Case Study

Mouldsworth Borehole Wilo UK







United Supply Chain United Utilities have a raw water extraction site at Mouldsworth in Cheshire.

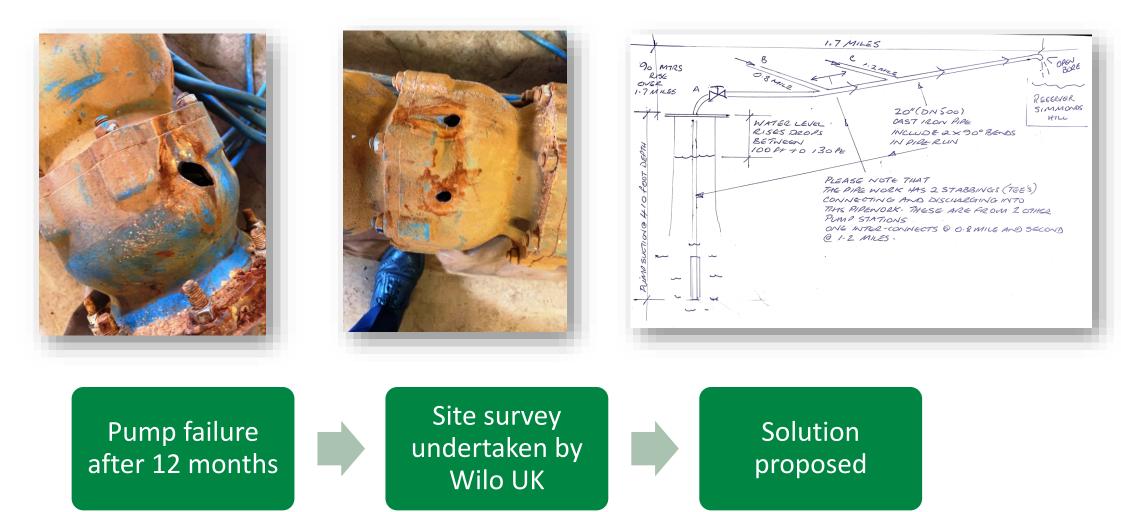
This site delivers 3 million litres of water per day through 1.7 miles of pipework to a reservoir.

This is a key part of United Utilities' clean water operations allowing them to deliver 1.8 billion litres of water a day to more than 3 million homes and businesses in the North West.





CASE STUDY

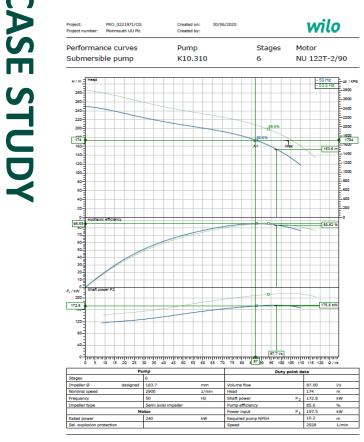


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Site surveying and analysis was undertaken to understand the site pumping requirements and to

optimise the sites operations.



Technical data Pump Stages Motor Submersible pump K10.310 6 NU 122T-	PRO_02219 umber: Monmouth L		30/06/2020	1	wilo
Submersible pump K10.310 6 NU 122T- 77	nical data	Pump		Stages Mot	or
	nersible pum				
G 185 Discharge port Int L 3720 G 6 1 G 6 1 M M PK63 M <					
G 185 Discharge port Int L 3720 G 6 1 M 2070 PKG3 PKG3		-			
L 3720 G 61 M 2070 PR63	185	Dimensions in mm			
M 2070 G 6 1 PN63					intake piece
PN63					
RV G 61PN 63				PN63	
RV G 6 IPN 63				DUC 6 LDU CO	•
				RV G 6 1 PN 63	

Project: Project number:	PRO_0221971/CG Monmouth UU Plc	Created on: 30/06/2020 Created by:		wilo
Technical		Pump	Stages	Motor
Submersi		K10.310-S	6	NU 122T-2/90

Pumped fluid	Water				ta specification Rated flow		87	Vs
Pumpeu nuiu	Type						174	m
Solids			0		Rated head Geodetic head		0	m
Weight % Operating temperature t A		20	*C	Available system I	IDCH	0		
operating tempe pH at t A	rature t A		20	ΨC	Available system i Max. inlet pressure		0	m kPa
			998.2	he feel			100	10.0
Density at t A				kg/m ^a	Altitude above sea level			m
Kin. viscosity at			1	mm ² /s kPa	Installation type Vertical installation		n	
Vapour pressure	atta		2.23		Borehole Ø		mm	
Voltage				v	Duty p			
Frequency			50	Hz			87.00	l/s
		Pu	imp				174	m
Make			WILO		Shaft power	P2	172.8	kW
Pump type			K10.310-S		Pump efficiency		85.6	%
Frame size			10° (Ø245 - Ø275)		Power input	P1	197.5	kW
Sense of rotation			Counter clockwise		Required pump NF	PSH	10.2	m
Max. operating p	1		2446	kPa	Speed		2900	1/min
	Pressure		PN63				tor	
Discharge port	Rated di		G 6 I		Manufacturer / Ty	pe	NU 122T-2/9	
	Standan	đ	DIN ISO 228-1 (I)		Specific design		NU (drinking	water filing)
Stages			6		Rated power		240	kW
Impelier type			Semi axial impeller		Electric voltage		400~3	v
Impelier constru	ction				Frequency		50	Hz
	Max.		186	mm	Power input with rated power			269.7 kW
Impelier Ø	designed	1	183.7	.7 mm		Current input with rated power		457.9 A
	Min.		150	mm	Number of poles		2	
	Nominal		87.5	Vs.	Rated speed		2900	1/min
Flow	Max-		110	l/s Load 12		25 / 100 / 75 / 50 / 25 %		
	Min-		0	l/s	cos phi 0.87/0.8			/0.76/0.58
	Nominal		173	m	cos phi with starting		0.28	
Head	Max-		250	m Efficiency 8		8.5/88.9/87.8/84.7/77.8		
	Min-		117	m			S1	immerse
Shut off head			250	m	Max, fluid temperature		20	*C
Max, shaft powe			176	kW	Min. flow velocity		0.1	m/s
Weight of unit			796.2	kg	Starting curr. d-o-l/ YD		2500 / 83	
Pump materials - Material		al design C		Starting torque		750	Nm	
Suction piece		1.4408		Inertia mon			0.284	ka m²
Suction piece 1.4408 Stage- /guide casing 1.4408		Starts per h				10		
Impelier 1.4408		Degree of p				IP 68		
Impelier 1.4408 Stationary wear ring EPDM		Weight of mot				620 kg		
Pump shaft 1.4462			Motor connection cable		7x1x70 S078			
damp sleeve 1.4462						mm ²		
Bearing sleeve EPDM			Max. possible motor connection cable		•	mm ²		
Connecting scree		A4		+		Motor materials		
Nuts A4			Motor materials Material design: A			c		
Non-return valve 1.4408 /			Shaft sealing:: mech. shaft seal		mech.shaft			
Non-recurn valve 1.4408 /		AISI 316	Stator pipe Upper bearing casing EN		St - G1L 200	G-Cu St G-Cu St		
				Lower bearin		- GJL 200 - GJL 200	G-Cu Sh G-Cu Sh	
				Lower part:	EN	- GJL 200	G-Cu Sn	10
				Shaft pivot:		.4462	1.446 EPDM	2
				Rubber parts Screws and r		EPDM 2 - 70	A4 - 7	0
								-
Remarks:								



wilo



- 10% Hydraulic efficiency gain
- 27 Kilowatts per hour energy saving
- £64,000 Running cost saving per annum
- £640,000 Saving based on life expectancy
- 23% Savings in capital costs
- Reduction in CO2 emissions of 194 tonnes
 per annum
- Reduction in CO2 emissions of 1940 tonnes per 10-year life expectancy.
- Wilo pump has no embedded CO2 in manufacturing process

Result

Wite	Life	Cycle Cost An	lysis
Item	Wile K10	Pleuger	-
ISO Performance Grade	ISO 9906 1B	ISO 9906 1B	
Pump Model	K10-220	ON103/7	
Litres per sec.	83	83	
Head (mts)	174	174	
Hydraulic Efficiency	85.60%	75.00%	
Motor Efficiency	88.80%	88.80%	
Combined Efficiency	76.01%	66.60%	
Pump kW abs	165.14	188.47	
Total Input power Electricity Cost	185.97	212.24	
(pence per kWh)	20		
Operating hours per day	24		
Operating days per week	7		
Capital Cost	€ 28,296.00	€ 32,407.00	
Annual running cost	€ 324,918.18	€ 370,819,78	
kWh per Mega Litre	622.37	710.30	
€ 3,500,000.00			
€ 2,500,000.00			
€ 2,000,000.00		<u> </u>	
€ 1,500,000.00		*	
€ 1,000,000.00			
€ 500,000.00	×		
€- <u>Year1 v</u>	ar2 Year3 Year4 Y	ar5 Yaar6 Yaar7 Ya	ard Year 9 Year 10
	\$70,1 €1,003 €1,327 €	1,052 € 1,977 € 2,502 € 2	(027 € 2,952 € 3,277
			.990 € 3,309 € 3,740 L. €. €.
y of Life Cycle Cost Calculator 2	023 mouldsworth		

Life Cycle Cost Analysis

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READ MORE

United Supply Chain: <u>https://www.unitedutilities.com/corporate/about-us/governance/suppliers/delivering-value/united-supply-chain/</u>

Supply Chain Sustainability School: https://www.supplychainschool.co.uk/

Wilo Sustainability Report: https://wilo.com/en/Pioneering/Sustainability/Sustainability-Report/

