

## Environmental Management System 5

### Bidston Moss Closed Landfill Site and Community Woodland: Maintenance Manual

**THE LEACHATE TREATMENT  
AND DISCHARGE SYSTEM IS  
SWITCHED OFF**

**THIS DOCUMENT IS  
SUSPENDED  
UNTIL FURTHER NOTICE**

**SEE BIDSTON MOSS SITE LOG**

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## **Section 1.**

### **Site location and access**

<b>Sub Section</b>	<b>Description</b>
1.1	Site location
1.2	Access route
1.3	Keys

## **1.1 Site location**

- 1.1.1 The landfill site is located off Wallasey Bridge Road (A5088), Bidston, Birkenhead. It is situated to the rear of Bidston Waste Management Facility (BWMF) and in close proximity to Bidston Pond. See drawing no.1, Section 6, for details.

## **1.2 Access route**

- 1.2.1 Access to the landfill site is gained via the main entrance into BWMF on Wallasey Bridge Road. A road from the entrance leads to the landfill access gates which are located at the rear of BWMF. See drawing no.2, Section 6, for details.
- 1.2.2 A pathway/cycle track leads from the access gates to the pumping station. This is situated approximately  $\frac{1}{4}$  mile along the pathway/cycle track in a clockwise direction.
- 1.2.3 An electricity supply meter housing is located a further  $\frac{1}{4}$  mile along the pathway/cycle track. This is sometimes obscured by foliage and can be difficult to spot.

## **1.3 Keys**

- 1.3.1 Keys to the pumping station and electricity supply meter housing are kept in the Facilities Section on the 6th floor of North House, 17 North John St, Liverpool L2 5QY.

## **Section 2.**

### **Purpose of Pumping Station and Aeration System**

<b>Sub Section</b>	<b>Description</b>
2.1	Background of Drainage Contamination Problem on the Site
2.2	Environment Agency
2.3	Brief Description of Work implemented to satisfy Environment Agency
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2.5	Summary

## **2.1 Background of Drainage Contamination Problem on the Site**

### **Historical**

- 2.1.1 Bidston Moss operated as a landfill site from the 1930s until the early 1990s.
- 2.1.2 Prior to becoming a landfill, the site was low lying marshland. A number of small surface water ditches, which were interlinked, existed on the site and helped drain it. These ditches connected into a much larger ditch which ran from east to west across the middle of the site. This larger ditch also carried surface water from land situated to the east of the site. All the water in the larger ditch eventually discharged into the River Birket.

### **Site Drainage**

- 2.1.3 Drawing no.3, see Section 6, indicates historical site drainage on the site. It has been compiled from old records of unknown source and by information provided by Mersey Docks and Harbour Company (MDHC). The accuracy of the information shown on the drawing **cannot be guaranteed.**
- 2.1.4 It would appear that 3no. culverts exist on, or close to, the site:-
- Culvert "A"
- Culvert "A" commences at manhole "MH1" on the site at a point close to its western boundary. It is approximately 200 metres long and runs under the adjacent railway land to its outlet at the River Birket. The larger ditch on the site originally drained into Culvert "A".
- Culvert "B"
- Culvert "B" runs parallel to Culvert "A". It is also situated under the railway land and has its outlet into the River Birket approximately 400 metres south of the outlet of Culvert "A". Its commencement point is not known but is assumed to be close to the western boundary of the site.
- Culvert "C"
- Culvert "C" was constructed to replace the function of the larger ditch on the site. It is assumed that construction of Culvert "C" was carried out in stages as landfilling progressed.
- 2.1.5 A number of manholes were constructed along the length of Culvert "C" but have, over the years, been buried in up to 30 metres of waste as landfilling progressed.
- "MH1", however, which was constructed at the connection point of Culvert "A" and Culvert "C", was not buried. Access into it can still be obtained.
  - "MH1" not only contains the two connections of Culverts "A" and Culvert "C", but also accommodates two further connections.



- 2.1.6 It appears that these two further connections form part of a "cut off" drain which seems to run parallel to the western boundary of the site. There is no evidence of this drain on the site surface.
- 2.1.7 It is apparent, that at some time in the past, attempts have been made to block up this cut-off drain with timber, and other matter, at its connections into "MH1". The extent and the effectiveness of the "cut off" drain are not known, as records are unclear on the matter.
- 2.1.8 It is almost certain however, that a drainage link exists between Culvert "C", "MH1", the "cut off" drain, and Culvert "B". This is based on the following reasoning:-
- As the blockages to the "cut off" drain connections in "MH1" are not adequately constructed, it is reasonable to assume that some water from Culvert "C" will drain through them.
  - Trial pumping from "MH1" took place in 1998 to establish how much water from the site was discharging into the River Birket from the outlet of Culvert "A". To facilitate the trial, the connection from "MH1" to Culvert "A" was "stoppered up". Pumping during the trials was intermittent. During the periods when no pumping was taking place significant increases in the flow of water discharging into the River Birket at the outlet of Culvert "B" were observed.
- 2.1.9 A number of piped connections were made into Culvert "C" from an old drainage system on Mersey Docks & Harbour Company (MDHC) railway land, and from Bidston Pond. These are situated to the east of the site.
- It is not known if any water still flows along these connections. It is possible that they were blocked up at some time in the past. Again, records are unclear.
- 2.1.10 It is known however, that surface water from the other land to the east of the site; i.e. that land in the vicinity of the M53 Motorway viaduct supports and the railway footbridge, still drains through Culvert "C". This was evidenced in a manhole, "MH2", situated on the eastern side of the site.
- 2.1.11 During the pumping trials referred to in 2.1.8 above, water "backed up" in "MH2" when the pump was not operating. This in turn led to localised flooding in the vicinity of the viaduct supports and footbridge. It is assumed therefore that there is some form of drainage connection from the viaduct support and footbridge areas, and "MH2". Apart from "MH2" there is no other evidence of any drainage on the surface of the site in this area.

## **2.2 Environment Agency**

- 2.2.1 It is assumed that Culvert "C" partially collapsed at some time in the past.
- 2.2.2 As a consequence, leachate generated within the landfill entered Culvert "C" and contaminated the surface water within it. As the water eventually discharged into the River Birket, the river itself became contaminated.

- 2.2.3 The Environment Agency therefore instructed MWDA to stop the contaminated surface water discharging into the River Birket, and divert it to the public foul sewer.

## **2.3 Description of Work implemented to satisfy Environment Agency**

- 2.3.1 For the purposes of clarity, the contaminated surface water is hereinafter referred to as leachate.

- 2.3.2 The diversion of the leachate has been achieved by the construction of a pumping station and rising main. The works included:-

### **i) Pumping Station**

- “Stoppering up” the connection of Culvert “A” at “MH1”. This prevents leachate entering Culvert “A” and discharging into the River Birket.
- Construction of a pumping chamber, “PC1”, adjacent to “MH1” and diverting into it the leachate flow from Culvert “C”.
- Construction of a brick built housing unit containing pumping control panel.
- Construction of a valve chamber adjacent to the pump chamber.

### **ii) Rising Main**

- Construction of a rising main commencing at the valve chamber. It was laid close to the western boundary of the landfill site and continues through land adjacent to Bidston Waste Management Facility before discharging into the public foul sewer in Wallasey Bridge Road.
- Constuction of a number of access chambers along the length of the rising main.

Drawings no.4, see Section 6, indicates the details of the above works.

- 2.3.4 The leachate contains dissolved methane which originates from the waste within the site.
- 2.3.5 United Utilities Ltd, which owns the public foul water sewer, stipulate in its Trade Effluent Discharge Agreement with MWDA that the level of dissolved methane should not exceed 0.14mg/l.
- 2.3.6 The pumping chamber incorporates a facility to aerate the leachate in order to reduce dissolved methane levels to below this value before it is pumped to the rising main. Details of the aeration facility are also indicated on Drawings no.4.



## **2.4 Commercial Gas Extraction System**

- 2.4.1 There is a commercial gas extraction system on the site. Gas rights are owned by Bidston Methane Ltd which is a joint venture company set up by MWDA and Novera Energy Ltd.
- 2.4.2 Leachate levels on the site determine the amount of gas which can be extracted. The lower the levels, the more gas that can be extracted.
- 2.4.3 It is assumed that the inflow of leachate into Culvert "C" affects the leachate levels in the site. The pumping system described in 2.3.2 above therefore needs to be operating permanently and efficiently to keep the leachate levels down and consequently maximise gas outputs.

## **2.5 Summary**

- 2.5.1 Leachate no longer discharges into the River Birket via Culvert "A". It is pumped to the public foul sewer in Wallasey Bridge Road.
- 2.5.2 If the leachate treatment and discharge system breaks down:-
- It is assumed that leachate will build up within the site and have an adverse affect on the amount of gas which can be extracted.
  - Leachate from Culvert "C" would eventually discharge into the River Birket via "MH1", the "cut off" drain which connects into "MH1", and Culvert "B".
  - Flooding would occur on land to the east of the site, and potentially flood that part of the site adjacent to this land.
- 2.5.3 It is important therefore that the pumping system is kept in good working order. To ensure this, regular monitoring and maintenance of the system should be carried out. Potential problems could therefore be avoided, or planned around, thus ensuring that any disruption is kept to a minimum.
- 2.5.4 Monitoring, maintenance, and emergency procedures for the pumping system have therefore been produced to assist in this respect, and can be found in the following sections of this manual.

## **Section 3.**

### **Pumps, Control, and monitoring equipment**

<b>Sub Section</b>	<b>Description</b>
3.1	Description of equipment
3.2	Description of equipment installation
3.3	Pumping mode of operation

### **3.1 Description of equipment**

#### **Equipment in Pumping Chamber**

3.1.1 The Pumping Chamber contains:-

i) **Submersible Pumps**

2no Pumpex submersible waste water pumps, type K100 (explosion proof)  
Serial numbers 10001258 & 10001259.

The pumps were installed in April 1999.

ii) **1No Recirculation pump**

Brief description of service requirements:-

Pumps should be removed at 6 monthly intervals for a full mechanical and electrical service which should be carried out by a competent pump Service Company. The service report should be logged in a maintenance diary with report recommendations acted upon if necessary.

iii) **Level Monitoring unit**

A sonar level transducer fitted at the top of the chamber.

Brief description of service requirements:-

To be constantly monitored for any inconsistencies of readings.

iv) **Pipe work and ancillary valves**

2no lengths 100mm ductile steel pipework from pump to valves.

#### **Equipment in Valve Chamber**

3.1.2 The Valve Chamber contains:-

i) **Valves and Tee piece**

2no non return valves

2no isolation valves

1no tee piece to 6" main via 1x 6-4" reducer

Brief description of service requirements:-

Valves and pipe work contained within the valve chamber should be checked and inspected at 6 monthly intervals.

ii) **Flow meter**

1no Magmaster Electromagnetic flow meter.  
Serial number V/25492/1/1  
Meter Code MF/ E15114110115ER1301111

Brief description of service requirements:-

An annual calibration service check is required.

**Control Panel Housing**

3.1.3 i) **Discharge Pump Control Panel**

1 no 415v/3ph/50Hz. dual pump and system control panel, see drawing no.5 and photograph no.1 in Section 6, consists of:-

- 1no emergency stop push switch
- 1no panel isolation switch
- 2no toggle switches (manual, off, auto)
- 2no amp meters
- 2no pump run indication lamps
- 2no pump trip indication lamps
- 2no hour run and No of starts counters

Brief description of service requirements:-

A six monthly service check is required as part of pump service.

ii) **Level Transducer Digital readout and control panel**

Fitted to the front of the Discharge pump control Panel

iii) **Actuator Control panel**

Fitted on the left hand wall of the control panel.

iv) **Flowmeter Digital readout unit**

This is fitted to the left of the discharge pump control panel at a lower level.

**Control panel heater**

Model Unknown

Brief description of service requirements:-

To be checked for operation in cold conditions.

## **3.2 Description of equipment installation**

### **Submersible Pumps**

- 3.2.1 The 2no pumps sit at the base of the chamber docked into position whereas the discharge of the pump volute is mating with the entrance to the beginning discharge pipe work.
- 3.2.2 This docking is facilitated in each pump, by a mounting plinth, which incorporates a 4" 90 degree piece of pipe work and is attached to the base of the chamber by 4No M16 floor bolts.
- 3.2.3 Located on the topside of each plinth are pairs of 2" stainless steel guide rails which run up to the very top of the chamber perpendicular and parallel where they are fixed to the side of the chamber by a bracket secured by 2 x M12 floor bolts.
- 3.2.4 Once they have been lowered into place (by starting them over the guide rails at the top of the chamber), the pumps are kept in place by their own weight and by the retaining lugs to the rear of pump volute casing which start over the guide rails and keep the pumps on course through their descent to the docked position.

### **Discharge pipework and valves**

- 3.2.5 From each of the mounting plinths to the rear of the mounted pumps, a length of 4" discharge pipe work runs up the inside of the chamber where it turns 90 degrees and runs through the chamber wall into the valve chamber.
- 3.2.6 In the valve chamber, each line runs through firstly a non-return, and then an isolation valve before they join via a tee piece and then 6"-4" reducer to the buried rising main leading to the UU foul sewer.

### **Inlet valve and Actuator**

- 3.2.7 Fitted to the end of the inlet pipe work to the chamber is a 300mm isolation valve, this is attached to and driven by an actuator at ground level and is protected by a galvanised steel box. The two are connected by a valve stem.

### **Recirculation pump**

- 3.2.8 Located in the main pump chamber and connected electronically to the Actuator valve.
- 3.2.9 The recirculation pump is activated by the closure of the Actuator valve, and runs the body of leachate through an aeration process for a predetermined time (adjustable by a timer)

### **Control and Monitoring equipment**

- 3.2.10 The brick built housing, adjacent to the pump and valve chambers, contains all the control and instrumentation panels. The cables from all equipment in the chambers run to them via underground ducts.
- 3.2.11 Beneath the panels is the cabinet heater and to the left of this is the flow meter both of which are powered from the control panel.
- 3.2.12 The sonar liquid level transducer is fixed to the inner wall of the pumping chamber at the top.
- 3.2.13 Running from the flow meter and via another duct to the valve chamber, is a cable connected up to two probes attached to the six-inch discharge pipe work, these are the sensors which signal a flow to the flow meter display unit in the housing.

### **3.3 Leachate treatment and discharge cycle.**

- 3.3.1 At the start of the cycle the leachate level in the chamber is at the low parameter, the discharge and recirculation pumps are stopped and the inlet valve is closed.
- The actuator (signalled by the control system at the time when the discharge pump stops running) operates to wind the chamber inlet valve to its open position allowing leachate from the site to flow into the collection chamber.
  - When the leachate level in the collection chamber rises and reaches the upper parameter then the actuator operates to wind the inlet valve to its closed position.
  - With the valve closed, the recirculation pump starts running which constantly treats the contained leachate in the chamber for a predetermined time (adjustable by a timer)
  - Once the re-circulation pump has treated the leachate (the predetermined pump run time) it stops and the discharge pump starts, discharging the contained and treated leachate from the collection chamber.
  - Once the level of the leachate in the chamber reaches the low parameter (due to being discharged from the chamber) the discharge pump stops running (the start of the next treatment and discharge cycle.)

## **Section 4.**

### **Meter Reading, Condition Monitoring and Routine Servicing**

<b>Sub Section</b>	<b>Description</b>
4.1	Meter Reading Procedures (Schedule A + C)
4.2	Condition Monitoring Procedures (Schedule B + C)
4.3.	Analysis of Meter Readings (Schedule C)
4.4	Scheduled Maintenance Procedures (Schedule D)
4.5	Emergency Procedures in event of System Breakdown

## **4.1 Meter Reading Procedures - Schedule A + C**

4.1.1 Monitoring of the pumps meter readings and electricity meter readings should be carried out every two weeks.

- See Schedule A, Section 7 - "Schedules" for dates when meter readings should be carried out.
- See Schedule C, Section 7 - "Schedules" for recording of pump meter readings and electricity meter readings.

### **Pump meter readings**

4.1.2 The following procedure should be carried out when monitoring is undertaken:-

- i) Check the immediate area of the pumping station for security and damage.
- ii) Unlock and open the door to the control panel housing.
- iii) Check there is power to the pumping station by checking there is a digital readout being displayed at the flow meter.
- iv) Check that both pumps have been left on auto mode.
- v) All being in order sit through the treatment and discharge cycle and outline in 3.3.6.
- vi) Whilst this is being done the following readings can be taken and checks carried out.
  - the running amps of the recirculation pump (pump 1)
  - hours run of the recirculation pump (pump 1)
  - start up count of the recirculation pump (pump 1)
  - totalised discharge (m3) from the flow meter readout
  - the discharge flow rate taken from the flow meter readout (this can only be taken when the discharge pump is running).
  - The opening and closing of the inlet valve (verified by the valve indication lamps on the actuator control panel)



- vii) Once these procedures have been carried out noting any irregularities the control panel housing door can be closed and locked.

### **Electricity meter readings**

4.1.3 The following procedure should be carried out when monitoring is undertaken:-

- i) Check the immediate area of the electricity meter housing for security and damage.
- ii) Unlock and open the door to the electricity meter housing.
- iii) Record KWh meter reading.
- v) Close and lock electricity meter housing door.
- vi)
- vii) Report any irregularities to the Waste Facilities Section at North House

## **4.2 Condition Monitoring Procedures - Schedule B + C**

### **General**

- 4.2.1 The operation of the pumps and control gear should be checked on a monthly basis. See Schedule A, Section 7 - "Schedules" for dates when checking should be carried out.
- 4.2.2 During the checking routine, condition monitoring of the pumps and control gear should be recorded. See Schedule B and C, Section 7 - "Schedules" for details.

### **Condition Monitoring**

4.2.3 Upon arrival check the immediate area for security/damage. This includes:-

- Manhole covers to the pump chamber and valve chamber
- Door and lock to the control panel housing.

4.2.4 Lift the manhole covers to the pump chamber.

4.2.5 Open the door to the control panel housing.

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4.2.6 Check that:-

- There is power to the control panel.
- There are no obstructions or debris in the pumping chamber.

4.2.7 Check both pumps are switched to auto and then carry out the meter reading procedures as per 4.1 – 4.4

- Whilst the system is running through its auto sequencing (as per 3.3.6 leachate treatment and discharge cycle), check for any irregularities noises, severe vibrations or leaks in pumps pipe work etc.
- Check that the inlet valve is opening and closing and in sequence
- Check to see that when the valve closes the recirculation pump starts and runs lifting leachate to the top of the chamber and discharging it onto the striker plate.
- Check to see that the recirculation pump stops after a set time and as it does the discharge pump starts and runs.
- Check to see that as the discharge pump is running the leachate level in the chamber falls steadily and stops at the level indicated on the level readout (in the control cabinet housing).
- Check to see that when the discharge pump stops the inlet valve opens again.
- Note any unusual findings in the comments on schedule B and C.

4.2.8 In winter check the control panel heater is working.

4.2.9 Ensure that the control panel is left in auto mode.

4.2.10 close and lock control panel housing and manhole covers.

### **4.3. Analysis of Meter Readings**

4.3.1. After meter readings have been taken they should be compared to previous readings. If the pumping system is operating normally and correctly the readings will reflect an ongoing steady and progressive state.

- The hour's run and the number of starts for each pump, should continue to rise in steady increments
- The amps drawn by both pumps should be the same and constant.
- The discharge pump flow rate should be constant.
- The total flow at the flow meter should be rising in steady increments.
- The total of KW hours used should be rising in steady increments.

4.3.2. If an increase of the flow into the chamber arose, it would be reflected by:-

- an increasing incremental reading of the total flow
- an increasing incremental reading of the run hours of the discharge pump
- an increasing incremental reading of electricity (KWh)

4.3.3. If a decrease of the flow into the chamber arose, it would be reflected by:-

- a decreasing decremental reading of the total flow
- a decreasing decremental reading of the run hours of the discharge pump
- a decreasing decremental reading of electricity (KWh )

4.3.4 Occurrences of the nature described in 4.4.2 and 4.4.3 above should be noted in the comments column of Schedule C.

4.3.5 If any of the readings taken are erratic, and cannot be explained, a condition monitoring exercise must be carried out as soon as possible to identify the cause.

4.3.6 After meter readings have been taken they should be compared to previous readings. If the pumping system is operating normally and correctly the readings will reflect an ongoing steady and progressive state.

- The hour's run and the number of starts for each pump, should continue to rise in steady increments
- The amps drawn by both pumps should be the same and constant.
- The discharge pump flow rate should be constant.
- The total flow at the flow meter should be rising in steady increments.
- The total of KW hours used should be rising in steady increments.

If an increase of the flow into the chamber arose, it would be reflected by:-

- an increasing incremental reading of the total flow
- an increasing incremental reading of the run hours of the discharge pump
- an increasing incremental reading of electricity (KWh)
- a decreasing decremental reading in hours run of the aeration pump.

If a decrease of the flow into the chamber arose, it would be reflected by:-

- a decreasing decremental reading of the total flow
- a decreasing decremental reading of the run hours of the discharge pump
- a decreasing decremental reading of electricity (KWh )
- an increase in incremental reading in hours run of the aeration pump.

4.3.9 Occurrences of the nature described in 4.4.2 and 4.4.3 above should be noted in the comments column of Schedule C.

If any of the readings taken are erratic, and cannot be explained, a condition monitoring exercise must be carried out as soon as possible to identify the cause.

## **4.4 Maintenance Procedures (Schedule D)**

### **General**

A Maintenance service of the pumps and control gear should be carried out every 6 months.

- See Schedule A - Section 7 - "Schedules" for dates when Maintenance services should be carried out.
- See Schedule D - Section 7 - "Schedules" for a summary/report sheet of the Maintenance service works.

4.4.1 The procedures of the Maintenance service works are shown in 4.2.5 to 4.2.8. and cover.

- Pump chamber covers
- 
- Pump chamber
- Pumps.
- Control panel and housing
- Valve Chamber
- Actuator/inlet Valve

4.4.2 The Maintenance service is to be carried out by suitably qualified electrical and mechanical personnel. They must provide a specific method statement and risk assessment, and use only equipment with current safety and calibration certificates.

**Maintenance service (schedule D)**

**4.4.3 a) Pump chamber covers.**

- The covers are to be carefully opened into their locked position where they are to be inspected for any damage which may affect the opening/closed, flush closed fitting and any damage or wear that may cause them to be unsafe or unserviceable.
- Hinges can be grease (if deemed necessary.)

**b) Control panel housing**

**NOTE: If it is assumed there is any damaged caused which may render the area hazardous contact waste facilities – Do not enter or proceed.**

- Open the control panel housing door. The condition of the building, the door and locks should be checked for any irregularities or damage including acts of vandalism or disrepair.
- Once access has been gained the general condition of the equipment can be assessed for visible signs of disrepair – burning, moisture present or any damage
- When the pumps run check the ammeters, flow meters and level readouts all work and that the indication lamps all illuminate when they should and the run hours meters and start meters also work.
- Check to see the pumps and actuator/valve operate in sequence and cycle (as per 3.3.6) when in Auto mode
- Check to see the pumps and actuator/valve operate when the mode of operation is change to Manual.

**c) Pump Chamber – To be carried out with the pump chamber and control cabinet housing open**

- The pump chamber should be visually inspected (from the surface) for any damage or spawling to the chamber wall and for any debris that may be present inside which could both interfere with the operation of the level transducer or be drawn into the pumps causing damage.
  - When the pumps are running the pipe work and any hoses should be similarly observed for leaks excessive corrosion or noticeable vibration.
  - With the recirculation pump running check to see if leachate is being drawn up and discharged at the top of the chamber against the striker plate and spraying down to the bottom of the chamber again.
  - With the discharge pump running check to see the rate at which leachate is being discharged (at the flowmeter) and that it starts and stops at the set levels (at the telemetry readout unit).
  - Visually inspect the state of the level control transducer for damage and that it is secure positioned and fixed in place.
  - Inspect the condition of the lifting chain hooks for damage, corrosion, that they are securely fixed in position and as far as possible the condition of the lifting chain.
  - Inspect as far as possible the condition of the Discharge pump guide rails, that they are free from damage, corrosion and that they are securely fixed in place.
- d) Pumps –** To be carried out with the pumps safely removed from the chamber to ground level
- Inspect pump for any signs of wear or damage paying particular attention to the cable gland and along the length of the electric cable for cuts, chaffing, blistering or tears.
  - Carefully check the free turning of the impellor and for any build up or blockage in the volute
  - With the pump stood upright, it can be started and checked for any undue noises or vibrations.
  - With suitable meters check the motor insulation, phase resistance and continuity.
  - Removing the drain plug carry out an oil change noting if the old oil is discoloured or contaminated in anyway.
  - Inspect the condition of the whole of the length of the lifting chain and shackles for corrosion, damage or wear.
  - If satisfied the pump is fully serviceable carefully re-fit.
- e) Valve Chamber**
- Check the serviceable condition of the access cover and fixings

- With the cover removed and the area deemed safe visually check the condition of all the pipe work equipment for leaks, corrosion undue vibrations and to see if the non-return-valves open and shut as the discharge pump comes on and off (flow rate readout).
- With the discharge pump switched off check to see that both isolation valves can be wound shut and open fully easily (ensure the are left open).
- Replace cover and secure with fixings

**e) Actuator/Valve chamber** – To be carried out with pump chamber access covers open

- Remove the top cover of the actuator housing and inspect for signs of damage or malfunction.
- By visually inspection check to see that the actuator winds down the valve to its closed position sealing the flow of leachate into the chamber and winds to open the valve allowing leachate in (as per 3.3.6).
- Replace the housing cover and secure

Pipeline inspection and cleaning

**g) Rising Main**

Check for any leaks about the joints or cracks/fractures about the pipeline in the valve chamber.

## **4.5 Emergency Procedures in event of System Breakdown**

4.5.1 The result of a complete system breakdown will be an unmanageable and uncontrollable build up of leachate in the site. Measures can be put in place to avoid this whilst waiting for essential repairs to be carried out.

4.5.2 There are usually three reasons for a complete breakdown:-

- Power failure from electricity supplier.
- Power failure from control panel to pumps or pump failure.

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- Blocked discharge pipe work or collapsed rising main.

4.5.3 Carry out a condition monitoring exercise to quickly identify which of the above reasons has caused the breakdown; then follow the procedures set out below:-

i) Power failure from electricity supplier

Inform the electricity supply company and request an immediate presence on site to investigate/re-establish the supply. If a long delay is expected before power supply is re-established, then the options for controlling the level of leachate in the pumping chamber are as follows:-

- a) Request Maintenance service contractor to attend site with a portable generator. This can be coupled straight into the control panel. The pumping system should run on auto, as normal, provided the generator is periodically fuelled up.
- b) Arrange for daily tankering of leachate from the pump chamber to be carried out. The leachate can be discharged further down the rising main line.

ii) Power failure from control panel to pumps or pump failure.

Request Maintenance service contractor to attend site to investigate/rectify problem. The contractor should be able to rectify a power failure from the control panel to the pumps. If the fault is due to a pump failure, and a long delay is expected before fault can be rectified, then the options for controlling the level of leachate in the pumping chamber are as follows:-

- a) Request the contractor to replace the unserviceable pump/pumps with a suitable hire pump whilst the fault is being investigated and rectified. The hire pump should be a diesel driven self-priming pump.
- b) Request the contractor to arrange for an over pumping facility to be installed from the chamber to the discharge pipe work in the valve chamber.

For both these options, ensure the appropriate safety/security arrangements are in place around the area of the pumping chamber, as the public has access to the area and equipment will be left unattended.

iii) Blocked discharge pipe work or collapsed rising main

Request a high pressure jetting contractor to attend site if a blockage along the discharge pipeline is suspected. The pipework section from the pumps to the valve chamber should be carried out first, followed by the rising main section.

If a blockage is found, but cannot be cleared, or a collapse in the rising main has been identified, then that particular section of pipework or rising main must be replaced. Whilst this work is being carried out, the control of the leachate level in the pumping chamber can be provided by adopting measures as indicated in I ) b) and/or ii ) b).





MERSEYSIDE WASTE DISPOSAL AUTHORITY

## MAINTENANCE MANUAL

### **Bidston Moss**

Uncontrolled

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Date of Issue: 11<sup>th</sup> Sept 2009

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## **Section 5.**

### **Easy Guide to System Operation**

<b>Sub Section</b>	<b>Description</b>
5.1	General
5.2	Brief description of pumping control/monitoring equipment
5.3	Normal state of operation of pumping regime
5.4	In the event of a Problem

## **5.1 General**

- 5.1.1 The keys to the pumping station can be found in the key cupboard, MWDA offices, North House.
- 5.1.2 Access to the landfill site is gained via the main entrance into Bidston Waste Management Facility (BWMF) on Wallasey Bridge Road. A road from the entrance leads to the landfill access gates which are located at the rear of BWMF. See drawing no.2, Section 6, for details.
- 5.1.3 The pumping station can be found by following the pedestrian/cycle path clockwise from the gate for approximately one half mile.
- 5.1.4 The pumping station consists of a pump chamber, slightly raised above ground level, and an adjacent brick built housing unit. It is located immediately to the left of the pedestrian/cycle path. See drawing no.2.
- 5.1.5 The brick housing unit contains the pumping control and monitoring equipment.
- 5.1.6 The pump chamber is approximately 10metres deep and contains 2no pumps which pump the leachate from the site via the Rising Main
- 5.1.7 The Rising Main is located as indicated on drawing no.4

## **5.2 Brief description of pumping control/monitoring equipment**

- 5.2.1 The pumping control and monitoring equipment is as indicated on photograph no.1 and drawing no.5, Section6, and consists of :-
  - A control panel which is centrally positioned within the brick housing unit.
  - A flowmeter display unit located to the bottom left hand side of the control panel.
  - A circuit breaker located to the top right hand side of the control panel.
  - 2no pump isolator switches located immediatly below the control panel.

### **Control Panel**

- 5.2.2 A red coloured "EMERGENCY STOP" button on a yellow background is located in the middle of the control panel. Above this button the control panel is effectively made up of two sections:-
  - The section to the left is for Pump no.1.
  - The section to the right is for Pump no.2.
- 5.2.3 Near to the top edge of the control panel, each section is labelled "PUMP No1" and "PUMP No.2" respectively. Each section contains:-

- an ammeter.
  - a meter indicating the number of hours the pump has run, and the number of starts the pump has made.
  - a green coloured light indicating "MOTOR RUNNING" (i.e pump is running).
  - a yellow coloured light indicating "O/L TRIPPED" (i.e. pump has tripped).
  - a three way toggle switch which operates pump by "HAND", "OFF", or "AUTO"
- 5.2.4 Below, and to the left of, the "EMERGENCY STOP" button, is the control panel isolator switch. This switch is coloured red and is on a yellow background.
- 5.2.5 The "EMERGENCY STOP" button and the control panel isolator switch will switch off both pumps when operated.

### **Flowmeter display unit**

- 5.2.6 The flowmeter display unit indicates two readings:-
- Instantaneous flow rate, normally between 14/16 litres/sec.
  - Totalised flow in cubic metres – m<sup>3</sup>

### **Circuit Breaker**

- 5.2.7 **The circuit breaker is not to be touched under any circumstances by unqualified personnel.**

### **2no pump isolator switches**

- 5.2.7 These switches are coloured red on a yellow background and labelled "PUMP No1" and "PUMP No2" respectively.
- 5.2.8 **The 2no pump isolator switches should not be touched under any circumstances by unqualified personnel.**

## **5.3 Normal state of operation of pumping regime**

- 5.3.1 Under normal operating conditions:-
- both toggle switches will be switched to "AUTO".
  - each pump operates separately and alternately as and when required.

- only one ammeter will be registering, and one green light will be lit, at any time.
- the flowmeter's instantaneous flow rate display will always be registering.

## **5.4 In the event of a Problem**

5.4.1 Problems sometimes occur on site which may require prompt action. The following recommended course of action **can be** carried out by personnel who are **not** qualified to undertake Checking, Maintenance and Monitoring as described in Section 4.

5.4.1.1 All non-conformances must be documented as per procedure listed in the Environmental monitoring procedures.

### **Leaking from Rising Main**

5.4.2 Leaking from the rising main would normally be evidenced by signs of leachate outbreaks on the surface of the stone surround to the main, or on the surface of the adjacent ground.

5.4.3 The following action is required:-

- i) Switch off both pumps by turning both toggle switches to "OFF" position, or press "EMERGENCY STOP" button.
- ii) Notify relevant personnel. See 5.4.8

5.4.4 It is possible that the rising main could be leaking and the direction of the discharge could be downwards and into the surrounding ground. In this case the leakage would not be noticeable and no action can be taken.

### **High leachate levels within the Site**

5.4.5 High leachate levels within the site would normally be evidenced by:-

- i) Higher than normal gas levels have been recorded in and around the site .
- ii) Leachate outbreaks occur on the surface of the site.

5.4.6 The above symptoms would suggest that the leachate level within the site is higher than normal and there is a fault in one or both pumps, or in the control panel.

5.4.7 The following actions are required:-

- i) Check to see if the toggle switches on the control panel are switched to the normal operating position, "AUTO".
- ii) If they are not, then contact the relevant personnel, see 5.4.8 below, to establish why. There may be a legitimate reason.
- iii) If toggle switches are in "AUTO" position, check the following to see if pumps are running properly. Only one pump at a time can be checked as they run alternately:-

- Is one of the green “MOTOR RUNNING” lights lit?
- Is the corresponding ammeter indicating a reading of approximately 12 amps?
- Is the flow meter displaying a reading of about 14-16 litres/sec?

iv) If the above pump is running but:-

- the ammeter reading is higher than 12 amps, or,
- discharge flow rate is less than 14-16 litre/sec range

it can be assumed that the pump is running inefficiently. It should be turned off immediately by moving the corresponding toggle switch to the “OFF” position.

- vi) At this point the other pump should automatically come on. Follow the same procedure as in iii) and iv) above. It can now be established if 2nd pump is running and discharging efficiently.
- vii) If it is, then this pump can be left on “AUTO” with the other pump left on “OFF”. Contact the relevant personnel. See 5.4.8.
- viii) In the event that the flowmeter is registering little or no flow, but the pumps running correctly, it can be assumed the the rising main is blocked. Both pumps should be switched off. Contact the relevant personnel. See 5.4.8.
- ix) In the event that neither pump is running, it is a likely there has been a power failure to the pump housing. The ammeters, and the flowmeter’s instantaneous flow rate display will therefore not be registering any reading. Contact the relevant personnel. See 5.4.8.
- x) If one of the yellow lights is lit, it indicates that there is an electrical fault in the corresponding pump. This pump will have tripped out and will not be operating. In this situation the 2nd pump should have automatically switched on. Do not switch off the 2nd pump. Contact the relevant personnel. See 5.4.8.
- xi) If both yellow lights are lit, it indicates that there are electrical faults in both pumps. Both pumps will therefore have tripped out and will not be operating. Do not switch off the pumps. Contact the relevant personnel. See 5.4.8.

### **Relevant Personnel**

5.4.8 The contact details of relevant personnel are as follows:-

Name	Tel. No.	Comment



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Gerry Holmes    255 2546    (Office)    Gerry should be 1st person to  
07795 627244 (Mobile)    contact on any occasion there is  
problem.

Tony Byers    255 2579    Should only be contacted if Gerry  
Holmes is unavailable.

5.4.9    If Gerry Holmes or John Benton are both unavailable and the problem  
urgently requires attention then contact should be made with:-

Company	Contact	Tel No.	Comment
Site Electrical	Jim Bird	0161 725 5555	For pump and pump control problems
Aqua Jet	Lou Griffiths	07711 229217	For drainage and pipeline problems
Scottish Power		0845 272 2424	For mains power supply failure

## **Section 6.**

### **Drawings and Photographs**

<b>Sub Section</b>	<b>Description</b>
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6.1	Drawings
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6.2	Photographs
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## 6.1 Drawings

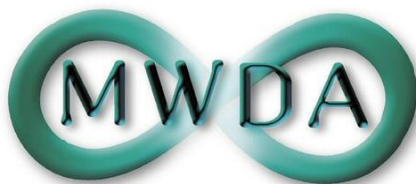
6.1.1 The following drawings are included in this section:-

Drawing no.	Description
• <b>Drawing no.1</b> (refer to 1.1.1)	Location Plan
• <b>Drawing no.2</b> (refer to 1.2.1)	Site Plan
• <b>Drawing no.3</b> (refer to 2.1.3)	Historical Site Drainage
• <b>Drawings no.4</b> (refer to 2.3.2) 511/3/1)	i) Layout (Scheme drawing no. 511/3/1) ii) Details (Scheme drawing no. 511/3/2)
• <b>Drawing no.5</b> (refer to 3.1.3) Housing	Schematic layout of Control Panel
• <b>Drawing no.6</b> (refer to 3.3.4)	Three Stage Pumping Cycle

## 6.2 Photographs

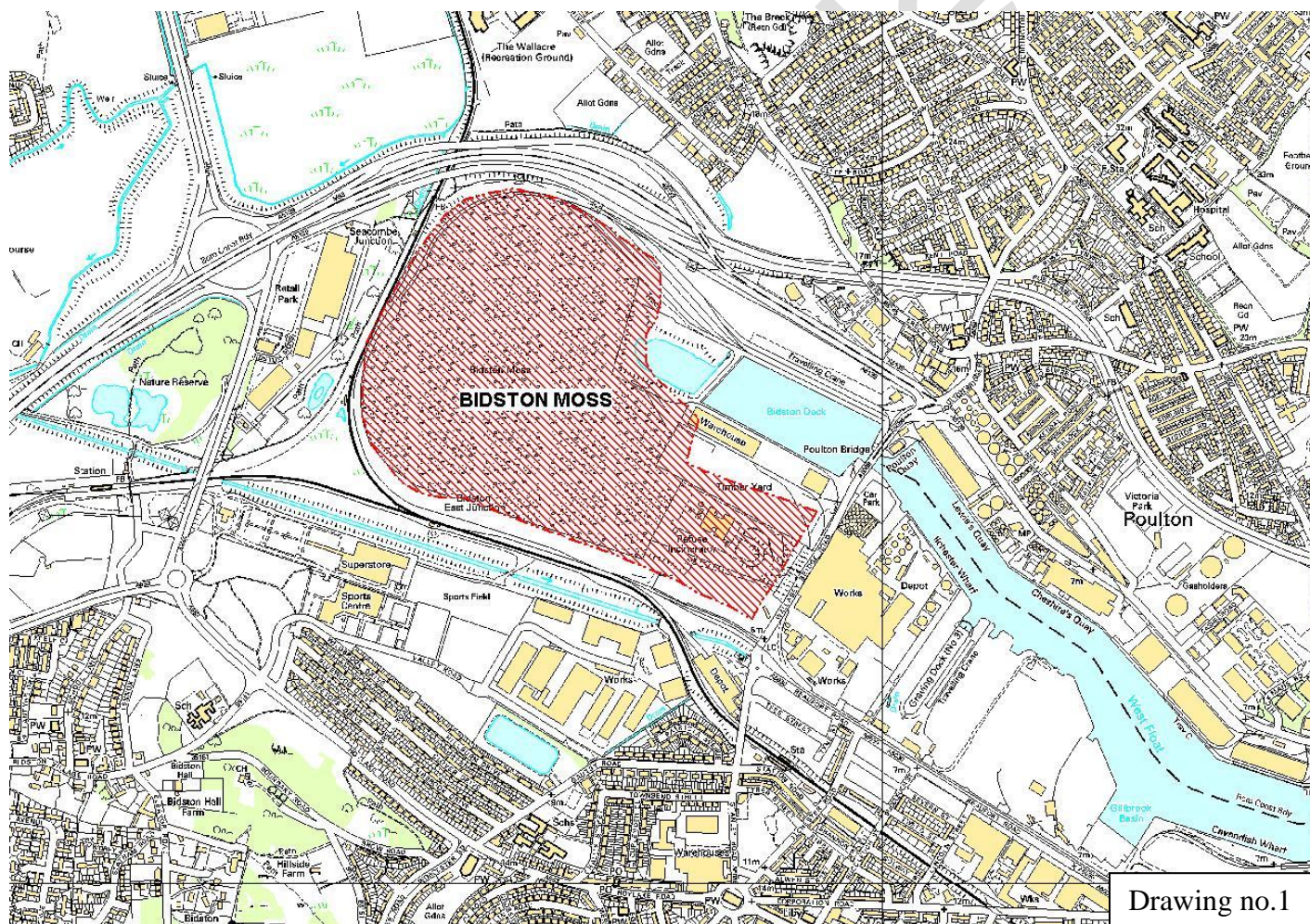
6.2.1 The following photographs are included in this section:-

Photograph no.	Description
• <b>Photograph no.1</b> (refer to 3.1.3)	Control Panel

**MERSEYSIDE WASTE DISPOSAL AUTHORITY**

# Bidston Moss Closed Landfill Site

Bidston, Wallasey Bridge Road, Wallasey, Wirral, CH41 1EB



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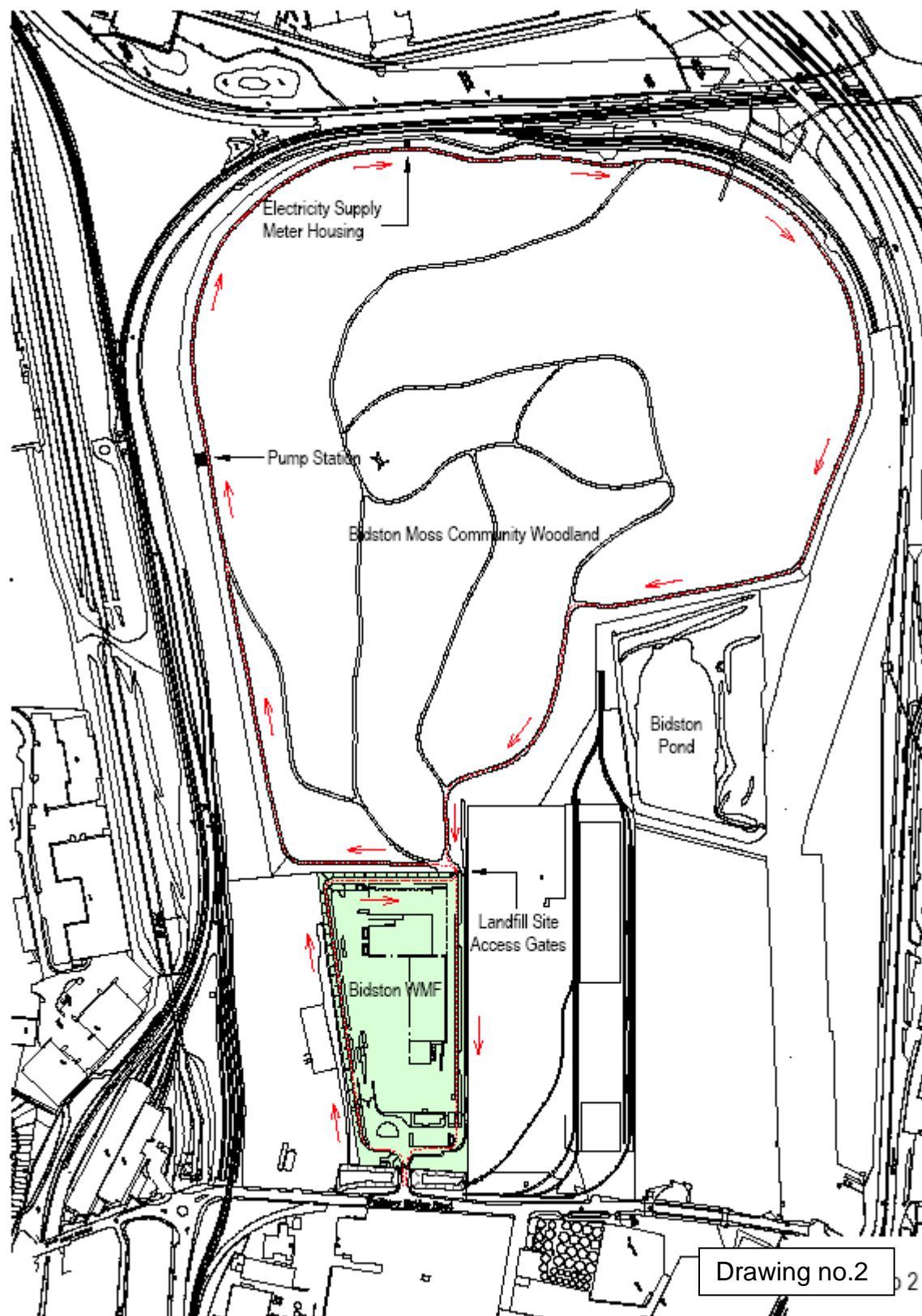
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Drawing no.2

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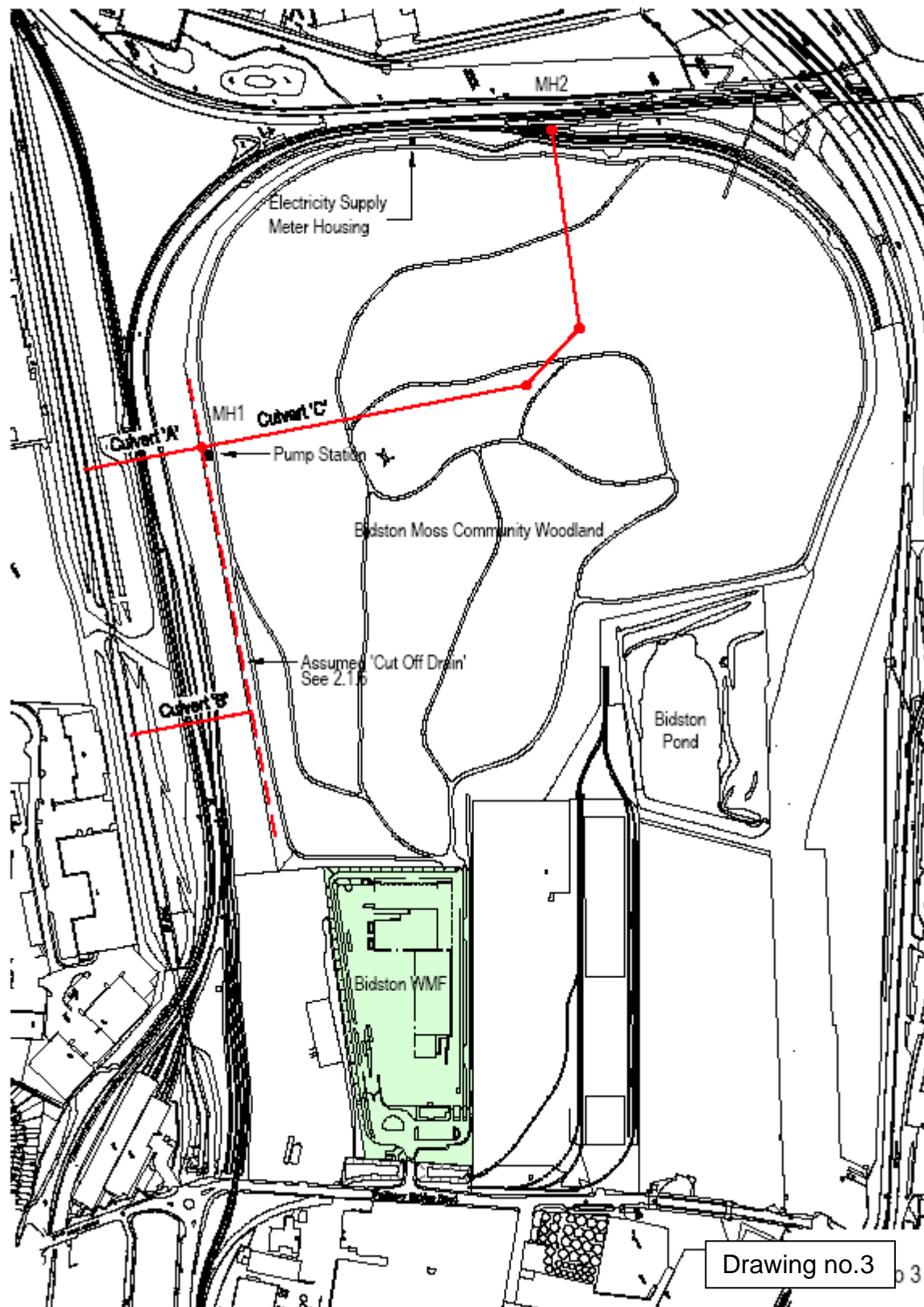
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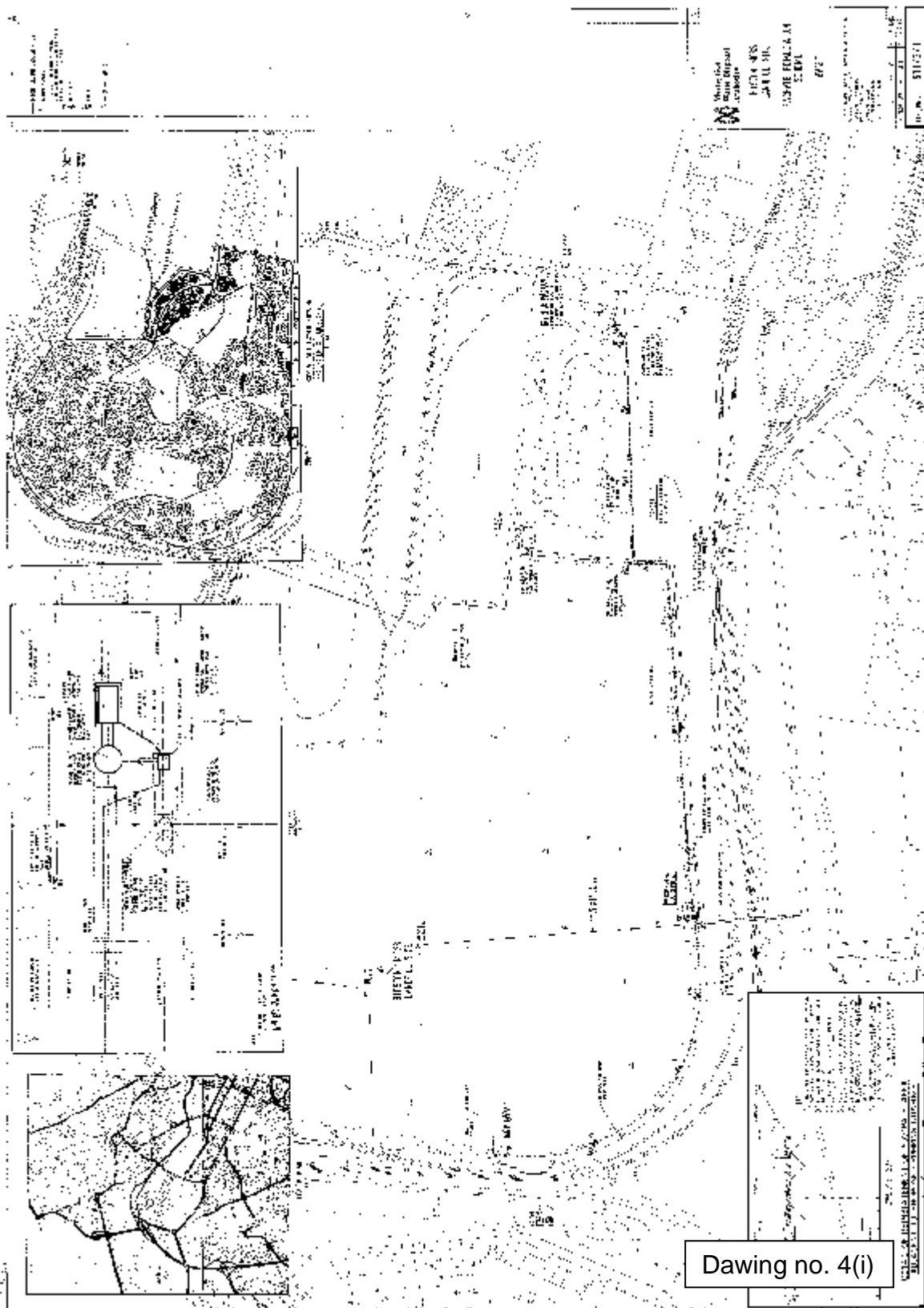
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Drawing no. 4(i)

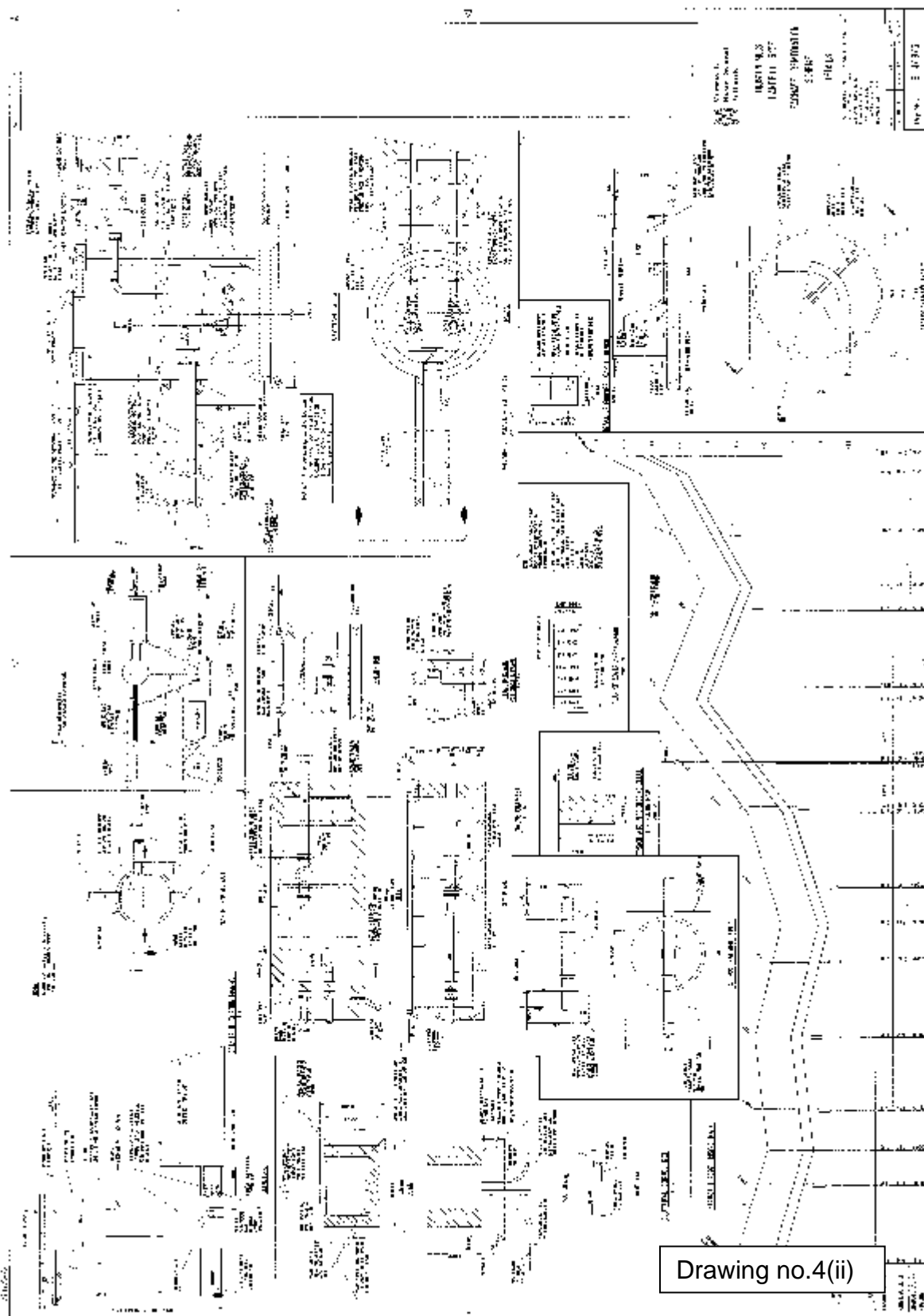
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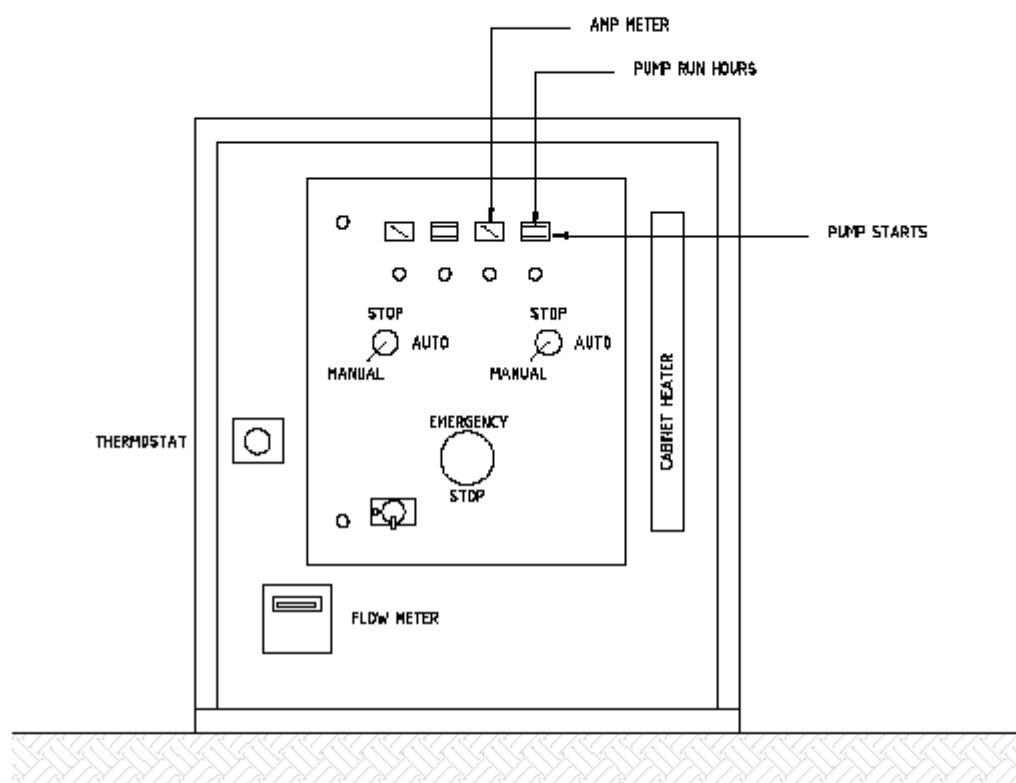
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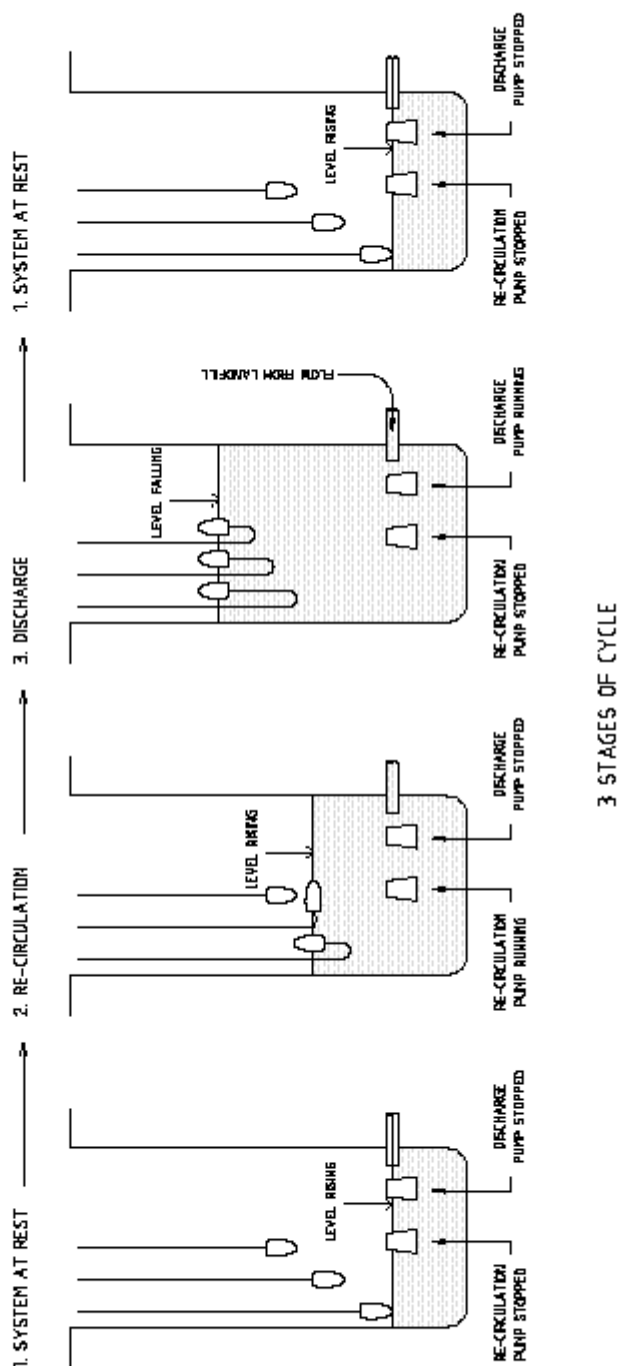
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Drawing no.5



Drawing no.6





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## **Section 7.**

### **Schedules**

<b>Sub Section</b>	<b>Description</b>
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7.1	Schedules
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## **7.1 Schedules**

7.1.1 Four schedules are included in this section:-

- **Schedule A**

Programme dates for Checking, Monitoring/meter readings, and Maintenance services.

- **Schedule B**

Condition Monitoring of the Pump Station.

- **Schedule C**

Pump meter and Electricity meter readings.

- **Schedule D**

Summary of works required for Maintenance service.