

DRAINAGE STRATEGY MARGAM DATA CENTRE



CONSULTING

Data Centre, Tyn-y-Caeau, Margam

Report Ref:
2464- JRC-XX-XX-RP-C-1001

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Project:

Data Centre, Tyn-y-Caeau, Margam

Report:

Drainage Strategy

Report Ref:

2365-JRC-XX-RP-C-1001

Client

Western Bio-Energy Limited

REVISION RECORD					
Rev	Description	Date	Originator	Checked	Approved
P1	ISSUED FOR PRE-APP	24/01/25	GB	GM	GM
P2	ISSUED FOR PLANNING	13/03/25	GRB	GM	GM

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1. INTRODUCTION

JRC Consulting have been instructed by Western Bio-Energy Limited (WBE) to carry out the drainage strategy for the new data centre proposed on the Land at Tyn-y-Caeau, Margam. This document has been put together to detail the proposed drainage network, along with information on the current site.

The centre of the site is located at grid reference SS 79294 86429, with the closest address being Margam Road, Ty'n-y-Caeau, Margam, Neath Port Talbot, Wales, SA13 2NW,

Sustainable Drainage Systems (SuDS) are an essential part of the Margam data centre's design. SuDS are necessary for environmentally appropriate surface water management, especially on a site with difficult terrain and high rainfall patterns like Margam.

The SuDS strategy for this site includes permeable paving, which allows rainwater to pass through the surface and infiltrate the ground beneath, reducing surface runoff and minimising the risk of flooding. This technique also helps to trap and filter pollutants, improving water quality before it enters local watercourses or groundwater systems. Permeable paving is not only practical but also an eco-friendly alternative to traditional paving methods, which often exacerbate water management issues in built environments.

Another key feature of the SuDS is the inclusion of an open water features, an infiltration pond located to the northern edge of the site. Infiltration ponds capture excess water during heavy rainfall, storing it temporarily and then gradually releasing it back into the environment. Open water features also serve to improve biodiversity on the site. By creating new habitats for wildlife, including birds, amphibians, and aquatic species, they enhance the ecological value of the surrounding area.

These features contribute not only to water management but also to the aesthetic and environmental appeal of the site, blending seamlessly with the landscape while offering practical benefits.

The drainage strategy adheres to the guidance set out in the Planning Policy Wales and best practice guidance which requires surface water to be managed so that flood risk (both on site and to third-parties) is not increased and where possible, lead to a betterment from the existing situation.

Sections 3.1, in this report, show the parameters to which the surface water drainage has been designed. All private drainage will be constructed in accordance with the relevant Building Regulations.

2. GUIDANCE AND POLICY

2.1 Hierarchy of Surface Water Disposal

An appraisal was undertaken of the most suitable and sustainable method for managing surface water runoff from the development in accordance with the following hierarchy as follows:

1. Infiltration to the ground using a sustainable drainage system.
2. If this is not feasible, discharge to a watercourse or river; generally, at a controlled rate unless it does not affect flood risk e.g., if to the sea or an estuary.
3. Discharge at a controlled rate to a surface water sewer or drain.
4. Only if the above have all been investigated and it has been proved that none of these options are suitable will discharge at a controlled rate to a combined sewer system be considered and the approval for this can only be given by the Water Authority.

Soakaway testing has been carried out in accordance with BRE 365(2016) and these show good potential for infiltration on site. The infiltration test results can be seen under Section 1.3.2 below.

Infiltration drainage will be implemented by means of a soakaway pond and geocellular tanks.

Permeable Paving has been proposed for the highways that are not subject to HGV movements, and in areas where root protection zones are in place and no dig solutions are required.

Petrol interceptors have been proposed in the carparking area, as well as the permeable paving in order to provide pollution prevention and control measures.

2.2 Sustainable Drainage Approval Body

The SAB is a statutory function delivered by the local authority. It ensures that drainage proposals for all new developments of more than 1 house or where the construction area is 100m² or greater are designed and built in accordance with the national standards for sustainable drainage published by Welsh Ministers.

The SAB is established to:

- Evaluate and approve drainage applications for new developments where construction work has drainage implications, and
- Adopt and maintain sustainable surface water drainage systems according to Section 17 of Schedule 3 (FWMA).
- The SAB also has powers of inspection and enforcement
- Uses discretionary powers to offer non-statutory pre-application advice

3. SURFACE WATER STRATEGY

3.1 Infiltration Tests of Existing Strata

To determine the permeability of the ground and assess the suitability of soakaway drainage at the site, soakaway testing was undertaken in accordance with CIRIA BRE 365 (2016).

The soakaway test locations were chosen based on the proposed site plans, completing the tests under the proposed landscaped areas.

A summary of the ground conditions encountered are presented below. For full details of the strata encountered reference should be made to the enclosed trial pit logs.

STRATUM	Depth to top (m bgl)	
	TP01	TP02
Topsoil: Dark grey sandy loam	0.00	0.00
Disaggregated light grey coarse grained clast supported sandstone with silty sandy matrix	0.30	0.35
Base of pit	1.80	1.60

3.2 Infiltration Test Results

2 infiltration trial pits were dug on site and 25% of effective depth was reached in all the 3 tests completed in both pits, and the infiltration rates were recorded as follows:

TP01

- TP01 Test 1 1.16×10^{-3} m/s
- TP01 Test 2 1.16×10^{-3} m/s
- P01 Test 3 7.75×10^{-4} m/s

TP02

- TP02 Test 1 [3.67×10^{-5} m/s]
- TP02 Test 2 [3.90×10^{-5} m/s]
- TP02 Test 3 [3.97×10^{-5} m/s]

Convention is to adopt the lowest of the results for design, ie 3.67×10^{-5} m/s. The full details of the tests are appended to this report.

3.3 Site Drainage Hierarchy

As set out in Section 2.1, there is a hierarchy for the preferred method of drainage from the site. When applied to the site, these are the results of the assessment:

1. Infiltration tests were undertaken as per Geotechnical Technical Note ref: B06583-CLK-XX-XX-RPGT-0002 which deemed there to be suitable infiltration in the existing stratum.

As infiltration is possible and the preferred option in the hierarchy, it will be used for the development. The attenuation proposed on site has been sized for the volume of the 100 year +45% climate change storms. SuDS measures have been proposed to achieve this including the creation of an infiltration basin and soakaway tanks.

3.4 Proposed Surface Water Strategy

The principle of the surface water strategy is to for all impermeable area to be positively drained into soakaway crate and an infiltration basin. The rate of infiltration used will be as per TPO2 Test 1 of 3.67×10^{-5} m/s. It is suggested that a fuel and oil interceptor be placed as part of the drainage scheme because HGVs will be using the service road and docking yard.

Using the FEH Data, the quick storage estimate required is volumes required to be attenuated are in the range of 66m^3 – 258m^3 based off an impermeable area of 3971m^2 . For the purposes of this exercise and preliminary models, a higher mid-way volume of 192m^3 will be assumed. The 192m^3 of storage will be split between a 125m^3 pond, and geocellular tanks allowing for the remainder of the volume (67m^3).

An Impermeable Areas Plan can be found in *Appendix A*. the Drainage Strategy Schematic can be found in *Appendix B*. The Hydraulic Modelling results for the surface water system can be seen in *Appendix C*. the proposed site levels can be seen in *Appendix D*.

3.5 Design considerations within the site constraints

The pond's size is constrained by the site. The space available for new trees, existing tree root protectors, a pond, and existing grassed areas is limited, and the trees that are being destroyed will need to be replaced. With the limitations in mind, the pond's size has been determined to be the best fit scenario; the shortfall will be mitigated by soakaway crates beneath the parking lot. The additional private drive will be permeable paved to soak into the ground to ensure there is a no dig solution for the Root Protection Areas.

3.6 Foul Drainage

The new data centre's foul water will be connected to the site's existing foul sewer that runs along its eastern edge. Welsh Water owns the existing foul sewer, which is a 450Ø line with an anticipated depth of 1.2 m cover in accordance with adoptable standards. Further investigation will be carried out to determine exact depths and locations.

4. Operations and Maintenance

4.1. BASINS, PONDS AND WETLANDS

- **Basins, ponds and wetlands** are depressions in the ground that store water. Water levels rise after rain and then drop to the normal level as the excess soaks into the ground or is released slowly to a watercourse or drain. Some water is often held back in a pond or wetland for final ‘polishing’ treatment or amenity interest.
- **Basins** are usually dry
- **Ponds** can be permanent or temporary and are mainly open water.
- **Wetlands** are mainly aquatic vegetation but can have small areas of open water like ponds.

BASINS, PONDS AND WETLANDS	
Regular Maintenance	Frequency
Grass Mow grass access paths and verges surrounding basins, ponds and wetlands areas at 35mm-50mm minimum and 75mm maximum or as specified to provide a cared for appearance and allow pedestrian access. Mow rough grass areas for occasional access or habitat reasons at 100mm and maximum 150mm with cuttings removed to wildlife piles Grass areas not required for access may be managed for wildlife interest and to reduce costs. 2 cuts in July and September or 1 cut annually in September or October as specified and cuttings removed to wildlife piles.	Monthly or as required As required 4-6 times annually Annually or as required
Wet woodland management Manage annually as detailed spec. with cuttings left in situ or removed to wildlife piles.	Annually or as required
Wetland vegetation Cut (strim) at 100mm with cuttings removed to wildlife piles September - October or Maintain as a mosaic to be cut 25-30% in any one year at 100mm in September or October with cuttings removed to wildlife pile.	Annually or as required

Occasional Tasks	Frequency
Where silt accumulates on apron or area in front of inlet or outlet then remove and land apply within design profile of SuDS Where silt accumulates more than 150mm in base of wetland undertake a phased removal of silt subject to Client approval. Confirm whether a liner is present to hold water or prevent pollution of groundwater and protect. Remove silt as instructed but not more than 30% of pond or wetland area at any one time and to an agreed depth but not subsoil layer. Retain as much representative existing vegetation as possible to ensure rapid re-colonisation of open areas. Stack excavated material adjacent to wetland to allow de-watering of silt. Undertake silt removal during September-October to minimise damage to protected wildlife and ensure re-growth of aquatic vegetation before winter. Spread excavated material on site above SUDS design profile, e.g. top of banks, in accordance with E.A. Waste Exemption Guidance.	Annually or every 3 years as required
Remedial work	Frequency
Although not usually required this may be needed due to damage to liners or control structures.	Undertake as design details or as required

4.2. ATTENUATION TANKS

- **Attenuation tanks** attenuate excess peak flows in the more extreme rainfall events

ATTENUATION TANKS	
Regular Maintenance	Frequency
Inspect and identify any areas that are not operating correctly. If required, take remedial action	Monthly for 3 months, then annually
Remove debris from catchment surface (Where it may cause risks to performance)	Monthly

Occasional Tasks	Frequency
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 sediments from pre-treatment structures and/or internal forebays	Annually, or as required
Inspect/check inlets, outlet, vents and overflows to ensure they are in good condition and operating as designed.	Annually
Survey inside of tank for sediment build-up and remove as necessary	Every 5 years or as required
Remedial work	Frequency
Repair/rehabilitate inlets, outlets, overflows and vents	As required

4.3. PERMEABLE SURFACES

- **Permeable surfaces** including permeable block paving, porous asphalt, gravel or free draining soils that allow rain to percolate through the surface into underlying drainage layers. They must be protected from silt, sand, compost, mulch, etc. Permeable block paving and porous asphalt can be cleaned by suction brushing.

PERMEABLE AND POROUS SURFACES	
Regular Maintenance	Frequency
Cleaning Brush regularly and remove sweepings from all hard surfaces	Monthly
Occasional Tasks	Frequency
Permeable Pavements. Brush and vacuum surface once a year to prevent silt blockage and enhance design life.	Annually
Remedial Work	Frequency
Monitor effectiveness of permeable pavement and when water does not infiltrate immediately advise Client of possible need for reinstatement of top layers or specialist cleaning. Recent experience suggests jet washing and suction cleaning will substantially reinstate pavement to 90% efficiency.	As required

5. SUMMARY AND CONCLUSION

JRC Consulting has been commissioned by Western Bio-Energy Limited (WBE) to develop a drainage strategy for a new data centre at Tyn-y-Caeau, Margam. The strategy emphasises Sustainable Drainage Systems (SuDS) to manage surface water sustainably, particularly given the site's challenging terrain and high rainfall. Key SuDS features include permeable paving to reduce runoff and filter pollutants, and an infiltration pond to manage excess water and enhance biodiversity. The design aligns with Planning Policy Wales and aims to minimise flood risk while improving environmental conditions.

Key Points:

SuDS Strategy:

- Permeable paving allows rainwater infiltration, reducing runoff and filtering pollutants.
- An infiltration pond at the northern edge will store and gradually release water, supporting biodiversity.
- The strategy adheres to national standards and aims for betterment in flood risk management.

Surface Water Disposal Hierarchy:

- Priority is given to infiltration using SuDS, followed by controlled discharge to watercourses, surface water sewers, or combined sewers as a last resort.
- Soakaway testing confirmed good infiltration potential, with results guiding the design.

Surface Water Strategy:

- Infiltration tests showed suitable ground permeability, with the lowest rate (3.67×10^{-5} m/s) used for design.
- A 125m³ pond and geocellular tanks will manage stormwater, with permeable paving in non-HGV areas.
- Fuel and oil interceptors will be installed in parking areas to prevent pollution.

Design Constraints:

- Limited space requires balancing the pond size with tree root protection and replacement of removed trees.
- Soakaway crates and permeable paving will compensate for space limitations.

Foul Drainage:

- Foul water will connect to an existing 450mm sewer owned by Welsh Water, with further investigations to confirm depths and locations.

This strategy ensures sustainable water management, compliance with regulations, and environmental enhancement for the new data centre.

6. LIMITATIONS

JRC Consulting Engineers Ltd has prepared this Report for the sole use of Western Bio-Energy Limited (WBE) (“Client”) in accordance with the Agreement under which our services were performed. No other warranty, expressed or implied, is made as to the professional advice included in this Report or any other services provided by JRC Consulting Engineers Ltd. This Report is confidential and may not be disclosed by the Client nor relied upon by any other party without the prior and express written agreement of JRC Consulting Engineers Ltd.

The conclusions and recommendations contained in this Report are based upon information provided by others and upon the assumption that all relevant information has been provided by those parties from whom it has been requested and that such information is accurate. Information obtained by JRC Consulting has not been independently verified by JRC Consulting Engineers Ltd, unless otherwise stated in the Report.

The methodology adopted, and the sources of information used by JRC Consulting Engineers Ltd in providing its services are outlined in this Report. The scope of this Report and the services are accordingly factually limited by these circumstances.

Where assessments of works or costs identified in this Report are made, such assessments are based upon the information available at the time and where appropriate are subject to further investigations or information which may become available.

JRC Consulting Engineers Ltd disclaim any undertaking or obligation to advise any person of any change in any matter affecting the Report, which may come or be brought to JRC Consulting Engineers Ltd.’s attention after the date of the Report.

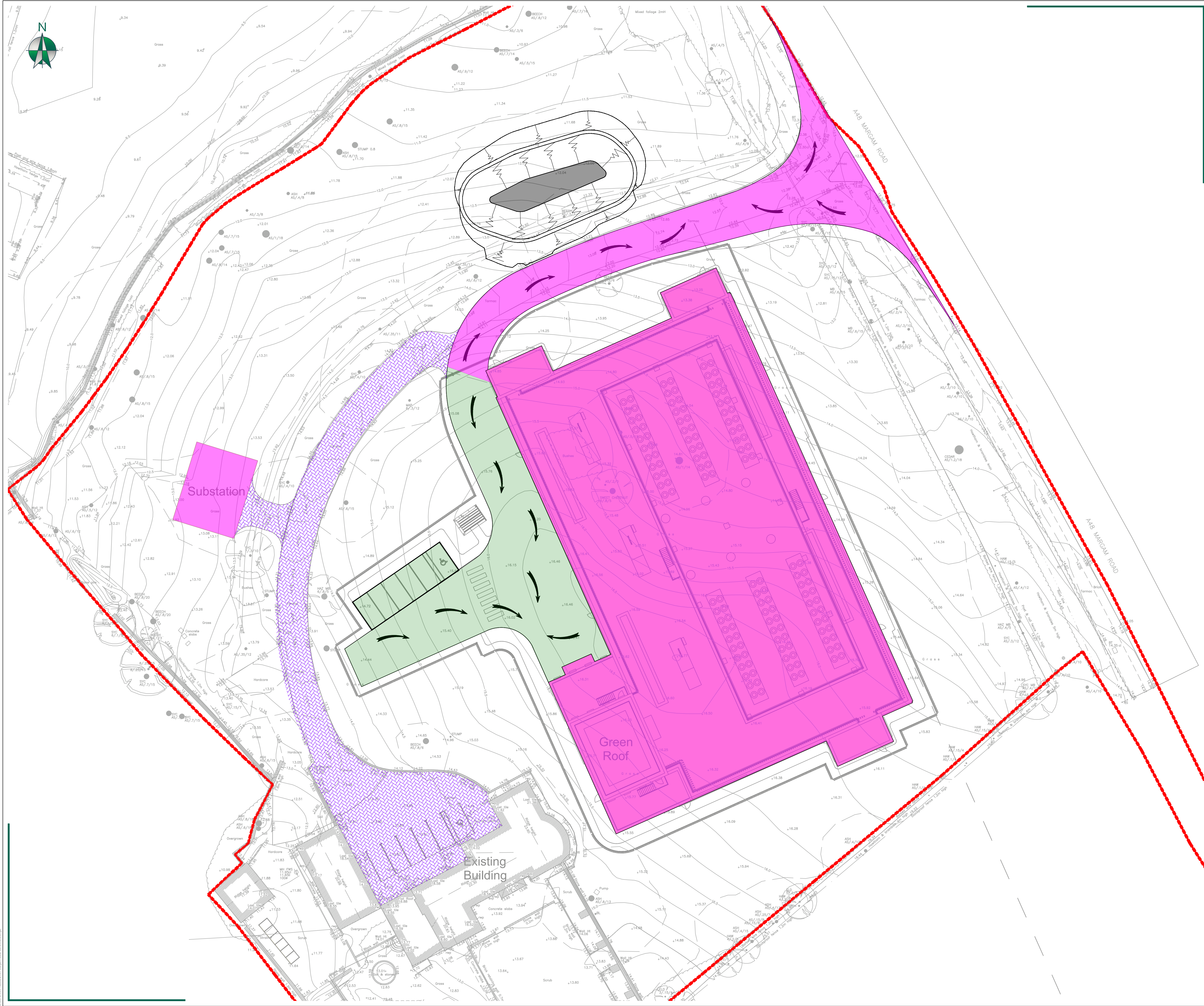
Certain statements made in the Report that are not historical facts may constitute estimates, projections or other forward-looking statements and even though they are based on reasonable assumptions as of the date of the Report, such forward-looking statements by their nature involve risks and uncertainties that could cause actual results to differ materially from the results predicted. JRC Consulting Engineers Ltd specifically does not guarantee or warrant any estimate or projections contained in this Report.

Where field investigations are conducted, these have been restricted to a level of detail required to meet the stated objectives of the services. The results of any measurements taken may vary spatially or with time and further confirmatory measurements should be made after any significant delay in issuing this Report.



APPENDIX A – Impermeable Areas Plan

C O N S U L T I N G



CDM: Significant Hazards

Health and Safety hazards are identified by the designer as abnormal in pursuance of the current Construction Design and Management regulations. It is assumed that all works will be carried out by competent & adequately resourced contractor(s) working to safe systems of work.



General Notes

- DO NOT SCALE FROM THIS DRAWING FOR CONSTRUCTION. Scaling from this drawing or obtaining dimensions electronically may not provide accurate information and should be avoided, therefore work only from figured dimensions and contact JRC Consulting Engineers.
- This drawing is to be read in conjunction with all other relevant Architect's, Engineers & Specialist drawings, details, Specification and the relevant Health and Safety Plan (as appropriate to the project). All discrepancies to be reported to the Engineer immediately for verification.

Legend

- Draining to infiltration basin (Total = 3315m²)
- Draining to soakaway crate (Total = 656m²)
- Overall Impermeable Area = 3971m²
- Permeable private driveways (Total = 689m²)
- Overall Permeable Area = 689m²
- Exceedance Routing

Notes

This design is based on the following received drawings:

Document name	Revision	Dated received
1044 - FUT - V1 - ZZ - DR - Z - X100 - Site Wide Layout	2	16.01.2025
CBsite3margamTOPO Topographical Survey	1	07.01.2025
ACAD-TYN-Y-CAEAU-MARGAM-R1 - PAS128 Utility Survey	1	07.01.2025

P4	13.03.25	Issued for planning	GRB	GM
P3	23.01.25	Permeable driveway area amended	GRB	GM
P2	21.01.25	FIRST ISSUE	GRB	GM
P1	13.01.25	FIRST DRAFT	MY	GM
REV.	DATE	DETAILS	BY	CHK.



DRAWING STATUS
PLANNING APPLICATION

PROJECT
2464
Margam Data Center,
Land at Tyn-Y-Caeau

CLIENT
Western Bio-Energy

DRAWING TITLE
Impermeable Area Plan

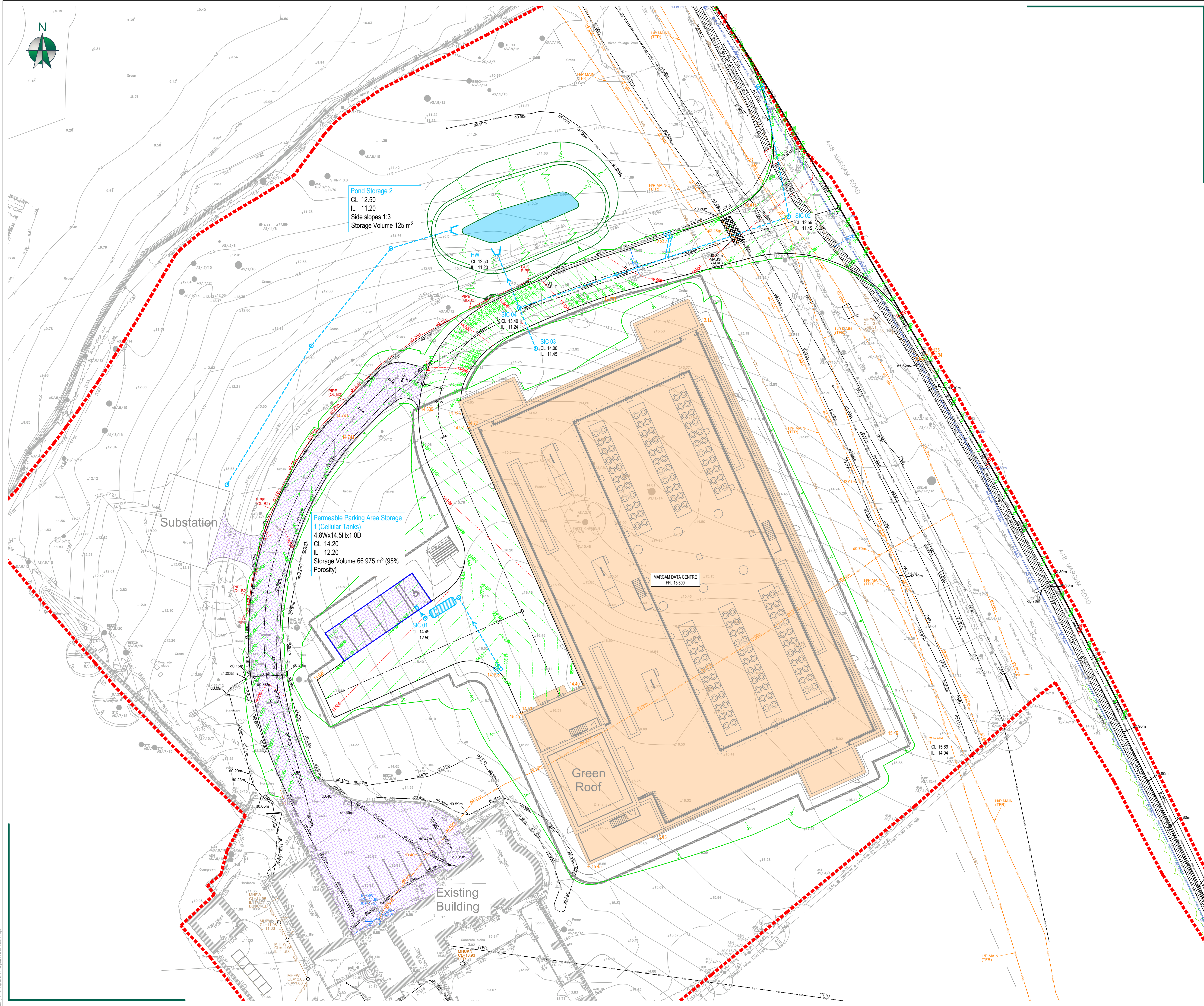
0m	SCALE @ A1 1:250	10m	SIZE A1	DATE Jan 25
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PROJECT NUMBER 2464	DRAWING NUMBER 0120	REVISION P4
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APPENDIX B – Drainage Strategy Schematic

C O N S U L T I N G



CDM: Significant Hazards

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Legend

- Site boundary
- Proposed private storm drain
To be constructed in solid walled PVC-u pipe to BS EN 1401 (non vehicle loading) and structured walled PVC-u pipe (vehicle loaded) in a Class S bed and surround, unless otherwise noted.
Pipe sizes to be: 100mm dia for drains serving less than 5 properties
150mm dia for drains serving 5 properties or more, unless otherwise noted.
- Proposed private storm non-access inspection chambers
To be constructed in 300mm or 450mm internal diameter polypropylene units. Unless annotated otherwise size to be 450mm Ø.
- Proposed private storm gully
- Proposed private storm attenuation
To be constructed using Wavin AquaCell, or similar approved
- Proposed private permeable paving
To be constructed using Marshalls, or similar approved, permeable concrete block paving.
- Proposed private headwall
Refer to standard detail.
The color that was used for the topo-survey layer
- Infiltration Basin
- Primary Contour
- Secondary Contour

Legend for Utilities survey

the line types and the colors were used the same as in the original drawings

- Foul water
- Gas
- Radio locate
- Water
- Power
- Storm water
- British telecom
- Cable television
- Pumping main

Notes

This design is based on following received drawings:

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1044 - FUT - V1 - ZZ - DR - Z - X100 - Site Wide Layout	2	16.01.2025
CBsite3margamTOPO Topographical Survey	1	07.01.2025
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P2	21.01.25	FIRST ISSUE	GRB	GM
P1	13.01.25	FIRST DRAFT	MY	GM
REV.	DATE	DETAILS	BY	CHKD.

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DRAWING STATUS

PLANNING APPLICATION

PROJECT
2464
Margam Data Center,
Land at Tyn-Y-Caeau

CLIENT
Western Bio-Energy

DRAWING TITLE
Drainage Layout

0m	SCALE @ A1 1:250	10m	SIZE A1	DATE Jan 25
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PROJECT NUMBER 2464	DRAWING NUMBER 0500	REVISION P4
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APPENDIX C – Hydraulic Modelling Results

C O N S U L T I N G

Network Details

Manhole Schedule

Manhole	Catchment Area (ha)	Diameter (m)	Type	CL (m)	IL (m)	Depth To Soffit (m)	Easting (m)	Northing (m)
S1	0.000	1.350	Type C	12.556	11.445	0.887	279316.336	186475.963
S5	0.264	1.200	Type B	13.990	12.150	1.615	279280.483	186457.221
S2	0.052	1.200	Type B	13.400	11.243	1.932	279278.112	186463.071
S3	0.000	0.000	Type C	12.500	11.200	1.075	279274.892	186471.016
S4	0.000	1.350	Type C	12.500	11.200	1.075	279276.007	186475.213

Pipe Schedule

Pipe Number	US Manhole	US IL (m)	DS Manhole	DS IL (m)	Shape	Dimension (m)	Length (m)	Gradient (1:x)	Roughness (mm)	US Depth To Soffit (m)
1.000	S1	11.445	S2	11.243	Circ	0.225mØ	40.340	200.0	0.600	0.887
2.000	S5	12.150	S2	11.293	Circ	0.225mØ	6.312	7.4	0.600	1.615
1.001	S2	11.243	S3	11.200	Circ	0.225mØ	8.573	200.0	0.600	1.932
1.002	S3	11.200	S4	11.200	Circ	0.225mØ	4.343		0.600	1.075

Outfall Details

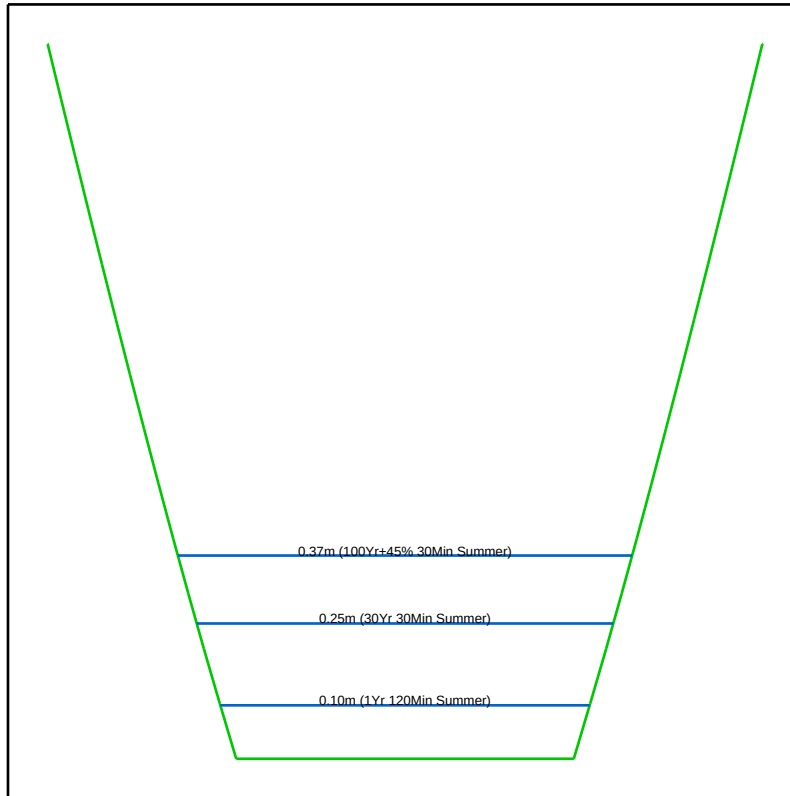
Outfall Manhole S4 : Free Discharge

Flow Control Details

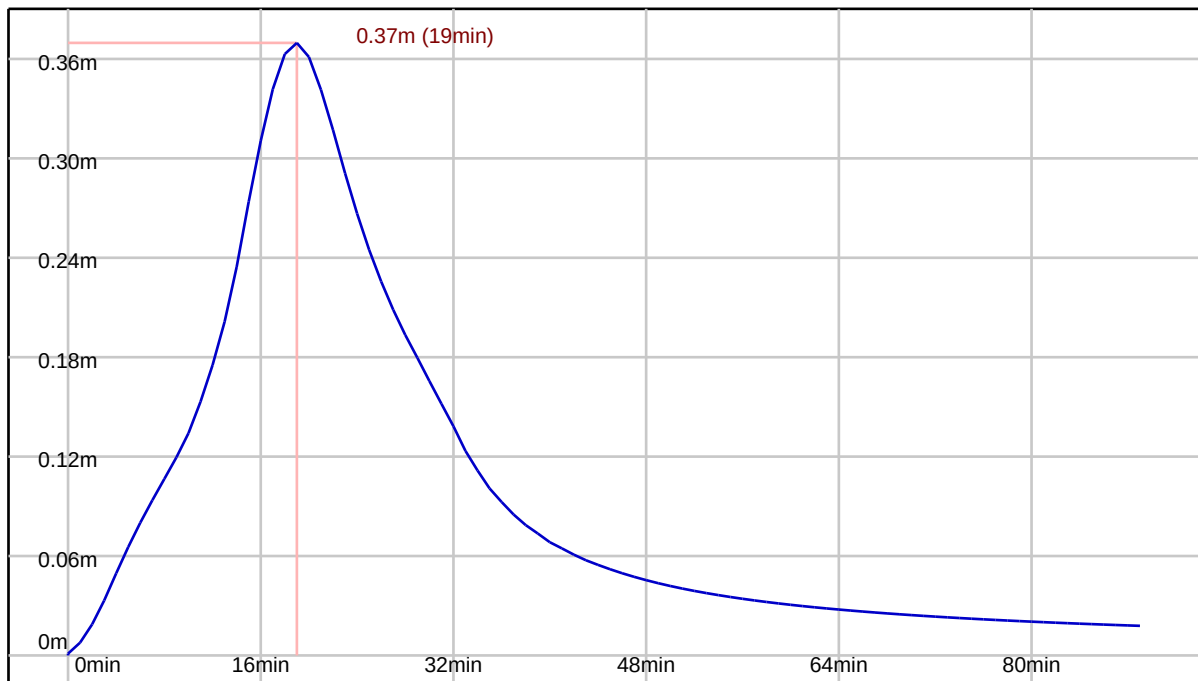
Pond Structure at Manhole S3

Pond Invert (m)	Max Depth (m)	Volume To Water Level (m3)	Water Level (m)	Freeboard (m)	Infil Base (m/hr)	Infil Side (m/hr)	Safety Factor
11.200	1.300	119.965	12.200	0.300	0.13200000	0.13200000	5.00

Pond Depth/Area Diagram at S3



Pond at S3 (100Yr+45% 30Min Summer)



Simulation Settings

FEH2022 (point): Filename=FEH_Point_Descriptors_279270_186498_v5_0_1.xml

Summer (Cv: 0.75)

Global Time of Entry: 5.0 mins

Durations (mins): 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440

Return Periods (yrs) + Climate Change: (1, +0%), (30, +0%), (100, +45%)

Simulated Rainfall Events

Storm	Average Intensity (mm/hr)	Runoff Continuity %	Flow Continuity %	Storm	Average Intensity (mm/hr)	Runoff Continuity %	Flow Continuity %
1Yr 15Min Summer	14.004	0.00	0.00	30Yr 360Min Summer	8.727	0.00	0.00
1Yr 30Min Summer	9.510	0.00	0.00	30Yr 480Min Summer	7.036	0.00	0.00
1Yr 60Min Summer	6.166	0.00	0.00	30Yr 600Min Summer	5.931	0.00	0.00
1Yr 120Min Summer	5.337	0.00	0.00	30Yr 720Min Summer	5.147	0.00	0.00
1Yr 180Min Summer	4.688	0.00	0.00	30Yr 960Min Summer	4.120	0.00	0.00
1Yr 240Min Summer	4.057	0.00	0.00	30Yr 1440Min Summer	3.020	0.00	0.00
1Yr 360Min Summer	3.321	0.00	0.00	100Yr+45% 15Min Summer	112.369	0.00	0.00
1Yr 480Min Summer	2.825	0.00	0.00	100Yr+45% 30Min Summer	78.748	0.00	0.00
1Yr 600Min Summer	2.439	0.00	0.00	100Yr+45% 60Min Summer	52.976	0.00	0.00
1Yr 720Min Summer	2.144	0.00	0.00	100Yr+45% 120Min Summer	33.035	0.00	0.00
1Yr 960Min Summer	1.756	0.00	0.00	100Yr+45% 180Min Summer	24.787	0.00	0.00
1Yr 1440Min Summer	1.327	0.00	0.00	100Yr+45% 240Min Summer	20.276	0.00	0.00
30Yr 15Min Summer	63.775	0.00	-0.15	100Yr+45% 360Min Summer	15.044	0.00	0.00
30Yr 30Min Summer	43.988	0.00	-0.06	100Yr+45% 480Min Summer	12.119	0.00	0.00
30Yr 60Min Summer	29.235	0.00	0.00	100Yr+45% 600Min Summer	10.241	0.00	0.00
30Yr 120Min Summer	18.738	0.00	0.00	100Yr+45% 720Min Summer	8.918	0.00	0.00
30Yr 180Min Summer	14.293	0.00	0.00	100Yr+45% 960Min Summer	7.175	0.00	0.00
30Yr 240Min Summer	11.715	0.00	0.00	100Yr+45% 1440Min Summer	5.282	0.00	0.00

Simulation Results

Return Period Yrs: 1.0

Climate Change %: 0

Manholes

Manhole	Critical Storm	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Flood (m3)	Status
S1	-	0	11.445	0.000	0.000		OK
S5	30 min Summer	16	12.191	0.041	14.230		OK
S2	30 min Summer	16	11.349	0.106	17.020		OK
S3	120 min Summer	65	11.297	0.097	10.306		OK
S4	120 min Summer	65	11.282	0.082	10.035		Outfall

Conduits

Pipe No.	Critical Storm	Peak (mins)	US Manhole	DS Manhole	Flow Depth (m)	Max Velocity (m/s)	Max Flow (l/s)	Flow / Capacity	Status
1.000	30 min Summer	16	S1	S2	0.053	0.000	0.000	0.000	OK
2.000	30 min Summer	16	S5	S2	0.049	2.584	14.230	0.074	OK
1.001	30 min Summer	17	S2	S3	0.093	1.240	16.960	0.464	OK
1.002	120 min Summer	65	S3	S4	0.089	0.681	10.035		OK

Return Period Yrs: 30.0

Climate Change %: 0

Manholes

Manhole	Critical Storm	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Flood (m3)	Status
S1	30 min Summer	17	11.592	0.147	0.000		OK
S5	30 min Summer	16	12.240	0.090	65.820		OK
S2	30 min Summer	17	11.593	0.350	72.282		Surcharged
S3	30 min Summer	19	11.446	0.246	51.626		OK
S4	30 min Summer	19	11.394	0.194	55.224		Outfall

Conduits

Pipe No.	Critical Storm	Peak (mins)	US Manhole	DS Manhole	Flow Depth (m)	Max Velocity (m/s)	Max Flow (l/s)	Flow / Capacity	Status
1.000	30 min Summer	19	S1	S2	0.186	0.171	4.942	0.135	OK
2.000	30 min Summer	16	S5	S2	0.157	2.519	65.820	0.341	OK
1.001	60 min Summer	33	S2	S3	0.225	1.542	60.653	1.659	OK
1.002	30 min Summer	19	S3	S4	0.209	1.433	55.224		OK

Return Period Yrs: 100.0

Climate Change %: 45

Manholes

Manhole	Critical Storm	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Flood (m3)	Status
S1	30 min Summer	17	12.074	0.630	0.000		Surcharged
S5	30 min Summer	16	12.332	0.182	117.832		OK
S2	30 min Summer	17	12.065	0.822	130.537		Surcharged
S3	30 min Summer	19	11.570	0.370	95.358		OK
S4	30 min Summer	17	11.425	0.225	86.034		Outfall

Conduits

Pipe No.	Critical Storm	Peak (mins)	US Manhole	DS Manhole	Flow Depth (m)	Max Velocity (m/s)	Max Flow (l/s)	Flow / Capacity	Status
1.000	30 min Summer	19	S1	S2	0.225	0.220	8.735	0.239	OK
2.000	30 min Summer	16	S5	S2	0.203	3.244	117.108	0.607	OK
1.001	30 min Summer	16	S2	S3	0.225	3.310	131.623	3.601	OK
1.002	60 min Summer	34	S3	S4	0.225	2.207	87.758		OK

Network Details

Manhole Schedule

Manhole	Catchment Area (ha)	Diameter (m)	Type	CL (m)	IL (m)	Depth To Soffit (m)	Easting (m)	Northing (m)
S6	0.066	1.200	Type B	14.492	12.500	1.767	279264.693	186418.734
S7	0.000	1.200	Type B	14.500	12.200	2.075	279262.977	186420.996

Pipe Schedule

Pipe Number	US Manhole	US IL (m)	DS Manhole	DS IL (m)	Shape	Dimension (m)	Length (m)	Gradient (1:x)	Roughness (mm)	US Depth To Soffit (m)
1.000	S6	12.500	S7	12.200	Circ	0.225mØ	2.839	9.5	0.600	1.767

Outfall Details

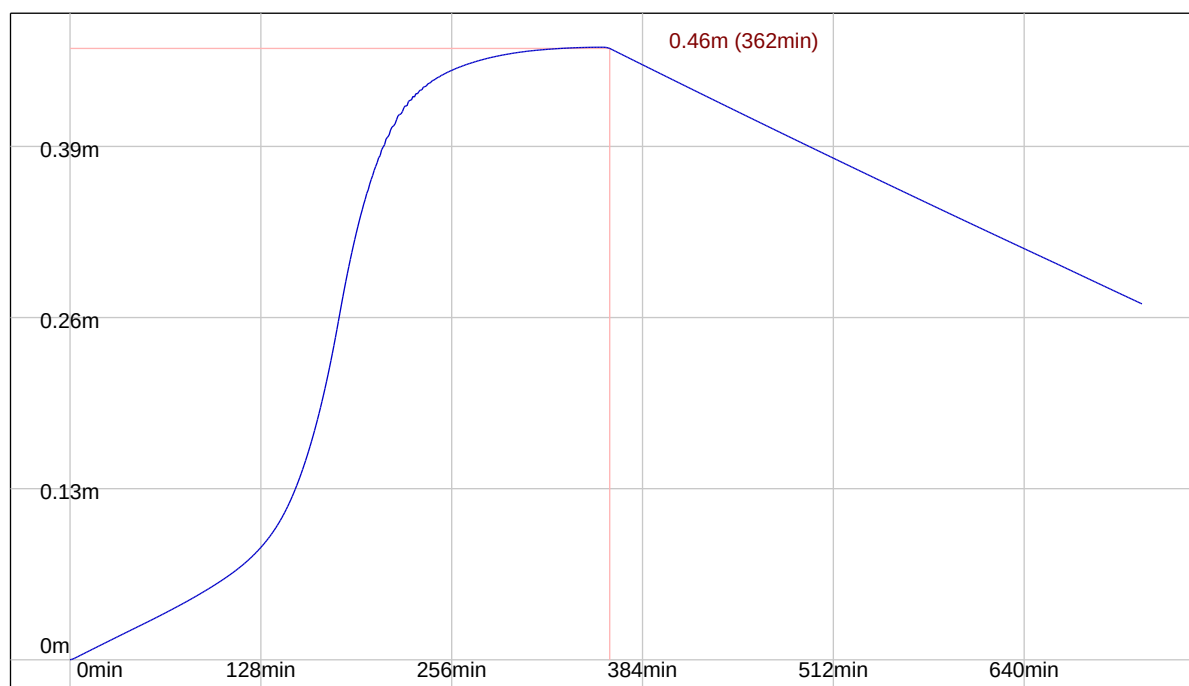
Outfall Manhole S7 : Free Discharge

Flow Control Details

Tank Structure at Manhole S7

Tank Invert (m)	Tank Height (m)	Void Ratio (%)	Area (m2)	Effective Area (m2) Area x Void Ratio	Max Storage (m3) Effective Area x Height	Infil Base (m/hr)	Infil Side (m/hr)	Safety Factor
12.200	1.000	95.00	73.163	69.505	69.505	0.13200000	0.13200000	5.00

Tank at S7 (100Yr+45% 360Min Summer)



Simulation Settings

FEH2022 (point): Filename=FEH_Point_Descriptors_279270_186498_v5_0_1.xml

Summer (Cv: 0.75)

Global Time of Entry: 5.0 mins

Durations (mins): 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440

Return Periods (yrs) + Climate Change: (1, +0%), (30, +0%), (100, +45%)

Simulated Rainfall Events

Storm	Average Intensity (mm/hr)	Runoff Continuity %	Flow Continuity %	Storm	Average Intensity (mm/hr)	Runoff Continuity %	Flow Continuity %
1Yr 15Min Summer	14.004	0.00	0.00	30Yr 360Min Summer	8.727	0.00	0.00
1Yr 30Min Summer	9.510	0.00	0.00	30Yr 480Min Summer	7.036	0.00	0.00
1Yr 60Min Summer	6.166	0.00	0.00	30Yr 600Min Summer	5.931	0.00	0.00
1Yr 120Min Summer	5.337	0.00	0.00	30Yr 720Min Summer	5.147	0.00	0.00
1Yr 180Min Summer	4.688	0.00	0.00	30Yr 960Min Summer	4.120	0.00	0.00
1Yr 240Min Summer	4.057	0.00	0.00	30Yr 1440Min Summer	3.020	0.00	0.00
1Yr 360Min Summer	3.321	0.00	0.00	100Yr+45% 15Min Summer	112.369	0.00	0.00
1Yr 480Min Summer	2.825	0.00	0.00	100Yr+45% 30Min Summer	78.748	0.00	0.00
1Yr 600Min Summer	2.439	0.00	0.00	100Yr+45% 60Min Summer	52.976	0.00	0.00
1Yr 720Min Summer	2.144	0.00	0.00	100Yr+45% 120Min Summer	33.035	0.00	0.12
1Yr 960Min Summer	1.756	0.00	0.00	100Yr+45% 180Min Summer	24.787	0.00	0.10
1Yr 1440Min Summer	1.327	0.00	0.00	100Yr+45% 240Min Summer	20.276	0.00	0.08
30Yr 15Min Summer	63.775	0.00	0.00	100Yr+45% 360Min Summer	15.044	0.00	0.00
30Yr 30Min Summer	43.988	0.00	0.00	100Yr+45% 480Min Summer	12.119	0.00	0.00
30Yr 60Min Summer	29.235	0.00	0.00	100Yr+45% 600Min Summer	10.241	0.00	0.00
30Yr 120Min Summer	18.738	0.00	0.00	100Yr+45% 720Min Summer	8.918	0.00	0.00
30Yr 180Min Summer	14.293	0.00	0.00	100Yr+45% 960Min Summer	7.175	0.00	0.00
30Yr 240Min Summer	11.715	0.00	0.00	100Yr+45% 1440Min Summer	5.282	0.00	0.00

Simulation Results

Return Period Yrs: 1.0

Climate Change %: 0

Manholes

Manhole	Critical Storm	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Flood (m3)	Status
S6	30 min Summer	15	12.524	0.024	3.568		OK
S7	480 min Summer	299	12.283	0.083	0.474		OK

Conduits

Pipe No.	Critical Storm	Peak (mins)	US Manhole	DS Manhole	Flow Depth (m)	Max Velocity (m/s)	Max Flow (l/s)	Flow / Capacity	Status
1.000	480 min Summer	290	S6	S7	0.046	1.140	1.496	0.009	OK

Return Period Yrs: 30.0

Climate Change %: 0

Manholes

Manhole	Critical Storm	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Flood (m3)	Status
S6	30 min Summer	16	12.547	0.047	16.525		OK
S7	360 min Summer	275	12.443	0.243	0.610		OK

Conduits

Pipe No.	Critical Storm	Peak (mins)	US Manhole	DS Manhole	Flow Depth (m)	Max Velocity (m/s)	Max Flow (l/s)	Flow / Capacity	Status
1.000	360 min Summer	218	S6	S7	0.120	1.625	4.584	0.027	OK

Return Period Yrs: 100.0

Climate Change %: 45

Manholes

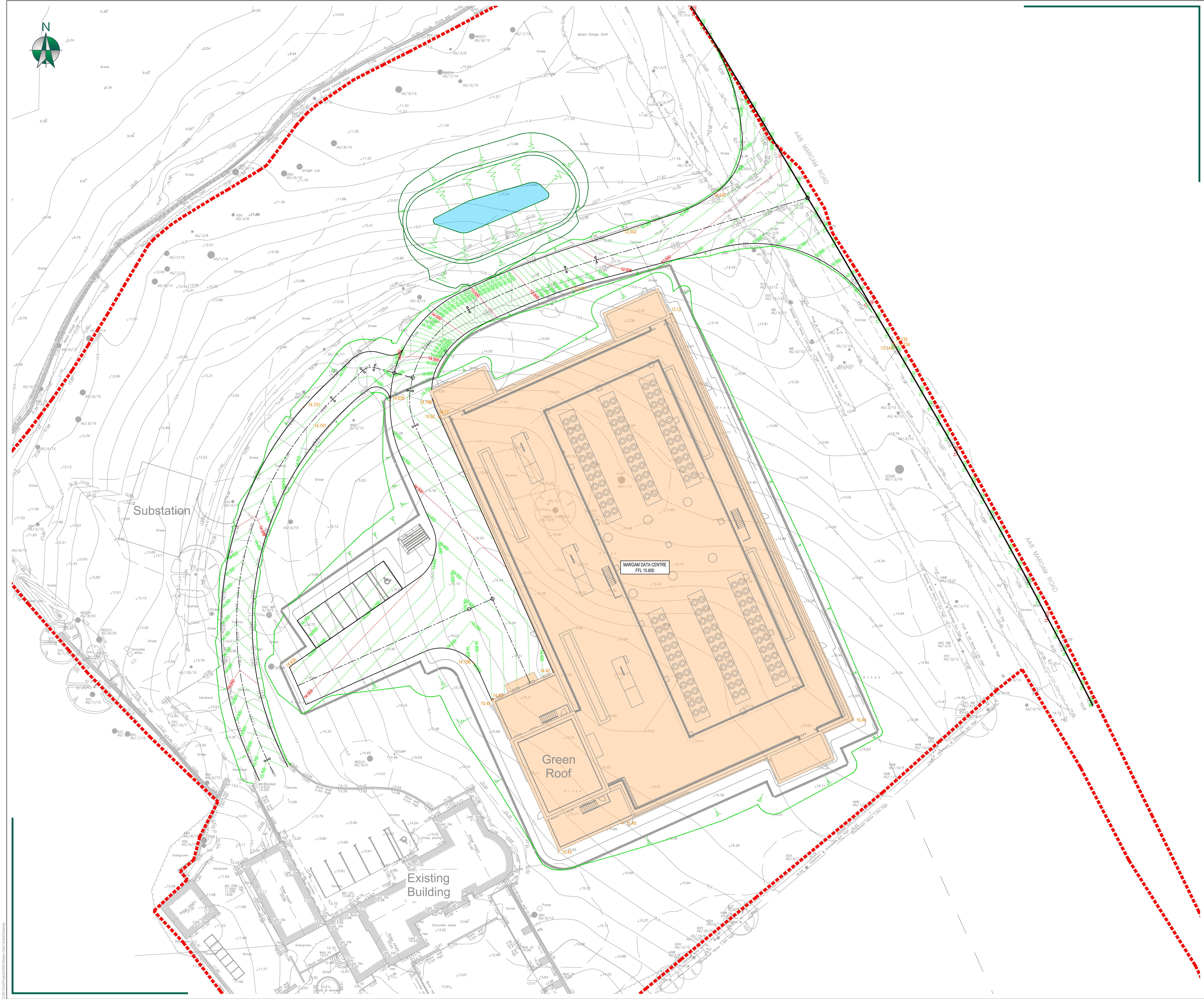
Manhole	Critical Storm	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Flood (m3)	Status
S6	360 min Summer	356	12.666	0.166	0.672		OK
S7	360 min Summer	356	12.665	0.465	0.680		OK

Conduits

Pipe No.	Critical Storm	Peak (mins)	US Manhole	DS Manhole	Flow Depth (m)	Max Velocity (m/s)	Max Flow (l/s)	Flow / Capacity	Status
1.000	360 min Summer	356	S6	S7	0.195	1.872	22.269	0.131	OK



Appendix D – Proposed Site Wide Levels



CDM: Significant Hazards

Health and Safety hazards are identified by the designer as abnormal in pursuance of the current Construction Design and Management regulations. It is assumed that all works will be carried out by competent & adequately resourced contractor(s) working to safe systems of work.



General Notes

- DO NOT SCALE FROM THIS DRAWING FOR CONSTRUCTION. Scaling from this drawing or obtaining dimensions electronically may not provide accurate information and should be avoided, therefore work only from figured dimensions and contact JRC Consulting Engineers.
- This drawing is to be read in conjunction with all other relevant Architect's, Engineers & Specialist drawings, details, Specification and the relevant Health and Safety Plan (as appropriate to the project). All discrepancies to be reported to the Engineer immediately for verification.

Legend

- Site boundary
- Spot level
- FFL
- Gradient
- Slope
- The color that was used for the topo-survey layer
- Infiltration Basin
- Primary Contour
- Secondary Contour

Notes

This design is based on the following received drawings:

Document name	Revision	Dated received
1044 - FUT - V1 - ZZ - DR - Z - X100 - Site Wide Layout	2	16.01.2025
CBsite3margamTOPO Topographical Survey	1	07.01.2025
ACAD-TYN-Y-CAEU-MARGAM-R1 - PAS128 Utility Survey	1	07.01.2025

P2	21.01.25	FIRST ISSUE	GRB	GM
P1	13.01.25	FIRST DRAFT ISSUE	MY	GM
REV.	DATE	DETAILS	BY	CHK.

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DRAWING STATUS
FOR INFORMATION ONLY

PROJECT
2464
Margam Data Centre,
Land at Tyn-Y-Caeau

CLIENT
Western Bio-Energy

DRAWING TITLE
External Works Layout

0m	SCALE @ A1	10m	SIZE	DATE
	1:250		A1	Jan 25

PROJECT NUMBER	DRAWING NUMBER	REVISION
2464	0600	P2