# Drainage Strategy

## Land at Tremont Park, Llandrindod Wells

Prepared for Mr Reg Knill

Prepared by:

**SLR Consulting Limited**

3rd Floor, Brew House, Jacob Street, Tower Hill, Bristol, BS2 0EQ

SLR Ref.: 416.065167.00001

18 November 2024

Revision: 01

# Revision Record

| Revision | Date | Prepared By | Checked By | Authorised By |
|---|---|---|---|---|
| 01 | 18 November 2024 | Hamza El-Adnany | Nick Bosanko | Nick Bosanko |
| | Click to enter a date. | | | |
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# Basis of Report

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# Table of Contents



# Appendices

# 1.0 Introduction

## Authorisation

1.1 SLR has been instructed by Mr Reg Knill to prepare a Drainage Strategy to support an outline planning application and SuDS Approval Body (SAB) application associated with a proposed development at Tremont Park, Llandrindod Wells.

## Background

1.2 The greenfield site is site is allocated within the Powys Local Development Plan for the provision of up to 122 residential dwellings.

1.3 According to the Natural Resources Wales (NRW) Flood and Coastal Erosion Risk Maps, the site is not susceptible to flooding from rivers or the sea.

1.4 It is proposed to develop the site for residential purposes. The proposed site plans are enclosed in Appendix A.

1.5 This Drainage Strategy has been undertaken in accordance with the guidelines set out in the Statutory National Standards for Sustainable Drainage Systems (SuDS) for Wales.

## Objectives

1.6 The purpose of this report is coordinate the various technical pieces of information that have been used to support the SAB application.

1.7 This is an interim version of the report, which has been prepared to support the pre-application consultation (PAC). The content is subject to change, once these initial stages are complete.

1.8 It is also intended that this report will be submitted to support the forthcoming planning application.

1.9 The objectives of this Drainage Strategy are to:

- Undertake a desk-based review of the available data for the site to assess flood risk and surface water drainage issues.
- Review the relevant planning policy documents to ensure that the development is in accordance with these and other relevant regional and local guidance.
- Assess whether the development will result in an increase of surface water runoff and how this can be mitigated through the application of SuDS.
- Present a summary and justification of the strategy and associated SuDS proposed on site.
- Append key technical drawings, calculations and preliminary designs.
- Evaluate a conceptual foul water drainage solution.

# 2.0 Site Description

## Site Location and Description

2.1 The site currently consists of a field used for grazing sheep, which is approximately 4.0 ha in size and is in northeast Llandrindod Wells. The approximate National Grid Reference of the site is SO066622. A site location plan is presented in Figure 1.

2.2 The Llandrindod Wells Fire Station is located to the north and residential development to the west. Area to the south and east largely consist of fields and woodland.


*Figure 1: Site Location and Stream Network*

## Site Topography

2.3 A topographical survey of the site is enclosed in Appendix B. It shows that the ground levels on the site falls from south to north. The highest point recorded on the site is approximately 222 metres Above Ordnance Datum (m AOD); the lowest point recorded is approximately 205 m AOD.

## Geology and Hydrogeology

2.4 The 1 in 50,000 scale British Geological Survey (BGS) online mapping indicates that the bedrock underlaying the site is complex and consists of Builth Mudstones Formation,

Gilwern Volcanic Formation and Unnamed Igneous Intrusion. Till and Peat superficial deposits are indicated to be present beneath the west part of the site.

2.5 A Soakaway Investigation Report was completed by TerraFirma in September 2024 (refer to Appendix C). Three infiltration test pits were excavated across the site. Pits were excavated to a maximum depth of 2.6 m. All pits failed to drain.

2.6 The online Cranfield Environment Centre Soilscapes mapping tool describes the characteristics of soils as impeded drainage.

## Hydrology and Existing Drainage

2.7 A small stream flows through the site (see Figure 1). The main reach of the stream flows in a northwest direction in the east part of the site. Two smaller ditches drain the remainder of the site, which connect to the stream. The stream is a tributary of the River Ithon.

2.8 The DCWW sewer plans are enclosed in Appendix D. These show a public surface water and foul water sewer network in the residential development to the west of the site.

# 3.0 Flood Risk

3.1 According to the NRW Flood and Coastal Erosion Risk Maps, the site is not at risk of flooding from rivers or the sea. However, parts of the site are susceptible to surface water flooding (see Figure 2).

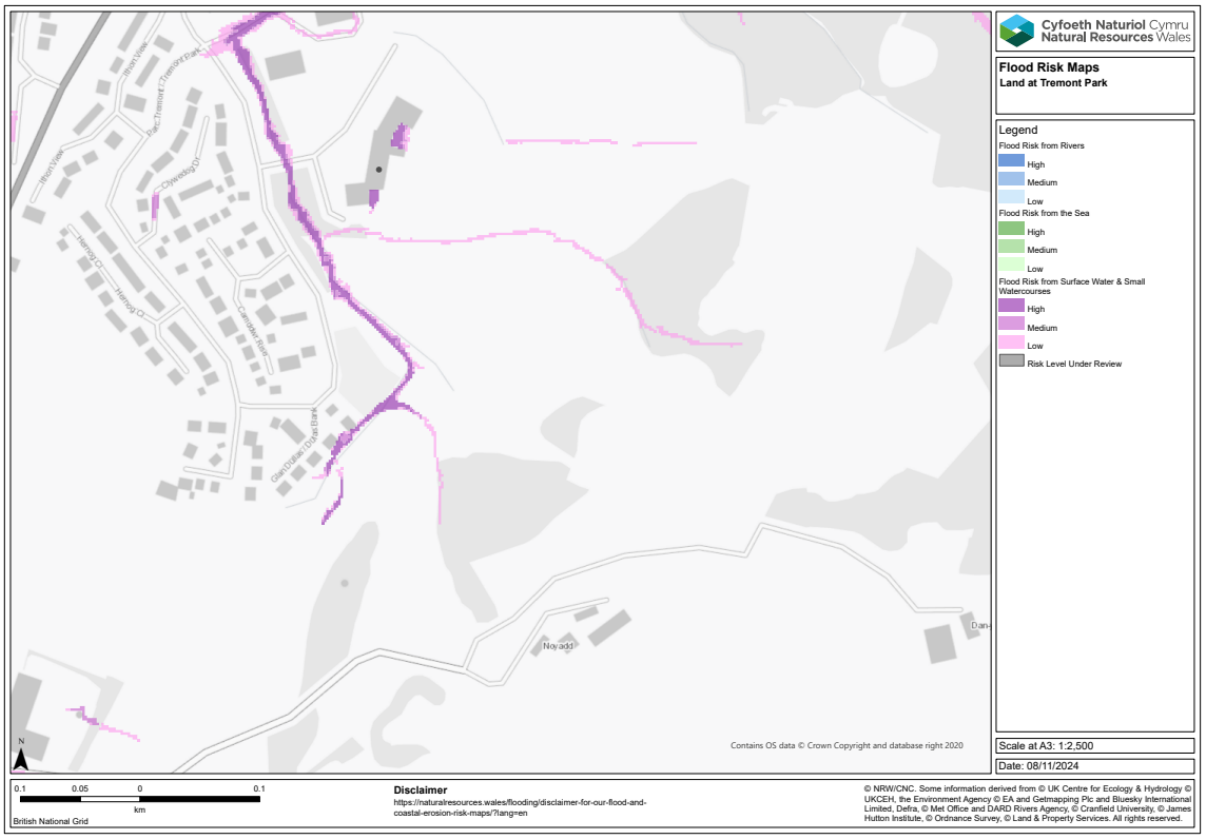


*Figure 2: Flood Risk Map*

3.2 The main surface water flood flow path is generated from a small field and wooded area to the south of the site. It is contained within a narrow corridor and joins the stream network on site. Part of the flow paths is shown to effect gardens of several existing residential properties alongside the north site boundary.

3.3 The modelling carried out to derive these surface water flooding maps is not accurate at the site scale and does not account for the presence of existing local drainage systems, such as gullies, sewers and culverts, nor does it account for the full channel conveyance capacity. These inaccuracies can cause significant variance on the actual extent of surface water flood risk to an area and the generally the mapping overestimates the impacts.

3.4 The flow paths do not accurately reflect the locations of the stream on site, which is likely to reduce the extent of flooding. This is shown on Figure 3, which presents an overlay the surface water flood map and the location of the stream and ditches on site.

3.5 The primary surface water flow paths are alongside the boundary of the site and represent little or no flood consequence to the proposed development. Some minor and isolated areas of surface water flooding are present, but these are anticipated to disappear once the site is developed and rainfall is collected by the drainage arrangements.

3.6 Nevertheless, some limited flood mitigation requirements have been identified and are discussed later in this chapter. These will further reduce the risk of surface water flooding to the development and adjoining areas.

## Other Sources of Flooding

3.7 A desktop review has not identified any other potential significant sources of flood risk at the site.

## Flood Mitigation

3.8 Two areas where the existing ditch should be extended are shown in Figure 3. The extended network will help to intercept surface water runoff and contain it within the riparian corridor.


*Figure 3: Ditch Extension and Surface Water Flooding*

3.9 Finished floor levels (FFL) of all dwellings should be elevated above the surrounding ground levels by at least 150 mm in accordance with building regulations. This will protect against the possibility of shallow ponding of water which is inevitable following heavy or prolonged rainfall.

# 4.0 Surface Water Management

## Overview

4.1 It is well understood that one of the effects of development is typically to reduce the permeability of the site and consequently to change its response to rainfall. Therefore, a suitable surface water drainage strategy is required to ensure that the surface water runoff regime is managed appropriately so that there will be no increase flood risk to third parties.

4.2 A fundamental principle of sustainable development is the reduction of surface water runoff. Surface water drainage arrangements for any development site must ensure that volumes and peak discharge rates leaving the site are no greater than those for the site prior to development. Any increase in surface water run-off above the pre-development volumes must also be controlled on site.

4.3 The Statutory National Standards for Sustainable Drainage Systems (SuDS) for Wales outline the key standards that must be met when managing surface water runoff from a new development site. This has informed this Drainage Strategy.

## Proposed Surface Water Discharge Receptor

4.4 The drainage hierarchy presented in the Statutory National Standards for Sustainable Drainage Systems (SuDS) for Wales states that the aim should be to discharge surface run off as high up the following hierarchy of drainage options as reasonably practicable:

- Collected for use,
- into the ground (infiltration),
- to a surface water body,
- to a surface water sewer, highway drain, or another drainage system,
- to a combined sewer.

4.5 The nature of the development (i.e. small private roof surfaces) is not conducive to an economic rainwater harvesting system. Water butts will be used and runoff from roof surfaces and paved areas will be harvested informally to supply water for rain gardens.

4.6 The Soakaway Investigation Report completed by TerraFirma demonstrated that the site will offer no infiltration potential.

4.7 A surface water body is available on site, which accommodates runoff from it. This existing connectivity will be retained as part of the development, but discharge rates will be controlled.

## Greenfield Runoff Rates

4.8 The FEH method has been used to calculate the greenfield runoff rates for the site. The parameters utilised and the calculated rates are provided in Table 1 and 2, respectively. Full results are provided in Appendix E.

*Table 1: Calculation Parameters*

| Parameter | Value | Unit |
|---|---|---|
| Area | 1 | ha |
| SAAR | 1019 | mm |
| BFI HOST 19 | 0.354 | - |
| Region | 9 | - |

*Table 2: Greenfield Rates*

| Return Period | Peak Greenfield Discharge (l/s/ha) |
|---|---|
| QBAR | 10.71 |
| Q1 | 9.42 |
| Q30 | 19.06 |
| Q100 | 23.34 |

4.9 The QBAR discharge rate of 10.71 l/s/ha has been adopted and all storms up to and including the 1 in 100 year plus climate change event will be restricted to this rate.

## Proposed Surface Water Drainage Strategy

4.10 The surface water management strategy proposed for the site has been derived based upon the principles of sustainable drainage as detailed in the CIRIA SuDS Manual (2015) and the Statutory National Standards for Sustainable Drainage Systems (SuDS) for Wales.

4.11 SuDS will be utilised to manage surface water runoff from the site. Where practical, roof surfaces will drain to a private rain garden, which will subsequently connect into a pipe system. Some paved areas in the public highway may also drain to a rain garden. Private parking areas will be constructed using permeable surfaces, which will also subsequently connect into a pipe system. The adopted highway will drain into a pipe system, via a swale, or gully pot. It is likely that some of the adopted highway will also be constructed using permeable surfaces.

4.12 These various source control SuDS will be located throughout the development and will offer interception of smaller rainfall events.

4.13 The pipe system will lead to one of two detention basins, which will provide attenuation storage and a final water quality treatment. Each basin will release runoff into the adjacent stream at greenfield rates. This will be achieved using a hydrobrake (or similar approved) fitted within a manhole downstream of the detention basin.

4.14 The detention basins are likely to be lined to prevent seepages of perched groundwater.

4.15 A Preliminary Surface Water Drainage Layout is enclosed in Appendix F, which present the proposed SuDS.

4.16 A Causeway Flow calculation has been prepared to inform the design of each detention basin. This has been undertaken based on the parameters identified in Table 3 and Table 4.

4.17 The current impermeable area refers to all paved and roof surfaces, which was estimated based on a 60% ratio (i.e., that 60% of the developable area is impermeable). At this stage, a 10% urban creep allowance has been applied conservatively to the entire developable area. The impermeable area also includes the area of the detention basin.

4.18 An upper end 40% climate change allowance has been adopted, as required by national guidance.

4.19 The discharge rate was calculated based on the estimated current impermeable area, across the whole site.

*Table 3 – Detention Basin Storage Parameters - North Catchment*

| Parameter | Values | Units |
|---|---|---|
| Developable area | 1.465 | ha |
| Basin area | 0.075 | ha |
| Current impermeable surface area (including basin) | 0.954 | ha |

| | | |
|---|---|---|
| Urban creep | 10 | % |
| Future impermeable surface area | 1.042 | ha |
| Discharge rate | 10.2 | l/s |
| Climate change allowance | 40 | % |
| Basin average side slope | 1:3.5 | - |

*Table 4 – Detention Basin Storage Parameters - South Catchment*

| Parameter | Values | Units |
|---|---|---|
| Developable area | 2.302 | ha |
| Basin area | 0.115 | ha |
| Current impermeable surface area (including basin) | 1.496 | ha |
| Urban creep | 10 | % |
| Future impermeable surface area | 1.635 | ha |
| Discharge rate | 16 | l/s |
| Climate change allowance | 40 | % |
| Basin average side slope | 1:4 | - |

4.20 The calculations are enclosed in Appendix E. Table 5 identifies details of each detention basin, which was found to be required. These details are also shown on the Preliminary Surface Water Drainage Layout (Appendix F).

*Table 5: Preliminary Basin Design Details*

| Catchment | Total Basin Depth (m) | Basin Area ($m^2$) | Attenuation Storage Volume ($m^3$) | Freeboard Depth (m) |
|---|---|---|---|---|
| North | 1.6 | 670 | 497 | 0.3 |
| South | 1.5 | 1,150 | 777 | 0.3 |

4.21 Additional space has also been allocated around the detention basin for earthworks and maintenance access requirements. However, this is subject to more detailed design at a subsequent stage.

## Exceedance

4.22 Surface water flow paths in extreme events, known as exceedance events (i.e. events in excess of the design criteria i.e. the 1 in 100 year plus climate change event), should be steered away from properties and to provide better protection to people and property. Exceedance routes are shown on the Preliminary Surface Water Drainage Layout enclosed in Appendix F.

## Water Quality

4.23 In accordance with the CIRIA SuDS Manual (2015), SuDS components must have a total pollution index that equals or exceeds the pollution hazard index for different land use classifications. It is considered that the SuDS provided as part of the surface water drainage strategy would offer sufficient mitigation for the land use classification.

4.24 This has been undertaken for different land use categories and the SuDS that have been proposed for certain components of the site. Table 6 shows the pollution hazard indices for paved surfaces. All paved surfaces will drain through a detention basin, which provides adequate mitigation (see Table 7). These tables are informed by Table 26.2 and 26.3 of the CIRIA SuDS Manual (2015)).

4.25 Some paved areas will also drain through permeable paving, rain gardens or swales, which will provide further pollution mitigation.

*Table 6: Pollution Hazard Indices for Paved Surfaces*

| Land Use | Total Suspended Solids (TSS) | Metals | Hydrocarbons |
|---|---|---|---|
| Individual property driveways, residential car parks, low traffic roads and non-residential car parking with infrequent change | 0.5 | 0.4 | 0.40 |

*Table 7: SuDS Mitigation Indices for Paved Surfaces*

| Type of SuDS | Mitigation Indices | | |
|---|---|---|---|
| | TSS | Metals | Hydrocarbons |
| Detention basin | 0.5 | 0.5 | 0.6 |

4.26 Table 8 shows the pollution hazard indices for roof surfaces. All roof surfaces will drain through a detention, which provides adequate mitigation (see Table 9). These tables are informed by Table 26.2 and 26.3 of the CIRIA SuDS Manual (2015)).

4.27 Some roof surfaces will also drain through a rain garden, which will provide further pollution mitigation.

*Table 8: Pollution Hazard Indices for Roof Surfaces*

| Land Use | TSS | Metals | Hydrocarbons |
|---|---|---|---|
| Residential roof surfaces | 0.2 | 0.2 | 0.05 |

*Table 9: SuDS Mitigation Indices for Roof Surfaces*

| Type of SuDS | Mitigation Indices | | |
|---|---|---|---|
| | TSS | Metals | Hydrocarbons |
| Detention basin | 0.5 | 0.5 | 0.6 |

# 5.0 Foul Water Drainage

5.1 A pre-planning enquiry was submitted to DCWW, seeking their views on the capacity of their network of assets and infrastructure to accommodate the proposed development. It was confirmed that the foul flows generated by the proposed development can be accommodated within the public sewerage system. It was advised that the flows should be connected to the foul sewer at or downstream of manhole SO6624102 located on Tremont Park Road. Full detailed are enclosed in Appendix G.

5.2 It is anticipated that a connection to the public sewerage system can be achieved using a gravity arrangement, but this is subject to confirmation at a more detailed stage of design.

# 6.0 Conclusions

6.1 This Drainage Strategy has been undertaken in accordance with the guidelines set out in the Statutory National Standards for Sustainable Drainage Systems (SuDS) for Wales.

6.2 This is an interim version of the report, which has been prepared to support the pre-application consultation (PAC). The content is subject to change, once these initial stages are complete.

6.3 A desktop study has concluded that most of the site is not susceptible to flood risk. However, a minor surface water flow paths impacts the central part of site. It is recommended that the existing ditch is extended to intercept the surface water runoff and contain it within the riparian corridor.

6.4 The surface water drainage strategy includes an extensive network of SuDS, including rain gardens, permeable paving, swales and two detention basins.

6.5 An attenuation-based surface water drainage strategy has been proposed to manage surface water generated from the proposed impermeable surfaces, which will subsequently discharge to the stream network on site at a controlled rate.

6.6 The SuDS have been designed to permit the localised interception of rainfall during the smaller storm events.

6.7 Foul water will be discharged to the public sewer network, which has been agreed with DCWW.

6.8 The drainage strategy is subject to detailed drainage design and SAB full application, prior to construction.

# Appendix A Site Plans


**HOUSING SCHEDULE - TOTAL 80**

| House | House Type | GIAs | Dwellings |
|---|---|---|---|
| | 4 Person, 2 Bedroom Semi Detached House (3 no. Detached) | 83m² | 63 |
| | 6 Person, 3 Bedroom Semi Detached / Detached House | A - 92m² | 16 |
| | | B - 98m² | 6 |
| | | C - 99m² Room in roof | 11 |
| | 6 Person, 3 Bedroom Semi Detached Split Level | D - 103m² Room in roof | 20 |
| | 8 Person, 4 Bedroom Semi Detached House | 113m² | 6 |
| | | Total | 122 UNITS |
| | | | INCLUDING 41 AFFORDABLE UNITS |

**CAR PARKING SCHEDULE**

| House Type | Bedrooms | Spaces |
|---|---|---|
| 2 Bed | 126 | 126 |
| 3 Bed | 159 | 159 |
| 4 Bed | 24 | 24 |
| Total | | 309 |

| Parking (CSS Zone 4 Suburban) | Spaces |
|---|---|
| Dwelling Units 122 | 309 |

Note - possible visitors spaces to be agreed with LA

HUGHES ARCHITECTS

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29 Broad Street
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SY16 2BQ
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Rev B - Car Parking P54 updated - OO - 31.10.24
Rev A - Attenuation amended - GD - 30.09.24

Project :- **New Residential Development at Land at Tremont Parc, Llandrindod, Wells, LD1 5AF**

Drawing Status :- **Stage 3a**

Drawing Title :- **Sketch Site Layout Plan 2**

Scale :- **1:500@A0** Date :- **11.09.24**
Drawn by :- **GD** Checked :- **DH**

Drawing No :- **Y042.3a.1.002** Rev :- **B**

# Appendix B Topographical Survey

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Newtown
Powys
SY16 2BQ

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| | | | |
|---|---|---|---|
| Project :- ..... | | | |
| Drawing Status :- Existing | | Drawing Title :- Topographical Survey | |
| Scale :- 1 : 50 | Date :- 08/11/2023 | Drawing No :- Y047. 3.001 | Rev :- |
| Drawn by :- KT | Checked :- - | | |

# Appendix C Soakaway Investigation

terra firma
Geotechnical & Geoenvironmental Specialists
www.terrafirmawales.co.uk

Our Ref: TF-24-423-CA

Your Ref:

Contact: Florence Linklater

2st September 2024

R & P Knill

For the attn. of Ms Hollie Bumford

Dear Hollie,

**SOAKAWAY TESTING: TREMONT PARK, LLANDRINDOD WELLS.**

## 1.0 Soakaway Testing

I confirm that we have completed the required soakaway testing in general accordance with BRE DG 365:2016 and report the following:

Terra Firma attended site on Thursday 28th August 2024.

The test locations, SA01, SA02 and SA03, were set out by the Client, and the test holes were dug on the instruction of Terra Firma to depths ranging from between 1.0 m to 2.6 m. Site soils were noted to have a prominent clay component.


**Figure 1: Soakaway Test Positions**

Groundwater was encountered in SA02. This was found to pool at a level of 1.0 m below ground level. A soakaway test was not therefore performed in SA02.

Each pit was filled with test water, below 1.5 m in SA01, and below 0.40 m in SA03. Test waters were monitored for several hours, but negligible infiltration occurred.

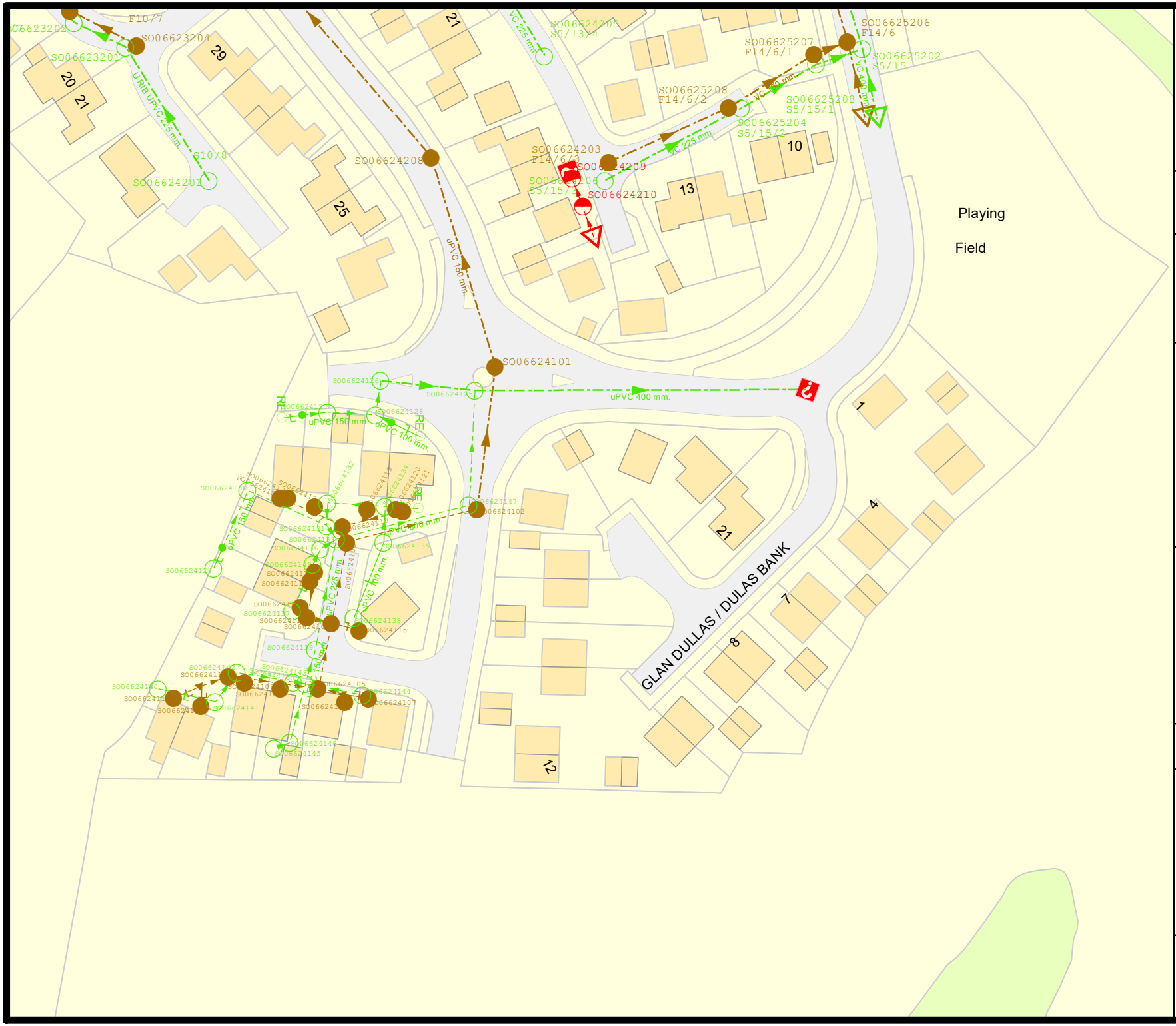
It is therefore concluded that the ground conditions are unsuitable for a soakaway drainage system.

We trust that the above is to your satisfaction, however, if you have any queries or require any further information, please do not hesitate to contact us.

Yours sincerely
**for: TFW Group Ltd**

**Miss Florence Linklater**

# Appendix D Sewer Plans




Dŵr Cymru
Welsh Water

PPA0008500 Public Sewer Record

N
W E
S

**LEGEND(Representative of most common features)**

Waste network:

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

NB: Sewer symbol colour indicates the type.

RED - Combined
GREEN - Surface Water
BROWN - Foul
Purple - Former S24 sewers (for indicative purposes only)

**Notes:**

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

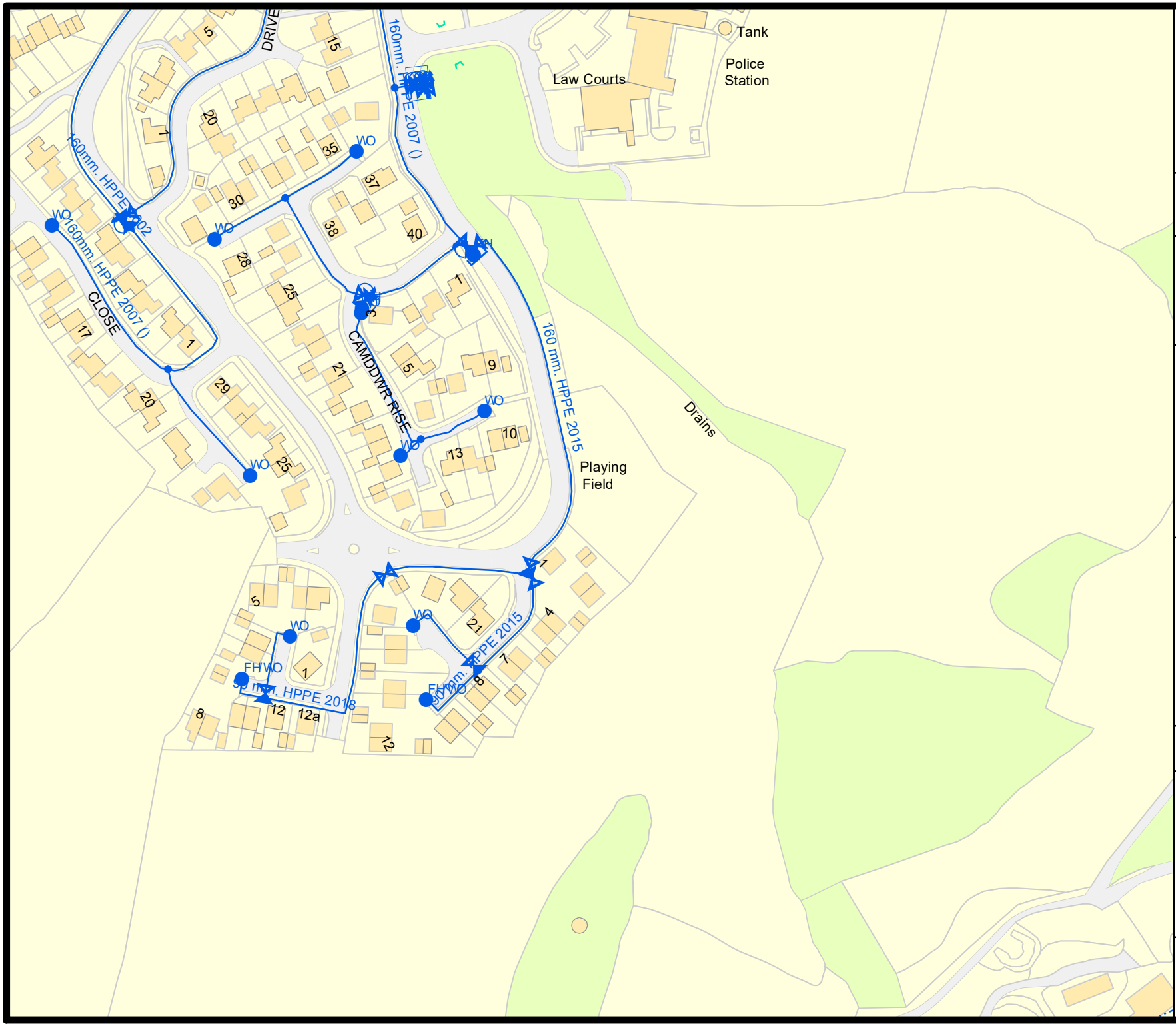
Dŵr Cymru Cyfyngedig ('the Company') gives this information as to the position of its underground apparatus by way of general guidance only and on the strict understanding that it is based on the best information available and no warranty as to its correctness is relied upon in the event of excavations or other works made in the vicinity of the company's apparatus. The onus of locating apparatus before carrying out any excavations rests entirely on you. The information which is supplied by the Company, is done so in accordance with statutory requirements of sections 198 and 199 of the Water Industry Act 1991 which is based upon the best information available and, in particular, but without prejudice to the generality of the foregoing, it should be noted that the records that are available to the Company may not disclose the existence of a water main, service pipe, sewer, lateral drain or disposal main and any associated apparatus laid before 1 September 1989, or, if they do, the particulars thereof including their position underground may not be accurate. It must be understood that the furnishing of this information is entirely without prejudice to the provision of the New Roads and Street Works Act 1991 and the Company's right to be compensated for any damage to its apparatus.

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

**EXACT LOCATIONS OF ALL APPARATUS TO BE DETERMINED ON SITE.**



| | |
|---|---|
| Map Ref: | 306489,262170 |
| Map scale: | 1:1000 |
| Printed by: | Jeremy Hackman |
| Printed on: | 12 Jan 2024 |




Dŵr Cymru
Welsh Water

PPA0008500 Water Main Plan

N
W E
S

**LEGEND**

Clean network:

- Sluice valve
- Pressure reducing valve
- Meter
- Bulk meter
- Hydrant
- Cap end
- Air valve
- Stop tap
- Water Treatment Works
- Water Pumping Station
- Existing main
- Non-operational main
- Raw Water

NB: Water main symbol colour indicates the type.

LIGHT BLUE - Trunk
DARK BLUE - Distribution
YELLOW - Raw Water

**Notes:**

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

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

**EXACT LOCATIONS OF ALL APPARATUS TO BE DETERMINED ON SITE.**



| | |
|---|---|
| Map Ref: | 306562,262211 |
| Map scale: | 1:2000 |
| Printed by: | Jeremy Hackman |
| Printed on: | 12 Jan 2024 |

# Appendix E Surface Water Calculations

# Greenfield runoff rate estimation for sites

www.uksuds.com | Greenfield runoff tool

| | |
|---|---|
| **Calculated by:** | Nick Bosanko |
| **Site name:** | Tremont Park |
| **Site location:** | Llandrindod Wells |

This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments", SC030219 (2013) , the SuDS Manual C753 (Ciria, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

## Site Details

| | |
|---|---|
| **Latitude:** | 52.24930° N |
| **Longitude:** | 3.36989° W |
| **Reference:** | 265190820 |
| **Date:** | Nov 18 2024 12:37 |

## Runoff estimation approach

FEH Statistical

## Site characteristics

**Total site area (ha):** 1

## Methodology

| | |
|---|---|
| **$Q_{MED}$ estimation method:** | Calculate from BFI and SAAR |
| **BFI and SPR method:** | Specify BFI manually |
| **HOST class:** | N/A |
| **BFI / BFIHOST:** | 0.354 |
| **$Q_{MED}$ (l/s):** | |
| **$Q_{BAR}$ / $Q_{MED}$ factor:** | 1.08 |

## Hydrological characteristics

| | Default | Edited |
|---|---|---|
| **SAAR (mm):** | 1019 | 1019 |
| **Hydrological region:** | 9 | 9 |
| **Growth curve factor 1 year:** | 0.88 | 0.88 |
| **Growth curve factor 30 years:** | 1.78 | 1.78 |
| **Growth curve factor 100 years:** | 2.18 | 2.18 |
| **Growth curve factor 200 years:** | 2.46 | 2.46 |

## Notes

### (1) Is $Q_{BAR}$ < 2.0 l/s/ha?

When $Q_{BAR}$ is < 2.0 l/s/ha then limiting discharge rates are set at 2.0 l/s/ha.

### (2) Are flow rates < 5.0 l/s?

Where flow rates are less than 5.0 l/s consent for discharge is usually set at 5.0 l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set where the blockage risk is addressed by using appropriate drainage elements.

### (3) Is SPR/SPRHOST ≤ 0.3?

Where groundwater levels are low enough the use of soakaways to avoid discharge offsite would normally be preferred for disposal of surface water runoff.

## Greenfield runoff rates

| | Default | Edited |
|---|---|---|

| | | |
|---|---|---|
| $Q_{BAR}$ (l/s): | | 10.71 |
| 1 in 1 year (l/s): | | 9.42 |
| 1 in 30 years (l/s): | | 19.06 |
| 1 in 100 year (l/s): | | 23.34 |
| 1 in 200 years (l/s): | | 26.34 |

## Design Settings

| | | | | | |
|---|---|---|---|---|---|
| Rainfall Methodology | FEH-22 | Maximum Time of Concentration (mins) | 30.00 | Preferred Cover Depth (m) | 1.200 |
| Return Period (years) | 100 | Maximum Rainfall (mm/hr) | 50.0 | Include Intermediate Ground | ✓ |
| Additional Flow (%) | 0 | Minimum Velocity (m/s) | 1.00 | Enforce best practice design rules | x |
| CV | 0.750 | Connection Type | Level Soffits | | |
| Time of Entry (mins) | 5.00 | Minimum Backdrop Height (m) | 0.200 | | |

## Nodes

| | Name | Area (ha) | T of E (mins) | Cover Level (m) | Depth (m) |
|---|---|---|---|---|---|
| ✓ | Basin 01 | 1.040 | 5.00 | 208.500 | 1.600 |
| ✓ | SW01 (FC) | | | 208.500 | 1.650 |
| ✓ | Outfall 01 | | | 207.000 | 0.700 |

## Pipeline Schedule

| Link | Length (m) | Slope (1:X) | Dia (mm) | Link Type | US CL (m) | US IL (m) | US Depth (m) | DS CL (m) | DS IL (m) | DS Depth (m) |
|---|---|---|---|---|---|---|---|---|---|---|
| 1.000 | 5.000 | 100.0 | 375 | 1 STANDARD | 208.500 | 206.900 | 1.225 | 208.500 | 206.850 | 1.275 |
| 1.001 | 8.007 | 14.6 | 225 | 1 STANDARD | 208.500 | 206.850 | 1.425 | 207.000 | 206.300 | 0.475 |

| Link | US Node | Dia (mm) | Node Type | MH Type | DS Node | Dia (mm) | Node Type | MH Type |
|---|---|---|---|---|---|---|---|---|
| 1.000 | Basin 01 | | Junction | | SW01 (FC) | 1500 | Manhole | 1 STANDARD |
| 1.001 | SW01 (FC) | 1500 | Manhole | 1 STANDARD | Outfall 01 | 1200 | Manhole | 1 STANDARD |

## Manhole Schedule

| Node | Easting (m) | Northing (m) | CL (m) | Depth (m) | Dia (mm) | Node Type | MH Type | Connections | Link | IL (m) | Dia (mm) | Link Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Basin 01 | 306581.436 | 262291.274 | 208.500 | 1.600 | | Junction | | 0 | 1.000 | 206.900 | 375 | 1 STANDARD |
| SW01 (FC) | 306576.973 | 262289.020 | 208.500 | 1.650 | 1500 | Manhole | 1 STANDARD | 1 | 1.000 | 206.850 | 375 | 1 STANDARD |
| | | | | | | | | 0 | 1.001 | 206.850 | 225 | 1 STANDARD |
| Outfall 01 | 306569.826 | 262285.409 | 207.000 | 0.700 | 1200 | Manhole | 1 STANDARD | 1 | 1.001 | 206.300 | 225 | 1 STANDARD |

## Simulation Settings

| | | | | | |
|---|---|---|---|---|---|
| Rainfall Methodology | FEH-22 | Analysis Speed | Normal | Additional Storage (m³/ha) | 20.0 |
| Summer CV | 0.750 | Skip Steady State | x | Check Discharge Rate(s) | x |
| Winter CV | 0.840 | Drain Down Time (mins) | 240 | Check Discharge Volume | x |

**Storm Durations**

| 15 | 30 | 60 | 120 | 180 | 240 | 360 | 480 | 600 | 720 | 960 | 1440 |
|---|---|---|---|---|---|---|---|---|---|---|---|

| Return Period (years) | Climate Change (CC %) | Additional Area (A %) | Additional Flow (Q %) |
|---|---|---|---|
| 100 | 40 | 0 | 0 |

## Node SW01 (FC) Online Hydro-Brake® Control

| | | | |
|---|---|---|---|
| Flap Valve | x | Objective | (HE) Minimise upstream storage |
| Downstream Link | 1.001 | Sump Available | ✓ |
| Replaces Downstream Link | ✓ | Product Number | CTL-SHE-0142-1020-1350-1020 |
| Invert Level (m) | 206.850 | Min Outlet Diameter (m) | 0.225 |
| Design Depth (m) | 1.350 | Min Node Diameter (mm) | 1200 |
| Design Flow (l/s) | 10.2 | | |

## Node Basin 01 Depth/Area Storage Structure

| | | | | | |
|---|---|---|---|---|---|
| Base Inf Coefficient (m/hr) | 0.00000 | Safety Factor | 2.0 | Invert Level (m) | 206.900 |
| Side Inf Coefficient (m/hr) | 0.00000 | Porosity | 1.00 | Time to half empty (mins) | |

| Depth (m) | Area (m²) | Inf Area (m²) | Depth (m) | Area (m²) | Inf Area (m²) |
|---|---|---|---|---|---|
| 0.000 | 157.8 | 0.0 | 1.600 | 670.3 | 0.0 |

## Rainfall

| Event | Peak Intensity (mm/hr) | Average Intensity (mm/hr) | Event | Peak Intensity (mm/hr) | Average Intensity (mm/hr) |
|---|---|---|---|---|---|
| 100 year +40% CC 15 minute summer | 371.609 | 105.153 | 100 year +40% CC 360 minute summer | 50.824 | 13.079 |
| 100 year +40% CC 15 minute winter | 260.778 | 105.153 | 100 year +40% CC 360 minute winter | 33.037 | 13.079 |
| 100 year +40% CC 30 minute summer | 260.835 | 73.807 | 100 year +40% CC 480 minute summer | 40.338 | 10.660 |
| 100 year +40% CC 30 minute winter | 183.042 | 73.807 | 100 year +40% CC 480 minute winter | 26.799 | 10.660 |
| 100 year +40% CC 60 minute summer | 187.785 | 49.626 | 100 year +40% CC 600 minute summer | 33.305 | 9.110 |
| 100 year +40% CC 60 minute winter | 124.760 | 49.626 | 100 year +40% CC 600 minute winter | 22.756 | 9.110 |
| 100 year +40% CC 120 minute summer | 111.113 | 29.364 | 100 year +40% CC 720 minute summer | 29.913 | 8.017 |
| 100 year +40% CC 120 minute winter | 73.821 | 29.364 | 100 year +40% CC 720 minute winter | 20.103 | 8.017 |
| 100 year +40% CC 180 minute summer | 84.337 | 21.703 | 100 year +40% CC 960 minute summer | 24.872 | 6.549 |
| 100 year +40% CC 180 minute winter | 54.821 | 21.703 | 100 year +40% CC 960 minute winter | 16.475 | 6.549 |
| 100 year +40% CC 240 minute summer | 66.438 | 17.558 | 100 year +40% CC 1440 minute summer | 18.401 | 4.932 |
| 100 year +40% CC 240 minute winter | 44.140 | 17.558 | 100 year +40% CC 1440 minute winter | 12.367 | 4.932 |

**Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.97%**

| Node Event | US Node | Peak (mins) | Level (m) | Depth (m) | Inflow (l/s) | Node Vol (m³) | Flood (m³) | Status |
|---|---|---|---|---|---|---|---|---|
| 360 minute winter | Basin 01 | 344 | 208.200 | 1.300 | 80.2 | 492.6610 | 0.0000 | SURCHARGED |
| 360 minute winter | SW01 (FC) | 344 | 208.200 | 1.350 | 22.2 | 2.3849 | 0.0000 | SURCHARGED |
| 15 minute summer | Outfall 01 | 1 | 206.300 | 0.000 | 10.2 | 0.0000 | 0.0000 | OK |

| Link Event (Upstream Depth) | US Node | Link | DS Node | Outflow (l/s) | Velocity (m/s) | Flow/Cap | Link Vol (m³) | Discharge Vol (m³) |
|---|---|---|---|---|---|---|---|---|
| 360 minute winter | Basin 01 | 1.000 | SW01 (FC) | 22.2 | 0.582 | 0.111 | 0.5515 | |
| 360 minute winter | SW01 (FC) | Hydro-Brake® | Outfall 01 | 10.2 | | | | 329.5 |

## Design Settings

| | | | | | |
|---|---|---|---|---|---|
| Rainfall Methodology | FEH-22 | Maximum Time of Concentration (mins) | 30.00 | Preferred Cover Depth (m) | 1.200 |
| Return Period (years) | 100 | Maximum Rainfall (mm/hr) | 50.0 | Include Intermediate Ground | ✓ |
| Additional Flow (%) | 0 | Minimum Velocity (m/s) | 1.00 | Enforce best practice design rules | x |
| CV | 0.750 | Connection Type | Level Soffits | | |
| Time of Entry (mins) | 5.00 | Minimum Backdrop Height (m) | 0.200 | | |

## Nodes

| | Name | Area (ha) | T of E (mins) | Cover Level (m) | Depth (m) |
|---|---|---|---|---|---|
| ✓ | Detention Basin 02 | 1.630 | 5.00 | 215.000 | 1.500 |
| ✓ | SW02 (FC) | | | 215.000 | 1.550 |
| ✓ | Outfall 02 | | | 214.800 | 1.500 |

## Pipeline Schedule

| Link | Length (m) | Slope (1:X) | Dia (mm) | Link Type | US CL (m) | US IL (m) | US Depth (m) | DS CL (m) | DS IL (m) | DS Depth (m) |
|---|---|---|---|---|---|---|---|---|---|---|
| 1.000 | 4.999 | 100.0 | 450 | 1 STANDARD | 215.000 | 213.500 | 1.050 | 215.000 | 213.450 | 1.100 |
| 1.001 | 7.001 | 46.7 | 225 | 1 STANDARD | 215.000 | 213.450 | 1.325 | 214.800 | 213.300 | 1.275 |

| Link | US Node | Dia (mm) | Node Type | MH Type | DS Node | Dia (mm) | Node Type | MH Type |
|---|---|---|---|---|---|---|---|---|
| 1.000 | Detention Basin 02 | | Junction | | SW02 (FC) | 1500 | Manhole | 1 STANDARD |
| 1.001 | SW02 (FC) | 1500 | Manhole | 1 STANDARD | Outfall 02 | 1200 | Manhole | 1 STANDARD |

## Manhole Schedule

| Node | Easting (m) | Northing (m) | CL (m) | Depth (m) | Dia (mm) | Node Type | MH Type | Connections | Link | IL (m) | Dia (mm) | Link Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Detention Basin 02 | 306579.681 | 262167.062 | 215.000 | 1.500 | | Junction | | 0 | 1.000 | 213.500 | 450 | 1 STANDARD |
| SW02 (FC) | 306579.258 | 262172.043 | 215.000 | 1.550 | 1500 | Manhole | 1 STANDARD | 1 | 1.000 | 213.450 | 450 | 1 STANDARD |
| | | | | | | | | 0 | 1.001 | 213.450 | 225 | 1 STANDARD |
| Outfall 02 | 306578.667 | 262179.019 | 214.800 | 1.500 | 1200 | Manhole | 1 STANDARD | 1 | 1.001 | 213.300 | 225 | 1 STANDARD |

## Simulation Settings

| | | | | | |
|---|---|---|---|---|---|
| Rainfall Methodology | FEH-22 | Analysis Speed | Normal | Additional Storage (m³/ha) | 20.0 |
| Summer CV | 0.750 | Skip Steady State | x | Check Discharge Rate(s) | x |
| Winter CV | 0.840 | Drain Down Time (mins) | 240 | Check Discharge Volume | x |

**Storm Durations**

| 15 | 30 | 60 | 120 | 180 | 240 | 360 | 480 | 600 | 720 | 960 | 1440 |
|---|---|---|---|---|---|---|---|---|---|---|---|

| Return Period (years) | Climate Change (CC %) | Additional Area (A %) | Additional Flow (Q %) |
|---|---|---|---|
| 100 | 40 | 0 | 0 |

## Node SW02 (FC) Online Hydro-Brake® Control

| | | | |
|---|---|---|---|
| Flap Valve | x | Objective | (HE) Minimise upstream storage |
| Downstream Link | 1.001 | Sump Available | ✓ |
| Replaces Downstream Link | ✓ | Product Number | CTL-SHE-0177-1600-1250-1600 |
| Invert Level (m) | 213.450 | Min Outlet Diameter (m) | 0.225 |
| Design Depth (m) | 1.250 | Min Node Diameter (mm) | 1500 |
| Design Flow (l/s) | 16.0 | | |

## Node Detention Basin 02 Depth/Area Storage Structure

| | | | | | |
|---|---|---|---|---|---|
| Base Inf Coefficient (m/hr) | 0.00000 | Safety Factor | 2.0 | Invert Level (m) | 213.500 |
| Side Inf Coefficient (m/hr) | 0.00000 | Porosity | 1.00 | Time to half empty (mins) | |

| Depth (m) | Area (m²) | Inf Area (m²) | Depth (m) | Area (m²) | Inf Area (m²) |
|---|---|---|---|---|---|
| 0.000 | 275.4 | 0.0 | 1.500 | 1150.2 | 0.0 |

## Rainfall

| Event | Peak Intensity (mm/hr) | Average Intensity (mm/hr) | Event | Peak Intensity (mm/hr) | Average Intensity (mm/hr) |
|---|---|---|---|---|---|
| 100 year +40% CC 15 minute summer | 371.609 | 105.153 | 100 year +40% CC 360 minute summer | 50.824 | 13.079 |
| 100 year +40% CC 15 minute winter | 260.778 | 105.153 | 100 year +40% CC 360 minute winter | 33.037 | 13.079 |
| 100 year +40% CC 30 minute summer | 260.835 | 73.807 | 100 year +40% CC 480 minute summer | 40.338 | 10.660 |
| 100 year +40% CC 30 minute winter | 183.042 | 73.807 | 100 year +40% CC 480 minute winter | 26.799 | 10.660 |
| 100 year +40% CC 60 minute summer | 187.785 | 49.626 | 100 year +40% CC 600 minute summer | 33.305 | 9.110 |
| 100 year +40% CC 60 minute winter | 124.760 | 49.626 | 100 year +40% CC 600 minute winter | 22.756 | 9.110 |
| 100 year +40% CC 120 minute summer | 111.113 | 29.364 | 100 year +40% CC 720 minute summer | 29.913 | 8.017 |
| 100 year +40% CC 120 minute winter | 73.821 | 29.364 | 100 year +40% CC 720 minute winter | 20.103 | 8.017 |
| 100 year +40% CC 180 minute summer | 84.337 | 21.703 | 100 year +40% CC 960 minute summer | 24.872 | 6.549 |
| 100 year +40% CC 180 minute winter | 54.821 | 21.703 | 100 year +40% CC 960 minute winter | 16.475 | 6.549 |
| 100 year +40% CC 240 minute summer | 66.438 | 17.558 | 100 year +40% CC 1440 minute summer | 18.401 | 4.932 |
| 100 year +40% CC 240 minute winter | 44.140 | 17.558 | 100 year +40% CC 1440 minute winter | 12.367 | 4.932 |

**Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.92%**

| Node Event | US Node | Peak (mins) | Level (m) | Depth (m) | Inflow (l/s) | Node Vol (m³) | Flood (m³) | Status |
|---|---|---|---|---|---|---|---|---|
| 360 minute winter | Detention Basin 02 | 344 | 214.701 | 1.201 | 125.7 | 777.2224 | 0.0000 | FLOOD RISK |
| 360 minute winter | SW02 (FC) | 344 | 214.700 | 1.250 | 22.7 | 2.2091 | 0.0000 | FLOOD RISK |
| 15 minute summer | Outfall 02 | 1 | 213.300 | 0.000 | 15.9 | 0.0000 | 0.0000 | OK |

| Link Event (Upstream Depth) | US Node | Link | DS Node | Outflow (l/s) | Velocity (m/s) | Flow/Cap | Link Vol (m³) | Discharge Vol (m³) |
|---|---|---|---|---|---|---|---|---|
| 360 minute winter | Detention Basin 02 | 1.000 | SW02 (FC) | 22.7 | 0.572 | 0.070 | 0.7921 | |
| 360 minute winter | SW02 (FC) | Hydro-Brake® | Outfall 02 | 16.0 | | | | 515.5 |

# Appendix F Surface Water Drainage Plans

N

BASIN 01
CREST LEVEL:208.50M
INVERT LEVEL:206.90M
DEPTH:1.60M
FREEBOARD:0.3M
AREA AT CREST:670M²
VOLUME (EXCLUDING FREEBOARD):493M³
AVERAGE SLOPE:1IN3.5

SW01
FLOW CONTROL CHAMBER.
DISCHARGE RATE
RESTRICTED TO 10.2L/S.
CL:208.50M
IL:206.85M

OUTFALL TO BE INSTALLED WITH
FLAP VALVE TO PREVENT BACK FLOW
IL:206.300M

OUTFALL TO BE INSTALLED WITH
FLAP VALVE TO PREVENT BACK FLOW
IL:213.300M

SW02
FLOW CONTROL CHAMBER.
DISCHARGE RATE
RESTRICTED TO 16.0L/S.
CL:215.00M
IL:213.45M

BASIN 02
CREST LEVEL:215.00M
INVERT LEVEL:213.50M
DEPTH:1.50M
FREEBOARD:0.3M
AREA AT CREST:1,150M²
VOLUME (EXCLUDING FREEBOARD):777M³
AVERAGE SLOPE:1IN4

Site Boundary
Development Framework Boundary
Split Level Houses
Playing Field
Approximate position and size of surface water attenuation ponds
Existing tree / planting buffer to
Position of swale
P.O.S.
Llandrindod Wells Church in Wales Community School Trefonnen
School
LLANDRINDOD
Car Park
Shelters

0 10 20 30 40 50 60 70 80 90 100m
Scale 1:1,000

**Notes:**

1. DRAWING TO BE READ IN CONJUNCTION WITH ALL RELEVANT DOCUMENTS AND SLR DRAINAGE STRATEGY.
2. DRAINAGE STRATEGY IS SUBJECT TO DETAILED DESIGN INCLUDING LEVELS.
3. ALL LEVELS ARE SHOWN IN METRES ABOVE ORDNANCE DATUM.
4. DRAINAGE STRATEGY DESIGN ATTENUATES SURFACE WATER RUNOFF FOR THE 1 IN 100 YEAR EVENT PLUS 40% CLIMATE CHANGE.
5. DISPLAYED ACRONYMS:

- CL - COVER LEVEL
- IL - INVERT LEVEL
- D - DEPTH

**Legend:**

- SITE BOUNDARY
- EXISTING DITCH
- PROPOSED DITCH EXTENTION
- PROPOSED SURFACE WATER DRAIN
- PROPOSED HEADWALL
- PROPOSED SWALE WITH UNDERLYING FILTER DRAIN
- PROPOSED PRIVATE RAIN GARDEN
- PROPOSED PUBLIC RAIN GARDEN
- PROPOSED PERMEABLE PAVING
- PROPOSED DETENTION BASIN
- PROPOSED FLOOD EXCEEDANCE ROUTE
- CATCHMENT 01 (NORTH - 1.465HA)
- CATCHMENT 02 (SOUTH - 2.302HA)
- 1 IN 1000 SURFACE WATER FLOOD EXTENTS

| Rev | Amendments | Date | By | Chk | Auth |
|---|---|---|---|---|---|

SLR

www.slrconsulting.com

Drawing Status & Suitability Code: **FOR INFORMATION**

Client: REG KNILL

Project: LAND AT TREMONT PARK

Drawing Title: PRELIMINARY SURFACE WATER DRAINAGE LAYOUT

| Scale | SLR Project No. |
|---|---|
| 1:1,000 @ A1 | 416.065167.00001 |

| Designed | Drawn | Checked | Authorised |
|---|---|---|---|
| HE | HE | NB | NB |
| Date | Date | Date | Date |
| NOV 2024 | NOV 2024 | NOV 2024 | NOV 2024 |

Drawing Number: **416.065167.00001_PDL_01** Rev: **P01**

18/11/2024

\\slr.local\eu\Offices\UK\Bristol\Admin\Projects\136787 - Reg Knill\416.065167.00001 - Land at Tremont Park\Tech\HYD\Dwgs\Wking\416.065167.00001_PDL_01-P01 Preliminary Surface Water Drainage Layout.dwg

# Appendix G DCWW Correspondence

Dŵr Cymru
Welsh Water

Developer Services
PO Box 3146
Cardiff
CF30 0EH

Tel: +44 (0)800 917 2652
Fax: +44 (0)2920 740472
E.mail: developer.services@dwrcymru.com

Gwasanaethau Datblygu
Blwch Post 3146
Caerdydd
CF30 0EH

Ffôn: +44 (0)800 917 2652
Ffacs: +44 (0)2920 740472
E.bost: developer.services@dwrcymru.com

Mrs Helena Preston
SLR Consulting
Treenwood House
Rowden Lane
Bradford on Avon
Wiltshire
BA15 2AU

**Date: 12/01/2024**
**Our Ref: PPA0008500**

Dear Mrs Preston,

**Grid Ref: 306528 262085**
**Site Address: Tremont Park, Llandrindod Wells**
**Development: Land at Tremont Park**

I refer to your pre-planning enquiry received relating to the above site, seeking our views on the capacity of our network of assets and infrastructure to accommodate your proposed development. Having reviewed the details submitted I can provide the following comments which should be taken into account within any future planning application for the development.

## APPRAISAL

Firstly, we note that the proposal relates to 115 dwellings on Land at Tremont Park and acknowledge that the site is allocated Ref: P28 HA2 within the Local Development Plan (LDP) for 122 units. In reference to our representations during the LDP consultation process, we can confirm that an assessment has been undertaken of the public sewerage and watermains systems to accommodate 122 and informs our appraisal as follows. Please note, however, this proposal comprises a decrease to the allocation and the following assessment takes this into account.

## PUBLIC SEWERAGE NETWORK

The proposed development site is located in the immediate vicinity of a separate sewerage system, comprising foul and surface water public sewers, which drains to Llandrindod Wells Wastewater Treatment Works (WwTW).

You are also advised that some public sewers and lateral drains may not be recorded on our maps of public sewers because they were originally privately owned and were transferred into public ownership by nature of the Water Industry (Schemes for Adoption of Private Sewers) Regulations 2011. The presence of such assets may affect the proposal. In order to assist you may contact Dwr Cymru Welsh Water on 0800 085 3968 to establish the location and status of the apparatus in and around your site. Please be mindful that under the Water Industry Act 1991 Dwr Cymru Welsh Water has rights of access to its apparatus at all times.

**SURFACE WATER DRAINAGE**

As of 7th January 2019, this proposed development is subject to Schedule 3 of the Flood and Water Management Act 2010. The development therefore requires approval of Sustainable Drainage Systems (SuDS) features, in accordance with the 'Statutory standards for sustainable drainage systems – designing, constructing, operating and maintaining surface water drainage systems'. As highlighted in these standards, the developer is required to explore and fully exhaust all surface water drainage options in accordance with a hierarchy which states that discharge to a combined sewer shall only be made as a last resort. Disposal should be made through the hierarchical approach, preferring infiltration and, where infiltration is not possible, disposal to a surface water drainage body in liaison with the Land Drainage Authority and/or Natural Resources Wales.

As part of this pre-planning enquiry, we acknowledge the proposals to discharge surface water flows into a surface water body and in principle we would offer no objection subject to consultation and an agreement with the Lead Local Flood Authority and Environment Agency as the regulatory body. Please refer to further detailed advice relating to surface water management included in our attached Advice & Guidance note and our Developer Services website at https://developers.dwrcymru.com/en/help-advice/regulation-to-be-aware-of/sustainable-drainage-systems.

In addition, please note that no highway or land drainage run-off will be permitted to discharge directly or indirectly into the public sewerage system.

**FOUL WATER DRAINAGE – SEWERAGE NETWORK**

We have considered the impact of foul flows generated by the proposed development and concluded that flows can be accommodated within the public sewerage system which is consistent with our representations to the forward planning consultation process. We advise that the flows should be connected to the foul sewer at or downstream of manhole SO6624102 located on Tremont Park Road.

Should a planning application be submitted for this development we will seek to control these points of communication via appropriate planning conditions and therefore recommend that any drainage layout or strategy submitted as part of your application takes this into account. However, should you wish for an alternative connection point to be considered please provide further information to us in the form of a drainage strategy, preferably in advance of a planning application being submitted.

You may need to apply to Dwr Cymru Welsh Water for any connection to the public sewer under Section 106 of the Water industry Act 1991. However, if the connection to the public sewer network is either via a lateral drain (i.e. a drain which extends beyond the connecting property boundary) or via a new sewer (i.e. serves more than one property), it is now a mandatory requirement to first enter into a Section 104 Adoption Agreement (Water Industry Act 1991). The design of the sewers and lateral drains must also conform to the Welsh Ministers Standards for Foul Sewers and Lateral Drains and conform with the publication "Sewers for Adoption"- 7th Edition. Further information can be obtained via the Developer Services pages of www.dwrcymru.com.

**FOUL WATER DRAINAGE – SEWAGE TREATMENT**

We can advise that Llandrindod Wells WwTW has a phosphate permit, this matter will need to be considered further by the local planning authority. Notwithstanding this, no problems are envisaged with the Waste Water Treatment Works for the treatment of domestic discharges from this site.

**POTABLE WATER SUPPLY**

Capacity is currently available in the water supply system to accommodate the development. Initial indications are that a connection can be made from the 160mm diameter watermain Location 306552,262233. We reserve the right however to reassess our position as part of the formal application for the provision of new water mains under Section 41 and Section 51 of the Water Industry Act (1991) to ensure there is sufficient capacity available to serve the development without causing detriment to existing customers' supply as demands upon our water systems change continually.

I trust the above information is helpful and will assist you in forming water and drainage strategies that should accompany any future planning application. I also attach copies of our water and sewer extract plans for the area, and a copy of our Planning Guidance Note which provides further information on our approach to the planning process, making connections to our systems and ensuring any existing public assets or infrastructure located within new development sites are protected.

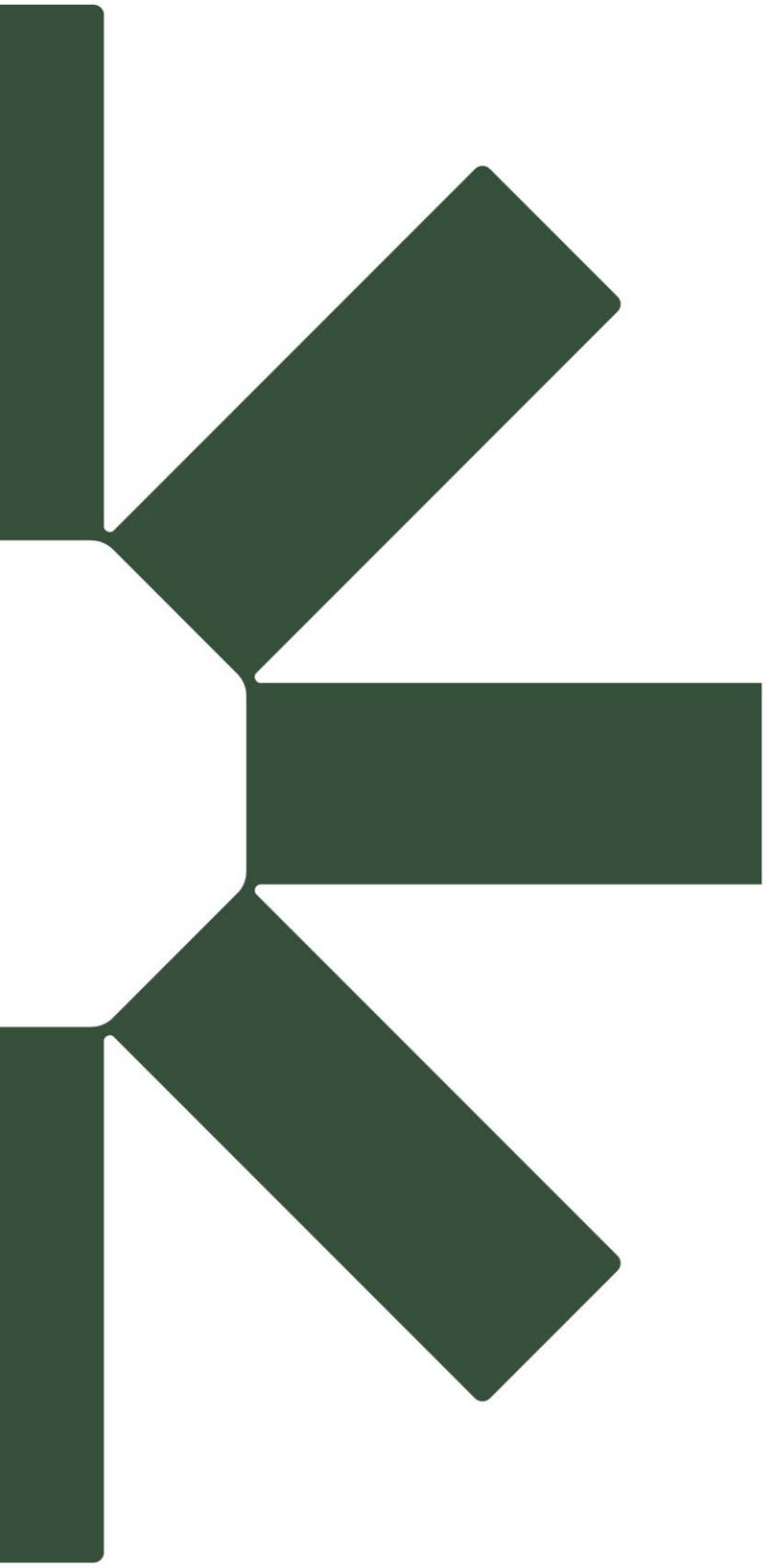
Please note that our response is based on the information provided in your enquiry and should the information change we reserve the right to make a new representation. Should you have any queries or wish to discuss any aspect of our response please do not hesitate to contact our dedicated team of planning officers, either on 0800 917 2652 or via email at **developer.services@dwrcymru.com**

Please quote our reference number in all communications and correspondence.

Yours faithfully,

**Owain George**
**Planning Liaison Manager**
**Developer Services**

***<u>Please Note</u> that demands upon the water and sewerage systems change continually; consequently the information given above should be regarded as reliable for a maximum period of 12 months from the date of this letter.***



Making Sustainability Happen