,1 l/s	Head 6,22 m	Rated power 1,22 kW	Hydraulic efficiency 24 %	NPSH 0 m



Impeller size 171 mm	N° of vanes 6	Impeller Vortex impeller	Solid size 80 mm	Revision
-------------------------	------------------	-----------------------------	---------------------	----------

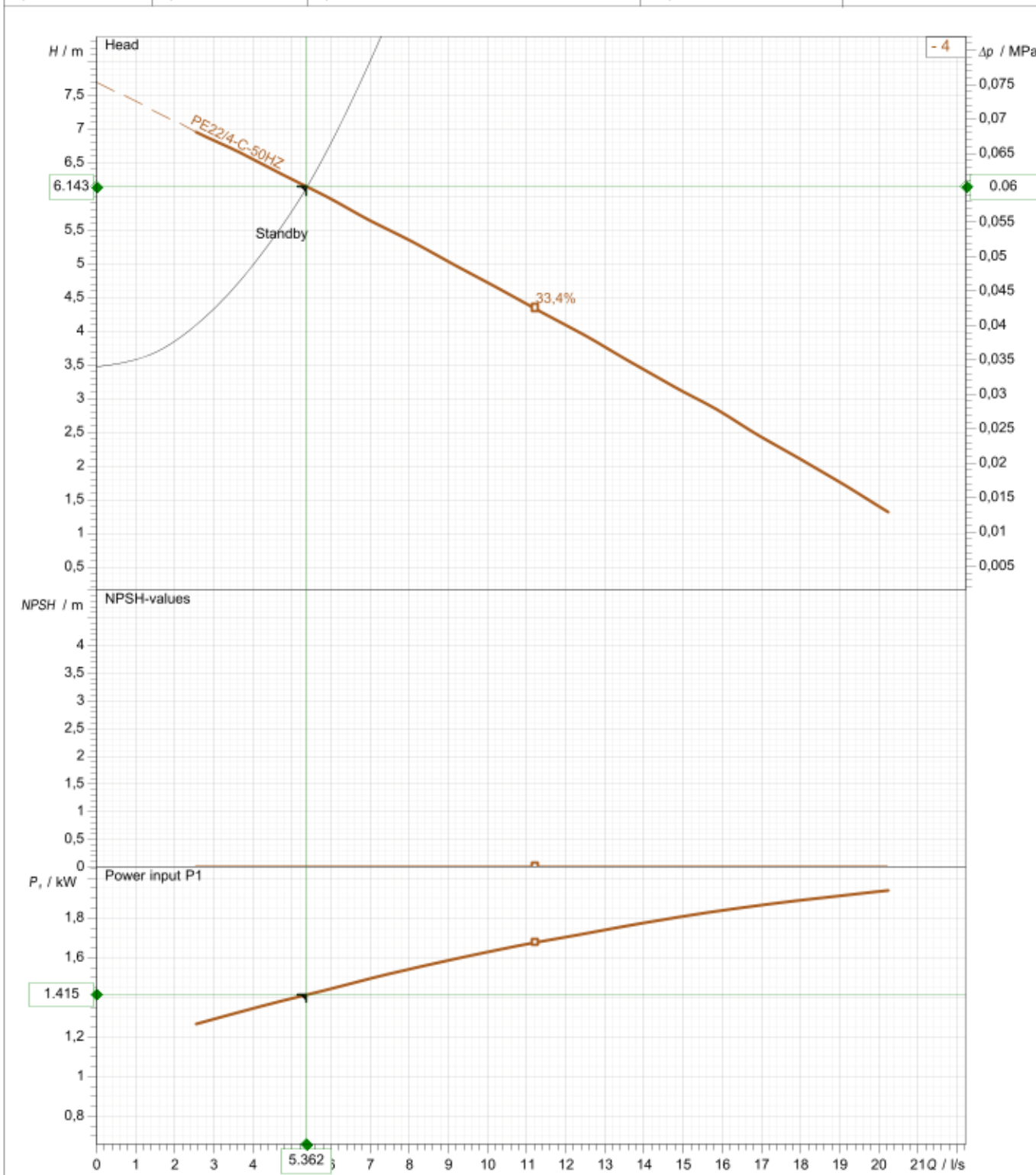
Curve number		<div>Pump performance curves</div> <div>XFP 80C VX 50HZ</div>			<div>SULZER</div>
Reference curve XFP80C-VX 50HZ					
			Discharge DN80	Frequency 50 Hz	
Density 998,3 kg/m³	Viscosity 1,005 mm²/s	Testnorm ISO 9906: 2012, HI 11.6/14.6 ≤10kW	Rated speed 1470 1/min	Date 2022-09-27	
Flow 5,24 l/s	Head 6,18 m	Rated power 1,23 kW	Hydraulic efficiency 24,4 %	NPSH 0 m	



Impeller size 171 mm	N° of vanes 6	Impeller Vortex impeller	Solid size 80 mm	Revision
-------------------------	------------------	-----------------------------	---------------------	----------

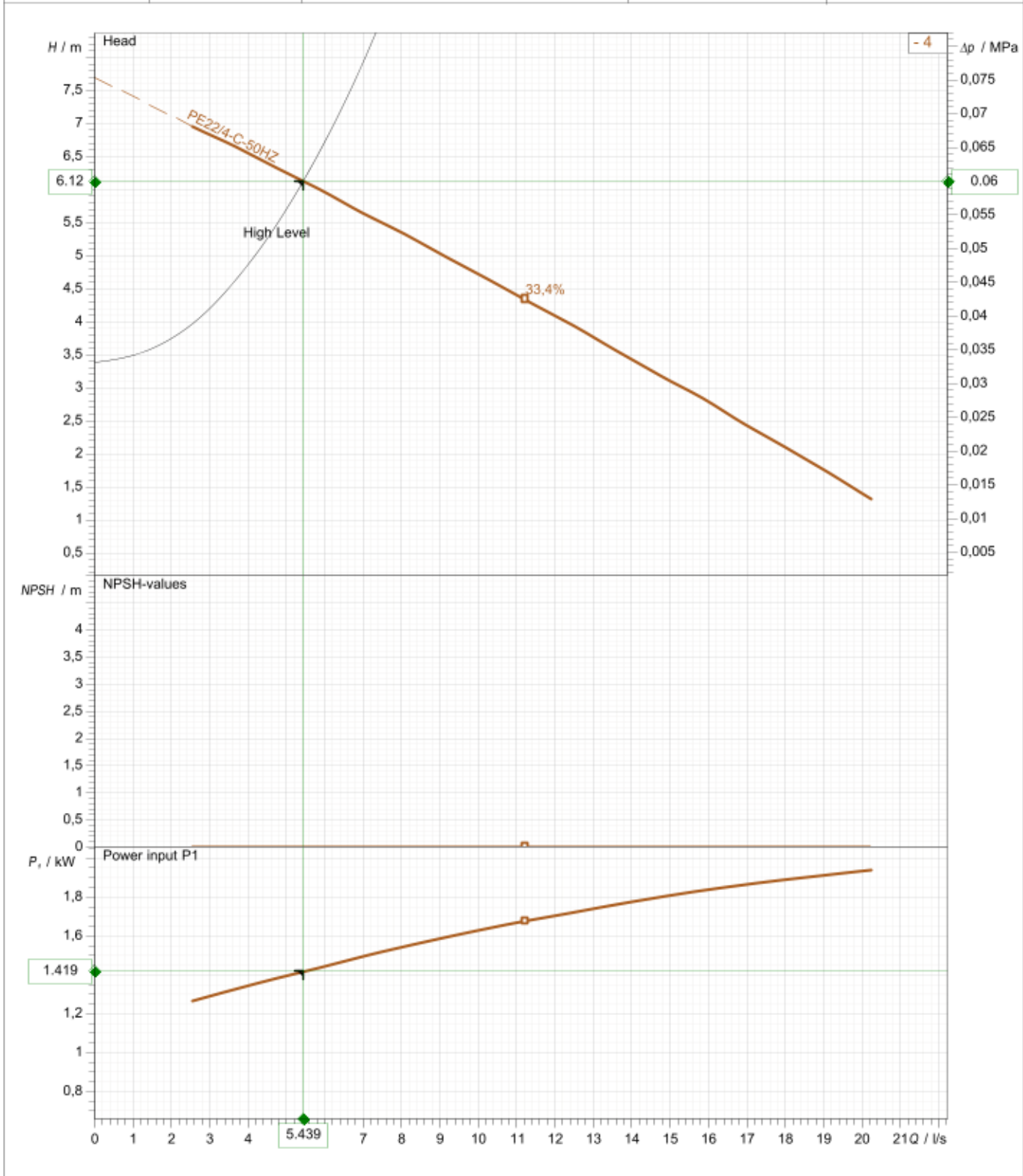
Curve number	Pump performance curves XFP 80C VX 50HZ	
Reference curve XFP80C-VX 50HZ		

			Discharge DN80	Frequency 50 Hz
Density 998,3 kg/m ³	Viscosity 1,005 mm ² /s	Testnorm ISO 9906: 2012, HI 11.6/14.6 ≤10kW	Rated speed 1470 1/min	Date 2022-09-27
Flow 5,36 l/s	Head 6,14 m	Rated power 1,24 kW	Hydraulic efficiency 24,8 %	NPSH 0 m



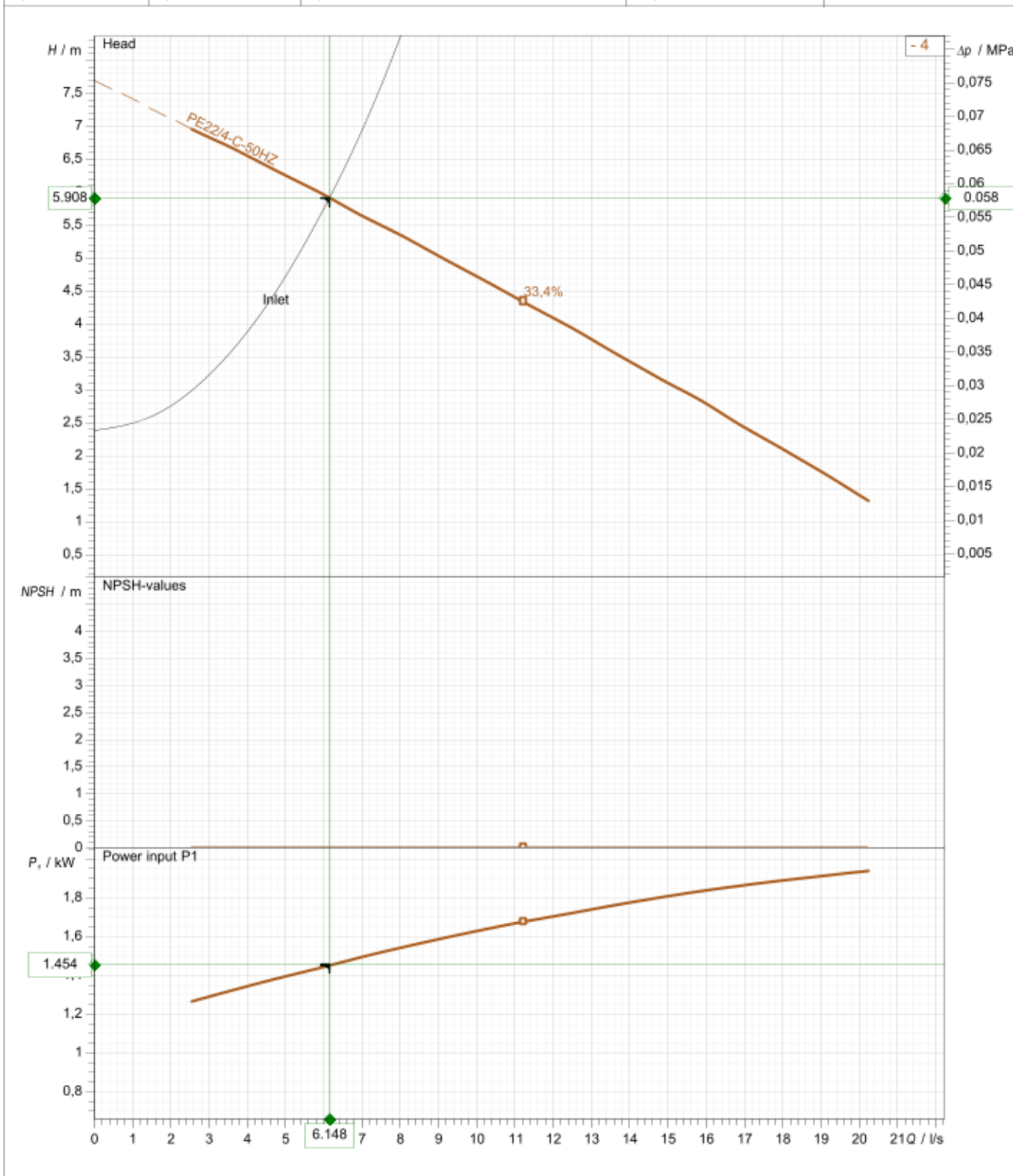
Impeller size 171 mm	N° of vanes 6	Impeller Vortex impeller	Solid size 80 mm	Revision
-------------------------	------------------	-----------------------------	---------------------	----------

Curve number		<div>Pump performance curves</div> <div>XFP 80C VX 50HZ</div>			<div>SULZER</div>
Reference curve XFP80C-VX 50HZ					
			Discharge DN80	Frequency 50 Hz	
Density 998,3 kg/m³	Viscosity 1,005 mm²/s	Testnorm ISO 9906: 2012, HI 11.6/14.6 ≤10kW	Rated speed 1470 1/min	Date 2022-09-27	
Flow 5,44 l/s	Head 6,12 m	Rated power 1,24 kW	Hydraulic efficiency 25 %	NPSH 0 m	



Impeller size 171 mm	N° of vanes 6	Impeller Vortex impeller	Solid size 80 mm	Revision
-------------------------	------------------	-----------------------------	---------------------	----------

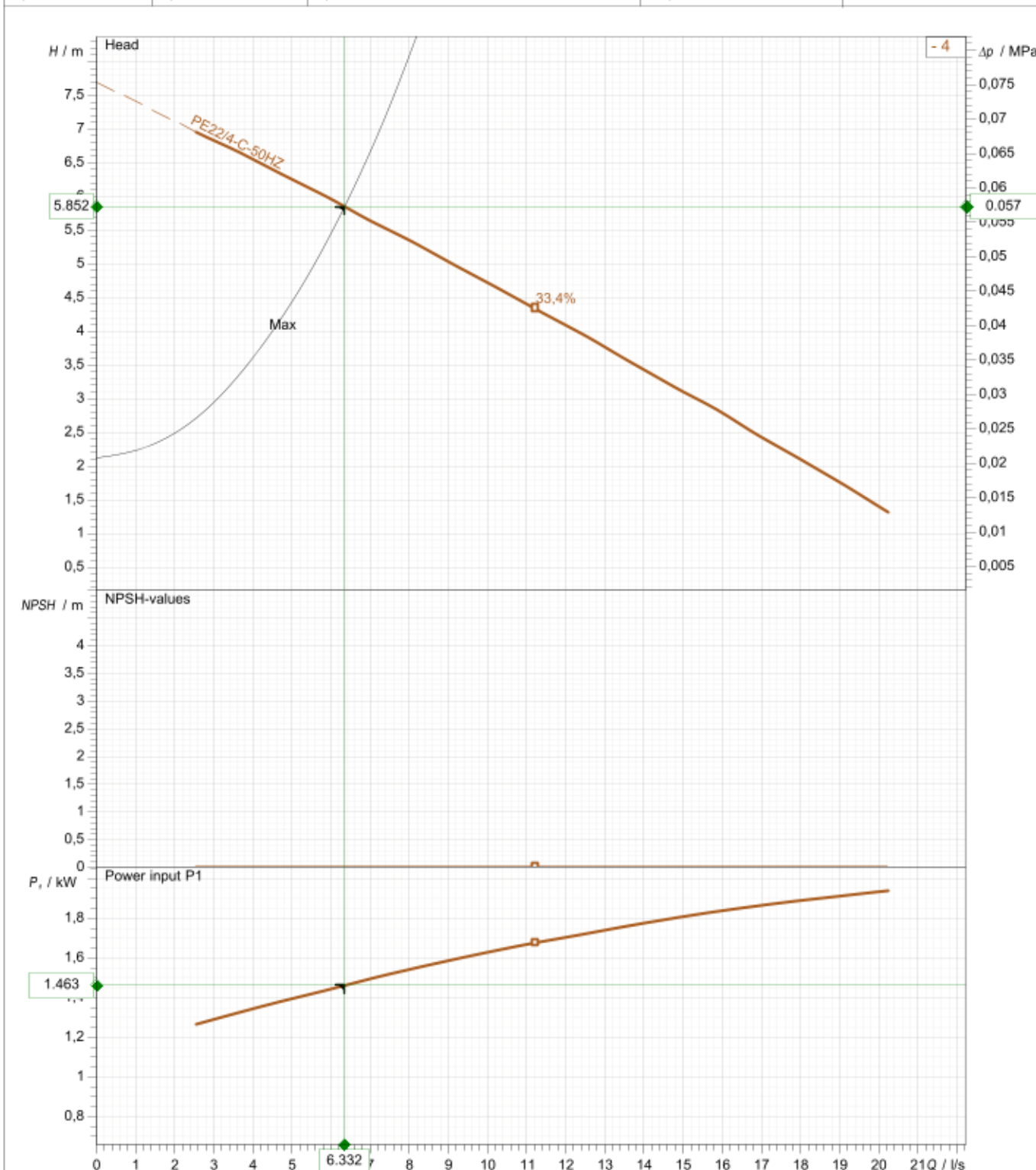
Curve number		<div>Pump performance curves</div> <div>XFP 80C VX 50HZ</div>			<div>SULZER</div>
Reference curve XFP80C-VX 50HZ					
			Discharge DN80	Frequency 50 Hz	
Density 998,3 kg/m³	Viscosity 1,005 mm²/s	Testnorm ISO 9906: 2012, HI 11.6/14.6 ≤10kW	Rated speed 1469 1/min	Date 2022-09-27	
Flow 6,15 l/s	Head 5,91 m	Rated power 1,27 kW	Hydraulic efficiency 26,9 %	NPSH 0 m	



Impeller size 171 mm	N° of vanes 6	Impeller Vortex impeller	Solid size 80 mm	Revision
-------------------------	------------------	-----------------------------	---------------------	----------

Curve number	Pump performance curves XFP 80C VX 50HZ			SULZER
Reference curve XFP80C-VX 50HZ				

			Discharge DN80	Frequency 50 Hz
Density 998,3 kg/m ³	Viscosity 1,005 mm ² /s	Testnorm ISO 9906: 2012, HI 11.6/14.6 ≤10kW	Rated speed 1469 1/min	Date 2022-09-27
Flow 6,33 l/s	Head 5,85 m	Rated power 1,28 kW	Hydraulic efficiency 27,4 %	NPSH 0 m



Impeller size 171 mm	N° of vanes 6	Impeller Vortex impeller	Solid size 80 mm	Revision
-------------------------	------------------	-----------------------------	---------------------	----------

Frequency
50 Hz

Motor performance curve

SULZER

PE22/4-C-50HZ

Rated power
2,2 kW

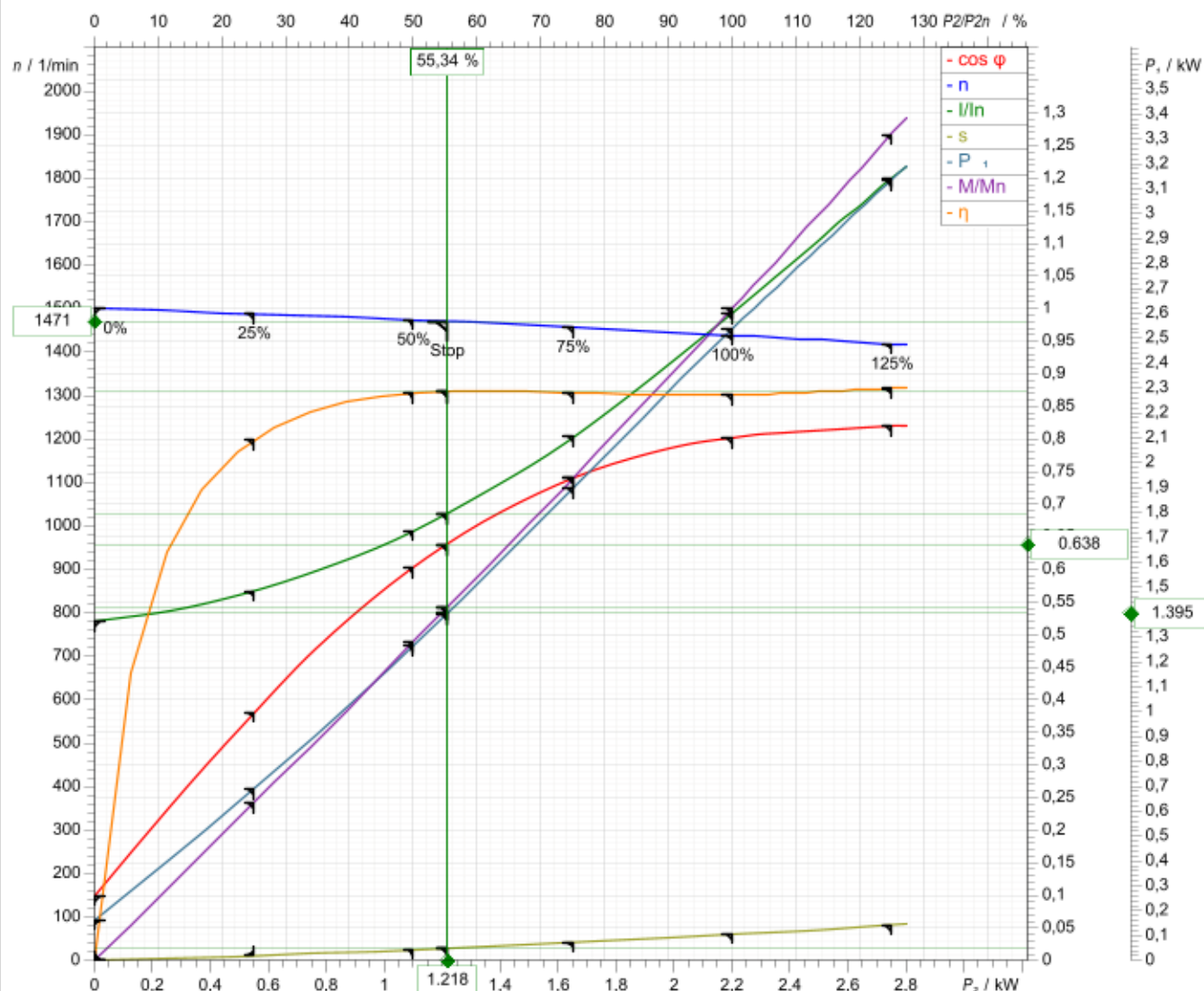
Service factor
1

Nominal Speed
1440 1/min

Number of poles
4

Rated voltage
400 V

Date
2022-09-27



Symbol	No loac	25 %	50 %	75 %	100 %	125 %
P_2 / kW	0	0,55	1,1	1,65	2,2	2,75
P_1 / kW	0,1646	0,6889	1,264	1,895	2,534	3,135
η / %	0	79,84	87,05	87,08	86,81	87,74
n / 1/min	1500	1489	1474	1457	1439	1419
$\cos \varphi$	0,09926	0,3813	0,6017	0,7398	0,8016	0,8195
I / A	2,394	2,608	3,031	3,697	4,564	5,52
s / %	0	0,7635	1,719	2,839	4,09	5,418
M / Nm	0	3,528	7,125	10,81	14,6	18,51

Tolerance according to VDE 0530 T1 12.84 for rated power

Starting current 29,8 A	Starting torque 21,2 Nm	Moment of inertia 0,008 kg m ²	No. starts per hour 15	
----------------------------	----------------------------	--	---------------------------	--

Sulzer reserves the right to change any data and dimensions without prior notice and can not be held responsible for the use of information contained in this software.

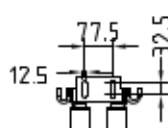
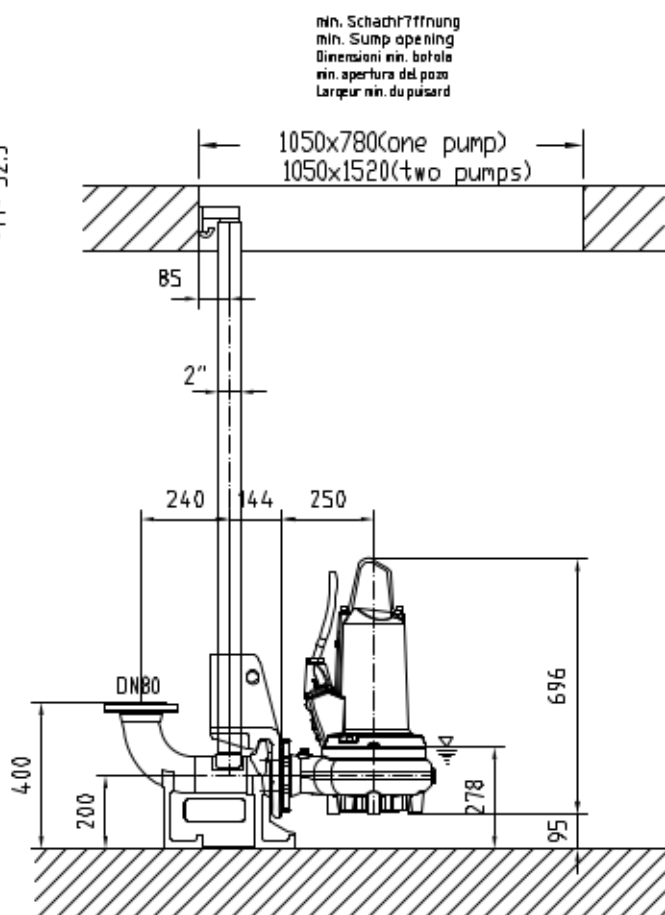
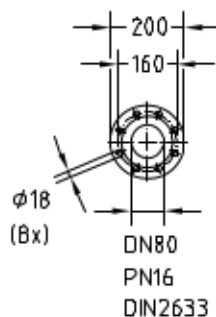
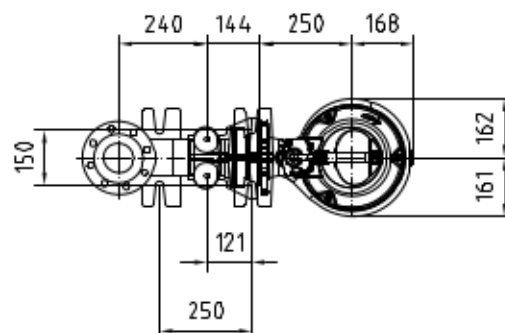
Spaix® 4, Version 4.3.4 - 2016/12/07 (Build 546)
Data version Dec-2016

S.I.

Typ Type Tipo	Gewicht Weight Poids Peso (kg)
PE 15/4	95.5
PE 22/4	97.5
PE 29/4	100.0

60 Hz

Typ Type Tipo	Gewicht Weight Poids Peso (kg)
PE 18/4W	95.5
PE 22/4	97.5
PE 28/4W	97.5
PE 35/4	100.0



Gewicht: Beinhaltet Pumpe und Halterung
Weight: Includes pump and slider bracket
Il peso include il pezzo intermedio
Peso: Incluye bomba y una
Poids: Pompe et coulisseau

Guss-Allgemeintoleranzen nach DIN1680 - GTB16
General tolerances for castings in acc. to DIN1680-GTB16
Tolleranze generali delle fusioni secondo DIN1680-GTB16
Tolerancias generales para la fundición seg. de DIN1680-GTB16
Tolérance générale de la fonderie selon DIN1680-GTB16

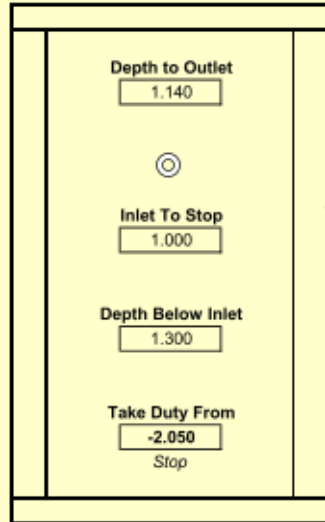
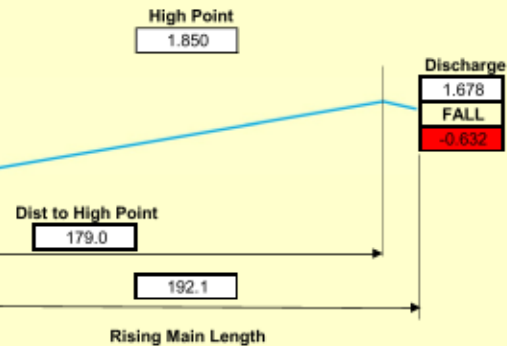
Surface Water Pump Station

Clients Name	Gleeson Homes (Midlands)
Site Address	York Gardens, Gosberton

Adopting Authority	Anglian Water
Pump Station Type	Surface Water
Number of Dwellings	
Non Domestic Area (m2)	
Non Domestic Rate (L/s Hectare)	
Number of Pumps	2
Number of Duty Pumps	1

Design Flow / Rising Main	
Dry Flow AWA	0.00 L/sec
Pump Discharge Rate AWA	0.00 L/sec
Pump Discharge Rate	5 L/sec
Rising Main Material	PE100
Rising Main Pressure Rating	SDR11
Rising Main O.D.	110 mm
Rising Main I.D.	89.1 mm
Velocity in Main	0.80 m/sec
Surge Analysis	NOT REQUIRED

Cover Level	3.450
VC Outlet	2.310
Max Storage	-1.050
Inlet	-1.050
HLA	-1.350
P2 Start	-1.450
P1 Start	-1.600
Mid Water	-1.825
Stop Level	-2.050
Dead Area	300
Base Level	-2.350



Notes:

Wet Well	
Wet Well Diameter	2100 mm
Calc Chamber Depth	5.523 m
Volume Per M	3,463.61 litres
Depth Between Starts	150 mm
Actual Chamber Depth	5.800 m
Theoretical Op Volume	600.00 litres
Actual Op Volume	1,558.62 litres
Max Theoretical Starts	7.50
Actual Starts	3.23

Retention Calculations	
DWF Inflow Per Day	0.00 litres
Rising Main Volume	1,197.61 litres
Combined Main and Op Vol	2,756.23 litres
No. of Main Clears per Day	0.00
Retention Full Usage	#DIV/0! Hours
Retention Half Usage	#DIV/0! Hours

Retention calcs assume ascending rising main

Storage	
Domestic @ AWA Rates	0.000 m³
Industrial 1 Hr @ Design Flow	0.000 m³
Total Required Storage	0.000 m³
Capacity in Gravity System	m³
Capacity between HLA & inlet	1,039.08 litres

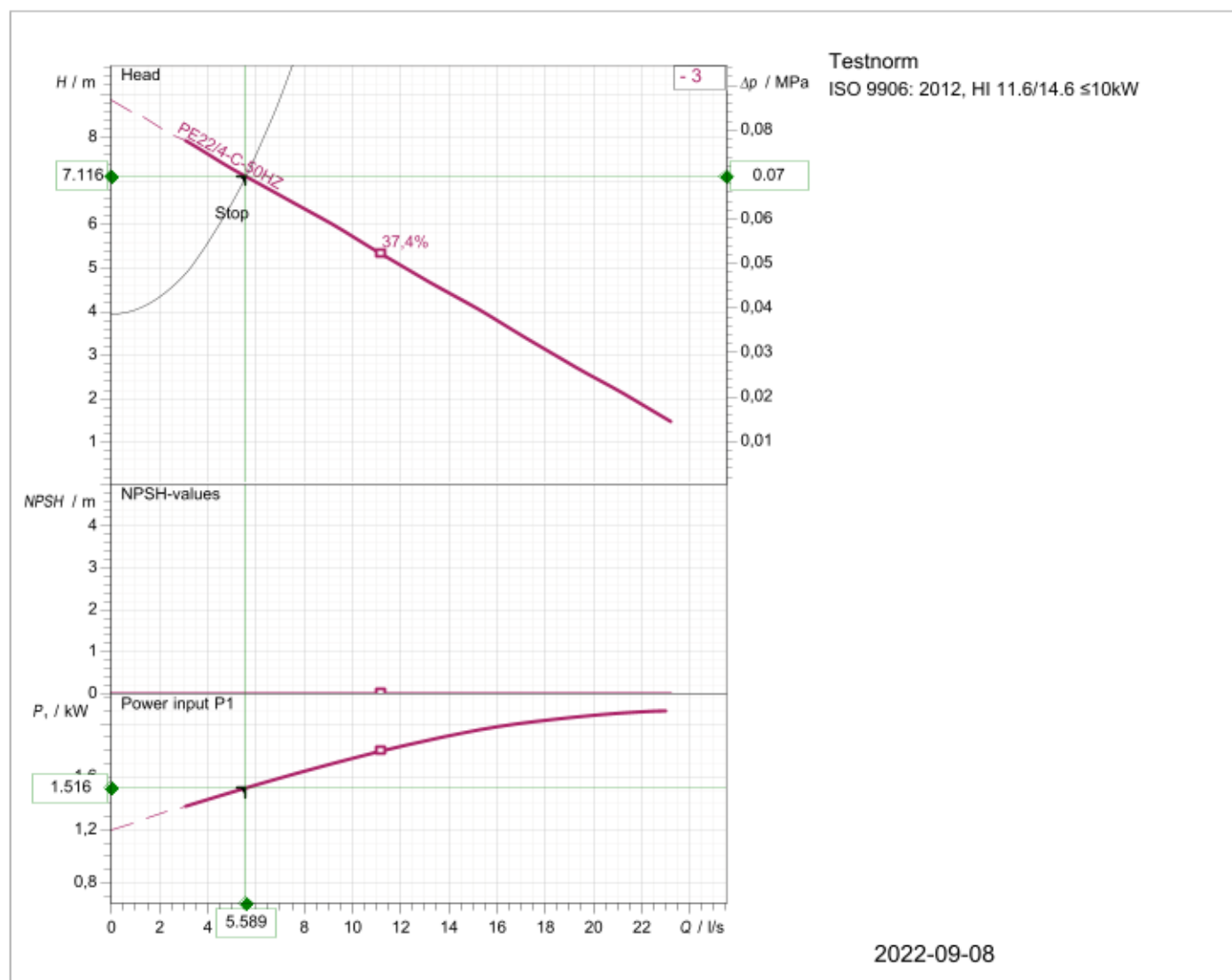
	Rising Main	Common 3	Common 2	Common 1	Individual 3	Individual 2	Individual 1
Flow Rate (L/sec)	5.00	5.00	5.00	5.00	5.00	5.00	5.00
Static Head (m)	3.90						
Pipe Diameter (mm)	89.10	100	80	80	80	80	80
Velocity (m/sec)	0.80	0.64	0.99	0.99	0.99	0.99	0.99
Roughness Factor	0.30	0.30	0.30	0.30	0.30	0.30	0.30
Pipe length (m)	179.002					9.660	
Duckfoot Bend							1
Short Radius Bends						1	
Long Radius Bends						1	
Tee Straight through		2				3	
Tee through branch							
Radial Tee thro Branch							
Sluice Valve						1	
Non Return Valve						1	
Bellmouth Inlet							
Sharp Taper							
Standard Taper						1	
Equivalent Pipe Length (m)	179.002	2.200	0.000	0.000	0.000	22.380	2.720
Reynolds Number	6.3E+04	5.6E+04	7.0E+04	7.0E+04	7.0E+04	7.0E+04	7.0E+04
Darcy-Weisbach Friction Factor	0.0289	0.0284	0.0295	0.0295	0.0295	0.0295	0.0295
Velocity Head	0.033	0.021	0.050	0.050	0.050	0.050	0.050
Hydraulic (Piezometric) gradient	0.0106	0.0059	0.0186	0.0186	0.0186	0.0186	0.0186
Friction Head Loss	1.905	0.013	0.000	0.000	0.000	0.416	0.051

Calc Duty Point	
Flow	5.00 L/sec
Static Head	3.90 m
Total Head	6.32 m

Pump Selection	
Pump Type	XFP80C VX PE22/4
Impeller	VX.3 (180mm)
kW Rating	2.2

Actual Duty	
Flow	5.59 L/sec
Head	7.12 m

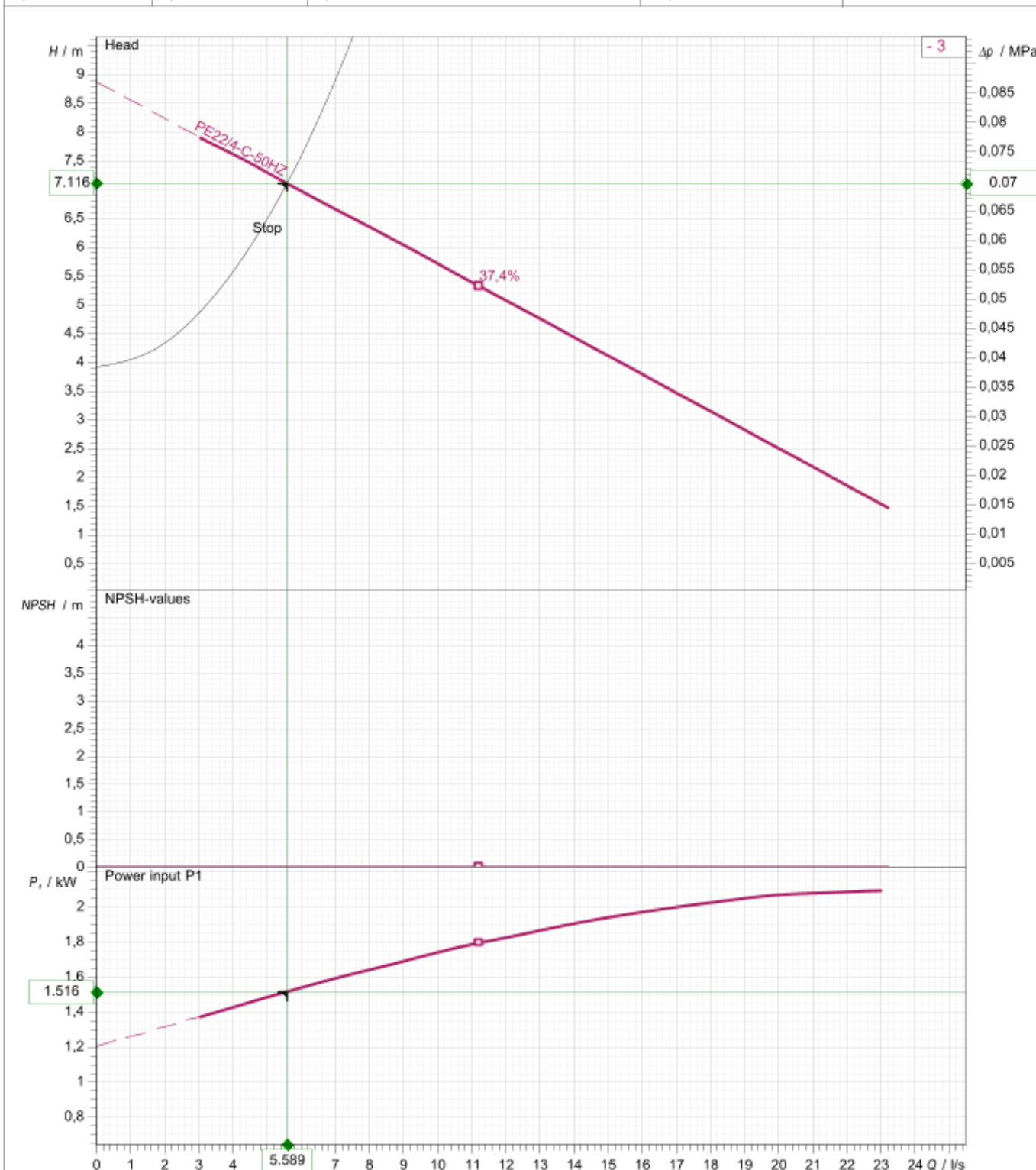
XFP 80C VX 50HZ



Operating data specification			
Flow	5,59 l/s	Head	7,12 m
Efficiency	29,9 %	Shaft power	1,32 kW
NPSH	0 m	Fluid	Water
Temperature	20 °C	Nature of system	Single head pump
No. of pumps	1		
Pump data			
Type	XFP 80C VX 50HZ	Make	SULZER
Series	XFP PE1-PE3	Impeller	Vortex impeller
N° of vanes	6	Impeller size	180 mm
Free passage	80 mm	Suction flange	DN80
Discharge flange	DN80	Type of installation	Wet Well installation with pedestal
Motor data			
Rated voltage	400 V	Frequency	50,0 Hz
Rated power P2	2,2 kW	Nominal Speed	1440 1/min
Number of poles	4	Efficiency	86,8 %
Power factor	0,8	Rated current	4,6 A
Starting current	29,8 A	Rated torque	14,6 Nm
Starting torque	21,2 Nm	Degree of protection	IP 68
Insulation class	H	No. starts per hour	15

Curve number	Pump performance curves XFP 80C VX 50HZ			SULZER
Reference curve XFP80C-VX 50HZ				

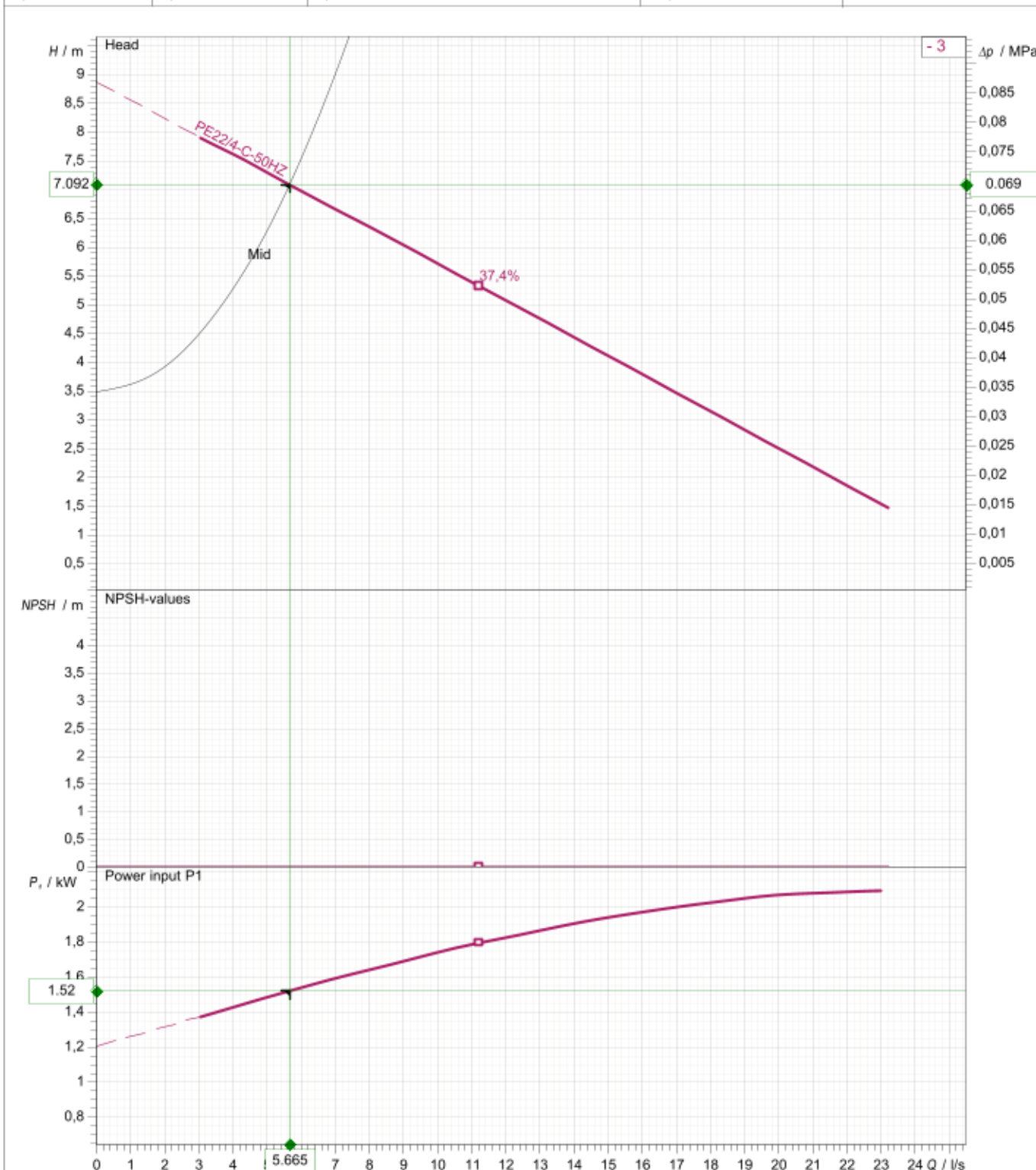
			Discharge DN80	Frequency 50 Hz
Density 998,3 kg/m ³	Viscosity 1,005 mm ² /s	Testnorm ISO 9906: 2012, HI 11.6/14.6 ≤10kW	Rated speed 1468 1/min	Date 2022-09-08
Flow 5,59 l/s	Head 7,12 m	Rated power 1,32 kW	Hydraulic efficiency 29,9 %	NPSH 0 m



Impeller size 180 mm	N° of vanes 6	Impeller Vortex impeller	Solid size 80 mm	Revision
-------------------------	------------------	-----------------------------	---------------------	----------

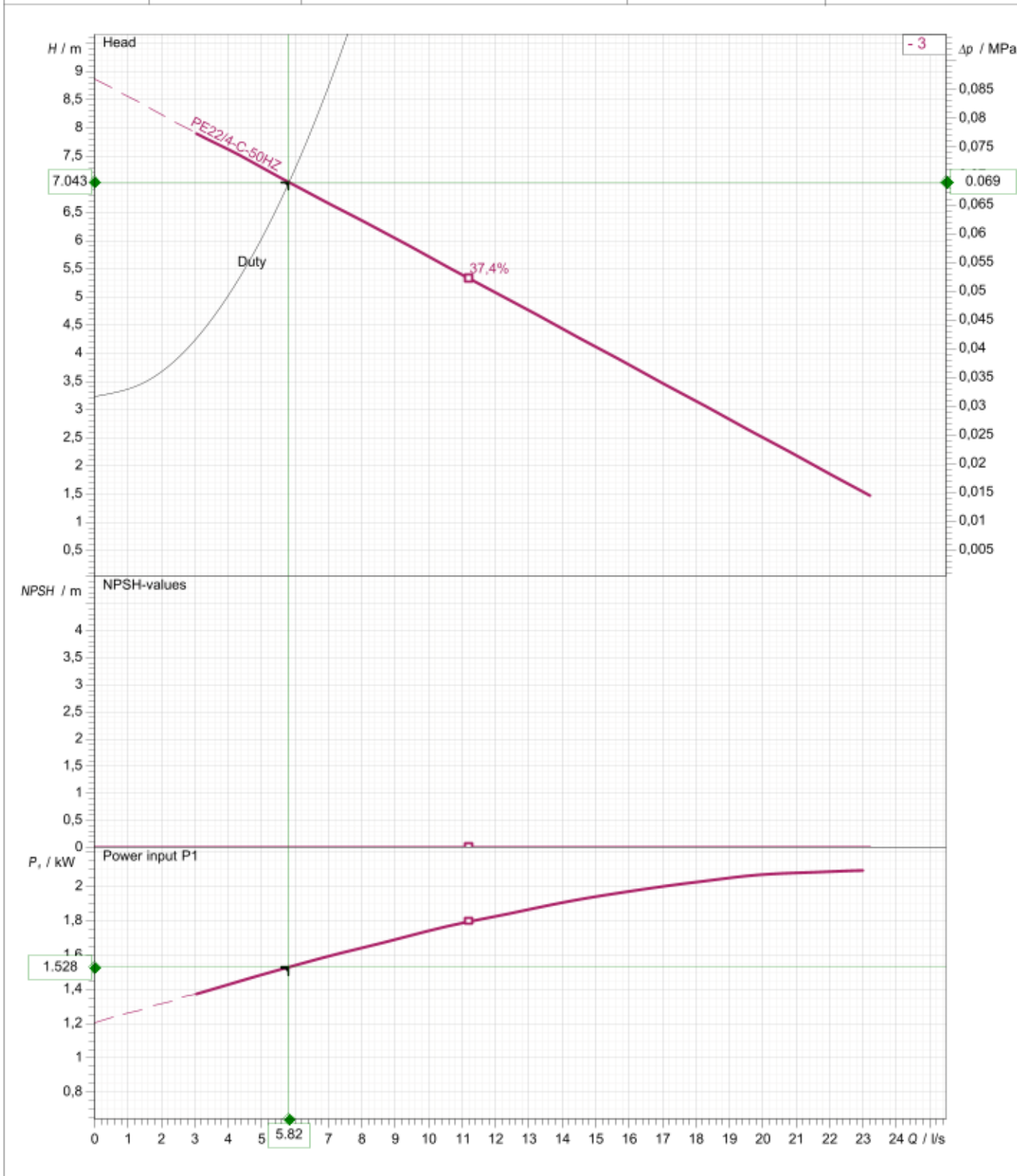
Curve number	Pump performance curves XFP 80C VX 50HZ			SULZER
Reference curve XFP80C-VX 50HZ				

			Discharge DN80	Frequency 50 Hz
Density 998,3 kg/m ³	Viscosity 1,005 mm ² /s	Testnorm ISO 9906: 2012, HI 11.6/14.6 ≤10kW	Rated speed 1468 1/min	Date 2022-09-22
Flow 5,66 l/s	Head 7,09 m	Rated power 1,33 kW	Hydraulic efficiency 30,1 %	NPSH 0 m



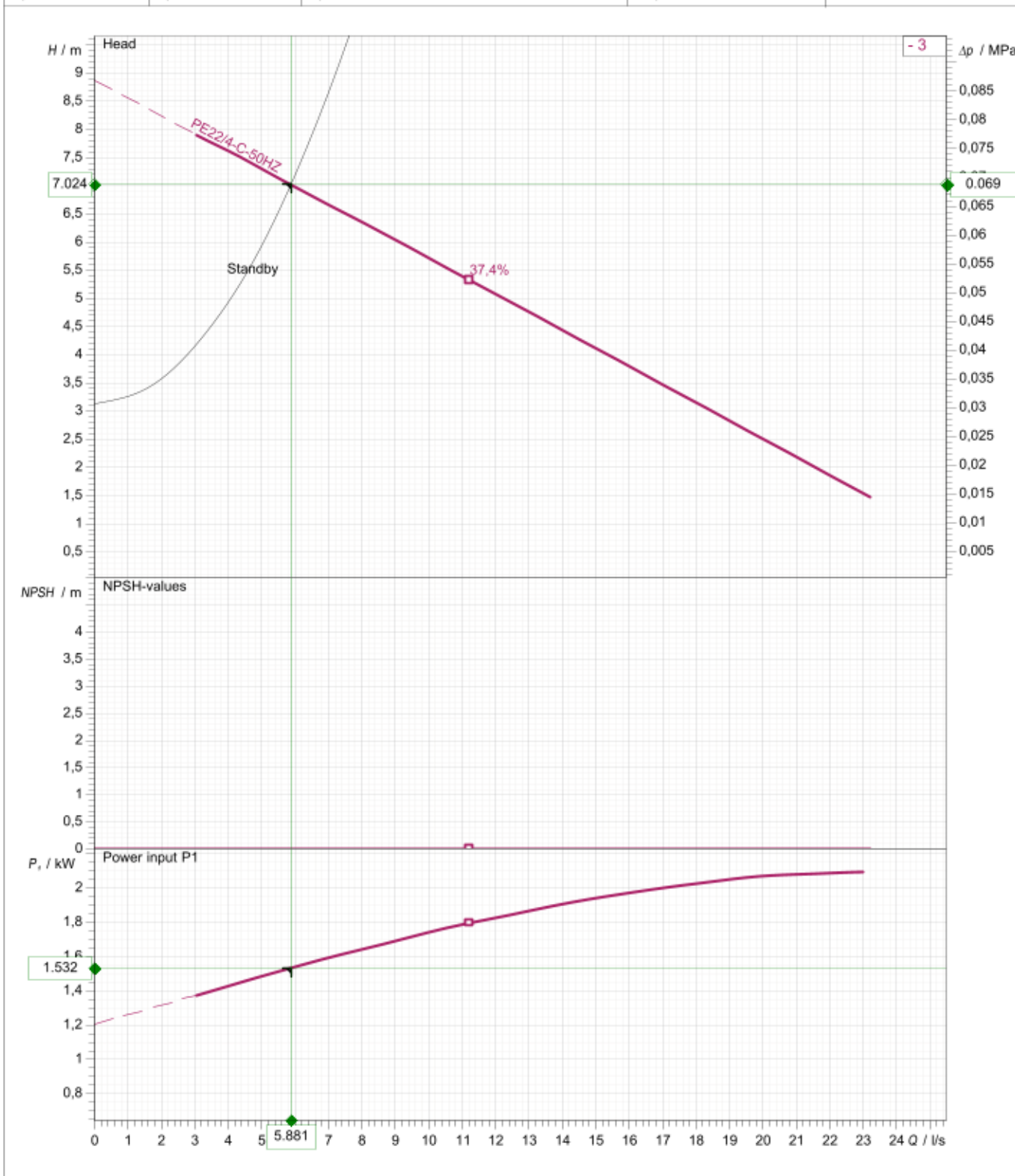
Impeller size 180 mm	N° of vanes 6	Impeller Vortex impeller	Solid size 80 mm	Revision
-------------------------	------------------	-----------------------------	---------------------	----------

Curve number		<div>Pump performance curves</div> <div>XFP 80C VX 50HZ</div> <div>SULZER</div>		
Reference curve XFP80C-VX 50HZ				
			Discharge DN80	Frequency 50 Hz
Density 998,3 kg/m³	Viscosity 1,005 mm²/s	Testnorm ISO 9906: 2012, HI 11.6/14.6 ≤10kW	Rated speed 1467 1/min	Date 2022-09-22
Flow 5,82 l/s	Head 7,04 m	Rated power 1,34 kW	Hydraulic efficiency 30,5 %	NPSH 0 m



Impeller size 180 mm	N° of vanes 6	Impeller Vortex impeller	Solid size 80 mm	Revision
-------------------------	------------------	-----------------------------	---------------------	----------

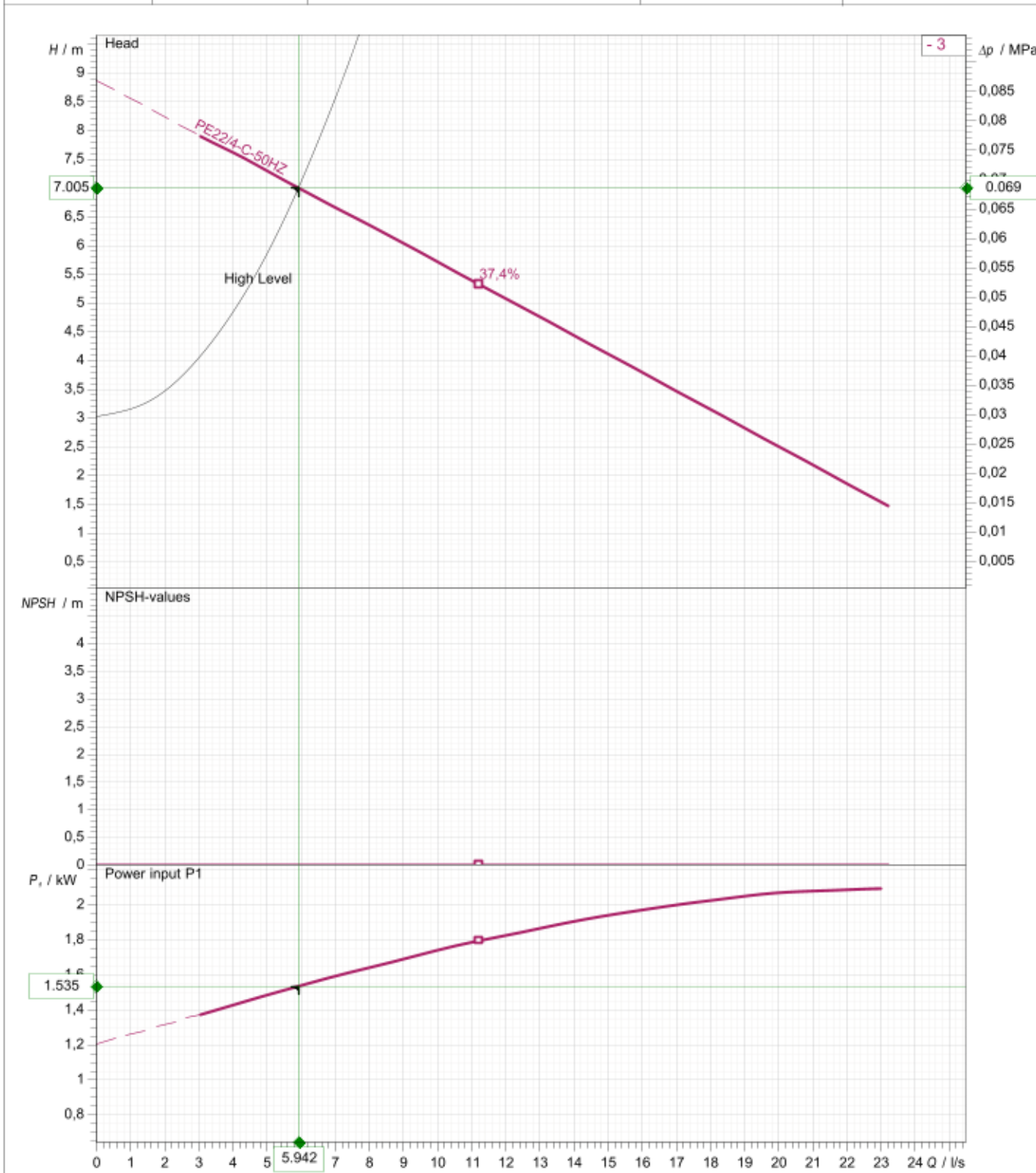
Curve number		Pump performance curves		
Reference curve XFP80C-VX 50HZ				
		XFP 80C VX 50HZ		
			Discharge DN80	Frequency 50 Hz
Density 998,3 kg/m³	Viscosity 1,005 mm²/s	Testnorm ISO 9906: 2012, HI 11.6/14.6 ≤10kW	Rated speed 1467 1/min	Date 2022-09-22
Flow 5,88 l/s	Head 7,02 m	Rated power 1,34 kW	Hydraulic efficiency 30,7 %	NPSH 0 m



Impeller size 180 mm	N° of vanes 6	Impeller Vortex impeller	Solid size 80 mm	Revision
-------------------------	------------------	-----------------------------	---------------------	----------

Curve number	Pump performance curves XFP 80C VX 50HZ		SULZER	
Reference curve XFP80C-VX 50HZ				

			Discharge DN80	Frequency 50 Hz
Density 998,3 kg/m ³	Viscosity 1,005 mm ² /s	Testnorm ISO 9906: 2012, HI 11.6/14.6 ≤10kW	Rated speed 1467 1/min	Date 2022-09-22
Flow 5,94 l/s	Head 7 m	Rated power 1,34 kW	Hydraulic efficiency 30,9 %	NPSH 0 m



Impeller size 180 mm	N° of vanes 6	Impeller Vortex impeller	Solid size 80 mm	Revision
-------------------------	------------------	-----------------------------	---------------------	----------

Curve number		<div>Pump performance curves</div> <div>XFP 80C VX 50HZ</div>			<div>SULZER</div>
Reference curve XFP80C-VX 50HZ					
			Discharge DN80	Frequency 50 Hz	
Density 998,3 kg/m³	Viscosity 1,005 mm²/s	Testnorm ISO 9906: 2012, HI 11.6/14.6 ≤10kW	Rated speed 1467 1/min	Date 2022-09-22	
Flow 6,12 l/s	Head 6,95 m	Rated power 1,35 kW	Hydraulic efficiency 31,3 %	NPSH 0 m	



Impeller size 180 mm	N° of vanes 6	Impeller Vortex impeller	Solid size 80 mm	Revision
-------------------------	------------------	-----------------------------	---------------------	----------

Frequency
50 Hz

Motor performance curve

SULZER

PE22/4-C-50HZ

Rated power
2,2 kW

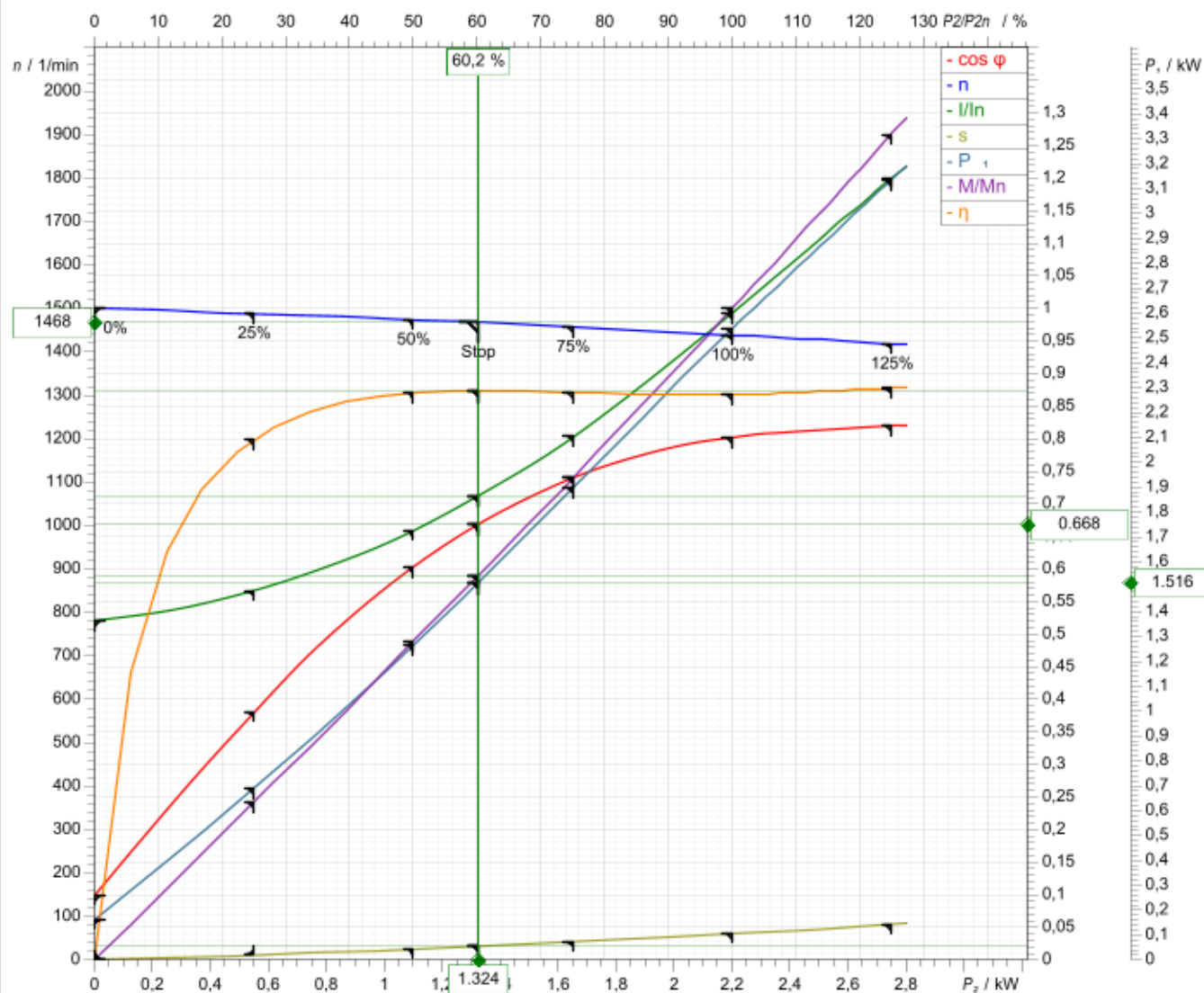
Service factor
1

Nominal Speed
1440 1/min

Number of poles
4

Rated voltage
400 V

Date
2022-09-08



Symbol	No loac	25 %	50 %	75 %	100 %	125 %
P_2 / kW	0	0,55	1,1	1,65	2,2	2,75
P_1 / kW	0,1646	0,6889	1,264	1,895	2,534	3,135
η / %	0	79,84	87,05	87,08	86,81	87,74
n / 1/min	1500	1489	1474	1457	1439	1419
$\cos \varphi$	0,09926	0,3813	0,6017	0,7398	0,8016	0,8195
I / A	2,394	2,608	3,031	3,697	4,564	5,52
s / %	0	0,7635	1,719	2,839	4,09	5,418
M / Nm	0	3,528	7,125	10,81	14,6	18,51

Tolerance according to VDE 0530 T1 12.84 for rated power

Starting current 29,8 A	Starting torque 21,2 Nm	Moment of inertia 0,008 kg m ²	No. starts per hour 15	
----------------------------	----------------------------	--	---------------------------	--

Sulzer reserves the right to change any data and dimensions without prior notice and can not be held responsible for the use of information contained in this software.

Spaix® 4, Version 4.3.4 - 2016/12/07 (Build 546)
Data version Dec-2016

SULZER

Massblatt XFP 80C-VX Twin Guide Rail
Dimension Sheet XFP 80C-VX Twin Guide Rail
Dimensioni Installazione sommersa
Hoja de dimensiones Instalación sumergida
Plan d'encombrement Installation noyée

No: AN-M.22.610 - 03
Drawn: 11.08.10 / D.Wheeler
Issue Date: 30/03/2011
Änderungen vorbehalten
Technical changes reserved
Con riserva di modifiche
Con reserva de modificaciones
Sous réserve de modification

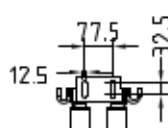
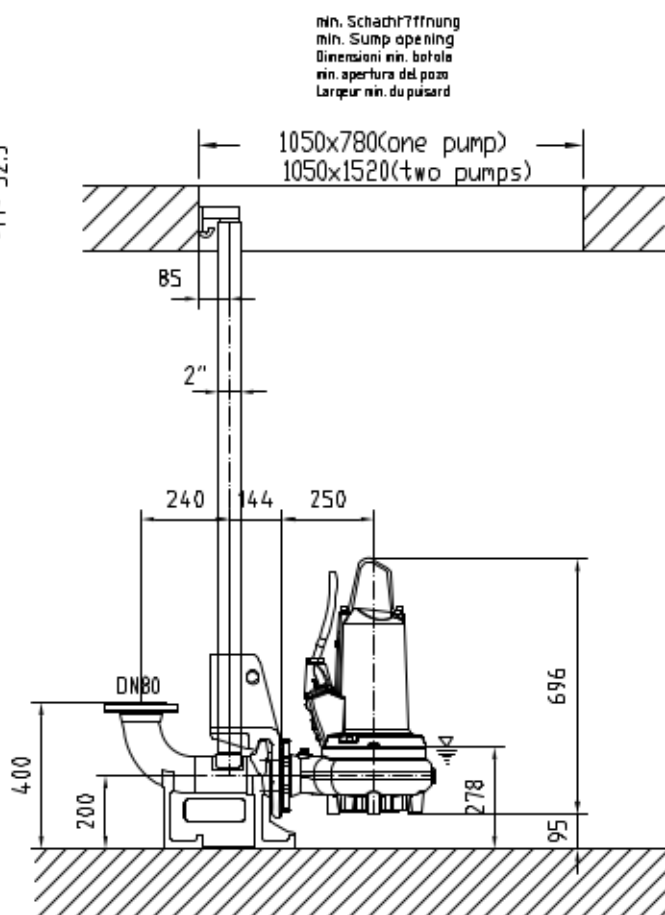
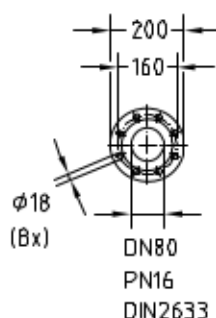
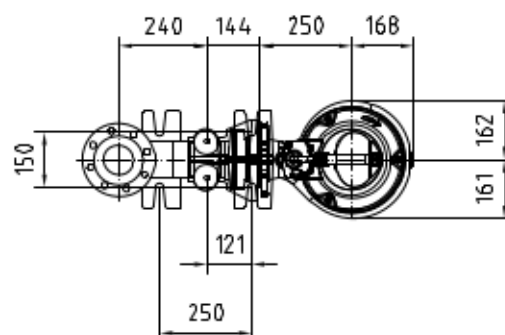
50 Hz

S.I.

Typ Type Tipo	Gewicht Weight Poids Peso (kg)
PE 15/4	95.5
PE 22/4	97.5
PE 29/4	100.0

60 Hz

Typ Type Tipo	Gewicht Weight Poids Peso (kg)
PE 18/4W	95.5
PE 22/4	97.5
PE 28/4W	97.5
PE 35/4	100.0



Gewicht: Beinhaltet Pumpe und Halterung
Weight: Includes pump and slider bracket
Il peso include il pezzo intermedio
Peso: Incluye bomba y una
Poids: Pompe et coulisseau

Guss-Allgemeintoleranzen nach DIN1680 - GTB16
General tolerances for castings in acc. to DIN1680-GTB16
Tolleranze generali delle fusioni secondo DIN1680-GTB16
Tolerancias generales para la fundición seg. de DIN1680-GTB16
Tolérance générale de la fonderie selon DIN1680-GTB16

Appendix C
Foul Water Emergency Storage Calculations

Pump Design and Services Ltd Building 4.6 HiTECH Frimley 4 Business Park Frimley, Camberley Surrey GU16 7SG Tel: 01483 930 520 Email: info@pdasgroup.co.uk				<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">Site ID #</td> <td style="width: 50%;">2091</td> </tr> <tr> <td>Project Reference</td> <td>17881</td> </tr> <tr> <td>Date</td> <td>08/09/22</td> </tr> </table>		Site ID #	2091	Project Reference	17881	Date	08/09/22
Site ID #	2091										
Project Reference	17881										
Date	08/09/22										

Clients Name	Gleeson Homes (Midlands)
Site Address	York Gardens, Gosberton

Storage Requirement		
Number of Dwellings	96	
Non Residential Design Flow	0	L/sec
Domestic @ AWA Rates	5.875	m ³
Non Residential 1 Hr @ Design Flow	0.000	m ³
Total Required Storage	5.875	m ³
Location of Lowest Private Manhole	Plot 74	
Invert Level of Lowest Private Manhole	-0.042	m

Notes:

Storage in Gravity Manholes					
Manhole Reference	Manhole Diameter (mm)	Max Storage Level (m)	Cover Level (m)	Invert Level (m)	Storage Volume (m ³)
		-0.042			0.000
Inlet	1500	-0.042	3.400	-0.264	0.392
F6	1200	-0.042	2.972	-0.128	0.097
F5	1200	-0.042	2.868	-0.042	0.000
F4	1200	-0.042	2.811	0.288	0.000
F3	1200	-0.042	3.235	0.588	0.000
F2	1200	-0.042	3.056	0.784	0.000
F1	1200	-0.042	2.847	1.016	0.000
		-0.042			0.000
F8	1200	-0.042	2.936	1.200	0.000
		-0.042			0.000
F11	1200	-0.042	2.971	0.807	0.000
F10	1200	-0.042	3.052	0.944	0.000
F9	1200	-0.042	3.100	1.194	0.000
		-0.042			0.000
F14	1200	-0.042	3.137	0.776	0.000
F13	1200	-0.042	3.126	1.087	0.000
F12	1200	-0.042	3.048	1.200	0.000
Total storage in manholes below detailed maximum storage level					0.490

Private Manhole Invert (m)		
1.900		VC Base
-0.042		Plot 74
1.500		Plot 48 & 68
1.500		
1.200		Plot 63
1.200		Plot 51 & 60
1.500		Plot 37 & 44
1.700		Plot 23
2.000		Plot 8
1.550		Plot 14 & 20
1.500		Plot 80
1.300		Plot 3
1.300		Plot 2 & 83

Storage in Gravity Sewer Pipes					
Sewer Pipe Run	Sewer Diameter (mm)	Max Storage Level (m)	Length (m)	Upper Invert (m)	Storage Volume (m ³)
4.000	150	-0.042	16.922	1.200	0.000
4.001	150	-0.042	46.490	1.087	0.000
4.002	150	-0.042	33.294	0.776	0.000
		-0.042			0.000
3.000	150	-0.042	37.548	1.194	0.000
3.001	150	-0.042	20.503	0.944	0.000
3.002	150	-0.042	77.763	0.807	0.000
		-0.042			0.000
2.000	150	-0.042	61.561	1.200	0.000
		-0.042			0.000
1.000	150	-0.042	34.767	1.016	0.000
1.001	150	-0.042	29.399	0.784	0.000
1.002	150	-0.042	44.990	0.588	0.000
1.003	150	-0.042	49.528	0.288	0.000
1.004	150	-0.042	12.814	-0.042	0.000
1.005	150	-0.042	20.418	-0.128	0.000
Total storage in sewers below detailed maximum storage level					0.000

Storage in Wet Well				
	Wet Well Diameter (mm)	Max Storage Level (m)	High Level Alarm (m)	Storage Volume (m ³)
Pump Station	2400	-0.042	-1.300	5.691
Total storage in wet well below detailed maximum storage level				5.691

Summary	
Manholes	0.490 m ³
Sewers	0.000 m ³
Pump Station	5.691 m ³
Total Provided	6.181 m ³
Total Required	5.875 m ³

Appendix D
Hazardous Area Certification



EC-TYPE-EXAMINATION CERTIFICATE

(Translation)



- (2) Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres - **Directive 94/9/EC**

- (3) EC-type-examination Certificate Number:

PTB 10 ATEX 1062 X

- (4) Equipment: Three-phase motor, types PE 1 and PE 2

- (5) Manufacturer: Cardo Flow Solutions AB

- (6) Address: Roskildevägen 1, SE-201 23 Malmö, Sweden

- (7) This equipment and any acceptable variation thereto are specified in the schedule to this certificate and the documents therein referred to.

- (8) The Physikalisch-Technische Bundesanstalt, notified body No. 0102 in accordance with Article 9 of the Council Directive 94/9/EC of 23 March 1994, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres, given in Annex II to the Directive.

The examination and test results are recorded in the confidential test report PTB Ex 10-19149.

- (9) Compliance with the Essential Health and Safety Requirements has been assured by compliance with:

EN 60079-0:2009

EN 60079-1:2007

- (10) If the sign "X" is placed after the certificate number, it indicates that the equipment is subject to special conditions for safe use specified in the schedule to this certificate.

- (11) This EC-type-examination Certificate relates only to the design, examination and tests of the specified equipment in accordance to the Directive 94/9/EC. Further requirements of the Directive apply to the manufacturing process and supply of this equipment. These are not covered by this certificate.

- (12) The marking of the equipment shall include the following:



II 2 G Ex d IIB T4 resp. T3 Gb

Zertifizierungssektor Explosionsschutz

On behalf of PTB:

Braunschweig, May 30, 2011

Dr.-Ing. U. Klausmeyer
Direktor und Professor



sheet 1/4

SCHEDULE

(13)

(14) **EC-TYPE-EXAMINATION CERTIFICATE PTB 10 ATEX 1062 X**

(15) Description of equipment

The equipment is a rotating electrical machine. The machine enclosure is a cast construction. The shaft rotates in rolling bearings. Together with the end shield on the drive end it forms a flameproof shaft joint.

For operation in 'G' atmospheres (areas with potentially explosive gas, vapour, mist, air mixtures), the machine is designed to Flameproof Enclosure "d" type of protection.

Technical data

The concrete rated voltage, amperage, electrical performance or frequency values, duty types, liquid temperatures and temperature classes for the different motor series are defined by the manufacturer for the different electro-thermal design versions.

The motors may be connected to electrical low-voltage networks with voltage and frequency tolerances complying with the specifications in EN 60034-1. The "A" or "B" tolerance ranges, or tolerances deviating from these ranges, shall be considered with the temperature measurements that have to be performed by the manufacturer. Motor protection in compliance with the specifications in section 17 shall be provided.

(16) Assessment and Test Report PTB Ex 10-19149

(17) Special conditions for safe use

Repairs on flameproof joints may only be performed in accordance with the manufacturer's design specifications. Repair on the basis of the values in tables 1 and 2 of EN 60079-1 is not permitted.

Additional notes for safe operation:

Components attached or installed (terminal compartments, bushings, cable glands, connectors) shall be of a technical standard that complies with the specifications on the cover sheet. They shall be suited for the operating conditions and have a separate examination certificate. The special conditions specified for the components shall be complied with, and the components shall be included in the type test, if necessary. This equally applies to the components mentioned in the technical description.

With submersible-pump motors, a double-casing design may optionally be used to achieve the required cooling effect for the motor enclosure. With the version with cooling jacket, the stator housing is either cooled with a part stream of the medium that is tapped from the pump pressure compartment, or with a separate, closed cooling cycle and a heat exchanger. Measures must be taken to ensure that the required cooling medium is available (to be monitored, if necessary). This applies, in particular to the version with a closed cooling cycle.

The motors can optionally be operated with an anti-condensation heater, e.g. strip heaters in the winding overhang. Measures must be taken to ensure that the anti-condensation heater can only operate when the motor is at a standstill. The anti-condensation heater performance and its minimum ON period before motor start as a function of the ambient temperature shall be rated so that the entire motor enclosure will be safely heated to a surface temperature of at least -20 °C. The relevant specifications shall be included in the instructions for operation.

The connecting cable shall be of a quality that meets the thermal, chemical and mechanical requirements under field service conditions.

When pipelines are entered into the flameproof connection housing, the specifications in EN 60079-1, section 13.2, shall be observed.

Operation with frequency converter is possible, provided the manufacturer's specifications are complied with.

Compliance with the governing regulations shall be verified for each electro-thermal design of the motors in the form of a type test. In this connection, the requirements in the code of practice

"Merkblatt für die elektrische Auslegung und Prüfung von Motoren in der Zündschutzart Druckfeste Kapselung im Rahmen der EG-Baumusterprüfbescheinigung"

shall be observed. It is the manufacturer's responsibility to perform and log the type tests in compliance with the above code of practice, and to define the operating conditions and the temperature class for every type series.

The motors may be employed only for the duty type and at the ambient conditions for which they were type tested. This also applies to operation with frequency converter.

Temperature monitoring

Standard EN 60079-14, clause 7, allows **duty type S1** motors to be provided with an overcurrent protection device with inverse time-delay operation (motor protection switch) as the only overload protection, **or** a combined protection consisting of temperature sensors embedded in the winding (e.g. PTC resistors) and a tripping unit.

For motor operation with **duty types other than S1 and operation with frequency converter**, a combined protection consisting of temperature sensors embedded in the winding (e.g. PTC resistors) and a tripping unit is permitted as the only overload protection.

For the version with temperature sensors embedded in the winding, at least one sensor shall be provided for each phase.

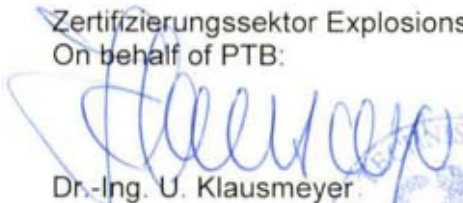
Monitoring devices shall meet the requirements in Directive 94/9/EC and EN 1127-1. If non-approved monitoring devices are used, successful function testing shall be separately demonstrated and documented. The devices shall be included into the operating company's regular supervision programme. A note to this effect shall be included in the instructions for operation of the motor.

(18) Essential health and safety requirements

Met by compliance with the afore-mentioned Standards.

Zertifizierungssektor Explosionsschutz
On behalf of PTB:

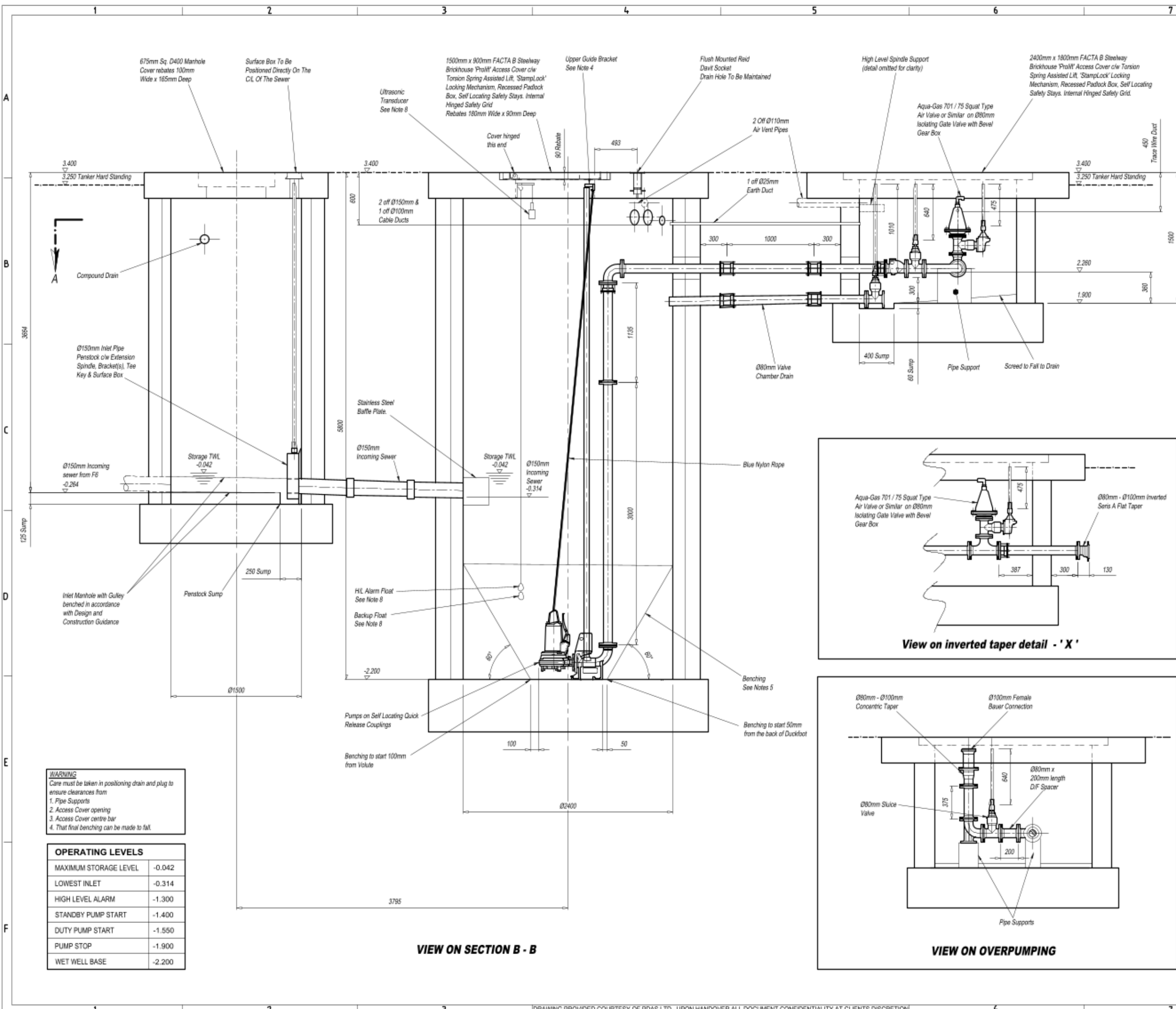
Braunschweig, May 30, 2011


Dr.-Ing. U. Klausmeyer
Direktor und Professor



Appendix E

Pump Station Drawings



- NOTES**
- DO NOT SCALE.
 - UNLESS OTHERWISE STATED ALL DIMENSIONS ARE IN MILLIMETRES AND ALL INVERTS IN METRES AOD.
 - ALL CIVIL WORKS IS THE RESPONSIBILITY OF THE DEVELOPER OR CONTRACTOR INCLUDING FIXING OF STEELWORK SUCH AS ACCESS COVERS AND PENSTOCKS ETC. INSTALLATION OF CABLE DUCTS, BENCHING AND MAKING GOOD AROUND PIPES AFTER INSTALLATION.
 - REINFORCING BARS ARE TO BE A MINIMUM OF 75MM BELOW THE SURFACE. ANY STRUCTURAL DETAILING / CIVIL WORKS SHOWN SHOWN ON THIS DRAWING ARE ILLUSTRATIVE ONLY UNLESS OTHERWISE STATED AND SHOULD NOT BE USED FOR CONSTRUCTION.
 - BENCHING IS TO BE FORMED AFTER PUMP INSTALLATION AND TO BE IN ACCORDANCE WITH THE APPLICABLE DESIGN AND CONSTRUCTION GUIDANCE AND ADOPTING AUTHORITY SPECIFICATION.
 - UNLESS OTHERWISE STATED, ALL DUCTS ARE TO BE Ø100MM AND BE COMPLETE WITH DRAW ROPES. SERVICE DUCTS TO BE TO THE UTILITY SUPPLIERS SPECIFICATION.
 - DUCT ROUTES ARE SHOWN DIAGRAMMATICALLY ONLY. ALL DUCTS LAID IN THE MOST DIRECT ROUTE TO SUIT THE SERVICE BEING CARRIED AVOIDING ANY ACUTE CHANGES OF DIRECTION.
 - LEVEL CONTROL POSITIONS ARE SHOWN DIAGRAMMATICALLY ONLY. THEY WILL BE POSITIONED AWAY FROM OBSTRUCTIONS AND BE READILY ADJUSTABLE AFTER INSTALLATION.

STATION INFORMATION		
PUMP TYPE	SULZER	XFP80C VX PE22/4
IMPELLER		VX.4 (171mm)
MOTOR RATING		2.2 kW
FULL LOAD CURRENT		4.6 A FLC
ZONE RATING		EXP
DUTY FLOW		4.75 L/Sec
HEAD GENERATED		6.07m
LEVEL CONTROLS		PULSAR ZENITH ULTRASONIC C/W HIGH LEVEL ALARM AND BACK UP FLOAT SWITCHES
PIPE / VALVE SIZE		Ø80mm
FINAL DISCHARGE		
INTERNAL DIAMETER		Ø100mm
MATERIAL		DUCTILE IRON
TERMINATION		FLANGED
PIPE OD		N/A
FLANGE DATA		Ø100mm PN16 Drilled
RISING MAIN		110mm OD PE100 SDR11 (89.1mm BORE)
RISING MAIN COUPLER		BY THE DEVELOPER OR CONTRACTOR

REV	DATE	DESCRIPTION	DR'n	CHK'd	APR'l
FOR APPROVAL					
					
TOTAL WATER EXPERTISE					
BUILDING 4.6, HITCH, FRIMLEY BUSINESS PARK, FRIMLEY, CAMBERLEY, SURREY, GU11 7SD					
OFFICE TEL No: (01483) 930525					
WEBSITE: WWW.PDAS.CO.UK					
PROJECT YORK GARDENS GOSBERTON					
TITLE FOUL WATER PUMP STATION ELEVATION VIEW					
CLIENT GLEESON HOMES (MIDLANDS)					
SCALE AT A1	1:20	SCALE AT A3	1:40		
SITE ID	2091	APR'l	E.W.	DATE	15-09-2022
JOB NO.	17881	CHK'd	I.H.	DATE	15-09-2022
DRAWING NUMBER	2091-17881-001	DR'n	N.K.	DATE	15-09-2022

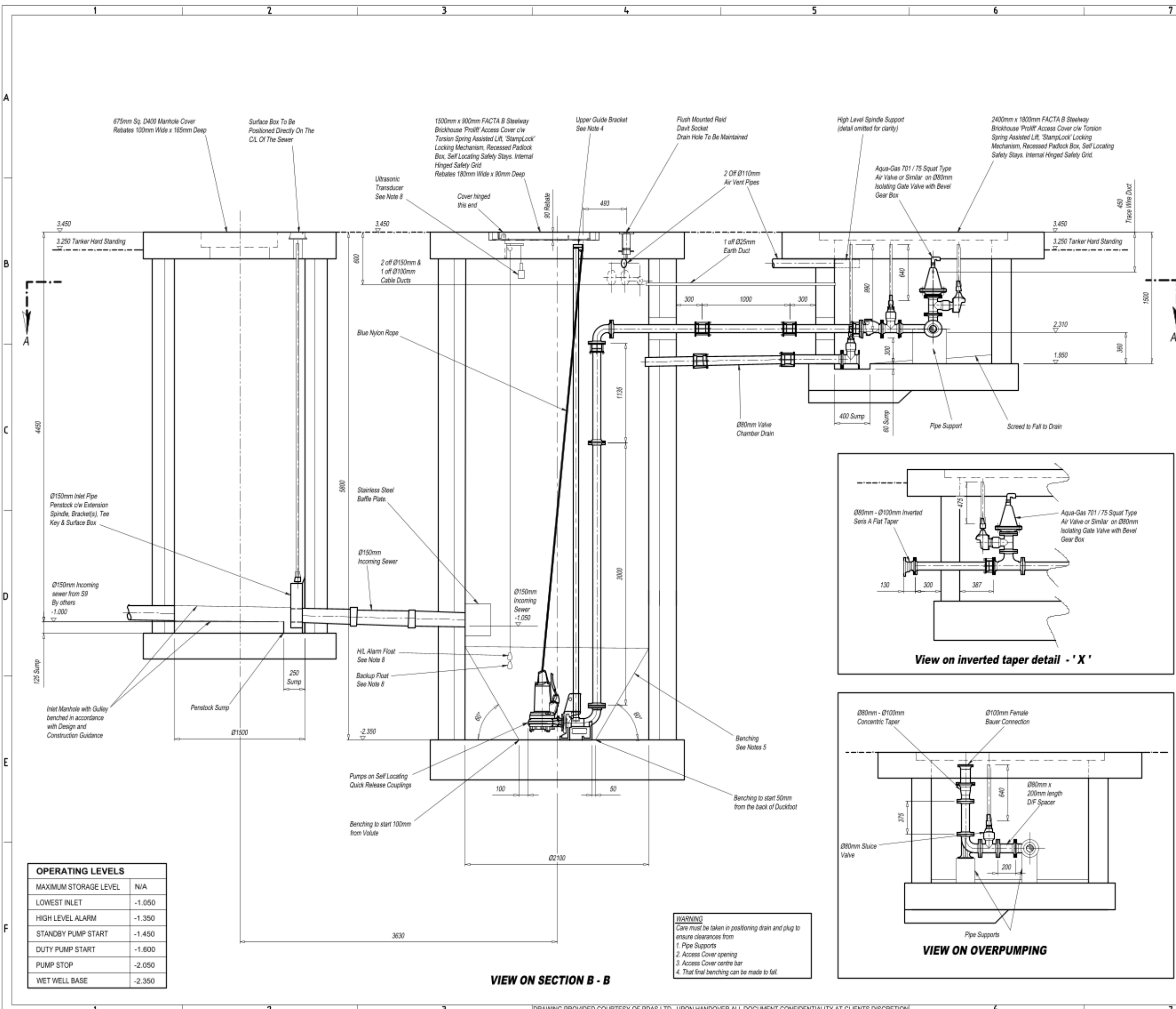
WARNING
Care must be taken in positioning drain and plug to ensure clearances from
1. Pipe Supports
2. Access Cover opening
3. Access Cover centre bar
4. That final benching can be made to fall

OPERATING LEVELS	
MAXIMUM STORAGE LEVEL	-0.042
LOWEST INLET	-0.314
HIGH LEVEL ALARM	-1.300
STANDBY PUMP START	-1.400
DUTY PUMP START	-1.550
PUMP STOP	-1.900
WET WELL BASE	-2.200

VIEW ON SECTION B - B

View on inverted taper detail - 'X'

VIEW ON OVERPUMPING



- NOTES**
- DO NOT SCALE.
 - UNLESS OTHERWISE STATED ALL DIMENSIONS ARE IN MILLIMETRES AND ALL INVERTS IN METRES AOD.
 - ALL CIVIL WORKS IS THE RESPONSIBILITY OF THE DEVELOPER OR CONTRACTOR INCLUDING FIXING OF STEELWORK SUCH AS ACCESS COVERS AND PENSTOCKS ETC. INSTALLATION OF CABLE DUCTS, BENCHING AND MAKING GOOD AROUND PIPES AFTER INSTALLATION.
 - REINFORCING BARS ARE TO BE A MINIMUM OF 75MM BELOW THE SURFACE. ANY STRUCTURAL DETAILING / CIVIL WORKS SHOWN SHOWN ON THIS DRAWING ARE ILLUSTRATIVE ONLY UNLESS OTHERWISE STATED AND SHOULD NOT BE USED FOR CONSTRUCTION.
 - BENCHING IS TO BE FORMED AFTER PUMP INSTALLATION AND TO BE IN ACCORDANCE WITH THE APPLICABLE DESIGN AND CONSTRUCTION GUIDANCE AND ADOPTING AUTHORITY SPECIFICATION.
 - UNLESS OTHERWISE STATED, ALL DUCTS ARE TO BE Ø100MM AND BE COMPLETE WITH DRAW ROPES. SERVICE DUCTS TO BE TO THE UTILITY SUPPLIERS SPECIFICATION.
 - DUCT ROUTES ARE SHOWN DIAGRAMMATICALLY ONLY. ALL DUCTS LAID IN THE MOST DIRECT ROUTE TO SUIT THE SERVICE BEING CARRIED AVOIDING ANY ACUTE CHANGES OF DIRECTION.
 - LEVEL CONTROL POSITIONS ARE SHOWN DIAGRAMMATICALLY ONLY. THEY WILL BE POSITIONED AWAY FROM OBSTRUCTIONS AND BE READILY ADJUSTABLE AFTER INSTALLATION.

STATION INFORMATION		
PUMP TYPE	SULZER	XFP80C VX PE22/4
IMPELLER		VX.3 (180mm)
MOTOR RATING		2.2 kW
FULL LOAD CURRENT		4.6 A FLC
ZONE RATING		EXP
DUTY FLOW		5.00 L/Sec
HEAD GENERATED		6.32m
LEVEL CONTROLS		PULSAR ZENITH ULTRASONIC C/W HIGH LEVEL ALARM AND BACK UP FLOAT SWITCHES
PIPE / VALVE SIZE		Ø80mm
FINAL DISCHARGE		
INTERNAL DIAMETER		Ø100mm
MATERIAL		DUCTILE IRON
TERMINATION		FLANGED
PIPE OD		N/A
FLANGE DATA		Ø100mm PN16 Drilled
RISING MAIN		110mm OD PE100 SDR11 (89.1mm BORE)
RISING MAIN COUPLER		BY THE DEVELOPER OR CONTRACTOR

REV	DATE	DESCRIPTION	DR'n	CHK'd	APR'l
-----	------	-------------	------	-------	-------

FOR APPROVAL

PDAS DESIGN
TOTAL WATER EXPERTISE INSTALL
PROACTIVE

BUILDING 4.6, HITCH, FRIMLEY 4 BUSINESS PARK, FRIMLEY, CAMBERLEY, SURREY, GU11 7SD OFFICE TEL No. 01483 939525 WEBSITE WWW.PDAS.CO.UK

PROJECT **YORK GARDENS GOSBERTON**

TITLE **SURFACE WATER PUMP STATION ELEVATION VIEW**

CLIENT **GLEESON HOMES (MIDLANDS)**

SCALE AT A1 1:20 SCALE AT A3 1:40

SITE ID. 2091 APR'l E.W. DATE 15-09-2022

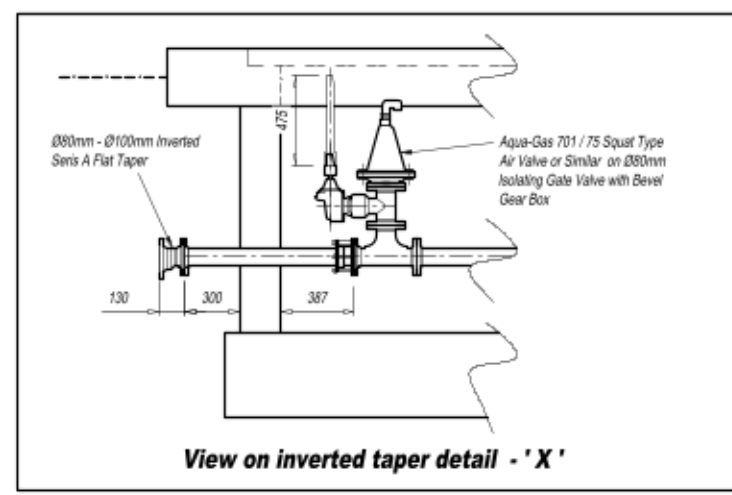
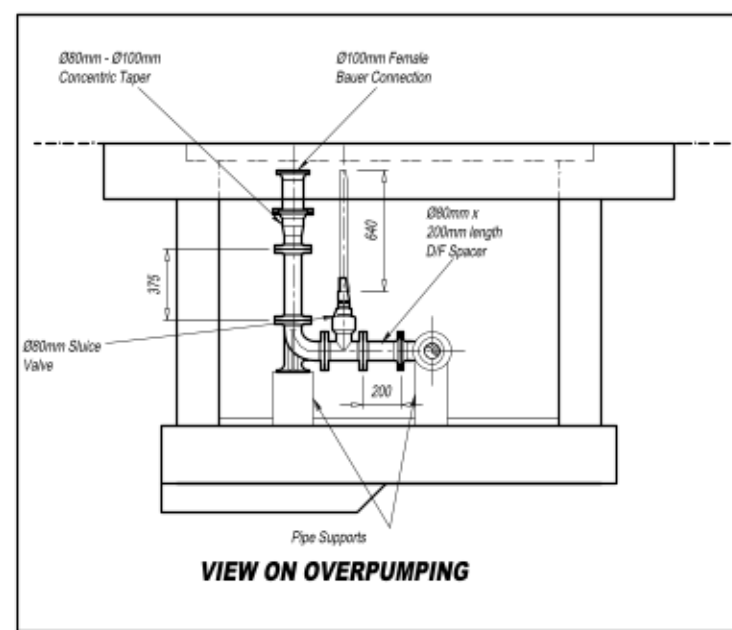
JOB NO. 17881 CHK'd I.H. DATE 15-09-2022

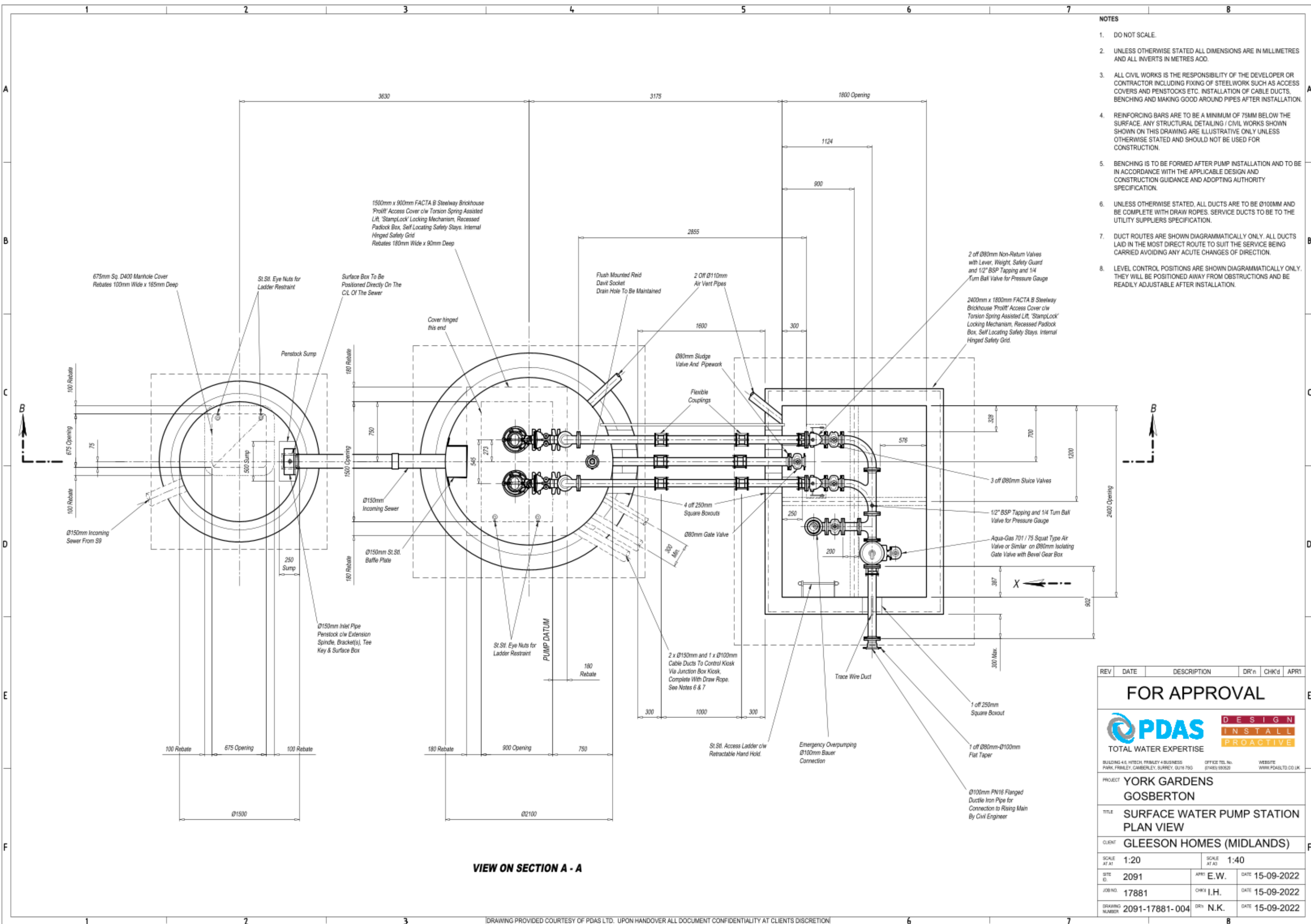
DRAWING NUMBER 2091-17881-003 DR'n N.K. DATE 15-09-2022

OPERATING LEVELS	
MAXIMUM STORAGE LEVEL	N/A
LOWEST INLET	-1.050
HIGH LEVEL ALARM	-1.350
STANDBY PUMP START	-1.450
DUTY PUMP START	-1.600
PUMP STOP	-2.050
WET WELL BASE	-2.350

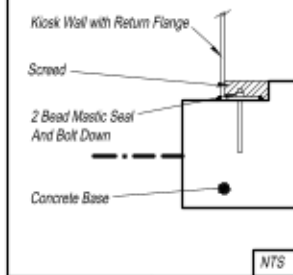
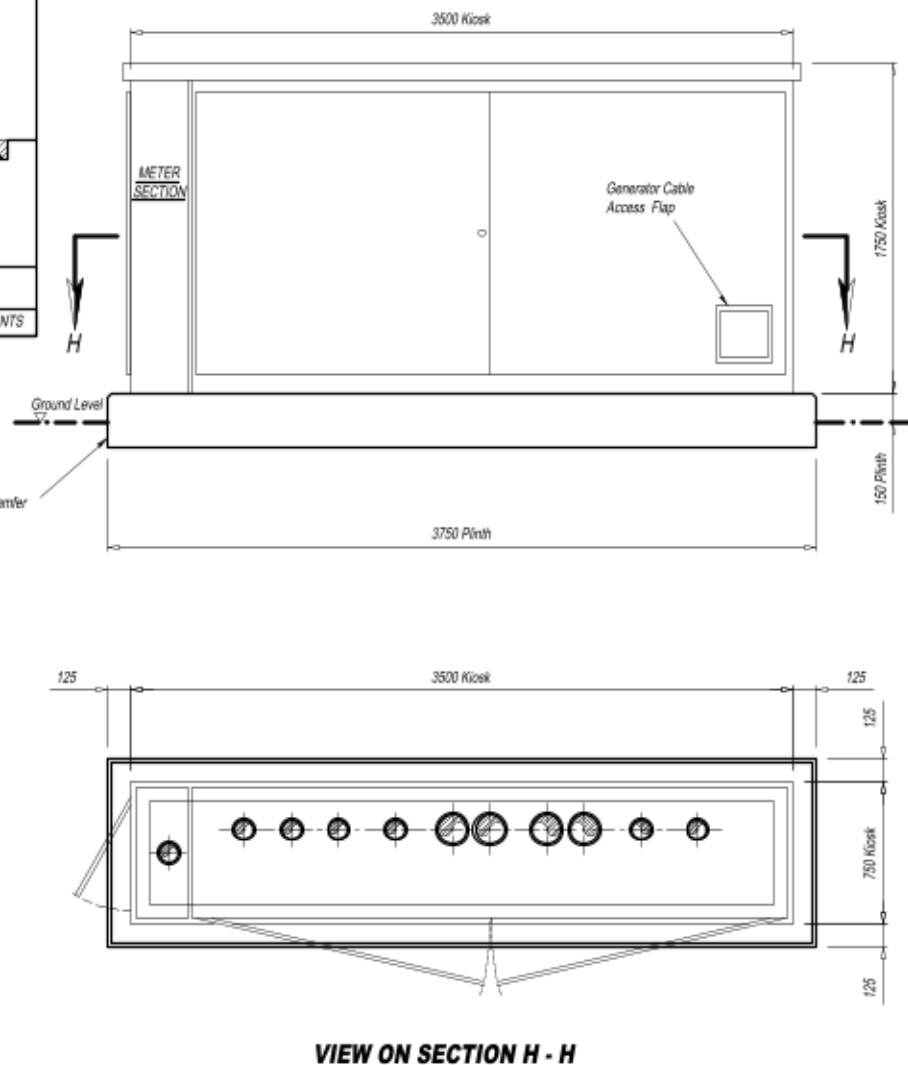
WARNING
Care must be taken in positioning drain and plug to ensure clearances from
1. Pipe Supports
2. Access Cover opening
3. Access Cover centre bar
4. That final benching can be made to fall.

VIEW ON SECTION B - B

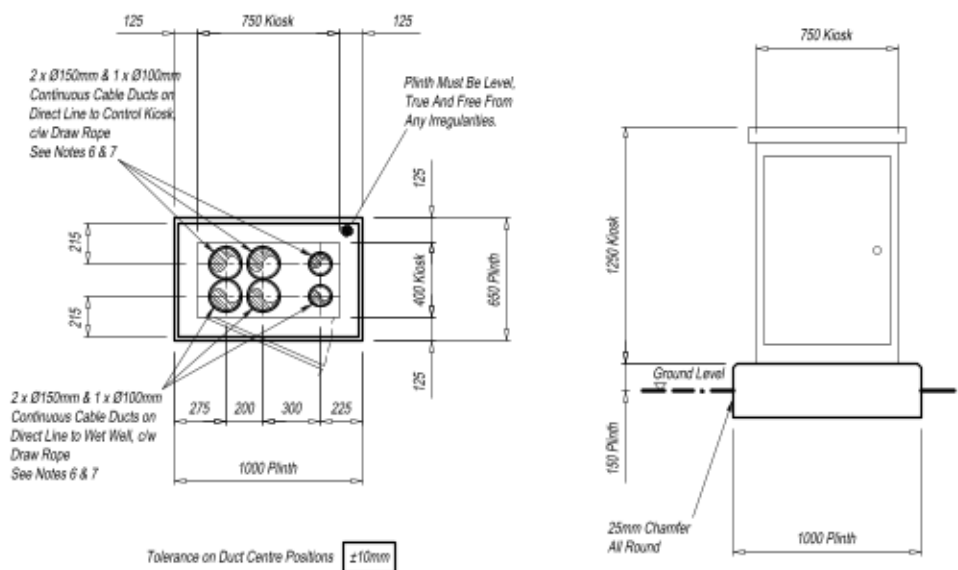




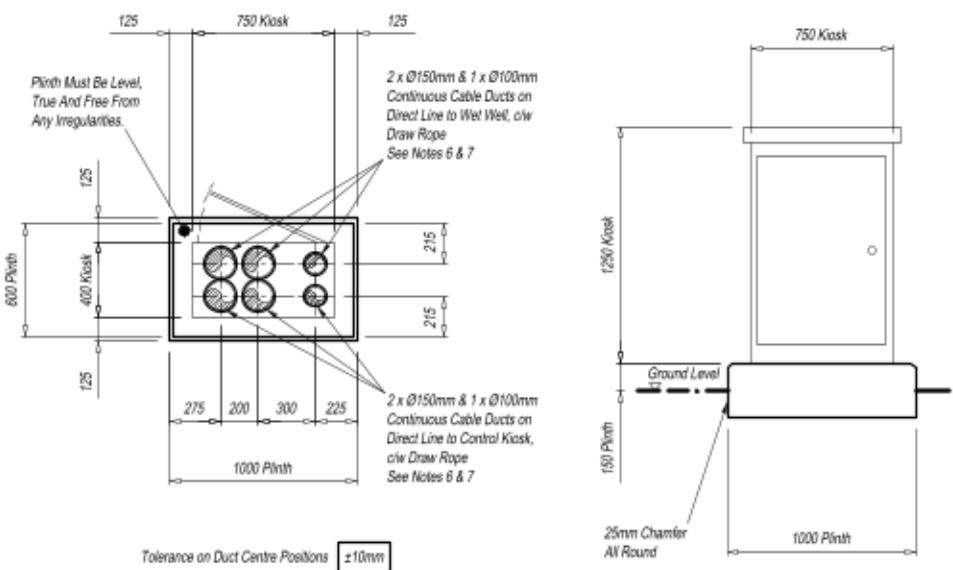
- THE BOTTOM FLANGE SHALL BE SEALED WITH MASTIC AND BOLTED TO THE PLINTH IN ACCORDANCE WITH POAS LTD. STANDARD INSTALLATION PROCEDURES.
- WHEN INSTALLATION IS COMPLETE ALL CABLE DUCTS TO BE CUT LEVEL WITH TOP OF PLINTH AND SEALED TO A MINIMUM DEPTH OF 100MM AND MAXIMUM DEPTH OF 150MM WITH AN APPROVED POLYURETHANE FOAM IMPERVIOUS TO WATER AND GAS.

**MCC KIOSK
REBATE DETAIL****CONTROL KIOSK PLAN & ELEVATION VIEW**

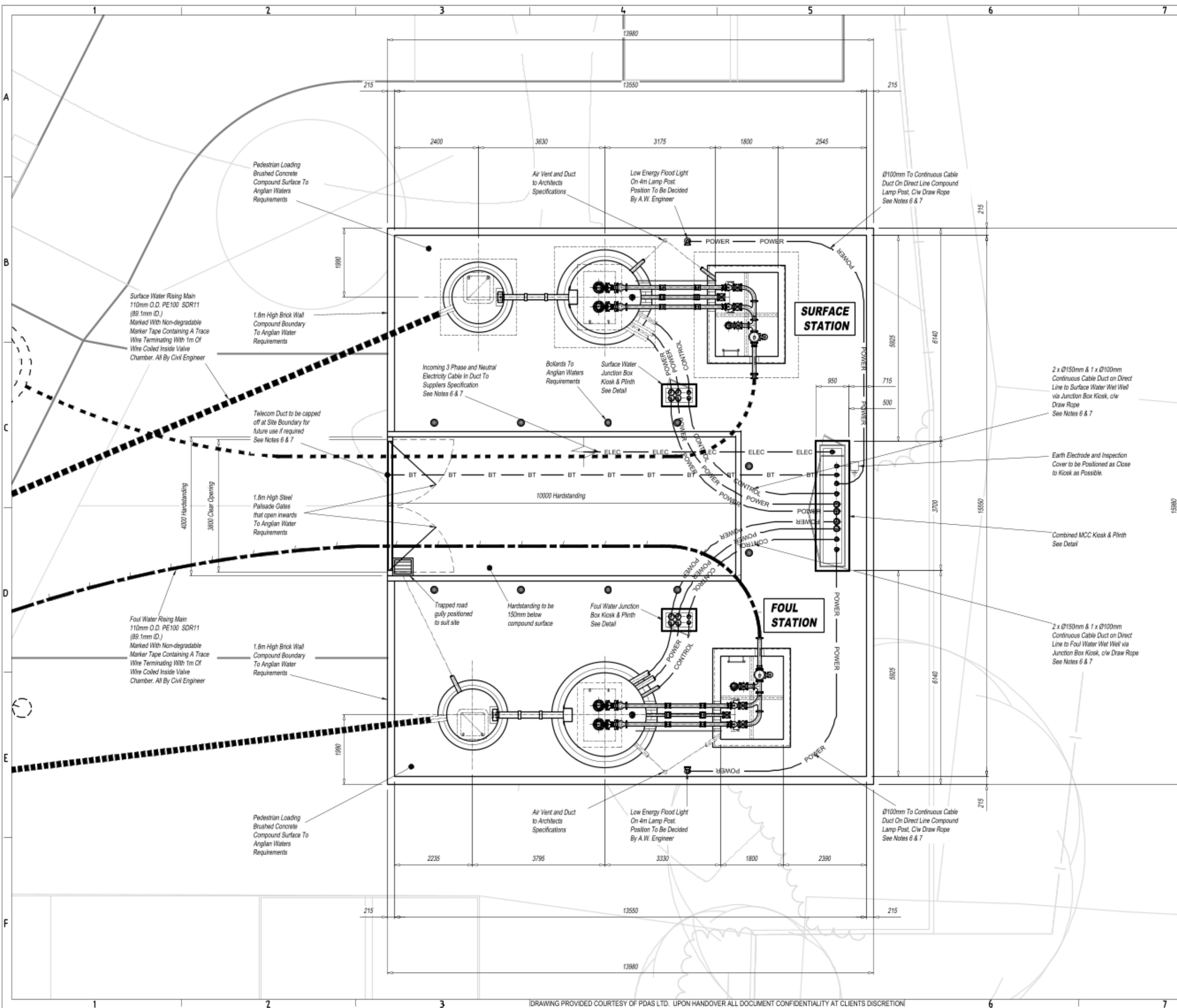
FOUL WATER JUNCTION BOX KIOSK PLINTH DETAIL



SURFACE WATER JUNCTION BOX KIOSK PLINTH DETAIL

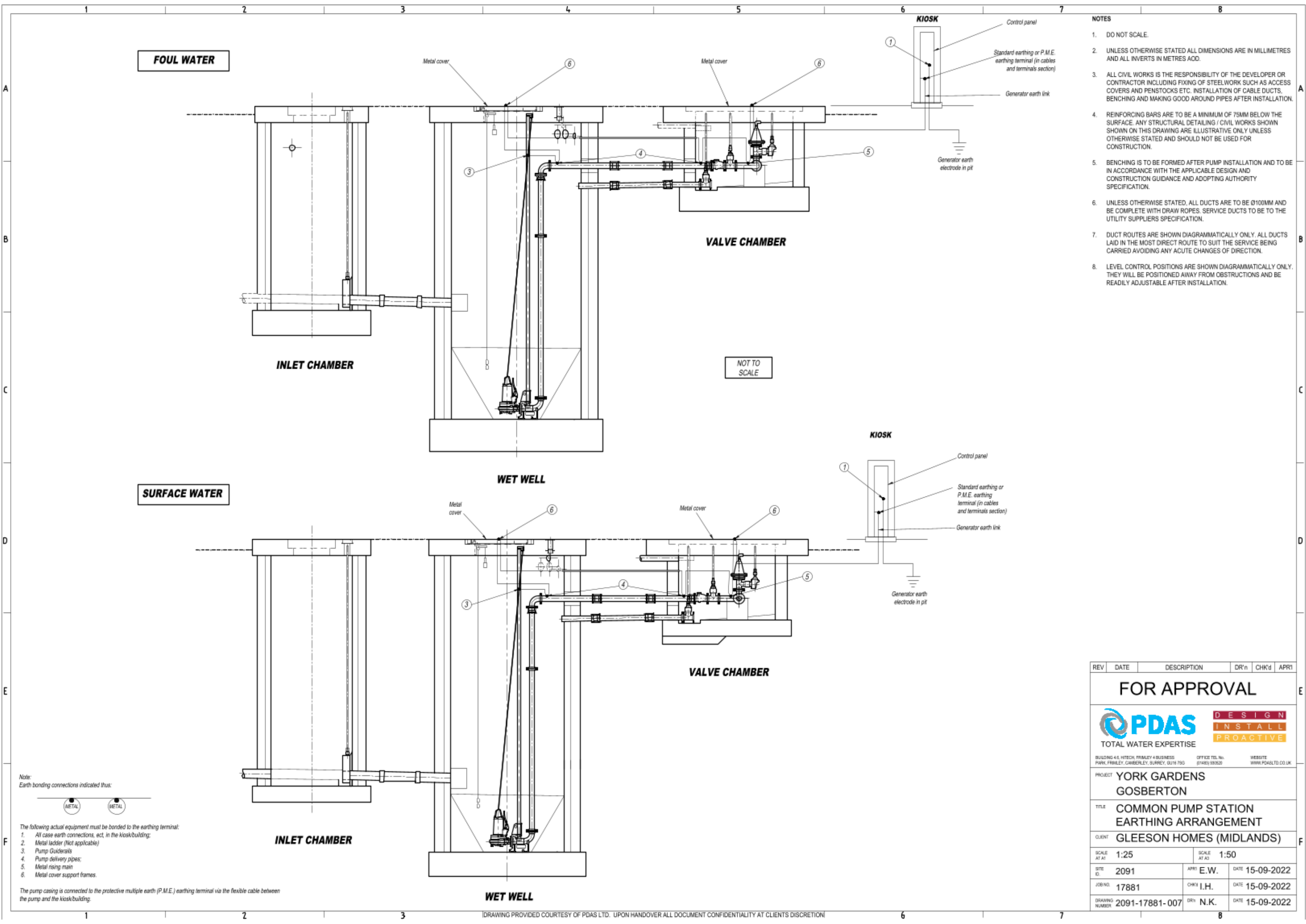


REV	DATE	DESCRIPTION	DR'n	CHK'd	APPR'd
<div>  <div> <div>DESIGN</div> <div>INSTALL</div> <div>PROACTIVE</div> </div> </div> <p>TOTAL WATER EXPERTISE</p>					
BUILDING 4/5, HITCH, FRIMLEY 4 BUSINESS PARK, FRIMLEY, CAMBERLEY, SURREY, GU16 7SD			OFFICE TEL No. (01483) 993629		WEBSITE WWW.PDASLTD.CO.UK
PROJECT YORK GARDENS GOSBERTON					
TITLE COMMON PUMP STATION KIOSK AND PLINTH DETAIL					
CLIENT GLEESON HOMES (MIDLANDS)					
SCALE AT A1 1:20		SCALE AT A3 1:40			
SITE ID.	2091	APPRO	E.W.	DATE	15-09-2022
JOB NO.	17881	CHKD	I.H.	DATE	15-09-2022
DRAWING NUMBER	2091-17881-005	DRN	N.K.	DATE	15-09-2022



- NOTES**
- DO NOT SCALE.
 - UNLESS OTHERWISE STATED ALL DIMENSIONS ARE IN MILLIMETRES AND ALL INVERTS IN METRES AOD.
 - ALL CIVIL WORKS IS THE RESPONSIBILITY OF THE DEVELOPER OR CONTRACTOR INCLUDING FIXING OF STEELWORK SUCH AS ACCESS COVERS AND PENSTOCKS ETC. INSTALLATION OF CABLE DUCTS, BENCHING AND MAKING GOOD AROUND PIPES AFTER INSTALLATION.
 - REINFORCING BARS ARE TO BE A MINIMUM OF 75MM BELOW THE SURFACE. ANY STRUCTURAL DETAILING / CIVIL WORKS SHOWN SHOWN ON THIS DRAWING ARE ILLUSTRATIVE ONLY UNLESS OTHERWISE STATED AND SHOULD NOT BE USED FOR CONSTRUCTION.
 - BENCHING IS TO BE FORMED AFTER PUMP INSTALLATION AND TO BE IN ACCORDANCE WITH THE APPLICABLE DESIGN AND CONSTRUCTION GUIDANCE AND ADOPTING AUTHORITY SPECIFICATION.
 - UNLESS OTHERWISE STATED, ALL DUCTS ARE TO BE Ø100MM AND BE COMPLETE WITH DRAW ROPES. SERVICE DUCTS TO BE TO THE UTILITY SUPPLIERS SPECIFICATION.
 - DUCT ROUTES ARE SHOWN DIAGRAMMATICALLY ONLY. ALL DUCTS LAID IN THE MOST DIRECT ROUTE TO SUIT THE SERVICE BEING CARRIED AVOIDING ANY ACUTE CHANGES OF DIRECTION.
 - LEVEL CONTROL POSITIONS ARE SHOWN DIAGRAMMATICALLY ONLY. THEY WILL BE POSITIONED AWAY FROM OBSTRUCTIONS AND BE READILY ADJUSTABLE AFTER INSTALLATION.

REV	DATE	DESCRIPTION	DR'n	CHK'd	APR'l
FOR APPROVAL					
 TOTAL WATER EXPERTISE					
BUILDING 4.6, HITECH, FRIMLEY BUSINESS PARK, FRIMLEY, CAMBERLEY, SURREY, GU11 7SS			OFFICE TEL No: (01483) 939525		WEBSITE: WWW.PDASLTD.CO.UK
PROJECT YORK GARDENS GOSBERTON					
TITLE COMMON PUMP STATION SITE PLAN					
CLIENT GLEESON HOMES (MIDLANDS)					
SCALE AT A1 1:50		SCALE AT A3 1:100			
SITE ID. 2091		APR'l E.W.		DATE 15-09-2022	
JOB NO. 17881		CHK'd I.H.		DATE 15-09-2022	
DRAWING NUMBER 2091-17881-006		DR'n N.K.		DATE 15-09-2022	



- NOTES**
- DO NOT SCALE.
 - UNLESS OTHERWISE STATED ALL DIMENSIONS ARE IN MILLIMETRES AND ALL INVERTS IN METRES AOD.
 - ALL CIVIL WORKS IS THE RESPONSIBILITY OF THE DEVELOPER OR CONTRACTOR INCLUDING FIXING OF STEELWORK SUCH AS ACCESS COVERS AND PENSTOCKS ETC. INSTALLATION OF CABLE DUCTS, BENCHING AND MAKING GOOD AROUND PIPES AFTER INSTALLATION.
 - REINFORCING BARS ARE TO BE A MINIMUM OF 75MM BELOW THE SURFACE. ANY STRUCTURAL DETAILING / CIVIL WORKS SHOWN SHOWN ON THIS DRAWING ARE ILLUSTRATIVE ONLY UNLESS OTHERWISE STATED AND SHOULD NOT BE USED FOR CONSTRUCTION.
 - BENCHING IS TO BE FORMED AFTER PUMP INSTALLATION AND TO BE IN ACCORDANCE WITH THE APPLICABLE DESIGN AND CONSTRUCTION GUIDANCE AND ADOPTING AUTHORITY SPECIFICATION.
 - UNLESS OTHERWISE STATED, ALL DUCTS ARE TO BE Ø100MM AND BE COMPLETE WITH DRAW ROPES. SERVICE DUCTS TO BE TO THE UTILITY SUPPLIERS SPECIFICATION.
 - DUCT ROUTES ARE SHOWN DIAGRAMMATICALLY ONLY. ALL DUCTS LAID IN THE MOST DIRECT ROUTE TO SUIT THE SERVICE BEING CARRIED AVOIDING ANY ACUTE CHANGES OF DIRECTION.
 - LEVEL CONTROL POSITIONS ARE SHOWN DIAGRAMMATICALLY ONLY. THEY WILL BE POSITIONED AWAY FROM OBSTRUCTIONS AND BE READILY ADJUSTABLE AFTER INSTALLATION.

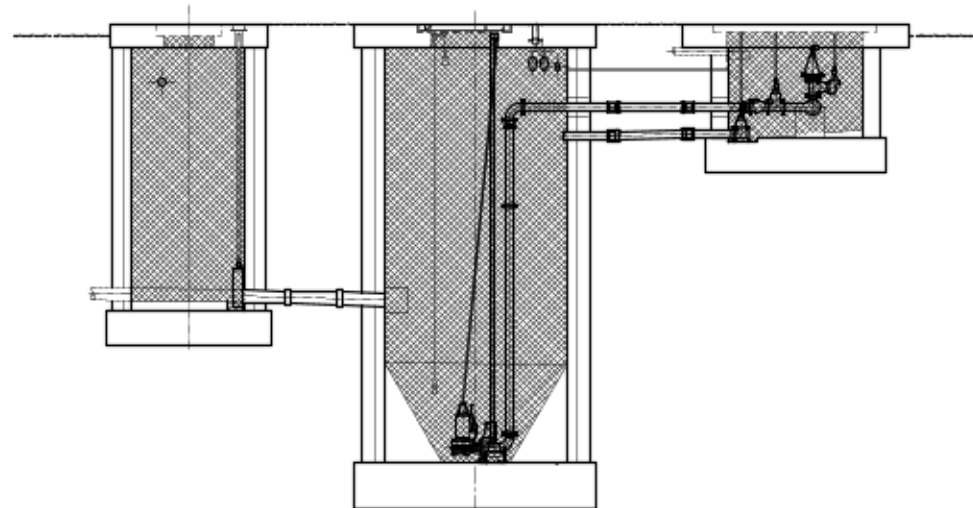
Note:
Earth bonding connections indicated thus:

The following actual equipment must be bonded to the earthing terminal:

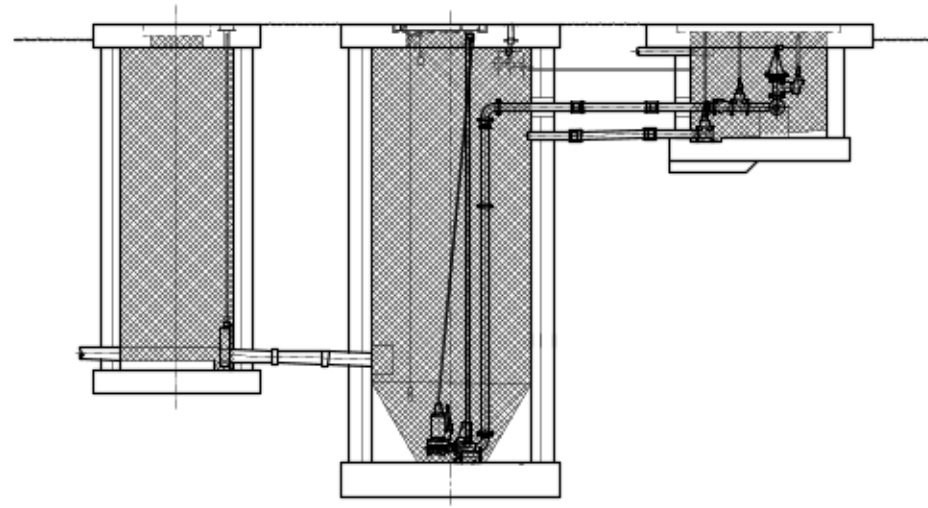
- All case earth connections, ect, in the kiosk/building;
- Metal ladder (Not applicable)
- Pump Guideways
- Pump delivery pipes;
- Metal rising main
- Metal cover support frames.

The pump casing is connected to the protective multiple earth (P.M.E.) earthing terminal via the flexible cable between the pump and the kiosk/building.

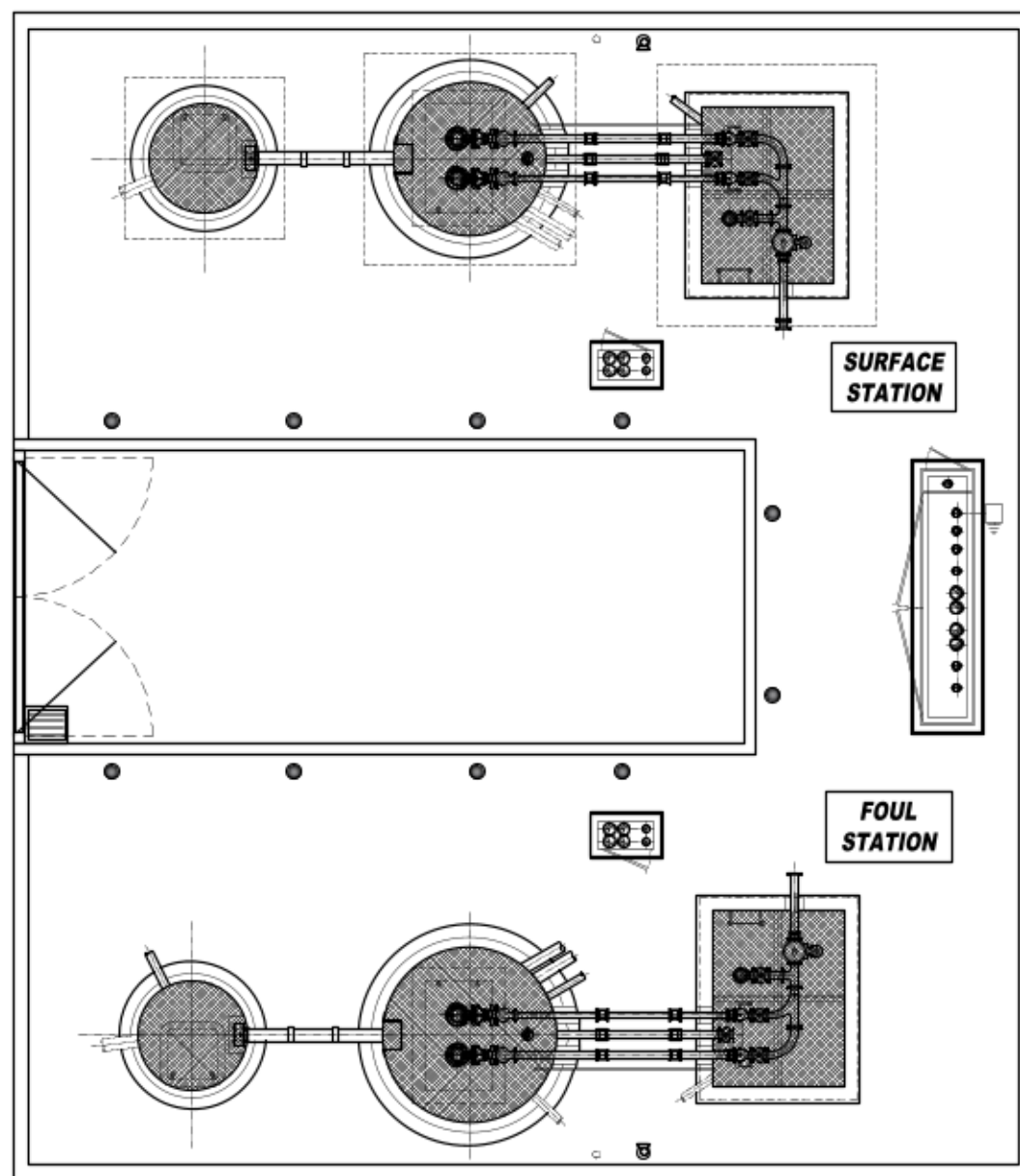
REV	DATE	DESCRIPTION	DR'n	CHK'd	APR'l
FOR APPROVAL					
<div><div><div>TOTAL WATER EXPERTISE</div></div><div><div>DESIGN</div><div>INSTALL</div><div>PROACTIVE</div></div></div>					
BUILDING 4/6, HTECH, FRIMLEY 4 BUSINESS PARK, FRIMLEY, CAMBERLEY, SURREY, GU11 7SS OFFICE TEL No: (01483) 930625 WEBSITE: WWW.PDASLTD.CO.UK					
PROJECT YORK GARDENS GOSBERTON					
TITLE COMMON PUMP STATION EARTHING ARRANGEMENT					
CLIENT GLEESON HOMES (MIDLANDS)					
SCALE AT A1 1:25		SCALE AT A3 1:50			
SITE ID.	2091	APR'l	E.W.	DATE	15-09-2022
JOB NO.	17881	CHK'd	I.H.	DATE	15-09-2022
DRAWING NUMBER	2091-17881-007	DR'n	N.K.	DATE	15-09-2022



FOUL WATER



SURFACE WATER



Cable Ducts in accordance with DCG F.3.4.4 and BS EN 1401-01 & BS 4680 sealed with rise sealant system Gas + waterproof sealant system

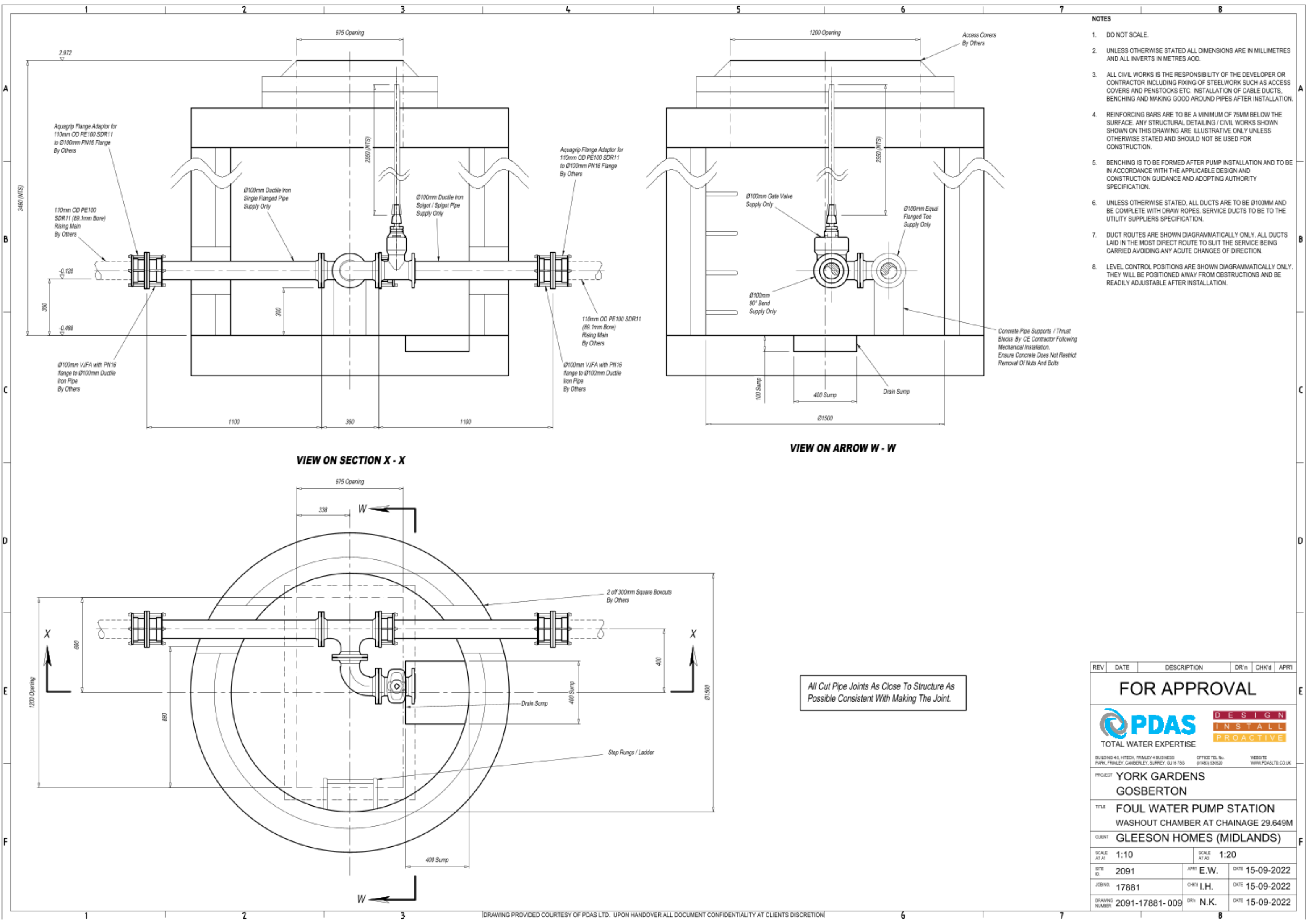
LEGEND

	Non Hazardous Zone
	Zone 2
	Zone 1

NOTES

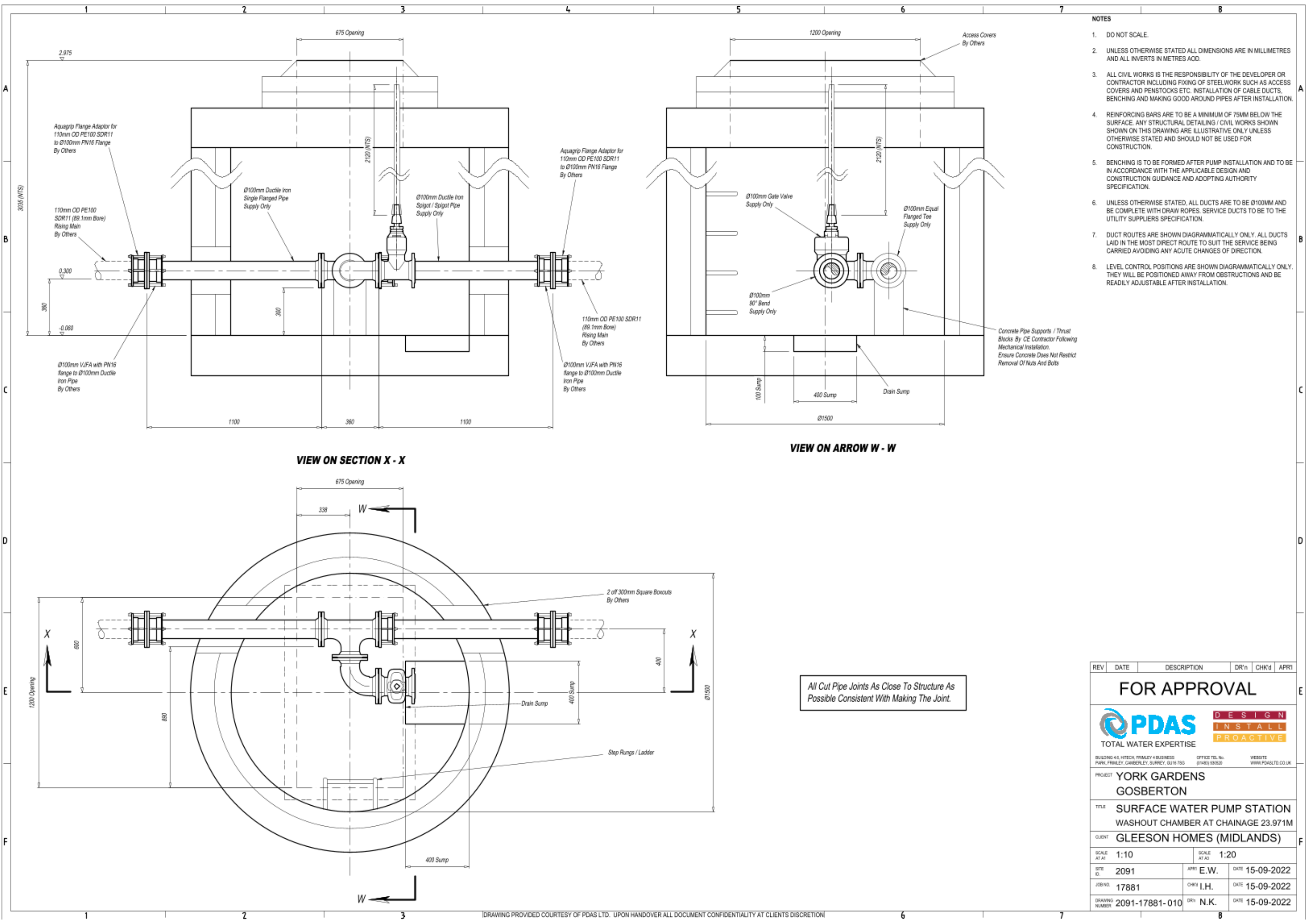
- DO NOT SCALE.
- UNLESS OTHERWISE STATED ALL DIMENSIONS ARE IN MILLIMETRES AND ALL INVERTS IN METRES AOD.
- ALL CIVIL WORKS IS THE RESPONSIBILITY OF THE DEVELOPER OR CONTRACTOR INCLUDING FIXING OF STEELWORK SUCH AS ACCESS COVERS AND PENSTOCKS ETC. INSTALLATION OF CABLE DUCTS, BENCHING AND MAKING GOOD AROUND PIPES AFTER INSTALLATION.
- REINFORCING BARS ARE TO BE A MINIMUM OF 75MM BELOW THE SURFACE. ANY STRUCTURAL DETAILING / CIVIL WORKS SHOWN SHOWN ON THIS DRAWING ARE ILLUSTRATIVE ONLY UNLESS OTHERWISE STATED AND SHOULD NOT BE USED FOR CONSTRUCTION.
- BENCHING IS TO BE FORMED AFTER PUMP INSTALLATION AND TO BE IN ACCORDANCE WITH THE APPLICABLE DESIGN AND CONSTRUCTION GUIDANCE AND ADOPTING AUTHORITY SPECIFICATION.
- UNLESS OTHERWISE STATED, ALL DUCTS ARE TO BE Ø100MM AND BE COMPLETE WITH DRAW ROPES. SERVICE DUCTS TO BE TO THE UTILITY SUPPLIERS SPECIFICATION.
- DUCT ROUTES ARE SHOWN DIAGRAMMATICALLY ONLY. ALL DUCTS LAID IN THE MOST DIRECT ROUTE TO SUIT THE SERVICE BEING CARRIED AVOIDING ANY ACUTE CHANGES OF DIRECTION.
- LEVEL CONTROL POSITIONS ARE SHOWN DIAGRAMMATICALLY ONLY. THEY WILL BE POSITIONED AWAY FROM OBSTRUCTIONS AND BE READILY ADJUSTABLE AFTER INSTALLATION.

REV	DATE	DESCRIPTION	DR'n	CHK'd	APR'l
FOR APPROVAL					
PDAS DESIGN TOTAL WATER EXPERTISE INSTALL PROACTIVE					
BUILDING 4/6, HTECH, FRIMLEY 4 BUSINESS PARK, FRIMLEY, CAMBERLEY, SURREY, GU11 7SS OFFICE TEL No: (01483) 930525 WEBSITE: WWW.PDASLTD.CO.UK					
PROJECT YORK GARDENS GOSBERTON					
TITLE COMMON PUMP STATION HAZARDOUS ZONING					
CLIENT GLEESON HOMES (MIDLANDS)					
SCALE AT A1	1:50	SCALE AT A3	1:100		
SITE ID:	2091	APR'l	E.W.	DATE	15-09-2022
JOB NO.	17881	CHK'd	I.H.	DATE	15-09-2022
DRAWING NUMBER	2091-17881-008	DR'n	N.K.	DATE	15-09-2022



- NOTES**
- DO NOT SCALE.
 - UNLESS OTHERWISE STATED ALL DIMENSIONS ARE IN MILLIMETRES AND ALL INVERTS IN METRES AOD.
 - ALL CIVIL WORKS IS THE RESPONSIBILITY OF THE DEVELOPER OR CONTRACTOR INCLUDING FIXING OF STEELWORK SUCH AS ACCESS COVERS AND PENSTOCKS ETC. INSTALLATION OF CABLE DUCTS, BENCHING AND MAKING GOOD AROUND PIPES AFTER INSTALLATION.
 - REINFORCING BARS ARE TO BE A MINIMUM OF 75MM BELOW THE SURFACE. ANY STRUCTURAL DETAILING / CIVIL WORKS SHOWN SHOWN ON THIS DRAWING ARE ILLUSTRATIVE ONLY UNLESS OTHERWISE STATED AND SHOULD NOT BE USED FOR CONSTRUCTION.
 - BENCHING IS TO BE FORMED AFTER PUMP INSTALLATION AND TO BE IN ACCORDANCE WITH THE APPLICABLE DESIGN AND CONSTRUCTION GUIDANCE AND ADOPTING AUTHORITY SPECIFICATION.
 - UNLESS OTHERWISE STATED, ALL DUCTS ARE TO BE 100MM AND BE COMPLETE WITH DRAW ROPES. SERVICE DUCTS TO BE TO THE UTILITY SUPPLIERS SPECIFICATION.
 - DUCT ROUTES ARE SHOWN DIAGRAMMATICALLY ONLY. ALL DUCTS LAID IN THE MOST DIRECT ROUTE TO SUIT THE SERVICE BEING CARRIED AVOIDING ANY ACUTE CHANGES OF DIRECTION.
 - LEVEL CONTROL POSITIONS ARE SHOWN DIAGRAMMATICALLY ONLY. THEY WILL BE POSITIONED AWAY FROM OBSTRUCTIONS AND BE READILY ADJUSTABLE AFTER INSTALLATION.

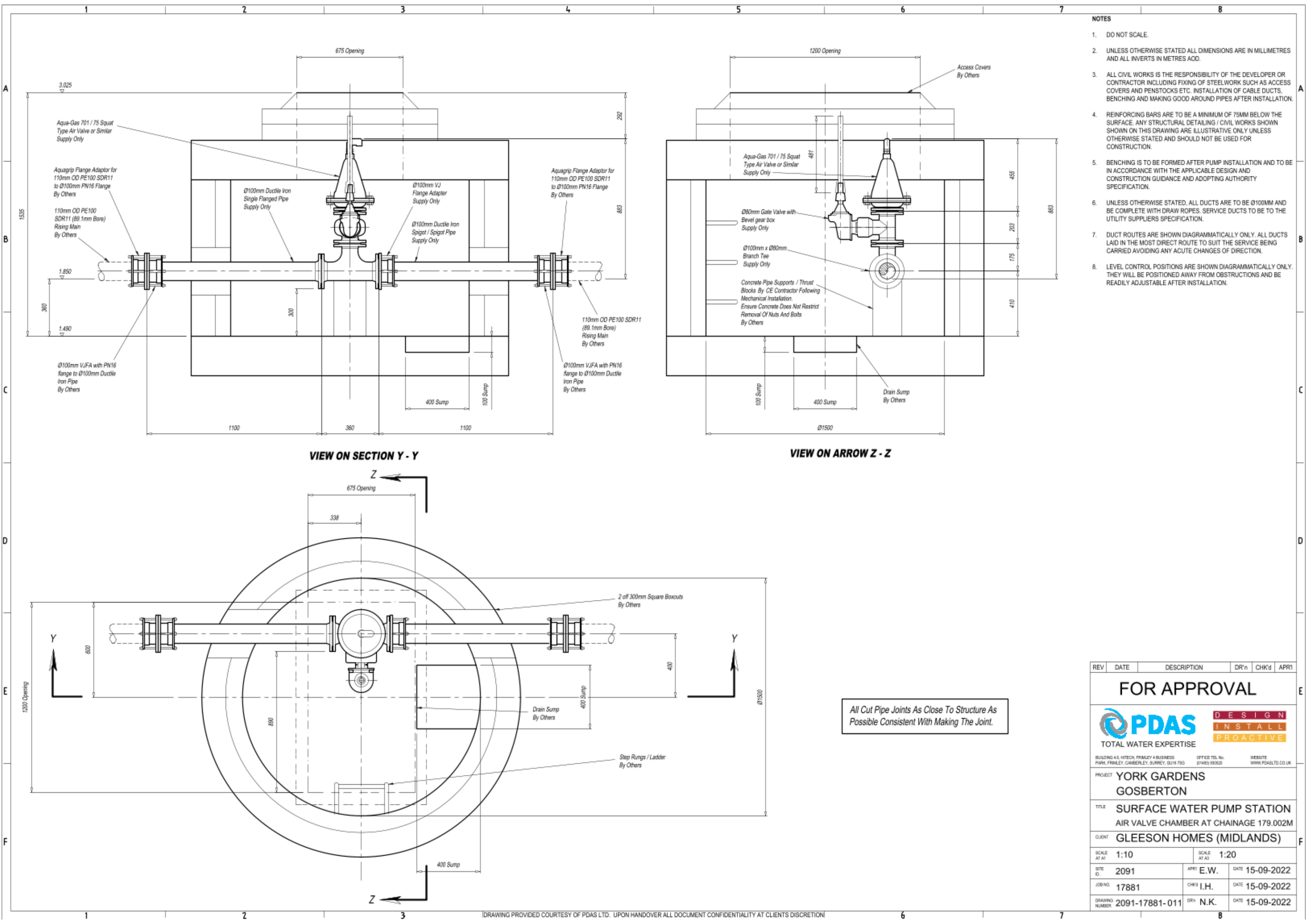
REV	DATE	DESCRIPTION	DR'n	CHK'd	APR'l
FOR APPROVAL					
 PDAS <small>TOTAL WATER EXPERTISE</small> DESIGN INSTALL PROACTIVE					
<small>BUILDING 4.6, HITECH, FRIMLEY 4 BUSINESS PARK, FRIMLEY, CAMBERLEY, SURREY, GU11 7SD OFFICE TEL No: (01483) 930525 WEBSITE: WWW.PDASLTD.CO.UK</small>					
PROJECT YORK GARDENS GOSBERTON					
TITLE FOUL WATER PUMP STATION WASHOUT CHAMBER AT CHAINAGE 29.649M					
CLIENT GLEESON HOMES (MIDLANDS)					
SCALE AT A1 1:10		SCALE AT A3 1:20			
SITE ID: 2091	APR'l: E.W.	DATE 15-09-2022			
JOB NO: 17881	CHK'd: I.H.	DATE 15-09-2022			
DRAWING NUMBER: 2091-17881-009	DR'n: N.K.	DATE 15-09-2022			



- NOTES**
1. DO NOT SCALE.
 2. UNLESS OTHERWISE STATED ALL DIMENSIONS ARE IN MILLIMETRES AND ALL INVERTS IN METRES AOD.
 3. ALL CIVIL WORKS IS THE RESPONSIBILITY OF THE DEVELOPER OR CONTRACTOR INCLUDING FIXING OF STEELWORK SUCH AS ACCESS COVERS AND PENSTOCKS ETC. INSTALLATION OF CABLE DUCTS, BENCHING AND MAKING GOOD AROUND PIPES AFTER INSTALLATION.
 4. REINFORCING BARS ARE TO BE A MINIMUM OF 75MM BELOW THE SURFACE. ANY STRUCTURAL DETAILING / CIVIL WORKS SHOWN SHOWN ON THIS DRAWING ARE ILLUSTRATIVE ONLY UNLESS OTHERWISE STATED AND SHOULD NOT BE USED FOR CONSTRUCTION.
 5. BENCHING IS TO BE FORMED AFTER PUMP INSTALLATION AND TO BE IN ACCORDANCE WITH THE APPLICABLE DESIGN AND CONSTRUCTION GUIDANCE AND ADOPTING AUTHORITY SPECIFICATION.
 6. UNLESS OTHERWISE STATED, ALL DUCTS ARE TO BE Ø100MM AND BE COMPLETE WITH DRAW ROPES. SERVICE DUCTS TO BE TO THE UTILITY SUPPLIERS SPECIFICATION.
 7. DUCT ROUTES ARE SHOWN DIAGRAMMATICALLY ONLY. ALL DUCTS LAID IN THE MOST DIRECT ROUTE TO SUIT THE SERVICE BEING CARRIED AVOIDING ANY ACUTE CHANGES OF DIRECTION.
 8. LEVEL CONTROL POSITIONS ARE SHOWN DIAGRAMMATICALLY ONLY. THEY WILL BE POSITIONED AWAY FROM OBSTRUCTIONS AND BE READILY ADJUSTABLE AFTER INSTALLATION.

All Cut Pipe Joints As Close To Structure As Possible Consistent With Making The Joint.

REV	DATE	DESCRIPTION	DR'n	CHK'd	APR'l
FOR APPROVAL					
 PDAS <small>TOTAL WATER EXPERTISE</small> DESIGN INSTALL PROACTIVE					
<small>BUILDING 4.6, HITECH, FRIMLEY 4 BUSINESS PARK, FRIMLEY, CAMBERLEY, SURREY, GU11 7SD OFFICE TEL No: (01483) 930620 WEBSITE: WWW.PDASLTD.CO.UK</small>					
PROJECT YORK GARDENS GOSBERTON					
TITLE SURFACE WATER PUMP STATION WASHOUT CHAMBER AT CHAINAGE 23.971M					
CLIENT GLEESON HOMES (MIDLANDS)					
SCALE AT A1 1:10		SCALE AT A3 1:20			
SITE ID: 2091	APR'l: E.W.	DATE 15-09-2022			
JOB NO. 17881	CHK'd: I.H.	DATE 15-09-2022			
DRAWING NUMBER: 2091-17881-010	DR'n: N.K.	DATE 15-09-2022			



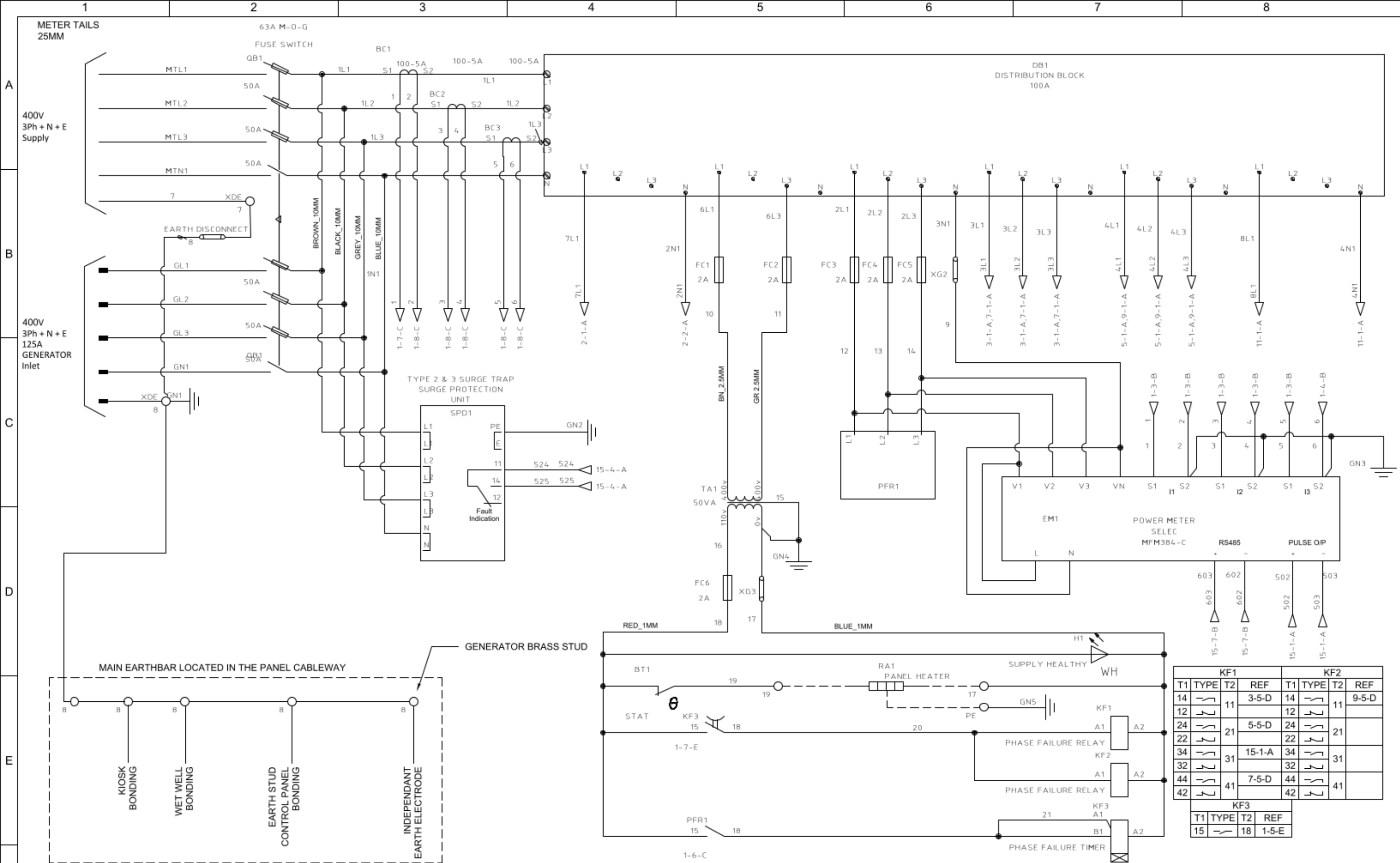
- NOTES
- DO NOT SCALE.
 - UNLESS OTHERWISE STATED ALL DIMENSIONS ARE IN MILLIMETRES AND ALL INVERTS IN METRES AOD.
 - ALL CIVIL WORKS IS THE RESPONSIBILITY OF THE DEVELOPER OR CONTRACTOR INCLUDING FIXING OF STEELWORK SUCH AS ACCESS COVERS AND PENSTOCKS ETC. INSTALLATION OF CABLE DUCTS, BENCHING AND MAKING GOOD AROUND PIPES AFTER INSTALLATION.
 - REINFORCING BARS ARE TO BE A MINIMUM OF 75MM BELOW THE SURFACE. ANY STRUCTURAL DETAILING / CIVIL WORKS SHOWN SHOWN ON THIS DRAWING ARE ILLUSTRATIVE ONLY UNLESS OTHERWISE STATED AND SHOULD NOT BE USED FOR CONSTRUCTION.
 - BENCHING IS TO BE FORMED AFTER PUMP INSTALLATION AND TO BE IN ACCORDANCE WITH THE APPLICABLE DESIGN AND CONSTRUCTION GUIDANCE AND ADOPTING AUTHORITY SPECIFICATION.
 - UNLESS OTHERWISE STATED, ALL DUCTS ARE TO BE Ø100MM AND BE COMPLETE WITH DRAW ROPES. SERVICE DUCTS TO BE TO THE UTILITY SUPPLIERS SPECIFICATION.
 - DUCT ROUTES ARE SHOWN DIAGRAMMATICALLY ONLY. ALL DUCTS LAID IN THE MOST DIRECT ROUTE TO SUIT THE SERVICE BEING CARRIED AVOIDING ANY ACUTE CHANGES OF DIRECTION.
 - LEVEL CONTROL POSITIONS ARE SHOWN DIAGRAMMATICALLY ONLY. THEY WILL BE POSITIONED AWAY FROM OBSTRUCTIONS AND BE READILY ADJUSTABLE AFTER INSTALLATION.

REV	DATE	DESCRIPTION	DR'n	CHK'd	APR'l
FOR APPROVAL					
 PDAS <small>TOTAL WATER EXPERTISE</small> DESIGN INSTALL PROACTIVE					
<small>BUILDING 4/6, HTECH, FRIMLEY 4 BUSINESS PARK, FRIMLEY, CAMBERLEY, SURREY, GU11 7SD OFFICE TEL No: (01483) 939525 WEBSITE: WWW.PDASLTD.CO.UK</small>					
PROJECT YORK GARDENS GOSBERTON					
TITLE SURFACE WATER PUMP STATION AIR VALVE CHAMBER AT CHAINAGE 179.002M					
CLIENT GLEESON HOMES (MIDLANDS)					
SCALE AT A1	1:10	SCALE AT A3	1:20		
SITE ID.	2091	APR'l	E.W.	DATE	15-09-2022
JOB NO.	17881	CHK'd	I.H.	DATE	15-09-2022
DRAWING NUMBER	2091-17881-011	DR'n	N.K.	DATE	15-09-2022

All Cut Pipe Joints As Close To Structure As Possible Consistent With Making The Joint.

Appendix F

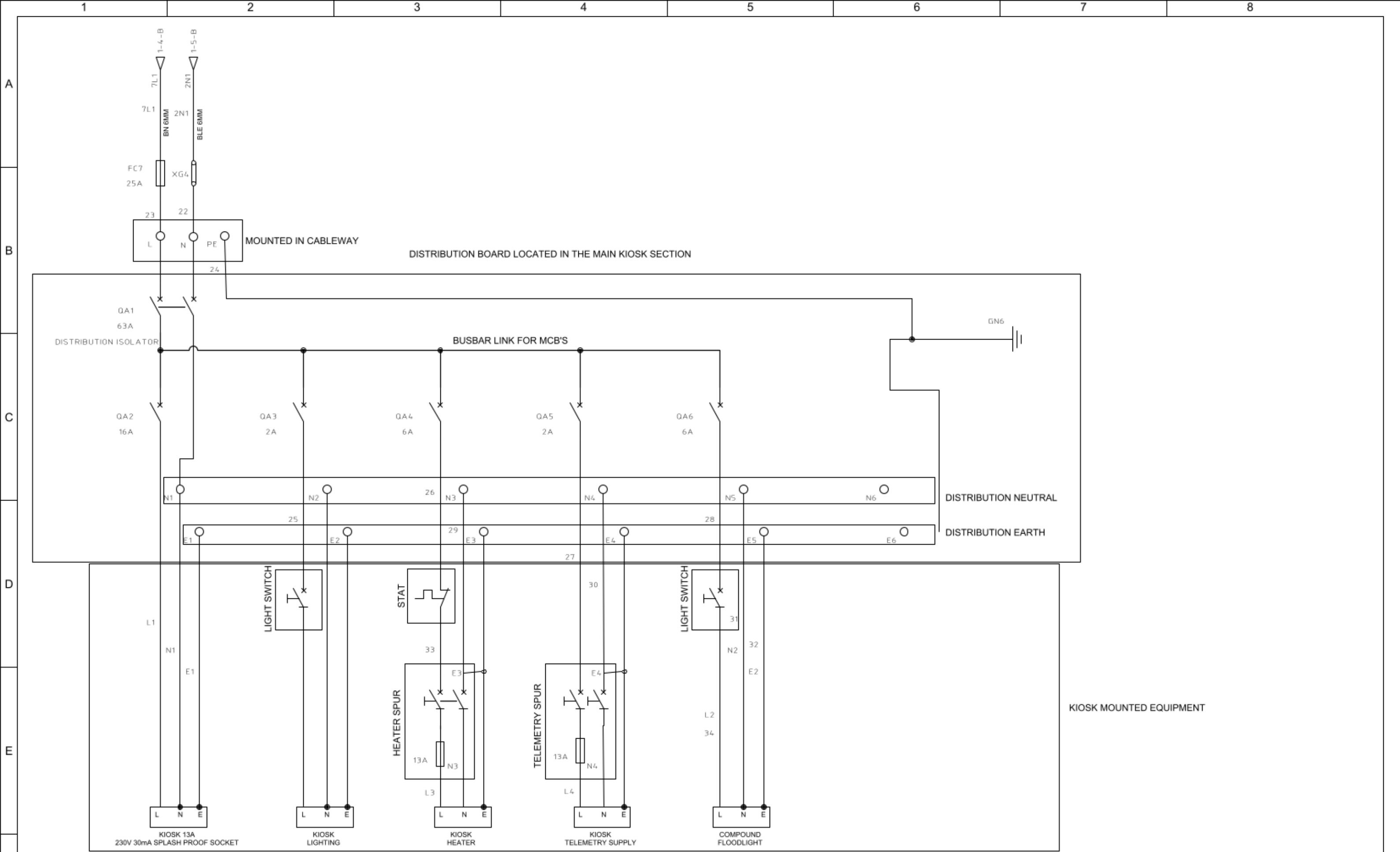
Wiring Diagrams



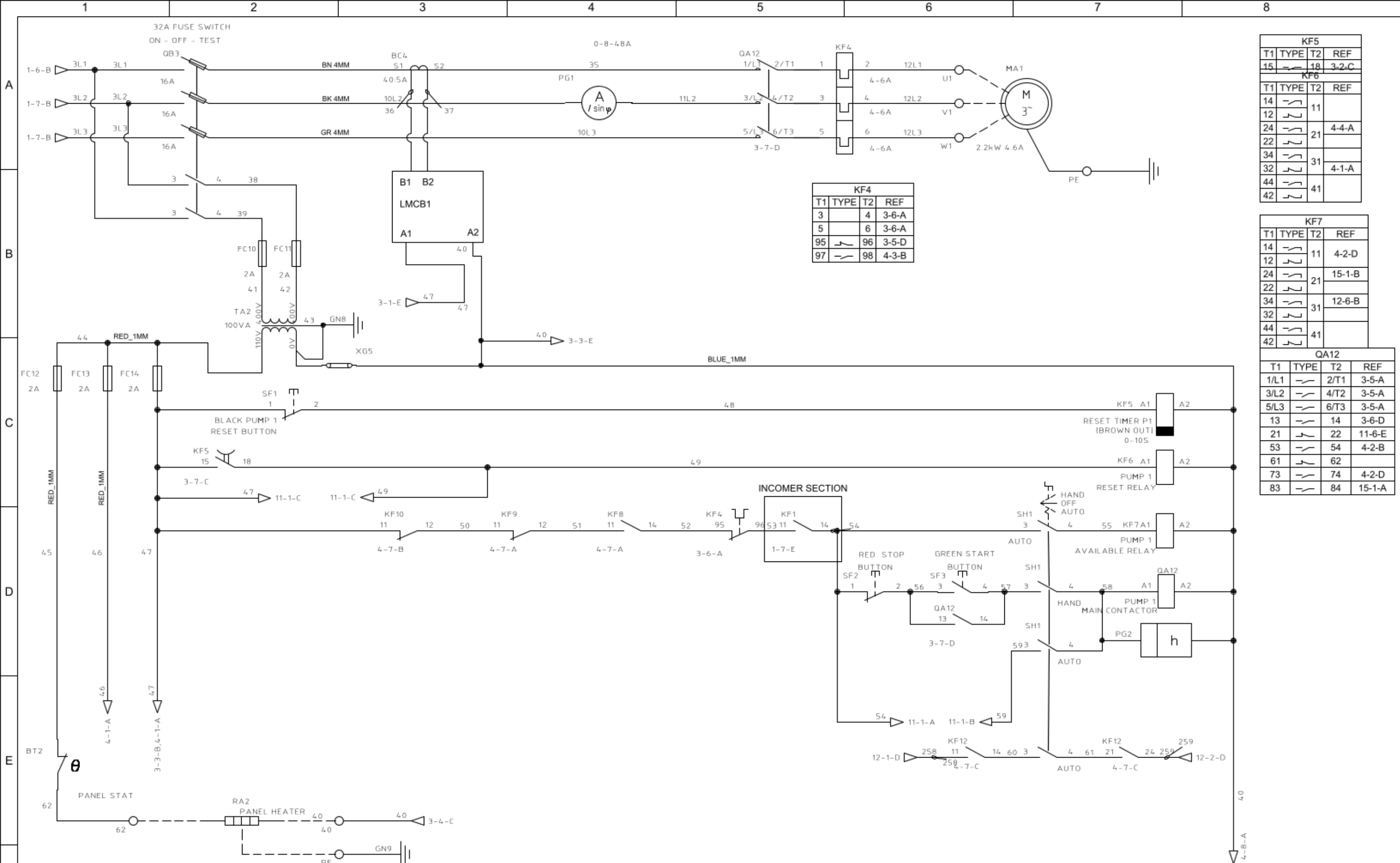
F

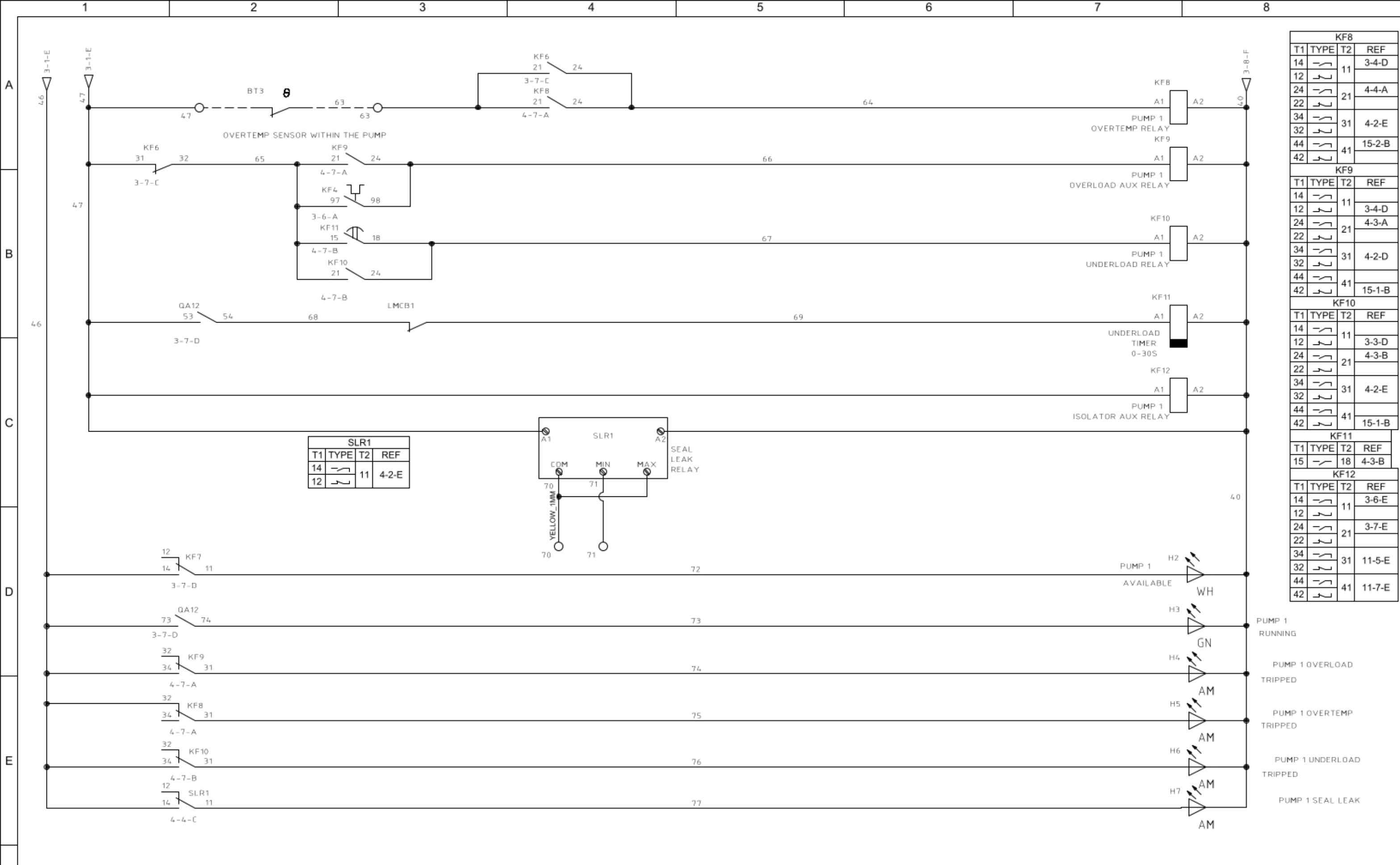
					Client Name Gleeson Homes (Midlands)		 gemini control systems ltd designers and manufacturers	 APPROVED CONTRACTOR GEMINI CONTROL SYSTEMS LTD TEL: 0808 196 8770 FAX: 01782 659 465 WWW.GEMINI-CONTROLS.COM	 interface ISO 9001 CERTIFICATION	 UKAS	 PDAS TOTAL WATER EXPERTISE	 Sheet No 1 of 20
					TitleAW SEWERAGE SECTOR GUIDANCE DUAL DOL CONTROL PANEL INCOMER SECTION							
					Drawn By JH	Project Code 2091-17881						
A	First Issue	09/09/22	JH	JH								
Rev	Description	Date	Drn	Apprv	Drawing No 2091-17881							

This document may not, without our permission, be copied, shown or handed out to competitors or any other unauthorised persons
Copyright Protected

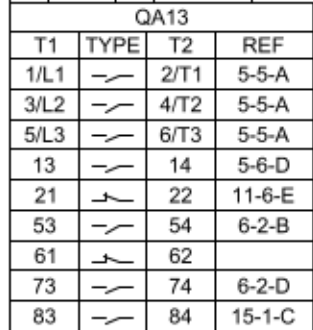


F						Client Name Gleeson Homes (Midlands)	 gemini control systems ltd designers and manufacturers	 APPROVED CONTRACTOR GEMINI CONTROL SYSTEMS LTD TEL: 0808 196 8770 FAX: 01782 659 465 WWW.GEMINI-CONTROLS.COM	 ISO 9001 CERTIFICATION	 UKAS	 PDAS TOTAL WATER EXPERTISE	 Sheet No 2 of 20			
					TitleAW SEWERAGE SECTOR GUIDANCE DUAL DOL CONTROL PANEL DISTRIBUTION SECTION										
					Drawn By JH	Project Code 2091-17881									
	A	First Issue	09/09/22	JH	JH										
Rev	Description	Date	Drn	Apprv	Drawing No 2091-17881			Site York Gardens, Gosberton		This document may not, without our permission, be copied, shown or handed out to competitors or any other unauthorised persons Copyright Protected					





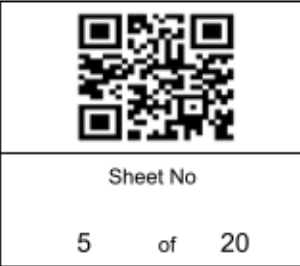
F					Client Name Gleeson Homes (Midlands)		 gemini control systems ltd designers and manufacturers	 GEMINI CONTROL SYSTEMS LTD TEL: 0808 196 8770 FAX: 01782 659 465 WWW.GEMINI-CONTROLS.COM	 	 This document may not, without our permission, be copied, shown or handed out to competitors or any other unauthorised persons Copyright Protected	 Sheet No 4 of 20	
					TitleAW SEWERAGE SECTOR GUIDANCE DUAL DOL CONTROL PANEL PUMP 1 STARTER SURFACE 1							
					Drawn By JH	Project Code 2091-17881						
	A	First Issue	09/09/22	JH	JH							
	Rev	Description	Date	Drn	Apprv	Drawing No 2091-17881						

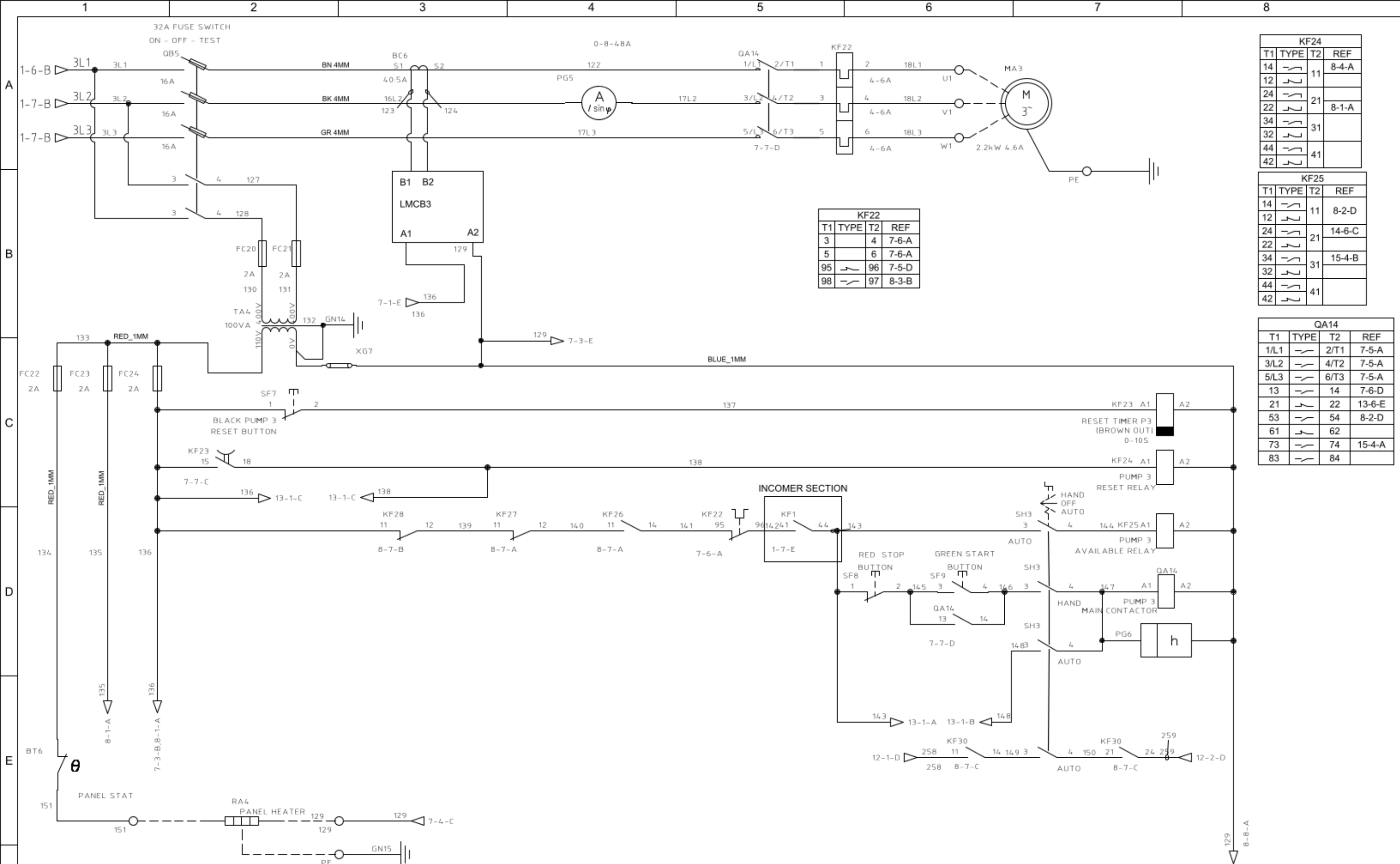


QA13			
T1	TYPE	T2	REF
1/L1		2/T1	5-5-A
3/L2		4/T2	5-5-A
5/L3		6/T3	5-5-A
13		14	5-6-D
21		22	11-6-E
53		54	6-2-B
61		62	
73		74	6-2-D
83		84	15-1-C



					Client Name Gleeson Homes (Midlands)	
					TitleAW SEWERAGE SECTOR GUIDANCE DUAL DOL CONTROL PANEL PUMP 2 STARTER SURFACE 2	
					Drawn By JH	Project Code 2091-17881
A	First Issue	09/09/22	JH	JH		
Rev	Description	Date	Drn	Apprv	Drawing No 2091-17881	



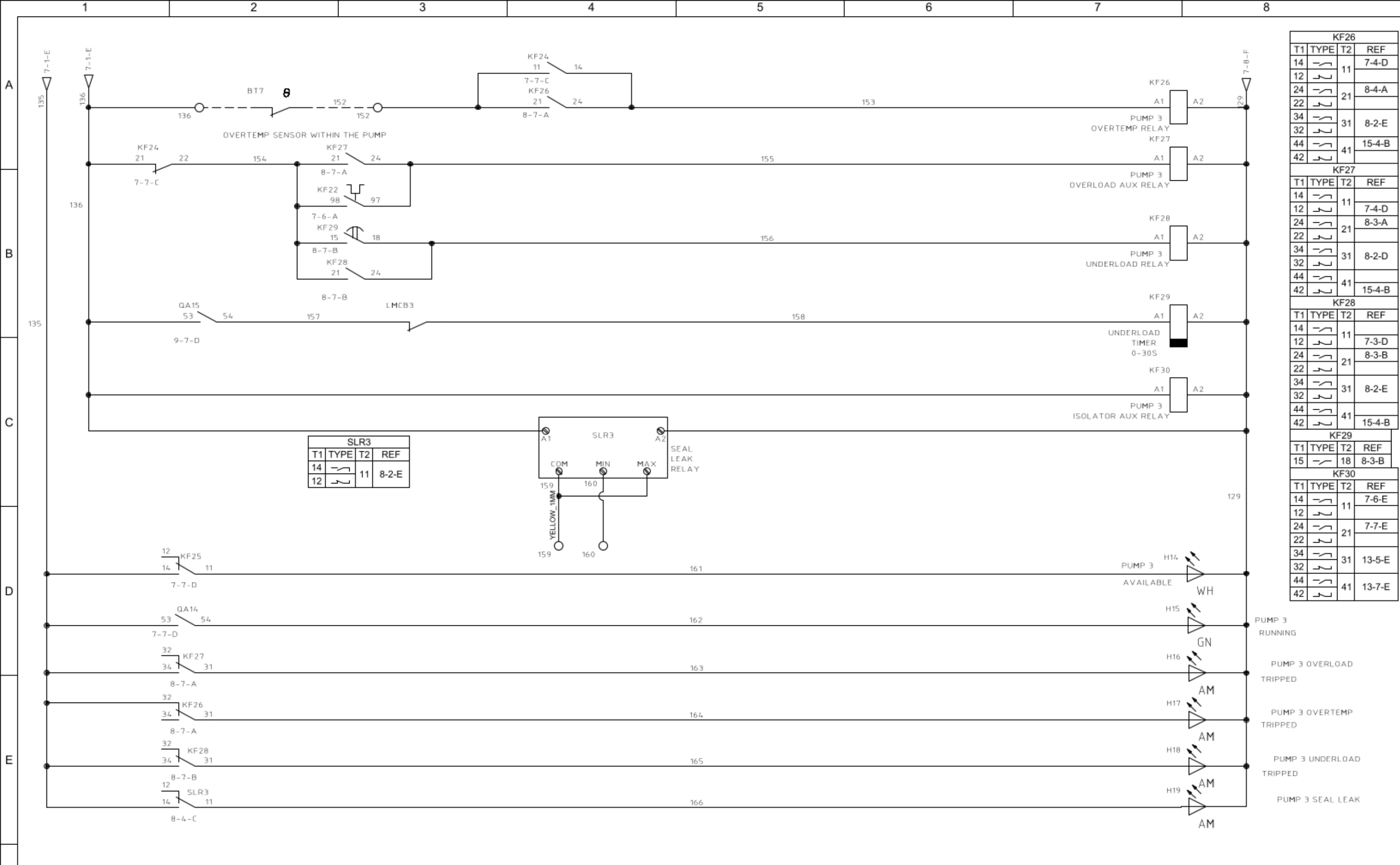


T1	TYPE	T2	REF
14	—	11	8-4-A
12	—	11	
24	—	21	8-1-A
22	—	31	
34	—	41	
32	—	41	
44	—	41	
42	—	41	

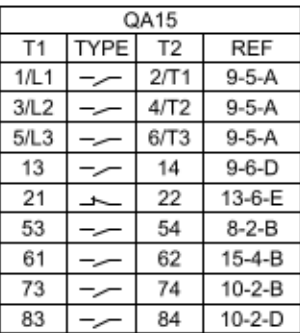
T1	TYPE	T2	REF
14	—	11	8-2-D
12	—	11	
24	—	21	14-6-C
22	—	31	15-4-B
34	—	41	
32	—	41	
44	—	41	
42	—	41	

T1	TYPE	T2	REF
1/L1	—	2/T1	7-5-A
3/L2	—	4/T2	7-5-A
5/L3	—	6/T3	7-5-A
13	—	14	7-6-D
21	—	22	13-6-E
53	—	54	8-2-D
61	—	62	
73	—	74	15-4-A
83	—	84	

F					Client Name Gleeson Homes (Midlands)		 gemini control systems ltd designers and manufacturers	 interface ISO 9001 CERTIFICATION	 This document may not, without our permission, be copied, shown or handed out to competitors or any other unauthorised persons Copyright Protected	 Sheet No 7 of 20
					TitleAW SEWERAGE SECTOR GUIDANCE COMPOSITE DOL CONTROL PANEL PUMP 3 STARTER FOUL 1					
					Drawn By JH	Project Code 2091-17881				
	A	First Issue	09/09/22	JH	JH					
	Rev	Description	Date	Drn	Apprv	Drawing No 2091-17881				

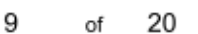


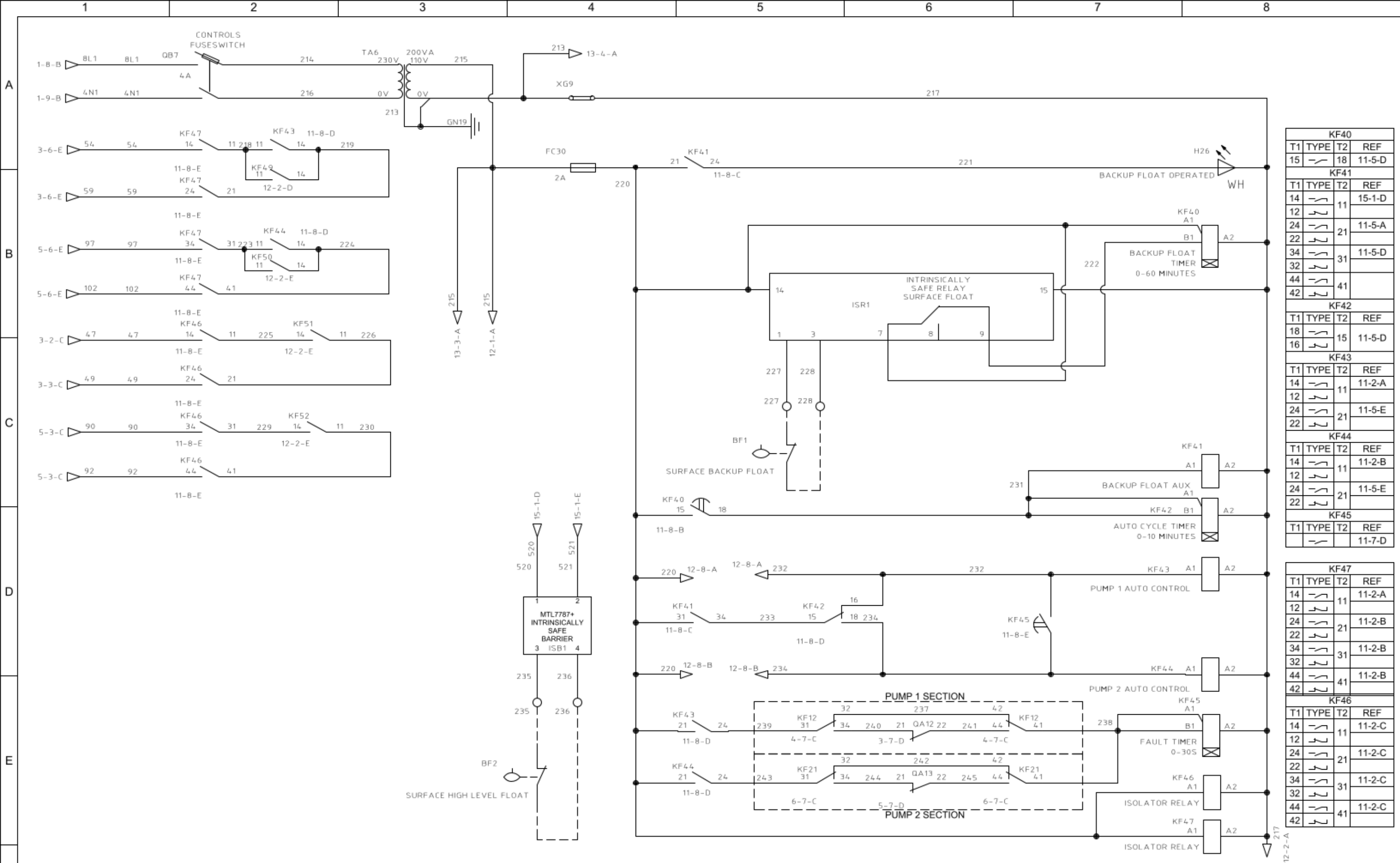
F					Client Name Gleeson Homes (Midlands)		 gemini control systems ltd designers and manufacturers	 GEMINI CONTROL SYSTEMS LTD TEL: 0808 196 8770 FAX: 01782 659 465 WWW.GEMINI-CONTROLS.COM	 This document may not, without our permission, be copied, shown or handed out to competitors or any other unauthorised persons Copyright Protected		 Sheet No 8 of 20
					TitleAW SEWERAGE SECTOR GUIDANCE COMPOSITE DOL CONTROL PANEL PUMP 3 STARTER FOUL 1						
					Drawn By JH	Project Code 2091-17881					
	A	First Issue	09/09/22	JH	JH						
	Rev	Description	Date	Drn	Apprv	Drawing No 2091-17881					



QA15			
T1	TYPE	T2	REF
1/L1		2/T1	9-5-A
3/L2		4/T2	9-5-A
5/L3		6/T3	9-5-A
13		14	9-6-D
21		22	13-6-E
53		54	8-2-B
61		62	15-4-B
73		74	10-2-B
83		84	10-2-D

Client Name	Gleeson Homes (Midlands)
Title	AW SEWERAGE SECTION COMPOSITE DOL CO PUMP 4 START
Drawn By	JH
Drawing No	2091-17881





T1	TYPE	T2	REF
15	—	18	11-5-D

T1	TYPE	T2	REF
14	—	11	15-1-D
12	—	21	11-5-A
24	—	31	11-5-D
32	—	41	
44	—	41	

T1	TYPE	T2	REF
18	—	15	11-5-D
16	—		

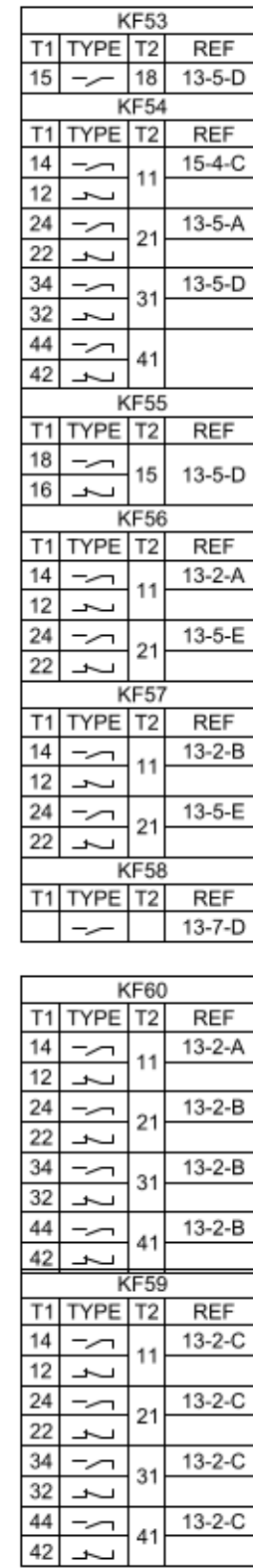
T1	TYPE	T2	REF
14	—	11	11-2-A
12	—	21	11-5-E
24	—	21	
22	—		

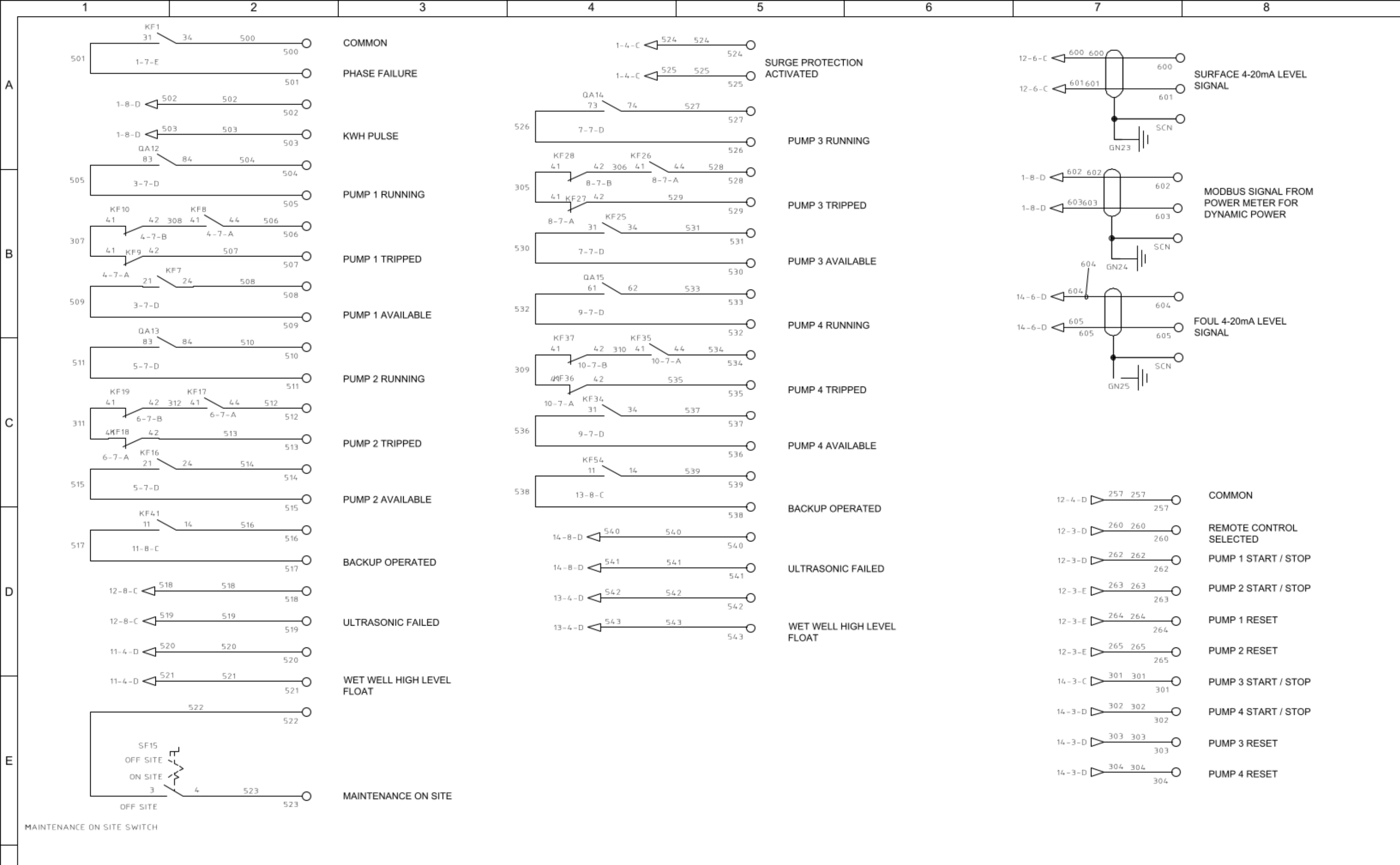
T1	TYPE	T2	REF
14	—	11	11-2-B
12	—	21	11-5-E
24	—	21	
22	—		

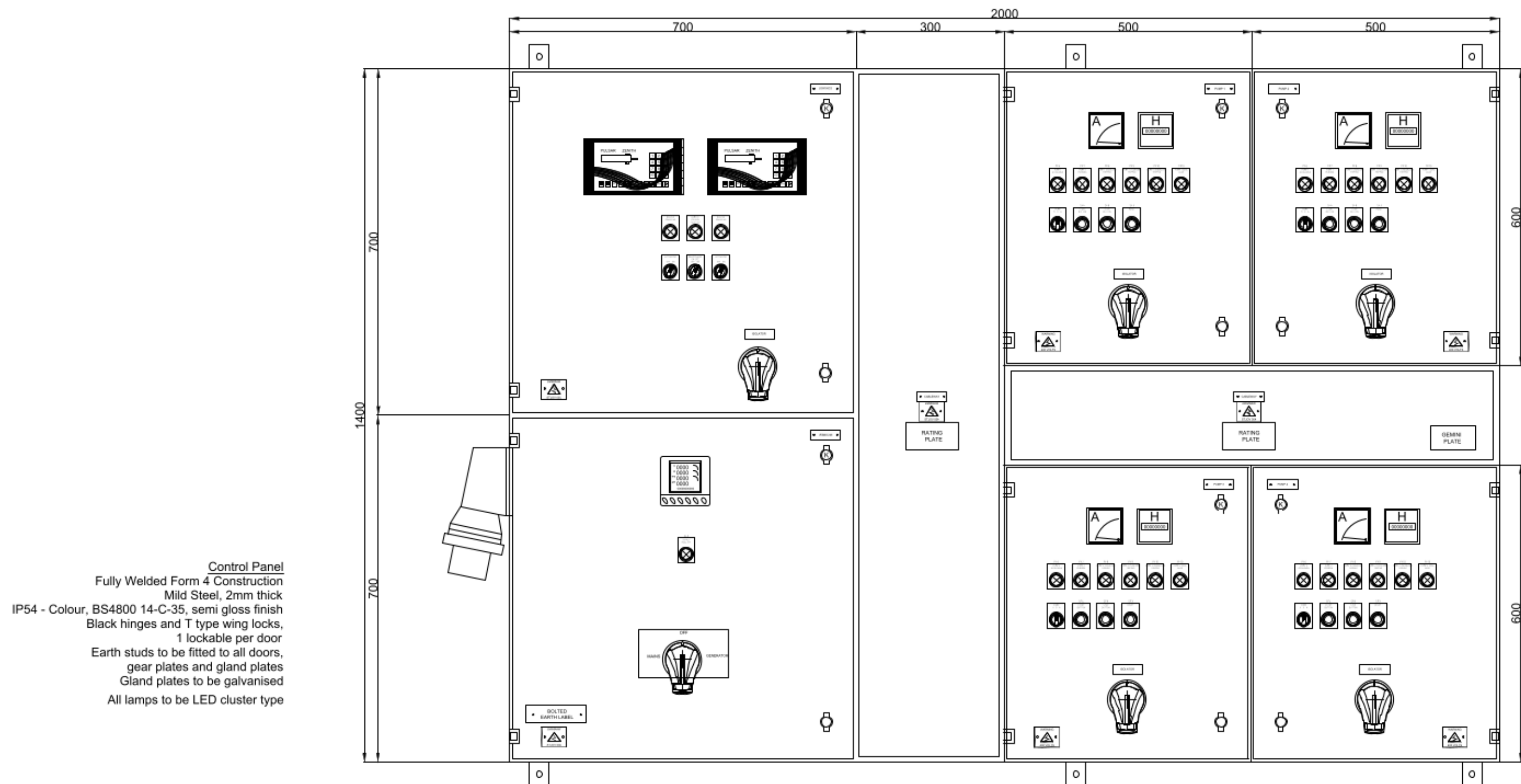
T1	TYPE	T2	REF
14	—	11	11-2-A
12	—	21	11-2-B
24	—	21	11-2-B
22	—	31	11-2-B
34	—	41	11-2-B
44	—	41	11-2-B
42	—		

T1	TYPE	T2	REF
14	—	11	11-2-C
12	—	21	11-2-C
24	—	31	11-2-C
22	—	41	11-2-C
34	—	41	11-2-C
44	—	41	11-2-C
42	—		

F					Client Name Gleeson Homes (Midlands)		 gemini control systems ltd designers and manufacturers	 APPROVED CONTRACTOR GEMINI CONTROL SYSTEMS LTD TEL: 0808 196 8770 FAX: 01782 659 465 WWW.GEMINI-CONTROLS.COM	 ISO 9001 CERTIFICATION	 UKAS	 PDAS TOTAL WATER EXPERTISE	 Sheet No 11 of 20	
					TitleAW SEWERAGE SECTOR GUIDANCE COMPOSITE DOL CONTROL PANEL COMMON CONTROLS								
					Drawn By JH	Project Code 2091-17881							
	A	First Issue	09/09/22	JH	JH								
	Rev	Description	Date	Drn	Apprv	Drawing No 2091-17881							

GCD0025/C - 11/1/19





					Client Name Gleeson Homes (Midlands)	
					Title AW SEWERAGE SECTOR GUIDANCE COMPOSITE DOL CONTROL PANEL PANEL GA	
					Drawn By JH	Project Code 2091-17881
A	First Issue	09/09/22	JH	JH		
Rev	Description	Date	Drm	Apprv	Drawing No 2091-17881	



Site
York Gardens, Gosberton

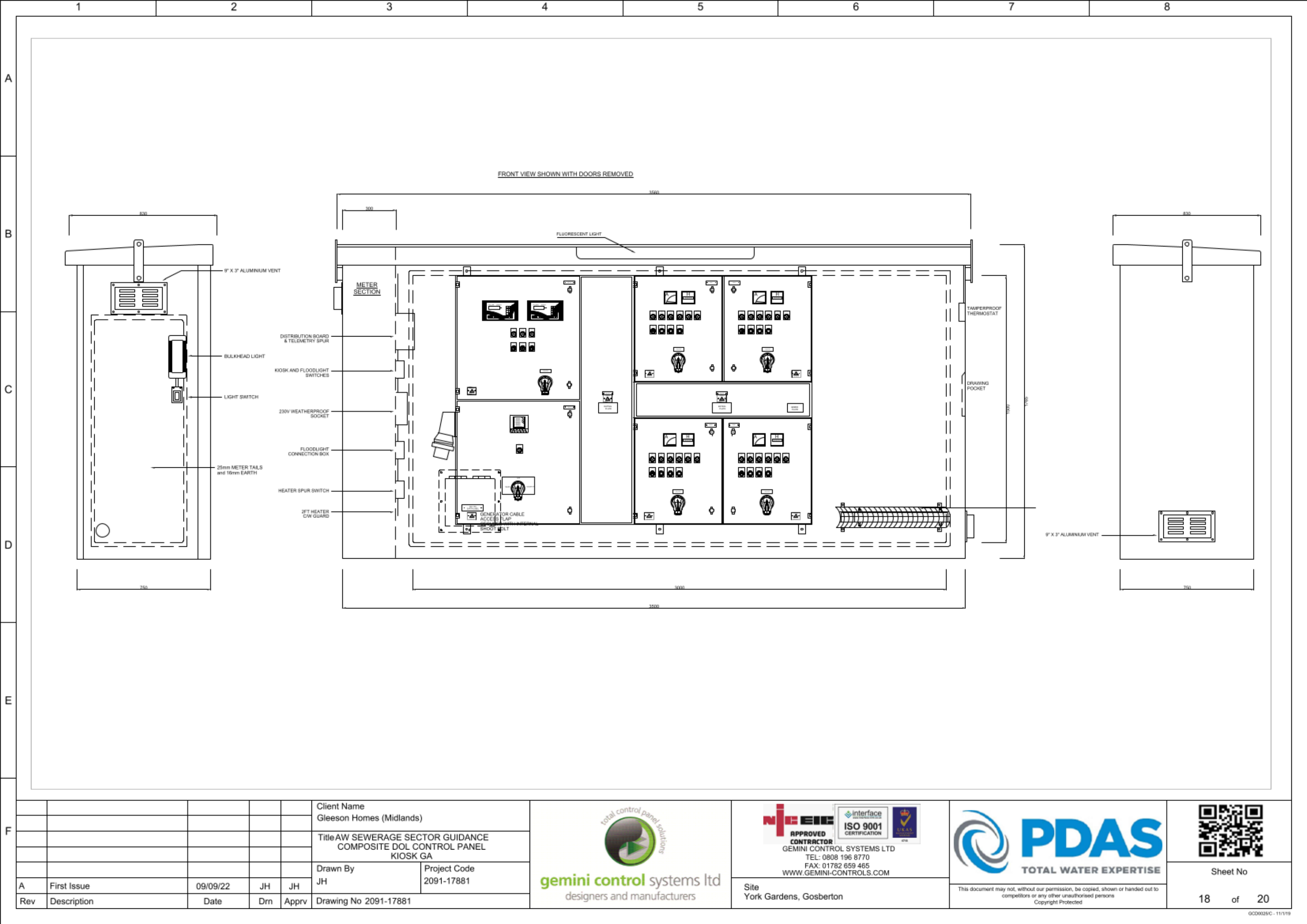


This document may not, without our permission, be copied, shown or handed out to competitors or any other unauthorised persons
Copyright Protected



Sheet No

17 of 20



					Client Name Gleeson Homes (Midlands)
					TitleAW SEWERAGE SECTOR GUIDANCE COMPOSITE DOL CONTROL PANEL KIOSK GA
					Drawn By JH
					Project Code 2091-17881
A	First Issue	09/09/22	JH	JH	
Rev	Description	Date	Drn	Apprv	Drawing No 2091-17881


gemini control systems ltd
designers and manufacturers


APPROVED CONTRACTOR
GEMINI CONTROL SYSTEMS LTD
TEL: 0808 196 8770
FAX: 01782 659 465
WWW.GEMINI-CONTROLS.COM


interface
ISO 9001
CERTIFICATION


UKAS

Site
York Gardens, Gosberton

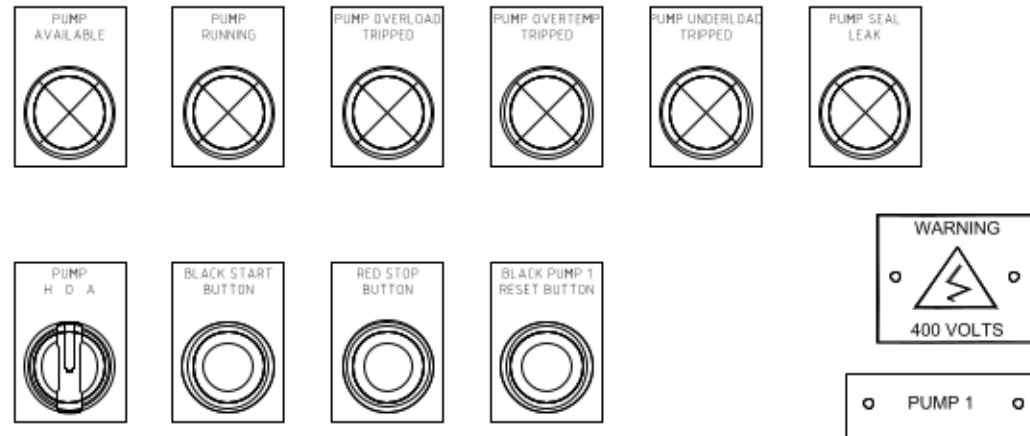

PDAS
TOTAL WATER EXPERTISE

This document may not, without our permission, be copied, shown or handed out to competitors or any other unauthorised persons
Copyright Protected

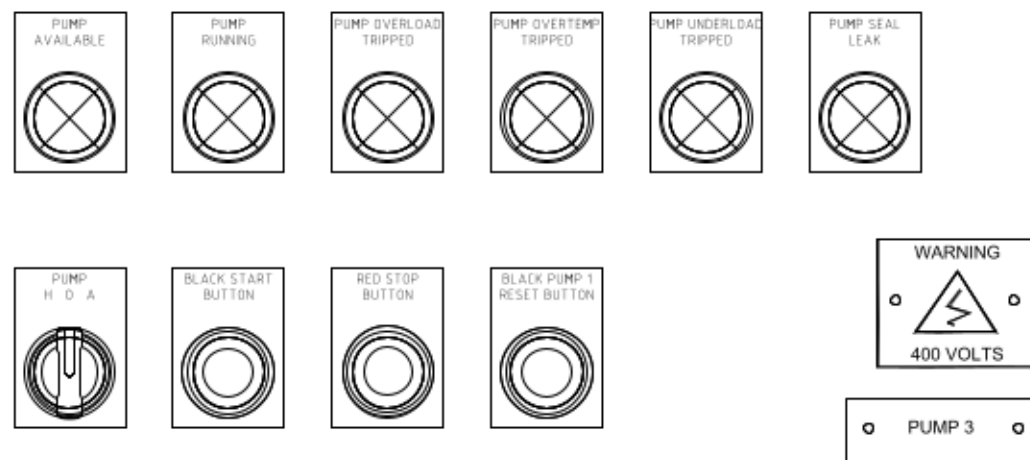


Sheet No
18 of 20

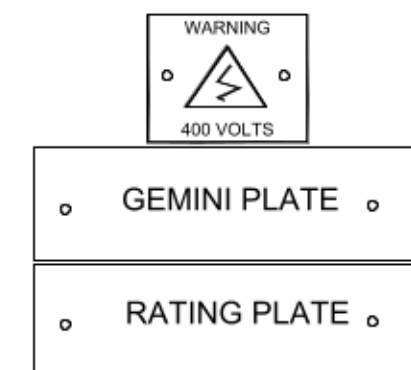
PUMP 1



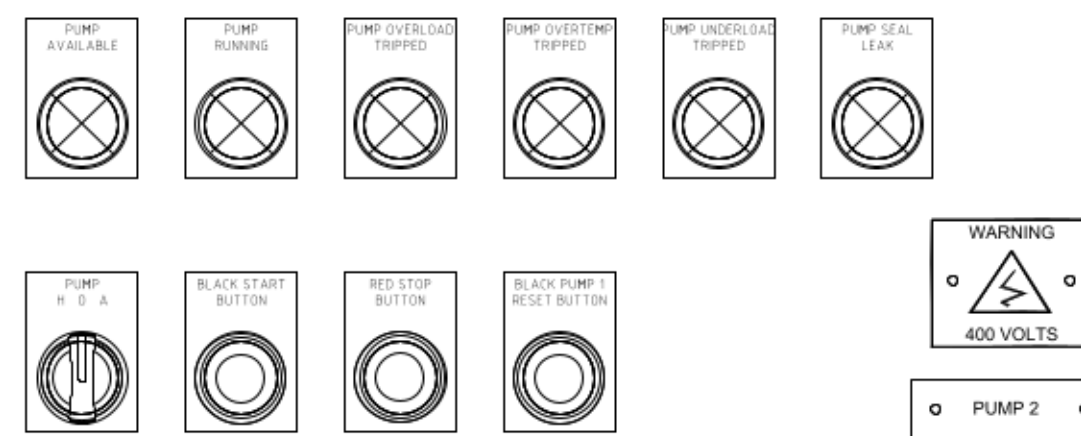
PUMP 3



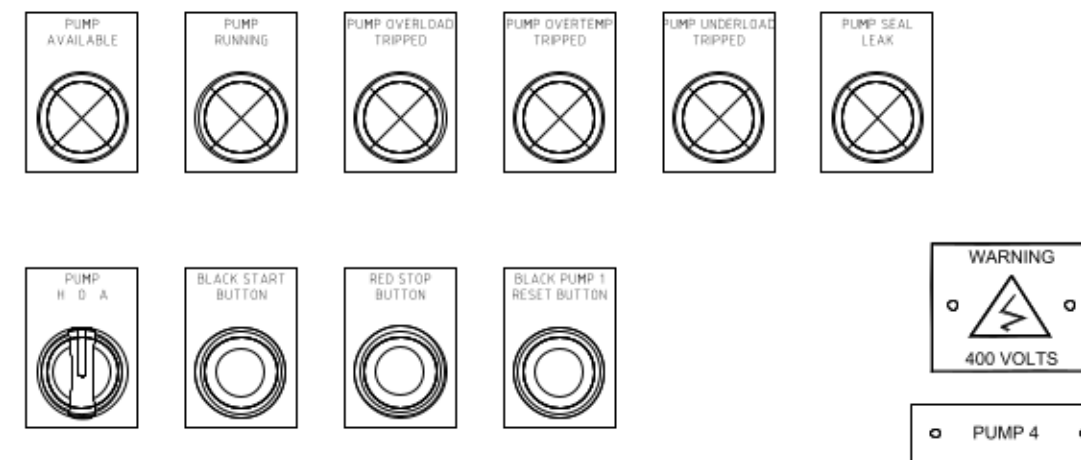
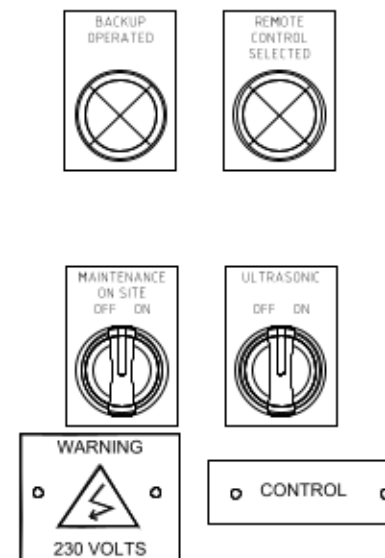
~~CABLEWAY~~



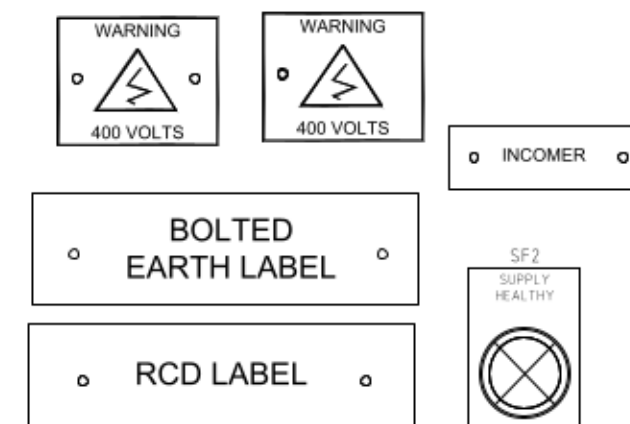
PUMP 2



PUMP 4

~~CONTROLS~~

~~INCOMER~~



					Client Name Gleeson Homes (Midlands)
					TitleAW SEWERAGE SE COMPOSITE DOL C LABEL
					Drawn By JH
A	First Issue	09/09/22	JH	JH	
Rev	Description	Date	Drn	Apprv	Drawing No 2091-17881

Client Name Gleeson Homes (Midlands)	
Title AW SEWERAGE SECTOR GUIDANCE COMPOSITE DOL CONTROL PANEL LABEL GA	
Drawn By JH	Project Code 2091-17881
Drawing No 2091-17881	



Appendix G

Floodlight and Column



Kingfisher Lighting Datasheet

Columns

A comprehensive range of tubular, conical and hinged columns, for road & transport, car parks, residential and urban landscapes.



Experts in columns

- Over 25 years' experience
- Lighting design facility to help you specify
- Support to match the columns with luminaires & brackets

Maintained stock levels

- Extensive stock of most columns held at our warehouse
- In-house fabrication and finishing options

Nation-wide delivery

- Hi-ab equipment to enable fast and safe off-loading
- Fleet fitted with trackers to monitor deliveries
- Helpful drivers who handle the on-site deliveries
- Free delivery on orders over £300 within mainland GB

High quality standards

- Designed in accordance with BS EN40
- Manufactured from steel tube to either EN10210 or EN10219

What to consider when designing with columns

BS EN40 provides a detailed framework for the design of a lighting column and provides key considerations when designing an exterior lighting scheme to ensure the structural integrity of the column.

A lighting column design must take into account (in relationship to mounting height):

- Weight and windage of the luminaire and bracket
- Wind speed
- Site altitude
- Site terrain and topography

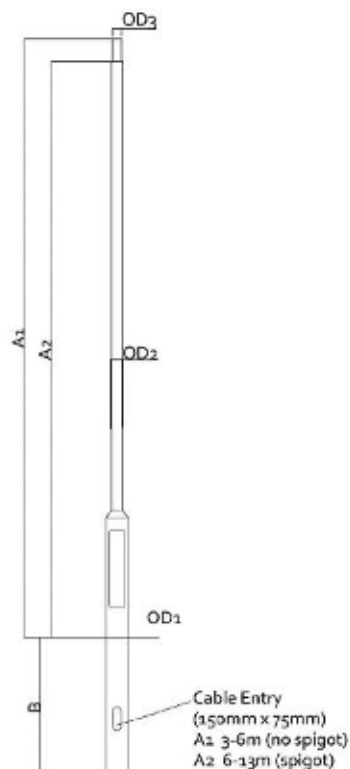
When this information is not readily available, PD 5647:2004 may be used for guidance.

This document contains informative data relating to the administrative areas of the UK, providing a rationalised wind loading factor (RWF) for each location. Please contact us for more information.

Tubular columns (3m - 12m)

A range of tubular lighting columns suitable for road, residential and general amenity areas. Available root mounted or flange plated.

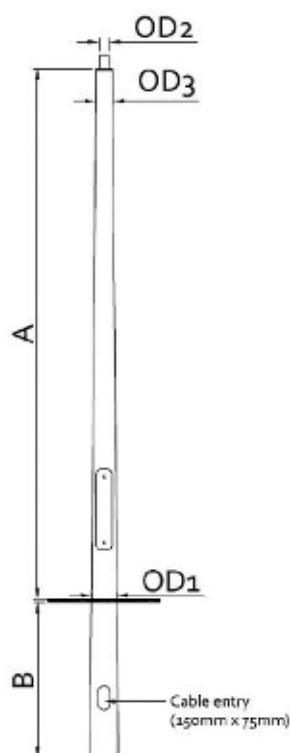
Tubular



Conical lighting columns (4m - 8m)

An aesthetic range of conical lighting columns suitable for residential and amenity areas. Available root mounted or flange plated.

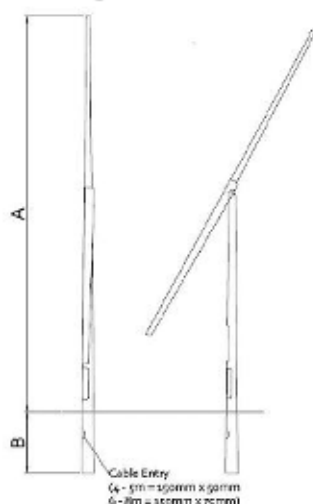
Conical



Mid-hinged columns (4m - 15m)

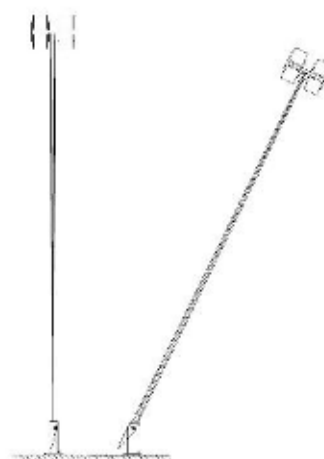
An easy-access range of mid-hinged columns suitable for residential, amenity, rail and industrial areas where conventional access platforms are unsafe or unsuitable. Available root mounted or flange plated. When installing mid-hinged columns, minimum head load is required for the column to hinge.

Mid-Hinged



Base-hinged columns

Base-hinged columns are an option for cost effective, safe and easy maintenance. The lowering of the column is done quickly and safely using a raising and lowering tool specific to the column. This lowers the column to ground level for easy access to the luminaire. Base-hinged columns are best suited to sites with tight access and where mobile platforms cannot be used such as sports facilities, car parks and footpaths.



Tubular columns (3–12m)

A range of tubular lighting columns suitable for road, residential and general amenity areas. Available root mounted or flange plated.

Tubular columns (root mounted)

Code	A	OD1	OD2	OD3	Door Openings	B	Terrain Category	Max Head Load
3CT76	3m	Ø140	Ø76	N/A	500 x 100	800	3	50kg/0.90m²
4CT76	4m	Ø140	Ø76	N/A	500 x 100	800	3	50kg/0.50m²
5CT76	5m	Ø140	Ø76	N/A	500 x 100	800	3	50kg/0.50m²
6CT76	6m	Ø140	Ø76	N/A	500 x 100	1000	3	50kg/0.50m²
6CTH89	6m	Ø168	Ø89	Ø76	600 x 115	1000	3	50kg/0.75m²
8CT89	8m	Ø168	Ø89	Ø76	600 x 115	1200	2	50kg/0.36m²
8CTM114	8m	Ø168	Ø114	Ø101	600 x 115	1200	2	60kg/0.55m²
10CT114	10m	Ø168	Ø114	Ø101	600 x 115	1500	2	50kg/0.50m²
10CTH140	10m	Ø192	Ø140	Ø127	600 x 115	1500	2	80kg/1.00m²
12CTH140	12m	Ø192	Ø140	Ø127	600 x 115	1700	2	70kg/0.85m²

Tubular columns (flange plated)

Code	A	OD1	OD2	OD3	Door Openings	Terrain Category	Max Head Load	Hole Centres C	Slot Size H	Bolt Code
3CT76FP	3m	Ø140	Ø76	N/A	500 x 100	3	50kg/0.90m²	200	20 x 50	FB001
4CT76FP	4m	Ø140	Ø76	N/A	500 x 100	3	50kg/0.50m²	200	20 x 50	FB001
5CT76FP	5m	Ø140	Ø76	N/A	500 x 100	3	50kg/0.50m²	200	20 x 50	FB001
6CT76FP	6m	Ø140	Ø76	N/A	500 x 100	3	50kg/0.50m²	200	20 x 50	FB001
6CTH89FP	6m	Ø168	Ø89	Ø76	600 x 115	3	50kg/0.75m²	200	24 x 50	FB007
8CT89FP	8m	Ø168	Ø89	Ø76	600 x 115	2	50kg/0.36m²	300	29 x 64	FB004
8CTM114FP	8m	Ø168	Ø114	Ø101	600 x 115	2	60kg/0.55m²	300	29 x 64	FB004
10CT114FP	10m	Ø168	Ø114	Ø101	600 x 115	2	50kg/0.50m²	300	29 x 64	FB004
10CTH140FP	10m	Ø192	Ø140	Ø127	600 x 115	2	80kg/1.00m²	300	29 x 64	FB004
12CTH140FP	12m	Ø192	Ø140	Ø127	600 x 115	2	70kg/0.85m²	300	29 x 64	FB004

Conical lighting columns (4–6m)

An aesthetic range of conical lighting columns suitable for residential and amenity areas. Available root mounted.

Code	A	B	OD1	OD2	OD3	Door Size	Terrain Category	Max Head Load	Max Windage
4CCS60L	4m	800mm	133mm	60mm	60 x 85	500 x 100	3	30kg	0.5m²
5CCS60L	5m	800mm	145mm	60mm	60 x 85	500 x 100	3	35kg	0.5m²
6CCS60L	6m	800mm	157mm	60mm	60 x 85	500 x 100	3	40kg	0.5m²
8CCS60L	8m	1200mm	168mm	60mm	76mm	500 x 100	2	40kg	0.45m²

Mid-hinged columns (4–8m)

An easy-access range of mid-hinged columns suitable for residential, amenity, rail and industrial areas where conventional access platforms are unsafe or unsuitable for use. Available root mounted or flange plated.

Code	A	Description - Mid hinged octagonal	B	Max Head Load *	Max Windage	Hole Size L	Flange Size/ Code	Bolt Code	Bolt	Winch
Rope Operated										
4MHRL	4m	Root mounted	800	20kg	0.5m²					Rope
4MHFPL	4m	Flange plated		20kg	0.5m²	200	300mm/18mm	M16 x 500	FB001	Rope
5MHRL	5m	Root mounted	800	20kg	0.5m²					Rope
5MHFPL	5m	Flange plated		20kg	0.5m²	200	300mm/18mm	M16 x 500	FB001	Rope
6MHRL	6m	Root mounted	1000	20kg	0.5m²					Rope
6MHFPL	6m	Flange plated		20kg	0.5m²	200	300mm/18mm	M16 x 500	FB001	Rope
Winch Operated										
4MHRL	4m	Root mounted	800	35kg	0.5m²					KLWINCHL
4MHFPL	4m	Flange plated		35kg	0.5m²	200	300mm/18mm	M16 x 500	FB001	KLWINCHL
5MHRL	5m	Root mounted	800	35kg	0.5m²					KLWINCHL
5MHFPL	5m	Flange plated		35kg	0.5m²	200	300mm/18mm	M16 x 500	FB001	KLWINCHL
6MHRL	6m	Root mounted	1000	35kg	0.5m²					KLWINCHL
6MHFPL	6m	Flange plated		35kg	0.5m²	200	300mm/18mm	M16 x 500	FB001	KLWINCHL
8MHF1	8m	Flange plated		70kg	0.98m²	300	420mm/25mm	M24 x 820	FB004	KJWINCHSHD
8MHRL1	8m	Rooted mounted	1200	135kg	0.70m²					KJWINCHSHD <100kg KJWINCHSHD >100kg

Above weight and windage area figures are based on a medium terrain category. Other sizes & variations available on request.

*Please note maximum carrying weight of a 4m - 6m mid - hinged column is 20kg with a rope or 35kg with a winch



**Kingfisher
Lighting**

Datasheet

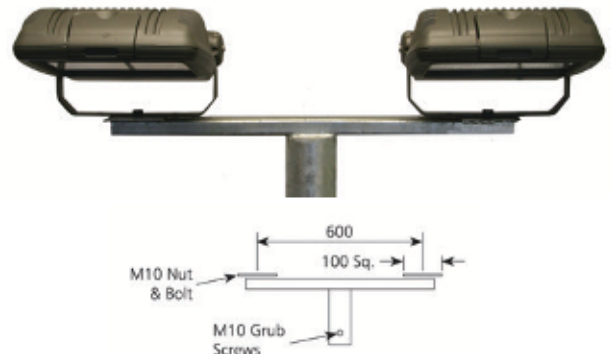
Floodlight Brackets

Our floodlight brackets ensure your floodlight is securely mounted onto the column. Each bracket has a top plate of 100mm square with a M10 zinc plated bolt, allowing full orientation of the floodlight. All brackets are supplied in a hot dip galvanised finish and are complete with the necessary bolts for mounting to the column.

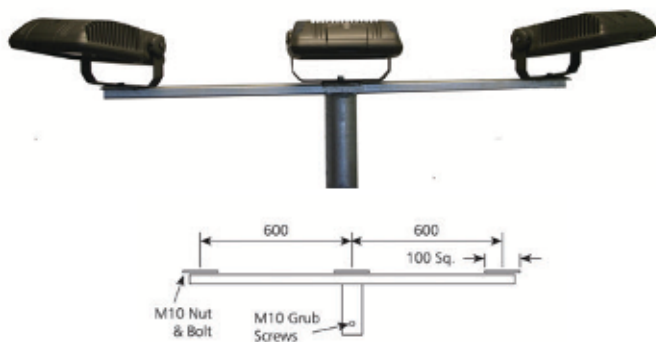
STM1 Single floodlight mounting bracket



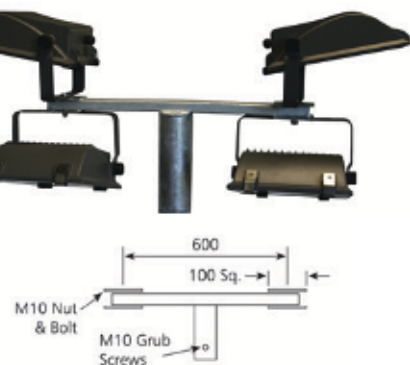
STM2 Twin floodlight mounting bracket



STM3 Triple floodlight mounting bracket



STM4 Four floodlight mounting bracket



Code	Luminaire Type
Single floodlight mounting bracket	
STM176	To over fit a column with a 60mm dia spigot/shaft
STM189	To over fit a column with a 76mm dia spigot/shaft
STM1114	To over fit a column with a 89 or 101mm dia spigot/shaft
STM1140	To over fit a column with a 127mm dia spigot/shaft
Twin floodlight mounting bracket	
STM276	To over fit a column with a 60mm dia spigot/shaft
STM289	To over fit a column with a 76mm dia spigot/shaft
STM2114	To over fit a column with a 89 or 101mm dia spigot/shaft
STM2140	To over fit a column with a 127mm dia spigot/shaft

Code	Luminaire Type
Triple floodlight mounting bracket	
STM376	To over fit a column with a 60mm dia spigot/shaft
STM389	To over fit a column with a 76mm dia spigot/shaft
STM3114	To over fit a column with a 89 or 101mm dia spigot/shaft
STM3140	To over fit a column with a 127mm dia spigot/shaft
Four floodlight mounting bracket	
STM476	To over fit a column with a 60mm dia spigot/shaft
STM489	To over fit a column with a 76mm dia spigot/shaft
STM4114	To over fit a column with a 89 or 101mm dia spigot/shaft
STM4140	To over fit a column with a 127mm dia spigot/shaft

Most columns of 8 metres and above have a column spigot; we will ensure that the brackets ordered will fit your columns. Where brackets are purchased alone for existing columns please indicate the diameter of the column spigot. The four-way brackets are to mount two floodlights on top of the cross arm and two underneath using the same bolts. Fittings to fix at the same level above the cross arm facing North, South, East, West are also available, add suffix NSEW to STM4 reference. These brackets are only suitable for mounting flood lights up to 400W. For 1000W and above suffix with 'H' for heavy duty e.g STM2H89.

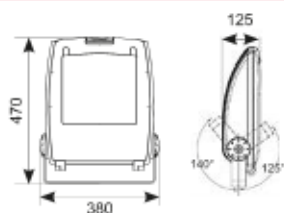
- Architectural slim die-cast LED floodlight
 - 100W LED exceeds performance of 150W HQL
 - 200W LED comparable performance to 400W HQL
 - Optically textured glass for enhanced light output
 - Heat sink design provides optimum LED life
 - Graphite textured paint finish
 - Pre-wired with 1 metre of rubber insulated cable for ease of installation
 - PIR versions complete with manual override facility
 - LED lifespan L70 50,000 hours
 - Non-dimmable
- Note: 100W and 200W versions are not suitable for interior use*



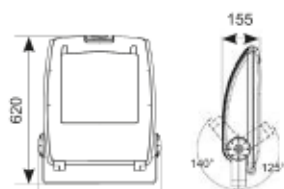
AMLED100



AMLED200



AMLED100



AMLED200

LED Information

Total (Watts)	100W
	200W
Lumens Delivered	
100W	7850lm
200W	17380lm
Lm/W 100W	78lm
Lm/W 200W	87lm
CRI	Ra 70
CCT	4750K
Input	230V

Code	Lamp	Description	Windage
AMLED100	LED	100W - Cool White	0.18
AMLED200	LED	200W - Cool White	0.30

Options	/PC	Electronic Photocell
---------	-----	----------------------

Appendix H
Anglian Water Local Practice Document Dated 22nd June 2020

Local Practice for Pumping Stations

Effective as of 22nd June 2020

Sewerage Sector Guidance allows Anglian Water to introduce a Local Practice in certain permitted areas where our operational requirements are not adequately covered in the Design Construction Guidance.

Anglian Water first published its Local Practice for pumping stations for an initial 30-day consultation period on Monday 9th March. As we did not receive any feedback during this time, the same consultation was extended for a further 30 days.

An additional amendment has now been added (F3.4.6.1). Except for this one point, the original document remains unchanged.

Our Local Practice for Pumping Stations is below, **which is effective as of 22nd June 2020**. This Local Practice is considered necessary for Anglian Water to comply with its own geographical and health and safety requirements, whilst meeting the principles of the Code.

The references shown below refer to the relevant sections of Design Construction Guidance (SSG Appendix C) published on Water UK's website [here](#)

D5.6.1 In order to achieve consistency between flow assessments made as part of our pre-planning process and adoptable pumping stations delivered by developers, the following actual water consumption figures should be used to calculate the dry weather flow:

- 2.35 persons per property
- 125 litres per head per day
- 25% infiltration

The use of realistic criteria also leads to smaller pumps and reduced power costs, smaller rising mains and a lower emergency storage requirement.

- Pump rate = 4 x DWF (increased if necessary to achieve velocity between 0.75-1.8m/s)
- Emergency storage is 4 hours at 1DWF
- The peak inflow is considered to be 2.12 x DWF

D2.2 Anglian Water accepts pumping stations designed to Code with a wet well depth of up to 8m based on our safe working practices for lifting. A wet well depth which exceeds 8m will require a specific consultation with Anglian Water as alternative powered lifting arrangements will be required.

D5.3.5 Anglian Water's preference is for the compound to be secured using a 1.8m high brick wall, 225mm width with engineering brick DPC wherever this is possible. This ensures the pumping station will match its surroundings and is more sustainable regards site security. We will not accept access gates which are constructed solely of wood as this solution reduces security sustainability. Galvanised steel bar is preferred.

D5.6.3.g There shall be sufficient clearance between the high level backup float and the telemetry high level alarm float required by Anglian Water's telemetry standards. The telemetry high level alarm float must activate before half the total retention capacity of the system has been reached, to give the best chances of avoiding pollution impact.

D6.1.7 At the discharge end tracer wire should be terminated with 1 m of wire coiled inside a small but suitably sized and IP rated enclosure to last in the installed environment. This enclosure must be accessible from ground surface level to enable safe future access and use.

D7.1.2 The system and equipment shall also be resilient enough to auto reset after 'brown-out' power situations. Refer to F3.3.11.4.7

D7.7.2.d All chambers (wet well/valve/flow meter) shall have covers with integral fall protection grids regardless of chamber depth. Therefore Anglian Water does not require the supplementary posts and rails for fall protection.

D7.7.3.b Unless there are specifically documented design needs, Anglian Water shall not allow open mesh or holes/slots within covers for venting. Where security fencing/wall is provided, Anglian Water will accept plastic vent pipes and cowl, the vent pipe must be positioned at the inside edge of the perimeter wall/fence and be of equal height.

D7.7.6 Chamber ladders should be in accordance with E2.37, preferably option 3 or 4, with retractable hand hold rail that can be raised above the cover level to aid safe access/egress.

D7.11.7 Kiosk construction form of any type except GRP must be agreed with Anglian Water during the technical review of the design.

D7.11.16.a Anglian Water does not require a resuscitation sign

F2.3.12.3.c If an existing handle or lifting point upon a pump will not meet these requirements, then an item must be fitted by the pump manufacturer, that is a recognised purpose designed part supplied by the manufacturer that provides at least 120mm clearance. It must form part of the fabric of the pump and the design and not be regarded as lifting equipment, thus not requiring testing under LOLER requirements.

If a pump cannot be supplied with the required lifting point to accept the required lifting equipment, then as an absolute last resort, Anglian Water under specific agreement may accept lifting chains. These will need to be subject to a written scheme of thorough examination. The chains will need to meet specific requirements i.e. short link BSEN 818, with larger links at 1m intervals, stainless chain – shackles – id and hooks, with pins secured.

F3.2.1.7.a This certificate shall confirm the installation satisfies all appropriate design requirements of BS7671. As part of the certification process, the period to next inspection should be recorded. Anglian Water will expect at least an 18 month period between the due date and date of legal transfer.

F2.3.12.2 Lifting points shall be designed for lifting the whole pump unit and be designed, supplied and marketed by the pump unit manufacturer.

F3.1 BS7671 specifies surge protection devices should be fitted, if they are not a risk assessment including calculations must be provided.

F3.3.3.4.3 Doors shall have the requisite number of handles to ensure effective opening and closing, and shall require a key to unlock (not tool) for opening.

F3.3.7 see F3.4.6.2.1.2

F3.3.8.2.7 “the control system for the relevant pump shall”

F3.3.8.2.7.c start the alternate pump (if available)

F3.3.8.2.7.d inhibit the relevant unit from running

F3.3.8.4 The High Wet Well Level referred to in this section is also known as High Level Backup Float level, not the High High Level or High Level Alarm float that shall be connected directly to telemetry.

F3.3.8.4.7 Anglian Water requires option a, the associated indication lamp shall remain illuminated until the system reverts to Ultrasonic Level Control, it shall not require manual reset.

Table F 3 On Anglian Water installations the High Wet Well Level and Backup Control Systems indications are to be one and the same/combined. Therefore the High High indication may be referred to as the High Wet Well Level (high level telemetry alarm).

F3.3.11.1.1 Motor starter compartments – motor protection shall be accordance with motor/pump unit manufacturer’s warranty requirements.

F3.3.11.2.3.d The distribution board shall incorporate the protection devices supplying items e to i. The items themselves do not need to be mounted on the door.

F3.3.11.5.3.c not required see F3.3.8.4.7 of Anglian Water local practice

F3.3.12.6.3.b not required see F3.3.8.4.7 of Anglian Water local practice

F3.4.1.2.1 At least 1 splash proof, IP54 (minimum) socket outlet, 13 A, 230 V, complying with BS 1363: Part 2: shall be provided inside the kiosk. This shall be provided with 30 mA RCD protection.

F3.4.5.4.1 If the pumping station is in a secure compound, pump connection junction boxes suitably IP rated shall be housed within a kiosk located at a safe distance but in close proximity to the wet well, with the same venting requirements as the main assembly kiosk.

F3.4.5.4.2 If the pumping station is not in a secure compound, the main assembly kiosk shall be provided with facilities to prevent the ingress of explosive or corrosive gases into the kiosk regardless of the hazardous area assessment of the wet well.

F3.4.6.1 Main earth conductors shall be connected to a main earth terminal bar to which the independent earth conductor for the generator will be connected. The DNO supply earth shall be easily disconnected or isolated from all other earth connections preferably by removeable link.

Appendix 1 10.d This certificate shall confirm the installation satisfies all appropriate design requirements of BS7671. As part of the certification process, the period to next inspection should be recorded. Anglian Water will expect at least an 18 month period between the due date and date of legal transfer.

Appendix 1 10.e Anglian Water will expect at least a 6 month period between the due date and date of legal transfer.

Appendix 1 10.f Anglian Water will expect at least a 6 month period between the due date and date of legal transfer.

Additional Services:

Anglian Water can provide monitoring of the pumping station via telemetry. Please liaise with our Telemetry Coordinator at the appropriate time who can confirm monitoring costs.

Acknowledgements:

This document has been produced by the Development Services Drainage Team. If you have any questions relating to the content, please contact us on 0345 60 66 087 or by email to developmentservices@anglianwater.co.uk

Final Version Publish Date:

21st May 2020