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Woodbrook Phase 1

Foul Pumping Station and Rising Main

Aeval

October 2019

Notice

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This document has 14 pages including the cover.

Document history

Revision	Purpose description	Originated	Checked	Reviewed	Authorised	Date
Rev 0.0	Information	G Hanratty	A Corrigan	G Hanratty	K Boyle	02.04.19
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Client signoff

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1. Introduction

This report outlines the design requirements for the proposed Shanganagh / Woodbrook Local Area Plan (LAP) Pumping Station as set out within the Woodbrook – Shanganagh LAP 2017 - 2023.

Section 3.3.4 (ii) Foul Drainage Network states that;

The Old Conna/Woodbrook Water Supply and Drainage Schemes also include the provision of an improved and reinforced foul drainage network for the Bray-Shanganagh area which will enable the development of new development parcels, including Woodbrook-Shanganagh. In the interim, Irish Water is investigating the potential of utilising the existing local drainage network by facilitating local upgrades where feasible. A survey to ascertain the capacity of the existing pipework is currently being carried out to determine what scale, or if any, development could be facilitated utilising the existing network.

Through discussions with Irish Water, the Southern boundary of the proposed Woodbrook Development was identified as the preferred location for the proposed Pumping Station (PS). The proposed PS will cater for the entire Woodbrook – Shanganagh LAP lands.

The proposed PS will initially discharge to the existing St. Annes Park Housing Development to the North of Shanganagh Park via a proposed rising main. Upon completion of the final rising main by Irish Water, wastewater flows will then be transferred to the new rising main and pumped to Shanganagh Waste Water Treatment Plant (WWTP) for treatment.

The table below indicates the current number of proposed units within the Woodbrook – Shanganagh LAP lands.

Solution	Source	Daily Production, m^3	m^3/PE/d	PE	Occupancy Rate	No. of Units
-	Reference	Atkins Technical Note	IW-TEC-800-01, Section 6.2.2	-	IW-TEC-800-01, Section 6.2.1	-
Interim	Woodbrook Development Phase 1	-	-	-	-	685
	Creche	5.68	0.150	37.87	2.70	15.00
	Shanganagh Park Development (by others)	-	-	-	-	630
	Shanganagh Crematorium, Sports Hall, Café (by others)					50
Permanent	Woodbrook Development Phase 2	-	-	-	-	803
	Retail Units	2.25	0.150	15.00	2.70	6.00
	School (700 student assumed - by others)	35.00	0.150	233.33	2.70	87.00
				Total Equivalent No. of Units	Interim	1380
					Permanent	896
					Total	2276
		Total Population Equivalent for Development (PE)				6146

As agreed with Irish Water and Dun Laoghaire Rathdown County Council a 20% uplift to residential unit numbers has been applied as headroom for potential increase in residential density in order to future-proof foul infrastructure investment. The table below outlines the figures used within the Hydraulic Calculations in Appendix A.

Solution	Source	Daily Production, m^3	m^3/PE/d	PE	Occupancy Rate	No. of Units
-	Reference	Atkins Technical Note	IW-TEC-800-01, Section 6.2.2	-	IW-TEC-800-01, Section 6.2.1	-
Interim	Woodbrook Development Phase 1	-	-	-	-	822
	Creche	5.68	0.150	37.87	2.70	15.00
	Shanganagh Park Development (by others)	-	-	-	-	756
	Shanganagh Crematorium, Sports Hall, Café (by others)					50
Permanent	Woodbrook Development Phase 2	-	-	-	-	964
	Retail Units	2.25	0.150	15.00	2.70	6.00
	School (700 student assumed - by others)	35.00	0.150	233.33	2.70	87.00
				Total Equivalent No. of Units	Interim	1643
					Permanent	1057
					Total	2700
		Total Population Equivalent for Development (PE)				7289

2. Control Philosophy

2.1. Introduction

This pumping station has been designed as a wet well and dry valve chamber configuration with submersible pumps. The design includes an emergency storage tank to allow for response measures to be put in place in the event of power failure, pump failure and blockages.

In addition to these key components, the design includes an inlet chamber, flow meter chamber, surge vessel (requirement depends on results of THS) and kiosk for control panels. Where relevant, the design of these align with the minimum requirements outlined in Irish Water's Wastewater Infrastructure Standard Details 'IW-CDS-5030-01'.

The proposed pumping station is a reinforced concrete structure with a wet well and dry valve chamber configuration with submersible pumps and includes the following plant and equipment:

- Wet well including 3 No. submersible pumps;
- Rising main (175mmID SDR17 HDPE)
- Valve chamber;
- Emergency storage tank (732m^3 minimum to allow for 24 hours emergency storage for the Interim solution and a minimum of 6 hours emergency storage for the Permanent solution);
- Inlet chamber (including penstock);
- Flow meter chamber;
- Surge vessel (requirement dependent on results of a Transient Hydraulic Study);
- Kiosk structures for control panels (final external finish details to be agreed)
- Hardstanding for vehicle access / turning;
- Screened Emergency overflow with Mechanical Self-cleaning screens and baffle plates to the proposed surface water drainage network prior to discharge to the Rathmichael / Crinkeen stream.
- Dosing Control Unit
- Odour Control Unit

Due to Site constraints the Emergency Storage tank length to breath ratio has been increased from 3:1 to 5:1.

A Flood Risk Assessment for the entire development site, including the location of the pumping station has been undertaken and is included within the planning application package (Atkins Document Reference 5154251DG0003).

2.2. Philosophy

The foul pumps in the Woodbrook Pumping Station shall start based on levels in the wet well. The pumps shall operate in a duty/assist/stand-by arrangement for the interim solution and duty/duty/stand-by arrangement for permanent solutions. Ultrasonic level transmitters in the wet well shall control the operation of the pumps.

Submersible pumps have variable speed drives for efficient operation. The foul sewage pump sump has been sized to operate for both interim solution (4436 PE) and permanent solution (7289 PE)

flows, with a similar number of pump starts per hour and the same pump cut-out level, but higher pump cut-in level for the permanent solution.

The pumps will be arranged to operate based on the following configuration:

Interim

- Pump 1 (D): 23.87 l/s
- Pump 2 (A): At set speed via variable speed drive to achieve self-cleansing velocity.
- Pump 3 (S): Standby

Permanent

- Pump 1 (D): 32.90 l/s
- Pump 2 (D): 32.90 l/s
- Pump 3 (S): Standby

Pumps shall be capable of automatic ramp up with increasing inflow.

Fixed flow rate set point / level control (PID loop functionality) - It shall be possible to select a fixed flowrate at which the pumps will operate depending on the wet well level. The flowrate shall remain constant by varying the speed of the pumps depending on the wet well level. The rate of change for the variable speed drive shall not be permitted to exceed 1 Hz per minute to avoid hunting during the fixed speed cycle - If the foul wet well level rises to Duty 2 level due to peak inflow, the pumps shall ramp up to meet the demand including:

- Option to change set points.
- Snore cycle for cleaning wet well.
- Variable start/stop levels to prevent build-up of grease on wet well walls.

Ramp up and ramp down times for the new pumps are in accordance with the pump and drive manufacturers recommendations. Variable speed drives shall be installed with anti-ragging software functionality. The pumps shall operate on an automatic cyclical duty rotation through the PLC to provide even operation hours per pump.

A SWO Event Duration Monitor will be installed remotely at the existing St Anne's combined sewer to inhibit Woodbrook PS during surcharge events. This remote monitor will relay information via wireless communication. During this period all flows into Woodbrook PS will be diverted to the emergency storage tank.

In the event of power failure prevision has been made for portable generator and emergency connection from the MCC.

2.3. Design Specification

In accordance with the RAM-SPEC-500-001, Section 5.2 (Two Pump Sewage Pumping Station (SPS)) the pumping station will have seven primary alarm signals namely:

1. Pump trip / fail (auto-changeover);
2. High-high level;
3. Low-low level;
4. Level sensor fault;
5. Emergency stop operated;
6. Motor temperature;
7. Flowmeter fault.

The signals will be logged on a site-based PLC which will alarm and notify both the IW and DLRCC operating systems through approved methods. Interlocks will ensure that forward feed flow is inhibited when a critical alarm is activated.

2.4. Pump Selection

A preliminary pump curve was selected for the specimen design based on the design parameters available at the time. The pumping station is designed, and the pumps selected in accordance with Irish Water specification 'IW-TEC-800-02 – Wastewater Pumping Stations & Rising Mains'.

Appendices

Appendix A. Hydraulic Calculations

Job No.: 5154251
Job Name: Castlethorn / Woodbrook Development

Pumping Station Design Calculations - Pumps & Pressure Pipelines

Pumping Station - Sewer Network Collection

Key

c	Calculated
d	Designer Chosen
s	Employer or Standard Specified

	Parameter	Reference	Unit	Interim	Permanent	Comments
	1.0 - Hydraulic Load Assessment					
	1.1 - Population equivalent					
d	Number of units		-	1643	2700	
d	Total area of development		ha	14.47	14.47	Red line boundary
d	Type of development		-	Residential	Residential	
s	Residential occupancy rate	IW-TEC-800-01, Section 6.2.1	-	2.7	2.7	PE = No. of households x 2.7
c	Population equivalent [P]		PE	4436.1	7288.92	
	1.2 - Design Flows					
s	Water consumption per capita [G]	IW-TEC-800-01, Section 6.2.2	l/d	150	150	
s	Peaking factor domestic [Pf_{Dom}]	IW-TEC-800-01, Section 6.2.5	-	3	2.5	PE dependant
c	Domestic flow		l/d	665415	1093338	
c	Peaked domestic flow		l/d	1996245	2733345	
c	Peak domestic flow		l/s	23.10	31.64	
c	Commercial & industrial dry weather flow	Section 6.2.6	l/s	0	0	
s	Commercial peaking factor	Section 6.2.7	-	0	0	
c	Peaked commercial & industrial flow		l/s	0	0	
s	Infiltration allowance (new property or new industrial)	IW-TEC-800-01, Section 6.2.4	-	10%	10%	Review %age with client
c	Infiltration [I]	IW-TEC-800-01, Section 6.2.4	l/d	66542	109334	
c	Infiltration [I]		l/s	0.77	1.27	
c	Dry weather flow [DWF]		l/s	8.47	13.92	
c	Dry weather flow [DWF]		m3/d	731.96	1202.67	
c	Formula A	IW-TEC-800-01, Section 6.2.10.2.1	l/s	77.53	127.39	
c	Design foul flow		l/s	23.87	32.90	Selected design flow rate
	1.3 Misconnections and Future Flows					
s	Misconnection allowance [SW]		-	3%	3%	
c	Misconnection allowance [SW] (2 year)		l/s	19.21	19.21	
c	Misconnection allowance [SW] (5 year)		l/s	24.62	24.62	
c	Misconnection allowance [SW] (30 year)		l/s	36.04	36.04	
c	Design flow (2yr)		l/s	43.09	52.11	
c	Design flow (30yr)		l/s	59.92	68.94	
c	Design flow (2yr) +20% CC	IW-TEC-800-13, Section 8.2	l/s	46.93	55.96	
c	Design flow (30yr) + 20% CC	IW-TEC-800-13, Section 8.2	l/s	67.13	76.15	
s	Design return period against surcharge	IW-TEC-800-01, Section 5.4	-	2.00	2.00	
s	Design return period against Internal flooding	IW-TEC-800-01, Section 5.4	-	30.00	30.00	

Future Storm Storage (FA)

Formula A (2h)	917.19	m^3
PFF	236.89	m^3
Storm volume	**680.30**	m^3

Missconnection Storage

M'connection	548.30	m^3
PFF	259.51	m^3
Storm volume	**288.79**	m^3

2.0 - Pumping Station Sizing and Geometry

2.1 - Rising Main Details

d	Length		m	1830	3150	Approximate value, subject to detailed design
d	Nominal bore (internal diameter)		m	0.175	0.175	200mm SDR17 HDPE
d	Invert at discharge point		mOD	30.000	30.000	Common high point, review topo when available
d	Residual head at discharge point		m	0.50	0.50	
c	Flow velocity	IW-TEC-800-02, Section 11.2.2	m/s	0.99	1.37	Typically, 0.75 to 1.8 m/second
s	Anticipated Colebrook-White roughness coefficient, k_s	IW-TEC-800-02, Section 11.2.1	mm	0.15	0.3	< 1.1 m/s, 0.3mm and > 1.1 m/s 0.15mm

2.2a - Wet Well: Sizing and Geometry

d	number of pumps, n		-	**1**	**1**	Phase 2, duty/duty/standby
c	pump capacity, Q		L/s	23.87	32.90	
s	pump cycles, N_{max}	IW-TEC-800-02, Section 7.12	1/hr	**10**	**10**	Typically, 8 to 12
c	pump cycle time, T_{min}		sec	360	360	
c	volume of operating band, V_{min}		m^3	2.15	2.96	V_{min} + (n-1) x ΔH x S, (ΔH taken as 0.2)
d	sump length		m	**3.00**	**3.00**	
d	sump width		m	**2.00**	**2.00**	
c	sump area		m^2	6.00	6.00	
s	depth of nominal operating band	IW-TEC-800-02, Section 7.12	m	0.358	0.494	> 150mm
d	ground level at pumping station		mOD	**22.000**	**22.000**	
d	inlet invert level		mOD	**21.000**	**21.000**	Assumed 1m IL below GL
c	free fall from inlet to pump cut-in, ΔH		m	2.31	2.18	Very deep!!
c	free fall from inlet invert to pump cut-out		m	2.67	2.67	
d	liquid level at duty cut-out (LWL)		mOD	**18.330**	**18.330**	Same cut-out levels for both phases
c	liquid level at duty cut-in (HWL)		mOD	18.688	18.824	Different cut-in levels for both phases
d	pump sump floor level		mOD	**17.730**	**17.730**	Sump depth = GL - sump floor level
c	liquid depth at duty cut-out (LWL)		m	0.60	0.60	

Phase 1

D	S
1.5m	1.5m

Wet Well Configuration

Phase 2

D	S
1.5m	1.5m

Wet Well Configuration

2.2b - Wet Well: Emergency Storage Capacity

c	Emergency storage capacity at DWF		m^3	731.96	731.96	Greater of 24 hrs DWF interim & 6 hrs DWF permanent

2.2c - Sizing and Geometry of Emergency Storage Tank

d	Selected depth of emergency storage tank		m	3.5	3.5	
c	Total area of emergency storage tank		m^2	209	209	
d	Number of emergency storage tanks, selected		-	1.00	1.00	
c	Area of individual emergency storage tank		m^2	209	209	
s	Length to breadth ratio		-	5.00	5.00	
c	Width of each tank		m	6.50	6.50	
c	Length of each tank		m	32.50	32.50	
c	Total working volume check (< $500m^3$)		-	Planning Required	Planning Required	Only accounts for working volume

	2.3a - Rising Main - Friction Losses - Pipe				
d	Pipe material	-	HDPE	HDPE	
d	Pump capacity	L/s	23.9	32.9	
c	Pump capacity	m^3/s	0.0239	0.0329	
d	Length of pipe	m	1830	3150	
d	Diameter of pipe, internal	mm	175	175	
c	Diameter of pipe, internal	m	0.175	0.175	
c	Pipe cross sectional area	m^2	0.024	0.024	
c	Fluid velocity	m/s	0.994	1.369	
d	Kinematic viscosity of the fluid at the operating temperature	m^2/s	0.000001519	0.000001519	
d	Colebrook-White roughness coefficient	mm	0.15	0.3	< 1.1 m/s, 0.3mm and > 1.1 m/s 0.15mm
c	Reynolds number	-	114420	157680	
c	Darcy friction factor, initial guess (from Barr explicit equation)	-	0.018	0.017	
c	CW, first term (fluid friction against wall)	-	0.00023179	0.00046359	
c	CW, second term (fluid's internal friction)	-	0.00014920	0.00010321	
d	Darcy friction factor	-	**0.021618403**	**0.023786559**	
c	$1/(f^{0.5})$	-	6.801242	6.483868	
c	$-2\log_{10}(CWT1 + CWT2)$	-	6.838175	6.493144	
c	Imbalance of terms	-	-0.036933	-0.009275	Needs to be zero, goal seek agaist darcy
c	Comparative Hazen-Williams, C, for Darcy-Weisbach, f	-	131	122	
c	Head loss due to friction	mH_2O	11.385	40.949	
	2.3b - Rising Main - Friction Losses - Fittings & Valves				
d	Pump discharge main diameter	m	0.175	0.175	
c	Pipe cross sectional area	m^2	0.024	0.024	
c	Fluid velocity	m/s	0.994	1.369	
c	Fitting resistance coefficients, sum of total	-	0.90	0.90	
d	90 degree bend	-	0.18	0.18	Assumed
d	45 degree bend	-	0.18	0.18	Assumed
d	45 degree bend	-	0.18	0.18	Assumed
d	90 degree bend	-	0.18	0.18	Assumed
d	90 degree bend	-	0.18	0.18	Assumed
c	Head loss due to friction, discharge fittings and valve	mH_2O	0.045	0.086	
	2.4 - Pump Details & Requirements				
d	Pump media	-	Raw Municipal Sewage	Raw Municipal Sewage	
c	Static head, max	mH_2O	11.670	11.670	
c	Dynamic head, max	mH_2O	11.430	41.035	Calculated in background
	Engineers allowance	mH_2O	**5.000**	**5.000**	
c	Total head	mH_2O	28.100	57.705	If > 55m, wet well / dry well arrangement
c	Flow, max	L/s	23.87	32.90	
c	Overall pumped head is greater than 55m	-	No	Yes	
	2.5 - Estimated Power				
d	Unit weight of fluid	kN/L	0.0098	0.0098	
c	Pump power, absorbed	kWhr	6.57	18.61	NOTE: This is the individual power, not total power
d	Overall efficiency	%	57.3	55.9	Dependant on selected pump
c	Pump individual power, rated	kWhr	11.48	33.28	If > 100kWh, wet well / dry well arrangement

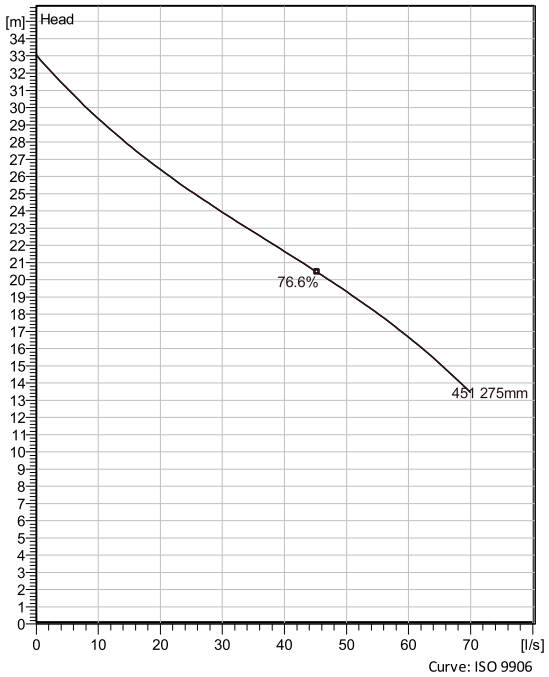
Appendix B. Pump Curve

NP 3153 HT 3~ 451

Patented self cleaning semi-open channel impeller, ideal for pumping in most waste water applications. Possible to be upgraded with Guide-pin® for even better clogging resistance. Modular based design with high adaptation grade.

Technical specification

Curves according to: Water, pure [100%],4 °C,999.9 kg/m³,1.569 mm²/s



Curve: ISO 9906

Configuration

Motor number
N3153.800 21-15-4AS-W IE3 10KW

Installation type
P - Semi permanent, Wet

Impeller diameter
275 mm

Discharge diameter
100 mm

Pump information

Impeller diameter
275 mm

Discharge diameter
100 mm

Inlet diameter
100 mm

Maximum operating speed
1500 rpm

Number of blades
2

Materials

Impeller
Grey cast iron

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Technical specification

Motor - General

Motor number N3153.800 21-15-4AS-W IE3 10KW	**Phases** 3~	**Rated speed** 1500 rpm	**Rated power** 10 kW
Approval No	**Number of poles** 4	**Rated current** 28 A	**Stator variant** 2
Frequency 50 Hz	**Rated voltage** 230 V	**Insulation class** H	**Type of Duty** S1

Motor - Technical

Power factor - 1/1 Load 0.98	**Motor efficiency - 1/1 Load** 91.8 %	**Total moment of inertia** 0.091 kg m²	**Starts per hour max.** 30
Power factor - 3/4 Load 0.97	**Motor efficiency - 3/4 Load** 92.2 %	**Starting current, direct starting** 181 A	
Power factor - 1/2 Load 0.98	**Motor efficiency - 1/2 Load** 92.3 %	**Starting current, star-delta** 60.3 A	

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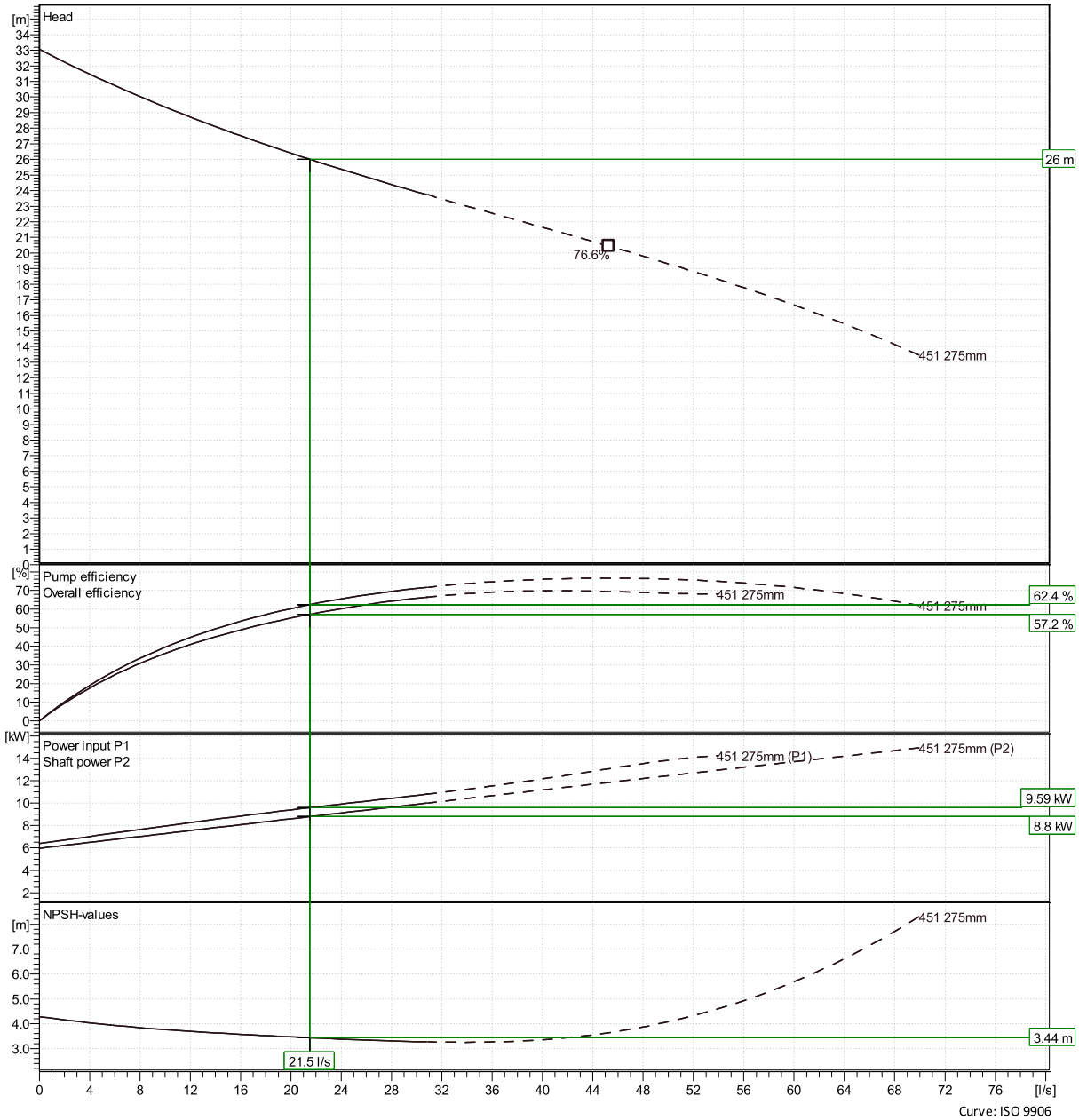
Performance curve

Duty point

Flow	Head
21.5 l/s	26 m

Curves according to: Water, pure [100%],4 °C,999.9 kg/m³,1.569 mm²/s



Curve: ISO 9906

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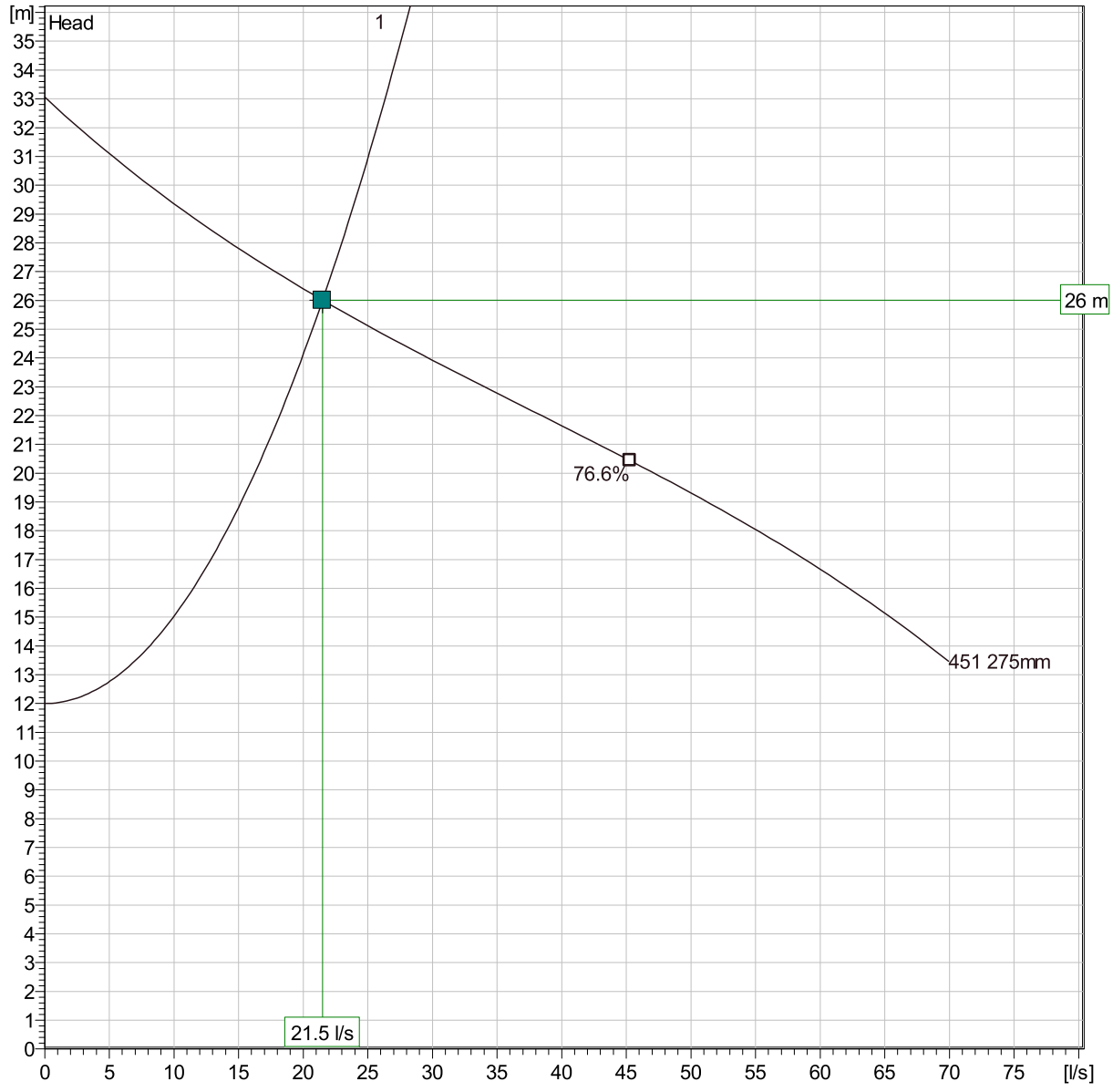
Duty Analysis

Curves according to: Water, pure [100%],4 °C,999.9 kg/m³,1.569 mm²/s



Curve: ISO 9906

Operating characteristics

Pumps/Systems	Flow	Head	Shaft power	Flow	Head	Shaft power	Hydr.eff.	Specific energy	NPSHr
1	21.5 l/s	26 m	8.8 kW	21.5 l/s	26 m	8.8 kW	62.4 %	0.124 kWh/m³	3.44 m

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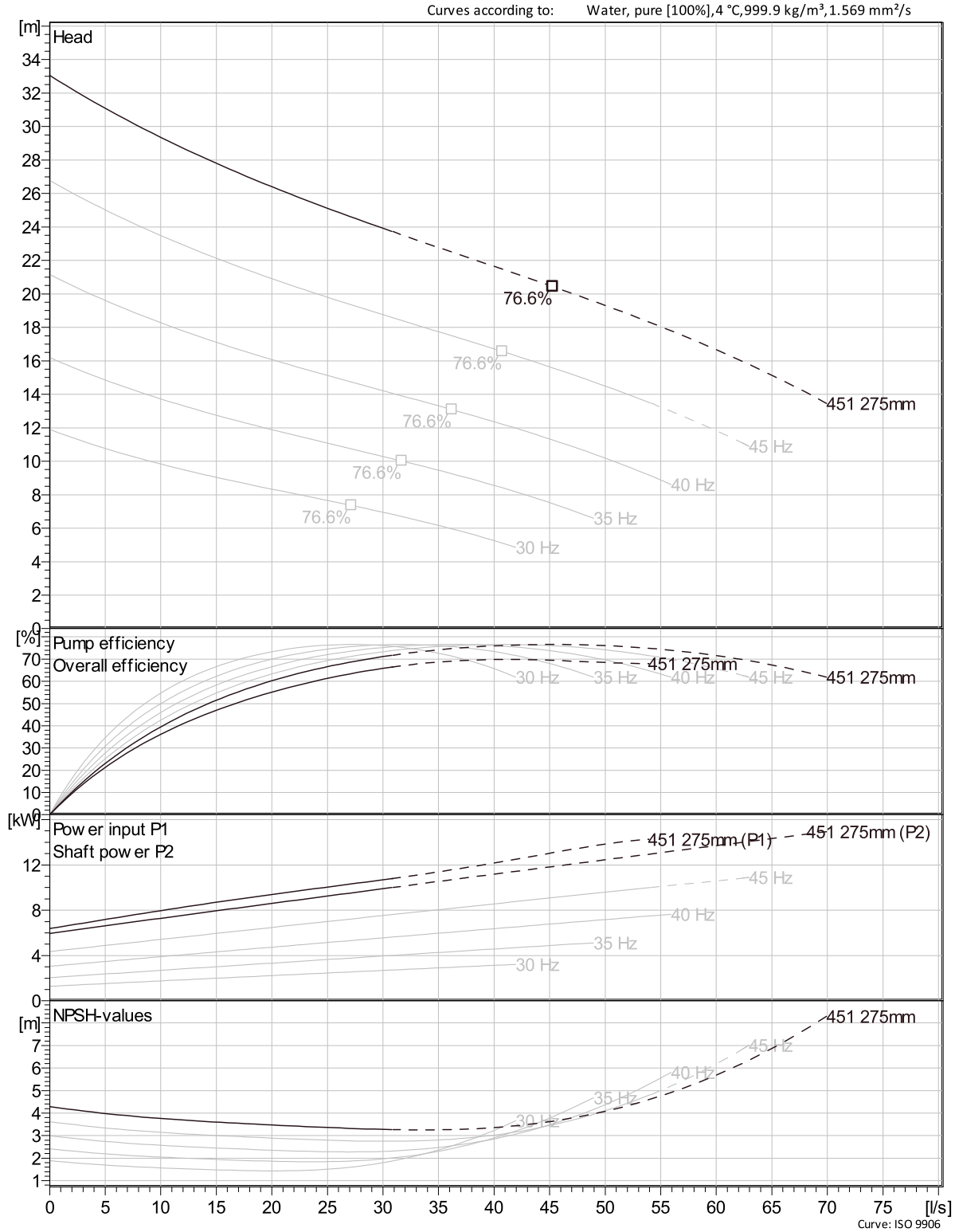
NP 3153 HT 3~ 451

VFD Curve

FLYGT
a xylem brand

Curves according to: Water, pure [100%],4 °C,999.9 kg/m³,1.569 mm²/s



Curve: ISO 9906

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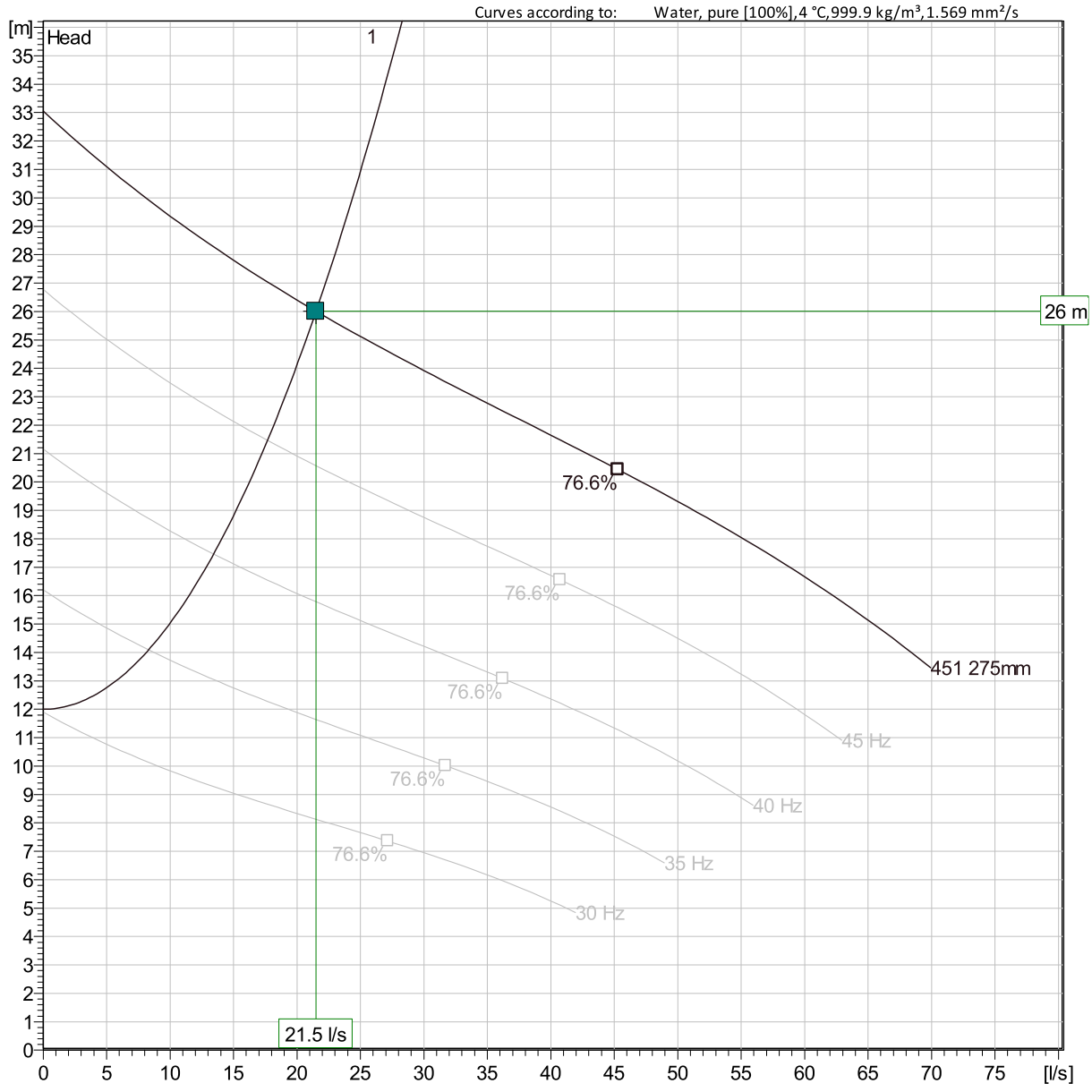
VFD Analysis



Operating Characteristics

Pumps/Systems	Frequency	Flow	Head	Shaft power	Flow	Head	Shaft power	Hydr.eff.	Specific energy	NPSHr
1	50 Hz	21.5 l/s	26 m	8.8 kW	21.5 l/s	26 m	8.8 kW	62.4 %	0.124 kWh/m³	3.44 m
1	45 Hz	17.7 l/s	21.5 m	6.24 kW	17.7 l/s	21.5 m	6.24 kW	59.7 %	0.105 kWh/m³	2.94 m
1	40 Hz	13.4 l/s	17.5 m	4.19 kW	13.4 l/s	17.5 m	4.19 kW	54.9 %	0.0921 kWh/m³	2.49 m
1	35 Hz	8.31 l/s	14.1 m	2.58 kW	8.31 l/s	14.1 m	2.58 kW	44.4 %	0.0979 kWh/m³	2.09 m
1	30 Hz									

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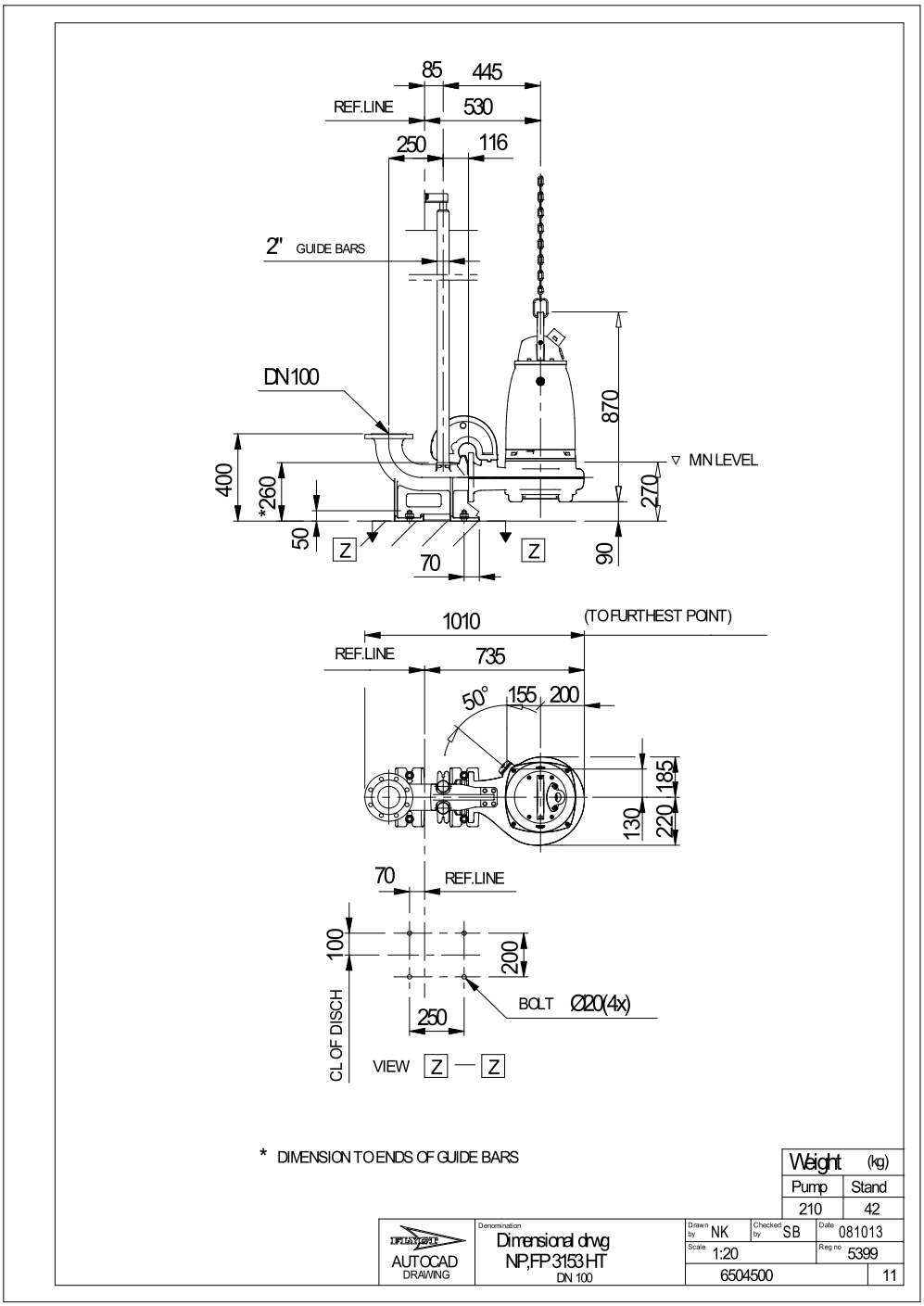
NP 3153 HT 3~ 451

Dimensional drawing



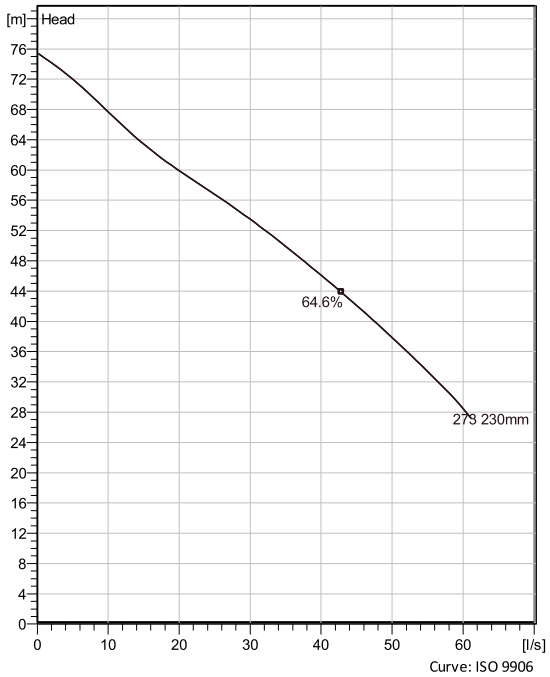
Project	**Created by**	**Last update**
Block	**Created on** 8/7/2019	

NP 3202 SH 3~ 273

Patented self cleaning semi-open channel impeller, ideal for pumping in most waste water applications. Possible to be upgraded with Guide-pin® for even better clogging resistance. Modular based design with high adaptation grade.

Technical specification

Curves according to: Water, pure [100%],4 °C,999.9 kg/m³,1.569 mm²/s



Curve: ISO 9906

Configuration

Motor number
N3202.820 30-40-2KE-W IE3 32KW

Installation type
P - Semi permanent, Wet

Impeller diameter
230 mm

Discharge diameter
100 mm

Pump information

Impeller diameter
230 mm

Discharge diameter
100 mm

Inlet diameter
150 mm

Maximum operating speed
2945 rpm

Number of blades
2

Materials

Impeller
Hard-Iron

Project	**Created by**	**Last update**
Block	**Created on**	8/7/2019

NP 3202 SH 3~ 273

Technical specification

Motor - General

Motor number N3202.820 30-40-2KE-W IE3 32KW	**Phases** 3~	**Rated speed** 2945 rpm	**Rated power** 32 kW
Approval No	**Number of poles** 2	**Rated current** 55 A	**Stator variant** 1
Frequency 50 Hz	**Rated voltage** 380 V	**Insulation class** H	**Type of Duty** S1

Motor - Technical

Power factor - 1/1 Load 0.94	**Motor efficiency - 1/1 Load** 93.5 %	**Total moment of inertia** 0.232 kg m²	**Starts per hour max.** 30
Power factor - 3/4 Load 0.94	**Motor efficiency - 3/4 Load** 94.4 %	**Starting current, direct starting** 330 A	
Power factor - 1/2 Load 0.92	**Motor efficiency - 1/2 Load** 94.7 %	**Starting current, star-delta** 110 A	

Project	**Created by**		**Last update**
Block	**Created on**	8/7/2019	

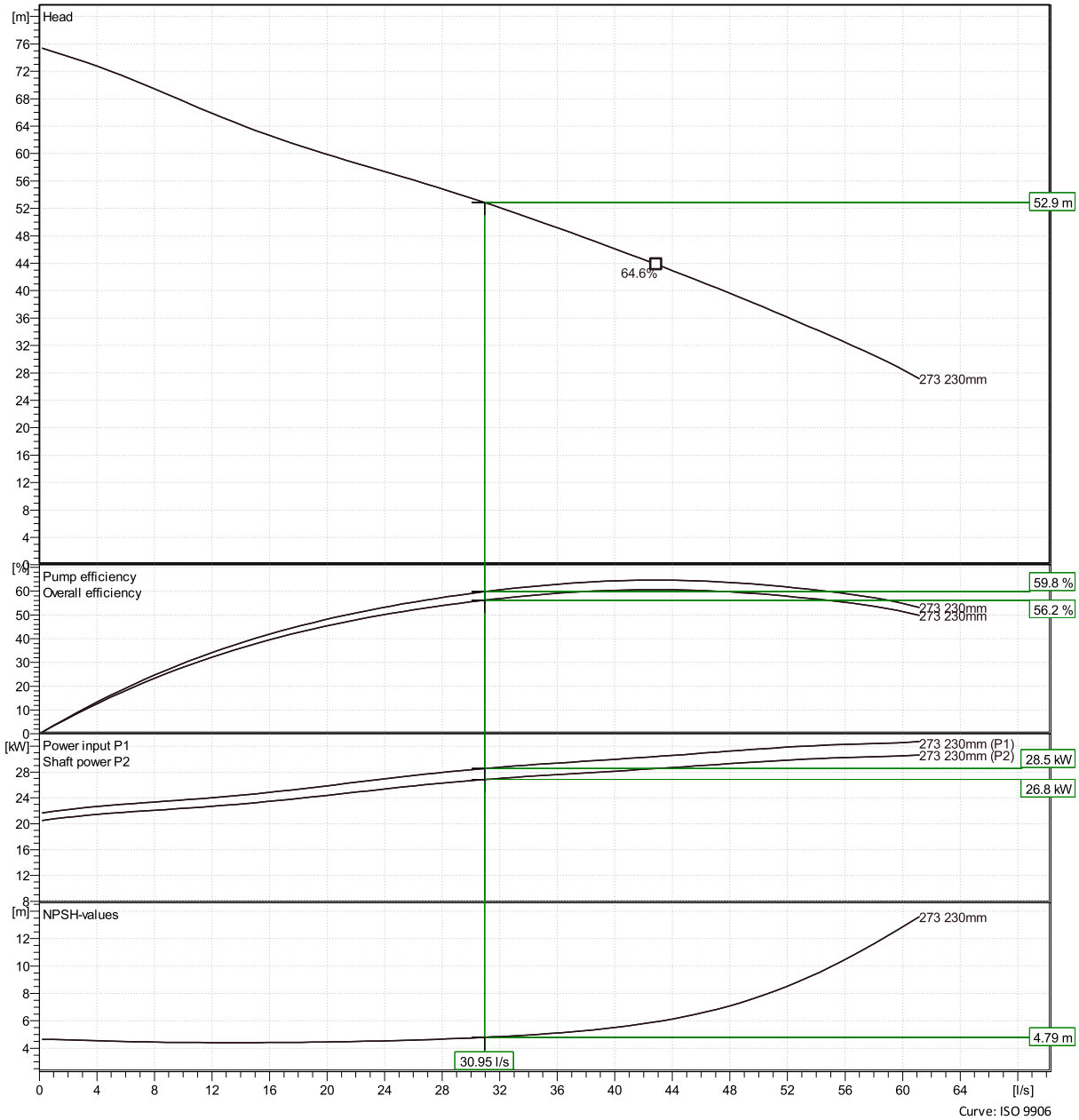
NP 3202 SH 3~ 273

Performance curve

Duty point

Flow	Head
30.9 l/s	52.9 m

Curves according to: Water, pure [100%],4 °C,999.9 kg/m³,1.569 mm²/s



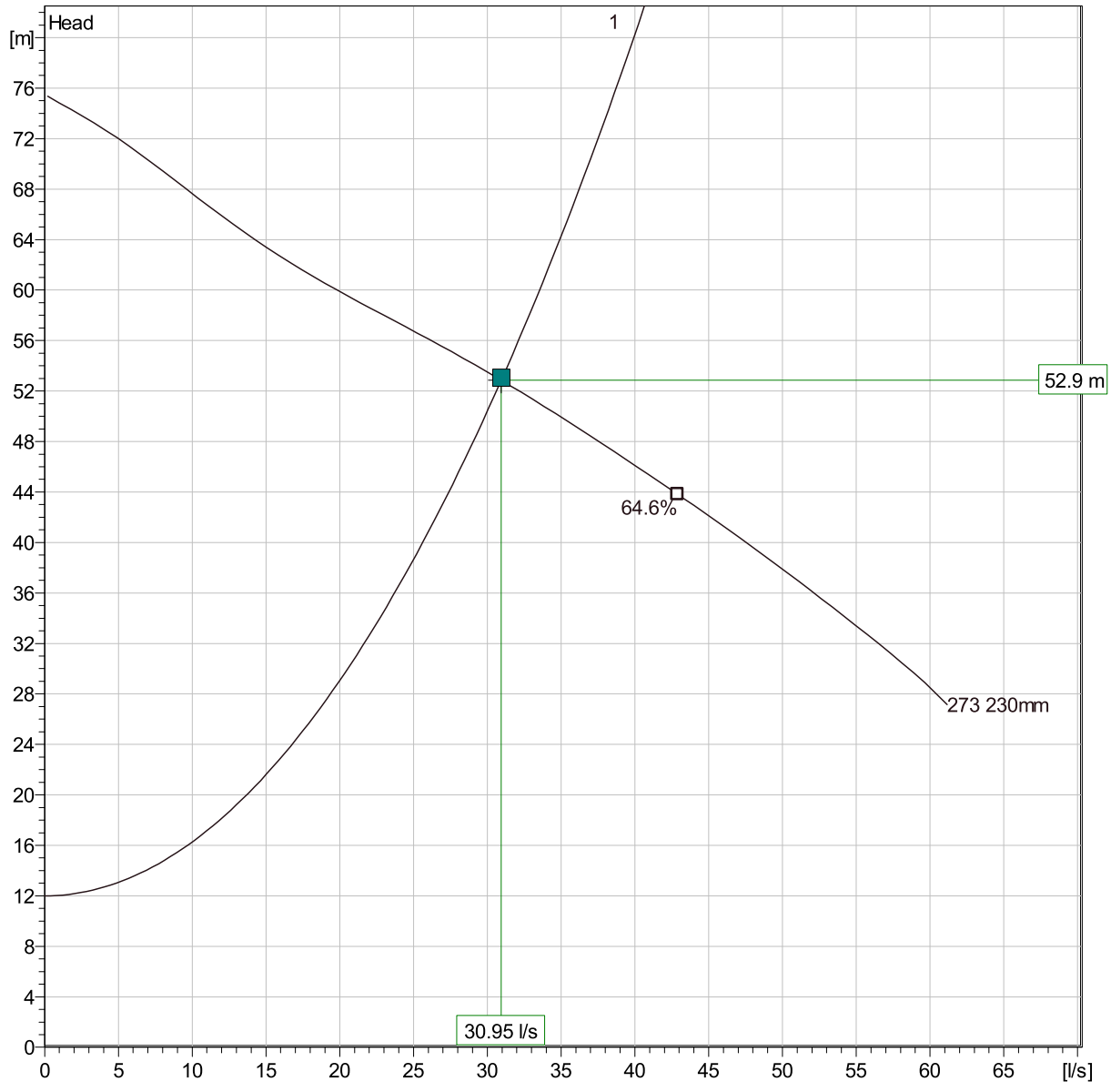
Curve: ISO 9906

Project	Created by	Last update
Block	Created on 8/7/2019	

NP 3202 SH 3~ 273

Duty Analysis

Curves according to: Water, pure [100%],4 °C,999.9 kg/m³,1.569 mm²/s



Curve: ISO 9906

Operating characteristics

Pumps/Systems	Flow	Head	Shaft power	Flow	Head	Shaft power	Hydr.eff.	Specific energy	NPSHr
1	30.9 l/s	52.9 m	26.8 kW	30.9 l/s	52.9 m	26.8 kW	59.8 %	0.256 kWh/m³	4.79 m

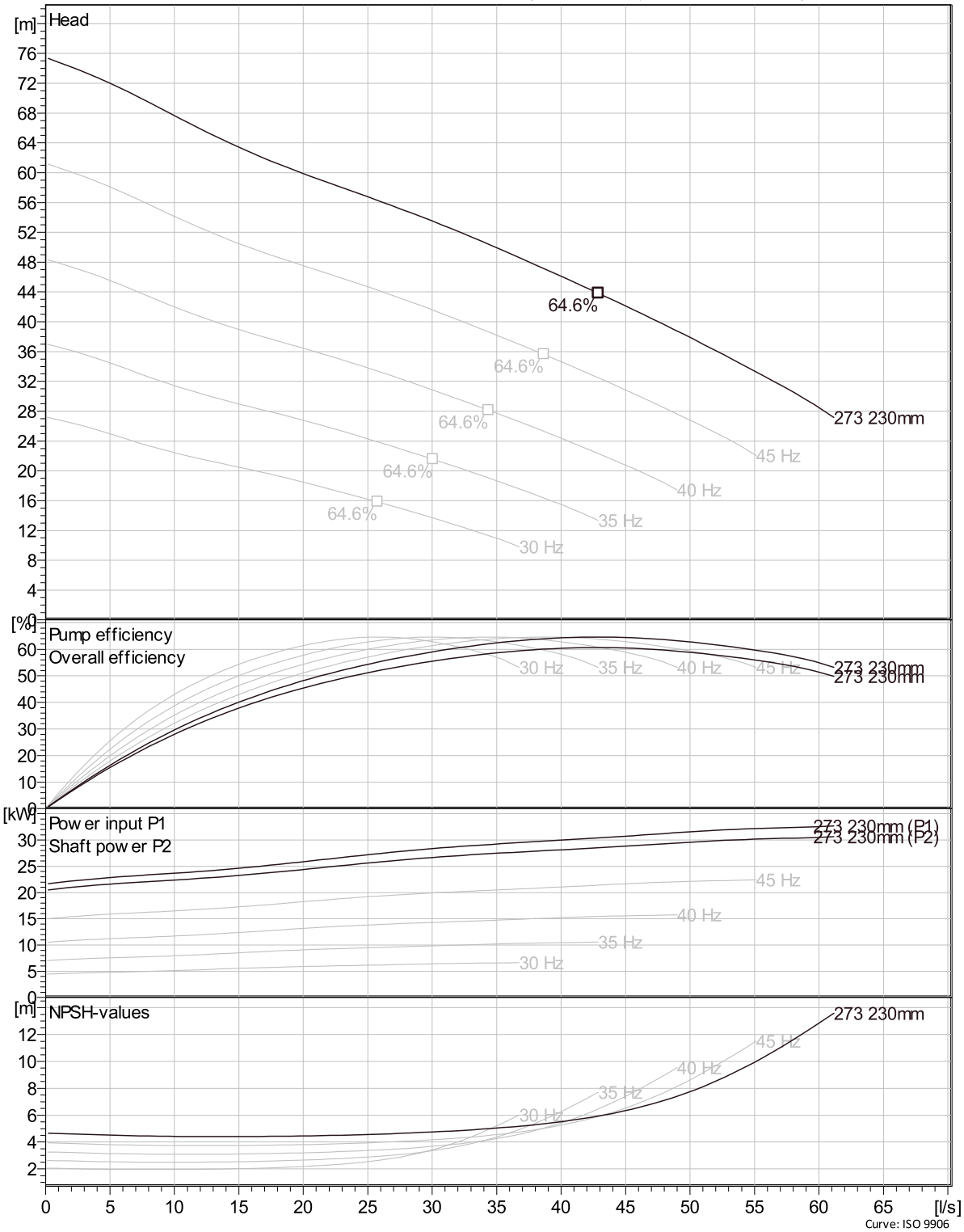
Project	**Created by**		**Last update**
Block	**Created on**	8/7/2019	

NP 3202 SH 3~ 273

VFD Curve

FLYGT
a xylem brand

Curves according to: Water, pure [100%],4 °C,999.9 kg/m³,1.569 mm²/s

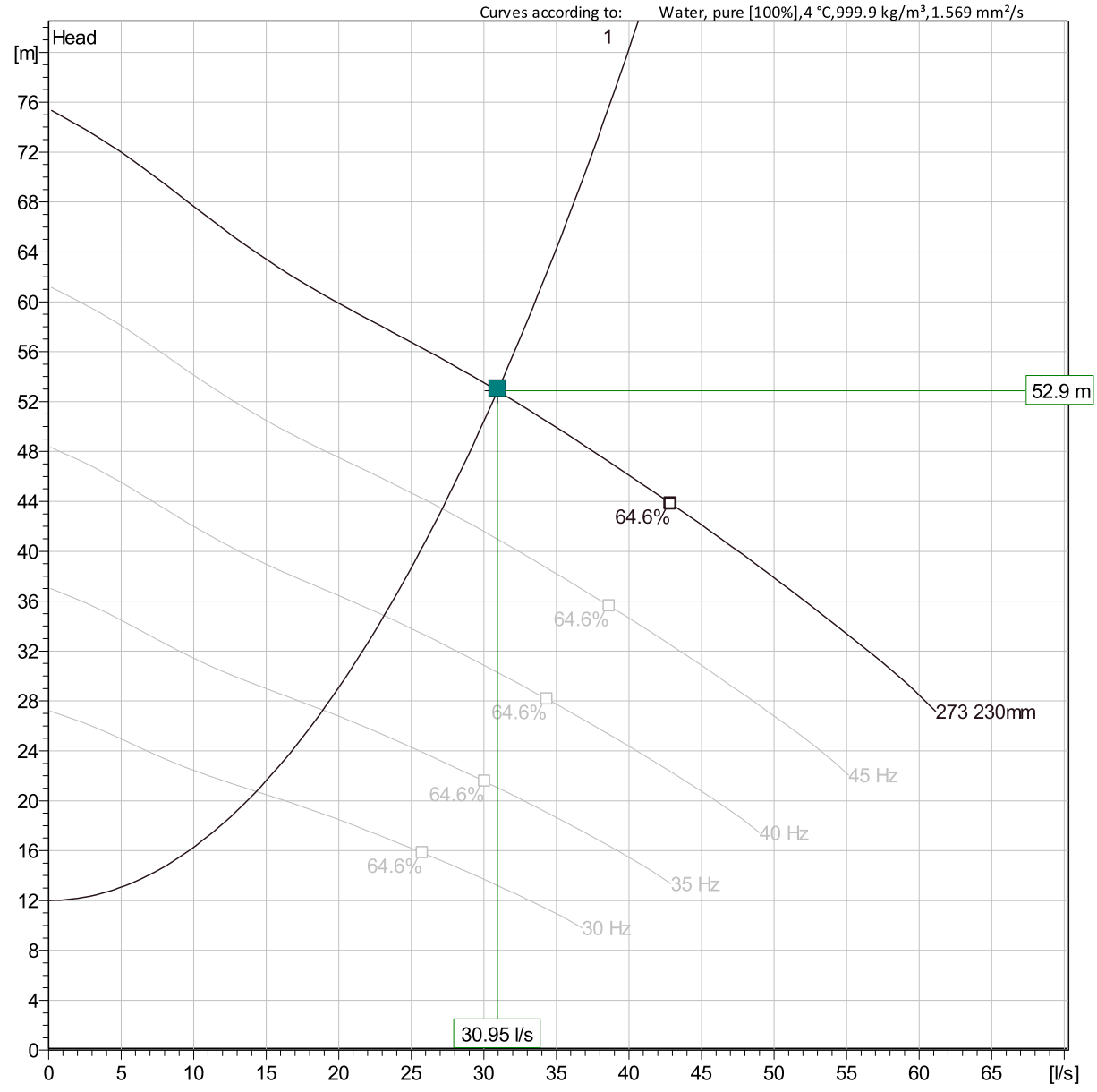


Curve: ISO 9906

Project	**Created by**		**Last update**
Block	**Created on**	8/7/2019	

NP 3202 SH 3~ 273

VFD Analysis



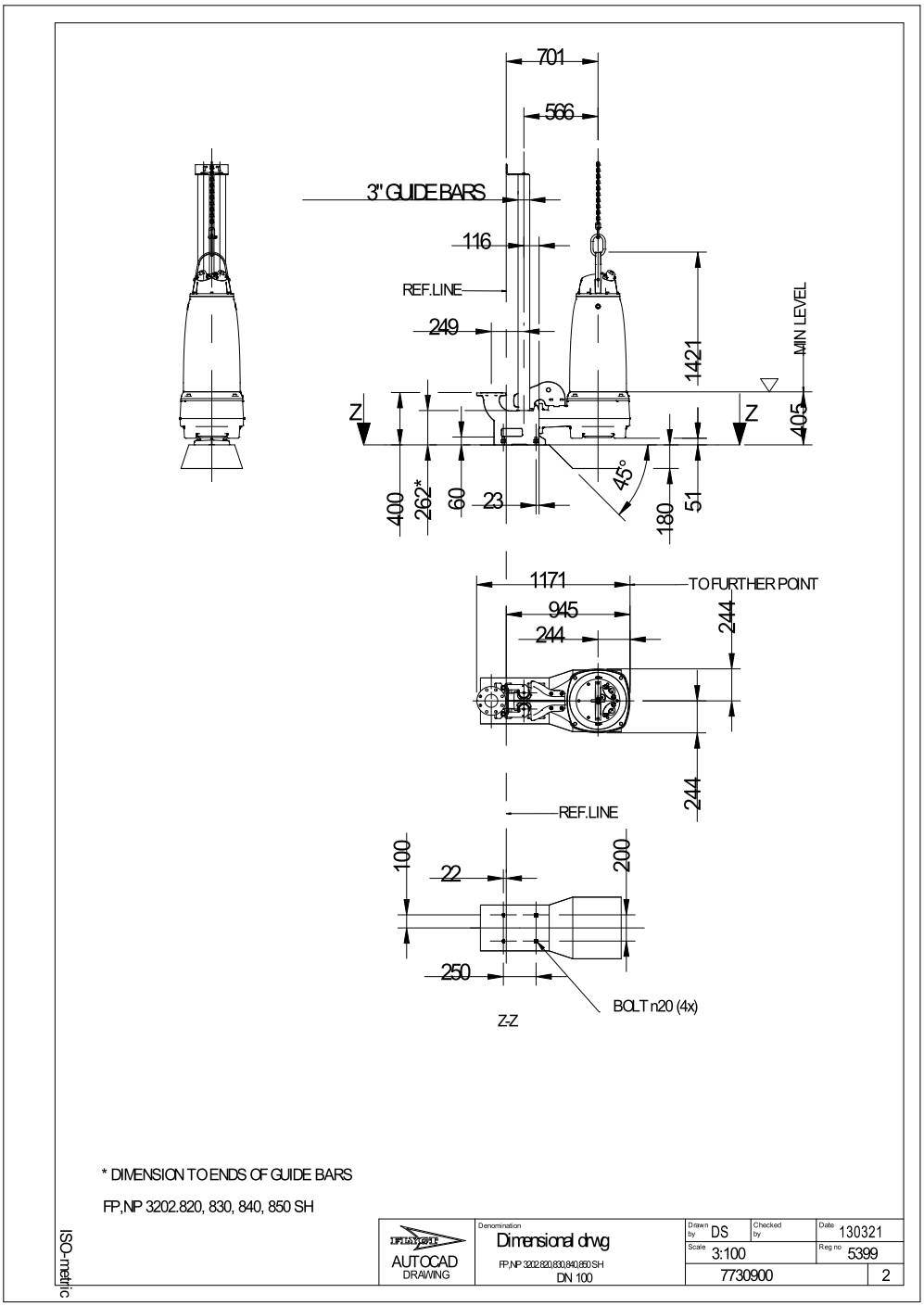
Operating Characteristics

Pumps/Systems	Frequency	Flow	Head	Shaft power	Flow	Head	Shaft power	Hydr.eff.	Specific energy	NPSHr
1	50 Hz	30.9 l/s	52.9 m	26.8 kW	30.9 l/s	52.9 m	26.8 kW	59.8 %	0.256 kWh/m³	4.79 m
1	45 Hz	27.1 l/s	43.4 m	19.5 kW	27.1 l/s	43.4 m	19.5 kW	59.1 %	0.211 kWh/m³	4.03 m
1	40 Hz	23.1 l/s	34.8 m	13.6 kW	23.1 l/s	34.8 m	13.6 kW	58.1 %	0.173 kWh/m³	3.3 m
1	35 Hz	18.9 l/s	27.3 m	8.98 kW	18.9 l/s	27.3 m	8.98 kW	56.4 %	0.141 kWh/m³	2.62 m
1	30 Hz	14.3 l/s	20.8 m	5.5 kW	14.3 l/s	20.8 m	5.5 kW	53.1 %	0.116 kWh/m³	2.01 m

Project	**Created by**		**Last update**
Block	**Created on**	8/7/2019	

NP 3202 SH 3~ 273

Dimensional drawing



Project	**Created by**		**Last update**
Block	**Created on**	8/7/2019	

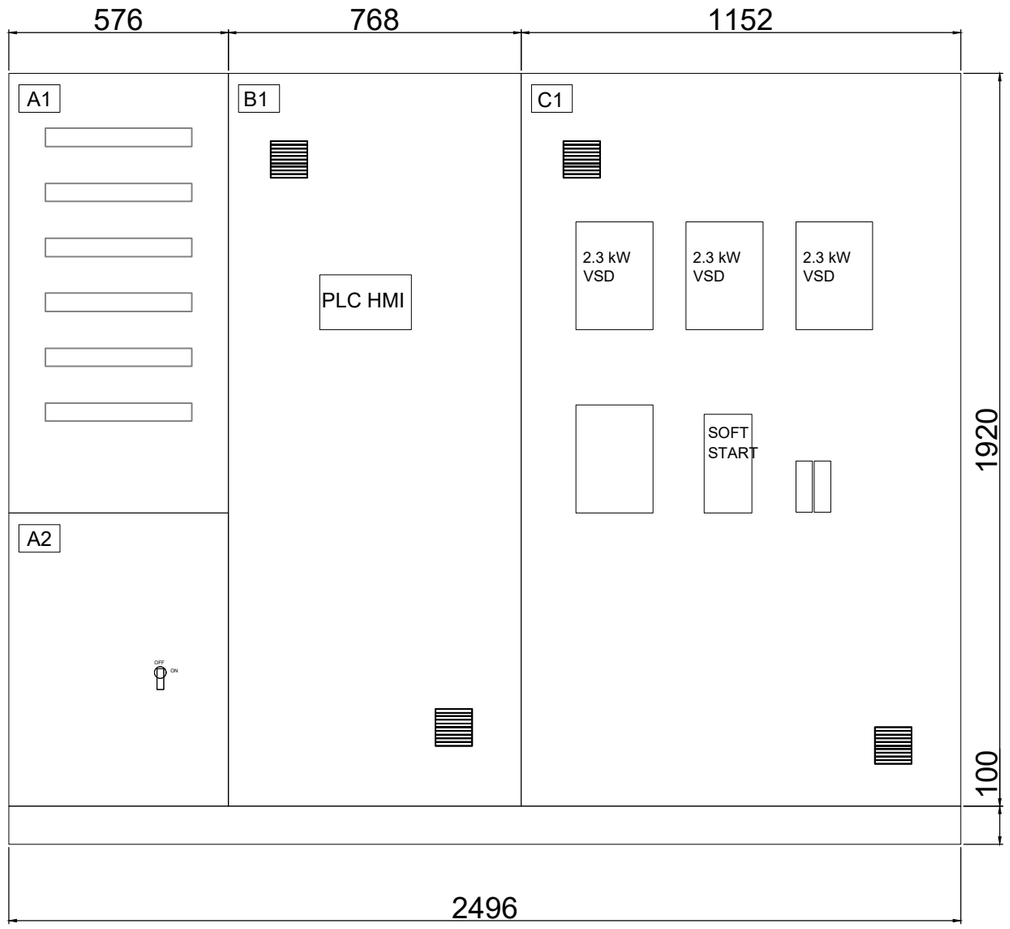
Appendix C. Control Panel

A1 MCB DISTRIBUTION SECTION
A2 MAIN INCOMER
B1 CONTROL AND INSTRUMENTATION SECTION
C1 MOTOR CONTROL SECTION

NOTES :

1. IP54 FORM 2B TYPE 2 PANEL
2. RAL 7035
3. CUBIC STEELWORK.
4. BOTTOM ENTRY
5. 35 DEG C AMBIENT

624MM DEEP



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INFORMATION

Rev	Description	By	Date	Chk'd	Auth
-	FOR INFORMATION	MT	19/03/19	TN	TN

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2nd Floor Technology House Parkmore Technology Park, Galway
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Client: AEVAL

Project: WOODBROOK DEVELOPMENT

Title: PUMP STATION MOTOR CONTROL CENTRE

Original Scale	Design/Drawn	Checked	Authorised
N.T.S	MT Date 19/03/19	TN Date 19/03/19	TN Date 19/03/19

Status	Drawing Number	Rev
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Date: Apr 09, 2019 - 12:29pm Plotted by: Gkenrathy

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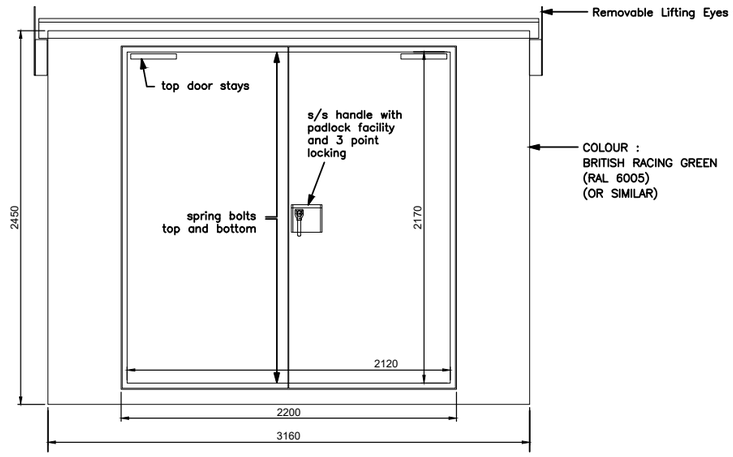
Appendix D. Control Kiosk



FRONT VIEW
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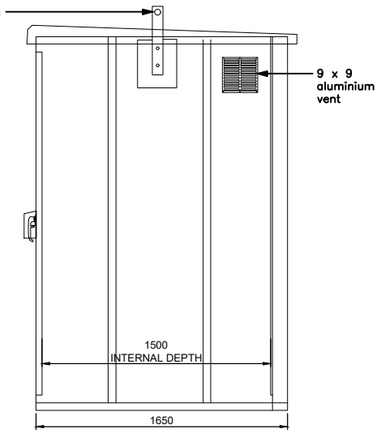
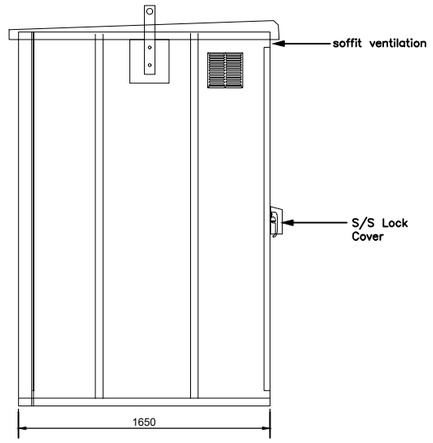
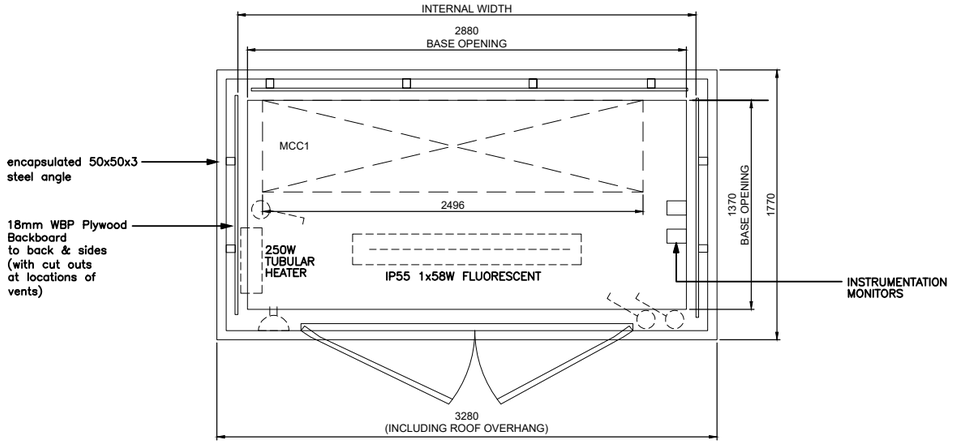
Scale at A3 1:40



RHS VIEW
Scale at A1 1:20
Scale at A3 1:40



LHS VIEW
Scale at A1 1:20
Scale at A3 1:40



PLAN VIEW
Scale at A1 1:20
Scale at A3 1:40

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INFORMATION

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Client: AEVAL

Project: WOODBROOK DEVELOPMENT

Title: ELECTRICAL GA PUMP STATION CONTROL KIOSK

Original Scale	Design/Drawn	Checked	Authorised
A1 - 1:20 A3 - 1:40	MT Date 19/03/19	TN Date 19/03/19	TN Date 19/03/19

Status	Drawing Number	Rev
I	5154251 / EWE / SK / 0018	-

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Date: Apr 09, 2019 - 12:49pm Plotted by: GHanratty

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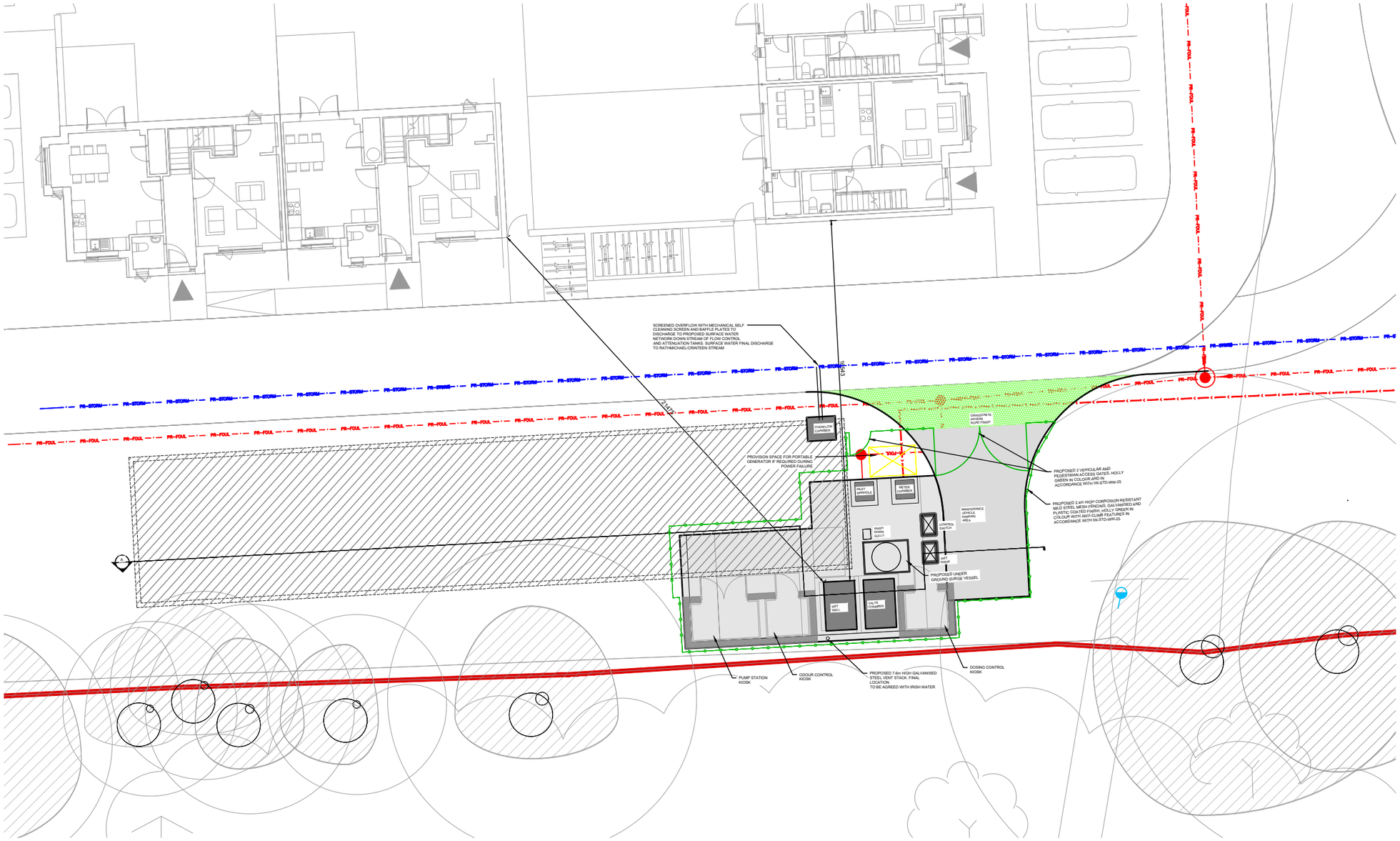
Appendix E. Drawings



FOUL PUMPING STATION AND 24 HOUR EMERGENCY STORAGE TANK (732m3) - INTERIM SOLUTION

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Rev	Description	By	Date	Chk'd	Auth
A	FOR PLANNING	PS	18.10.19	AC	GH
A	FINAL CLIENT APPROVAL	PS	09.10.19	AC	GH
-	ISSUED FOR IW REVIEW	PS	08.08.19	AC	GH

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Fax (+353) 091 779 830

Client: AEVAL

Project: WOODBROOK PHASE 1

Purpose: PLANNING

Title: PROPOSED PUMP STATION PLAN

Original Scale	Design/Drawn	Checked	Authorised
1:100 at A1 1:200 at A3	PS Date 08.08.19	AC Date 08.08.19	GH Date 08.08.19

Status: P

Drawing Number: 5154251 / EWE / DR / 0535

Rev: A

100 0 10

A1

DO NOT SCALE

File: 5154251_EWE_DR_0535-0537.dwg
Date: Nov 01, 2019 - 9:45am
Plotted by: patrick.sheridan

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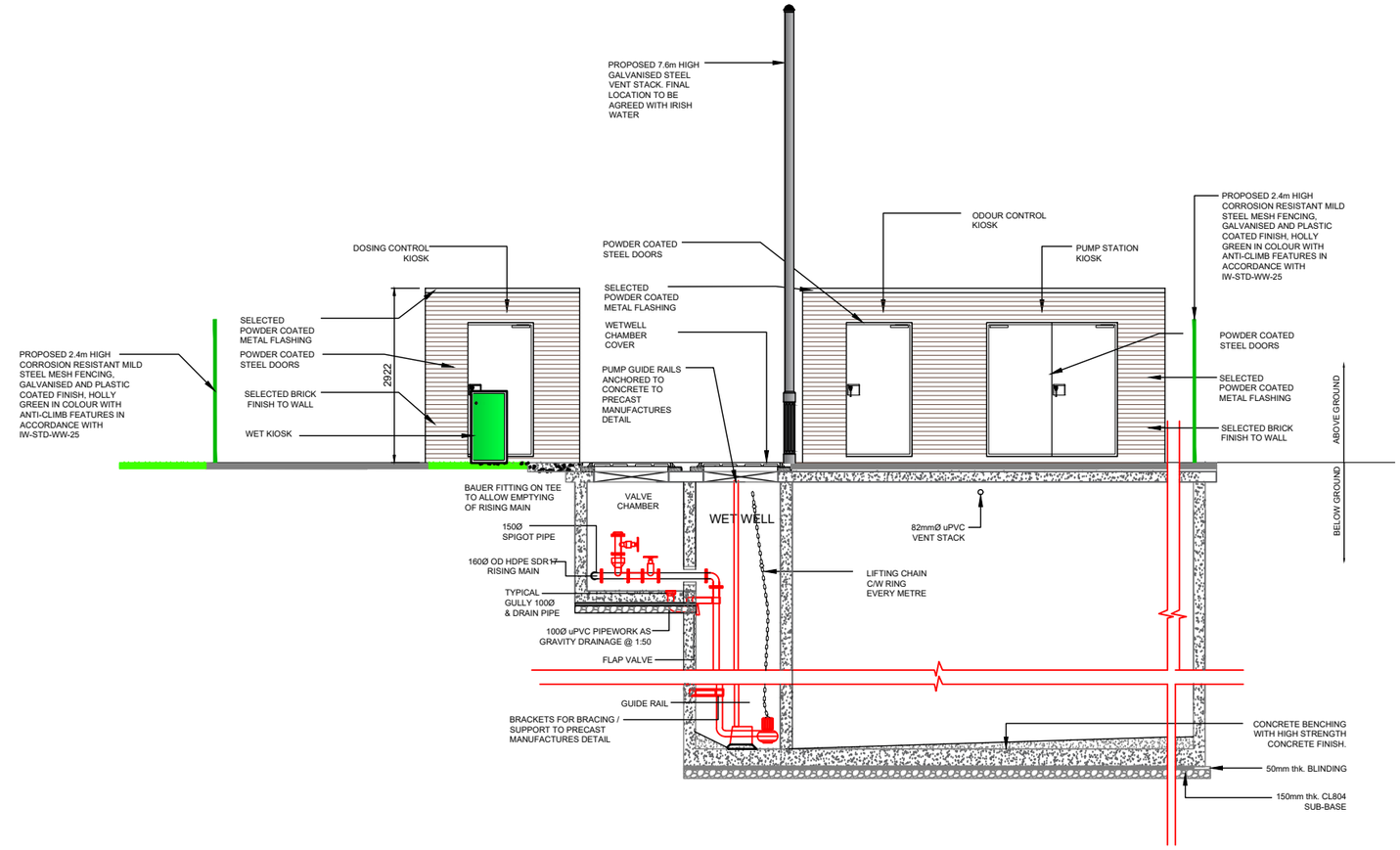

SECTION A
FOUL PUMPING STATION AND 24 HOUR EMERGENCY STORAGE TANK (732m3) - INTERIM SOLUTION

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Rev	Description	By	Date	Chk'd	Auth
A	FOR PLANNING	PS	18.10.19	AC	GH
A	FINAL CLIENT APPROVAL	PS	09.10.19	AC	GH
-	ISSUED FOR IW REVIEW	PS	08.08.19	AC	GH

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Client: AEVAL

Project: WOODBROOK PHASE 1

Purpose: PLANNING

Title: PROPOSED PUMP STATION SECTION

Original Scale	Design/Drawn	Checked	Authorised
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Status	Drawing Number	Rev
P	5154251 / EWE / DR / 0536	A

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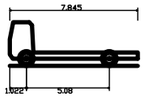

Rampmaster 3,000 Standard Tanker

Overall Length	7.845m
Overall Width	2.565m
Overall Body Height	2.273m
Min Body Ground Clearance	0.439m
Track Width	2.565m
Lock-to-lock time	4.00s
Curb to Curb Turning Radius	9.144m

VEHICLE INFORMATION

FOUL PUMPING STATION AND 24 HOUR EMERGENCY STORAGE TANK (732m3)

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A	FOR PLANNING	PS	18.10.19	AC	GH
A	FINAL CLIENT APPROVAL	PS	09.10.19	AC	GH
-	ISSUED FOR IW REVIEW	PS	08.08.19	AC	GH

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Client: AEVAL

Project: WOODBROOK PHASE 1

Purpose: PLANNING

Title: PROPOSED PUMP STATION AUTOTRACK

Original Scale	Design/Drawn	Checked	Authorised
1:100 at A1 1:200 at A3	PS Date 08.08.19	AC Date 08.08.19	GH Date 08.08.19

Status: P

Drawing Number: 5154251 / EWE / DR / 0537

Rev: A

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Plotted by: patrick.sheridan

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MATCH LINE

PROPOSED PUMP STATION LOCATION . REFER TO DRAWING5154251 / EWE / DR / 0535-0536 FOR LAYOUT AND SECTION

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GENERAL NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE
2. ONLY WRITTEN DIMENSIONS SHALL BE USED. NO DIMENSIONS SHALL BE SCALED FROM THE DRAWINGS
3. ALL LEVELS ARE IN METRES AND ARE TO MALIN HEAD DATUM
4. ALL COORDINATES ARE IN METRES AND ARE TO IRISH TRANSVERSE MERCATOR
5. DRAWINGS ARE TO BE READ IN CONJUNCTION WITH THE SPECIFICATION

LEGEND

- PR-FOUL — PROPOSED FOUL DRAINAGE
- FMH-XX — PROPOSED FOUL MANHOLE
- PROPOSED FOUL RING MAIN

Rev	Description	By	Date	Chk'd	Auth
B	FOR PLANNING	PS	18.10.19	AC	GH
B	RE ISSUED FOR IW REVIEW	PS	08.08.19	AC	GH
A	FOR IW REVIEW	TD	14.05.19	GH	GH
-	FOR INFORMATION	TD	03.04.19	GH	GH

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Fax (+353) 091 779 830

Client: AEVAL

Project: WOODBROOK PHASE 1

Purpose: PLANNING

Title: PROPOSED FOUL PUMP STATION AND FOUL RISING MAIN SHEET 1 OF 3

Original Scale	Design/Drawn	Checked	Authorised
1:1250 at A1 1:2500 at A3	PS Date 28.02.19	AC Date 28.02.19	GH Date 28.02.19

Status	Drawing Number	Rev
P	5154251 / EWE / SK / 0019	B

A1

DO NOT SCALE

File: 5154251_EWE_SK_0019-21.dwg
Date: Nov 01, 2019 - 10:00am
Plotted by: patrick.sheridan

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2. ONLY WRITTEN DIMENSIONS SHALL BE USED. NO DIMENSIONS SHALL BE SCALED FROM THE DRAWINGS
3. ALL LEVELS ARE IN METRES AND ARE TO MALIN HEAD DATUM
4. ALL COORDINATES ARE IN METRES AND ARE TO IRISH TRANSVERSE MERCATOR
5. DRAWINGS ARE TO BE READ IN CONJUNCTION WITH THE SPECIFICATION

MATCH LINE

MATCH LINE

POSSIBLE FUTURE CONNECTION LOCATION BETWEEN INTERIM RISING MAIN AND PROPOSED FUTURE RISING MAIN TO SHAGANAGH WWTP BY IRISH WATER

Shanganagh Cemetery

Golf Course

Golf Links

Woodbrook Golf Links

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LEGEND

- PR-FOUL — PROPOSED FOUL DRAINAGE
- FMH-XX — PROPOSED FOUL MANHOLE
- PROPOSED FOUL RING MAIN

Rev	Description	By	Date	Chk'd	Auth
A	FOR PLANNING	PS	18.10.19	AC	GH
A	FOR IW REVIEW	TD	14.05.19	GH	GH
-	FOR INFORMATION	TD	03.04.19	GH	GH

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Fax (+353) 091 779 830

Client: AEVAL

Project: WOODBROOK PHASE 1

Purpose: PLANNING

Title: PROPOSED FOUL PUMP STATION AND FOUL RISING MAIN SHEET 2 OF 3

Original Scale	Design/Drawn	Checked	Authorised
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Status: P

Drawing Number: 5154251 / EWE / SK / 0020

Rev: A

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A1

0 10 100

DO NOT SCALE

File: 5154251_EWE_SK_0019-21.dwg
Date: Nov 01, 2019 - 10:00am
Plotted by: patrick.sheridan

RISING MAIN TO OUTFALL TO DISCHARGE MANHOLE TO IRISH WATER STANDARDS (STD-WW-29)

RISING MAIN TO OUTFALL TO DISCHARGE MANHOLE TO IRISH WATER STANDARDS (STD-WW-29)

EXISTING IRISH WATER RISING MAIN WAYLEAVE FROM BRAY TO SHANGANAGH WWTP

FINAL RISING MAIN ROUTE TO BE CONFIRMED WITH DLRCC AND IRISH WATER

MATCH LINE

GENERAL NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE
2. ONLY WRITTEN DIMENSIONS SHALL BE USED. NO DIMENSIONS SHALL BE SCALED FROM THE DRAWINGS
3. ALL LEVELS ARE IN METRES AND ARE TO MALIN HEAD DATUM
4. ALL COORDINATES ARE IN METRES AND ARE TO IRISH TRANSVERSE MERCATOR
5. DRAWINGS ARE TO BE READ IN CONJUNCTION WITH THE SPECIFICATION

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LEGEND

- PR-FOUL — PROPOSED FOUL DRAINAGE
- FMH-XX — PROPOSED FOUL MANHOLE
- PROPOSED FOUL RING MAIN

Rev	Description	By	Date	Chk'd	Auth
A	FOR PLANNING	PS	18.10.19	AC	GH
A	FOR IW REVIEW	TD	14.05.19	GH	GH
-	FOR INFORMATION	TD	03.04.19	GH	GH

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Client: AEVAL

Project: WOODBROOK PHASE 1

Purpose: PLANNING

Title: PROPOSED FOUL PUMP STATION AND FOUL RISING MAIN SHEET 3 OF 3

Original Scale	Design/Drawn	Checked	Authorised
1:1250 @ A1 1:2500 at A3	PS Date 28.02.19	AC Date 28.02.19	GH Date 28.02.19

Status	Drawing Number	Rev
P	5154251 / EWE / SK / 0021	A

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