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Mitchell Court, Tonypandy

Drainage Strategy Report

For *Trivallis*

Date	*26 November 2024*
Doc ref	33335-HYD-XX-XXRP-C-0001

Document control sheet

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Client	Trivallis	
Project name	Mitchell Court, Tonypandy	
Title	Drainage Strategy Report	
Doc ref	33335-HYD-XX-XXRP-C-0001	
Project number	33335	
Status	For Information	
Date	26/11/2024	

Document production record		
Issue number	P01	Name
Prepared by		Jessica Sze-Wing Li - Senior Engineer
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Approved by		Mark Lewis - Associate

Document revision record			
Issue number	Status	Date	Revision details
P01	S2	26/11/2024	First Issue

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1. Introduction

Hydrock have been commissioned by RPA Group on behalf of Trivallis to provide a detailed drainage design and report for the proposed Mitchell Court, Tonypandy development, CF40 2RD.

The client is seeking to redevelop the current brownfield site and this report is required to support the planning and pre-SAB application submissions.

The objectives of the report are to:

- Review and report on the existing drainage arrangements on site for surface water;
- Assess the feasibility of Sustainable Drainage System (SuDS) features within the development to control and discharge surface water runoff to comply with the requirements of the Welsh Government statutory "Sustainable Drainage Systems Standards for Wales" (SDSSW) document 2018; and
- Provide a design for surface water (SuDS) systems including the sizing of storage/attenuation features and design drawings suitable for inclusion in a full application submission to the local authority's SuDS Approval Body (SAB).

The following tasks have been undertaken to complete this report:

- Undertake a desktop investigation of the site's existing surface water drainage arrangements;
- Detail solutions for surface water disposal. This will include calculations, drawings and schedules;
- Determine the area of impermeable surfaces that will be added by the proposed development and determine the equivalent greenfield and brownfield run-off rates for this area;
- Assess the feasibility of using infiltration as a disposal method, based on soakaway test results or any other available information on ground and site conditions provided by the client;
- Design of the storm water storage needed to manage run-off from the site post-development, using drainage design software (InfoDrainage by Innovyze);
- Provide information on the future maintenance requirements of SuDS features; and
- Give details of drainage exceedance. In particular, use topographic information to identify overland flow paths and areas susceptible to surface water ponding.

A number of sources of information have been used to compile this drainage strategy. Whilst Hydrock believe them to be trustworthy we are unable to guarantee the accuracy of the information that has been provided by others.

This report is based on information available at the time of preparation. Consequently, there is potential for further information to become available. These changes may lead to future alteration to the conclusions drawn in this report for which Hydrock cannot be held responsible.

2. Existing Site

2.1 Site Location

Figure 2.1 indicates the site location within the red circle, Mitchell Court, Tonypandy, CF40 2RD (approximate grid reference X - 299138, Y - 192866; what3words react.hood.calm) ©OpenStreetMap contributors.

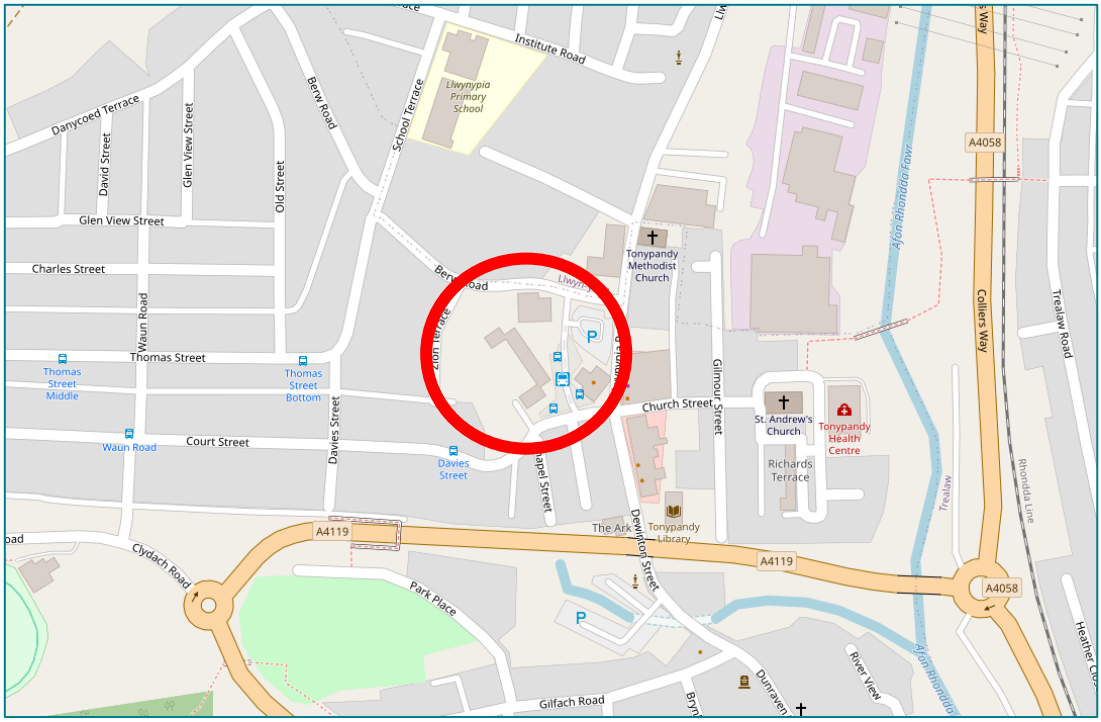


Figure 2.1: Site location plan (ref ©OpenStreetMap contributors (accessed Sept 2024))

2.2 Site Description

The total site is approximately 0.70 hectares (ha) and is brownfield in nature. The site is currently comprised of an existing apartment building, existing garages, an office building, associated infrastructure, existing buried foundations from previously demolished structures/infrastructure and soft landscaping.

The site is bounded by Berw Road, Tonypandy bus station, Court Street and Zion Terrace to the north, east, south and west respectively. There are existing dwellings situated to the southwest and west of the site and The Pandy Inn and a public car park to the east.

The existing site falls from southwest to northeast where the highest level is approximately 158.73m AOD and the lowest level is approximately 144.25m AOD. The existing site is divided into three plateaus by existing retaining walls, where tier 1, tier 2 and tier 3 all fall southwest to northeast at gradients of approximately 1 in 3, 1 in 11 and 1 in 85 respectively. Tier 1 is comprised of soft landscaping and existing pedestrian infrastructure that links Zion Terrace to the existing Mitchell Court apartment building. Tier 2 is comprised of the existing Mitchell Court apartment building, garages, buried foundations and associated infrastructure. Tier 3 is comprised of the existing office building and associated car park. Tier 2 and tier 3 have direct vehicle access off Court Street and off Berw Road located along the southeastern and eastern edge of the site boundary respectively. Figure 2.2 below is an extract from

satellite image of the existing site bounded by the proposed red line boundary, with tier 1, 2 and 3 highlighted in blue, green and purple respectively.

Figure 2.2: Extract from satellite image (accessed Sept 2024)

2.3 Flood Risk

Figure 2.3 below is an extract of the National Resources Wales (NRW) flood risk maps with the site location within the red circle.

From this mapping information it can be seen that the site is free from flooding from rivers and sea indicated in blue, but located within flood zone 2 and 3 for surface water and small watercourses indicated in pink. Where flood zone 2 and 3 are described as the following:

- Flood Zone 2 (light pink) – Areas with 0.1% to 1% (1 in 1000 to 1 in 100) chance of flooding from surface water and/or small watercourses in a given year, including the effects of climate change.
- Flood Zone 3 (dark pink) – Areas with more than 1% (1 in 1000) chance of flooding from surface water and/or small watercourses in a given year, including the effects of climate change.

Flood zone 2 located in the centre of the site is caused by the existing surface water drainage network that serves the existing apartment building surcharging and water ponding on the surface in the quadrangles formed by the existing building on 3 sides and the access road approximately 0.5m higher on the 4th side. Flood zone 3 is located within and along the northern border of the site is caused by runoff from the hillside to the northwest of Tonypandy collecting in the Nant Clydach Fach which under rainfall events in excess of the 1 in 1000yr event would exceed the capacity of the culvert inlet into the drainage network, linking Nant Clydach Fach (to the west) to the Rhondda River (to the east), near the intersection of Berw Road and Knoll terrace, and flow overland along Berw Road. Adjacent to the site

due to the steepness of Berw road, the majority, if not all, of the flow would be retained within the kerb lines of the road.

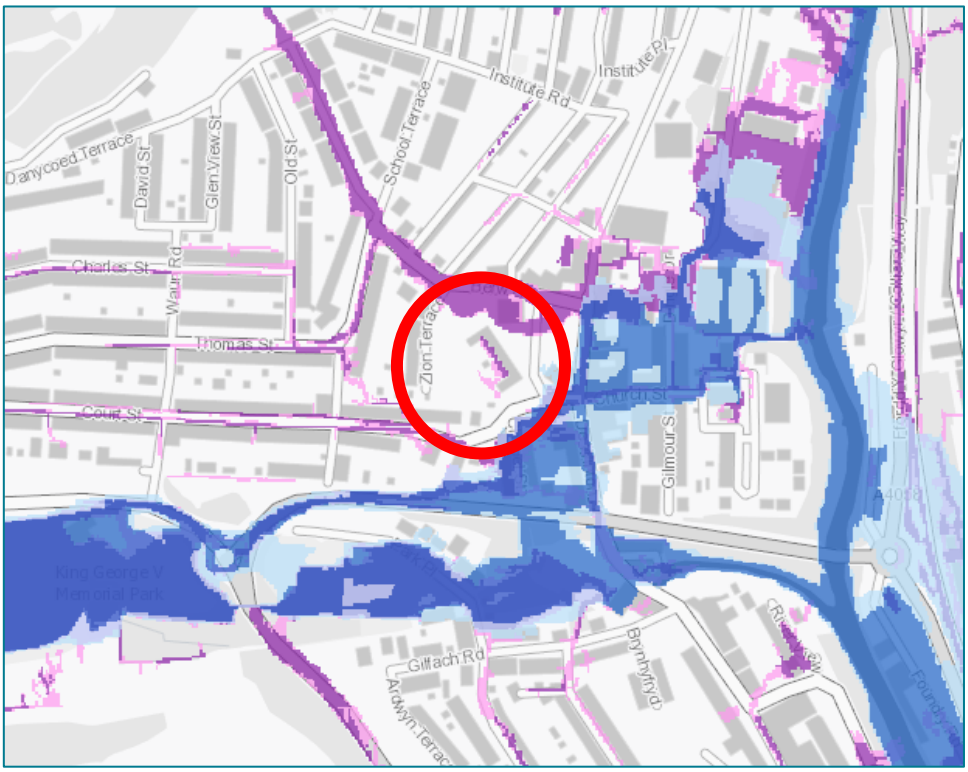


Figure 2.3: Extract from NRW Flood Risk Maps (accessed Sept 2024)

2.4 Existing Drainage Arrangements

From available mapping information it has been established that the nearest main watercourse is approximately 266m east of the site which flows north to south.

From GPR survey there is evidence of existing drainage networks that currently serve the existing apartment building and office building. The existing surface water network that serves the existing apartment building appears to be flowing northwest to southeast and the existing surface water network serving the existing office building appears to be flowing north to east.

From available Dŵr Cymru Welsh Water (DCWW) mapping information there is a 150mm diameter public combined sewer which serves the existing office building and located to the north and within the site boundary, and flows southwest to northeast. There is also a 300mm diameter public combined sewer which serves the existing apartment building and located to the south and within the site boundary, where it crosses the site from Zion Terrace and flows west to south. Figure 2.4 contains an extract of the DCWW asset plan for the area with the site located within the green circle.

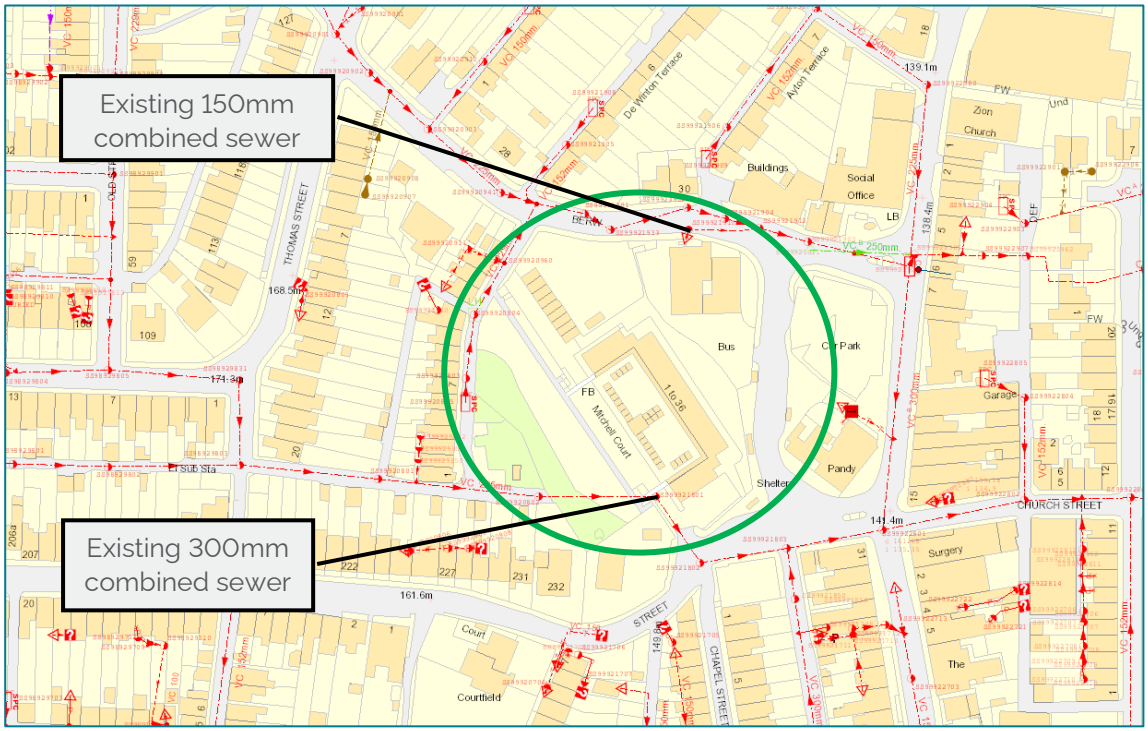


Figure 2.4: Extract from DCWW Asset Maps (accessed Sept 2024)

2.5 Existing Contributing Areas and Runoff Rates

The total site area is circa 0.70ha. The global greenfield run-off rates have been calculated using the FEH statistical method from HR Wallingford and Table 2.1 summarises the runoff rates for each return period (1, 30 & 100). Calculations detailing the derivation of the values in these tables are available in Appendix A.

Table 2.1: Greenfield Runoff Rates by Return Period

Return Period	Runoff Rate (l/s)
1yr	17.5
30yr	35.4
100yr	43.36

As the site is comprised of existing hardstanding, the existing peak discharge rate from the site has been calculated for each return period (2, 30 & 100) using a 30min rainfall event based on FEH22 data. The percentage runoff has been derived using the Fixed Wallingford Procedure UK runoff model as outlined in section 4.3.4 of The SuDS manual (CIRIA C697). Table 2.2 summarises the runoff rates and calculations detailing the derivation of the values are available in Appendix B.

Table 2.2: Existing brownfield Runoff Rate for 30min Rainfall Event

Return Period	Runoff Rate (l/s)
2yr	41.55
30yr	94.63
100yr	127.09

3. Proposed Development

3.1 Development Proposals

The proposed development comprises of a new apartment building which will be located in the same area as the existing apartment building, with associated parking and infrastructure; and eight number residential dwellings which will be located along the northern boundary in the location of the existing office building and buried foundations of the previously demolished buildings/infrastructure. Tier 1 to the west will remain as soft landscaping.

Tier 2 and 3's direct vehicle access off Court Street and off Berw Road located along the southeastern and eastern edge of the site boundary respectively, will be retained. The proposed residential dwellings located in the northwest corner of the site will require a new vehicle access to private drives located to the rear of the footway along Berw Road.

Figure 3.1 is an extract from the architect's latest site layout, at the time of writing this report.

Figure 3.1: Extract from architect's site layout (accessed Nov 2024)

3.2 Foul Water

The proposed development will be constructed on an existing brownfield site. The existing public combined 150mm and 300mm diameter sewer that are situated within the northern and the southern part of the site boundary respectively, have been identified as existing connection options. The proposed development will seek to utilise these proposed connection points, where the proposed dwellings will utilise the connection point within the northern part of the boundary, and the proposed apartment building will utilise the connection point within the southern part of the boundary.

It is proposed to utilise the existing pipework from the site to the existing public combined sewer which will remove the need for off-site works to form the connections. It is recommended that prior to detailed design a survey of the existing sewers is undertaken to establish their condition and confirm their

suitability for reuse. This will need to be agreed with DCWW as part of the detailed design stage of the project.

The capacity of the 300mm diameter existing sewer to receive the proposed flows from the proposed development has been confirmed by DCWW via a pre planning response (PPA00008734), a copy the pre planning response from DCWW is included in Appendix C. The capacity of the 150mm diameter existing sewer to receive the proposed flows from the proposed development will be subject to confirmation from DCWW.

All on site sewerage systems will be designed and constructed to comply with Welsh building regulations requirements with any adopted elements in accordance with the latest edition of "Sewers for Adoption" and any of the adopting authority's (DCWW) specific requirements.

3.3 Surface Water

The aim of the surface water drainage strategy is to mimic the natural catchment processes as closely as possible and adopt the principles of water management schemes as stated in section 2 of the SDSSW document 2018. The previous sections of this report have established the current drainage arrangements on site and have also determined the current discharge rates for surface water leaving the site.

From 7th January 2019 Schedule 3 of the Flood and Water Management Act has been implemented by the Welsh Government which requires any development of more than 1 unit or where the construction area is greater than 100m^2 to comply with the SuDS Approving Bodies (SAB's) design guidance and ministers' standards which will require all sites to adopt SuDs in their design. The standards are listed below;

- S1 – Surface Water Runoff Destination
- S2 – Surface Water Runoff Hydraulic Control
- S3 – Water Quality
- S4 – Amenity
- S5 – Biodiversity
- S6 – Design of Drainage for Construction, Operation and Maintenance

The Standards listed will need to be met by the design in order to comply with the SDSSW. S1 is a hierarchy standard with standards S2-S6 being fixed.

3.3.1 S1 - Surface Water Runoff Destination

In determining a suitable methodology for disposal of surface water flows from this development, it is necessary to explore the technical options outlined under Standard S1 of the SDSSW 2018 document published by Welsh Government. This states that disposal should be made through the hierarchical approach which are, in order of preference; surface water runoff collected for use, infiltration methods, discharge to surface water body, discharge to a surface water sewer, highway sewer or another drainage system and finally discharge to a combined sewer. Each of these options are considered below.

3.3.1.1 Collected for Use

The suitability of this option will depend on the proposed water usage of the development, if the development has low grey water demand, as is typical of residential developments the collection of water for reuse would not be economical or feasible, however if the demand for grey water is deemed to be high then rainwater harvesting would be an appropriate solution for parts of the development. The use of rainwater harvesting would need to be used in conjunction with one of the below methods of

discharge in order to cater for exceedance flows in extreme rainfall evens where the rainfall volume exceeds the volume of surface water storage provided by the rainwater harvesting tanks. As the development is considered to have low demand for grey water the use of a grey water system would not be suitable due to there being periods of very low demand which may result in legionella issues. Basic forms of rainwater harvesting could be incorporated into the development in the form of rainwater butts that will collect water from rainwater downpipes and store it for irrigation of the soft landscaped areas and planting beds. This will be considered at the detailed design stage of this development however as most of the flatter areas of the site are already proposed to be used as raingardens the need for irrigation water will be minimal. The suitability of utilising water butts for the residential houses will be considered during detailed design. Based on this storing rain water runoff for reuse is partially feasible on this scheme.

3.3.1.2 Infiltration Methods

Based on the Cranfield University Soilscapes mapping the subsoils in the area of the site are noted as freely draining slightly acid loamy soils, at the time of writing this report we are awaiting the results of the site investigation report. Infiltration testing will need to be carried out prior to detail design to establish the feasibility of infiltration as a disposal method for surface water run off generated from the site. As part of the detailed design stage where feasible and where ground conditions allow, the proposed sustainable drainage features can be designed as part or full infiltration drainage features depending on the result of the site investigation testing. Due to the location of the raingardens being in close proximity to retaining walls, impermeable membrane will need to be incorporated, to prevent flowpaths of water through the retaining walls, thereby removing the ability to utilise infiltration.

3.3.1.3 Discharge to Surface Water Body

Sequentially, the next consideration in the hierarchical approach is discharge to a surface water body. The nearest watercourse is located approximately 266m east of the site which flows north to south. It is not feasible to discharge to the watercourse due to the cost of the offsite works and crossing third party land outside of the client's control.

3.3.1.4 Discharge to Surface Water Sewer

From GPR survey there is evidence of existing drainage networks that currently serve the existing apartment building and office building. Where the existing surface water network that serves the existing apartment building appears to be flowing northwest to southeast and the existing surface water network serving the existing office building appears to be flowing north to east.

It is proposed to form new connections for the proposed dwellings and apartment building on the line of the existing surface water sewer from the site that serves the existing office building and existing apartment building respectively.

3.3.1.5 Discharge to Combined Sewer

Based on the above information there is no need to consider discharging into a public combined sewer system.

3.3.2 S2 - Surface Water Runoff Hydraulic Control

This standard requires surface water to be managed to prevent as far as possible any discharge from the development for rainfall events of less than 5mm and that the surface water runoff rate and volume for up to a 1 in 100-year return period should be managed to protect people, properties and the receiving water body. Consideration is also required to the risk associated with runoff from events greater than 1 in 100-year return period with mitigating proposals developed for the scheme.

3.3.2.1 *Interception of Runoff*

Interception will need to be considered under the statutory standards. Interception aims to mimic greenfield runoff conditions by preventing runoff from the majority of all small rainfall events. This can contribute to reducing pollution load to receiving surface water bodies. Meeting the Interception criterion is not expected during particularly wet periods, when permeable surfaces and subsoils are saturated, so a suggested target is that 80% compliance should be achieved during the summer and 50% in winter. Refer to table G2.1 in the Sustainable Drainage Systems Standards for Wales (SDSSW) 2018 document published by Welsh Government for details of interception mechanisms and their assumed compliance with the standards. It is proposed that this scheme will utilise permeable paving and bioretention areas to provide suitable levels of interception. The design is based on the bioretention areas being lined due to the location of proposed SuDS features adjacent to proposed/existing retaining walls as a result of the site level constraints.

The following interception ratios have been assumed based upon under the guidance in the SDSSW document and CIRIA SuDS manual;

- Permeable paving - unlined - permeable paved area plus impermeable area equivalent to the base area
- Bioretention areas - lined - vegetated base area plus impermeable surface area equivalent to 2 times base area

Where 3 times base area for lined bioretention areas/swales is taken from Box 24.3 of the CIRIA C753 SuDS Manual, where only evapotranspiration has been taken into account therefore, no infiltration. Interception compliance will be calculated and demonstrated at pre-SAB application.

Due to the site constraints, limited external areas which are generally steeply sloping, based upon the above parameters it is highly unlikely that interception criteria for the whole of the development will be achieved. This will need to be agreed with RCT SAB.

3.3.2.2 *Hydraulic Control and Storage*

As described in section 3.3.2.1 the bases of the SuDS features (raingardens) in the vicinity of the retaining walls will be lined therefore, infiltration will not be accounted for as a means of disposing surface water runoff generated from the development; meaning the discharge volume for the site will not decrease. So, for the purposes of the storage calculations, no volume will be lost to infiltration.

The proposed development will be discharging into the existing surface water sewer network at two connection points, the proposed discharge rate for the overall site is 28.0l/s (subject to agreement with RCT SAB) for all rainfall events which will provide 32% betterment for the 2 year event with that betterment increasing to 84% for the 100 year event with 40% allowance for climate change, as seen in Table 3.1 below.

Table 3.1: Summary of Betterment Discharge Rates

Return Period	Pre-Development Runoff Rate (l/s)	Post Development Runoff Rate (l/s)	Betterment (%)
2yr	41.55	28.0	32%
30yr	94.63	28.0	70%
100yr	127.09	28.0	78%
100yr + 40%	177.92	28.0	84%

In order to meet the standards, this report has adopted the simple index approach outlined in the statutory standards of restricting all runoff from the proposed areas of the site for all return periods up to and including the 1 in 100-year event with 40% allowance for climate change to a proposed discharge rate of 28.0l/s for the overall site for all rainfall events.

In accordance with statutory guidelines, the development of this site should not increase flood risk elsewhere and as such, all runoff from attenuated areas on site should be contained within the site boundary for up to and including a 1 in 100-year design period storm, plus 40% climate change. It is proposed to discharge surface water runoff from the development via gravity to the existing surface water sewer located within the site at two connection points, with the runoff rates being restricted to 12l/s and 16l/s to the north and southeast respectively.

Surface water flows from the proposed development will be attenuated via two flow control chambers downstream and on-site storage provided to accommodate surface water runoff for all rainfall events up to and including a 1 in 100-year event with 40% allowance for climate change.

Given the proposed site usage, storage in the form of permeable paving, bioretention areas and cellular storage tanks have been adopted. Table 3.2 below provides a summary of the SuDS feature used and storage values.

Table 3.2: Drainage Features Storage Summary

SuDS Feature	Approximate Area (m2)	Indicative Storage Provided (m3)
Permeable Paving	» 933	110
Bioretention Area	» 103	9.3
Cellular Storage	» 98	75.9

The analysis has shown the need to store 75.9m3 of runoff from the apartment building. The storage could either be provided in the form of a blue roof or underground storage crates or a combination of both. The exact form of storage will be determined during detailed design.

The preliminary drainage layout can be found in the supporting documents submitted with the relevant submissions.

3.3.2.3 Exceedance Flows and Flood Pathways

"It is inevitable that as a result of extreme rainfall the capacities of sewers, covered watercourses and other drainage systems will be exceeded on occasion. Periods of exceedance occur when the rate of surface runoff exceeds the drainage system inlet capacity, when the pipe system becomes overloaded, or when the outfall becomes restricted due to flood levels in the receiving water. Underground conveyance cannot economically or sustainably be built large enough for the most extreme events and, as a result, there will be occasions when surface water runoff will exceed the design capacity of drains. When drainage exceedance capacity is exceeded the excess water (exceedance flow) is conveyed above ground, and will travel along streets and paths, between and through buildings and across open space. Indiscriminate flooding of property can occur when this flow of water is not controlled." (CIRIA C753).

Flood-flow pathways will be indicated on the Exceedance Routing Plan which will be included in the SAB application, this will be designed to convey the overland flows from rainfall events above a 1in100 year return period to suitable areas of open space, such as landscaped areas, car parking areas and other hard surfaced areas in order to protect properties against flooding. Consideration will also be

given to exceedance pathways from storage areas in the event of extreme rainfall or failure with allowance made to convey flows away from properties both on and off the site.

3.3.2.4 Flood Risks to People

"People are at risk of suffering death or serious injury when flooding occurs. People are unable to stand in deep or fast flowing floodwater. Once they are unable to stand, there is a high risk of death or serious injury. Adults are unable to stand in still floodwater with a depth of about 1.5m or greater, although this is obviously affected by the height of a person. The depth of flowing floodwater where people are unable to stand is much less. For example, some people will be at risk when the water depth is only 0.5m, if the velocity is 1m/s (about 2 mph). If the velocity increases to 2m/s (about 4 mph) some people will be unable to stand in a depth of water of only 0.3m. Most people will be unable to stand when the velocity is 2m/s and the depth is 0.6m." (Defra/ Environment Agency, FD2321/TR2)

The scheme has been designed to convey all flows up to a 1 in 100 year return period, with a 40% increase for climate change, within the system so the only exceedance flows that will be generated from this development will be as a result of system failure or blockage or rainfall events in excess of the designed return period. The Exceedance Routing Plan will be provided within the SAB application pack and it will demonstrate the flow path ways to protect the building by directing water away from the building and towards the public highways.

3.3.3 S3 - Water Quality

This standard requires treatment of surface water runoff to prevent negative impacts on the receiving water quality and/or protect downstream drainage systems including sewers. The only exception to this standard is where drainage connects directly to a combined sewer, where the quality requirements are limited to preventing the discharge of oil and sediments to the sewer system.

The project has been assessed using the Simple Index Assessment (SIA) tool available publicly (http://www.ukSuDS.com/drainage-calculation-tools/water-quality-assessment-for-SuDS-developments), which is built around the principles for simple assessment outlined in CIRIA C753, to assess the levels of treatment provided by the proposals.

A water quality assessment report will be provided within the SAB application pack.

3.3.4 S4 - Amenity

This standard requires that the design of the surface water management system should maximise amenity benefits.

The incorporation of SuDS within the development has been considered at the outset with a landscape led approach to ensure that the proposed features are incorporated within the site masterplan in an appropriate manner providing the required multi-functional benefits that contribute to place making and other amenity benefits. Features in the form of bioretention areas have been provided, based on its natural form that mimics natural landscapes. These SuDS features will be planted with a planting regime, with wildflower grasses and native shrub planting to the surrounding areas, to create an attractive environment for the building users and visitors. Seating has been provided outside throughout the proposed development for users or visitors to improve the health and well-being of the users. Wider amenity benefits include improvements in air quality and carbon sequestration around the development through the planting of trees and shrubs in and around the SuDS features.

3.3.5 S5 - Biodiversity

This standard requires that the surface water management system should maximise biodiversity benefits.

The proposed bioretention areas have been designed to not only deal with water quantity and quality but provide amenity and biodiversity benefits; the Four Pillars of SuDS as set out in the CIRIA SuDS manual. As per these requirements the strategy is to create a SuDS scheme that provides above-ground water management features including green roofs, swales and detention basins, to manage the quality and quantity of surface water run-off and provide opportunities for habitat provision. The feature has been located and designed as an integral part of the strategic Green Infrastructure creating new habitats, native shrub planting to banks to extend existing boundary planting and a matrix of grassland from mown amenity through to wildflower grasses of both wet and dry tolerance. These features will increase the overall biodiversity of the site with the inclusion of plant species that will enhance the general eco system and simultaneously act as a water filtration system to clean pollutants and contaminants and slow flows via evapotranspiration.

The plant species have been selected as locally contextual and appropriate for the varied habitat zones including primary characteristics that shall ensure:

- Good soil binding and filtration species
- Minimised erosion
- Improved filtration via dense root and stem species
- Tolerance to seasonal variations including droughts and inundations
- Good suspended solids retention
- Pollutant tolerant
- Emergent and pioneering species for natural ecological colonisation
- The creation of diverse, self-sustaining and resilient ecosystems for high species biodiversity
- Support for local and regional habitat strategies

In general, the proposed bioretention areas will provide the focal habitats for the site, enhancing from its current status via provision of areas of open water and different planting typologies.

3.3.6 S6 - Design of Drainage for Construction and Maintenance and Structural Integrity

The surface water drainage system has been designed with the overriding ethos of simplicity in construction, use and maintenance. This then allows a very simple translation from the principles described within standard S6, namely that all elements of the surface water drainage system should be designed so that they can be constructed, as well as maintained and operated "…easily, safely, cost-effectively, in a timely manner, and with the aim of minimising the use of scarce resources and embedded carbon (energy)." (SDSSW).

The proposed system will be managed by the client as they will be the sole landowner and will be managing all the elements within the site boundary, therefore the client's maintenance team will be responsible for the maintenance of all elements of the system to ensure it continues to comply with SuDS standards.

A maintenance regime for each element will be provided within the SAB application pack. Information with regards to the construction methodology will be in the supporting information with the SAB application which includes Construction Phasing Plan & Construction Management Plan with the Construction (Design and Management) CDM Regulations File being provided at the end of the project.

4. Summary

4.1 Foul Water

The most sustainable method for the disposal of foul water discharge from the proposed development site is via the existing main sewer network. It is proposed to utilise the existing pipework from the site to the existing public combined sewer which will remove the need for off-site works to form the connections. It is recommended that prior to detailed design a survey of the existing sewers is undertaken to establish their condition and confirm their suitability for reuse. This will need to be agreed with DCWW as part of the detailed design stage of the project.

The capacity of the 300mm diameter existing sewer to receive the proposed flows from the proposed development has been confirmed by DCWW via a pre planning response (PPA00008734), a copy the pre planning response from DCWW is included in Appendix C. The capacity of the 150mm diameter existing sewer to receive the proposed flows from the proposed development will be subject to confirmation from DCWW.

All on site sewerage systems will be designed and constructed to comply with Welsh building regulations requirements with any adopted elements in accordance with the latest edition of "Sewers for Adoption" and any of the adopting authority's (DCWW) specific requirements.

4.2 Surface Water

The aim of the surface water drainage strategy is to mimic the natural catchment processes as closely as possible and adopt the principles of water management schemes as stated in section 2 of the SDSSW document 2018. The previous sections of this report have established the current drainage arrangements on site and have also determined the current discharge rates for surface water leaving the site.

In determining a suitable methodology for disposal of surface water flows from this development, it is necessary to explore the technical options outlined under Standard S1 of the SDSSW 2018 document published by Welsh Government. Based on the hierarchy it is proposed to form new connections for the proposed dwellings and apartment building on the line of the existing surface water sewer from the site that serves the existing office building and existing apartment building respectively.

The proposed development will be discharging into the existing surface water sewer network at two connection points, the proposed discharge rate for the overall site is 28.0l/s (subject to agreement with RCT SAB) for all rainfall events which will provide 32% betterment for the 2 year event with that betterment increasing to 84% for the 100 year event with 40% allowance for climate change, This proposed restricted rate will need to be agreed with SAB.

Surface water flows from the proposed development will be attenuated via two flow control chambers downstream and on-site storage provided to accommodate surface water runoff for all rainfall events up to and including a 1 in 100-year event with 40% allowance for climate change. It is proposed to discharge surface water runoff from the development via gravity to the existing surface water sewer located within the site at two connection points, with the runoff rates being restricted to 12l/s and 16l/s to the north and southeast respectively.

Given the proposed site usage, storage in the form of permeable paving, bioretention areas and cellular storage tanks have been adopted.

As the scheme is a residential scheme it is considered to have low demand for grey water the use of a grey water system would not be suitable due to there being periods of very low demand which may result in legionella issues. Basic forms of rainwater harvesting could be incorporated into the development in the form of rainwater butts that will collect water from rainwater downpipes and store it

for irrigation of the soft landscaped areas and planting beds. This will be considered at the detailed design stage of this development however as most of the flatter areas of the site are already proposed to be used as raingardens the need for irrigation water will be minimal. The suitability of utilising water butts for the residential houses will be considered during detailed design. Based on this storing rain water runoff for reuse is partially feasible on this scheme.

Amenity and biodiversity benefits to the site will be provided in the form of bioretention areas which will be incorporated throughout the site and also form part of the attenuation storage for the site, these will maximise the available green infrastructure within the development site which will improve air quality and water quality of the site.

All on site surface water drainage systems will be designed and constructed to comply with the (SDSSW) and building regulations requirements. The detailed design of the scheme will incorporate the philosophies outline in this report regarding standards S1-S6 listed in section 7 of this report.

Appendix A Greenfield runoff rates

Greenfield runoff rate estimation for sites

www.uksuds.com | Greenfield runoff tool

Calculated by:	Jessica Li
Site name:	Mitchell Court
Site location:	Tonypandy

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:	51.62537° N
Longitude:	3.4585° W
Reference:	1999646167
Date:	Nov 16 2024 13:10

Runoff estimation approach

FEH Statistical

Site characteristics

Total site area (ha):	0.7

Methodology

Q_{MED} estimation method:	Calculate from BFI and SAAR
BFI and SPR method:	Specify BFI manually
HOST class:	N/A
BFI / BFIHOST:	0.295
Q_{MED} (l/s):	
Q_{BAR} / Q_{MED} factor:	1.08

Hydrological characteristics

	Default	Edited
SAAR (mm):	1932	1911
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?

When Q_{BAR} is < 2.0 l/s 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):		19.89
1 in 1 year (l/s):		17.5
1 in 30 years (l/s):		35.4
1 in 100 year (l/s):		43.36
1 in 200 years (l/s):		48.93

Appendix B Brownfild runoff rates

Global Runoff Rates : Mitchell Court

Hydrock now Stantec
Cardiff Office
Wharton Place, 13 Wharton Street, Cardiff. CF10 1GS
+44 2920 023665
cardiff@hydrock.com

Duration (min)	30			
Return period	**2**	**30**	**100**	**100+cc**
Total depth rainfall (mm) (FEH data)	**9.69**	**22.07**	**29.64**	**41.496**
Average intensity (mm/hr)	**19.38**	**44.14**	**59.28**	**82.99**
Existing Q (l/s)	**41.55**	**94.63**	**127.09**	**177.93**

Calculation & Parameters Used

Q = 3.6CvIA

Q		l/s	Runoff rate (l/s)for each return period
Cv	0.85		
I		mm/hr	average rainfall intensity during the time of concentration for each return period
A	0.700	ha	Total Site Area

When impermeable area alone being considered

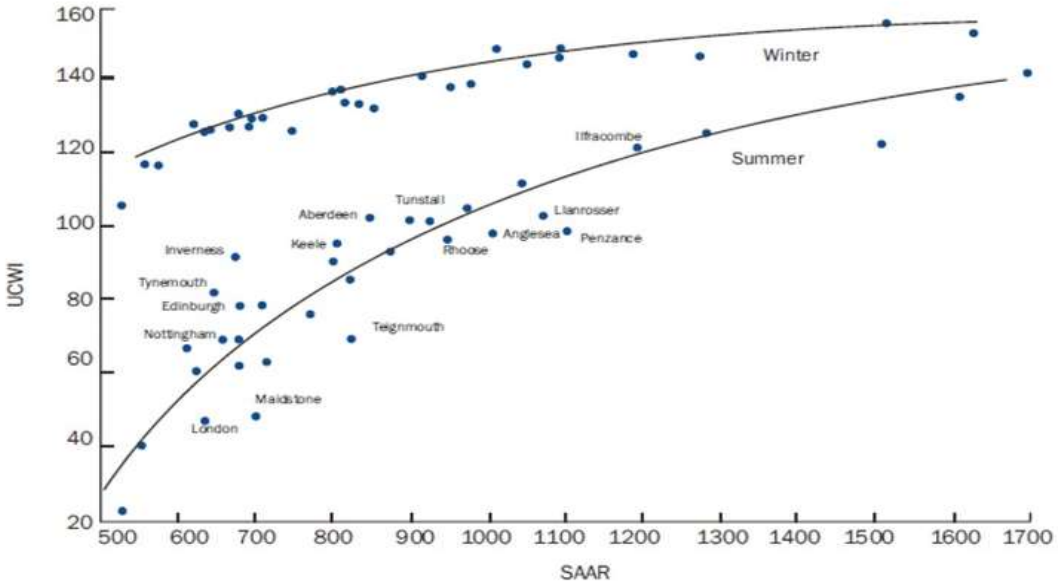
~~Cv = taken as 0.85~~

~~Cv~~	~~0.85~~		~~Volumetric co-efficient~~

When whole catchment is being considered

Percentage runoff (PR) derived using the Fixed Wallingford Procedure UK runoff model as outlined in section 4.3.4 CIRIA C697 The SuDS manual

PIMP	71.00	%	% of surface currently draining to the storm sewer
SOIL	0.4	-	Soil Type
SAAR	1911	mm	



UCWI	157	mm	antecedent wetness conditions (degree of wetness at start of storm event) taken as winter - worst case from Figure 4.6 (reproduced above)

PR = 0.829xPIMP +25.0xSOIL + 0.078xUCWI - 20.7	PR	60.41	
Cv = PR/PIMP	Cv (ex)	0.85	Volumetric co-efficient

Appendix C Dwr Cymru Welsh Water PPA response

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

Miss Jessica Li
Hydrock
3rd Floor Wharton Place 13
Wharton Street
Cardiff
CF10 1GS

Date: 13/05/2024
Our Ref: PPA0008734

Dear Miss Li

Grid Ref: 299120 192872
Site Address: Mitchell Court, Tonypandy, RCT
Development: Residential-49 units

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 8 x semi detached units, 24 x 1 bed flats and 17 x 2 bed flats and acknowledge that this is a brownfield site. Therefore, we offer the following comments as part of our appraisal of this development.

Public Sewerage Network

The proposed development site is located in the immediate vicinity of a combined sewerage system, which drains to Cardiff Bay Wastewater Treatment Works (WwTW).

The proposed site is crossed by public sewers with the approximate position being marked on the attached Statutory Public Sewer Record. Under the Water Industry Act 1991 Dwr Cymru Welsh Water has rights of access to its apparatus at all times. No operational development (or filter strip/drain) will be permitted within 3 metres either side of the centreline of the public sewer.

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 07/01/2019, 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.

It is therefore recommended that the developer consult with Rhondda Cynon Taff County Borough Council, as the determining SuDS Approval Body (SAB), in relation to their proposals for SuDS features. Please note, DCWW is a statutory consultee to the SAB application process and will provide comments to any SuDS proposals by response to SAB consultation. Please refer to further detailed advice relating to surface water management included in our attached Advice and 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 no objection for the domestic foul flows generated from this development to connect to the public sewer. We advise that the flows can be communicated to the 300mm public combined sewer crossing the site as indicated on the extract of public sewer record provided. 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.

We would also point out, that if any of the private connections from the former buildings were not to be utilised, then they will need to be abandoned and capped off before entering our public sewer. We require these drains to be capped off as to ensure no water infiltration is entering our sewer via your private drain.

SEWAGE TREATMENT

No problems are envisaged with the Wastewater Treatment Works for the treatment of domestic discharges from this site.

WATER SUPPLY

Capacity is currently available in the water supply system to accommodate the development. 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.

The proposed development is crossed by a trunk/distribution watermain, the approximate position being shown on the attached plan. Dwr Cymru Welsh Water as Statutory Undertaker has statutory powers to access our apparatus at all times. I enclose our Conditions for Development near Watermain(s). It may be possible for this watermain to be diverted under Section 185 of the Water Industry Act 1991, the cost of which will be re-charged to the developer. The developer must consult Dwr Cymru Welsh Water before any development commences on site.

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

***Please Note** 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.*

***ENC.** SEWER PLAN*
WATER PLAN
PRE-PLANNING NOTES

PPA0008734

Conditions For Development Near Water Mains

Location: Mitchell Court, Tonypandy, RCT
Date: 13/05/2024

The development of the site with our water main located as shown on the attached plan will involve certain conditions which must be strictly adhered to.

1. No structure is to be sited within a minimum distance of **4.15 metres** from the centre line of the pipe. The pipeline must therefore be located and marked up accurately at an early stage so that the Developer or others understand clearly the limits to which they are confined with respect to the Company's apparatus. Arrangements can be made for Company staff to trace and peg out such water mains on request of the Developer.

2. Adequate precautions are to be taken to ensure the protection of the water main during the course of site development.

3. If heavy earthmoving machinery is to be employed, then the routes to be used in moving plant around the site should be clearly indicated. Suitable ramps or other protection will need to be provided to protect the water main from heavy plant.

4. The water main is to be kept free from all temporary buildings, building material and spoil heaps etc.

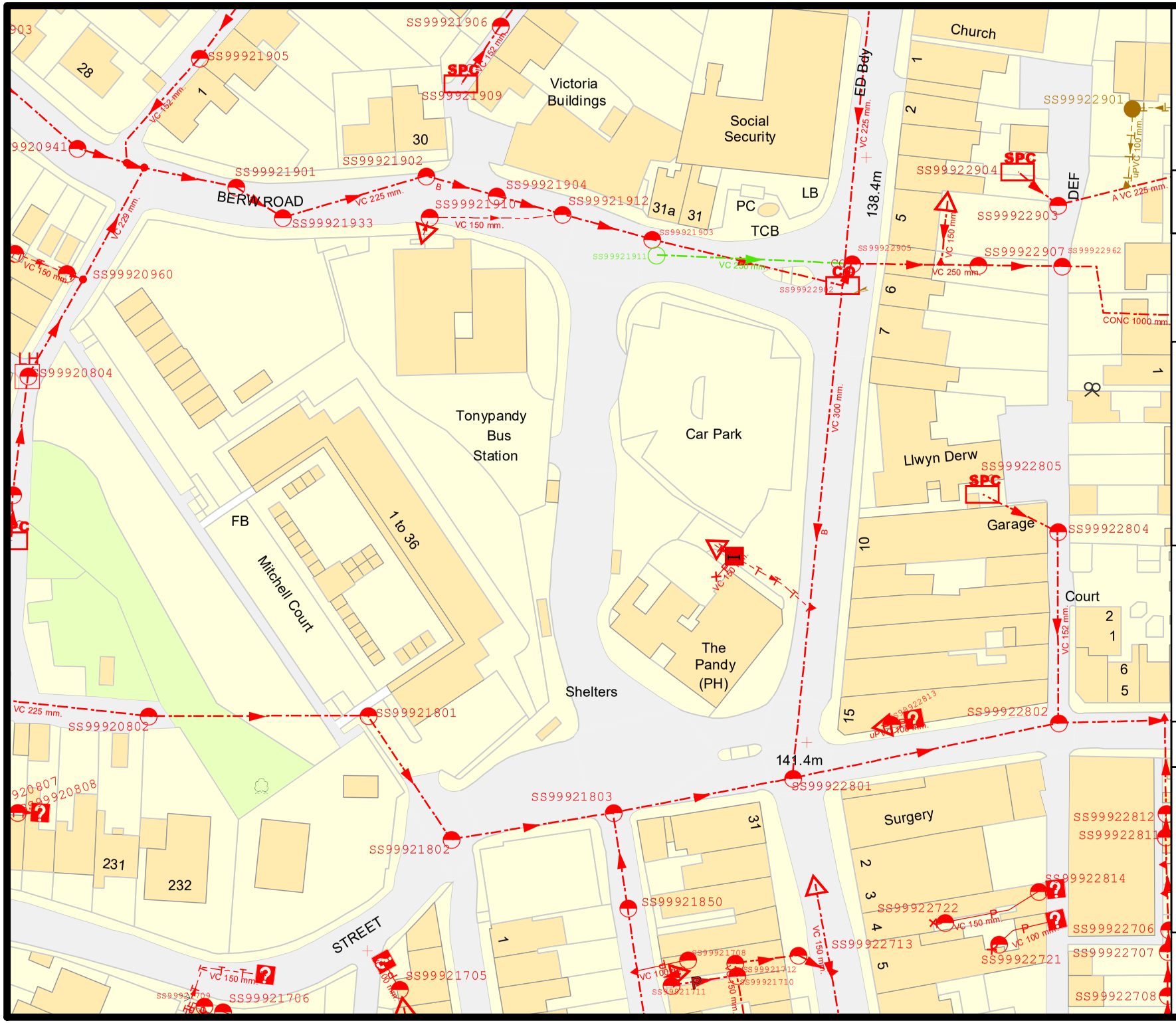
5. The existing ground cover on the water main should not be increased or decreased.

6. All chambers, covers, marker posts etc. are to be preserved in their present position.

7. Access to the Company's apparatus must be maintained at all times for inspection and maintenance purposes and must not be restricted in any way as a result of the development.

8. No work is to be carried out before this Company has approved the final plans and sections.

These are general conditions only and where appropriate, will be applied in conjunction with specific terms and conditions provided with our quotation and other associated documentation relating to this development.



Dŵr Cymru Welsh Water

PPA0008734 Sewer plan

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.

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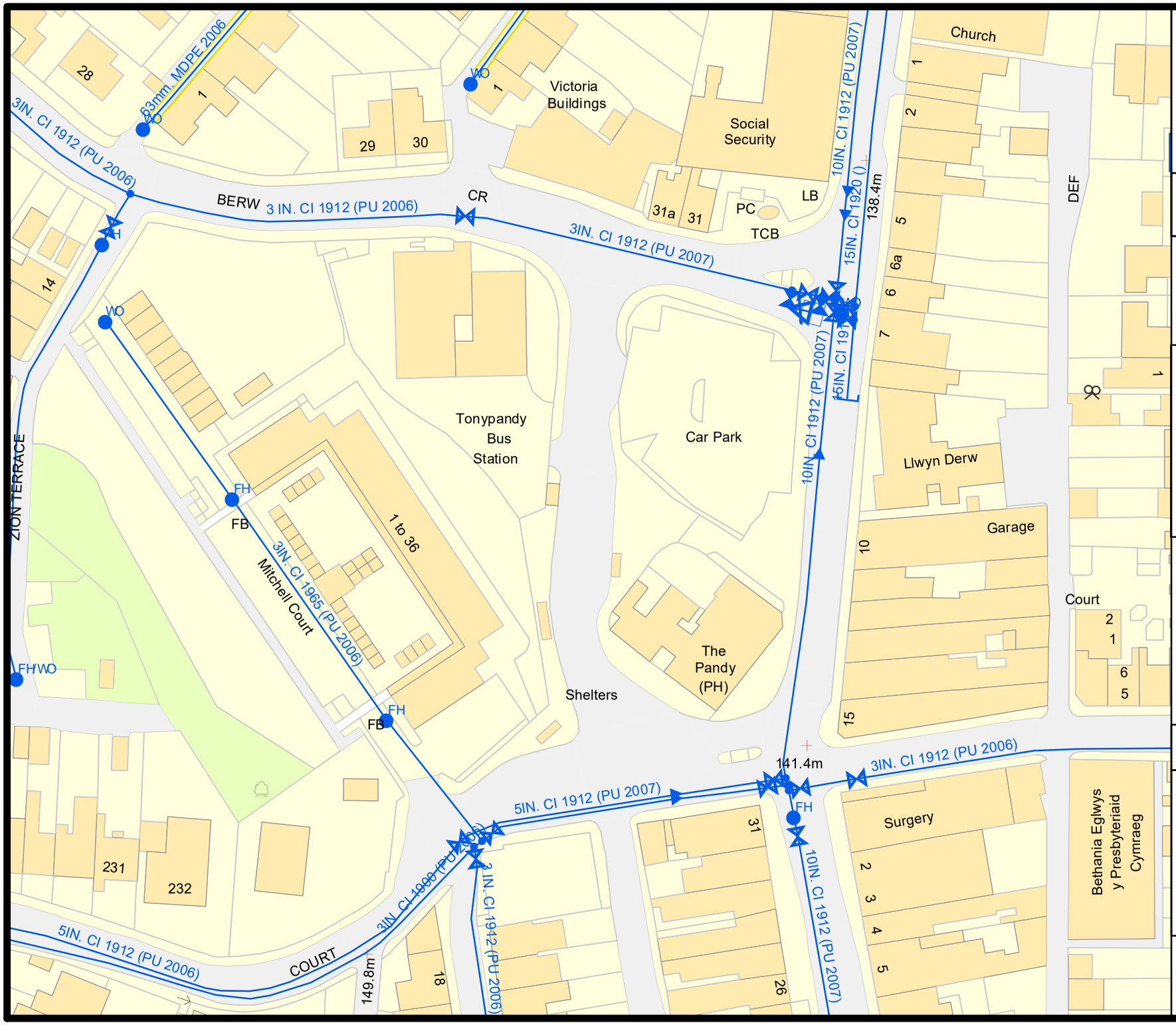
Map scale:	1:850
Printed by:	Stacey Harris
Printed on:	13 May 2024



Dŵr Cymru
Welsh Water

PPA0008734 Water 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

EXACT LOCATIONS OF ALL APPARATUS TO BE DETERMINED ON SITE.

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