Former Befesa Salt Slags Site, Whitchurch

Drainage Strategy

January 2025



Waterco

Assessment | Modelling | Design

Project Information	
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Client:	Axis P.E.D Ltd
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Document History		
Revision	**Date**	**Comment**
01	19/09/2025	First issue
02	02/10/2025	Second issue – Updated following client comments
03	19/12/2025	Third issue – Updated following NRW comments
04	05/01/2026	Fourth issue – Updated following Client comments

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This report will remain valid for a period of twelve months (from the date of last issue) after which the source data should be reviewed in order to reassess the findings and conclusions on the basis of latest available information.

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Introduction

Waterco has been instructed to prepare a Drainage Strategy in respect of a proposed industrial composting facility at the former Befesa Salt Slags site, Fenns Bank, Whitchurch, SY13 3PA.

The aim of this Drainage Strategy is to identify water management measures, including Sustainable Drainage Systems (SuDS), to provide surface water runoff reduction and treatment. This report has been prepared in accordance with the Welsh Government 'Statutory standards for sustainable drainage systems – designing, constructing, operating and maintaining surface water drainage systems' (2018) – herein referred to as 'the Statutory Standards for SuDS'.

Existing Conditions

The site covers an area of approximately 5.74 hectares (ha) and is located at National Grid Reference (NGR) 350628, 339097. A location plan and an aerial image are included in Appendix A.

Online mapping (including Google Maps / Google Streetview imagery, accessed September 2025) shows that the site comprises a former salt slags recycling service with associated car park and decommissioned lagoon. The site is bordered by agricultural land to the north, an unnamed access road with agricultural land beyond to the east, an industrial unit to the south, and agricultural land to the west. Access to the site is provided from an unnamed access road to the east.

Local Topography

A topographic survey has been undertaken by JPP Consulting in June 2025. The topographical survey shows that the site slopes from 91.57 metres Above Ordnance Datum (m AOD) in the south to 89.31m AOD in the north. An isolated area in the southern extent of the site, associated with the crest of an earth bund, rises to 91.99m AOD.

Topographic levels to m AOD have also been derived from a 1m resolution Natural Resources Wales (NRW) composite 'Light Detecting and Ranging' (LiDAR) Digital Terrain Model (DTM). The LiDAR data generally corroborates with the topographical survey.

Topographical information is included in Appendix B.

Ground Conditions

The British Geological Survey (BGS) online mapping (1:50,000 scale) indicates that the northern extent of the site is underlain by superficial glaciofluvial deposits of sand and gravel. The south-western extent of the site is underlain by Devensian Till, comprising diamicton. The superficial deposits are identified as being underlain by the Branscomb Mudstone Formation.

The geological mapping is available at a scale of 1:50,000 and as such may not be accurate on a site-specific basis.

According to NRW's Aquifer Designation data, obtained from the BGS GeoIndex online mapping [accessed September 2025], the glaciofluvial deposits of sand and gravel are classified as a Secondary A Aquifer. 'Secondary A aquifers comprise permeable layers that can support local water supplies, and may form an important source of base flow to rivers.'

The Devensian Till is classified as a Secondary Undifferentiated Aquifer. Secondary Undifferentiated are aquifers where it is not possible to apply either a Secondary A or B definition because of the variable characteristics of the rock type.

The underlying Branscomb Mudstone Formation is classified as a Secondary B Aquifer. Secondary B aquifers are mainly lower permeability layers that may store and yield limited amounts of groundwater through characteristics like thin cracks (called fissures) and openings or eroded layers.

Local Drainage

Public sewer records have been obtained from Dwr Cymru Welsh Water (DCWW) and are included in Appendix C. The DCWW sewer records show that there are no public sewers within the vicinity of the site.

A Drainage Survey was undertaken by Invek Surveys Ltd in September 2025 and is included as Appendix D. The drainage survey is supplemented by the topographical survey and anecdotal information by the Client.

The drainage survey shows that surface water drainage from the site is drained by a network of surface water drains which ultimately discharge to a 600mm surface water drain located in the northern extent of the site. The 600mm surface water drain discharges to an unnamed watercourse located approximately 240m north-west of the site. The unnamed watercourse is a tributary of Red Brook. Red Brook is located approximately 750m north-east of the site.

Surface water manhole MH04 located on the 600mm drain in the northern extent of the site has a cover level of 89.86m AOD and an invert level of 86.86m AOD.

A number of the surface water chambers within the site were noted to be surcharged (assumed due to debris build up).

Foul flows from the existing facility drain to an existing private treatment plant located in the north-western extent of the site.

Development Proposals

The proposed development is for the conversion of the salt slags recycling service to a 50,000tpa In-vessel composting facility with associated bio filters, refining plant, maturation pad and associated car park. Existing and proposed development plans are included in Appendix E.

The proposed development will include hardstanding areas in the form of a composting facility, access roads and a car park. Hardstanding will comprise 27,512m^2. Measurements have been taken from a PDF copy of

the 'Proposed Site Layout' (Drawing No. VES_TD_WREXIVC_200_000) and are approximate only.

Hardstanding associated with the unnamed access road located east of the site and outside of the site boundary has been included within the hardstanding area measurement, as runoff from this road will be captured via road gullies and conveyed into the site's proposed surface water drainage system.

Surface Water Management

The site currently comprises a former salt slags recycling service with associated car parking and access roads. Surface water runoff currently drains to a 600mm surface water drain immediately north of the site which in turn discharges to an unnamed watercourse approximately 240m north-west of the site.

The proposed development will include 27,512m² of hardstanding in the form of a composting facility, access road and a car park. The drainage system for the site will include 'clean' and 'process' water areas. Hardstanding from 'clean' water areas (roofs, car parks and roads) will drain into a dedicated surface water drainage system. The contributing clean water drainage area is 21,534m² (includes the access road east of the site). The process water area will cover 5,978m² in the form of the refining plant and maturation pad. Rainfall from the refining plant and maturation pad will be captured and conveyed to on-site storage tanks situated adjacent to the proposed biofilters. From these tanks, the stored water will be pumped back into the process network as required.

Discharge Method

Standard S1 of the Statutory Standards for SuDS sets out the following hierarchy of drainage options:

> *Priority Level 1: Surface water runoff is collected for use;*
>
> *Priority Level 2: Surface water runoff is infiltrated to ground;*
>
> *Priority Level 3: Surface water runoff is discharged to a surface water body;*
>
> *Priority Level 4: Surface water runoff is discharged to a surface water sewer, highway drain, or another drainage system;*
>
> *Priority Level 5: Surface water runoff is discharged to a combined sewer.*

Priority Level 1: Surface water runoff collected for use

Rainfall falling on the proposed refining plant and maturation pad will be captured and conveyed to on-site storage tanks situated adjacent to the proposed biofilters. From these tanks, the stored water will be pumped back into the process network as required. Runoff generated from designated 'clean water areas', such as roof and roads, will require discharge to a lower priority destination.

Priority Level 2: Surface water runoff is infiltrated to ground

As described above, the northern extent of the site is underlain by superficial glaciofluvial deposits of sand

and gravel. The south-western extent of the site is underlain by Devensian Till comprising diamicton. The superficial deposits are identified as being underlain by Branscomb Mudstone Formation.

Due to the impermeable nature of the underlying geology in the site's south-western extent, infiltration techniques may not be suitable for the discharge of surface water in this location.

Infiltration tests should be undertaken in accordance with the BRE365 specification to determine the suitability of soakaways in the northern extent of the site. The use of soakaways (infiltration techniques) may be restricted by potential ground contamination (subject to review by a geo-environmental consultant).

Priority Level 3: Surface water runoff is discharged to a surface water body

Where infiltration is not suitable, a connection to watercourse is the next consideration. The drainage survey undertaken by Invek Surveys Ltd (Appendix D) identified a 600mm surface water drain in the northern extent of the site which flows north-west and discharges to an unnamed watercourse located approximately 240m north-west of the site. The unnamed watercourse is a tributary of Red Brook. Discharge to watercourse via the 600mm surface water drain appears to be a feasible option. Surface water manhole MH04 located in the northern extent of the site has a cover level of 89.86m AOD and an invert level of 86.86m AOD. Based on a minimum site level of 89.31m AOD, a gravity connection can be achieved. Discharge will be made at a limited discharge rate.

Discharge Rate

In order to establish the proposed limited discharge rate, greenfield runoff rates have been estimated using the ICP SuDS method in MicroDrainage (based on the IoH 124 method). A summary of the greenfield runoff rates for a range of events is provided as Appendix F. The greenfield QBAR runoff rate for the 20,534m^2 contributing clean water drainage area is 9.4 l/s. A discharge rate of 9.4 l/s is therefore proposed for this site.

Attenuation Storage

In order to achieve a discharge rate of 9.4 l/s, attenuation storage will be required. Attenuation storage will be distributed on site with an attenuation storage feature and flow control serving the main composting facility compound and access road. A separate attenuate storage feature and flow control will serve a car park and an existing office building in the northern extent of the site. A plan showing the contributing drainage catchment areas is provided as Appendix G.

The proposed discharge rate will be split between the two drainage catchments. Drainage area 1 (composting facility & access road) will have a limited discharge rate of 8.4 l/s. Drainage area 2 (existing office building and car park) will have a limited discharge rate of 1 l/s.

Attenuation storage estimates have been provided using MicroDrainage and are included in Appendix H.

Drainage Area 1

An estimated storage volume of 1,993.5m^3 will be required to accommodate the 1 in 100 year plus 40% Climate Change (CC) event. The storage estimate is based on a discharge rate of 8.4 l/s, storage within a tank or pond structure, an impermeable drainage area of 19,422m^2, a design head of 1m and hydro-brake flow control.

Drainage Area 2

An estimated storage volume of 213m³ will be required to accommodate the 1 in 100 year plus 40% CC event. The storage estimate is based on a discharge rate of 1 l/s, storage within a tank or pond structure, an impermeable drainage area of 2,112m^2, a design head of 1m and hydro-brake flow control.

Sustainable Drainage Systems

Drainage Area 1

Attenuation storage will be provided in the form of an attenuation pond located within the landscaped area north-east of the composting facility and an attenuation tank located within the access road.

A 1.6m deep attenuation pond with an invert (base) area of 545.5m^2, 1 in 3 side slopes and a total surface area of 1015.3m^2 would provide 1,248.6m^3 of storage.

A 49.5m long x 10m wide x 1.6m deep attenuation tank with a 95% void ratio would provide 752.4m^3 of storage.

The attenuation pond together with the attenuation tank would provide 2001m^3 of storage, sufficient to accommodate the 1 in 100 year plus 40% CC event.

Drainage Area 2

Attenuation storage will be provided in the form of a below ground attenuation tank beneath the car park. A 16m long x 14m wide x 1m deep geo-cellular storage tank (with a 95% void ratio) would provide 212.8m^3 of storage, which combined with storage within the flow control chamber, is sufficient to accommodate the 1 in 100 year plus 40% CC event.

Concept Surface Water Drainage Scheme

Where infiltration techniques are not feasible, surface water runoff will be discharged to the unnamed watercourse located 240m north-west of the site via an existing 600mm surface water drain located in the northern extent of the site. Discharge will be made at a limited QBAR greenfield runoff rate of 9.4 l/s. Surface water runoff up to the 1 in 100 year plus 40% climate change allowance event will be attenuated on site. A total attenuation volume of 2,206.5m³ will be required to achieve the discharge rate and will be provided in the form of an attenuation pond located within the landscaped area north-east of the composting facility and an 2no. attenuation tanks located beneath the car park and access road.

The proposed surface water drainage scheme will ensure no increase in runoff over the lifetime of the development.

The proposed drainage system will operate as a sealed system, and the attenuation pond will be constructed with an impermeable geotextile liner. This will prevent any ingress of groundwater into the system and will also ensure that contaminated groundwater is not mobilised or conveyed to the receiving watercourse.

A Concept Drainage Sketch is included in Appendix I.

Exceedance Event

Storage will be provided for the 1 in 100 year plus 40% CC event. Storm events in excess of the 1 in 100 year plus 40% CC event should be permitted to produce temporary shallow depth flooding within the car park, access road and landscaped areas. Consideration will be given to finished floor levels and site levels at the detailed design stage to ensure any potential exceedance flooding will be directed away from buildings and sensitive equipment.

Surface Water Treatment

The Statutory Standards for SuDS sets out the following guidance for surface water treatment:

S3 - Surface water quality management

Treatment for surface water runoff should be provided to prevent negative impacts on the receiving water quality and/or protect downstream drainage systems, including sewers.

In accordance with the CIRIA C753 publication 'The SuDS Manual' (2015), industrial roofs have a 'low' pollution hazard level, with non-residential car parks also classified as having a 'low' pollution hazard level. Industrial sites with potential for heavy pollution have a 'high' pollution hazard level. Table 1 shows the pollution hazard indices for each land use.

Table 1 – Pollution Hazard Indices

Land Use	Pollution Hazard Level	Total Suspended Solids (TSS)	Metals	Hydrocarbons
Industrial Roofs	Low	0.3	0.2	0.05
Non-residential car park	Low	0.5	0.4	0.4
Sites with heavy pollution	High	0.8	0.8	0.9

Table extract taken from the CIRIA C753 publication 'The SuDS Manual' – Table 26.2

* Indices values range from 0-1.

The site will be split into 2no. drainage sub-catchments with runoff from the main composting facility compound directed to an attenuation pond and an attenuation tank. Runoff from the office building and associated car park will be directed to an attenuation tank. Sufficient treatment for the car park will be provided in the form of a proprietary treatment system such as the SDS Aqua Swirl located downstream of the attenuation tank. Table 2 demonstrates that the SDS Aqua Swirl provides sufficient treatment.

Table 2 – SuDS Mitigation Indices

	Mitigation Indices		
Type of SuDS	**Total Suspended Solids (TSS)**	**Metals**	**Hydrocarbons**
Pond	0.7	0.7	0.5
SDS Aqua Swirl	0.8	0.5	0.7

Table extract taken from the CIRIA C753 publication 'The SuDS Manual' – Table 26.3

Table 2 demonstrates that the attenuation pond in isolation will not provide sufficient treatment for a site with potential for heavy pollution. In addition to the attenuation pond, a suitably sized Class 1 bypass separator will be situated downstream of the pond. The attenuation pond together with the Class 1 bypass separator will provide sufficient treatment.

Amenity

The Statutory Standards for SuDS provide the following guidance in relation to Standard S4 – Amenity:

'The design of the surface water management system should maximise amenity benefits.'

The proposed development will include an attenuation pond which will maximise the amenity value of the proposed drainage system.

Biodiversity

The Statutory Standards for SuDS provide the following guidance in relation to Standard S5 – Biodiversity:

'The design of the surface water management system should maximise biodiversity benefits.'

The proposed attenuation pond and associated vegetation will maximise the biodiversity value of the proposed drainage system.

Construction, Operation and Maintenance

Standard S6 of the Statutory Standards for SuDS states:

S6 – Design of drainage for Construction, Operation and Maintenance

1) All elements of the surface water drainage system should be designed so that they can be constructed easily, safely, cost-effectively, in a timely manner, and with the aim of minimising the use of scarce resources and embedded carbon (energy).

2) All elements of the surface water drainage system should be designed to ensure maintenance and operation can be undertaken (by the relevant responsible body) easily, safely, cost-

effectively, in a timely manner, and with the aim of minimising the use of scarce resources and embedded carbon (energy).

3) The surface water drainage system should be designed to ensure structural integrity of all elements under anticipated loading conditions over the design life of the development site, taking into account the requirement for reasonable levels of maintenance.

All drainage systems will be readily accessible for maintenance access. The proposed drainage system will not be adopted by the SAB and will be in the private ownership of the site operator who will be responsible for maintenance.

Maintenance schedules for an attenuation tank, an attenuation pond, flow control chamber and piped drainage systems are included in Appendix J. Maintenance of the Class 1 Bypass Separator and Aqua Swirl (or similar unit) will be as per the manufacturers guidance.

Foul Drainage

The existing site previously accommodated approximately 56 employees during its final 10–15 years of operation. The proposed development will employ 9 full-time staff, representing a substantial reduction in site occupancy. Consequently, the associated foul flow and phosphate load generated by the site will reduce compared to the existing situation. Therefore, the proposed development will not have any adverse effects on the River Dee SAC.

The existing sewage treatment plant, which previously served a population equivalent of 56 employees, will be decommissioned and replaced with a new Marsh Ensign treatment unit to ensure optimal treatment performance for the significantly reduced proposed population (approximately 9 staff). The proposed system can be fitted with an integrated biological phosphate reduction module capable of achieving final effluent concentrations of 0.2 mg/l. This will provide further phosphate reduction in addition to that achieved by reducing the number of staff.

Treated foul flows from the treatment plant will be discharged to the existing 600mm drain in the northern extent of the site.

Rainfall from the refining plant and maturation pad will be captured and conveyed to on-site storage tanks situated adjacent to the proposed biofilters. From these tanks, the stored water will be pumped back into the process network as required.

Conclusions

The proposed development is for the conversion of a salt slags recycling service to a 50,000tpa in-vessel composting facility with associated bio filters, refining plant, maturation pad and associated car park.

The proposed development will include impermeable drainage area in the form of a composting facility, access roads and a car park. In order to comply with the Statutory standards for sustainable drainage systems, flow control will be used and attenuation provided on site to accommodate storm events up to and including the 1 in 100 year plus 40% climate change event.

All methods of surface water discharge have been assessed. Discharge of surface water will be made to an unnamed watercourse located 240m north-west of the site via an existing 600mm surface water drain located in the northern extent of the site. Discharge will be made at a limited QBAR greenfield runoff rate of 9.4 l/s. The discharge method will replicate the existing situation.

Attenuation storage will be required on site in order to restrict surface water discharge to a rate of 9.4 l/s. Attenuation can be provided within an attenuation pond located within the landscaped area north-east of the composting facility and 2no. attenuation tanks located beneath the car park and access road.

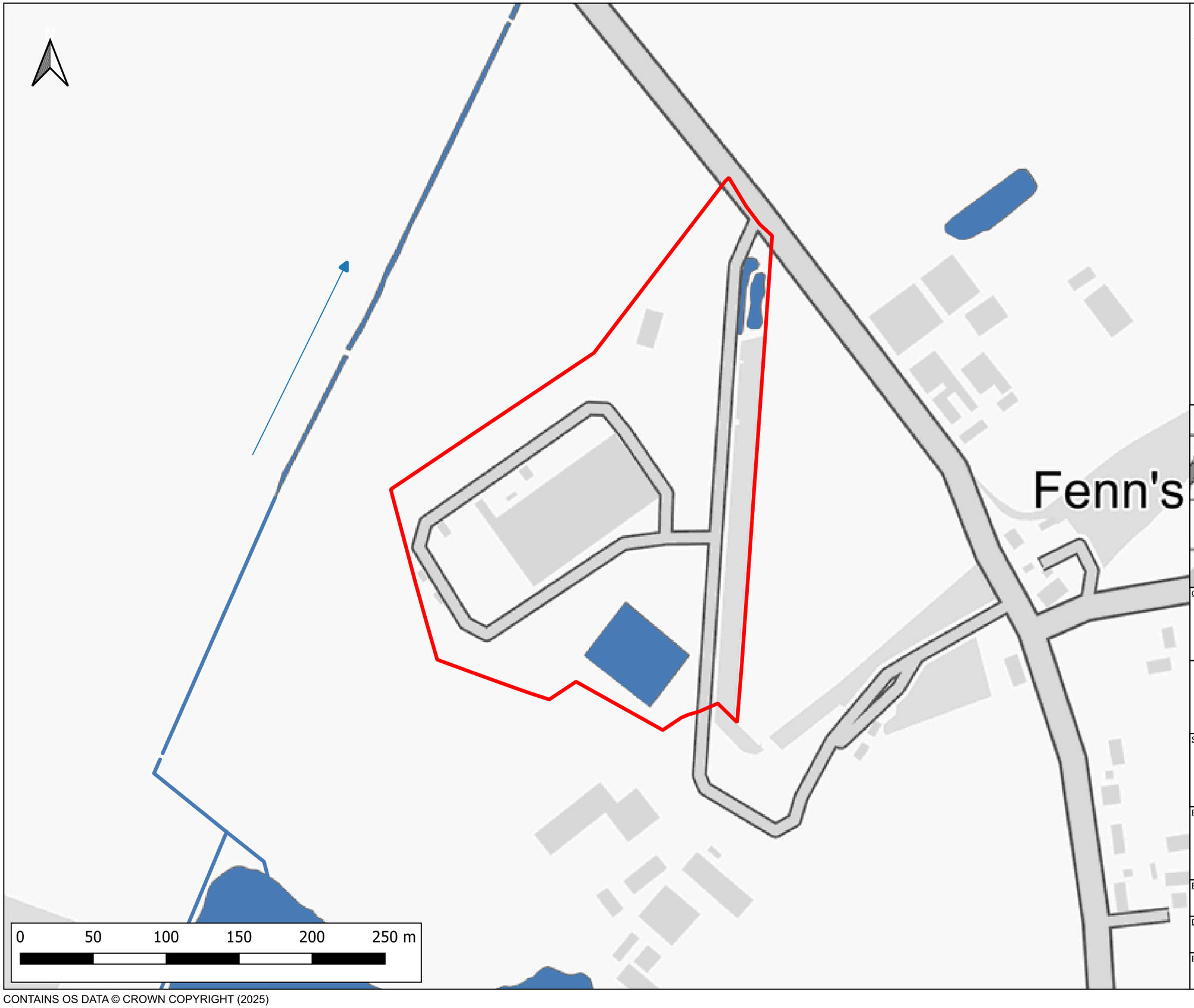
Domestic foul flows, generated from staff welfare facilities, will be discharged to the existing on-site package treatment plant for treatment and disposal (subject to a survey to determine the condition and capacity of the treatment plant). Rainfall from the refining plant and maturation pad will be captured and conveyed to on-site storage tanks situated adjacent to the proposed biofilters. From these tanks, the stored water will be pumped back into the process network as required.

A Concept Designer's Risk Assessment (cDRA) has been prepared to inform future designers of any identified hazards associated with the scheme. The cDRA has been included in Appendix K.

Recommendations

1. Submit this Drainage Strategy to the Planning Authority in support of the Planning Application.
2. Undertake BRE 365 infiltration testing to determine the suitability of infiltration techniques.
3. Verify the attenuation volumes included in this report when undertaking detailed drainage design.

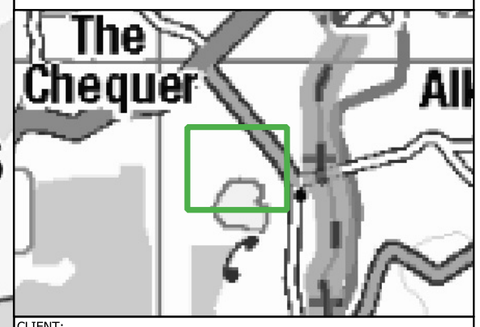
Appendix A Location Plan & Aerial Image



Notes:
1) All dimensions are in metres and all levels in metres above Ordnance Datum unless stated otherwise

LEGEND

- Site Boundary
- Watercourses
- Waterbodies



CLIENT:
Axis P.E.D Ltd

waterco
www.waterco.co.uk

SCHEME:
Former Befesa Salt Slags Site, Whitchurch

PLOT TITLE:
Location Plan

PLOT STATUS:	DATE:
FINAL	18-12-2025

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE AT A3:
AM	AW	NJ	1:2500

PLOT NAME:	REVISION:
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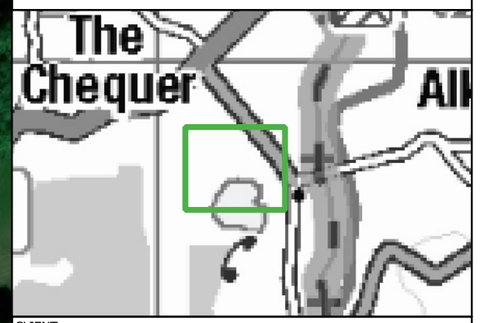
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1) All dimensions are in metres and all levels in metres above Ordnance Datum unless stated otherwise

LEGEND

Site Boundary



CLIENT:

Axis P.E.D Ltd

Waterco
www.waterco.co.uk

SCHEME:

Former Befesa Salt Slags Site, Whitchurch

PLOT TITLE:

Aerial Plan

PLOT STATUS:	DATE:
FINAL	18-12-2025

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE AT A3:
AM	AW	NJ	1:2500

PLOT NAME:	REVISION:
16076_Aerial_Plan	-

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Appendix B Topographical Information

339150N
339125N
339100N
339075N
339050N
339025N
339000N
338975N
350500E
350525E
350550E
350575E
350600E
350625E
350650E
350675E
350700E
350725E

General notes

Grid and levels have been aligned with OS National Grid OSGB36 (15).
All dimensions and levels are in metres unless noted otherwise.

This plan should only be used for its original purpose. JPP accepts no responsibility if supplied to any other party than the original client.

Survey station information

STATION	EASTING	NORTHING	LEVEL	TYPE
J1	350689.752	339190.021	90.100	PK NAIL
J2	350655.637	339174.791	90.177	PK NAIL
J3	350702.107	339119.780	90.113	PK NAIL
J4	350606.160	339048.346	90.089	PK NAIL

Key

AV	Air Valve	Fl.	Flood Light	P/R	Post & Rail Fence
Bol	Bollard	FW	Foul Water	P/W	Post & Wire Fence
BH	Borehole	g	Gully	RE	Rodding Eye
BL	Bed Level	GV	Gas Valve	RS	Road Sign
BT	BT Cover	Ht.	Height	rwp	Rainwater Pipe
CATV	Cable TV Cover	IC	Inspection Chamber	SV	Stop Valve
C/B	Close Boarded Fence	IL	Invert Level	svp	Soil & Vent Pipe
C/L	Chain Link Fence	I/R	Iron Railing	SW	Surface Water
CL	Cover Level	ko	Kerb Outlet	TL	Traffic Light
Col	Column	LC	Lighting column	TP	Telegraph Pole
El	Elec	LU	Light unit	TW	Top of wall
ER	Earth Rod	MH	Manhole	ull	Unable To Lift
EP	Electricity Pole	Mkr	Marker Post	VP	Vent Pipe
FH	Fire Hydrant	O/H	Overhead	WL	Water Level
FL	Floor Level	PB	Post Box	WM	Water Meter
		Po	Post	wo	Wash Out

Building
Control Station
Tree
Bore Hole
Gate

Bottom of Bank
Top of Bank
Vegetation
Change of surface
Fence
Contours
OH Telecom
OH Electric

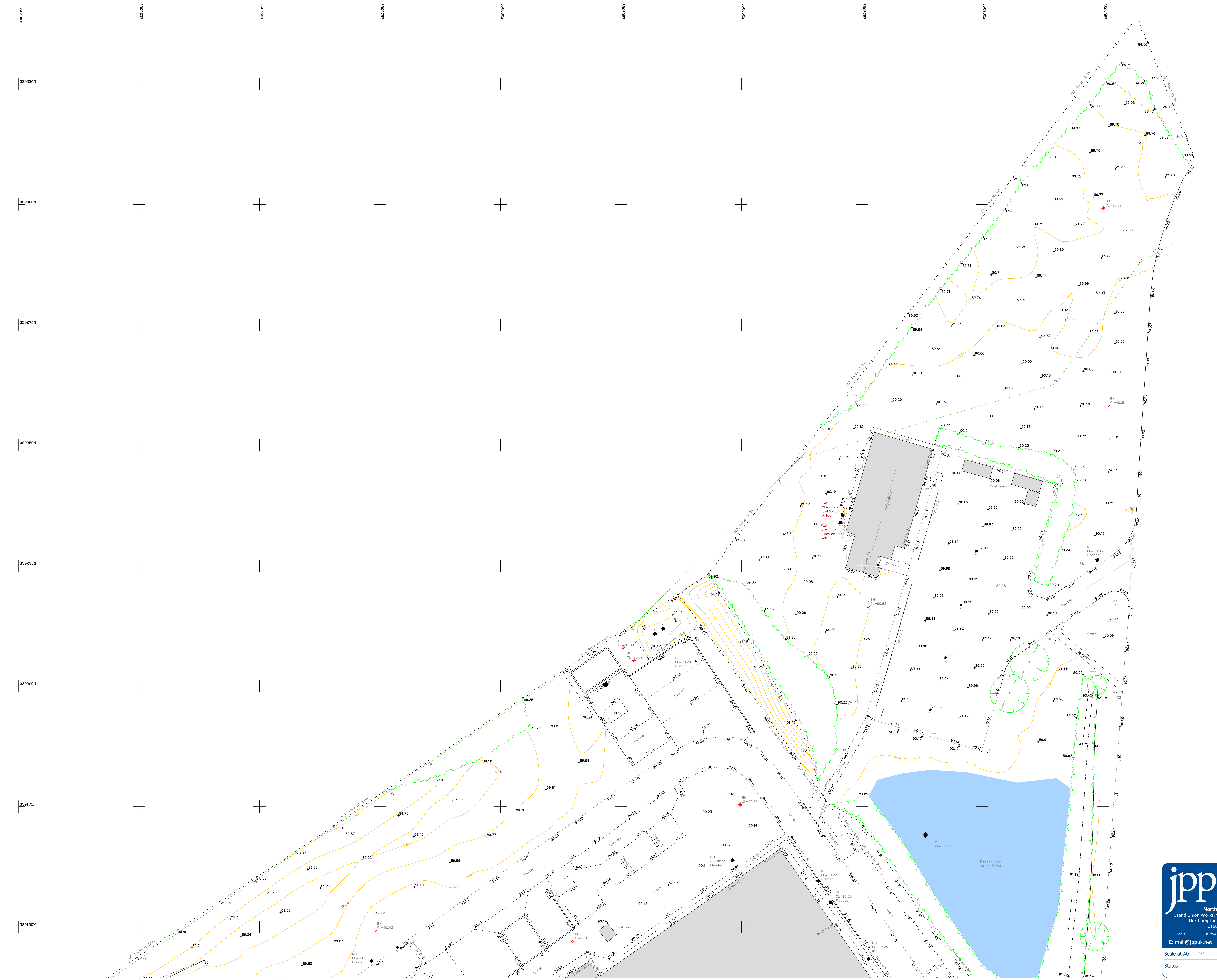
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- Infrastructure Design
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- Development Planning
- Professional Advice
- Geotechnical & Environmental
- Surveying

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Client: Veolia ES Shropshire Ltd.
Project: Fenn's Bank
Title: Topographical Survey Sheet 2 of 2

Scale at A0	Drawn by	Checked by	Date
1:250	JG	TB	16/6/25

Status	Project ref	Drawing no.	Revision
	30314Y	02	



General notes

Grid and levels have been aligned with OS National Grid OSGB36 (15).
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J4	350606.160	339048.346	90.089	PK NAIL

Key

AV	Air Valve	Fl.	Flood Light	P/R	Post & Rail Fence
Bol	Bollard	FW	Foul Water	P/W	Post & Wire Fence
BH	Borehole	g	Gully	RE	Rodding Eye
BL	Bed Level	GV	Gas Valve	RS	Road Sign
BT	BT Cover	Ht.	Height	rwp	Rainwater Pipe
CATV	Cable TV Cover	IC	Inspection Chamber	SV	Stop Valve
C/B	Close Boarded Fence	IL	Invert Level	svp	Soil & Vent Pipe
C/L	Chain Link Fence	I/R	Iron Railing	SW	Surface Water
CL	Cover Level	ko	Kerb Outlet	TL	Traffic Light
Col	Column	LC	Lighting column	TP	Telegraph Pole
El	Elec	LU	Light unit	TW	Top of wall
ER	Earth Rod	MH	Manhole	utl	Unable To Lift
EP	Electricity Pole	Mkr	Marker Post	VP	Vent Pipe
FH	Fire Hydrant	O/H	Overhead	WL	Water Level
FL	Floor Level	PB	Post Box	WM	Water Meter
		Po	Post	wo	Wash Out

Building
Control Station
Tree
Bore Hole
Gate

Bottom of Bank
Top of Bank
Vegetation
Change of surface
Fence
Contours 65.0
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OH Electric

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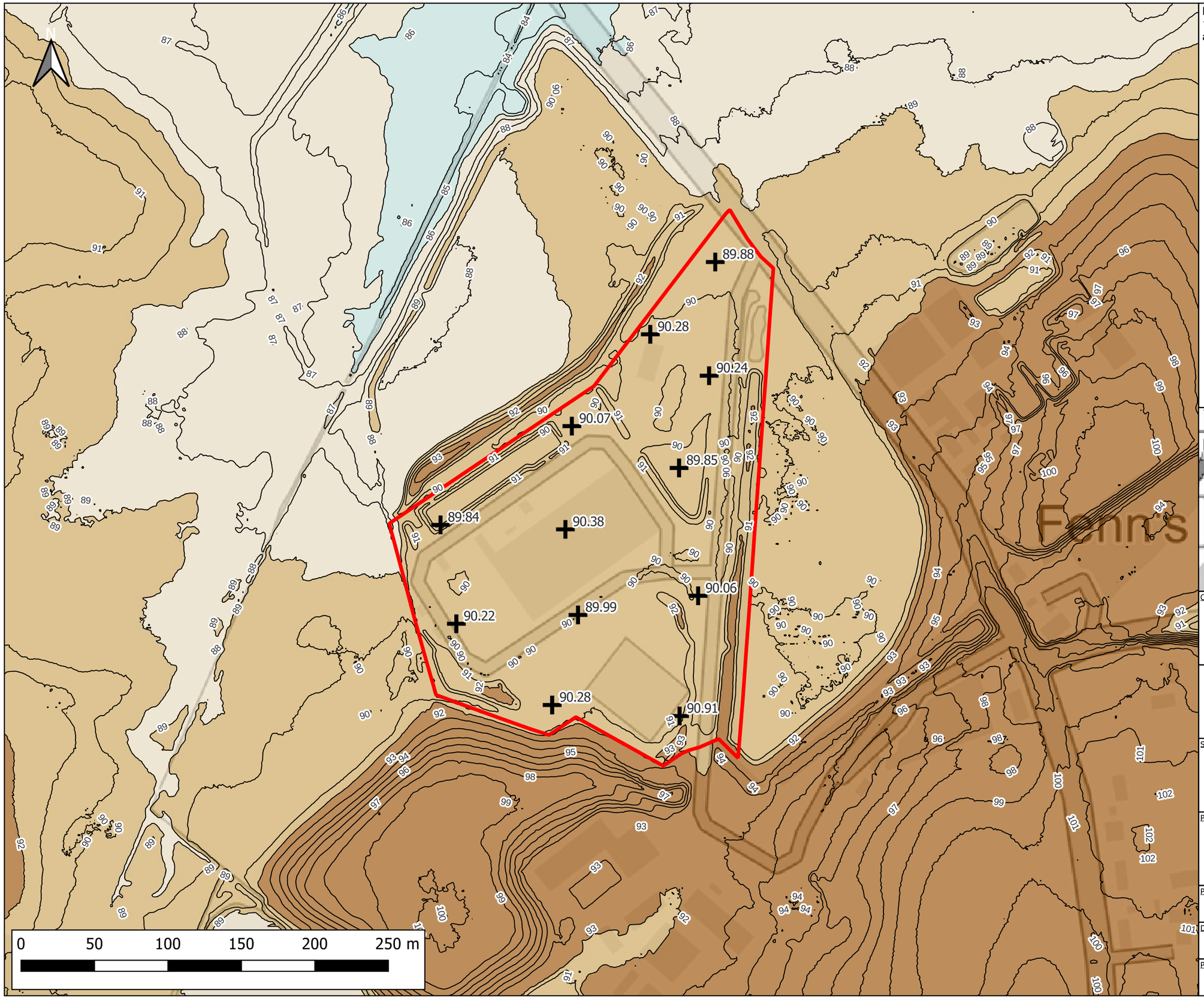
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Client: Veolia ES Shropshire Ltd.

Project: Fenn's Bank

Title: Topographical Survey
Sheet 1 of 2

Scale at A0 1:250	Drawn by JG	Checked by TB	Date 16/6/25
Status	Project ref 30314Y	Drawing no. 01	Revision



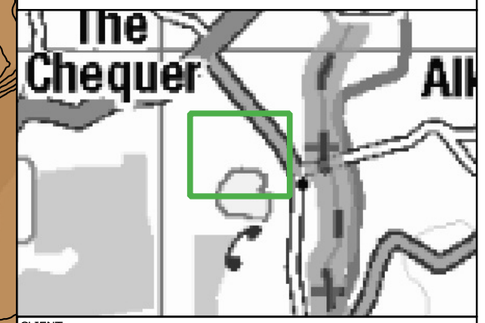
Notes:
1) All dimensions are in metres and all levels in metres above Ordnance Datum unless stated otherwise

LEGEND

- Site Boundary
- Site Levels (m AOD)
- 1m contour

Ground Elevation (m AOD)

- <= 83
- 83 - 86
- 86 - 89
- 89 - 92
- > 92



CLIENT:
Axis P.E.D Ltd

waterco
www.waterco.co.uk

SCHEME:
Former Befesa Salt Slags Site, Whitchurch

PLOT TITLE:
LiDAR Plan
1m Resolution
Data from Natural Resources Wales

PLOT STATUS:			DATE:
FINAL			18-12-2025
DRAWN:	CHECKED:	APPROVED:	PLOT SCALE AT A3:
AM	AW	NJ	1:2500
PLOT NAME:			REVISION:
16076_LiDAR_Plan			-

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Appendix C DCWW Sewer Plan

Dŵr Cymru
Welsh Water

former Befesa Salt Slags site, Wrexham, SY13 3PA

N
W E
S

LEGEND(Representative of most common features)

Waste network:

- Foul chamber
- Surface water chamber
- Combined chamber
- Combined sewer overflow
- Special purpose chamber
- Treatment works
- Pumping station
- Outfall
- Lamphole
- Storm Overflow
- Rising main
- Gravity sewer
- Private sewer
- Private sewer subject to Sect. 104 adoption agreement
- Private Sewer Transfer
- Lateral Drain
- Inspection Chamber

NB: Sewer symbol colour indicates the type.

RED - Combined
GREEN - Surface Water
BROWN - Foul
Purple - Former 524 sewers (for indicative purposes only)

Notes:

Whilst every reasonable effort has been taken to correctly record the pipe material of DCWW assets, there is a possibility that in some cases, pipe material (other than Asbestos Cement or Pitch Fibre) may be found to be asbestos cement (AC) or Pitch Fibre (PF) . It is therefore advisable that the possible presence of AC or PF pipes be anticipated and considered as part of any risk assessment prior to excavation

Dŵr Cymru Cyfyngedig ("the Company") gives this information as to the position of its underground apparatus by way of general guidance only and on the strict understanding that it is based on the best information available and no warranty as to its correctness is relied upon in the event of excavations or other works made in the vicinity of the company's apparatus. The onus of locating apparatus before carrying out any excavations rests entirely on you. The information which is supplied by the Company is given for your assistance only and is subject to the provisions of the New Roads and Street Works Act 1991 which is based upon the best information available and, in particular, but without prejudice to the generality of the foregoing, it should be noted that the records that are available to the Company may not disclose the existence of a water main, service pipe, sewer, lateral drain or disposal main and any associated apparatus laid before 1 September 1989, or, if they do, the particulars thereof including their position underground may not be accurate. It must be understood that the furnishing of this information is entirely without prejudice to the provision of the New Roads and Street Works Act 1991 and the Company's right to be compensated for any damage to its apparatus.

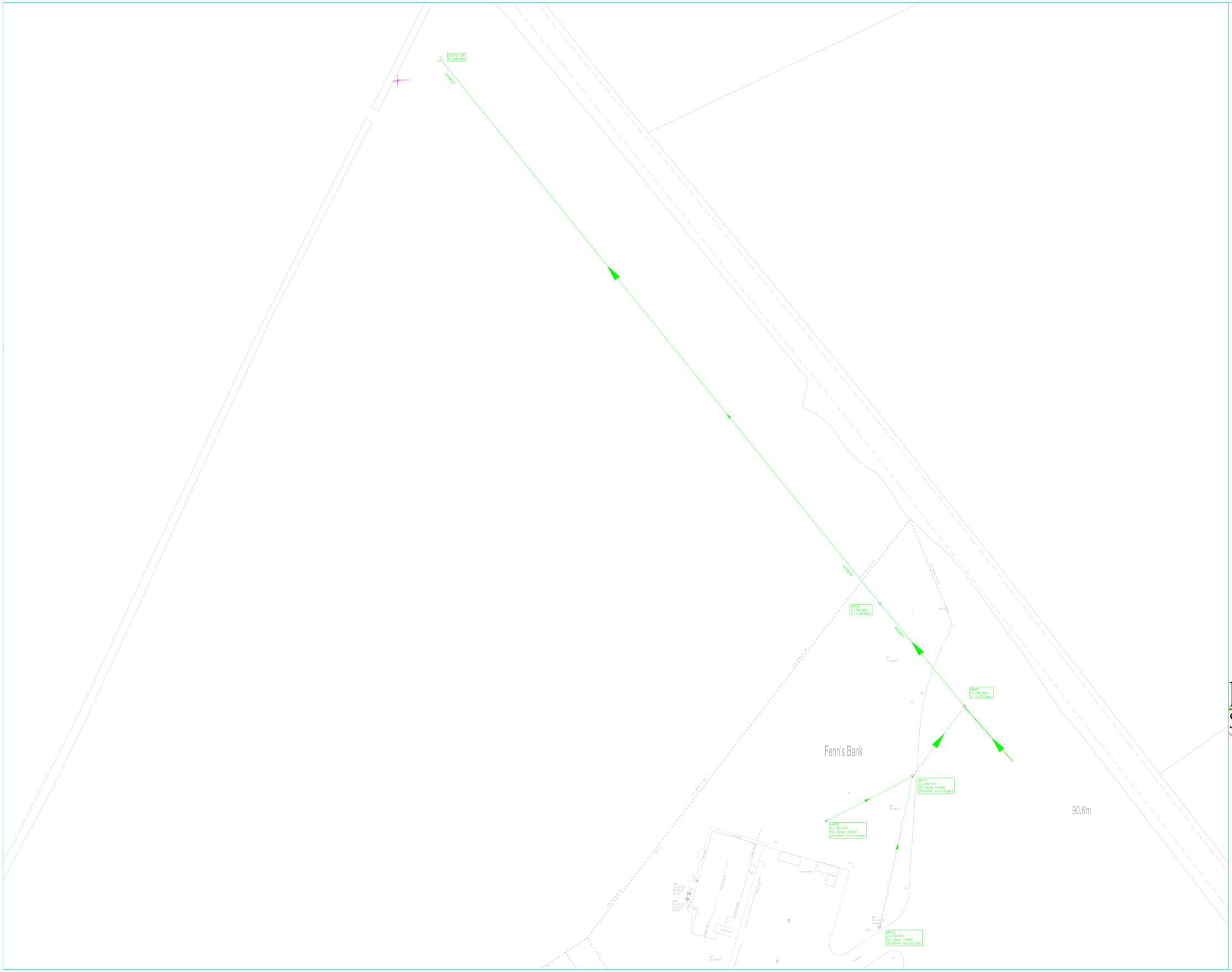
Service pipes are not generally shown but their presence should be anticipated.

EXACT LOCATIONS OF ALL APPARATUS TO BE DETERMINED ON SITE.

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Map Ref:	350628,339098
Map scale:	1:1500
Printed by:	Jessica Asamoah
Printed on:	16 May 2025

Appendix D Drainage Survey



N

Legend/Notes:

- Combined Sewer
- Foul Sewer
- SW Sewer
- Assumed Sewer (Not Proven)
- Rising Main
- Highway Drainage
- Culvert Sewer
- Open Water Course
- Overflow Line
- Treated Line
- RDP Rain Water Down Pipe
- FDP Foul Down Pipe
- CDP Combined Down Pipe
- GDP Grey Water Down Pipe
- Gully
- Highway Gully
- Direction of overland flows
- 48.591 Spot levels

Survey Notes

Disclaimer:-

Please note that all levels shown on the drawings and associated manhole survey cards / survey data are in accordance with the model contract document for manhole surveys.
Cover levels are taken with a Leica CS10 GPS unit, and not from local site control points.
Survey data is for modeling purposes and should be checked prior to using for any construction purposes.

BUILDER'S PROFILE

CHAS Accredited Contractor CHAS.co.uk

INVEK SURVEYS LTD.
Warrington Business Park, Long Lane, Warrington, Cheshire, WA2 8TX
Tel: 01925 244376 Fax: 01925 241517
Email: kevin@invek.com – www.invek.com

Client
Waterco

Drawing Title
Former Befesa
Salt Slags Site
Drainage Layout

Scale(s)	N.T.S	Drawn	PW
Date	11.09.25	Checked	RD
Job Number	2416	Approved	KN

Sheet Size, Drawing Number & Revision
A1_2416/01_Rev_00

Invek Surveys 6.16 — Manhole Details

11/09/25

OS ref SJ5039723315 — M/H no SJ50397350

Location FORMER BEFESA SITE

Year laid — Status PR — Function S — Type M — Survey date 10/09/25

COVER Shape U — Hinged N — Lockable N — Duty U — Size x — Toxic N

SHAFT Side N — Noreg — Depth 340 — Size 550 x — Vermn N

CHAMBER Soffit S — Steps 5 — Ladders 0 — Lndgs 0 — Size 1050 x — Const P

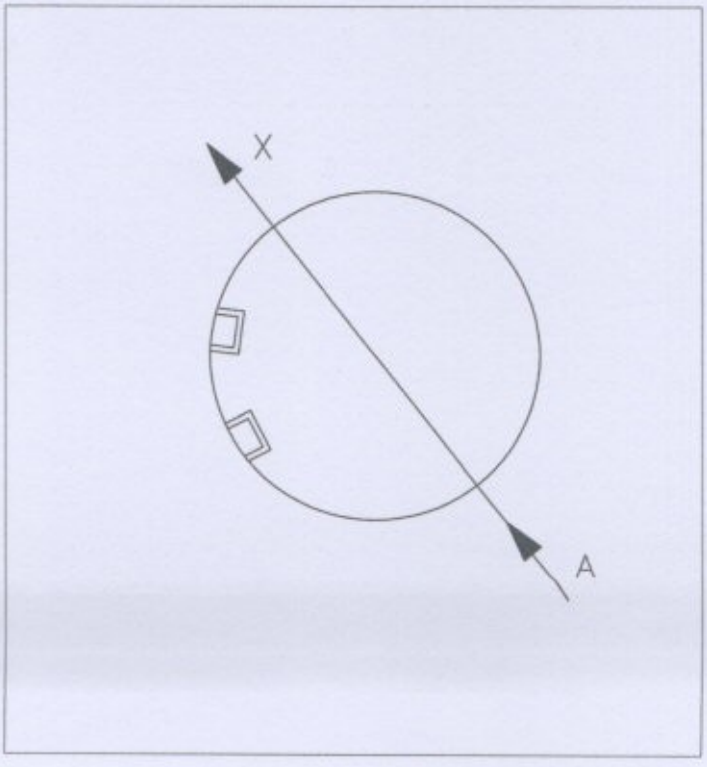
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	Up/dn ref	Shp	Size		Bdrop	Mat	Lng	Depth	Invert
In A	50397253	C	600	x		CO		2.99	86.87
B				x					
C				x					
D				x					
E				x					
F				x					
					TV	Crt			
Out X	50396450	C	600	x	N	B CO		3.00	86.86
Y				x	N	C			

Attention Cover Y — Step/Lad N — Shaft N — Chamb N — Bch/ch N — Other N

Remarks MH04. COVER BROKE, PALLET USED AS COVER. FLOW MONITOR IN PIPE A. — DAC





Invek Surveys 6.16 — Manhole Details

11/09/25

OS ref SJ5039747287 — M/H no SJ50397253

Location FORMER BEFESA SITE

Year laid — Status PR — Function S — Type M — Survey date 10/09/25

COVER — Shape D — Hinged N — Lockable N — Duty H — Size 610 x 610 — Toxic N

SHAFT — Side N — Noreg — Depth 950 — Size 610 x 770 — Vermn N

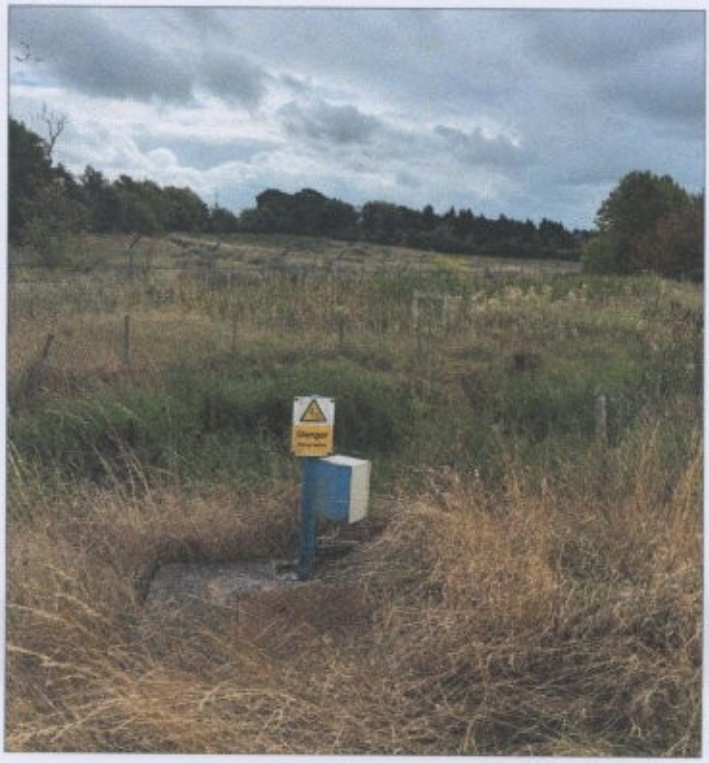
CHAMBER — Soffit N — Steps — Ladders 0 — Lndgs 0 — Size 1800 x 1200 — Const B

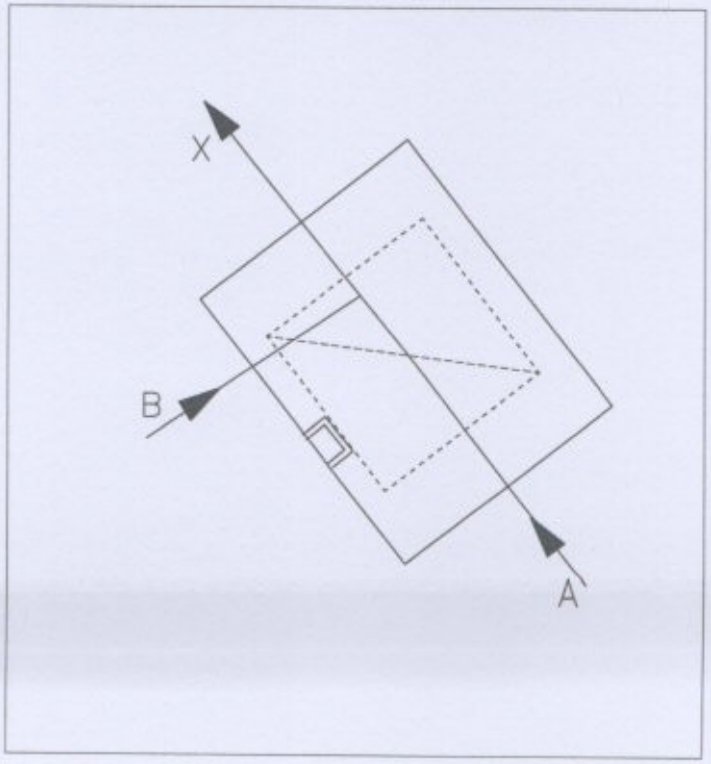
Depth flow — Depth silt 30 — Ht surch 80 — Cover level 89.85

	Up/dn ref	Shp	Size		Bdrop	Mat	Lng	Depth	Invert
In A	50397250	C	600	x		CO		2.78	87.07
B		C		x		U		2.50	87.35
C				x					
D				x					
E				x					
F				x					
					TV Crt				
Ou X	50397350	C	600	x	N B	CO		2.79	87.06
Y				x	N C				

Attention Cover N — Step/Lad N — Shaft N — Chamb N — Bch/ch N — Other N

Remarks MH05. BRICK IN CHANNEL. WATER MAIN RUNNING DOWN PIPE X. BRACING IN CHAMBER, MAYBE BLOCKING OLD B PIPE. LOOKS TO BE POND / DITCH NEXT TO CHAMBER IS PUMPED INTO THIS LINE. DAC





Invek Surveys 6.16 — Manhole Details

11/09/25

OS ref SJ5039602466 — M/H no SJ50396450

Location DITCH S/O FORMER BEFESA SITE

Year laid — Status PR — Function S — Type F — Survey date 10/09/25

COVER — Shape U — Hinged N — Lockable N — Duty U — Size x — Toxic N

SHAFT — Side N — Noreg — Depth — Size x — Vermn N

CHAMBER — Soffit N — Steps — Ladders 0 — Lndgs 0 — Size x — Const U

Depth flow — Depth silt — Ht surch — Cover level 84.45

	Up/dn ref	Shp	Size		Bdrop	Mat	Lng	Depth	Invert
A	50397350	C	600	x		CO		0.01	84.44
B				x					
C				x					
D				x					
E				x					
F				x					

			TV	Crt
X		x	N	C
Y		x	N	C

Attention Cover N — Step/Lad N — Shaft N — Chamb N — Bch/ch N — Other N

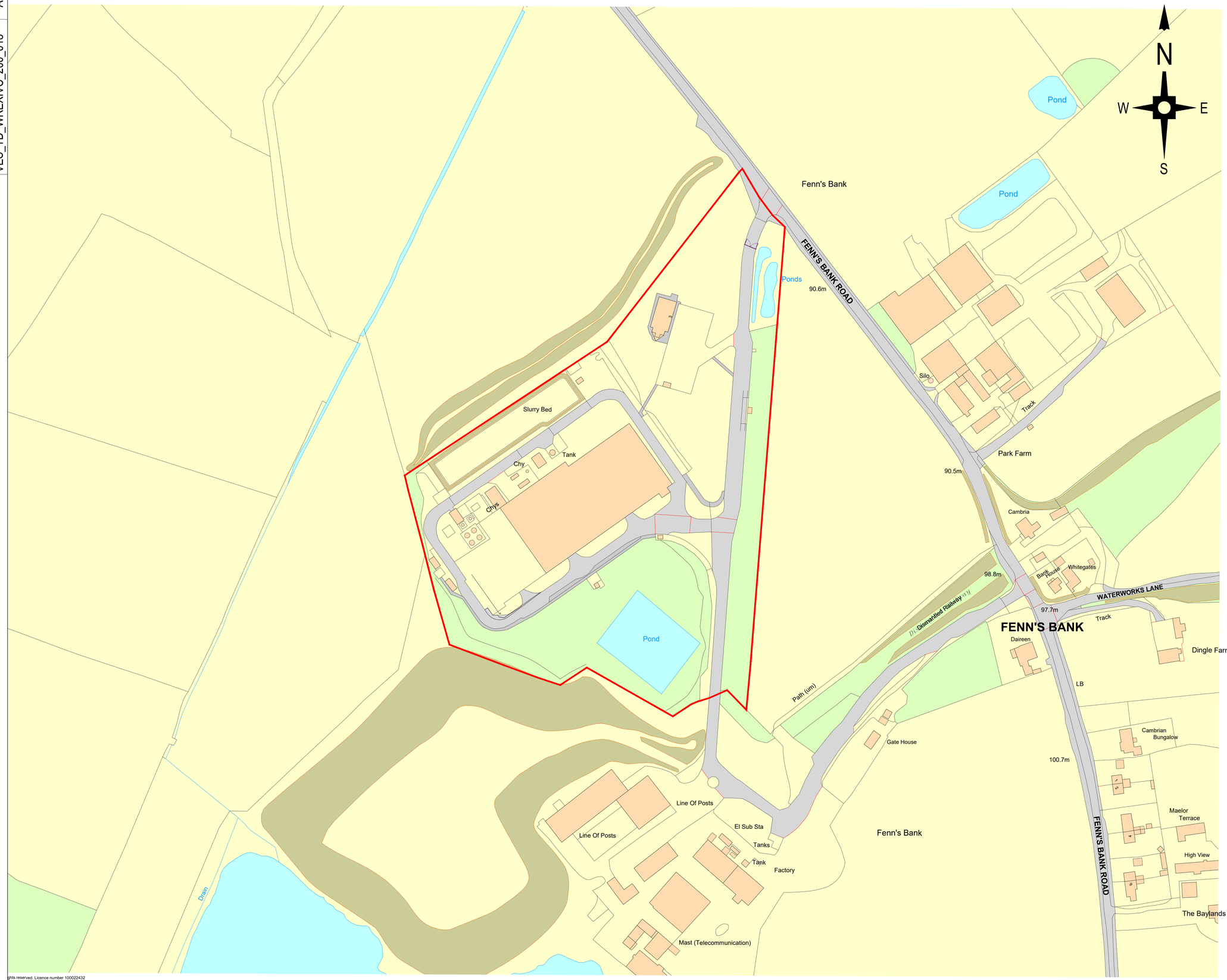
Remarks OUTFALL 01. NO HEADWALL OR SCREEN. — DAC



Appendix E Existing & Proposed Development Plans

Revision A

Drawing No. VES_TD_WREXIVC_200_018



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Rev	Description of revision	Drawn	Chkd	App	Date
A	BOUNDARY UPDATED	RB			14.11.25

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Tel: 0207 812 5185

Project

MERESIDE INDUSTRIAL PARK
FENNS BANK
WHITCHURCH

Title

FENN'S BANK IVC
SITE LOCATION PLAN

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Drawing No. VES_TD_WREXIVC_200_018

Revision A

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Drawing No. VES_TD_WREXIVC_200_001



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MERESIDE INDUSTRIAL PARK
FENNS BANK
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Title

FENN'S BANK IVC
EXISTING SITE LAYOUT

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Revision -

Drawing No. VES_TD_WREXIVC_200_005



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Title

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EXISTING ROOF PLAN

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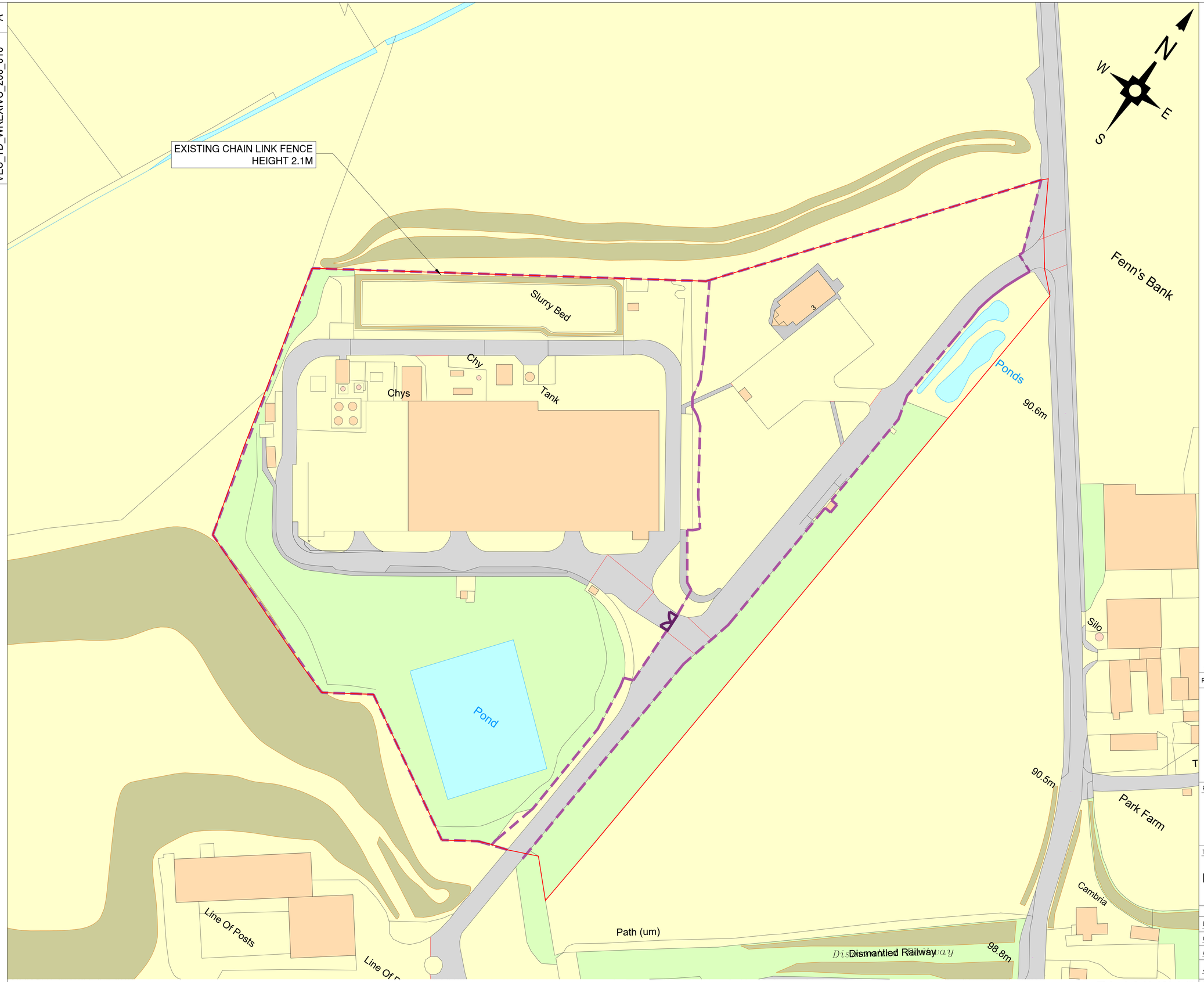
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Revision A

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Drawing No. VES_TD_WREXIVC_200_016



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FENNS BANK
WHITCHURCH

Title
FENN'S BANK IVC
EXISTING BOUNDARY TREATMENT PLAN

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APPLICATION BOUNDARY

FULL HEIGHT PARTITION WALL

2 HOUR FIRE RATED CONCRETE PUSHWALLS

ACOUSTIC SCREEN

Rev	Description of revision	Drawn	Chkd	App	Date
A	ACOUSTIC FENCE ADDED	RB			18.09.25

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MERESIDE INDUSTRIAL PARK
FENNS BANK
WHITCHURCH

Title

FENN'S BANK IVC
PROPOSED SITE LAYOUT

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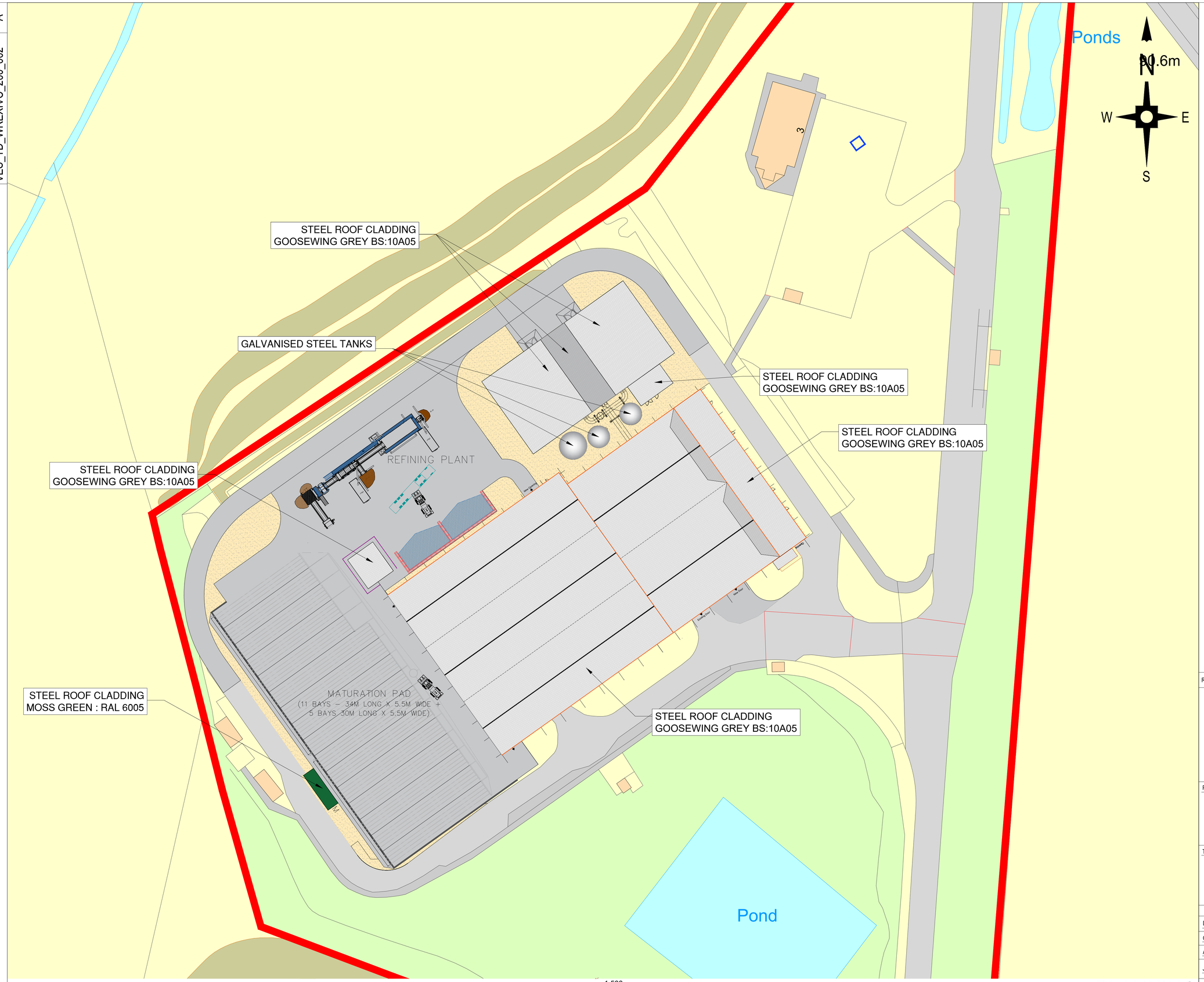
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Revision A

Drawing No. VES_TD_WREXIVC_200_002



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A	BOUNDARY UPDATED	RB			14.11.25

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MERESIDE INDUSTRIAL PARK
FENNS BANK
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Title

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PROPOSED ROOF PLAN

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Revision A

Revision A

Drawing No. VES_TD_WREXIVC_200_014



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APPLICATION BOUNDARY

INDICATIVE EXTERNAL LIGHTING

X2 CAPRIOLA FLOODLIGHT 200W FLOODLIGHT BUILDING MOUNTED @ 8000mm

X3 SHARK 35W WALL MOUNTED BUILDING MOUNTED @ 3500mm

X4 URBANO 199W ECG OPEN AREA LANTERN BUILDING MOUNTED UPON 8000mm COLUMN

Rev	Description of revision	Drawn	Chkd	App	Date
A	BOUNDARY UPDATED	RB			14.11.25

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Project
MERESIDE INDUSTRIAL ESTATE
FENNS BANK
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Title
FENN'S BANK IVC
INDICATIVE LIGHTING LAYOUT

	Initials	Date	Scale	Sheet size
Drawn	JB	02.05.25	1:500 @A1	A1
Checked				
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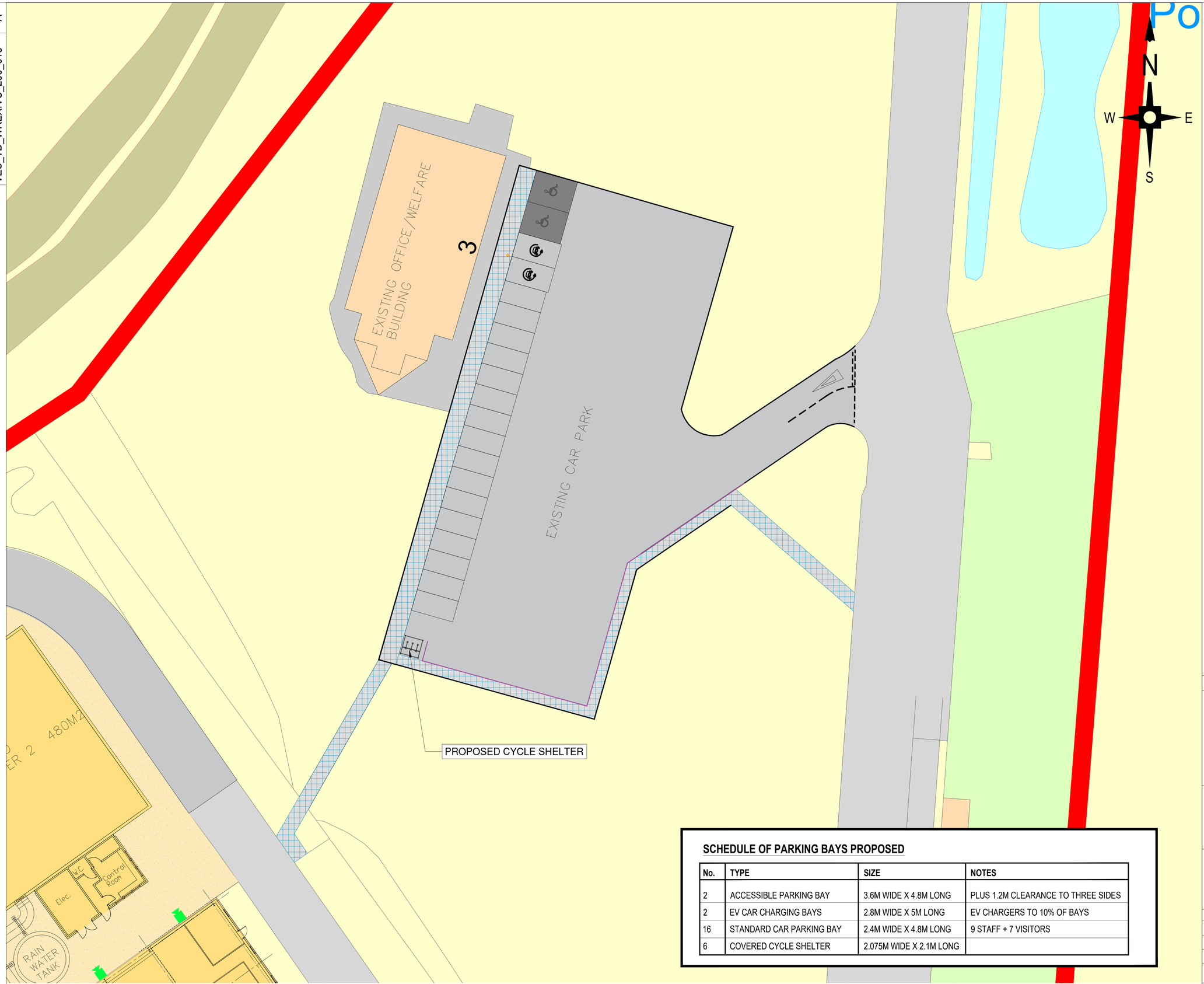
Drawing No. VES_TD_WREXIVC_200_014

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Drawing No. VES_TD_WREXIVC_200_015



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1:200
4m 0 4m 8m 12m 16m 20m

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APPLICATION BOUNDARY

EV CAR CHARGING BAY

SCHEDULE OF PARKING BAYS PROPOSED

No.	TYPE	SIZE	NOTES
2	ACCESSIBLE PARKING BAY	3.6M WIDE X 4.8M LONG	PLUS 1.2M CLEARANCE TO THREE SIDES
2	EV CAR CHARGING BAYS	2.8M WIDE X 5M LONG	EV CHARGERS TO 10% OF BAYS
16	STANDARD CAR PARKING BAY	2.4M WIDE X 4.8M LONG	9 STAFF + 7 VISITORS
6	COVERED CYCLE SHELTER	2.075M WIDE X 2.1M LONG	

Rev	Description of revision	Drawn	Chkd	App	Date
A	BAYS UPDATED	RB			14.11.25

VEOLIA

Technical Direction,
8th Floor, 210 Pentonville Road, London. N1 9JY
Tel: 0207 812 5185

Project
MERESIDE INDUSTRIAL ESTATE
FENNS BANK
WHITCHURCH

Title
SHROPSHIRE IVC
PROPOSED CAR PARK LAYOUT

	Initials	Date	Scale	Sheet size
Drawn	JB	02.05.25	1:200 @A1	A1
Checked				
Approved				

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Job No. WREXIVC

Drawing No. VES_TD_WREXIVC_200_015

Revision A

Revision A

Drawing No. VES_TD_WREXIVC_200_014

EXISTING FENCE REPLACED WITH
PALADIN FENCE/GATES
FINISHED IN GREEN RAL 6005
HEIGHT 2.4M

EXISTING CHAIN LINK FENCE RETAINED
HEIGHT 2.1M

Fenn's Bank

Ponds

90.6m

Pond

Path (um)

Line Of Posts

Line Of Posts

El Sub Sta

REFINING PLANT

BIO FILTER 1 480M2

BIO FILTER 2 480M2

MATURATION PAD
(1) 9A'S - 30M LONG X 5.5M WIDE +
5 BAYS - 50M LONG X 5.5M WIDE

TECH ROOM

FILLING CORRIDOR

TUNNEL 1 (32M LONG X 5.5M WIDE X 5.5M HIGH)
TUNNEL 2 (32M LONG X 5.5M WIDE X 5.5M HIGH)
TUNNEL 3 (32M LONG X 5.5M WIDE X 5.5M HIGH)
TUNNEL 4 (32M LONG X 5.5M WIDE X 5.5M HIGH)
TUNNEL 5 (32M LONG X 5.5M WIDE X 5.5M HIGH)
TUNNEL 6 (32M LONG X 5.5M WIDE X 5.5M HIGH)
TUNNEL 7 (32M LONG X 5.5M WIDE X 5.5M HIGH)

FILLING CORRIDOR

SHREDDING

ALTERNATIVE FUTURE USE

Office Ancillary

INPUT 3.5M3

INPUT 20M3

INPUT 45M3

INPUT 25M3

TIPPING HALL

Workshop

GREEN PROCESS WATER TANK

RED PROCESS WATER TANK

RAIN WATER TANK

N

E

S

W

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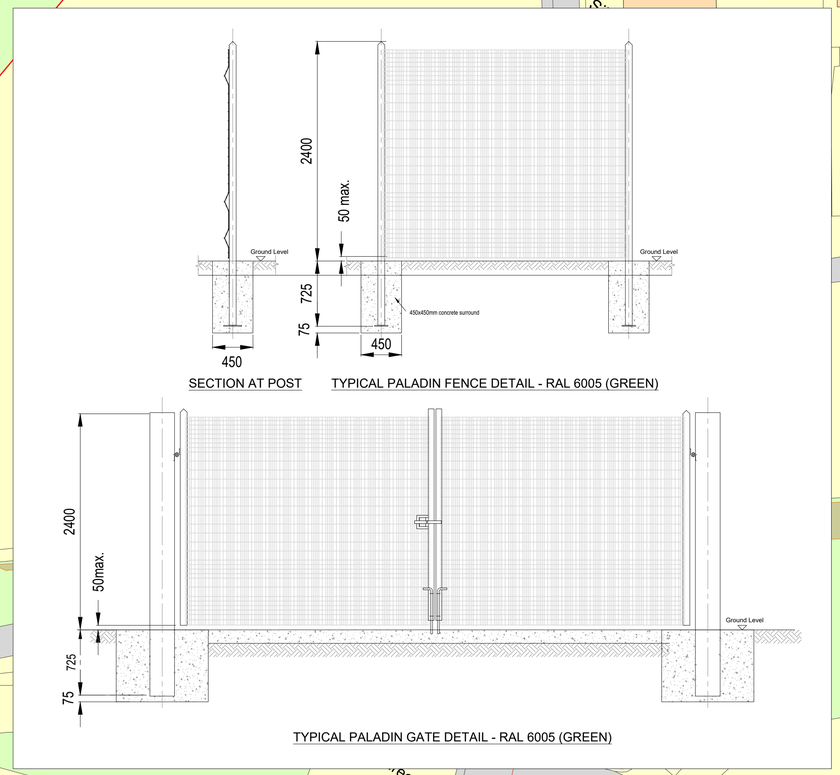
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APPLICATION BOUNDARY



Rev	Description of revision	Drawn	Chkd	App	Date
A	BOUNDARY UPDATED	RB			14.11.25

VEOLIA

Technical Direction,
8th Floor, 210 Pentonville Road, London. N1 9JY
Tel: 0207 812 5185

Project

MERESIDE INDUSTRIAL PARK
FENNS BANK
WHITCHURCH

Title

FENN'S BANK IVC
PROPOSED BOUNDARY
TREATMENT PLAN

	Initials	Date	Scale	Sheet size
Drawn	RB	18.06.25	1:750 @A1	A1
Checked				
Approved			© Copyright Reserved	

Job No. WREXIVC

Drawing No. VES_TD_WREXIVC_200_017

Revision A

PLANNING

Appendix F Greenfield Runoff Rates

ICP SUDS Mean Annual Flood

Input

Return Period (years)	100	Soil	0.450
Area (ha)	2.053	Urban	0.000
SAAR (mm)	722	Region Number	Region 9

Results l/s

QBAR Rural	9.4
QBAR Urban	9.4
Q100 years	20.4
Q1 year	8.2
Q30 years	16.5
Q100 years	20.4

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Appendix G Contributing Drainage Area Plan

Revision A

Drawing No. VES_TD_WREXIVC_20

Ponds

90.6m

N

W E

S

REFINING PLANT

Pond

1:500

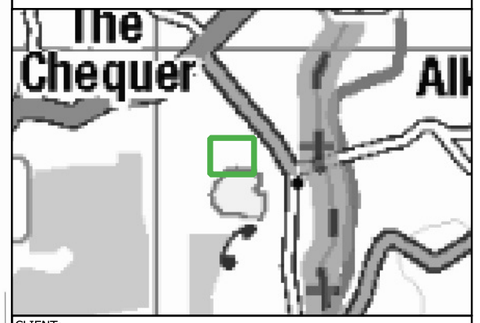
0 50 100 150 200 250 m

PLANNING

Notes:
1) All dimensions are in metres and all levels in metres above Ordnance Datum unless stated otherwise

LEGEND

- Site Boundary
- Drainage Area 1
- Drainage Area 2
- Process Water Collection Area



CLIENT:

Axis P.E.D Ltd

waterco

www.waterco.co.uk

SCHEME:

Former Befesa Salt Slags Site, Whitchurch

PLOT TITLE:

Drainage Area Plan

PLOT STATUS:	DATE:
FINAL	18-12-2025

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE AT A3:
AM	AW	NJ	1:1100

PLOT NAME:	REVISION:
16076_Drainage_Area_Plan	-

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Appendix H MicroDrainage Storage Estimates

Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	9.394	0.394	8.3	785.3	O K
30 min Summer	9.521	0.521	8.3	1039.4	O K
60 min Summer	9.658	0.658	8.3	1312.9	O K
120 min Summer	9.777	0.777	8.3	1549.3	Flood Risk
180 min Summer	9.841	0.841	8.3	1676.5	Flood Risk
240 min Summer	9.883	0.883	8.3	1760.3	Flood Risk
360 min Summer	9.936	0.936	8.3	1866.4	Flood Risk
480 min Summer	9.967	0.967	8.3	1927.3	Flood Risk
600 min Summer	9.984	0.984	8.4	1962.5	Flood Risk
720 min Summer	9.994	0.994	8.4	1981.4	Flood Risk
960 min Summer	9.997	0.997	8.4	1987.8	Flood Risk
1440 min Summer	9.977	0.977	8.3	1947.7	Flood Risk
2160 min Summer	9.921	0.921	8.3	1836.7	Flood Risk
2880 min Summer	9.874	0.874	8.3	1742.9	Flood Risk
4320 min Summer	9.797	0.797	8.3	1589.4	Flood Risk
5760 min Summer	9.737	0.737	8.3	1469.5	Flood Risk
7200 min Summer	9.695	0.695	8.3	1386.4	O K
8640 min Summer	9.664	0.664	8.3	1324.0	O K
10080 min Summer	9.641	0.641	8.3	1278.4	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	162.792	0.0	639.0	16
30 min Summer	108.108	0.0	704.6	31
60 min Summer	68.670	0.0	1225.0	62
120 min Summer	40.967	0.0	1336.2	122
180 min Summer	29.882	0.0	1327.2	182
240 min Summer	23.787	0.0	1316.0	242
360 min Summer	17.172	0.0	1299.2	362
480 min Summer	13.578	0.0	1287.0	482
600 min Summer	11.289	0.0	1276.6	602
720 min Summer	9.693	0.0	1266.8	720
960 min Summer	7.594	0.0	1247.7	960
1440 min Summer	5.374	0.0	1214.0	1440
2160 min Summer	3.780	0.0	2472.8	1856
2880 min Summer	2.947	0.0	2420.6	2220
4320 min Summer	2.085	0.0	2192.0	3024
5760 min Summer	1.646	0.0	3054.7	3856
7200 min Summer	1.393	0.0	3225.7	4688
8640 min Summer	1.229	0.0	3408.6	5536
10080 min Summer	1.119	0.0	3601.6	6352

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Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Winter	9.394	0.394	8.3	785.2	O K
30 min Winter	9.521	0.521	8.3	1039.2	O K
60 min Winter	9.658	0.658	8.3	1312.5	O K
120 min Winter	9.777	0.777	8.3	1548.6	Flood Risk
180 min Winter	9.841	0.841	8.3	1676.3	Flood Risk
240 min Winter	9.883	0.883	8.3	1760.3	Flood Risk
360 min Winter	9.936	0.936	8.3	1867.0	Flood Risk
480 min Winter	9.967	0.967	8.3	1928.9	Flood Risk
600 min Winter	9.985	0.985	8.4	1965.0	Flood Risk
720 min Winter	9.995	0.995	8.4	1985.0	Flood Risk
960 min Winter	10.000	1.000	8.4	1993.5	Flood Risk
1440 min Winter	9.983	0.983	8.3	1959.3	Flood Risk
2160 min Winter	9.925	0.925	8.3	1844.9	Flood Risk
2880 min Winter	9.868	0.868	8.3	1731.6	Flood Risk
4320 min Winter	9.772	0.772	8.3	1540.0	Flood Risk
5760 min Winter	9.685	0.685	8.3	1366.0	O K
7200 min Winter	9.606	0.606	8.3	1207.6	O K
8640 min Winter	9.545	0.545	8.3	1086.8	O K
10080 min Winter	9.501	0.501	8.3	998.4	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Winter	162.792	0.0	639.1	16
30 min Winter	108.108	0.0	704.8	31
60 min Winter	68.670	0.0	1225.1	62
120 min Winter	40.967	0.0	1336.8	122
180 min Winter	29.882	0.0	1327.9	180
240 min Winter	23.787	0.0	1316.7	240
360 min Winter	17.172	0.0	1299.9	358
480 min Winter	13.578	0.0	1287.5	474
600 min Winter	11.289	0.0	1276.9	590
720 min Winter	9.693	0.0	1267.1	706
960 min Winter	7.594	0.0	1248.1	940
1440 min Winter	5.374	0.0	1215.0	1384
2160 min Winter	3.780	0.0	2475.1	2012
2880 min Winter	2.947	0.0	2431.2	2280
4320 min Winter	2.085	0.0	2224.4	3200
5760 min Winter	1.646	0.0	3055.5	4152
7200 min Winter	1.393	0.0	3228.3	4968
8640 min Winter	1.229	0.0	3413.9	5792
10080 min Winter	1.119	0.0	3611.5	6560

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Rainfall Details

Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	2013
Site Location	GB 350625 339118 SJ 50625 39118
Data Type	Point
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	1.000
Cv (Winter)	1.000
Shortest Storm (mins)	15
Longest Storm (mins)	10080
Climate Change %	+40

Time Area Diagram

Total Area (ha) 1.942

Time (mins) From:	To:	Area (ha)
0	1	1.942

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Model Details

Storage is Online Cover Level (m) 10.000

Tank or Pond Structure

Invert Level (m) 9.000

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	1994.0	1.000	1994.0

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0134-8400-1000-8400
Design Head (m)	1.000
Design Flow (l/s)	8.4
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	134
Invert Level (m)	8.995
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

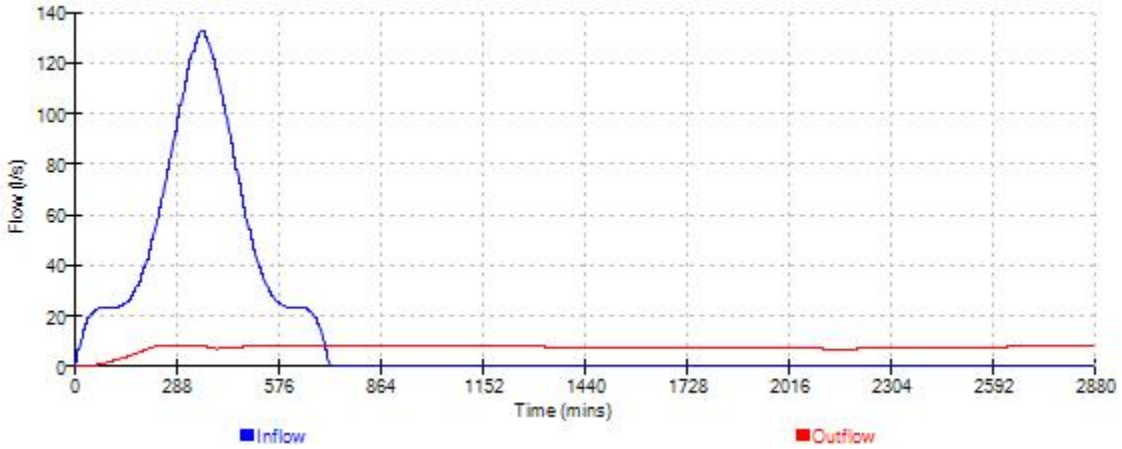
Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.000	8.4
Flush-Flo™	0.301	8.3
Kick-Flo®	0.662	6.9
Mean Flow over Head Range	-	7.2

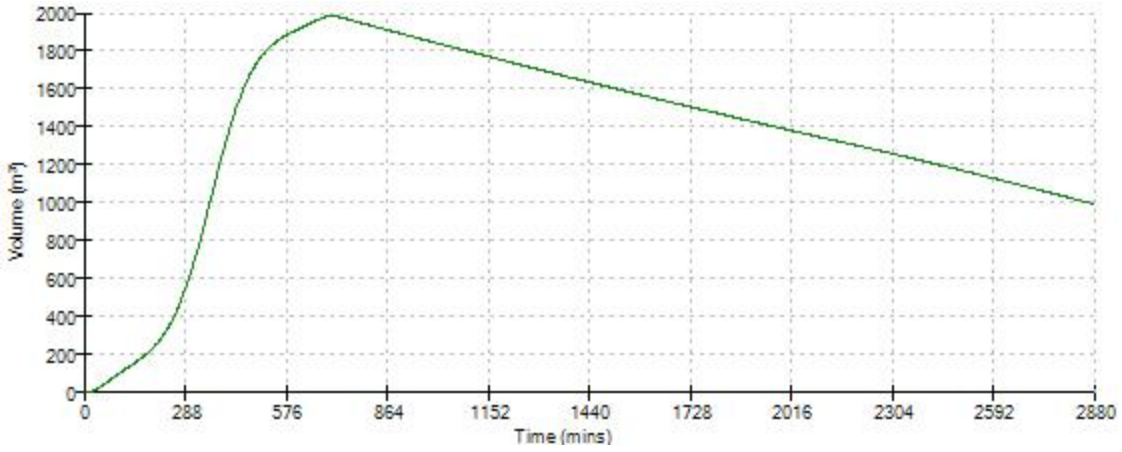
The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

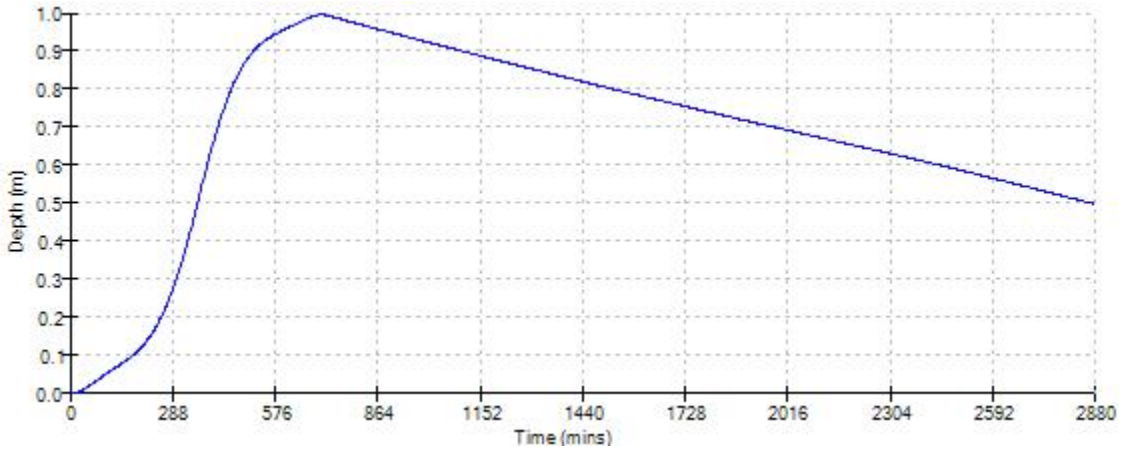
Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	4.8	1.600	10.5	5.000	18.0
0.200	8.1	1.800	11.1	5.500	18.8
0.300	8.3	2.000	11.6	6.000	19.6
0.400	8.2	2.200	12.2	6.500	20.4
0.500	8.0	2.400	12.7	7.000	21.2
0.600	7.5	2.600	13.2	7.500	21.9
0.800	7.6	3.000	14.1	8.000	22.6
1.000	8.4	3.500	15.2	8.500	23.2
1.200	9.1	4.000	16.2	9.000	23.9
1.400	9.8	4.500	17.1	9.500	24.5

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Event: 720 min Winter

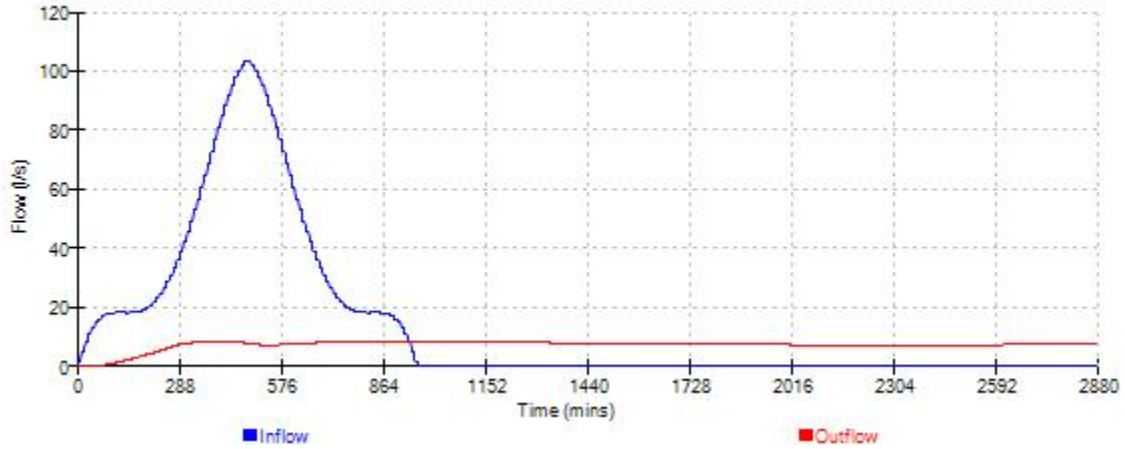


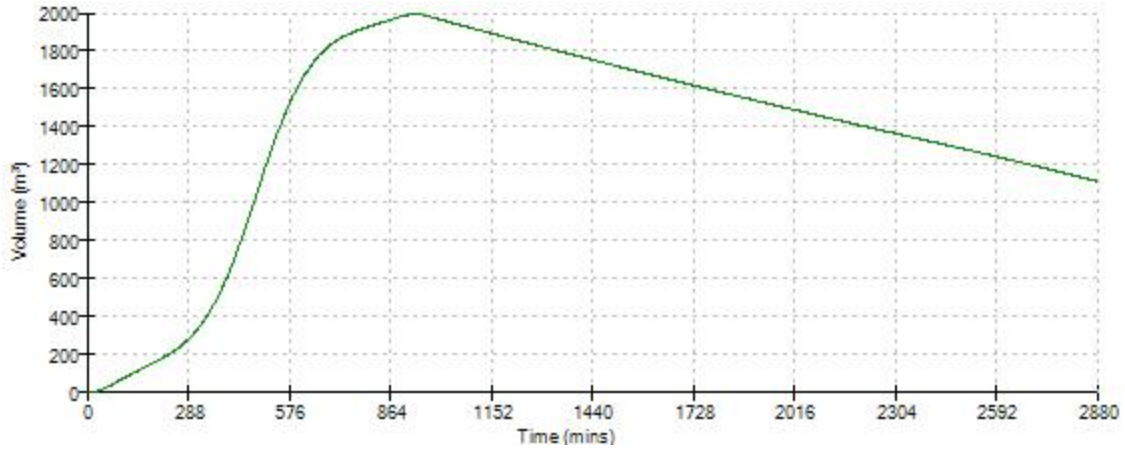


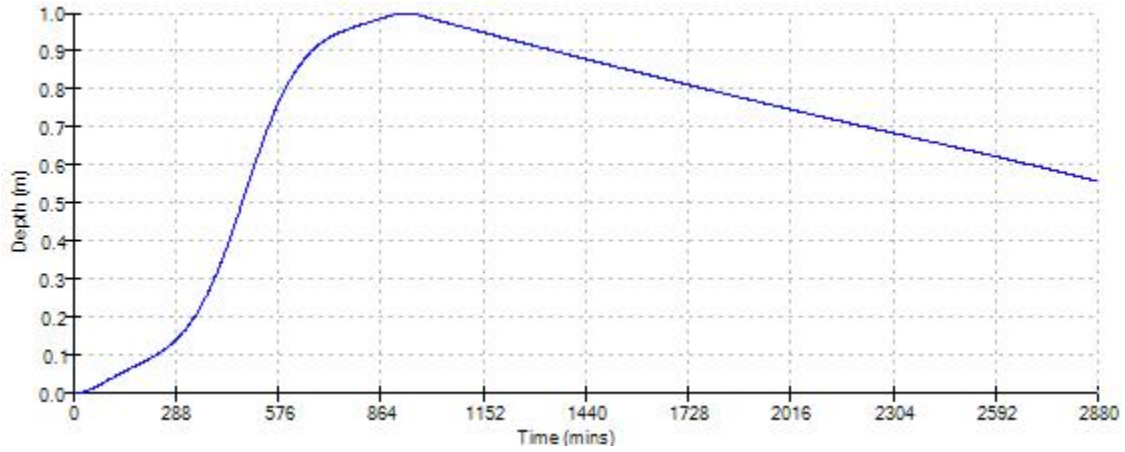


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Event: 960 min Winter

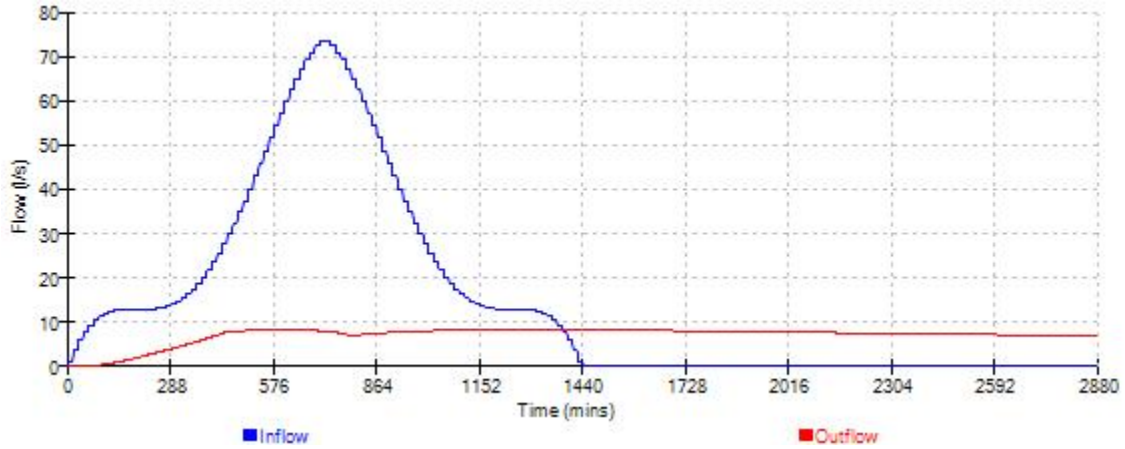


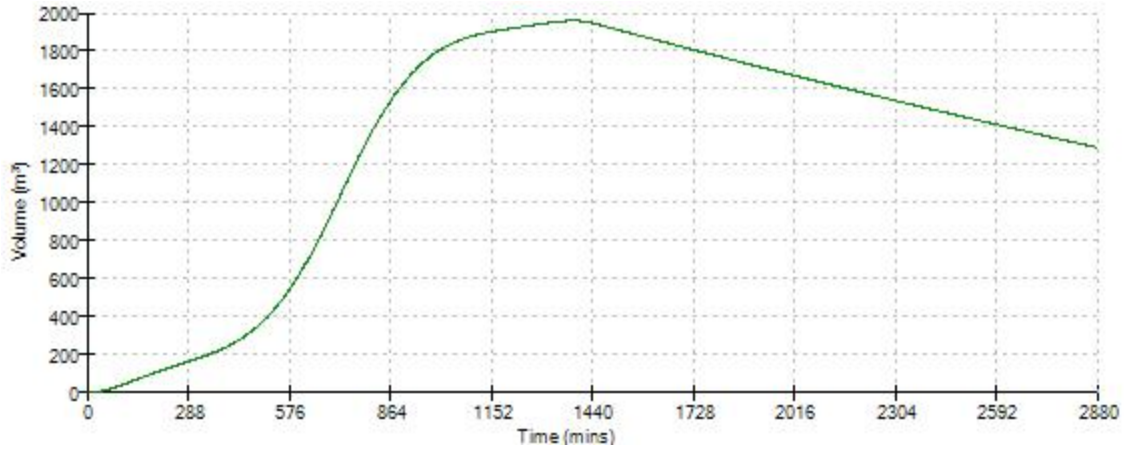


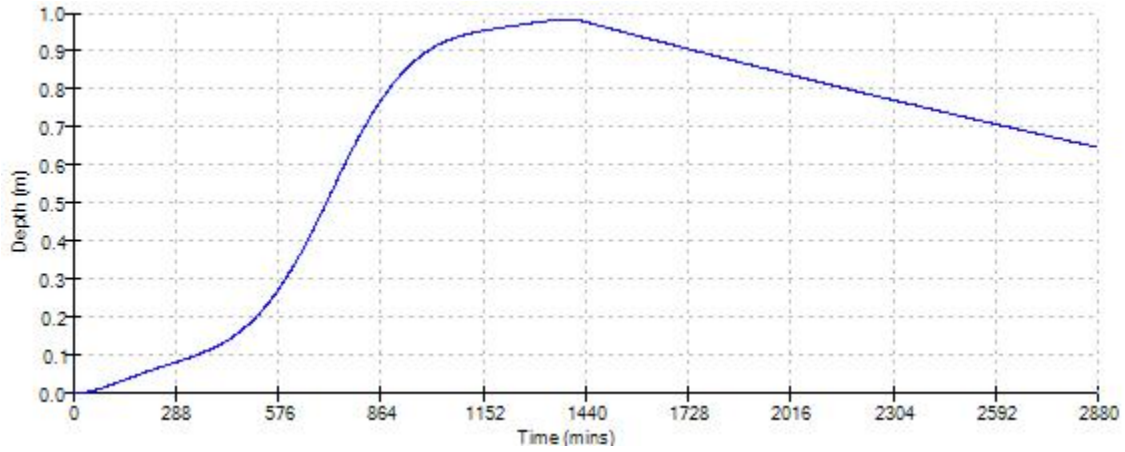


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Event: 1440 min Winter







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Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	9.401	0.401	0.8	85.3	O K
30 min Summer	9.530	0.530	0.8	112.9	O K
60 min Summer	9.669	0.669	0.8	142.4	O K
120 min Summer	9.787	0.787	0.9	167.7	Flood Risk
180 min Summer	9.851	0.851	0.9	181.2	Flood Risk
240 min Summer	9.892	0.892	1.0	189.9	Flood Risk
360 min Summer	9.943	0.943	1.0	200.8	Flood Risk
480 min Summer	9.971	0.971	1.0	206.9	Flood Risk
600 min Summer	9.986	0.986	1.0	210.1	Flood Risk
720 min Summer	9.993	0.993	1.0	211.6	Flood Risk
960 min Summer	9.992	0.992	1.0	211.2	Flood Risk
1440 min Summer	9.962	0.962	1.0	204.8	Flood Risk
2160 min Summer	9.900	0.900	1.0	191.7	Flood Risk
2880 min Summer	9.850	0.850	0.9	180.9	Flood Risk
4320 min Summer	9.771	0.771	0.9	164.3	Flood Risk
5760 min Summer	9.715	0.715	0.9	152.3	Flood Risk
7200 min Summer	9.679	0.679	0.8	144.7	O K
8640 min Summer	9.656	0.656	0.8	139.7	O K
10080 min Summer	9.642	0.642	0.8	136.8	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	162.792	0.0	68.0	16
30 min Summer	108.108	0.0	64.5	31
60 min Summer	68.670	0.0	132.7	62
120 min Summer	40.967	0.0	135.6	122
180 min Summer	29.882	0.0	136.8	182
240 min Summer	23.787	0.0	138.0	242
360 min Summer	17.172	0.0	140.2	362
480 min Summer	13.578	0.0	142.3	482
600 min Summer	11.289	0.0	144.1	602
720 min Summer	9.693	0.0	145.2	720
960 min Summer	7.594	0.0	145.8	960
1440 min Summer	5.374	0.0	144.3	1440
2160 min Summer	3.780	0.0	271.6	1776
2880 min Summer	2.947	0.0	264.2	2160
4320 min Summer	2.085	0.0	243.4	2944
5760 min Summer	1.646	0.0	333.3	3800
7200 min Summer	1.393	0.0	352.5	4616
8640 min Summer	1.229	0.0	373.4	5448
10080 min Summer	1.119	0.0	395.3	6256

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Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Winter	9.400	0.400	0.8	85.3	O K
30 min Winter	9.530	0.530	0.8	112.9	O K
60 min Winter	9.669	0.669	0.8	142.4	O K
120 min Winter	9.788	0.788	0.9	167.7	Flood Risk
180 min Winter	9.851	0.851	0.9	181.3	Flood Risk
240 min Winter	9.893	0.893	1.0	190.2	Flood Risk
360 min Winter	9.945	0.945	1.0	201.2	Flood Risk
480 min Winter	9.974	0.974	1.0	207.5	Flood Risk
600 min Winter	9.990	0.990	1.0	210.9	Flood Risk
720 min Winter	9.998	0.998	1.0	212.6	Flood Risk
960 min Winter	9.998	0.998	1.0	212.6	Flood Risk
1440 min Winter	9.973	0.973	1.0	207.3	Flood Risk
2160 min Winter	9.907	0.907	1.0	193.2	Flood Risk
2880 min Winter	9.851	0.851	0.9	181.3	Flood Risk
4320 min Winter	9.756	0.756	0.9	161.0	Flood Risk
5760 min Winter	9.679	0.679	0.8	144.6	O K
7200 min Winter	9.624	0.624	0.8	132.8	O K
8640 min Winter	9.581	0.581	0.8	123.8	O K
10080 min Winter	9.550	0.550	0.8	117.1	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Winter	162.792	0.0	68.0	16
30 min Winter	108.108	0.0	64.6	31
60 min Winter	68.670	0.0	132.6	62
120 min Winter	40.967	0.0	135.5	120
180 min Winter	29.882	0.0	136.7	180
240 min Winter	23.787	0.0	137.9	240
360 min Winter	17.172	0.0	140.0	356
480 min Winter	13.578	0.0	142.1	474
600 min Winter	11.289	0.0	143.8	590
720 min Winter	9.693	0.0	144.8	706
960 min Winter	7.594	0.0	145.4	934
1440 min Winter	5.374	0.0	143.6	1382
2160 min Winter	3.780	0.0	271.0	1968
2880 min Winter	2.947	0.0	263.6	2224
4320 min Winter	2.085	0.0	243.9	3156
5760 min Winter	1.646	0.0	333.3	4088
7200 min Winter	1.393	0.0	352.5	4968
8640 min Winter	1.229	0.0	373.4	5872
10080 min Winter	1.119	0.0	395.6	6752

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Rainfall Details

Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	2013
Site Location	GB 350625 339118 SJ 50625 39118
Data Type	Point
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	1.000
Cv (Winter)	1.000
Shortest Storm (mins)	15
Longest Storm (mins)	10080
Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.211

Time (mins) From:	To:	Area (ha)
0	1	0.211

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Model Details

Storage is Online Cover Level (m) 10.000

Tank or Pond Structure

Invert Level (m) 9.000

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	213.0	1.000	213.0

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0047-1000-1000-1000
Design Head (m)	1.000
Design Flow (l/s)	1.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	47
Invert Level (m)	8.995
Minimum Outlet Pipe Diameter (mm)	75
Suggested Manhole Diameter (mm)	1200

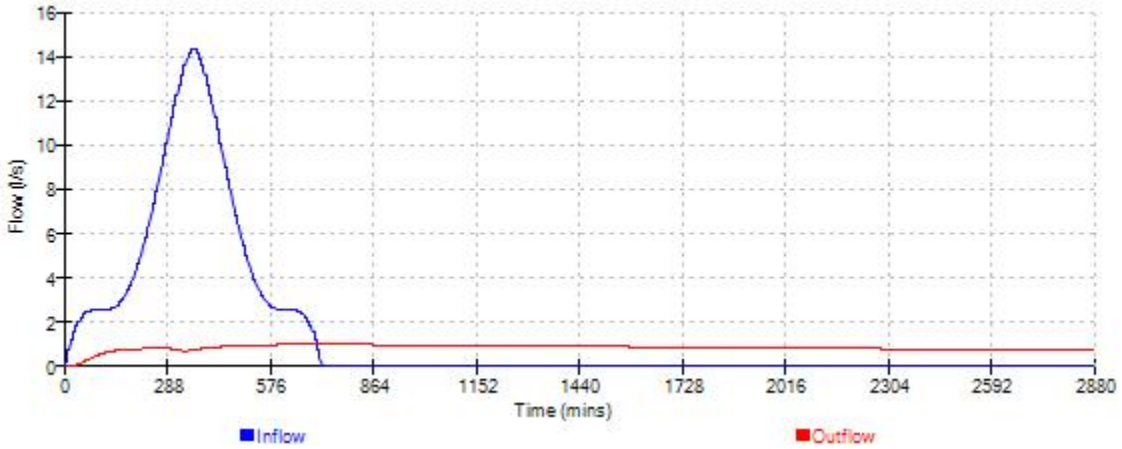
Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.000	1.0
Flush-Flo™	0.205	0.8
Kick-Flo®	0.415	0.7
Mean Flow over Head Range	-	0.8

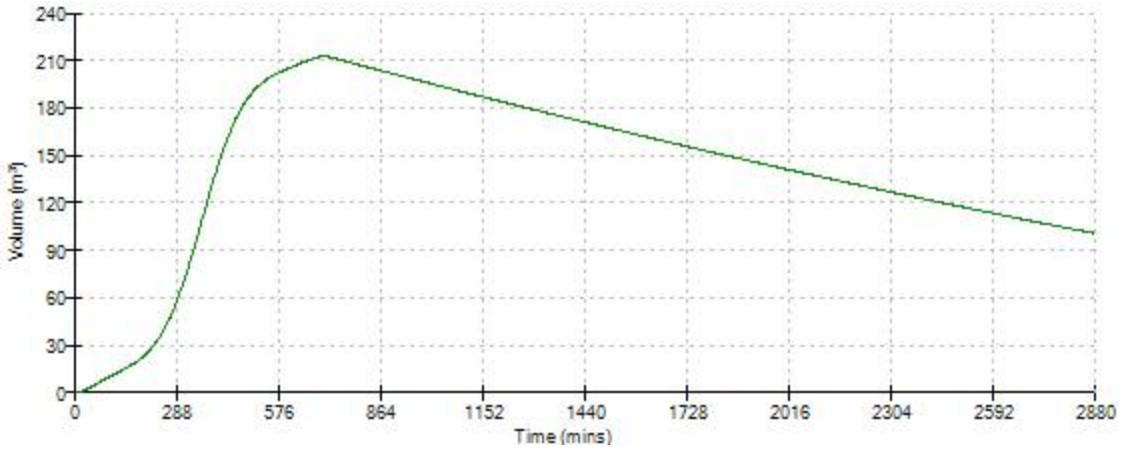
The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

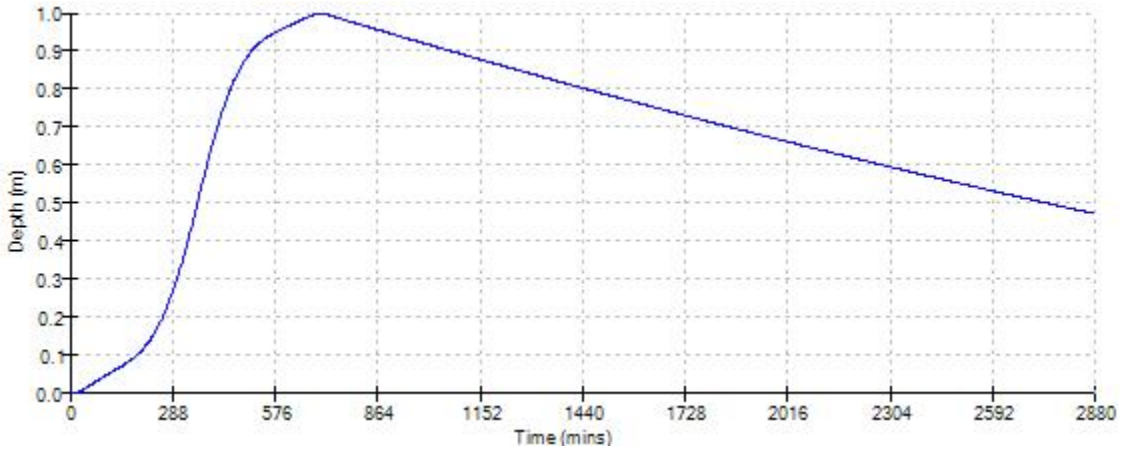
Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	0.8	1.600	1.2	5.000	2.1
0.200	0.8	1.800	1.3	5.500	2.2
0.300	0.8	2.000	1.4	6.000	2.3
0.400	0.7	2.200	1.4	6.500	2.3
0.500	0.7	2.400	1.5	7.000	2.4
0.600	0.8	2.600	1.5	7.500	2.5
0.800	0.9	3.000	1.6	8.000	2.6
1.000	1.0	3.500	1.8	8.500	2.7
1.200	1.1	4.000	1.9	9.000	2.7
1.400	1.2	4.500	2.0	9.500	2.8

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Event: 720 min Winter

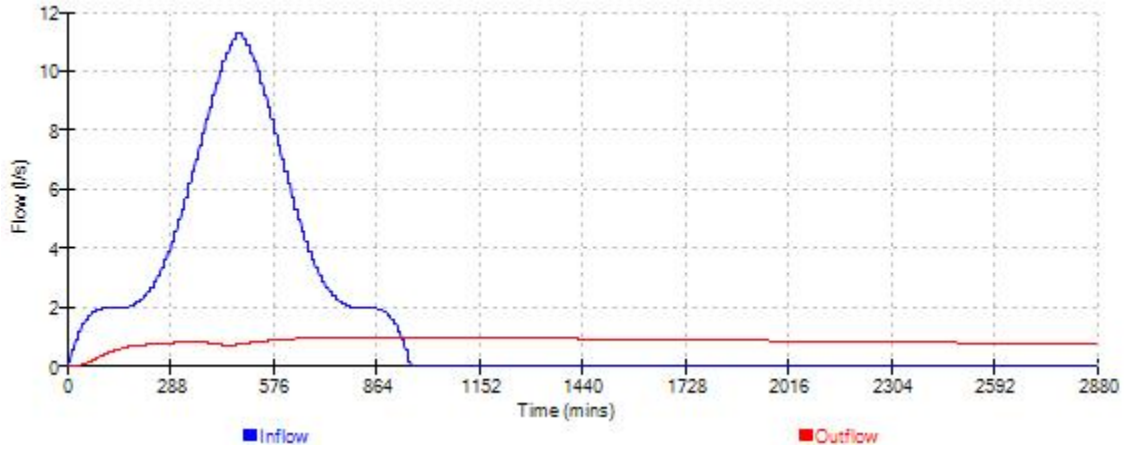


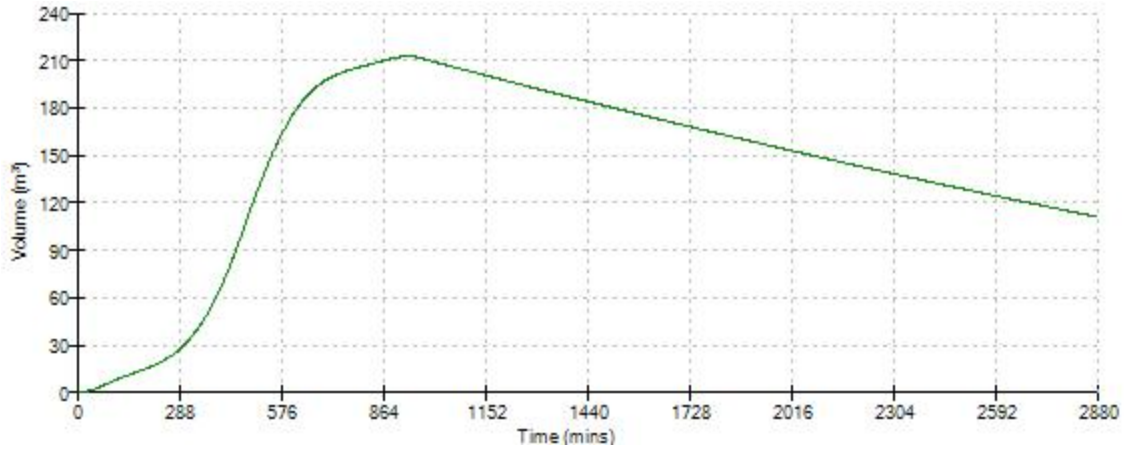


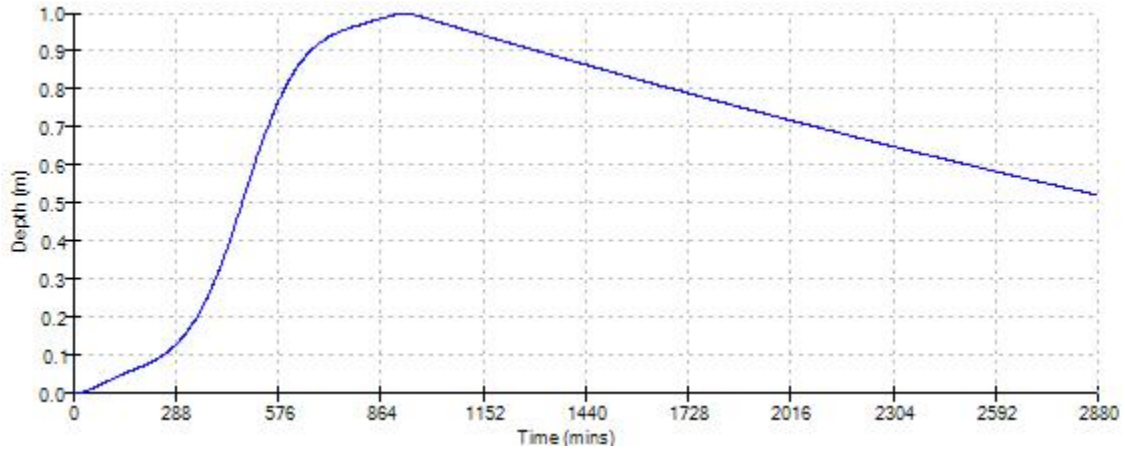


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Event: 960 min Winter

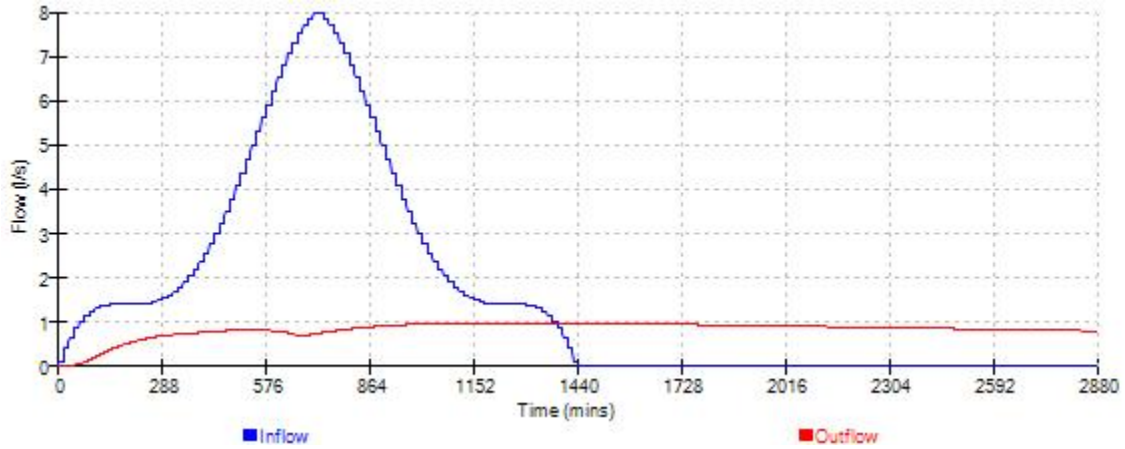


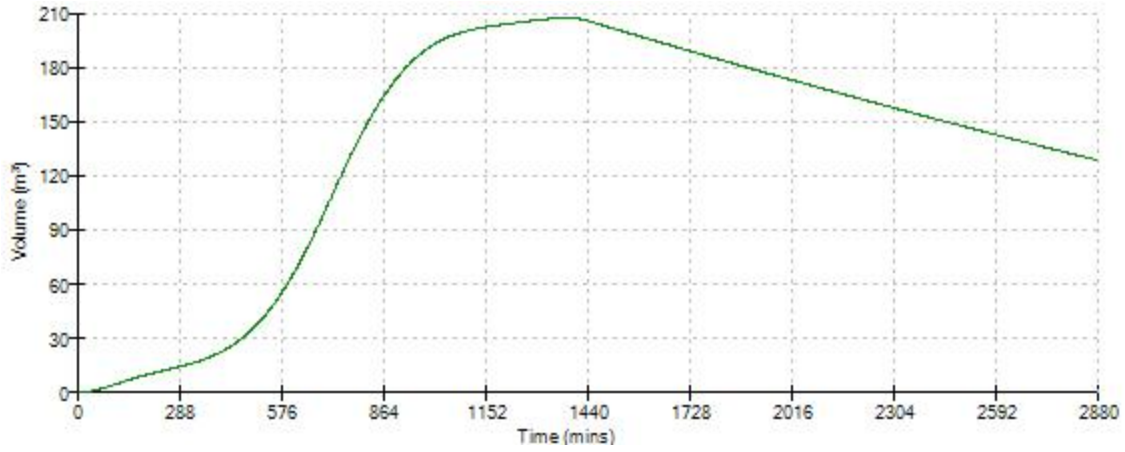


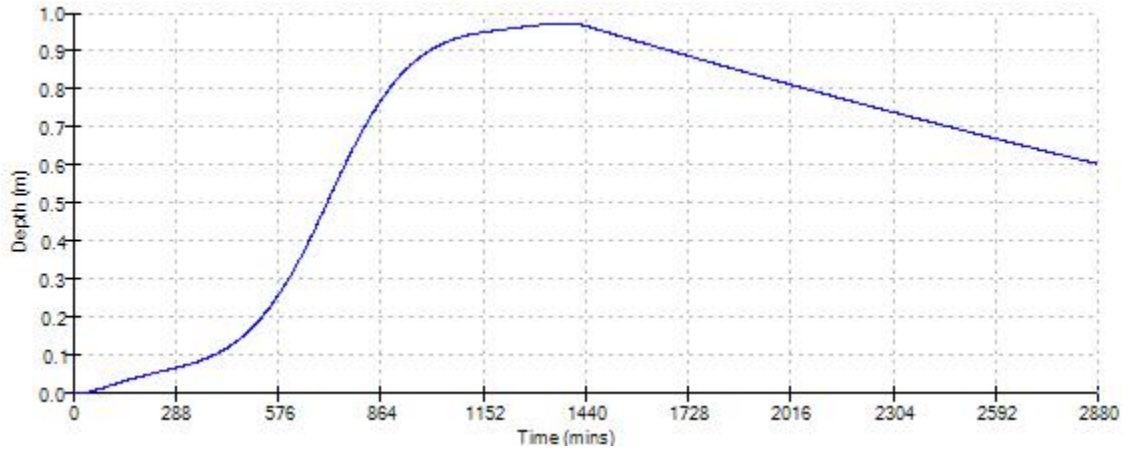


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Event: 1440 min Winter

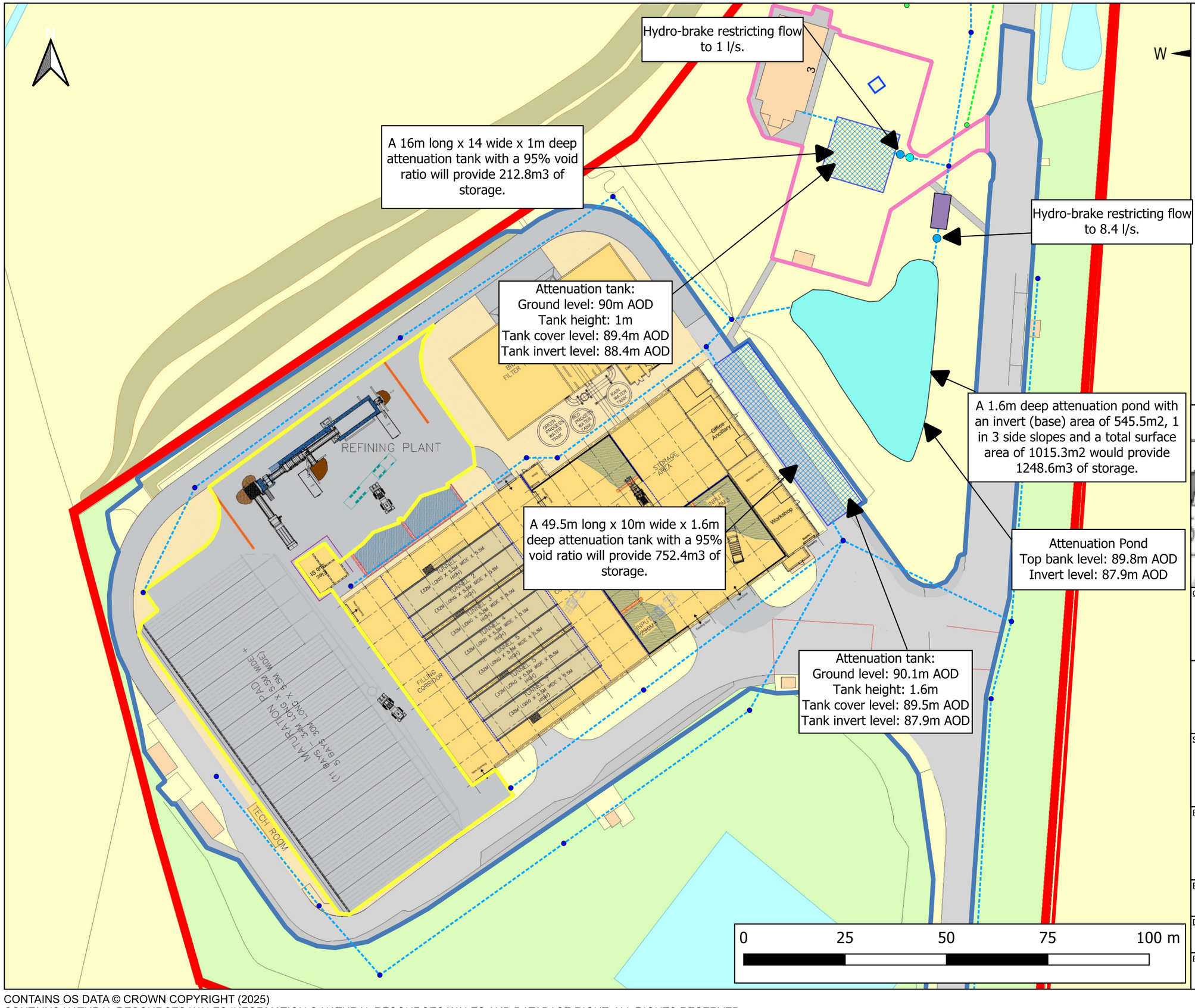






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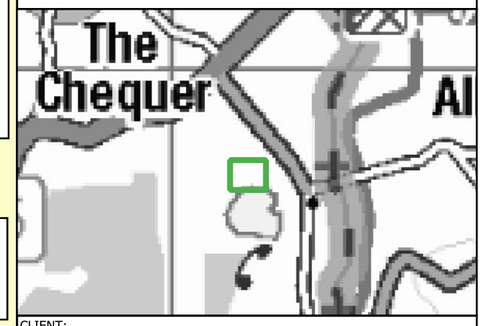
Appendix I Concept Drainage Sketch



Notes:
1) All dimensions are in metres and all levels in metres above Ordnance Datum unless stated otherwise

LEGEND

- Site Boundary
- Attenuation Pond
- Attenuation Tank
- Class 1 Bypass Separator
- Existing Surface Water Sewer
- Existing Surface Water Manhole
- Proposed Surface Water Drain
- Flow Control Chamber
- Surface Water Inspection Chamber
- Aqua Swirl
- Drainage Area 1
- Drainage Area 2
- Process Water Collection Area



CLIENT:
Axis P.E.D Ltd

waterco
www.waterco.co.uk

SCHEME:
Former Befesa Salt Slags Site, Whitchurch

PLOT TITLE:
Concept Drainage Sketch 1

PLOT STATUS:	DATE:
FINAL	18-12-2025

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE AT A3:
AM	AW	NJ	1:900

PLOT NAME:	REVISION:
16076_Concept_Drainage_Sketch	-

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CONTAINS NATURAL RESOURCES WALES INFORMATION © NATURAL RESOURCES WALES AND DATABASE RIGHT. ALL RIGHTS RESERVED.

Existing outfall to unnamed watercourse:
Invert level: 84.44m AOD

Manhole 04:
Cover level: 89.86m AOD
Invert level: 86.86m AOD

Proposed connection to existing surface water manhole.

Ponds

90.6m

3

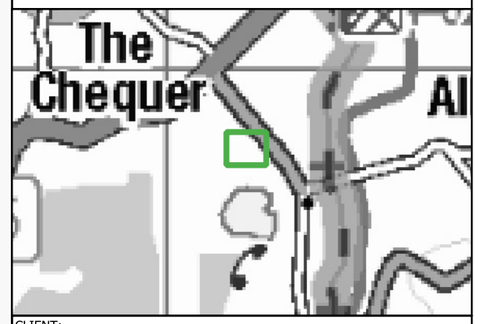
N
W
E
S

0 25 50 75 100 m

Notes:
1) All dimensions are in metres and all levels in metres above Ordnance Datum unless stated otherwise

LEGEND

- Site Boundary
- Attenuation Pond
- Attenuation Tank
- Existing Surface Water Sewer
- Existing Surface Water Manhole
- Proposed Surface Water Drain
- Flow Control Chamber
- Surface Water Inspection Chamber
- Aqua Swirl
- Drainage Area 1
- Drainage Area 2



GENERAL NOTES:

1. THIS DRAWING IS CO
OF VEOLIA AND IS NOT
PART EXCEPT UNDER A

2. DETAILS SHOWN ON
REFERENCE PURPOSE

3. THIS IS A CONCEPTU
DETAILED DESIGN BY A

4. IN CASE OF ANY DIS
DRAWING AND THE WO
INFORMATION WILL TA
CONTRACTOR WILL BE
COMPLY WITH THE WO
DO SO.

5. ALL DIMENSIONS AN

CLIENT:
Axis P.E.D Ltd

Waterco
www.waterco.co.uk

SCHEME:
Former Befesa Salt Slags Site, Whitchurch

PLOT TITLE:
Concept Drainage Sketch 2

PLOT STATUS:	DATE:
FINAL	18-12-2025

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE AT A3:
AM	AW	NJ	1:1000

PLOT NAME:	REVISION:
16076_Concept_Drainage_Sketch	-

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Appendix J Maintenance Schedules

Operation and Maintenance Requirements for Flow Control Chambers and Devices

Maintenance Schedule	Required Action	Typical Frequency
Regular maintenance	Inspect and identify any areas that are not operating correctly. Take remedial action if required.	Monthly (at start, then half yearly)
	Debris removal from catchment surface	Monthly
	Visual inspection of flow control chamber to assess if system is draining down correctly and the orifice or flow control device is not blocked. Assess if there is any build up of silt in chamber sump.	Monthly (at start, then half yearly) & after large storm events
	Removal of accumulated silt from silt trap and catchpit sumps.	As required
Remedial actions	Repair/rehabilitation of inlets/outlets.	As required

The maintenance requirements detailed above are to be undertaken by the site owner.

Name : _____

Position : _____

Date : _____

Signed on behalf of the site owner : _____

Operation and Maintenance Requirements for Piped Drainage Systems

Maintenance Schedule	Required Action	Typical Frequency
Regular maintenance	Inspect and identify any areas that are not operating correctly. Take remedial action if required.	Monthly (at start, then half yearly)
	Debris removal from catchment surface	Monthly
	Visual inspection of up/downstream chambers to assess if pipe length is draining down correctly and/or is blocked. Assess if there is any build up of silt in chamber sump.	Monthly (at start, then half yearly) & after large storm events
	Removal of accumulated silt from silt trap and catchpit sumps.	As required
Occasional Maintenance	CCTV Survey to confirm condition of pipework, identify any repairs/replacement works and action as required.	Following Poor Performance.
Remedial actions	Repair/rehabilitation of inlets/outlets.	As required

The maintenance requirements detailed above are to be undertaken by the site owner.

Name : _____

Position : _____

Date : _____

Signed on behalf of the site owner : _____

Operation and Maintenance Requirements for Ponds and Wetlands

Maintenance Schedule	Required Action	Typical Frequency
Regular maintenance	Remove litter and debris	Monthly (or as required)
	Cut the grass – public areas	Monthly (during growing season), or as required
	Inspect marginal and bankside vegetation and remove nuisance plants (for first 3 years)	Monthly (at start, then as required)
	Inspect inlets, outlets, banksides, structures, pipework etc for evidence of blockage, and / or physical damage.	Monthly
	Inspect water body for signs of poor water quality	Monthly (May – October)
	Inspect silt accumulation rates in any forebay and in main body of the pond and establish appropriate removal frequencies; undertake contamination testing once some build-up has occurred, to inform management and disposal options.	Half yearly
	Check any mechanical devices e.g. penstocks	Half yearly
	Hand cut submerged and emergent aquatic plants (at minimum of 0.1m above pond base; include max 25% of pond surface)	Annually
	Remove 25% of bank vegetation from water's edge to a minimum of 1m above water level	Annually
	Remove sediment from any forebay	Every 1 – 5 years, or as required
	Remove sediment and planting from one quadrant of the main body of ponds without sediment forebays	Every 5 years, or as required
Occasional maintenance	Remove sediment from the main body of big ponds when pool volume is reduced by 20%	With effective pre-treatment, this will only be required rarely, e.g. 25-50 years
Remedial actions	Repair erosion or other damage	As required
	Replant where necessary	As required
	Aerate pond when signs of eutrophication are detected	As required
	Realign rip-rap or repair other damage	As required
	Repair/rehabilitate of Inlets, outlets and overflows	As required

Ref. Table 23.1 CIRIA C753 'The SuDS Manual'

The maintenance requirements detailed above are to be undertaken by the site owner.

Name :

Position :

Date :

Signed on behalf of the site owner :

Operation and Maintenance Requirements for Attenuation Storage Tanks

Maintenance Schedule	Required Action	Typical Frequency
Regular maintenance	Inspect and identify any areas that are not operating correctly. If required, take remedial action	Monthly for 3 months, then annually
	Remove debris from the catchment surface (where it may cause risks to performance)	Monthly
	For systems where rainfall infiltrates into the tank from above, check surface of filter for blockage by sediment, algae or other matter; remove and replace surface infiltration medium as necessary	Annually
	Remove sediment from pre-treatment structures and/ or internal forebays	Annually, or as required
Remedial actions	Repair/rehabilitate inlets, outlet, overflows and vents	As required
Monitoring	Inspect/check all inlets, outlets, vents and overflows to ensure that they are in good condition and operating as designed	Annually
	Survey inside of tank for sediment build-up and remove If necessary	Every 5 years or as required

Ref. Table 21.3, CIRIA C753 'The SuDS Manual'

The maintenance requirements detailed above are to be undertaken by the site owner.

Name :

Position :

Date :

Signed on behalf of the site owner :

Appendix K Concept Designers Risk Assessment (cDRA)

CONCEPT DESIGNER'S RISK ASSESSMENT

Project:	Former Befesa Salt Slags Site, Whitchurch	**Project No:**	16076
Client:	Axis P.E.D Ltd		
Report Reference:	16076-Drainage Strategy-01		

Prepared by:	Adam McCulloch	**Date:**	16/09/2025
Checked by:	Aled Williams	**Date:**	19/09/2025
Reviewed by:	Nigel Jones	**Date:**	19/09/2025

Requirement:

The Construction (Design and Management) Regulations 2015 (CDM 2015) place an obligation on the Designer to take all reasonable steps to provide, with the design, sufficient information about the design, construction or maintenance of the structure, to adequately assist the client, other designers and contractors to comply with their duties under CDM. The Designer has undertaken this assessment to identify any extra-ordinary risks, or those that would not be expected on this particular project by an experienced and competent Contractor. The aim is to avoid needless paperwork and bureaucracy and ensure the assessment is project specific, relevant and proportionate to the risk.

DRA Summary

Each of the following risk areas has been considered using the question below. Is a risk present which is considered to be **extra-ordinary or unexpected** in this instance?

If **YES** - A detailed risk assessment is required at design stage
If **UNKNOWN** - Insufficient information has been provided at concept design stage and the risks are unknown. Further consideration must be given at design stage(s)
If **NO** - No further action is required.

Hazard Ref.	Risk Areas	YES, UNKNOWN or NO	Comments
1	Ground Conditions	Unknown	To be considered at detailed design
2	Hazardous Environment	Unknown	To be considered at detailed design
3	Existing Working Environment	Unknown	Former salt slags recycling site
4	Existing Services	Yes	Buried services present
5	Proximity to Other Structure(s)	Unknown	To be considered at detailed design
6	Near Waterbody / flood risk	Yes	Existing lagoon within Client land ownership to be decomissioned
7	Proximity to Other Activities	Unknown	Industrial land use adjacent
8	Sequence of Construction	Unknown	To be considered at detailed design
9	Access	Unknown	Access provided from unnamed access road
10	Interfaces	Unknown	To be considered at detailed design
11	Confined Space Working	Unknown	To be considered at detailed design
12	Maintenance Considerations	Unknown	Proposed attenuation tank and pond
13	Working at Height	Unknown	To be considered at detailed design
14	Steep Slopes	No	
15	Demolition / Refurbishment / Repair	Unknown	To be considered at detailed design
16	Welfare	Unknown	To be considered at detailed design
17	Occupational Health	Unknown	To be considered at detailed design
18	Environmental Issues	Unknown	To be considered at detailed design
19	Other Significant Hazards not Identified Above	Unknown	To be considered at detailed design
20	Residual Risk to Future Users	Unknown	To be considered at detailed design