Project: Glan Llyn

Subject: Summary of SWPS1 Management Protocols

1 Introduction

This technical note presents a summary of information relevant to the management of surface water pumping station SWPS1 at Glan Llyn. Surface water pumping station SWPS1 is designed to convey water from the surface water reen system in the developed areas of Glan Llyn to Monks Ditch, via Monks Lake, a settlement lagoon. SWPS1 is a standalone pumping station with no associated treatment plant.

A comprehensive operation and maintenance manual will be in place prior to the commencement of operation.

2 Roles and Responsibilities

The key roles and responsibilities are summarised in Table 1:

Table 1: Roles and Responsibilities

Role	Key Responsibilities
Operator – St. Modwen Developments Key personnel are Neil Williams and Jonathan Hearing	Neil Williams has oversight of the overall Glan Llyn development and Jonathan Hearing is responsible for day to day management of the development site. Their wider Glan Llyn responsibilities will extend to ensuring compliance with the SWPS1 environmental permit and they will have overall control of the operation and maintenance of SWPS1 and implementation of contingency measures in the event of an emergency.
Maintenance Contractor - P M Harris	PM Harris are a civil engineering contractor responsible for constructing and installing SWPS1. They are appointed by St. Modwen to undertake ongoing infrastructure works on the wider Glan Llyn development site. PM Harris will undertake all routine and emergency maintenance activities on SPWS1 and in the surface water drainage network.

3 Design Elements

Pumping station SWPS1 will run on mains electricity and comprises a main belowground pump chamber and associated value chambers, a rising main which discharges into Monks Ditch, and

an aboveground control kiosk. Drawing 02554-AA-003-P1 shows the location of SWPS1 and Monks Lake.

The main chamber comprises a fibre-reinforced concrete caisson shaft with a reinforced concrete base slab and a reinforced concrete roof slab.

The pumping station consists of two submersible pumps (one with capacity to pump at a flow rate of 750l/s and the other at 250l/s), which are designed to discharge through ductile iron internal pipework into Monks Ditch. The pumps are situated within a wet well, with a separate valve chamber accommodating non-return valves, gate valves and overpumping pipework.

4 Operation

It is anticipated that SWPS1 will operate daily, on an intermittent basis rather than continuously. Operation of SWPS1 will primarily be automatic and dependent upon water levels within Monks Ditch which will be monitored downstream at an off-site location to the south of the site. Real-time telemetry from the downstream monitoring device will determine when water levels are sufficiently low for SWPS1 to safely operate.

The design of SWPS1 means that it will also be possible for it to be operated manually, as required.

The appointed maintenance contractor will carry out monthly inspections to check the telemetry apparatus (for example the battery status and accuracy of water level measurement) and carry out checks of SWPS1 in accordance with the requirements of the operation and maintenance manual.

The named maintenance contractor will keep records of their inspections.

5 Cleaning and Maintenance

5.1 SWPS1

A penstock has been installed at the SWPS1 inlet to allow cleaning and maintenance of the pumping station to be undertaken in a dry environment in isolation from Monks Lake and Monks Ditch.

A trash screen is located on the outside of the penstock. Accumulated debris shall be cleared regularly from the screen. Fencing has been installed to ensure that clearance can be carried out safely.

Cleaning will be undertaken by the appointed maintenance contractor under the normal Health and Safety requirements in line with a site specific risk assessment and method statement.

Routine maintenance is likely to comprise servicing of the pumps and this will be planned to coincide with periods when low water levels are expected in the drainage system. More major maintenance is likely to be very infrequent.

Replacement of specific components will be completed, as required, at pre-determined intervals.

Maintenance of the off-site monitoring points should be infrequent, but the batteries will require replacing at infrequent intervals.

All maintenance of SWPS1 will be carried out in line with the manufacturer and construction contractor's requirements.

The appointed maintenance contractor will keep records of their maintenance activities.

5.2 Sediment Removal

Inspection of sediment accumulation will be undertaken biennially and sediment will be removed if there is a recoverable thickness present. SWPS1 will not be operational during and immediately after silt removal to ensure that mobilised sediment cannot discharge to Monks Ditch.

Sediment that has been removed will be cast onto the banks. A D1 exemption will be applied for, if required.

6 Contingency Plans

6.1 Power Supply Failure

In the event of failure of the mains electricity supply, SWPS1 will not operate, there will be no discharge of water via the Monks Ditch outfall and the surface water drainage system at the Glan Llyn site will store water in line with its design. Temporary pumps will be delivered to the site within 24 hours, if required.

On restoration of mains electricity, the pumps will be re-started in accordance with the operation and maintenance manual.

6.2 Pump Failure

In the event of a catastrophic failure of the pumping station, the surface water drainage system at the Glan Llyn site will store water in line with its design. Temporary pumps will be delivered to the site within 24 hours, if required.

The pumps will be re-started in accordance with the operation and maintenance manual.

6.3 Flooding

In the event of an extreme flooding event of Monks Ditch and the wider area beyond Glan Llyn which would mean that SWPS1 cannot operate, NRW will be contacted to discuss opening of the Monks Ditch tidal flap to allow discharge of water to the Severn Estuary.

6.4 Non-conformances with Environmental Permit Thresholds

In the event of non-conformances with the permit thresholds at the established SWPS1 discharge sampling location, the pumping station will be manually switched off and re-sampling will be undertaken within 48 hours of receipt of the laboratory analytical data via temporary operation of the pumping station.

It is proposed that sampling of water quality is undertaken on a regular basis upstream of Monks Lake and SWPS1 within the Glan Llyn site, at various locations shown on Drawing 02554-AA-003-P1. This water quality dataset can therefore be reviewed if non-conformances are identified at the SWPS1 discharge sampling location, to determine if there is an identifiable cause.

Re-sampling will continue at the established SWPS1 discharge sampling location within 48 hours of receipt of each set of laboratory analytical results which do not fully comply with permit thresholds, until two consecutive samples pass the thresholds in full. Automatic operation of SWPS1 will then re-commence.

In the event of continued non-conformances of the permit thresholds at the sampling location, the options for treatment of the surface water will be discussed with Natural Resources Wales.

All sampling will be carried out by the operator's appointed geo-environmental consultant.

7 Complaints Procedure

Complaints received will be escalated to the operator and investigated to determine if there is an identifiable issue to be resolved and the actions required.

8 Summary of Required Record Keeping

Records will be kept of:

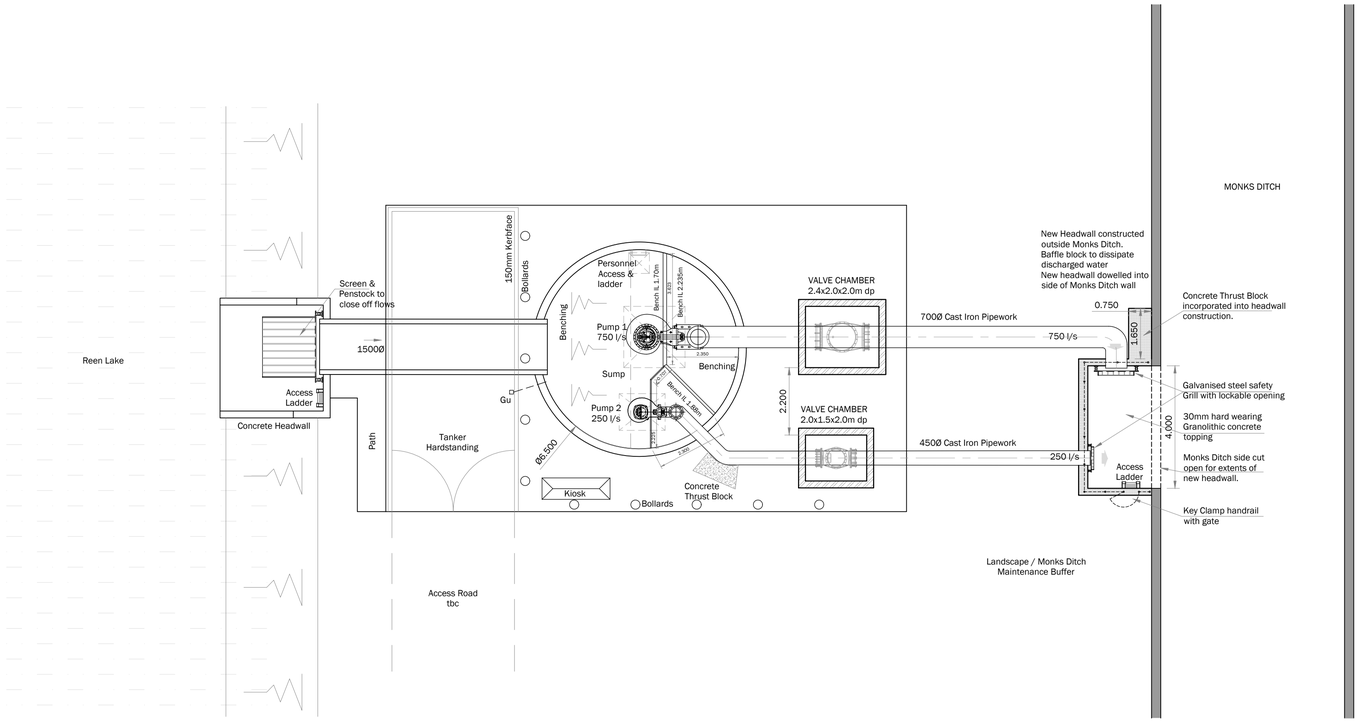
- all operating procedures and maintenance schedules;
- staff competence and training records;
- water quality sampling results;
- non-conformances and actions taken;
- maintenance works completed;

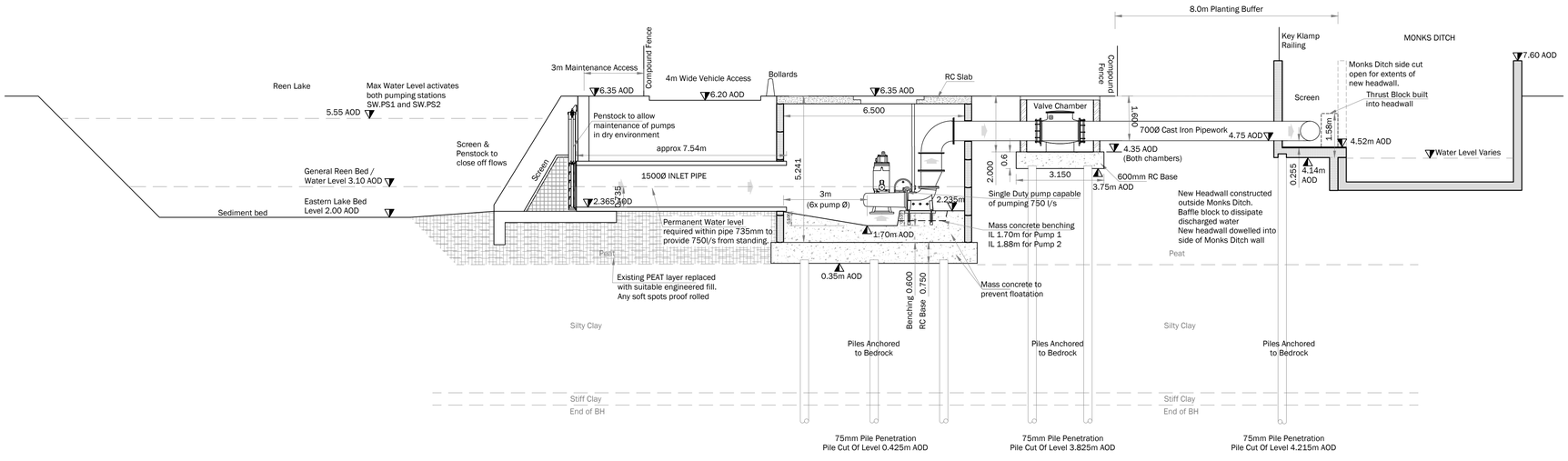
- complaints received, findings of subsequent investigation and actions taken; and
- any audits undertaken.

9 Review

Management protocols will be reviewed annually by the operator, or sooner if the nature of the surface water discharge activity or associated risks change.

A1 1:100 1 2 3 4 5 6 7





Pump Design Parameters:

Duty Pump Rate 750 l/s
Standby Pump Rate 250 l/s
Min pump operating period 1 hour

Pump control in PS (reen)
Pump Start Level - 4.10 AOD in Reen
Pump Stop Level - 3.10 AOD in Reen
Max water level in Reen 6.10m AOD before emergency operations considered

Offsite Control - Monks Croft Stop Board
Pump at 750 l/s when W.L is ≤ 5.502m AOD
Pump at 250 l/s when W.L is ≤ 5.72m AOD

Tidal Lock
Tide data for Goldcliff required.
No pumping when Goldcliff tide levels exceed 5.50m AOD

Telemetry required
- With second SW pumping Station
- With Offsite Control Point at Monks Croft Stop Boards
- Monks Ditch Water Level monitored only for performance data gathering, alarm to signal when W.L. exceeds 5.90m AOD

Pumping operation alternated between SW.PS1 and SW.PS2. When Water level in REEN reaches 5.55m AOD, both SW.PS1 and SW.PS2 to operate simultaneously.

Additional emergency manual operation to activate Standby Pump, equating to total discharge of 1,000 l/s

Reen storage network capable of total storage volume equal to >7 days of non-pumping.

REV	DATE	REVISION NOTE	BY
C8	01.04.20	As Built	DMcC
C7	15.01.18	Pile cut off levels added	DMcC
C6	26.10.17	Coordinated to structural drawings	DMcC
C5	04.10.17	Pump benching amended	DMcC
T4	26.09.17	Layout mirrored to outfall downstream	DMcC
T3	13.09.17	M&E details updated, outfall reconfigured	DMcC
P2	07.2017	Connection to Monks Ditch amended	DMcC
P1	27.04.17	Updated to latest design criteria	DMcC

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CLIENT
St Modwen Developments

PROJECT
Llanwern
Newport

DRAWING TITLE
Surface Water
Pumping Station No.1
Eastern Sub - Residential

DRAWING ISSUE STATUS
As Built

JOB CODE	STAGE	DRAWING NO.	REVISION
2554	- B -	201	- C8

Revision State : P - Prelim / T - Tender / C - Construction

CLIENT REF

SCALE	DESIGNED	CHECKED	DATE
A1@ 1:100	DMcC		02.2017

A1 1:1000

N

12000Ø Culvert

Monks Ditch

FW PS6

SW PS2

SW PS1

1:250

1:1>

<1:2

Reen

Reen Lake
Bed Level 3.1m AOD

Sump Area
Bed Level 2.0m AOD

SW PS1

15000

700Ø Cast Iron Pipework

450Ø Cast Iron Pipework

Outfall

Compound access / turning area

Site Haul Route

Existing Bridge

Water Level Sensor mounted upstream of outfalls

FW PS6

Landscape Buffer

Wet Well

Foul Pumping Station

Compound access / turning area

Landscape Buffer

15000

SW PS2

Drop Kerb

FWS IL 0.34

SWS IL 5.10

Maintenance Platform

Reen

220m

210m

200m

190m

180m

170m

160m

150m

140m

130m

120m

110m

100m

REV	DATE	REVISION NOTE	BY

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CLIENT

St. Modwen

PROJECT

Llanwern
Newport

DRAWING TITLE

SW Pumping Station
Compound Locations

DRAWING ISSUE STATUS

Information

JOB CODE	STAGE	DRAWING NO.	REVISION
02554 -	B -	205	-

Revision State : P - Prelim / T - Tender / C - Construction

CLIENT REF

SCALE	DESIGNED	CHECKED	DATE
A1@ 1:250	DMcC		27.09.17