MARGAM DRAINAGE REPORT

NG Margam Connection

BAKERHICKS PROJECT No.: 30004595

BAKERHICKS REFERENCE No.: MARPT-BHK-01-XX-RP-C-090001

NATIONAL GRID REFERENCE No.: 09_LOR_0016

REVISION: P03

Prepared for:

National Grid

A **MORGAN SINDALL GROUP** COMPANY

DOCUMENT VERIFICATION.

Project title:	NG Margam
BakerHicks Project number:	30004595
Document title:	Margam Drainage Report
BakerHicks reference number:	MARPT-BHK-01-XX-RP-C-090001
National Grid reference number:	09_LOR_0016

Rev	Date				
P01	29/11/2024	**File name**	Margam Drainage Report		
		Description	For review		
			Prepared by	**Checked by**	**Approved by**
		Name	PB	CE	JS
		Date	29/11/2024	05/12/2024	05/12/2024
P02	10/01/2025	**File name**	Margam Drainage Report		
		Description	For review		
			Prepared by	**Checked by**	**Approved by**
		Name	PB	CE	RC
		Date	10/01/2025	10/01/2024	10/01/2025
P03	21/08/2025	**File name**	Margam Drainage Report		
		Description	S3 For review		
			Prepared by	**Checked by**	**Approved by**
		Name	PB	CE	RC
		Date	21/08/2025	22/08/2024	22/08/2025

P01 - First Issue

P02 – Amended to Append revised Flood Consequence Assessment

P03 – Drainage strategy amended & SAB Issue

CONTENTS.

LIST OF ACRONYMS.

ACRONYM	DESCRIPTION
BGL	Below Ground Level
DAM	Development Advice Map
FCA	Flood Consequence Assessment
FEH	Flood Estimation Handbook
QSE	Quick Storage Estimate
SAB	SuDS Approval Body
SHW	Specification for Highway Works
SuDS	Sustainable Drainage Systems
TSS	Total Suspended Solids
NPT	Neath Port Talbot County Borough Council
Tp	Time to Peak
BL	Baseflow Lag
IF	Imperviousness Factor
IRF	Impervious Runoff Factor
AEP	Annual Exceedance Probability

1. Introduction

1.1. *Project Overview*

BakerHicks have been appointed by National Grid to undertake a Drainage Strategy report and associated calculations for the proposed extension to the Margam Distribution Substation (the proposed development). The extension shall provide additional electrical supply and distribution capacity to the nearby TATA Steel site – specifically providing capacity for a new Electric Arc Furnace.

1.2. *Scope of the Document*

The purpose of this report is to demonstrate & describe a compliant and engaged surface & foul water drainage design to inform and set the basis of the detailed design package. In addition, it is to support any planning requirements including the SuDS Approving Body (SAB) for this region, Neath Port Talbot County Borough Council (NPT).

This drainage strategy report considers and is developed in accordance with the guidance set out within the checklist provided by the SAB – Application Form for Pre-Application Advice on SuDS on new developments, with reference to the Sustainable Drainage (Approval and Adoption Procedure) (Wales) Regulations 2018 and also CIRIA C753 The SuDS Manual.

1.3. *Proposed Development Description within the Site*

“Planning application for the approval of full planning permission for the extension of the Margam 275kV substation including the erection of a gas insulated switchgear hall (GIS hall) and the demolition of the existing control and amenities buildings to enable the erection of a new amenities building. Works to include earthworks, surface water management and drainage infrastructure, lighting, CCTV, boundary treatment, car parking, ecological improvements including a wildlife tower and gabion baskets, improved internal access roads, a backup diesel generator and hardstanding, storage buildings, water storage tank, diesel generator, flood defence wall including flood gates, together with appropriate landscaping and other associated engineering operations”

2. References

2.1. *Design Standards, Codes & Guides*

Title / Reference	Version	Description
NGTS 2.10.01	2017	Oil Containment
NGTS 2.10.05	2017	Access Covers / Ducts / Trenches
NGTS 2.10.09	2017	Site Drainage
NGTS 2.10.13	2016	Flood Defences for Electricity Substations
BS EN 1401	2023	Plastics Piping Systems
BS EN 752	2017	Drain and sewer systems outside buildings
Ciria C753	2015	The SuDs Manual
MCHW	-	Manual of Contract for Highway Works

2.2. *Project/Client Information*

Title / Reference	Revision	Description
MARPT-BHK-01-XX-RP-C-090003 (09_LOR_0018)	P04	MARGAM FLOOD CONSEQUENCE ASSESSMENT REPORT
109964_03_02 - Bakerhicks - Margam South Wales	00	CENTARA – GPR UTILITY MAPPING SURVEY PRESENTED ON A TOPOGRAPHICAL SURVEY

2.3. *BakerHicks Documents/Drawings*

Drawing No.	Revision	Description
MARPT-BHK-01-ZZ-DG-C-181009 (18_LOR_0206)	P03	Margam Drainage Layout Sheet 01 of 01
MARPT-BHK-01-ZZ-SH-C-081010 (08_LOR_0001)	P02	Margam Drainage Schedule Sheet 01 of 01
MARPT-BHK-01-ZZ-DG-C-181022 (18_LOR_0207)	P02	Margam Drainage Construction Details Sheet 01 of 02
MARPT-BHK-01-ZZ-DG-C-181023 (18_LOR_0208)	P02	Margam Drainage Construction Details Sheet 02 of 02
MARPT-BHK-01-ZZ-DG-C-181025 (18_LOR_0210)	P02	Margam Drainage Cesspool Details Sheet 01 of 01
Margam Drainage Cesspool Details Sheet 01 of 01 (18_LOR_0211)	P02	Margam Drainage Attenuation Details Sheet 01 of 01

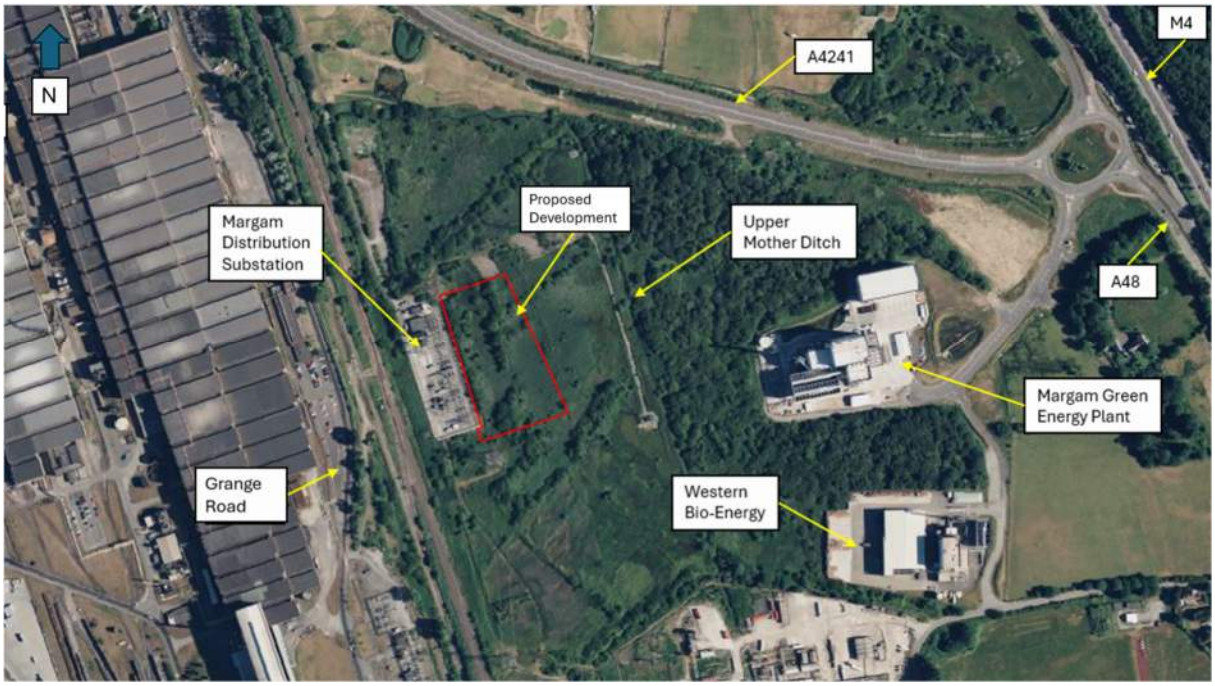
3. Existing Site

3.1. *Description*

The Proposed Development Site (hereafter referred to as “the Site”) comprises the NGET land at approximate central grid reference SS 78581 86365. The Site comprises an existing substation and area of wetland complex to the east of the Tata Steel Works and Network Rail railway line. The Site lies to the south of the Tata Steel Sports and Social Club (golf course), to the west of woodland and to the north of the BOC Ltd. works area and fields owned by BOC Ltd. Beyond the immediate Site surroundings, the M4 corridor lies to the east, Swansea Bay lies to the west, Eglwys Nunydd Reservoir to the south and Margam town to the north.

The proposed development within the site is shown in **Figure 1** and encompasses the area (1.50 hectares) required for delivery of all the proposed development. The site includes the area beyond the proposed built development footprint which is proposed for habitat creation and management for the purposes of achieving a net benefit for biodiversity through the Proposed Development. The plan provided at **Appendix A** shows the proposed built development footprint, i.e. the permanent works footprint associated with the proposed substation delivery that are being proposed through the planning application.

Figure 1: Site Location Plan



3.2. *Existing Site Drainage Details*

The existing site has multiple watercourses discharging through it – specifically tributaries of the Upper Mother Ditch. The Upper Mother Ditch lies approximately 80 metres west of The Proposed Development discharging north. Based on currently available information the Upper Mother Ditch becomes culverted downstream of The Proposed development as it passes under the existing railway line and ultimately discharges to an existing reservoir located to the west of the existing Tata Steel Facility. Further details of the local drainage infrastructure can be found in the Flood Consequence Assessment (FCA) Report referenced in **Appendix D.**

3.3. *Greenfield Runoff Rates*

The existing greenfield runoff rate which represents the maximum allowable proposed runoff rate for the development is defined as the existing greenfield 1 in 1-year rural runoff rate which has been calculated as 2.92 litres per second per hectare. The methodology for calculating the greenfield runoff rate for the proposed development follows the guidance set out in the ReFH Technical Guidance Guide Greenfield Runoff Rates and Values for the assessment of Greenfield Runoff Rates and Volumes using the ReFH2 software. This follows the guidance set out by the Environment Agency in the Flood Estimation guidelines, recommendations made in the Estimating flood peaks and hydrographs for small catchment research project and the Construction Industry Research and Information Association (CIRIA) SuDS Manual (C753).

The latest best practice guidance recommends that for plot scale area of less than 0.5km^2 (50ha) in size, greenfield runoff calculations are estimated based on an area of 0.5km^2 and then rescaled to the actual size of the catchment.

Design rainfall depths and catchment characteristics are obtained from the FEH Webservice. The time to peak (Tp) and baseflow lag (BL) parameters for a 0.5km^2 catchment or development area if greater than 0.5km^2 are then calculated using the plot scale equations in ReFH2, assuming an Aerial Reduction Factor (ARF) of 1 for the design rainfall and using the default Seasonal Correction Factor (SCF) for the winter storm and default rainfall event duration and timestep.

The area is then updated to the development area of 1ha (to obtain the per hectare greenfield runoff rate) maintaining an ARF of 1 and the rainfall event duration, timestep, Tp and BL parameters for a 0.5km^2 catchment. With the “as rural” total peak flow results providing the Greenfield Runoff Rate for the development area (or if the area is set to 1ha the per hectare Greenfield Runoff Volume).

3.3.1. *Data Import*

The FEH point descriptors for the site have been obtained from the FEH Webservice for the site. These have been reviewed and found to be representative of the conditions at the Site. The FEH Descriptors of the site are presented in Table 1 below.

Table 1: FEH Descriptors

Descriptor	Value
Point Descriptor	E: 278548 N: 186394
SAAR (mm)	1123
PROPWET	0.52
BFIHOST19	0.732

A review of BGS GeoIndex 1:50,000 scale Bedrock and Superficial deposits mapping indicate that the site is underlain by South Wales Middle Coal Measures Formation overlain by superficial deposits of Tidal Flat Deposits with low permeability, this is reflected in the BFIHOST19 value of 0.732 indicating that the catchment has high permeability.

3.3.2. *Initial Catchment Area*

The initial ReFH2 rainfall, Tp and BL parameters have been estimated based on a catchment area of 0.5km^2 (50ha).

3.3.3. *Rainfall Parameters*

The following rainfall events have been assessed:

- 100% AEP – 1:1 year
- 50% AEP – 1:2 year
- 3.3% AEP – 1:30 year
- 1% AEP – 1:100 year
- 1% AEP + 40% CC – 1:100 year + Climate Change

The default recommended rainfall event duration of 2:06:00 hh:mm:ss and timestep of 00:06:00 hh:mm:ss has been maintained, with the ARF updated from the default value of 0.976 to 1.000.

3.3.4. *Runoff Parameters*

Based on the analysis of a 0.5km^2 catchment, the Tp and BL parameters have been estimated as 1.00 hours and 42.021 hours.

3.3.5. *Greenfield Runoff Rate Rescaling*

To obtain the per hectare Greenfield Runoff Rate, the catchment area was updated to be 1ha, with the recommended rainfall event duration, timestep, Tp and BL for a 0.5km^2 catchment retained along with an ARF value of 1 and the default winter storm seasonality.

3.3.6. *Greenfield Runoff Volumes*

To obtain the Greenfield Runoff Volumes for the drained area of the development, the rainfall event duration and timestep was updated to be 06:00:00 hh:mm:ss and 00:08:00 hh:mm:ss respectively. Tp and BL for the recommended duration storm on a 0.5km^2 catchment was retained along with an ARF value of 1 and the default winter storm seasonality.

3.3.7. *Long-Term Storage Estimate*

To obtain the per hectare of impermeable area Long-Term Storage estimate, the Greenfield Runoff Volume model urbanisation parameters were updated. The urban area was updated to be 1ha, with both the Imperviousness Factor (IF) and Impervious Runoff Factor (IRF) set to 1. The conservatively assumes that 100% of the urban area is impervious with a 100% runoff factor (i.e. all of the rainfall upon the impervious area will form runoff). The difference between the Greenfield Runoff Volume and Post-Development Runoff Volume (Urbanised Runoff Volume) for the design 1% AEP + 40% Climate Change event is the Long-Term Storage estimate.

3.3.8. *Summary of Results*

The following tables summarises the Greenfield Runoff Rates, Greenfield Runoff Volumes and Long-Term storage estimate results for the ReFH2 analysis. These values will corroborate what is provided within the ReFH2 outputs.

Table 2: Greenfield Runoff Rates for 1ha Area

Annual Exceedance Probability	Greenfield Rates (l/s)
100% (1 in 1 year)	1.9
50% (1 in 2 year)	2.2
3.3% (1 in 30 year)	4.7
1.0% (1 in 100 year)	5.9
1.0% + 40% climate change	8.9

Table 3: 6-hour Greenfield Runoff Volumes for 1ha Area

Annual Exceedance Probability	Greenfield Rates (m^3)
100% (1 in 1 year)	21.6
50% (1 in 2 year)	24.4
3.3% (1 in 30 year)	50.5
1.0% (1 in 100 year)	63.1
1.0% + 40% climate change	98.8

Table 4: Long-Term Storage Estimate for 1ha Impermeable Area and 1ha Total Catchment Area

Greenfield Runoff Volume (m^3)	Post-Development Runoff Volume (m^3)	Long-Term Storage Estimate (m^3)
98.8	100.7	1.9

Table 5: Greenfield Runoff Rate for Development

Catchment Area (including access road)	Development Catchment (ha)	Total Greenfield Runoff Rate for site (l/sec)
Proposed Site including access road and basin	1.54	2.92

Therefore, the maximum allowable surface water flow rate from the proposed development shall be limited to 2.92 litres per second for up to and including the 1 in 100-year return period peak storm event (with 40% climate change applied).

4. Drainage Strategy

4.1. *Assumptions and Exclusions*

- The application boundary for the proposed development extends to greenfield land beyond the compound, including the area at which the proposed detention basin shall be located. The existing substation located directly adjacent the proposed site has not been considered in this drainage strategy and will continue to discharge via existing pump and detention/infiltration basin system.

- The existing drainage ditches running through the site is to be diverted in advance of constructing the substation platform & associated drainage to a location east of the proposed site boundary. Design works for this diversion is captured within the permitted development works of the site, however diverted ditch shall reconnect the tributary of the Upper Mother Ditch to the east of the proposed site with a projected size & cross-sectional detail as per existing.

- The proposed development has an existing ground level ranging from approximately 3.20m to 2.8m AOD. These levels are to be excavated for ground improvement works and levels are to be built up by others to by the contractor to a proposed finished platform level of 4.15m AOD, using a combination of a load transfer platform & engineered fill. A granular fill built up in well compacted layers will increase the surface water runoff in comparison to the existing case and this increase in runoff will be addressed by the surface water design proposed. The design is developed on a conservative runoff coefficient value of 0.6 (60%) to all the granular platform catchment areas. This coefficient value can be re-assessed as required once the composition of the platform fill is confirmed and the ground improvement / earthworks scheme design is complete.

4.2. *Catchment Areas*

An assessment has been carried out of the various impermeable and permeable areas that contribute to the overall development area. A summary of the various catchment areas that form the overall area that will ultimately need to be drained from the site are provided in **Table 6** below. The existing substation is ignored in terms of the catchments analysed in this report. The existing substation will continue to be drained as it is now, and all runoff generated from the proposed devlopment shall be conveyed to the new drainage system.

Table 6: Summary Table of Catchment Areas

Catchment Description	Catchment Area (hectares)	Runoff Coefficient applied to area	Contributing Area (hectares)
Access Road and onsite access routes	0.382	1.0	0.382
Onsite gravel surfacing	0.855	0.6	0.513
Roof areas	0.232	1.0	0.232
Detention Basin	0.072	1.0	0.072
Total	1.541		**1.199**

Figure 2: Proposed Catchment Plan

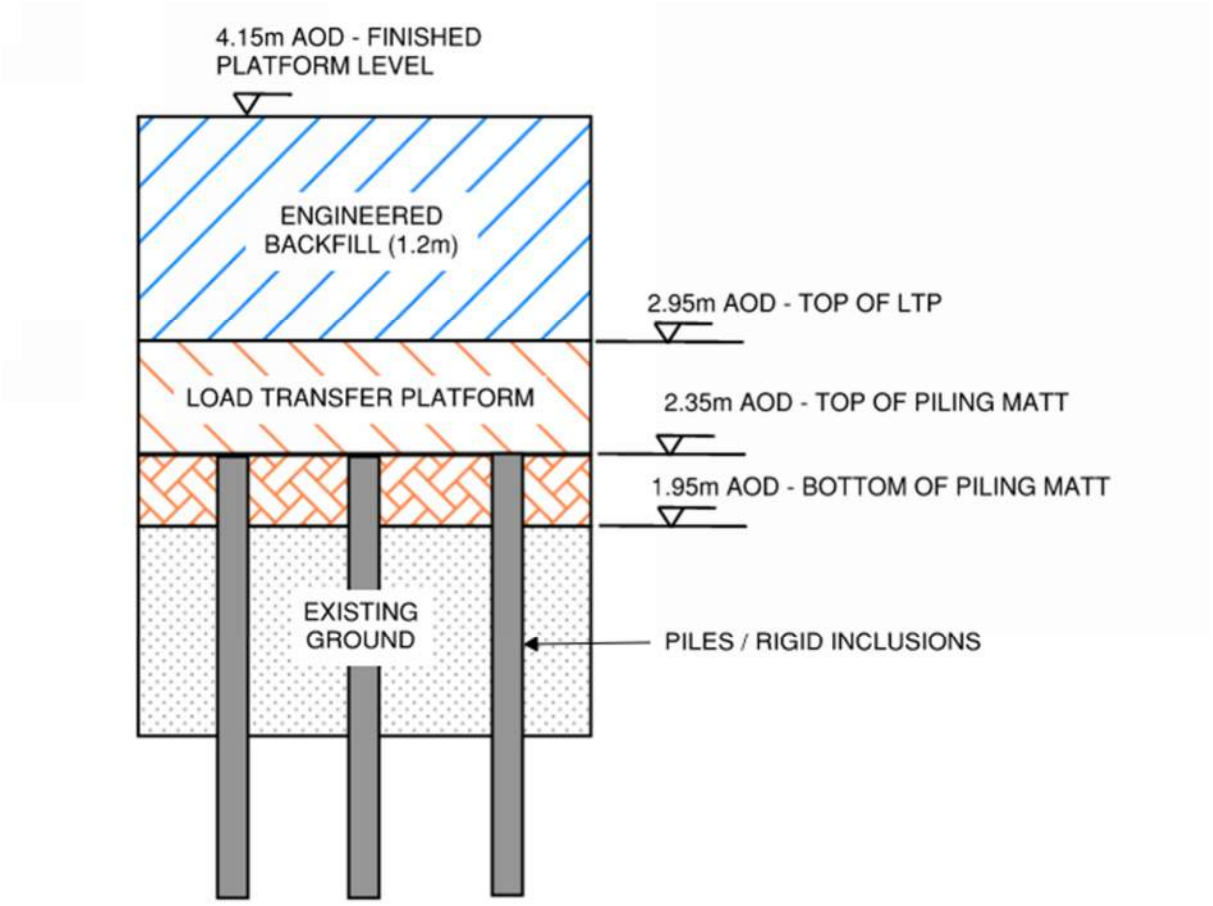
4.3. *Infiltration*

The LandIS Land Information System (LandIS - Land Information System - Soilscapes soil types viewer) describes the site as being 'Loamy and clayey soils of coastal flats with naturally high groundwater'. The geotechnical desk study completed by BakerHicks, further identified that the superficial materials are likely to comprise poorly consolidated clay & silt with peat which forms the Tidal Flat deposits underlain by Glacial Deposits. During the ground investigation (GI) these materials were confirmed along with a typically high groundwater level. As part of the GI works Soakaway tests were attempted, however the tests were abandoned due to the groundwater evident in the soakaway pits, making testing impractical. For these reasons infiltration is not deemed to be a suitable SuDS technique for the proposed development. With reference to the Development Advice Map (DAM) the Site lies within an area at risk of flooding 'without significant flood defence infrastructure' (Zone C2). This information has been provided by the Baker Hicks Ground Engineering team – refer to Appendix D for reference to the geotechnical investigation report for details.

The LandIS Land Information System (LandIS - Land Information System - Soilscapes soil types viewer) describes the site as being 'Loamy and clayey soils of coastal flats with naturally high groundwater. With reference to the Development Advice Map (DAM) the proposed development lies within an area at risk of flooding 'without significant flood defence infrastructure' (Zone C2). Soakaway tests were attempted in September 2024, however the tests were abandoned due to the groundwater evident in the soakaway pits, making testing impossible.

In addition, to consider the proposed ground improvement solution, composing of a piling matt, load transfer platform and engineer backfill, all compacted for the full footprint of the development, providing little opportunity for infiltration. With preliminary levels of the ground improvements, excavating to 1.95m AOD. During temporary works piling matt is installed to enable piling. Following completion of piling, matt is to be excavated down to 400mm depth followed by 600mm load transfer platform and 1200mm depth of engineered / compacted backfill to achieve platform level of 4.15m AOD along with a perimeter flood defence and retaining wall.

Figure 3: Proposed Substation Ground Section



As referenced in the Flood Consequence Report (referenced in Appendix D), the development is underlain by superficial deposits of Tidal Flat. The Tidal Flat deposits are likely to be of low permeability but with a high groundwater table due to the low-lying nature of the site and its proximity to the coast.

For the above reasons, infiltration is deemed unsuitable form of discharge for the proposed development.

4.4. *SuDS Discharge Hierarchy*

With reference to the SuDS Manual, the hierarchy of preferred disposal options for surface water runoff from proposed development in decreasing order of sustainability is as follows:

1. Rainwater Harvesting
2. Infiltration to Ground.
3. Discharge to Surface Waters / Surface Water Body; or
4. Discharge to Sewer.

As stated in Section 4.3 infiltration is not viable for this development. The next preferred option is discharge to surface waters or a surface water body. There is an existing ditch located to the north of the new substation which shall be the discharge point for the proposed surface water runoff generated. Refer to Section 3.4 for further details on the drainage proposals.

Table 7- Suitability of Surface Water Disposal Methods

Surface Water Disposal Method (in Order of Preference)	Suitability Description	Method Suitable? (Y / N)
Rainwater Harvesting	Due to unmanned nature of proposed development and it being electrical infrastructure, housing and storing water locally for reuse is impractical	N
Infiltration to Ground	Based on the results of the infiltration testing undertaken in the neighbouring site in the same geology, and for the reasons stated in Section 3.3, infiltration of surface water runoff is not an appropriate method of discharge.	N
Surface Water Discharge	**Upper Mother Ditch is located north of the proposed development and receives surface water runoff from the surrounding area.**	**Y**
Sewer Discharge	There are no public sewer in proximity to the proposed development.	N

4.5. *Surface Water Drainage Proposals*

As stated in **Section 4.3**, infiltration is not considered to be a viable SuDS technique for this site. It is therefore proposed to discharge surface water runoff at a controlled rate into the existing watercourse network (Upper Mother Ditch) that is located north of the site. As discussed in **Section 3.3**, the proposed discharge rate from the development shall not exceed the greenfield runoff rate of 2.92 litres per second for up to and including the 1 in 100-year return period peak storm event with 40% climate change applied in accordance with the Welsh Government published document; Flood Consequences Assessments: Climate Change.

The attenuation required to limit flow rates to 2.92 litres per second is achieved by providing a detention basin located north of the proposed development. Surface water runoff from the development and access road shall be conveyed to the basin via a traditional gravity sewer pipe network with chambers. Due to level constraints the basin outflow shall then be pumped to the adjacent Upper Mother Ditch. Further details on the drainage system upstream of the attenuation shall be defined and shown within detailed design drainage layout & details for the development. However, the following bullet points set out how the site drainage is likely to function.

- FEH22 rainfall point data used for site location.
- As discussed in Section 4.1, the existing site is to be excavated to accommodate an engineered fill. In accordance with the Margam Ground Improvement Performance Specification this fill will be placed in well compacted layers up to the underside, in which a proposed finish composing of 75mm thick chippings layer over a 300mm Type 3 subbase material is proposed. The compacted fill will substantially increase the surface water runoff compared to the existing case and will therefore be considered as part of the proposed drainage catchment areas.
- The internal access road shall be served by a gravity sewer system and gullys, on the basis this access road shall be kerbed. The drainage serving the compound will connect into the drainage system serving the access road and then heads north into the proposed detention basin.
- This increased surface water discharge from the built-up platform in addition to the road run off discussed below, which also discharges direct to the compacted fill platform, will be collected by a network of filter drains that will split the platform into smaller catchment areas. Catchpits will be provided at downstream connections from the filter drains into the wider surface water network to act as silt traps. At detailed design stage an increased time of concentration will be used to replicate the increased time that any surface water arising from the platform will take to enter the drainage network across the gravelled surface of the finished platform. This will demonstrate future betterment hydraulically than what is provided within this report / strategy. See Appendix B for drainage layout.
- In accordance with clause 3.5 of National Grid Document TS 2.10.09 – Issue 1, the road construction within the platform footprint will be drained via ‘over the edge’ methods onto the adjacent stone surfacing. Surface water run-off will discharge direct to the built-up platform & conveyed into perforated piped system. The proposed access road outside the platform footprint shall be kerbed and so will be drained into the proposed drainage system via gully’s.
- All roof area surface water runoff will be discharged into a piped gravity drainage or french drain network via downspouts with jetting access. Surface water system developed on the ethos to provide falls lesser than what achieves self-cleansing velocities to fit within the design depth provided as a result of the load transfer platform / ground improvement methodology. This nonstandard approach has been presented with the SAB officer & National Grid assurance in which has been accepted under the provision of increased frequency of maintenance / inspection with hydraulic results that demonstrates no flooding for 1:100-year storm + climate change. Falls have been determined based on construction tolerances and possible settlement of system, to provide a system that is functional and constructable.
- A penstock chamber shall be positioned on the outlet chamber from the onsite drainage system in with National Grid Document TS 2.10.09 – Issue 1 (Site Drainage). This shall allow the isolation of accidental contamination of on-site discharges. It will also enable isolation from the external flooding within Margam moor to prevent water backflowing into the substation and flooding the site. Refer to the Flood Consequence Assessment referenced in Appendix D.

- The attenuation has been designed to accommodate the 1 in 100-year peak storm event (with 40% climate change applied). Attenuation shall be provided off-site via a new detention basin adjacent to an existing tributary of the Upper Mother Ditch. Following inclusion of “compound surfacing” as attenuation, available capacity is therefore increased which enables flexibility in detailed design to propose a forebay or similar to improve treatment / ecological development markers.
- A pump shall be installed downstream of the basin in order to limit flows to 2.92 litres per second for up to the 1 in 100-year (40% climate change applied).
- The Infodrainage results are found in Appendix C. Within these simulation results represents attenuation of the compound surfacing however is not including the filter trench. In which the small amount of flooding found for the 1:100 + CC% storm will be stored by unmodelled attenuation.
- A new flood defence wall is proposed around the existing and proposed substation perimeter, with flood gates providing day to day access/egress. The top of flood defence wall set 5.3mAOD as per Flood Consequence Report.
- See Appendix D for full SAB application checklist for supported references.
- Ditch 1 diversion is proposed to avoid interface with surface water detention basin. Ditch diversion to retain existing characteristics and will continue to convey the same catchment to Upper Mother ditch, refer to Appendix B for layout.

4.6. *Foul Water Drainage Proposals*

Foul Drainage for the proposed GIS building and proposed washdown area will be provided in accordance with clause 3.2 of National Grid Document TS 2.10.9 – Issue 1, in the form of a cesspool at 9000 litres (9m3). There is an existing cesspool on site that will need to be assessed prior to details being developed for the proposed foul drainage infrastructure required for the new GIS building and washdown area. See Appendix B for drainage layout.

This is concluded on the basis that there is no practical discharge sewer to connect the proposed development system to. With consideration of number of units to discharge paired with infrequent use, it’s recognised as most practical to isolate foul water system. It is also chosen based on the fluvial flooding risk to the site, to avoid risk of foul mixing with fluvial discharge during flood events by keeping system isolate within the development. See appendix D for flood consequence report reference.

4.7. *SuDS Performance Assessment – Water Quality*

The simple index method, as outlined within the SuDS Manual, provides a way of quantifying the benefit to water quality of the SuDS Treatment Train. The pollution hazard from the land use and the mitigation from the SuDS component are each assigned an index. The total mitigation index must be greater than the pollution hazard index for adequate treatment to be delivered.

Table 8 below identifies the pollution hazard indices for the proposed development. This table is derived from Table 26.2 from The SuDS Manual.

Table 8: Summary Table of Catchment Areas

Land Use	Pollution hazard level	Total suspended solids (TSS)	Metals	Hydrocarbons
Individual properties driveways, residential car parks, low traffic roads and non-residential car parking with infrequent change (eg schools, office) ie <300 traffic movements/day	Low	0.5	0.4	0.4

Low usage is applicable to this site operationally, as it is to be an unmanned site with minimal presence and movements.

Table 9 below identifies indicative SuDS mitigation indices for discharges to surface water. This table is derived from Table 26.3 from The SuDS Manual. Where the mitigation index of an individual component is insufficient, two or more components will be required, with a factor of 0.5(50%) applied to the additional downstream components. This is to account for the reduced performance of secondary components associated with already reduced inflow concentrations.

Table 9: Indicative SuDS mitigation indices for discharges to surface waters.

	Mitigation		
Type of SuDS component	TSS	Metals	Hydrocarbons
Proprietary treatment systems (gravel surfacing)	0.4**	0.4**	0.4**
Filter Drains	0.4	0.4	0.4
Detention Basin	0.5	0.5	0.6
Total Indices	0.4 + 0.2 + 0.25 = 0.85	0.4 + 0.2 + 0.25 = 0.85	0.4 + 0.2 + 0.3 = 0.90

The indices values** applied to proprietary treatment system of gravel surfacing has been estimated based on its similarity to a filter drain. Areas of the proposed compound not occupied by buildings, access routes or slabs shall consist of a permeable gravel surface that ultimately conveys the compound runoff to a below ground drainage system, where required.

In accordance with Table 4.3 from Section 4.3 of the SuDS Manual, it is noted for “Low” that extra measures may be required for protected resources. An extract of the table is provided below.

Table 10: Indicative SuDS mitigation indices for discharges to surface waters.

TABLE 4.3 Minimum water quality management requirements for discharges to receiving surface waters and groundwater

Land use	Pollution hazard level	Requirements for discharge to surface waters, including coasts and estuaries[2]	Requirements for discharge to groundwater
Residential roofs	Very low	Removal of gross solids and sediments only	
Individual property driveways, roofs (excluding residential), residential car parks, low traffic roads (eg cul de sacs, home zones, general access roads), non-residential car parking with infrequent change (eg schools, offices)	Low	Simple index approach[3] *Note: extra measures may be required for discharges to protected resources[1]*	
Commercial yard and delivery areas, non-residential car parking with frequent change (eg hospitals, retail), all roads except low traffic roads and trunk roads/motorways	Medium	Simple index approach[3] *Note: extra measures may be required for discharges to protected resources[1]*	Simple index approach[3] *Note: extra measures may be required for discharges to protected resources1* In England and Wales, Risk Screening[4] must be undertaken first to determine whether consultation with the environmental regulator is required. In Northern Ireland, the need for risk screening should be agreed with the environmental regulator.
Trunk roads and motorways	High	Follow the guidance and risk assessment process set out in HA (2009)	
Sites with heavy pollution (eg haulage yards, lorry parks, highly frequented lorry approaches to industrial estates, waste sites), sites where chemicals and fuels (other than domestic fuel oil) are to be delivered, handled, stored, used or manufactured, industrial sites	High	Discharges may require an environmental licence or permit[3]. Obtain pre-permitting advice from the environmental regulator. Risk assessment is likely to be required[5].	

4.8. *Biodiversity and Amenity*

As part of the ongoing development of the scheme infrastructure proposals, opportunities shall be explored to identity and develop any proposed features that contribute to biodiversity of the site (where feasible). The Drainage General Arrangement Drawing provided to support, indicates some potential features (planting). Amenity features are not deemed appropriate for this site. It is also to be considered that the detention basin shall incorporate native planting / wildflowers to support amenity and biodiversity. The presence of water in the basin (forebay) will attract wildlife and support plant life.

Prior to Margam substation development, surrounding ditches are reinstated, diverted and/or enhanced to improve biodiversity / ecological markers for the project. Within this design for the site, it is proposed to provide enhanced ditches in which will contain a constant body of water to attract wildlife and provide habitat. This is achieved by use of natural weirs at the outlet into upper mother ditch and use of materials such as puddle clay to line the section of the ditch. The ditch reinstatement / enhancement design is developed in accordance with water vole management plan.

4.9. *SuDS Operation and Maintenance*

A full SuDS maintenance plan would be produced as part of the detailed drainage design post-development and the precise requirement would depend on manufacture specification of the final design. At this time, it is considered that the maintenance of the drainage network would be the responsibility of the site owner and / or operator.

An outline of the typical maintenance requirements of each proposed SuDS feature is provided below.

4.9.1. *Gravel Compound and Associated Filter Drains*

The proposed drainage scheme will utilise the gravel compound surface finish of a permeable chipping aggregate layer over a compacted granular sub grade as a mechanism for attenuation, treatment, and conveyance of surface water runoff. It comprises of 2 materials, 75mm chippings and 300mm of type 3 Mot Material. Filter drains will be formed out of perforated pipes laid in trenches with type B bedding and back fill material to clause 505 of SHW. The anticipated maintenance and management for the gravel compound associated with the surface water drainage system and the associated filter drains used to convey the surface water into the gravity drainage network is outlined in Table 11 below.

Table 11: Typical Gravel Compound & Associated Maintenance Requirements

Maintenance Schedule	Required Action	Minimum Frequency
Regular Maintenance	Remove litter (including leaf litter) and debris from surface, access chambers and pre-treatment devices	Monthly, or as required
	Inspect gravel surface, inlet/outlet pipework and control systems for blockages, clogging, standing water and structural damage	Monthly
	Inspect pre-treatment systems, inlets, and perforated pipework for silt accumulation, and establish appropriate silt removal frequencies	Six monthly
	Remove sediment from pre-treatment devices	Six monthly, or as required
	Remove sedimentation that has become entrained into the outflow	Every 6 months
Occasional Maintenance	At locations with high pollution loads, remove surface geotextile and replace, and wash or replace overlying filter medium	Five yearly, or as required
	Clear perforated pipework of blockages	As required

4.9.2. *Detention Basin*

The proposed drainage scheme will use a detention basin located north of the proposed development as the final attenuation and filtration destination before discharge via a pump chamber and rising main to the receiving ditch (Upper Mother ditch)

The anticipated maintenance and management for the detention basin and pump chamber associated with the surface water drainage system is outlined in Table 12 below.

Table 12
Detention Basin Maintenance Requirements

Maintenance Schedule	Required Action	Minimum Frequency
Regular Maintenance	Remove litter and debris removal.	Monthly.
	Cut grass in and around basin.	Half yearly (spring – before nesting season, and autumn).
	Manage other vegetation and remove nuisance plants.	Monthly (or as required).
	Inspect inlets, outlets and overflows for blockages, and clear if required.	Monthly.
	Inspect banksides, liner, structures, pipework etc. for evidence of physical damage.	Monthly.
	Inspect inlets and facility surface for silt accumulation. Establish appropriate silt removal frequencies.	Monthly (for first year), then annually or as required.
	Tidy all dead growth before start of growing season.	Annually.
	Remove sediment from inlet, outlets and forebay.	Annually (or as required).
	Manage wetland plants in outlet pool – where provided.	Annually.
	Removing sedimentation that has become entrained into the outflow	Six monthly, or as required
Occasional Maintenance	Re-seed areas of poor vegetation growth.	As required.
	Prune and trim any trees and remove cuttings.	Every 2 years, or as required.
	Remove sediment from inlets, outlets, forebay and main basin when required.	Every 5 years, or as required.
Remedial actions	Repair erosion or other damage by reseeding / re-turfing and relevel uneven surfaces and reinstate design levels.	As required.
	Realignment of scour protection (for example a riprap.)	As required.
	Repair/rehabilitation of inlets, outlets and overflows.	As required.

4.9.3. *Flow Control / Pumping Station*

The proposed drainage shall be pumped to the existing watercourse network via a new pumping station. As set out in Section 2.3, the allowable pump rate will be restricted to the greenfield runoff rate associated with the development (refer to Section 2.3 for further details).

The anticipated maintenance and management for the pumping station associated with the surface water drainage system is outlined in Table 13 below.

Table 13
Typical Pumping Station Maintenance Requirements

Pumping Station / rising main		
Maintenance Schedule	Required Action	Minimum Frequency
Regular Maintenance	Inspect surface structures (including covers), removing obstructions and silt as required. Check there is no physical damage.	Monthly
	Ensure level control floats activate the pump correctly and that operate as intended.	Six monthly
	Check Pump Chamber for sedimentation, or other blockages and flow bypassing	Six monthly
Occasional Maintenance	Remove cover(s) and inspect, ensuring flows can enter the chamber freely. Remove debris and silt.	Annually
	Periodic measuring of the bore size	Every 3 years, or as required.
Remedial actions	Replace damaged pumps / parts	As required

4.10. *General*

Under normal circumstances the network of pipes will be designed and installed at gradients which provide self-cleansing; therefore, no significant maintenance is required, however due to the requirement to flatten the surface water pipe network as much as practical, this increases the risk of blockages by removing the self-cleansing aspect of the traditional design. It was relayed by BakerHicks that this increase in risk would be taken on by the end client/maintaining agent, and that an increased inspection regime would need to be put into place, to ensure the full working capability of the system. Assurances were given that the system would have minimal silt ingress, however an increased inspection regime would ensure this. Manholes/inspection chambers with silt traps/ Weir wall manhole should be inspected 3 monthly and emptied of any silt as required. Back inlet gullies and rainwater pipes should be inspected 3 monthly and any blockages or silting up removed.

4.11. *Further Work Required*

In addition, surface Water Construction Management Plan (SWCMP) will be required as part of the detailed design package, to ensure all construction activities have suitable pollution mitigation measures in place during the construction period of both the temporary and permanent site.

Further analysis to be undertaken regarding the Detention basin risk at peak return periods against Margam moor fluvial flood duration. Need to review peak storm conditions of Margam substation against Margam Moor fluvial flood condition. This will determine whether any mitigations are required for the detention basin.

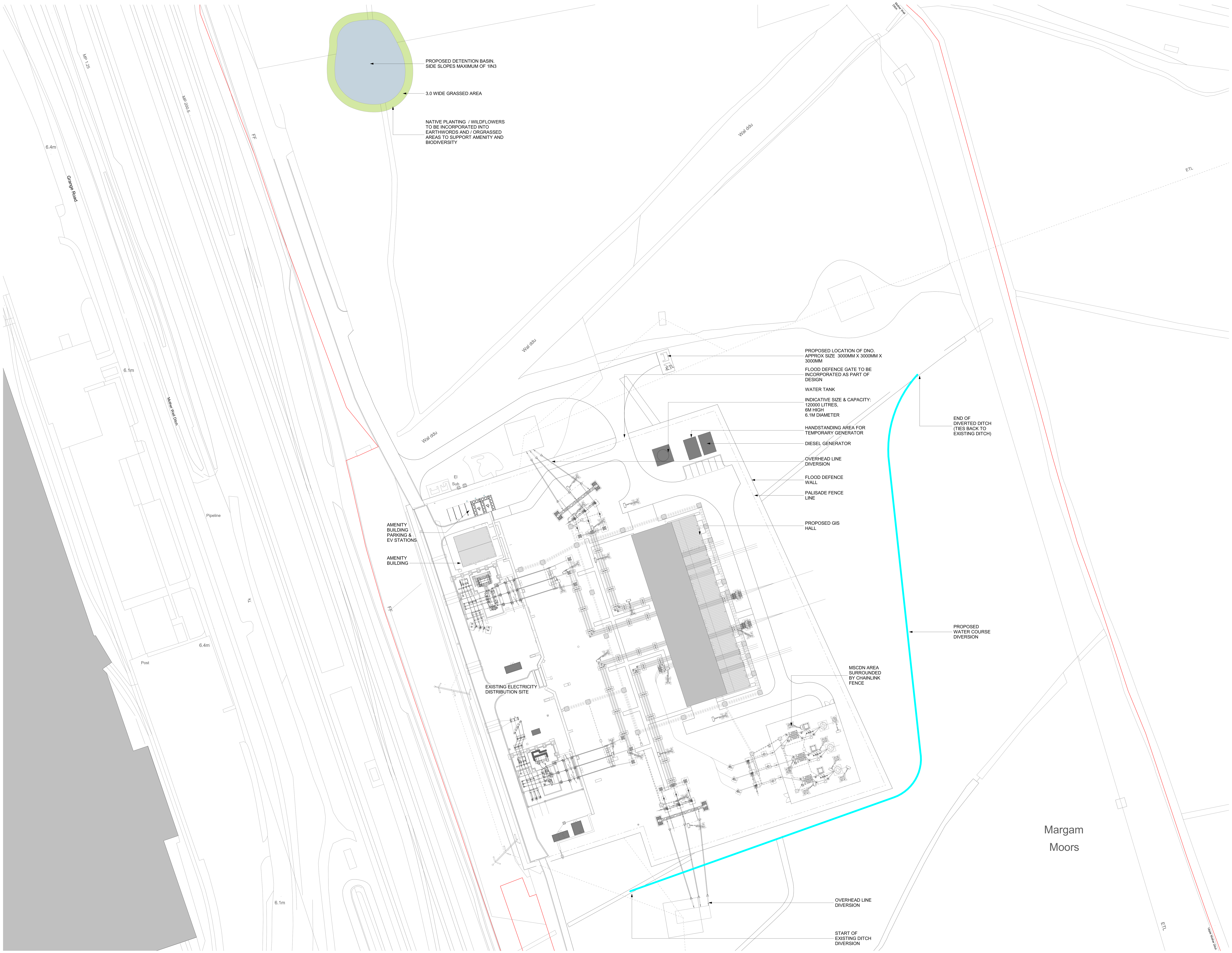
4.12. *Conclusion*

In conclusion, It is the proposal of this drainage strategy that the surface water drainage to be provided on site shall be able to withstand all storm durations up to and including 1 in 100-year return plus an allowance for climate change. The method of surface water discharge shall be via a gravity piped system discharging to a proposed off-site detention basin. A pump installed downstream of the detention basin shall then pump surface water from the basin at the attenuated rate of 2.92 litres per second into the existing tributary of the Upper Mother Ditch. Treatment of the surface water will be provided via the natural gravel surfacing (granular rainwater garden), infiltration trench and detention basin.

To support the substation extension and surface water drainage system, ditch 1 will be re located east of its existing position and continue to convey the surrounding catchments, while Ditch 4 will be diverted in advance around perimeter of substation extension, omitting part of ditch 4 & ditch 5 in full.

5. Appendices

5.1. *Appendix A – Proposed Site Plan*



1 Margam Site Plan - Proposed
Scale: 1 : 500

SCALE 1:500

For Planning

GENERAL NOTES

ALL BAKERHICKS DRAWINGS ARE TO BE READ IN CONJUNCTION WITH THE GENERAL NOTES DRAWINGS, THE RELEVANT BAKERHICKS SPECIFICATIONS AND ALL RELEVANT ARCHITECTS AND SERVICE ENGINEER'S DRAWINGS AND SPECIFICATION.

ALL LEVELS ARE IN METRES ABOVE ORDINANCE DATUM.

ALL DIMENSIONS ARE IN MILLIMETRES (U.N.O)

DO NOT SCALE ANY ENGINEERING DRAWINGS OR DIGITAL DATA. IF IN DOUBT ASK. WORK TO FIGURED DIMENSIONS ONLY. ANY DISCREPANCIES IN DIMENSIONS ARE TO BE REFERRED TO ENGINEER BEFORE WORK IS PUT TO HAND.

THE CONTRACTOR MUST ADVISE THE ARCHITECT AND ENGINEER OF ANY DISCREPANCIES BETWEEN THE CONTRACT DRAWINGS AND/OR SITE CONDITIONS / DIMENSIONS AT THE EARLIEST POSSIBLE OPPORTUNITY.

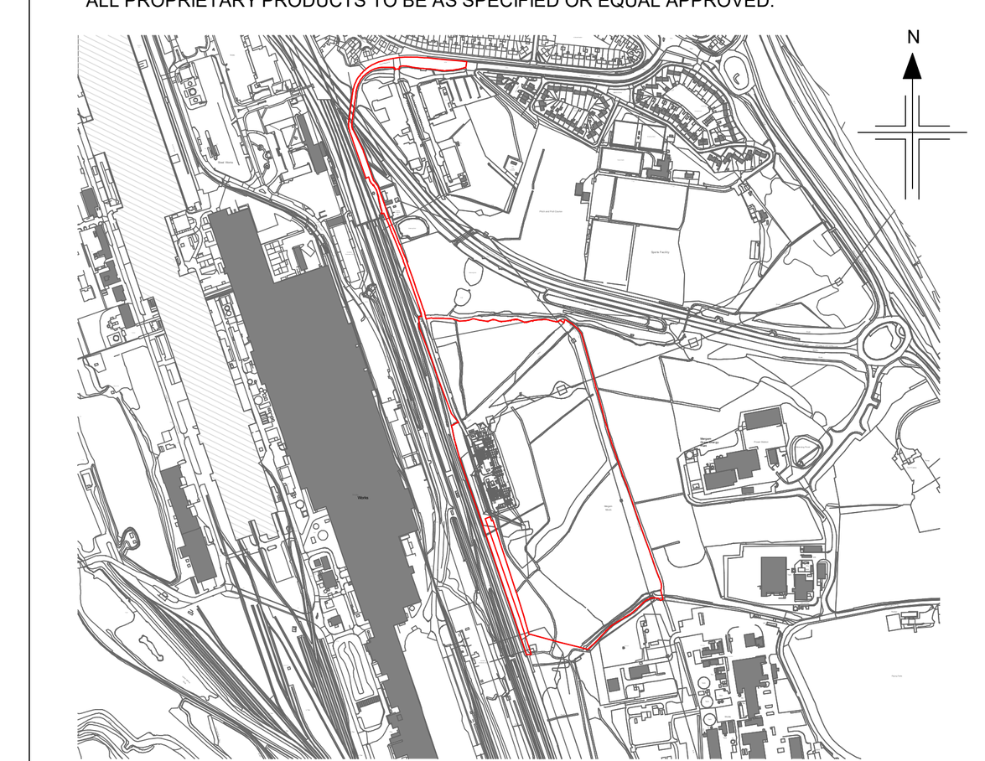
REVISION NOTES ARE FOR GUIDANCE ONLY. FOR SPECIFIC DETAILS, REFER TO CLOUDED AREA ON DRAWINGS FOR MOST RECENT AMENDMENTS.

ALL DIMENSIONS AND LEVELS ARE TO BE CHECKED ON SITE BY THE CONTRACTOR OR HIS SUBCONTRACTOR PRIOR TO PREPARING ANY WORKING DRAWINGS OR COMMENCING ON SITE.

ALL WORK HAS TO BE CARRIED OUT WITH THE REQUIREMENTS OF THE RELEVANT STATUTORY AUTHORITIES AND REGULATIONS.

ALL METHOD STATEMENTS SHOULD BE SUBMITTED TO THE ARCHITECT / CDM PRINCIPAL DESIGNER AND ENGINEER FOR REVIEW AT LEAST TWO WEEKS BEFORE CARRYING OUT THE SAID WORKS.

ALL PROPRIETARY PRODUCTS TO BE AS SPECIFIED OR EQUAL APPROVED.



KEYPLAN

SITE KEY

SITE BOUNDARY

SITE AREA: (154648.052 m2) (15.46 Hectares) (38.20 Acres)

BUILDINGS

PROPOSED WATERCOURSE DIVERSION

NOTE:

DRAWING TO BE PRINTED IN COLOUR

REFER TO PEAT MANAGEMENT STRATEGY FOR AREAS OF PEAT BURIAL LOCATIONS

Rev	Description	Cre'd	Chk'd / App'd	Date
P05	S3 For Review and Comment: Planning drawings updated following feedback with NPT on 24/07/25	MY	OTr / PC	29/07/25
P04	S3 - For Review & Comment. Updated Proposed Site Layout following Planning Consultant Feedback	OTr	OT/RC	30/06/25
P03	Issued for planning, comments incorporated following client feedback	GP	OTr / RC	24/04/25
P02	Issued For Planning	DSB	OTr / RW	10/02/25
P01	First Issue	DSB	RW / JK	03/02/25

nationalgrid

Master Scheme No:	Sub-Scheme No:	Site:
101677		MARGAM

Scheme Name: Margam Substation

Document Title: Margam GIS Hall - Proposed Site Plan

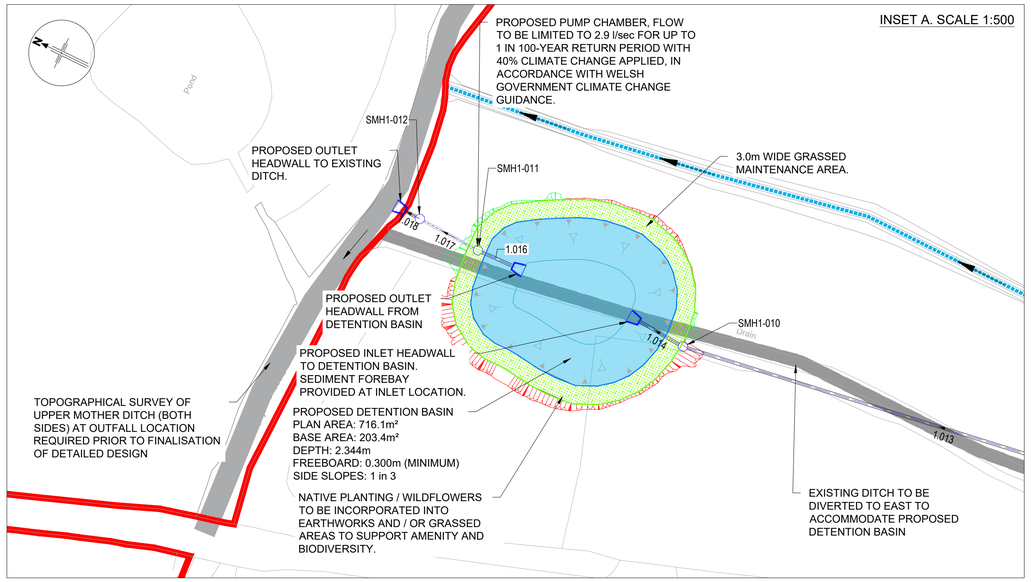
Created by:	Date:	Checked by:	Date:	Approved by:	Date:
DSB	30/01/25	RW	30/01/25	JK	30/01/25
Development Eng:	Document Type:	Scale:	Format:	Sheet(s):	Rev:
	DWG	1 : 500	A0		P05

National Grid Document Number: 13_LOR_0066

MARPT-BHK-01-ZZ-DG-A-130023

5.2. *Appendix B – Drainage Layout*

INSET A. SCALE 1:500



ASSOCIATED DRAWINGS:

MARPT-BHK-01-ZZ-SH-C-081010 - 08_LOR_0001 - MARGAM DRAINAGE SCHEDULE SHEET 01 OF 01
~~MARPT-BHK-01-ZZ-DG-C-181009 - 18_LOR_0206 - MARGAM DRAINAGE LAYOUT SHEET 01 OF 01~~
MARPT-BHK-01-ZZ-DG-C-181022 - 18_LOR_0207 - MARGAM DRAINAGE CONSTRUCTION DETAILS SHEET 01 OF 02
MARPT-BHK-01-ZZ-DG-C-181023 - 18_LOR_0208 - MARGAM DRAINAGE CONSTRUCTION DETAILS SHEET 02 OF 02
MARPT-BHK-01-ZZ-DG-C-181025 - 18_LOR_0210 - MARGAM DRAINAGE CESSPOOL DETAILS SHEET 01 OF 01
MARPT-BHK-01-ZZ-DG-C-181026 - 18_LOR_0211 - MARGAM DRAINAGE ATTENUATION DETAILS SHEET 01 OF 01

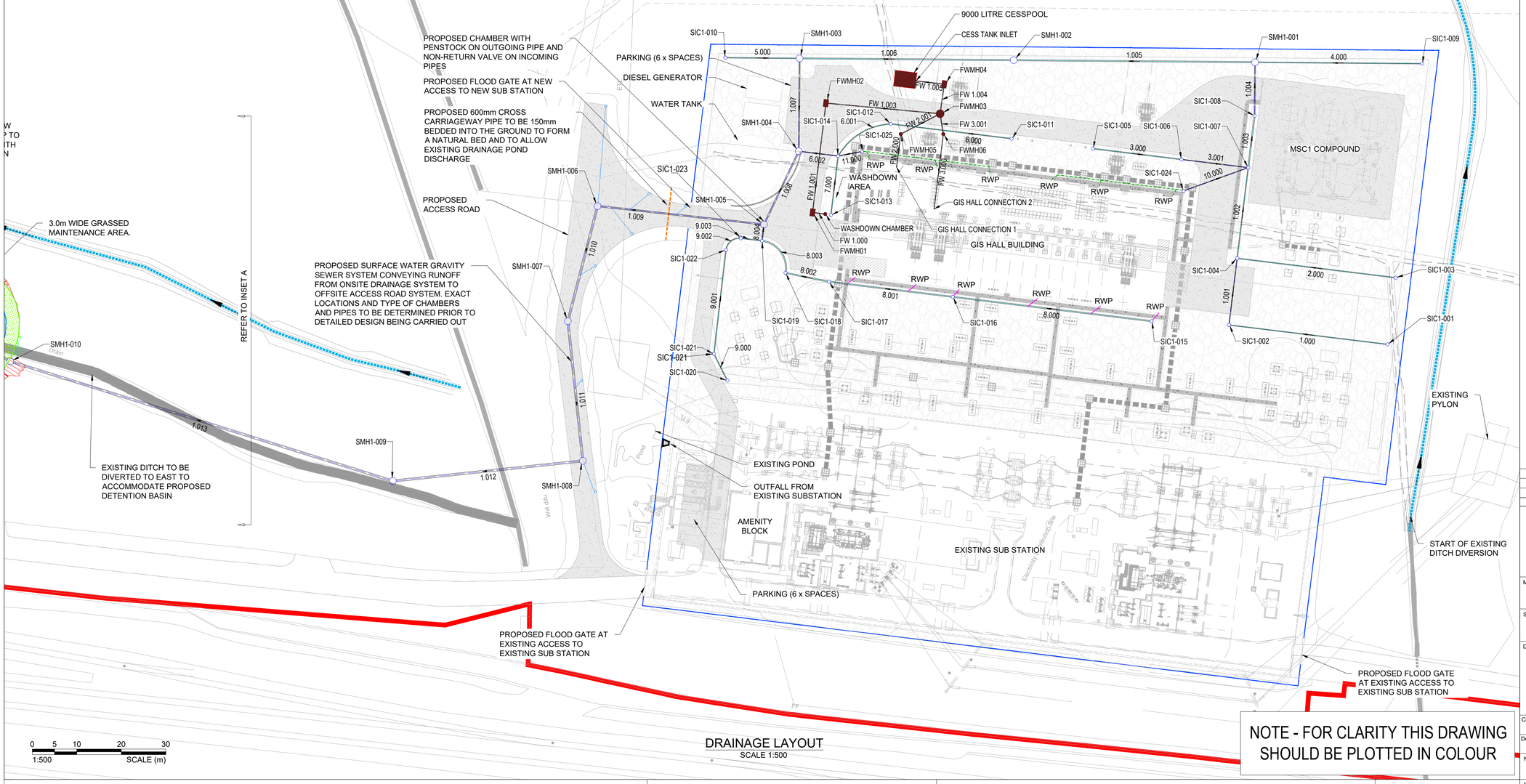
SPECIFICATIONS:

1. DRAINAGE WORKS TO BE IN ACCORDANCE WITH:-
   - NGTS 2.10.01 - OIL CONTAINMENT (ISSUE 2 - DECEMBER 2020)
   - NGTS 2.10.05 - COVERS, DUCTS & TRENCHES (ISSUE 1 - APRIL 2017)
   - NGTS 2.10.09 - DRAINAGE (ISSUE 1 - APRIL 2017)
   - NGTS 3.10.02 - MATERIALS (ISSUE 2 - APRIL 2017)
   - NGTS 3.10.03 - EXCAVATE, BACKFILL AND RESTORE (ISSUE 2 - APRIL 2017)
   - NGTS 3.10.05 - PIPELINES (ISSUE 2 - APRIL 2017)

LAING O'ROURKE

PRELIMINARY

WATERCOURSE DIVERSION INDICATIVE. FINAL LOCATION TO BE CONSIDERATE OF FUTURE WORKS TO AVOID ITS PROPOSED EXTENTS. FOR DETAILS REFER TO MARPT-BHK-01-ZZ-DG-C-181601.



0 5 10 20 30
1:500 SCALE (m)

DRAINAGE LAYOUT
SCALE 1:500

NOTE - FOR CLARITY THIS DRAWING SHOULD BE PLOTTED IN COLOUR

Health & Safety
CDM regulations 2015

Significant risks associated with this drawing are identified below and, where applicable, at specific locations on the drawing.
Refer to the CDM Regulation 9 Risk Register (30004595-BHK-XX-XX-RE-HS-0012) for full details.

1. DO NOT CONSTRUCT FROM THIS DRAWING - FOR PLANNING ONLY
2. WORKS WITHIN CLOSE PROXIMITY OF LIVE OHL, SUFFICIENT CLEARANCES TO BE PROVIDED AT ALL TIMES.
3. WORKS TO BE CONSIDERATE OF PRESENCE OF GROUND CONTAMINATION.
4. WORKS TO BE CONSIDERATE OF PEAT PRESENCE/POOR GROUND CONDITIONS.
5. WORKING IN PROXIMITY OF OPEN WATER BODIES, CARE BE TAKEN DURING PLANT MANOUVRES.
6. DEEP EXCAVATIONS REQUIRED FOR CESSPOOL & DETENTION BASI, EXCAVATIONS TO BE OPEN FOR MINIMUM TIME PRACTICABLE AND PROTECTED DURING WORKS.
7. HIGH GORUND WATER LEVELS ON SITE. SUITABLE DEWATERING TO BE IN PLACE DURING INSTALLATION OF SYSTEMS.

GENERAL NOTES:

1. DO NOT SCALE FROM THIS DRAWING.
2. UNLESS NOTED OTHERWISE, LEVELS (AOD) AND CO-ORDINATES (RELATIVE TO ORDINANCE DATUM) ARE IN METERS
3. DESIGN IN ACCORDANCE WITH:
   - 3.1. NATIONAL GRID TECHNICAL SPECIFICATION (NGTS) 2.10.09 SITE DRAINAGE (ISSUE 1).
   - 3.2. NATIONAL GRID TECHNICAL SPECIFICATION (NGTS) 2.10.01 OIL CONTAINMENT (ISSUE 2)
4. THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT ARCHITECTURAL AND ENGINEERING DETAILS, DRAWINGS AND SPECIFICATIONS.
5. ALL WORK SHALL BE CARRIED OUT WITH THE REQUIREMENTS OF THE RELEVANT STATUTORY AUTHORITIES AND REGULATORS.
6. ALL PIPES SHALL BE LAID WITH SOFFITS LEVEL UNLESS NOTED OTHERWISE.

KEY:

- PROPOSED SURFACE WATER PIPE
- PROPOSED SURFACE WATER RISING MAIN
- PROPOSED FILTER DRAIN
- PROPOSED FOUL DRAINAGE PIPE
- PROPOSED FRENCH DRAIN (GRANULAR MATERIAL)
- PROPOSED RAINWATER PIPE CONNECTION
- PROPOSED CROSS CARRIAGEWAY PIPE
- PROPOSED GULLY AND CONNECTION
- PROPOSED SURFACE WATER CHAMBER/INSPECTION CHAMBER
- PROPOSED HEADWALL
- PROPOSED FOUL WATER CHAMBER
- PROPOSED CESSPOOL TANK
- EXISTING HEADWALL INLET / OUTLET
- EXISTING WATERCOURSE
- PROPOSED WATERCOURSE DIVERSION
- PROPOSED DETENTION BASIN
- PROPOSED 3M WIDE MAINTENANCE AREA TO DETENTION BASIN
- PROPOSED FLOOD DEFENCE WALL
- PROPOSED IMPERMEABLE ROAD AREA
- PROPOSED CONCRETE SLAB FOOTPATH AREA
- PROPOSED GRANULAR STONE PLATFORM
- PROPOSED CABLE TROUGH
- SITE BOUNDARY
- PROPOSED EARTHWORKS CUT SECTION
- PROPOSED EARTHWORKS FILL SECTION

Rev	Description	Cre'd	Chk'd / App'd	Date
P03	S3 - FOR REVIEW AND COMMENT	IL	CE/RC	21.08.25
P02	S3 - FOR REVIEW AND COMMENT	KA	CE/JD	17.06.25
P01	S3 - FOR REVIEW AND COMMENT	KA	CE/JD	30.05.25

nationalgrid

National Grid Electricity Transmission plc, Warwick Technology Park, Gallows Hill, Warwick. CV34 6DA

Master Scheme No:	Sub-Scheme No:	Site:
101677		MARGAM / PORT TALBOT

Scheme Name: MARGAM CONNECTION

Document Title:

MARGAM
DRAINAGE LAYOUT
SHEET 01 OF 01

Created by:	Date:	Checked by:	Date:	Approved by:	Date:
KA	30.05.25	CE	30.05.25	JD	30.05.25
Development Eng:	Document Type:	Scale:	Format:	Sheet(s):	Rev:
	DWG	1:500	A1	01 OF 01	P03

National Grid Document Number: 18_LOR_0206

Document Number: MARPT-BHK-01-ZZ-DG-C- 181009

5.3. *Appendix C – Infodrainage Results*

Margam Substation LoR:	Date:		
Margam Drainage Design Surface Water summary Results	21/08/2025		
	Designed by: I Leonard	Checked by: C Rennie	Approved By: S Spencer
Report Details: Type: Rainfall Analysis Criteria	One Warwick Technology Park: Gallows Hill, Warwick CV34 6YL		

BakerHicks.

Runoff Type	Dynamic
Output Interval (mins)	1
Time Step	Shortest
Urban Creep	Apply Global Value
Urban Creep Global Value (%)	0
Junction Flood Risk Margin (mm)	300
Perform No Discharge Analysis	☐

Rainfall

FEH

Type: FEH

Site Location	GB 278535 186348 SS 78535 86348
Rainfall Version	2022
Summer	☑
Winter	☑

Return Period

Return Period (years)	Increase Rainfall (%)
2.0	0.000
30.0	0.000
100.0	40.000

Storm Durations

Duration (mins)	Run Time (mins)
15	30
30	60
60	120
120	240
180	360
240	480
360	720
480	960
600	1200
720	1440
960	1920
1440	2880

Margam Substation LoR:	Date:		
Margam Drainage Design Surface Water summary Results	21/08/2025		
	Designed by: I Leonard	Checked by: C Rennie	Approved By: S Spencer
Report Details: Type: Junctions Summary Storm Phase: Phase	One Warwick Technology Park: Gallows Hill, Warwick CV34 6YL		

FEH: 2 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Depth

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
SMH1-010 (01-SW)	FEH: 2 years: +0 %: 120 mins: Winter	5.400	1.952	2.036	0.084	14.5	0.121	0.000	14.5	64.599	OK
SMH1-008 (01-SW)	FEH: 2 years: +0 %: 120 mins: Winter	4.404	2.289	2.551	0.262	15.2	0.374	0.000	14.8	65.686	OK
SMH1-007 (01-SW)	FEH: 2 years: +0 %: 120 mins: Winter	4.214	2.392	2.610	0.219	15.4	0.313	0.000	15.2	65.954	OK
SIC1-012 (01-SW)	FEH: 2 years: +0 %: 30 mins: Winter	4.150	3.050	3.119	0.069	1.0	0.011	0.000	0.6	0.750	OK
SIC1-022 (01-SW) (1)	FEH: 2 years: +0 %: 30 mins: Summer	4.150	3.038	3.107	0.069	1.7	0.020	0.000	1.6	1.519	OK
SIC1-021 (01-SW) (1)	FEH: 2 years: +0 %: 30 mins: Summer	4.150	3.300	3.365	0.065	1.6	0.018	0.000	1.4	1.161	OK
SIC1-020 (01-SW) (1)	FEH: 2 years: +0 %: 15 mins: Summer	4.150	3.400	3.446	0.046	0.8	0.013	0.000	0.8	0.403	OK
SIC1-011 (01-SW)	FEH: 2 years: +0 %: 15 mins: Winter	4.150	3.400	3.458	0.058	0.9	0.009	0.000	1.0	0.491	OK
SIC1-006 (01-SW)	FEH: 2 years: +0 %: 120 mins: Winter	4.150	3.310	3.453	0.143	0.4	0.023	0.000	0.5	0.949	OK
SIC1-005 (01-SW)	FEH: 2 years: +0 %: 120 mins: Winter	4.150	3.400	3.455	0.055	0.3	0.009	0.000	0.3	0.921	OK
SIC1-007 (01-SW)	FEH: 2 years: +0 %: 120 mins: Winter	4.150	3.170	3.453	0.283	5.3	0.045	0.000	4.8	22.939	Surcharged
SMH1-005 (01-SW)	FEH: 2 years: +0 %: 120 mins: Summer	4.150	2.728	2.938	0.210	12.9	0.300	0.000	12.8	47.344	OK
SIC1-001 (01-SW)	FEH: 2 years: +0 %: 120 mins: Winter	4.150	3.400	3.522	0.122	1.0	0.019	0.000	1.0	4.242	OK
SIC1-002 (01-SW)	FEH: 2 years: +0 %: 120 mins: Winter	4.150	3.330	3.498	0.168	1.0	0.027	0.000	1.2	4.190	Surcharged
SIC1-003 (01-SW)	FEH: 2 years: +0 %: 120 mins: Winter	4.150	3.400	3.506	0.106	1.0	0.017	0.000	1.0	3.251	OK
SIC1-004 (01-SW)	FEH: 2 years: +0 %: 120 mins: Winter	4.150	3.290	3.488	0.198	1.9	0.031	0.000	2.1	7.399	Surcharged
SIC1-009 (01-SW)	FEH: 2 years: +0 %: 30 mins: Winter	4.150	3.400	3.469	0.069	1.3	0.011	0.000	1.1	1.123	OK
SIC1-008 (01-SW)	FEH: 2 years: +0 %: 120 mins: Winter	4.150	3.130	3.426	0.296	4.8	0.047	0.000	4.7	22.828	Surcharged
SMH1-001 (01-SW)	FEH: 2 years: +0 %: 120 mins: Winter	4.150	3.085	3.400	0.315	6.0	0.450	0.000	5.8	27.166	Surcharged
SMH1-002 (01-SW)	FEH: 2 years: +0 %: 120 mins: Winter	4.150	2.977	3.216	0.239	6.3	0.343	0.000	6.2	28.704	Surcharged

SIC1-010 (01-SW)	FEH: 2 years: +0 %: 30 mins: Winter	4.150	3.400	3.457	0.057	1.0	0.009	0.000	0.9	0.890	OK
SMH1-003 (01-SW)	FEH: 2 years: +0 %: 120 mins: Winter	4.150	2.884	2.995	0.111	6.7	0.159	0.000	6.7	30.418	OK
SIC1-015 (01-SW)	FEH: 2 years: +0 %: 120 mins: Summer	4.150	3.210	3.286	0.076	1.4	0.012	0.000	1.4	3.844	OK
SIC1-016 (01-SW)	FEH: 2 years: +0 %: 120 mins: Summer	4.150	3.060	3.164	0.104	2.6	0.017	0.000	2.4	6.819	OK
SIC1-017 (01-SW)	FEH: 2 years: +0 %: 120 mins: Summer	4.150	2.963	3.059	0.096	2.9	0.015	0.000	2.8	8.056	OK
SIC1-018 (01-SW)	FEH: 2 years: +0 %: 120 mins: Summer	4.150	2.903	3.000	0.097	2.9	0.028	0.000	2.9	8.324	OK
SIC1-023 (01-SW)	FEH: 2 years: +0 %: 30 mins: Summer	4.150	2.978	3.062	0.084	1.6	0.013	0.000	1.6	1.497	OK
SIC1-019 (01-SW)	FEH: 2 years: +0 %: 120 mins: Summer	4.150	2.843	2.956	0.113	4.1	0.018	0.000	4.1	11.311	OK
SMH1-004 (01-SW)	FEH: 2 years: +0 %: 120 mins: Winter	4.150	2.768	2.982	0.214	8.8	0.307	0.000	8.7	39.499	OK
SMH1-006 (01-SW)	FEH: 2 years: +0 %: 120 mins: Winter	4.118	2.503	2.692	0.189	14.4	0.270	0.000	14.3	61.035	OK
INLET HEADWALL 1 (01-SW)	FEH: 2 years: +0 %: 480 mins: Winter	3.499	1.192	1.484	0.292	11.2	0.330	0.000	11.1	138.324	OK
SMH1-009 (01-SW)	FEH: 2 years: +0 %: 120 mins: Winter	3.605	2.222	2.495	0.273	14.8	0.391	0.000	14.5	64.777	OK
OUTLET HEADWALL 1 (01-SW)	FEH: 2 years: +0 %: 480 mins: Winter	3.499	1.155	1.483	0.328	3.2	0.371	0.000	3.0	128.121	OK
SMH1-011 (01-SW)	FEH: 2 years: +0 %: 480 mins: Winter	2.700	1.130	1.484	0.353	3.0	0.506	0.000	2.9	128.074	OK
OUTLET HEADWALL 2 (01-SW)	FEH: 2 years: +0 %: 60 mins: Summer	2.725	1.800	1.870	0.070	2.9	0.000	0.000	2.9	11.273	OK
SIC1-014 (01-SW)	FEH: 2 years: +0 %: 15 mins: Winter	4.150	2.900	3.059	0.159	6.5	0.025	0.000	6.2	3.256	OK
SIC1-013 (01-SW)	FEH: 2 years: +0 %: 15 mins: Summer	4.150	3.400	3.400	0.000	0.0	0.000	0.000	0.0	0.000	OK
SMH1-012 (01-SW)	FEH: 2 years: +0 %: 60 mins: Summer	3.430	1.828	1.899	0.071	2.9	0.080	0.000	2.9	11.273	OK
SIC1-024 (01-SW)	FEH: 2 years: +0 %: 120 mins: Winter	4.150	3.195	3.453	0.258	3.5	0.041	0.000	3.4	10.083	Surcharged
SIC1-025 (01-SW)	FEH: 2 years: +0 %: 15 mins: Winter	4.150	3.190	3.224	0.034	6.5	0.005	0.000	6.5	3.018	OK

Margam Substation LoR:	Date:		
Margam Drainage Design Surface Water summary Results	21/08/2025		
	Designed by: I Leonard	Checked by: C Rennie	Approved By: S Spencer
Report Details: Type: Junctions Summary Storm Phase: Phase	One Warwick Technology Park: Gallows Hill, Warwick CV34 6YL		

BakerHicks.

FEH: 30 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Depth

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
SMH1-010 (01-SW)	FEH: 30 years: +0 %: 60 mins: Winter	5.400	1.952	2.064	0.112	25.5	0.160	0.000	25.5	81.603	OK
SMH1-008 (01-SW)	FEH: 30 years: +0 %: 60 mins: Winter	4.404	2.289	2.662	0.373	27.8	0.533	0.000	26.3	86.317	OK
SMH1-007 (01-SW)	FEH: 30 years: +0 %: 60 mins: Winter	4.214	2.392	2.725	0.333	29.0	0.477	0.000	27.8	88.181	OK
SIC1-012 (01-SW)	FEH: 30 years: +0 %: 60 mins: Winter	4.150	3.050	3.289	0.239	1.5	0.038	0.000	1.1	2.275	Surcharged
SIC1-022 (01-SW) (1)	FEH: 30 years: +0 %: 60 mins: Winter	4.150	3.038	3.235	0.197	3.0	0.056	0.000	3.0	4.673	Surcharged
SIC1-021 (01-SW) (1)	FEH: 30 years: +0 %: 30 mins: Summer	4.150	3.300	3.415	0.115	3.7	0.032	0.000	3.3	2.523	OK
SIC1-020 (01-SW) (1)	FEH: 30 years: +0 %: 15 mins: Summer	4.150	3.400	3.472	0.072	1.9	0.020	0.000	1.9	0.887	OK
SIC1-011 (01-SW)	FEH: 30 years: +0 %: 15 mins: Winter	4.150	3.400	3.478	0.078	2.2	0.012	0.000	2.0	1.124	OK
SIC1-006 (01-SW)	FEH: 30 years: +0 %: 60 mins: Winter	4.150	3.310	3.892	0.582	2.2	0.093	0.000	2.2	4.545	Flood Risk
SIC1-005 (01-SW)	FEH: 30 years: +0 %: 60 mins: Winter	4.150	3.400	3.866	0.466	1.8	0.074	0.000	1.9	3.564	Flood Risk
SIC1-007 (01-SW)	FEH: 30 years: +0 %: 60 mins: Winter	4.150	3.170	3.935	0.765	14.9	0.122	0.000	8.5	36.209	Flood Risk
SMH1-005 (01-SW)	FEH: 30 years: +0 %: 60 mins: Winter	4.150	2.728	3.180	0.452	21.6	0.647	0.000	21.5	71.951	Surcharged
SIC1-001 (01-SW)	FEH: 30 years: +0 %: 120 mins: Winter	4.150	3.400	3.844	0.444	2.3	0.071	0.000	2.4	9.839	Surcharged
SIC1-002 (01-SW)	FEH: 30 years: +0 %: 60 mins: Winter	4.150	3.330	3.850	0.520	2.6	0.083	0.000	2.4	6.789	Surcharged
SIC1-003 (01-SW)	FEH: 30 years: +0 %: 120 mins: Winter	4.150	3.400	3.852	0.452	1.9	0.072	0.000	1.9	7.494	Flood Risk
SIC1-004 (01-SW)	FEH: 30 years: +0 %: 60 mins: Winter	4.150	3.290	3.861	0.571	3.7	0.091	0.000	3.8	13.073	Flood Risk
SIC1-009 (01-SW)	FEH: 30 years: +0 %: 60 mins: Winter	4.150	3.400	3.820	0.420	2.2	0.067	0.000	1.7	3.363	Surcharged
SIC1-008 (01-SW)	FEH: 30 years: +0 %: 60 mins: Winter	4.150	3.130	3.870	0.740	8.5	0.118	0.000	7.4	31.189	Flood Risk
SMH1-001 (01-SW)	FEH: 30 years: +0 %: 60 mins: Winter	4.150	3.085	3.813	0.728	9.7	1.042	0.000	7.9	36.552	Surcharged
SMH1-002 (01-SW)	FEH: 30 years: +0 %: 60 mins: Winter	4.150	2.977	3.567	0.591	9.8	0.845	0.000	8.3	36.971	Surcharged

SIC1-010 (01-SW)	FEH: 30 years: +0 %: 15 mins: Winter	4.150	3.400	3.491	0.091	2.5	0.015	0.000	2.5	1.224	OK
SMH1-003 (01-SW)	FEH: 30 years: +0 %: 60 mins: Winter	4.150	2.884	3.261	0.377	9.8	0.540	0.000	9.9	39.077	Surcharged
SIC1-015 (01-SW)	FEH: 30 years: +0 %: 60 mins: Winter	4.150	3.210	3.358	0.148	3.7	0.023	0.000	3.5	6.252	OK
SIC1-016 (01-SW)	FEH: 30 years: +0 %: 60 mins: Winter	4.150	3.060	3.326	0.266	6.4	0.042	0.000	5.3	11.132	Surcharged
SIC1-017 (01-SW)	FEH: 30 years: +0 %: 60 mins: Winter	4.150	2.963	3.264	0.301	6.6	0.048	0.000	5.5	13.163	Surcharged
SIC1-018 (01-SW)	FEH: 30 years: +0 %: 60 mins: Winter	4.150	2.903	3.234	0.331	5.7	0.094	0.000	5.8	13.599	Surcharged
SIC1-023 (01-SW)	FEH: 30 years: +0 %: 60 mins: Winter	4.150	2.978	3.220	0.242	3.0	0.038	0.000	2.8	4.659	Surcharged
SIC1-019 (01-SW)	FEH: 30 years: +0 %: 60 mins: Winter	4.150	2.843	3.203	0.360	7.6	0.057	0.000	7.7	18.237	Surcharged
SMH1-004 (01-SW)	FEH: 30 years: +0 %: 60 mins: Winter	4.150	2.768	3.254	0.486	14.7	0.695	0.000	14.0	52.026	Surcharged
SMH1-006 (01-SW)	FEH: 30 years: +0 %: 60 mins: Winter	4.118	2.503	2.791	0.288	25.9	0.412	0.000	25.5	81.718	OK
INLET HEADWALL 1 (01-SW)	FEH: 30 years: +0 %: 480 mins: Winter	3.499	1.192	1.762	0.570	18.3	0.644	0.000	17.9	227.863	Surcharged
SMH1-009 (01-SW)	FEH: 30 years: +0 %: 60 mins: Winter	3.605	2.222	2.586	0.364	26.3	0.521	0.000	25.5	82.392	OK
OUTLET HEADWALL 1 (01-SW)	FEH: 30 years: +0 %: 480 mins: Winter	3.499	1.155	1.762	0.607	3.3	0.686	0.000	3.1	143.217	Surcharged
SMH1-011 (01-SW)	FEH: 30 years: +0 %: 480 mins: Winter	2.700	1.130	1.762	0.631	3.1	0.904	0.000	2.9	142.205	Surcharged
OUTLET HEADWALL 2 (01-SW)	FEH: 30 years: +0 %: 30 mins: Summer	2.725	1.800	1.870	0.070	2.9	0.000	0.000	2.9	5.463	OK
SIC1-014 (01-SW)	FEH: 30 years: +0 %: 60 mins: Winter	4.150	2.900	3.274	0.374	8.8	0.059	0.000	8.1	13.424	Surcharged
SIC1-013 (01-SW)	FEH: 30 years: +0 %: 15 mins: Summer	4.150	3.400	3.400	0.000	0.0	0.000	0.000	0.0	0.000	OK
SMH1-012 (01-SW)	FEH: 30 years: +0 %: 30 mins: Summer	3.430	1.828	1.899	0.071	2.9	0.080	0.000	2.9	5.463	OK
SIC1-024 (01-SW)	FEH: 30 years: +0 %: 60 mins: Winter	4.150	3.195	3.938	0.743	10.2	0.118	0.000	9.9	14.775	Flood Risk
SIC1-025 (01-SW)	FEH: 30 years: +0 %: 60 mins: Winter	4.150	3.190	3.274	0.084	7.7	0.013	0.000	7.7	11.266	OK

Margam Substation LoR:	Date:		
Margam Drainage Design Surface Water summary Results	21/08/2025		
	Designed by: I Leonard	Checked by: C Rennie	Approved By: S Spencer
Report Details: Type: Junctions Summary Storm Phase: Phase	One Warwick Technology Park: Gallows Hill, Warwick CV34 6YL		

BakerHicks.

FEH: 100 years: Increase Rainfall (%): +40: Critical Storm Per Item: Rank By: Max. Depth

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
SMH1-010 (01-SW)	FEH: 100 years: +40 %: 720 mins: Winter	5.400	1.952	2.202	0.250	19.6	0.358	0.000	19.6	371.349	OK
SMH1-008 (01-SW)	FEH: 100 years: +40 %: 60 mins: Winter	4.404	2.289	2.858	0.569	41.0	0.814	0.000	40.2	134.276	Surcharged
SMH1-007 (01-SW)	FEH: 100 years: +40 %: 60 mins: Winter	4.214	2.392	2.985	0.593	43.3	0.848	0.000	41.0	137.115	Surcharged
SIC1-012 (01-SW)	FEH: 100 years: +40 %: 60 mins: Winter	4.150	3.050	3.791	0.741	2.2	0.118	0.000	2.3	4.013	Surcharged
SIC1-022 (01-SW) (1)	FEH: 100 years: +40 %: 60 mins: Winter	4.150	3.038	3.712	0.674	4.3	0.191	0.000	3.6	8.244	Surcharged
SIC1-021 (01-SW) (1)	FEH: 100 years: +40 %: 60 mins: Winter	4.150	3.300	3.788	0.488	4.1	0.138	0.000	3.0	6.221	Surcharged
SIC1-020 (01-SW) (1)	FEH: 100 years: +40 %: 60 mins: Winter	4.150	3.400	3.792	0.392	2.2	0.111	0.000	2.0	3.164	Surcharged
SIC1-011 (01-SW)	FEH: 100 years: +40 %: 60 mins: Winter	4.150	3.400	3.809	0.409	2.8	0.065	0.000	2.2	4.017	Surcharged
SIC1-006 (01-SW)	FEH: 100 years: +40 %: 60 mins: Winter	4.150	3.310	4.110	0.800	3.6	0.127	0.000	2.0	10.407	Flood Risk
SIC1-005 (01-SW)	FEH: 100 years: +40 %: 60 mins: Winter	4.150	3.400	4.077	0.677	3.0	0.108	0.000	1.9	9.520	Flood Risk
SIC1-007 (01-SW)	FEH: 100 years: +40 %: 60 mins: Winter	4.150	3.170	4.148	0.978	19.9	0.156	0.000	11.8	50.657	Flood Risk
SMH1-005 (01-SW)	FEH: 100 years: +40 %: 60 mins: Winter	4.150	2.728	3.624	0.896	26.1	1.282	0.000	26.3	108.137	Surcharged
SIC1-001 (01-SW)	FEH: 100 years: +40 %: 180 mins: Winter	4.150	3.400	3.953	0.553	2.7	0.088	0.000	2.8	24.919	Flood Risk
SIC1-002 (01-SW)	FEH: 100 years: +40 %: 60 mins: Winter	4.150	3.330	3.972	0.642	2.7	0.102	0.000	1.3	5.619	Flood Risk
SIC1-003 (01-SW)	FEH: 100 years: +40 %: 120 mins: Winter	4.150	3.400	3.987	0.587	2.2	0.093	0.000	2.1	16.071	Flood Risk
SIC1-004 (01-SW)	FEH: 100 years: +40 %: 60 mins: Winter	4.150	3.290	4.001	0.711	4.4	0.113	0.000	2.9	12.438	Flood Risk
SIC1-009 (01-SW)	FEH: 100 years: +40 %: 120 mins: Winter	4.150	3.400	3.989	0.589	2.2	0.094	0.000	2.3	10.094	Flood Risk
SIC1-008 (01-SW)	FEH: 100 years: +40 %: 60 mins: Winter	4.150	3.130	4.072	0.942	11.8	0.150	0.000	11.5	36.710	Flood Risk
SMH1-001 (01-SW)	FEH: 100 years: +40 %: 60 mins: Winter	4.150	3.085	4.002	0.917	11.6	1.312	0.000	8.8	50.952	Flood Risk
SMH1-002 (01-SW)	FEH: 100 years: +40 %: 60 mins: Winter	4.150	2.977	3.830	0.853	10.8	1.221	0.000	9.1	46.115	Surcharged

SIC1-010 (01-SW)	FEH: 100 years: +40 %: 60 mins: Winter	4.150	3.400	3.790	0.390	3.3	0.062	0.000	2.9	4.616	Surcharged
SMH1-003 (01-SW)	FEH: 100 years: +40 %: 60 mins: Winter	4.150	2.884	3.720	0.836	10.5	1.197	0.000	10.3	49.914	Surcharged
SIC1-015 (01-SW)	FEH: 100 years: +40 %: 60 mins: Winter	4.150	3.210	3.840	0.630	6.4	0.100	0.000	5.3	11.259	Surcharged
SIC1-016 (01-SW)	FEH: 100 years: +40 %: 60 mins: Winter	4.150	3.060	3.811	0.751	9.8	0.119	0.000	7.6	19.954	Surcharged
SIC1-017 (01-SW)	FEH: 100 years: +40 %: 60 mins: Winter	4.150	2.963	3.745	0.782	10.0	0.124	0.000	8.7	23.563	Surcharged
SIC1-018 (01-SW)	FEH: 100 years: +40 %: 60 mins: Winter	4.150	2.903	3.703	0.800	9.2	0.226	0.000	8.0	24.353	Surcharged
SIC1-023 (01-SW)	FEH: 100 years: +40 %: 60 mins: Winter	4.150	2.978	3.685	0.707	3.6	0.112	0.000	3.3	8.228	Surcharged
SIC1-019 (01-SW)	FEH: 100 years: +40 %: 60 mins: Winter	4.150	2.843	3.657	0.814	10.7	0.129	0.000	11.0	32.524	Surcharged
SMH1-004 (01-SW)	FEH: 100 years: +40 %: 60 mins: Winter	4.150	2.768	3.716	0.948	18.6	1.356	0.000	16.9	72.590	Surcharged
SMH1-006 (01-SW)	FEH: 100 years: +40 %: 60 mins: Winter	4.118	2.503	3.064	0.561	36.9	0.803	0.000	34.9	125.624	Surcharged
INLET HEADWALL 1 (01-SW)	FEH: 100 years: +40 %: 720 mins: Winter	3.499	1.192	2.202	1.010	22.9	1.142	0.000	22.8	429.928	Surcharged
SMH1-009 (01-SW)	FEH: 100 years: +40 %: 60 mins: Winter	3.605	2.222	2.688	0.466	40.2	0.667	0.000	39.4	128.950	Surcharged
OUTLET HEADWALL 1 (01-SW)	FEH: 100 years: +40 %: 720 mins: Winter	3.499	1.155	2.202	1.047	3.3	1.184	0.000	3.1	227.882	Surcharged
SMH1-011 (01-SW)	FEH: 100 years: +40 %: 720 mins: Winter	2.700	1.130	2.202	1.072	3.1	1.534	0.000	2.9	226.216	Surcharged
OUTLET HEADWALL 2 (01-SW)	FEH: 100 years: +40 %: 15 mins: Summer	2.725	1.800	1.870	0.070	2.9	0.000	0.000	2.9	2.243	OK
SIC1-014 (01-SW)	FEH: 100 years: +40 %: 60 mins: Winter	4.150	2.900	3.783	0.883	13.0	0.140	0.000	10.7	24.029	Surcharged
SIC1-013 (01-SW)	FEH: 100 years: +40 %: 60 mins: Winter	4.150	3.400	3.783	0.383	2.0	0.061	0.000	0.4	0.446	Surcharged
SMH1-012 (01-SW)	FEH: 100 years: +40 %: 15 mins: Summer	3.430	1.828	1.899	0.071	2.9	0.080	0.000	2.9	2.243	OK
SIC1-024 (01-SW)	FEH: 100 years: +40 %: 60 mins: Winter	4.150	3.195	4.154	0.959	17.8	3.839	3.687	16.0	25.511	Flood
SIC1-025 (01-SW)	FEH: 100 years: +40 %: 60 mins: Winter	4.150	3.190	3.785	0.595	13.5	0.095	0.000	12.4	19.754	Surcharged

Margam Substation LoR:	Date:		
Margam Drainage Design Surface Water summary Results	21/08/2025		
	Designed by: I Leonard	Checked by: C Rennie	Approved By: S Spencer
Report Details: Type: Stormwater Controls Summary Storm Phase: Phase	One Warwick Technology Park: Gallows Hill, Warwick CV34 6YL		

FEH: 2 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Resident Volume

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Half Drain Down Time (mins)	Percentage Available (%)	Status
Pond	FEH: 2 years: +0 %: 480 mins: Winter	1.483	1.483	0.328	0.328	11.1	75.332	0.000	0.000	3.2	128.241	199	90.735	OK
Porous Paving 1	FEH: 2 years: +0 %: 1440 mins: Winter	4.092	3.788	0.100	0.013	1.6	44.223	0.000	0.000	0.3	10.822	1211	78.375	OK
Porous Paving 2	FEH: 2 years: +0 %: 1440 mins: Winter	4.082	3.784	0.139	0.009	1.1	30.299	0.000	0.000	0.2	7.531	1165	70.225	OK
Porous Paving 3	FEH: 2 years: +0 %: 1440 mins: Winter	4.127	3.782	0.189	0.007	0.8	21.239	0.000	0.000	0.2	5.303	1144	59.454	OK
Porous Paving 4	FEH: 2 years: +0 %: 240 mins: Summer	4.161	3.788	0.380	0.013	2.2	2.357	0.105	0.000	1.8	6.098	16	45.910	Flood
Porous Paving 5	FEH: 2 years: +0 %: 1440 mins: Winter	4.068	3.780	0.114	0.005	0.7	19.572	0.000	0.000	0.1	4.871	1160	75.614	OK
Porous Paving 6	FEH: 2 years: +0 %: 1440 mins: Winter	4.086	3.780	0.152	0.005	0.6	17.572	0.000	0.000	0.1	4.384	1150	67.288	OK
Porous Paving 7	FEH: 2 years: +0 %: 1440 mins: Winter	4.081	3.781	0.157	0.006	0.6	16.379	0.000	0.000	0.1	4.092	1139	66.252	OK
Porous Paving 8	FEH: 2 years: +0 %: 1440 mins: Winter	4.027	3.780	0.114	0.005	0.3	8.470	0.000	0.000	0.1	2.109	1137	75.473	OK
Porous Paving 9	FEH: 2 years: +0 %: 1440 mins: Winter	4.099	3.781	0.148	0.006	0.5	14.230	0.000	0.000	0.1	3.546	1146	68.219	OK
Porous Paving 10	FEH: 2 years: +0 %: 1440 mins: Winter	4.088	3.786	0.143	0.011	1.5	41.017	0.000	0.000	0.3	10.179	1169	69.216	OK
Porous Paving 11	FEH: 2 years: +0 %: 1440 mins: Winter	4.062	3.782	0.147	0.007	1.1	31.143	0.000	0.000	0.2	7.772	1160	68.547	OK
Porous Paving 12	FEH: 2 years: +0 %: 1440 mins: Winter	4.004	3.779	0.115	0.004	0.5	12.737	0.000	0.000	0.1	3.185	1138	75.238	OK
Porous Paving 13	FEH: 2 years: +0 %: 1440 mins: Winter	3.954	3.777	0.125	0.002	0.1	2.616	0.000	0.000	0.0	1.311	594	77.629	OK
Porous Paving 14	FEH: 2 years: +0 %: 1440 mins: Winter	3.996	3.778	0.141	0.003	0.2	5.371	0.000	0.000	0.1	1.789	855	71.719	OK
Porous Paving 15	FEH: 2 years: +0 %: 1440 mins: Winter	3.915	3.777	0.075	0.002	0.1	1.424	0.000	0.000	0.0	0.711	591	86.492	OK
Porous Paving 16	FEH: 2 years: +0 %: 1440 mins: Winter	4.138	3.777	0.328	0.002	0.2	3.422	0.000	0.000	0.1	1.771	570	41.716	OK
Porous Paving 17	FEH: 2 years: +0 %: 1440 mins: Summer	3.986	3.779	0.112	0.004	0.2	2.857	0.000	0.000	0.0	0.948	562	77.405	OK
Porous Paving 18	FEH: 2 years: +0 %: 1440 mins: Winter	3.957	3.778	0.111	0.003	0.2	4.337	0.000	0.000	0.0	1.441	856	77.640	OK

FEH: 30 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Resident Volume

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Half Drain Down Time (mins)	Percentage Available (%)	Status
Pond	FEH: 30 years: +0 %: 480 mins: Winter	1.762	1.762	0.607	0.607	17.9	153.412	0.000	0.000	3.3	144.680	388	81.132	OK
Porous Paving 1	FEH: 30 years: +0 %: 1440 mins: Winter	4.150	3.791	0.158	0.016	2.5	69.755	0.000	0.000	0.5	17.182	1189	65.890	OK
Porous Paving 2	FEH: 30 years: +0 %: 1440 mins: Winter	4.162	3.786	0.219	0.011	1.7	47.807	0.000	0.000	0.3	11.920	1152	53.020	OK
Porous Paving 3	FEH: 30 years: +0 %: 1440 mins: Winter	4.237	3.784	0.299	0.009	1.2	33.519	0.000	0.000	0.2	8.391	1142	36.012	OK
Porous Paving 4	FEH: 30 years: +0 %: 60 mins: Winter	4.167	3.936	0.386	0.161	6.8	3.291	0.207	0.000	6.5	7.848	6	24.478	Flood
Porous Paving 5	FEH: 30 years: +0 %: 1440 mins: Winter	4.133	3.781	0.179	0.006	1.1	30.801	0.000	0.000	0.2	7.684	1151	61.623	OK
Porous Paving 6	FEH: 30 years: +0 %: 1440 mins: Winter	4.174	3.781	0.240	0.006	1.0	27.679	0.000	0.000	0.2	6.925	1146	48.472	OK
Porous Paving 7	FEH: 30 years: +0 %: 1440 mins: Winter	4.173	3.782	0.250	0.007	0.9	25.987	0.000	0.000	0.2	6.510	1146	46.454	OK
Porous Paving 8	FEH: 30 years: +0 %: 1440 mins: Winter	4.092	3.781	0.179	0.006	0.5	13.246	0.000	0.000	0.1	3.312	1132	61.640	OK
Porous Paving 9	FEH: 30 years: +0 %: 1440 mins: Winter	4.185	3.782	0.234	0.007	0.8	22.485	0.000	0.000	0.2	5.618	1160	49.784	OK
Porous Paving 10	FEH: 30 years: +0 %: 1440 mins: Winter	4.170	3.788	0.225	0.013	2.3	64.502	0.000	0.000	0.5	16.058	1158	51.590	OK
Porous Paving 11	FEH: 30 years: +0 %: 1440 mins: Winter	4.147	3.783	0.231	0.008	1.8	49.116	0.000	0.000	0.4	12.293	1146	50.395	OK
Porous Paving 12	FEH: 30 years: +0 %: 1440 mins: Winter	4.072	3.780	0.183	0.005	0.7	20.211	0.000	0.000	0.1	5.070	1154	60.707	OK
Porous Paving 13	FEH: 30 years: +0 %: 1440 mins: Winter	4.026	3.778	0.197	0.003	0.2	4.107	0.000	0.000	0.1	2.074	570	64.881	OK
Porous Paving 14	FEH: 30 years: +0 %: 1440 mins: Winter	4.077	3.779	0.221	0.004	0.3	8.424	0.000	0.000	0.1	2.823	876	55.642	OK
Porous Paving 15	FEH: 30 years: +0 %: 1440 mins: Winter	3.962	3.777	0.123	0.002	0.1	2.311	0.000	0.000	0.0	1.160	577	78.072	OK
Porous Paving 16	FEH: 30 years: +0 %: 1440 mins: Winter	4.187	3.779	0.376	0.004	0.2	4.033	0.096	0.000	0.2	4.372	296	31.298	Flood
Porous Paving 17	FEH: 30 years: +0 %: 1440 mins: Winter	4.050	3.779	0.177	0.004	0.2	4.502	0.000	0.000	0.0	1.501	835	64.401	OK
Porous Paving 18	FEH: 30 years: +0 %: 1440 mins: Winter	4.023	3.780	0.177	0.005	0.3	6.899	0.000	0.000	0.1	2.311	858	64.431	

FEH: 100 years: Increase Rainfall (%): +40: Critical Storm Per Item: Rank By: Max. Resident Volume

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Half Drain Down Time (mins)	Percentage Available (%)	Status
Pond	FEH: 100 years: +40 %: 720 mins: Winter	2.202	2.202	1.047	1.047	22.8	306.977	0.000	0.000	3.3	230.055	798	62.246	OK
Porous Paving 1	FEH: 100 years: +40 %: 1440 mins: Winter	4.259	3.796	0.267	0.021	4.3	117.603	0.000	0.000	0.8	29.135	1172	42.492	OK
Porous Paving 2	FEH: 100 years: +40 %: 1440 mins: Winter	4.313	3.789	0.370	0.014	2.9	80.680	0.000	0.000	0.6	20.185	1151	20.715	OK
Porous Paving 3	FEH: 100 years: +40 %: 1440 mins: Winter	4.316	3.793	0.377	0.018	2.1	44.326	1.912	0.000	1.1	28.838	499	15.380	Flood
Porous Paving 4	FEH: 100 years: +40 %: 30 mins: Winter	4.197	4.197	0.416	0.422	16.8	6.080	1.725	0.000	11.4	10.581	7	-39.544	Flood
Porous Paving 5	FEH: 100 years: +40 %: 1440 mins: Winter	4.256	3.783	0.302	0.008	1.9	51.977	0.000	0.000	0.4	13.004	1140	35.238	OK
Porous Paving 6	FEH: 100 years: +40 %: 1440 mins: Winter	4.309	3.783	0.376	0.008	1.7	44.065	0.863	0.000	0.3	15.358	1088	17.967	Flood
Porous Paving 7	FEH: 100 years: +40 %: 1440 mins: Winter	4.300	3.784	0.376	0.009	1.6	39.912	0.846	0.000	0.3	16.003	1055	17.762	Flood
Porous Paving 8	FEH: 100 years: +40 %: 1440 mins: Winter	4.220	3.783	0.307	0.008	0.8	22.727	0.000	0.000	0.2	5.703	1142	34.185	OK
Porous Paving 9	FEH: 100 years: +40 %: 1440 mins: Winter	4.327	3.784	0.376	0.009	1.4	36.738	0.726	0.000	0.3	11.431	1114	17.951	Flood
Porous Paving 10	FEH: 100 years: +40 %: 1440 mins: Winter	4.320	3.792	0.376	0.017	4.0	108.697	1.399	0.000	0.8	29.221	1148	18.422	Flood
Porous Paving 11	FEH: 100 years: +40 %: 1440 mins: Winter	4.292	3.786	0.376	0.011	3.0	81.048	1.341	0.000	0.6	24.130	1121	18.145	Flood
Porous Paving 12	FEH: 100 years: +40 %: 1440 mins: Winter	4.198	3.781	0.309	0.006	1.3	34.090	0.000	0.000	0.3	8.588	1140	33.723	OK
Porous Paving 13	FEH: 100 years: +40 %: 1440 mins: Winter	4.161	3.779	0.332	0.004	0.3	6.921	0.000	0.000	0.1	3.516	557	40.819	OK
Porous Paving 14	FEH: 100 years: +40 %: 1440 mins: Winter	4.228	3.781	0.372	0.006	0.6	14.185	0.000	0.000	0.1	4.784	860	25.304	OK
Porous Paving 15	FEH: 100 years: +40 %: 1440 mins: Winter	4.044	3.778	0.205	0.003	0.2	3.855	0.000	0.000	0.1	1.941	566	63.428	OK
Porous Paving 16	FEH: 100 years: +40 %: 240 mins: Winter	4.191	3.786	0.380	0.011	1.6	4.260	0.290	0.000	1.1	5.129	46	27.436	Flood
Porous Paving 17	FEH: 100 years: +40 %: 1440 mins: Summer	4.172	3.782	0.298	0.007	0.5	7.585	0.000	0.000	0.1	2.539	552	40.015	OK
Porous Paving 18	FEH: 100 years: +40 %: 1440 mins: Summer	4.144	3.782	0.297	0.007	0.7	11.593	0.000	0.000	0.2	3.907	555	40.230	OK

FEH: 2 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Flow

Connection	Storm Event	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
1.000 (01-SW)	FEH: 2 years: +0 %: 120 mins: Winter	Pipe	SIC1-001 (01-SW)	SIC1-002 (01-SW)	4.150	3.522	0.144	4.242	0.1	0.7	1.0	OK
1.001 (01-SW)	FEH: 2 years: +0 %: 120 mins: Winter	Pipe	SIC1-002 (01-SW)	SIC1-004 (01-SW)	4.150	3.498	0.150	4.190	0.1	0.73	1.2	Surcharged
1.002 (01-SW)	FEH: 2 years: +0 %: 120 mins: Winter	Pipe	SIC1-004 (01-SW)	SIC1-007 (01-SW)	4.150	3.488	0.150	7.399	0.1	1.36	2.1	Surcharged
1.004 (01-SW)	FEH: 2 years: +0 %: 15 mins: Winter	Pipe	SIC1-008 (01-SW)	SMH1-001 (01-SW)	4.150	3.343	0.222	5.128	0.3	1.36	7.6	OK
1.005 (01-SW)	FEH: 2 years: +0 %: 30 mins: Winter	Pipe	SMH1-001 (01-SW)	SMH1-002 (01-SW)	4.150	3.352	0.225	10.577	0.2	1.4	6.2	Surcharged
1.006 (01-SW)	FEH: 2 years: +0 %: 120 mins: Winter	Pipe	SMH1-002 (01-SW)	SMH1-003 (01-SW)	4.150	3.216	0.175	28.704	0.2	1.46	6.2	Surcharged
1.008 (01-SW)	FEH: 2 years: +0 %: 120 mins: Winter	Pipe	SMH1-004 (01-SW)	SMH1-005 (01-SW)	4.150	2.982	0.212	39.499	0.2	0.89	8.7	OK
1.009 (01-SW)	FEH: 2 years: +0 %: 120 mins: Winter	Pipe	SMH1-005 (01-SW)	SMH1-006 (01-SW)	4.150	2.938	0.195	53.144	0.3	0.78	12.6	OK
1.010 (01-SW)	FEH: 2 years: +0 %: 120 mins: Winter	Pipe	SMH1-006 (01-SW)	SMH1-007 (01-SW)	4.118	2.692	0.203	61.035	0.2	0.36	14.3	OK
1.011 (01-SW)	FEH: 2 years: +0 %: 120 mins: Winter	Pipe	SMH1-007 (01-SW)	SMH1-008 (01-SW)	4.214	2.610	0.240	65.954	0.2	0.43	15.2	OK
1.012 (01-SW) (1)	FEH: 2 years: +0 %: 120 mins: Winter	Pipe	SMH1-008 (01-SW)	SMH1-009 (01-SW)	4.404	2.551	0.267	65.686	0.2	0.61	14.8	OK
1.013 (01-SW)	FEH: 2 years: +0 %: 120 mins: Winter	Pipe	SMH1-009 (01-SW)	SMH1-010 (01-SW)	3.605	2.495	0.179	64.777	0.2	0.43	14.5	OK
1.014 (01-SW)	FEH: 2 years: +0 %: 120 mins: Winter	Pipe	SMH1-010 (01-SW)	INLET HEADWALL 1 (01-SW)	5.400	2.036	0.122	64.599	0.6	0.08	14.5	OK
1.016 (01-SW)	FEH: 2 years: +0 %: 120 mins: Winter	Pipe	OUTLET HEADWALL 1 (01-SW)	SMH1-011 (01-SW)	3.499	1.388	0.246	30.077	0.1	0.08	3.2	OK
2.000 (01-SW)	FEH: 2 years: +0 %: 120 mins: Summer	Pipe	SIC1-003 (01-SW)	SIC1-004 (01-SW)	4.150	3.484	0.129	2.887	0.1	0.6	1.1	OK
3.000 (01-SW)	FEH: 2 years: +0 %: 30 mins: Winter	Pipe	SIC1-005 (01-SW)	SIC1-006 (01-SW)	4.150	3.443	0.064	0.438	0.1	0.18	0.4	OK
1.003 (01-SW)	FEH: 2 years: +0 %: 15 mins: Winter	Pipe	SIC1-007 (01-SW)	SIC1-008 (01-SW)	4.150	3.392	0.211	5.524	0.2	1.39	7.9	OK
3.001 (01-SW)	FEH: 2 years: +0 %: 15 mins: Summer	Pipe	SIC1-006 (01-SW)	SIC1-007 (01-SW)	4.150	3.380	0.101	0.148	0.1	0.28	0.6	OK
4.000 (01-SW)	FEH: 2 years: +0 %: 30 mins: Winter	Pipe	SIC1-009 (01-SW)	SMH1-001 (01-SW)	4.150	3.469	0.125	1.123	0.1	0.43	1.1	OK

5.000 (01-SW)	FEH: 2 years: +0 %: 30 mins: Winter	Pipe	SIC1-010 (01-SW)	SMH1-003 (01-SW)	4.150	3.457	0.042	0.890	0.2	0.18	0.9	OK
6.000 (01-SW)	FEH: 2 years: +0 %: 30 mins: Summer	Pipe	SIC1-011 (01-SW)	SIC1-012 (01-SW)	4.150	3.457	0.054	0.691	0.2	0.26	1.0	OK
8.000 (01-SW)	FEH: 2 years: +0 %: 120 mins: Summer	Pipe	SIC1-015 (01-SW)	SIC1-016 (01-SW)	4.150	3.286	0.090	3.844	0.1	0.24	1.4	OK
8.001 (01-SW)	FEH: 2 years: +0 %: 120 mins: Summer	Pipe	SIC1-016 (01-SW)	SIC1-017 (01-SW)	4.150	3.164	0.100	6.819	0.1	0.42	2.4	OK
8.002 (01-SW)	FEH: 2 years: +0 %: 120 mins: Summer	Pipe	SIC1-017 (01-SW)	SIC1-018 (01-SW)	4.150	3.059	0.097	8.056	0.2	0.38	2.8	OK
9.000 (01-SW)	FEH: 2 years: +0 %: 15 mins: Summer	Pipe	SIC1-020 (01-SW) (1)	SIC1-021 (01-SW) (1)	4.150	3.446	0.051	0.403	0.2	0.2	0.8	OK
9.001 (01-SW)	FEH: 2 years: +0 %: 30 mins: Summer	Pipe	SIC1-021 (01-SW) (1)	SIC1-022 (01-SW) (1)	4.150	3.365	0.067	1.161	0.2	0.39	1.4	OK
9.003 (01-SW)	FEH: 2 years: +0 %: 30 mins: Summer	Pipe	SIC1-023 (01-SW)	SIC1-019 (01-SW)	4.150	3.062	0.060	1.497	0.2	0.44	1.6	OK
8.004 (01-SW)	FEH: 2 years: +0 %: 120 mins: Summer	Pipe	SIC1-019 (01-SW)	SMH1-005 (01-SW)	4.150	2.956	0.124	11.311	0.2	0.4	4.1	OK
8.003 (01-SW)	FEH: 2 years: +0 %: 120 mins: Summer	Pipe	SIC1-018 (01-SW)	SIC1-019 (01-SW)	4.150	3.000	0.105	8.324	0.2	0.38	2.9	OK
9.002 (01-SW)	FEH: 2 years: +0 %: 30 mins: Summer	Pipe	SIC1-022 (01-SW) (1)	SIC1-023 (01-SW)	4.150	3.107	0.077	1.519	0.2	0.43	1.6	OK
1.015 (01-SW)	FEH: 2 years: +0 %: 120 mins: Winter	Pipe	INLET HEADWALL 1 (01-SW)	Pond	3.499	1.388	0.215	75.856	0.9	0.09	16.0	OK
1.015a (01-SW)	FEH: 2 years: +0 %: 120 mins: Winter	Pipe	Pond	OUTLET HEADWALL 1 (01-SW)	3.499	1.388	0.233	30.856	0.1	0.03	3.5	OK
Dummy PP7	FEH: 2 years: +0 %: 30 mins: Winter	Pipe	Porous Paving 7	SIC1-010 (01-SW)	4.150	3.807	0.036	0.909	0.3	0.02	1.0	OK
Dummy PP1	FEH: 2 years: +0 %: 120 mins: Winter	Pipe	Porous Paving 1	SIC1-001 (01-SW)	4.150	3.814	0.072	4.290	0.2	0.06	1.0	OK
Dummy PP2	FEH: 2 years: +0 %: 30 mins: Winter	Pipe	Porous Paving 2	SIC1-003 (01-SW)	4.150	3.804	0.050	1.436	0.3	0.04	1.2	OK
Dummy PP3	FEH: 2 years: +0 %: 30 mins: Winter	Pipe	Porous Paving 3	SIC1-009 (01-SW)	4.150	3.813	0.044	1.162	0.4	0.04	1.3	OK
Dummy PP4	FEH: 2 years: +0 %: 15 mins: Winter	Pipe	Porous Paving 4	SIC1-007 (01-SW)	4.150	3.892	0.118	1.338	0.2	0.01	2.9	OK
Dummy PP5	FEH: 2 years: +0 %: 30 mins: Winter	Pipe	Porous Paving 5	SMH1-001 (01-SW)	4.150	3.798	0.139	1.020	0.1	0.01	1.0	OK
Dummy PP6	FEH: 2 years: +0 %: 15 mins: Winter	Pipe	Porous Paving 6	SMH1-002 (01-SW)	4.150	3.798	0.104	0.645	0.7	0.01	1.1	OK
Dummy PP8	FEH: 2 years: +0 %: 30 mins: Winter	Pipe	Porous Paving 8	SIC1-005 (01-SW)	4.150	3.798	0.028	0.452	0.3	0.02	0.5	OK
Dummy PP9	FEH: 2 years: +0 %: 15 mins: Winter	Pipe	Porous Paving 9	SIC1-011 (01-SW)	4.150	3.798	0.036	0.507	0.5	0.02	0.9	OK
Dummy PP10	FEH: 2 years: +0 %: 120 mins: Summer	Pipe	Porous Paving 10	SIC1-015 (01-SW)	4.150	3.823	0.049	3.868	0.3	0.05	1.4	OK
Dummy PP11	FEH: 2 years: +0 %: 30 mins: Winter	Pipe	Porous Paving 11	SIC1-016 (01-SW)	4.150	3.805	0.055	1.636	0.6	0.03	1.6	OK

Dummy PP12	FEH: 2 years: +0 %: 30 mins: Winter	Pipe	Porous Paving 12	SIC1-017 (01-SW)	4.150	3.798	0.048	0.710	0.4	0.01	0.8	OK
Dummy PP15	FEH: 2 years: +0 %: 15 mins: Winter	Pipe	Porous Paving 15	SIC1-018 (01-SW)	4.150	3.785	0.038	0.115	0.6	0	0.2	OK
Dummy PP16	FEH: 2 years: +0 %: 15 mins: Winter	Pipe	Porous Paving 16	SIC1-022 (01-SW) (1)	4.150	3.814	0.035	0.299	0.6	0.01	0.6	OK
Dummy PP14	FEH: 2 years: +0 %: 15 mins: Winter	Pipe	Porous Paving 14	SIC1-021 (01-SW) (1)	4.150	3.795	0.035	0.280	0.4	0.01	0.5	OK
Dummy PP13	FEH: 2 years: +0 %: 15 mins: Winter	Pipe	Porous Paving 13	SIC1-020 (01-SW) (1)	4.150	3.791	0.026	0.218	0.4	0.01	0.4	OK
Dummy PP18	FEH: 2 years: +0 %: 30 mins: Summer	Pipe	Porous Paving 18	SIC1-020 (01-SW) (1)	4.150	3.796	0.028	0.322	0.2	0.01	0.4	OK
Dummy PP17	FEH: 2 years: +0 %: 30 mins: Summer	Pipe	Porous Paving 17	SIC1-021 (01-SW) (1)	4.150	3.796	0.037	0.209	0.1	0.01	0.3	OK
1.007 (01-SW)	FEH: 2 years: +0 %: 120 mins: Winter	Pipe	SMH1-003 (01-SW)	SMH1-004 (01-SW)	4.150	2.995	0.125	30.418	0.4	0.3	6.7	OK
6.001 (01-SW)	FEH: 2 years: +0 %: 30 mins: Winter	Pipe	SIC1-012 (01-SW)	SIC1-014 (01-SW)	4.150	3.119	0.053	0.750	0.1	0.26	0.6	OK
6.002 (01-SW)	FEH: 2 years: +0 %: 15 mins: Winter	Pipe	SIC1-014 (01-SW)	SMH1-004 (01-SW)	4.150	3.059	0.115	3.250	0.3	0.8	6.2	OK
7.000 (01-SW)	FEH: 2 years: +0 %: 15 mins: Summer	Pipe	SIC1-013 (01-SW)	SIC1-014 (01-SW)	4.150	3.400	0.041	0.000	0.0	0	0.0	OK
1.017 (01-SW)	FEH: 2 years: +0 %: 30 mins: Winter	Pipe	SMH1-011 (01-SW)	SMH1-012 (01-SW)	2.700	1.233	0.016	2.802	0.0	0.02	2.9	OK
1.018 (01-SW)	FEH: 2 years: +0 %: 60 mins: Summer	Pipe	SMH1-012 (01-SW)	OUTLET HEADWALL 2 (01-SW)	3.430	1.899	0.070	11.273	0.2	0.05	2.9	OK
10.000 (01-SW)	FEH: 2 years: +0 %: 15 mins: Winter	Pipe	SIC1-024 (01-SW)	SIC1-007 (01-SW)	4.150	3.395	0.211	3.913	0.3	0.39	8.1	OK
11.000 (01-SW)	FEH: 2 years: +0 %: 15 mins: Winter	Pipe	SIC1-025 (01-SW)	SIC1-014 (01-SW)	4.150	3.224	0.096	3.018	0.7	0.05	6.5	OK

FEH: 30 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Flow

Connection	Storm Event	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
1.000 (01-SW)	FEH: 30 years: +0 %: 120 mins: Winter	Pipe	SIC1-001 (01-SW)	SIC1-002 (01-SW)	4.150	3.844	0.150	8.272	0.1	1.64	2.4	Surcharged
1.001 (01-SW)	FEH: 30 years: +0 %: 120 mins: Winter	Pipe	SIC1-002 (01-SW)	SIC1-004 (01-SW)	4.150	3.847	0.150	8.179	0.1	1.49	2.5	Surcharged
1.002 (01-SW)	FEH: 30 years: +0 %: 120 mins: Winter	Pipe	SIC1-004 (01-SW)	SIC1-007 (01-SW)	4.150	3.849	0.150	14.344	0.2	2.49	3.8	Surcharged
1.004 (01-SW)	FEH: 30 years: +0 %: 15 mins: Winter	Pipe	SIC1-008 (01-SW)	SMH1-001 (01-SW)	4.150	3.742	0.225	8.984	0.3	2.05	11.5	Surcharged
1.005 (01-SW)	FEH: 30 years: +0 %: 15 mins: Winter	Pipe	SMH1-001 (01-SW)	SMH1-002 (01-SW)	4.150	3.705	0.225	9.029	0.2	2.05	9.1	Surcharged
1.006 (01-SW)	FEH: 30 years: +0 %: 180 mins: Winter	Pipe	SMH1-002 (01-SW)	SMH1-003 (01-SW)	4.150	3.453	0.225	66.819	0.2	1.95	8.3	Surcharged
1.008 (01-SW)	FEH: 30 years: +0 %: 30 mins: Winter	Pipe	SMH1-004 (01-SW)	SMH1-005 (01-SW)	4.150	3.189	0.300	29.339	0.2	1.45	14.2	Surcharged
1.009 (01-SW)	FEH: 30 years: +0 %: 60 mins: Winter	Pipe	SMH1-005 (01-SW)	SMH1-006 (01-SW)	4.150	3.180	0.300	70.789	0.3	1.33	21.5	Surcharged
1.010 (01-SW)	FEH: 30 years: +0 %: 60 mins: Winter	Pipe	SMH1-006 (01-SW)	SMH1-007 (01-SW)	4.118	2.791	0.310	81.718	0.2	0.64	25.5	OK
1.011 (01-SW)	FEH: 30 years: +0 %: 60 mins: Winter	Pipe	SMH1-007 (01-SW)	SMH1-008 (01-SW)	4.214	2.725	0.352	88.181	0.2	0.79	27.8	OK
1.012 (01-SW) (1)	FEH: 30 years: +0 %: 60 mins: Winter	Pipe	SMH1-008 (01-SW)	SMH1-009 (01-SW)	4.404	2.662	0.368	86.317	0.2	1.08	26.3	OK
1.013 (01-SW)	FEH: 30 years: +0 %: 60 mins: Winter	Pipe	SMH1-009 (01-SW)	SMH1-010 (01-SW)	3.605	2.586	0.238	82.392	0.3	0.75	25.5	OK
1.014 (01-SW)	FEH: 30 years: +0 %: 60 mins: Winter	Pipe	SMH1-010 (01-SW)	INLET HEADWALL 1 (01-SW)	5.400	2.064	0.184	81.603	0.7	0.14	25.5	OK
1.016 (01-SW)	FEH: 30 years: +0 %: 60 mins: Winter	Pipe	OUTLET HEADWALL 1 (01-SW)	SMH1-011 (01-SW)	3.499	1.505	0.362	15.474	0.2	0.09	3.5	OK
2.000 (01-SW)	FEH: 30 years: +0 %: 120 mins: Winter	Pipe	SIC1-003 (01-SW)	SIC1-004 (01-SW)	4.150	3.852	0.150	6.201	0.1	1.06	1.9	Flood Risk
3.000 (01-SW)	FEH: 30 years: +0 %: 60 mins: Winter	Pipe	SIC1-005 (01-SW)	SIC1-006 (01-SW)	4.150	3.866	0.150	1.357	0.1	0.87	1.9	Flood Risk
1.003 (01-SW)	FEH: 30 years: +0 %: 15 mins: Winter	Pipe	SIC1-007 (01-SW)	SIC1-008 (01-SW)	4.150	3.789	0.225	9.836	0.3	2.28	13.0	Surcharged
3.001 (01-SW)	FEH: 30 years: +0 %: 60 mins: Winter	Pipe	SIC1-006 (01-SW)	SIC1-007 (01-SW)	4.150	3.892	0.150	1.338	0.1	1	2.2	Flood Risk
4.000 (01-SW)	FEH: 30 years: +0 %: 15 mins: Summer	Pipe	SIC1-009 (01-SW)	SMH1-001 (01-SW)	4.150	3.664	0.150	1.348	0.1	0.67	1.7	Surcharged

5.000 (01-SW)	FEH: 30 years: +0 %: 30 mins: Winter	Pipe	SIC1-010 (01-SW)	SMH1-003 (01-SW)	4.150	3.486	0.138	1.869	0.3	0.52	2.8	OK
6.000 (01-SW)	FEH: 30 years: +0 %: 15 mins: Winter	Pipe	SIC1-011 (01-SW)	SIC1-012 (01-SW)	4.150	3.478	0.094	1.124	0.2	0.54	2.0	OK
8.000 (01-SW)	FEH: 30 years: +0 %: 30 mins: Winter	Pipe	SIC1-015 (01-SW)	SIC1-016 (01-SW)	4.150	3.341	0.174	4.232	0.1	0.64	3.6	OK
8.001 (01-SW)	FEH: 30 years: +0 %: 30 mins: Winter	Pipe	SIC1-016 (01-SW)	SIC1-017 (01-SW)	4.150	3.283	0.225	7.587	0.2	1	5.7	OK
8.002 (01-SW)	FEH: 30 years: +0 %: 30 mins: Winter	Pipe	SIC1-017 (01-SW)	SIC1-018 (01-SW)	4.150	3.212	0.225	9.007	0.2	0.76	5.7	Surcharged
9.000 (01-SW)	FEH: 30 years: +0 %: 15 mins: Summer	Pipe	SIC1-020 (01-SW) (1)	SIC1-021 (01-SW) (1)	4.150	3.472	0.088	0.887	0.2	0.46	1.9	OK
9.001 (01-SW)	FEH: 30 years: +0 %: 30 mins: Summer	Pipe	SIC1-021 (01-SW) (1)	SIC1-022 (01-SW) (1)	4.150	3.415	0.123	2.523	0.2	0.93	3.3	OK
9.003 (01-SW)	FEH: 30 years: +0 %: 30 mins: Summer	Pipe	SIC1-023 (01-SW)	SIC1-019 (01-SW)	4.150	3.107	0.144	3.259	0.3	1.09	4.0	OK
8.004 (01-SW)	FEH: 30 years: +0 %: 30 mins: Summer	Pipe	SIC1-019 (01-SW)	SMH1-005 (01-SW)	4.150	3.083	0.225	11.355	0.3	0.83	8.3	Surcharged
8.003 (01-SW)	FEH: 30 years: +0 %: 30 mins: Winter	Pipe	SIC1-018 (01-SW)	SIC1-019 (01-SW)	4.150	3.181	0.225	9.275	0.2	0.79	6.0	Surcharged
9.002 (01-SW)	FEH: 30 years: +0 %: 30 mins: Summer	Pipe	SIC1-022 (01-SW) (1)	SIC1-023 (01-SW)	4.150	3.170	0.131	3.284	0.2	1.06	4.0	OK
1.015 (01-SW)	FEH: 30 years: +0 %: 120 mins: Winter	Pipe	INLET HEADWALL 1 (01-SW)	Pond	3.499	1.623	0.449	145.943	0.9	0.17	29.4	OK
1.015a (01-SW)	FEH: 30 years: +0 %: 60 mins: Winter	Pipe	Pond	OUTLET HEADWALL 1 (01-SW)	3.499	1.505	0.350	16.901	0.2	0.03	4.0	OK
Dummy PP7	FEH: 30 years: +0 %: 15 mins: Winter	Pipe	Porous Paving 7	SIC1-010 (01-SW)	4.150	3.823	0.058	1.325	0.5	0.06	2.5	OK
Dummy PP1	FEH: 30 years: +0 %: 120 mins: Winter	Pipe	Porous Paving 1	SIC1-001 (01-SW)	4.150	3.855	0.150	8.317	0.2	0.12	2.3	OK
Dummy PP2	FEH: 30 years: +0 %: 30 mins: Winter	Pipe	Porous Paving 2	SIC1-003 (01-SW)	4.150	3.840	0.150	2.841	0.4	0.11	3.2	OK
Dummy PP3	FEH: 30 years: +0 %: 15 mins: Winter	Pipe	Porous Paving 3	SIC1-009 (01-SW)	4.150	3.833	0.150	1.705	0.7	0.1	3.2	OK
Dummy PP4	FEH: 30 years: +0 %: 60 mins: Summer	Pipe	Porous Paving 4	SIC1-007 (01-SW)	4.150	4.156	0.225	6.780	0.2	0.03	7.6	Flood
Dummy PP5	FEH: 30 years: +0 %: 15 mins: Winter	Pipe	Porous Paving 5	SMH1-001 (01-SW)	4.150	3.810	0.225	1.490	0.2	0.02	2.5	OK
Dummy PP6	FEH: 30 years: +0 %: 15 mins: Winter	Pipe	Porous Paving 6	SMH1-002 (01-SW)	4.150	3.821	0.205	1.436	0.9	0.02	2.9	OK
Dummy PP8	FEH: 30 years: +0 %: 60 mins: Winter	Pipe	Porous Paving 8	SIC1-005 (01-SW)	4.150	3.849	0.150	1.355	0.3	0.07	1.8	OK
Dummy PP9	FEH: 30 years: +0 %: 15 mins: Winter	Pipe	Porous Paving 9	SIC1-011 (01-SW)	4.150	3.820	0.051	1.148	0.5	0.05	2.2	OK
Dummy PP10	FEH: 30 years: +0 %: 30 mins: Winter	Pipe	Porous Paving 10	SIC1-015 (01-SW)	4.150	3.837	0.083	4.383	0.5	0.15	4.1	OK
Dummy PP11	FEH: 30 years: +0 %: 30 mins: Winter	Pipe	Porous Paving 11	SIC1-016 (01-SW)	4.150	3.836	0.121	3.626	0.6	0.08	4.2	OK

Dummy PP12	FEH: 30 years: +0 %: 15 mins: Winter	Pipe	Porous Paving 12	SIC1-017 (01-SW)	4.150	3.810	0.078	1.058	0.7	0.03	2.1	OK
Dummy PP15	FEH: 30 years: +0 %: 15 mins: Winter	Pipe	Porous Paving 15	SIC1-018 (01-SW)	4.150	3.795	0.082	0.247	0.6	0.01	0.5	OK
Dummy PP16	FEH: 30 years: +0 %: 15 mins: Winter	Pipe	Porous Paving 16	SIC1-022 (01-SW) (1)	4.150	3.855	0.066	0.615	0.9	0.01	1.3	OK
Dummy PP14	FEH: 30 years: +0 %: 15 mins: Winter	Pipe	Porous Paving 14	SIC1-021 (01-SW) (1)	4.150	3.815	0.061	0.604	0.5	0.03	1.2	OK
Dummy PP13	FEH: 30 years: +0 %: 15 mins: Winter	Pipe	Porous Paving 13	SIC1-020 (01-SW) (1)	4.150	3.807	0.041	0.458	0.4	0.01	1.0	OK
Dummy PP18	FEH: 30 years: +0 %: 30 mins: Summer	Pipe	Porous Paving 18	SIC1-020 (01-SW) (1)	4.150	3.818	0.044	0.694	0.2	0.03	1.0	OK
Dummy PP17	FEH: 30 years: +0 %: 30 mins: Summer	Pipe	Porous Paving 17	SIC1-021 (01-SW) (1)	4.150	3.818	0.065	0.455	0.2	0.03	0.7	OK
1.007 (01-SW)	FEH: 30 years: +0 %: 60 mins: Winter	Pipe	SMH1-003 (01-SW)	SMH1-004 (01-SW)	4.150	3.261	0.225	39.077	0.4	0.43	9.9	Surcharged
6.001 (01-SW)	FEH: 30 years: +0 %: 15 mins: Winter	Pipe	SIC1-012 (01-SW)	SIC1-014 (01-SW)	4.150	3.161	0.131	1.050	0.2	0.88	2.1	OK
6.002 (01-SW)	FEH: 30 years: +0 %: 15 mins: Winter	Pipe	SIC1-014 (01-SW)	SMH1-004 (01-SW)	4.150	3.135	0.186	6.873	0.4	1.62	12.6	Surcharged
7.000 (01-SW)	FEH: 30 years: +0 %: 15 mins: Summer	Pipe	SIC1-013 (01-SW)	SIC1-014 (01-SW)	4.150	3.400	0.075	0.000	0.0	0	0.0	OK
1.017 (01-SW)	FEH: 30 years: +0 %: 30 mins: Summer	Pipe	SMH1-011 (01-SW)	SMH1-012 (01-SW)	2.700	1.345	0.016	5.570	0.0	0.02	2.9	OK
1.018 (01-SW)	FEH: 30 years: +0 %: 30 mins: Summer	Pipe	SMH1-012 (01-SW)	OUTLET HEADWALL 2 (01-SW)	3.430	1.899	0.070	5.463	0.2	0.05	2.9	OK
10.000 (01-SW)	FEH: 30 years: +0 %: 15 mins: Winter	Pipe	SIC1-024 (01-SW)	SIC1-007 (01-SW)	4.150	3.790	0.225	7.683	0.4	0.75	15.5	Surcharged
11.000 (01-SW)	FEH: 30 years: +0 %: 15 mins: Winter	Pipe	SIC1-025 (01-SW)	SIC1-014 (01-SW)	4.150	3.238	0.141	6.169	0.8	0.11	13.3	OK

FEH: 100 years: Increase Rainfall (%): +40: Critical Storm Per Item: Rank By: Max. Flow

Connection	Storm Event	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
1.000 (01-SW)	FEH: 100 years: +40 %: 240 mins: Winter	Pipe	SIC1-001 (01-SW)	SIC1-002 (01-SW)	4.150	3.946	0.150	18.557	0.2	1.89	2.8	Flood Risk
1.001 (01-SW)	FEH: 100 years: +40 %: 240 mins: Winter	Pipe	SIC1-002 (01-SW)	SIC1-004 (01-SW)	4.150	3.954	0.150	18.489	0.2	1.65	2.8	Flood Risk
1.002 (01-SW)	FEH: 100 years: +40 %: 180 mins: Winter	Pipe	SIC1-004 (01-SW)	SIC1-007 (01-SW)	4.150	3.979	0.150	28.020	0.2	2.76	4.3	Flood Risk
1.004 (01-SW)	FEH: 100 years: +40 %: 15 mins: Winter	Pipe	SIC1-008 (01-SW)	SMH1-001 (01-SW)	4.150	4.006	0.225	11.295	0.3	2.45	13.7	Flood Risk
1.005 (01-SW)	FEH: 100 years: +40 %: 15 mins: Summer	Pipe	SMH1-001 (01-SW)	SMH1-002 (01-SW)	4.150	3.849	0.225	9.354	0.3	2.39	10.7	Surcharged
1.006 (01-SW)	FEH: 100 years: +40 %: 120 mins: Winter	Pipe	SMH1-002 (01-SW)	SMH1-003 (01-SW)	4.150	3.808	0.225	86.127	0.2	2.15	9.2	Surcharged
1.008 (01-SW)	FEH: 100 years: +40 %: 30 mins: Summer	Pipe	SMH1-004 (01-SW)	SMH1-005 (01-SW)	4.150	3.558	0.300	36.522	0.3	1.85	18.2	Surcharged
1.009 (01-SW)	FEH: 100 years: +40 %: 60 mins: Winter	Pipe	SMH1-005 (01-SW)	SMH1-006 (01-SW)	4.150	3.624	0.300	106.287	0.4	1.64	26.6	Surcharged
1.010 (01-SW)	FEH: 100 years: +40 %: 30 mins: Winter	Pipe	SMH1-006 (01-SW)	SMH1-007 (01-SW)	4.118	2.961	0.450	73.081	0.2	0.9	35.9	Surcharged
1.011 (01-SW)	FEH: 100 years: +40 %: 30 mins: Winter	Pipe	SMH1-007 (01-SW)	SMH1-008 (01-SW)	4.214	2.886	0.450	79.863	0.3	1.21	42.7	Surcharged
1.012 (01-SW) (1)	FEH: 100 years: +40 %: 60 mins: Winter	Pipe	SMH1-008 (01-SW)	SMH1-009 (01-SW)	4.404	2.858	0.450	134.276	0.3	1.65	40.2	Surcharged
1.013 (01-SW)	FEH: 100 years: +40 %: 60 mins: Winter	Pipe	SMH1-009 (01-SW)	SMH1-010 (01-SW)	3.605	2.688	0.303	128.950	0.3	1.16	39.4	Surcharged
1.014 (01-SW)	FEH: 100 years: +40 %: 60 mins: Winter	Pipe	SMH1-010 (01-SW)	INLET HEADWALL 1 (01-SW)	5.400	2.091	0.294	127.863	0.7	0.21	39.3	OK
1.016 (01-SW)	FEH: 100 years: +40 %: 60 mins: Summer	Pipe	OUTLET HEADWALL 1 (01-SW)	SMH1-011 (01-SW)	3.499	1.664	0.450	16.608	0.2	0.1	4.0	Surcharged
2.000 (01-SW)	FEH: 100 years: +40 %: 180 mins: Winter	Pipe	SIC1-003 (01-SW)	SIC1-004 (01-SW)	4.150	3.982	0.150	12.075	0.1	1.16	2.1	Flood Risk
3.000 (01-SW)	FEH: 100 years: +40 %: 60 mins: Summer	Pipe	SIC1-005 (01-SW)	SIC1-006 (01-SW)	4.150	4.021	0.150	1.816	0.1	0.86	1.9	Flood Risk
1.003 (01-SW)	FEH: 100 years: +40 %: 15 mins: Summer	Pipe	SIC1-007 (01-SW)	SIC1-008 (01-SW)	4.150	4.146	0.225	11.508	0.4	2.82	16.0	Flood Risk
3.001 (01-SW)	FEH: 100 years: +40 %: 60 mins: Summer	Pipe	SIC1-006 (01-SW)	SIC1-007 (01-SW)	4.150	4.083	0.150	1.422	0.1	0.93	2.0	Flood Risk
4.000 (01-SW)	FEH: 100 years: +40 %: 60 mins: Winter	Pipe	SIC1-009 (01-SW)	SMH1-001 (01-SW)	4.150	3.988	0.150	4.869	0.1	0.91	2.4	Flood Risk

5.000 (01-SW)	FEH: 100 years: +40 %: 15 mins: Summer	Pipe	SIC1-010 (01-SW)	SMH1-003 (01-SW)	4.150	3.517	0.150	1.931	0.3	0.94	5.0	OK
6.000 (01-SW)	FEH: 100 years: +40 %: 15 mins: Summer	Pipe	SIC1-011 (01-SW)	SIC1-012 (01-SW)	4.150	3.647	0.150	1.754	0.2	0.75	2.8	Surcharged
8.000 (01-SW)	FEH: 100 years: +40 %: 60 mins: Winter	Pipe	SIC1-015 (01-SW)	SIC1-016 (01-SW)	4.150	3.840	0.225	11.259	0.1	0.95	5.3	Surcharged
8.001 (01-SW)	FEH: 100 years: +40 %: 30 mins: Summer	Pipe	SIC1-016 (01-SW)	SIC1-017 (01-SW)	4.150	3.788	0.225	12.256	0.2	1.41	8.1	Surcharged
8.002 (01-SW)	FEH: 100 years: +40 %: 30 mins: Winter	Pipe	SIC1-017 (01-SW)	SIC1-018 (01-SW)	4.150	3.705	0.225	16.149	0.2	1.2	9.1	Surcharged
9.000 (01-SW)	FEH: 100 years: +40 %: 15 mins: Summer	Pipe	SIC1-020 (01-SW) (1)	SIC1-021 (01-SW) (1)	4.150	3.629	0.150	1.561	0.2	0.75	3.0	Surcharged
9.001 (01-SW)	FEH: 100 years: +40 %: 15 mins: Summer	Pipe	SIC1-021 (01-SW) (1)	SIC1-022 (01-SW) (1)	4.150	3.605	0.150	2.967	0.2	1.14	4.0	Surcharged
9.003 (01-SW)	FEH: 100 years: +40 %: 15 mins: Summer	Pipe	SIC1-023 (01-SW)	SIC1-019 (01-SW)	4.150	3.345	0.150	3.659	0.3	1.38	5.1	Surcharged
8.004 (01-SW)	FEH: 100 years: +40 %: 15 mins: Winter	Pipe	SIC1-019 (01-SW)	SMH1-005 (01-SW)	4.150	3.414	0.225	11.199	0.3	1.13	11.4	Surcharged
8.003 (01-SW)	FEH: 100 years: +40 %: 15 mins: Winter	Pipe	SIC1-018 (01-SW)	SIC1-019 (01-SW)	4.150	3.488	0.225	7.971	0.2	1.12	8.5	Surcharged
9.002 (01-SW)	FEH: 100 years: +40 %: 15 mins: Winter	Pipe	SIC1-022 (01-SW) (1)	SIC1-023 (01-SW)	4.150	3.467	0.150	3.847	0.3	1.4	5.3	Surcharged
1.015 (01-SW)	FEH: 100 years: +40 %: 60 mins: Winter	Pipe	INLET HEADWALL 1 (01-SW)	Pond	3.499	1.710	0.450	156.578	1.3	0.3	51.0	Surcharged
1.015a (01-SW)	FEH: 100 years: +40 %: 60 mins: Summer	Pipe	Pond	OUTLET HEADWALL 1 (01-SW)	3.499	1.664	0.450	18.450	0.2	0.04	4.8	Surcharged
Dummy PP7	FEH: 100 years: +40 %: 15 mins: Winter	Pipe	Porous Paving 7	SIC1-010 (01-SW)	4.150	3.856	0.084	2.371	0.6	0.11	4.7	OK
Dummy PP1	FEH: 100 years: +40 %: 30 mins: Summer	Pipe	Porous Paving 1	SIC1-001 (01-SW)	4.150	3.854	0.150	0.874	0.4	0.22	4.1	OK
Dummy PP2	FEH: 100 years: +40 %: 15 mins: Summer	Pipe	Porous Paving 2	SIC1-003 (01-SW)	4.150	3.850	0.150	0.920	0.6	0.18	5.3	OK
Dummy PP3	FEH: 100 years: +40 %: 15 mins: Winter	Pipe	Porous Paving 3	SIC1-009 (01-SW)	4.150	3.886	0.150	1.151	0.7	0.17	5.7	OK
Dummy PP4	FEH: 100 years: +40 %: 30 mins: Summer	Pipe	Porous Paving 4	SIC1-007 (01-SW)	4.150	4.185	0.225	9.487	0.3	0.06	13.4	Flood
Dummy PP5	FEH: 100 years: +40 %: 30 mins: Winter	Pipe	Porous Paving 5	SMH1-001 (01-SW)	4.150	3.889	0.225	2.749	0.2	0.04	5.5	OK
Dummy PP6	FEH: 100 years: +40 %: 15 mins: Winter	Pipe	Porous Paving 6	SMH1-002 (01-SW)	4.150	3.853	0.225	2.535	0.9	0.04	5.3	OK
Dummy PP8	FEH: 100 years: +40 %: 15 mins: Summer	Pipe	Porous Paving 8	SIC1-005 (01-SW)	4.150	3.848	0.150	0.256	0.5	0.07	1.9	OK
Dummy PP9	FEH: 100 years: +40 %: 15 mins: Winter	Pipe	Porous Paving 9	SIC1-011 (01-SW)	4.150	3.851	0.150	2.050	0.5	0.11	4.1	OK
Dummy PP10	FEH: 100 years: +40 %: 30 mins: Winter	Pipe	Porous Paving 10	SIC1-015 (01-SW)	4.150	3.885	0.150	7.889	0.6	0.29	8.0	OK
Dummy PP11	FEH: 100 years: +40 %: 15 mins: Winter	Pipe	Porous Paving 11	SIC1-016 (01-SW)	4.150	3.851	0.150	4.316	1.0	0.16	8.2	OK

Dummy PP12	FEH: 100 years: +40 %: 15 mins: Winter	Pipe	Porous Paving 12	SIC1-017 (01-SW)	4.150	3.834	0.150	1.862	0.7	0.06	3.9	OK
Dummy PP15	FEH: 100 years: +40 %: 15 mins: Winter	Pipe	Porous Paving 15	SIC1-018 (01-SW)	4.150	3.808	0.150	0.427	0.6	0.01	0.9	OK
Dummy PP16	FEH: 100 years: +40 %: 15 mins: Winter	Pipe	Porous Paving 16	SIC1-022 (01-SW) (1)	4.150	3.911	0.150	1.052	0.7	0.03	2.3	OK
Dummy PP14	FEH: 100 years: +40 %: 15 mins: Summer	Pipe	Porous Paving 14	SIC1-021 (01-SW) (1)	4.150	3.838	0.150	0.995	0.5	0.05	2.2	OK
Dummy PP13	FEH: 100 years: +40 %: 15 mins: Summer	Pipe	Porous Paving 13	SIC1-020 (01-SW) (1)	4.150	3.825	0.119	0.740	0.5	0.02	1.7	OK
Dummy PP18	FEH: 100 years: +40 %: 30 mins: Summer	Pipe	Porous Paving 18	SIC1-020 (01-SW) (1)	4.150	3.849	0.150	1.220	0.3	0.05	1.8	OK
Dummy PP17	FEH: 100 years: +40 %: 15 mins: Summer	Pipe	Porous Paving 17	SIC1-021 (01-SW) (1)	4.150	3.829	0.150	0.557	0.3	0.05	1.2	OK
1.007 (01-SW)	FEH: 100 years: +40 %: 120 mins: Winter	Pipe	SMH1-003 (01-SW)	SMH1-004 (01-SW)	4.150	3.628	0.225	91.388	0.5	0.46	10.5	Surcharged
6.001 (01-SW)	FEH: 100 years: +40 %: 15 mins: Summer	Pipe	SIC1-012 (01-SW)	SIC1-014 (01-SW)	4.150	3.456	0.150	1.557	0.2	1.18	2.8	Surcharged
6.002 (01-SW)	FEH: 100 years: +40 %: 15 mins: Winter	Pipe	SIC1-014 (01-SW)	SMH1-004 (01-SW)	4.150	3.484	0.225	11.359	0.5	2.52	19.6	Surcharged
7.000 (01-SW)	FEH: 100 years: +40 %: 30 mins: Winter	Pipe	SIC1-013 (01-SW)	SIC1-014 (01-SW)	4.150	3.708	0.150	0.000	0.0	0.02	0.6	Surcharged
1.017 (01-SW)	FEH: 100 years: +40 %: 15 mins: Summer	Pipe	SMH1-011 (01-SW)	SMH1-012 (01-SW)	2.700	1.292	0.016	2.350	0.0	0.02	2.9	OK
1.018 (01-SW)	FEH: 100 years: +40 %: 15 mins: Summer	Pipe	SMH1-012 (01-SW)	OUTLET HEADWALL 2 (01-SW)	3.430	1.899	0.070	2.243	0.2	0.05	2.9	OK
10.000 (01-SW)	FEH: 100 years: +40 %: 15 mins: Winter	Pipe	SIC1-024 (01-SW)	SIC1-007 (01-SW)	4.150	4.152	0.225	13.125	0.7	1.35	27.8	Flood
11.000 (01-SW)	FEH: 100 years: +40 %: 15 mins: Winter	Pipe	SIC1-025 (01-SW)	SIC1-014 (01-SW)	4.150	3.484	0.225	10.546	0.9	0.18	21.3	Surcharged

Phase
FEH: 2 years: Increase Rainfall (%): +0: 360 mins: Summer

Tables

Name	Max. Inflow (L/s)	Total Inflow Volume (m³)	Max. Outflow (L/s)	Total Outflow Volume (m³)
OUTLET HEADWALL 2 (01-SW)			2.9	97.033
TOTAL	53.4	294.246	4.0	102.935

Phase
FEH: 30 years: Increase Rainfall (%): +0: 15 mins: Winter

Tables

Name	Max. Inflow (L/s)	Total Inflow Volume (m³)	Max. Outflow (L/s)	Total Outflow Volume (m³)
OUTLET HEADWALL 2 (01-SW)			2.6	0.945
TOTAL	368.7	170.202	7.4	4.374

Phase
FEH: 100 years: Increase Rainfall (%): +40: 15 mins: Winter

Tables

Name	Max. Inflow (L/s)	Total Inflow Volume (m³)	Max. Outflow (L/s)	Total Outflow Volume (m³)
OUTLET HEADWALL 2 (01-SW)			2.9	2.483
TOTAL	629.9	290.891	12.7	8.346

5.4. *Appendix D - SAB Application Checklist*

Appendix D - SAB Application Checklist

TABLE A: Specific information and evidence required for the Full Application
Flood Consequences Assessment (FCA) Refer to the "Flood Consequence Assessment Report", MARPT-BHK-01-XX-RP-C-090003
Detailed Geotechnical Factual and Interpretive Report Refer to the "Ground Investigation Report" (GIR) MARPT-BHK-01-XX-RP-G-090001.
Detailed Whole Site SuDS Drainage Design Proposals The site is to drain via mostly filter drains connecting to carrier drains before discharging into a proposed detention basin where runoff will be pumped at an attenuated rate to the existing ditch network. Refer to Section 3.5 for further details.
Detailed SuDS Assets Maintenance Plan The proposed development is to use filter trenches and a permeable surface as a way to treat the water as well as to slow the flows down to alleviate the speed of the water passing through the system. Refer to Chapter 3.8 for further details.
Amenity and Biodiversity Plan Due to the limited space, there are no plans for this development, however there is offsets provided elsewhere within the site. Refer to section 3.7 for further details Refer to the wider site strategy for further details and proposed offsets.
Unstable and Contaminated Land Reports Refer to the "Ground Investigation Report" (GIR) MARPT-BHK-01-XX-RP-G-090001.
Water Quality Treatment and Pollution Prevention Strategy and Plan With the surface water filtering through the single sized stone at the surface and the subsequent filter trenches, the water quality and pollution mitigation indices are acceptable. Refer to Chapter 3.6 for further details.

BakerHicks.

OUR OFFICES.

United Kingdom

- Motherwell (Eurocentral) +44 (0)1698 756100
- Manchester +44 (0)161 873 2500
- Derby +44 (0)1332 974398
- Warwick +44 (0)1926 567800
- London +44 (0)20 7549 1300

JOIN US (UK).

bakerhicks.com/careers

FOLLOW US.

Twitter @BakerHicks_1957
Linkedin BakerHicks

bakerhicks.com