AtkinsRéalis

Drainage Strategy

Coleg Gwent

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COLEG GWENT PHASE 1

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Document history

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Client signoff

Client	Coleg Gwent
Project	COLEG GWENT PHASE 1
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Contents

1. Introduction

AtkinsRéalis, on behalf of Coleg Gwent has prepared a drainage strategy, which incorporates a Surface Water Management Plan (SWMP) for the proposed development of Coleg Gwent Phase 1 at Risca Road, Crosskeys. The strategy will focus on the disposal of surface water run-off and foul effluent, by detailing the planned use of the scheme and it's an anticipated impact on the site's existing drainage regime. It has been produced to be compliant with the Statutory National Standards for Sustainable Drainage Systems (SuDS) in Wales.

1.1 Background

AtkinsRéalis formed part of the consultant team to review the current Crosskeys campus performance in its entirety and formulate an operational Net Zero Carbon masterplan in line with the college vision. Key aspirations of the master planning included: improving current access, circulation, and landscape areas on campus, reviewing under-performing buildings and maintenance issues, and aligning with Welsh Government published guidance "Net Zero Carbon Status by 2030".

The masterplan was issued in 2023 and involves the phased development and refurbishment of the Crosskeys Campus. Phases 1-3 are planned for delivery (subject to funding approvals) over 9 years up to 2032, based upon space requirements, cost estimates and the phasing/decant strategy. Phases 4-6 are anticipated over 2 years each, taking the indicative completion of the masterplan to 2038.

The document "Crosskeys Campus, Coleg Gwent Net Zero Carbon Masterplan" should be referred to for further details on the overall phasing strategy plan.

1.2 Report Scope

The scope of this report is to provide a drainage strategy to support RIBA Stage 2 design for Crosskeys Campus, Coleg Gwent Phase 1. This will be achieved by providing detail on how the surface water runoff and foul effluent will be managed in accordance with local and national guidance. Development of the strategy includes the following:

- Review of relevant local and national development guidance stated in Table 3-2.
- Review of pre-development topographical survey data.
- Review of factual ground investigation data.
- Undertake an assessment of pre-development surface water runoff rates.
- Identify existing drainage regime, systems and assets.
- Identify potential outfalls from the site for both foul effluent and surface water runoff.
- Calculate the additional foul load anticipated and identify the most appropriate discharge point.
- Consider future maintenance requirements.

This report will focus solely on Phase 1 of the overall Masterplan however implications of future phasing on the Phase 1 Drainage Strategy will be reviewed, affording design consideration where necessary.

1.3 Proposed Development

Phase 1 consists of the relocation of the existing reception to Block X and the construction of a new building and energy centre with soft and hard landscaping and parking area.

Figure 1-1 - Extract from Stride Treglown drawing 155663-STL-XX-XX-DR-L-09000 Landscape Masterplan

2. Flood Risk Assessment

Coleg Gwent Campus is not located within a Flood Zone, therefore there is no requirement for a Flood Risk Assessment to be carried out. Figure 2-1 shows an extract from the Flood Zone Map from Natural Resource Wales. Refer to Appendix A to view the layout in full.

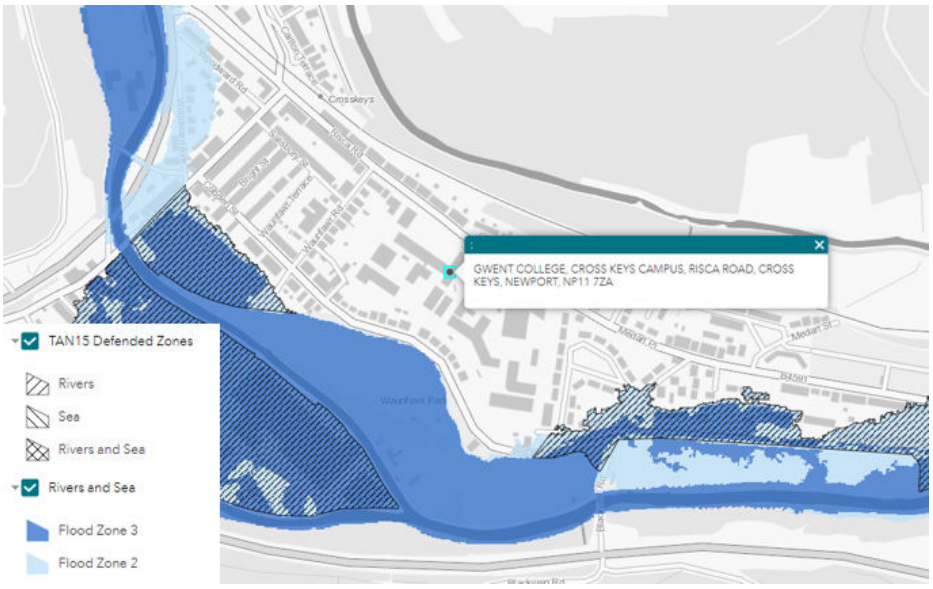


Figure 2-1 - Flood Zone Map Extract from Natural Resources Wales

Figure 2-2 shows that the site is not at risk from flooding from rivers or the sea. There are multiple areas at low to medium flood risk of surface water flooding located sporadically throughout the site. These are small and not considered a concern. Any surface water flood risks will be mitigated through the proposed surface water management plan (SWMP). Refer to Appendix A to view the layout in full.

Figure 2-2 - Flood Risk Map Extract from Natural Resource Wales

3. Policy Context

3.1 Rainfall Return Periods

Rainfall is a natural process that can present a range of different risks depending on its form. The Department for Environment, Food and Rural Affairs (DEFRA) define the risks presented by rainfall and associated flood risk according to an Annual Exceedance Probability (AEP), or as having a 'return period'.

Return period includes the statistical probability of an event occurring and the scale of the potential consequences. The 10-Year, 50-Year and the 100-Year return periods have a 10%, 2% and 1% chance of occurring in any given year, respectively. However, over a longer period the probability of flooding is considerably greater.

Table 3-1 below provides a summary of the relevant AEP and corresponding return period events of sensitivity.

Table 3-1 - Definition of AEP and 'Return Period' Rainfall Events

AEP (%)	Return Period (Years)
100%	1 in 1 Year
10%	1 in 10 Years
2%	1 in 50 Years
3%	1 in 30 Years
1%	1 in 100 Years
0.5%	1 in 200 Years
0.1%	1 in 1000 Years

3.2 Local Development Policies

The design of surface water drainage systems for all developments in Wales that are larger than 100 square metres must conform to Schedule 3 of the Flood and Water Management Act 2010. The development must seek approval from the SuDS Approval Body (SAB) before construction can commence. The SAB in this instance is Caerphilly County Council.

In addition, the design of all sewers and lateral drains must conform to BS EN 752, Building Regulations 2010 Part H, planning policy and best practice guidelines (such as Sewers for Adoption 7th Edition) wherever applicable.

In order to inform the strategy, a review has been undertaken of relevant local and national development policies as detailed in Table 3-2.

Table 3-2 - Local Development Policies and National Guidance to Inform the Report

Document Name	Published By	Date
Statutory Standards for Sustainable Drainage Systems - designing, constructing, operating and maintaining surface water drainage systems (SDSSW)	Welsh Government	2018

The key points extracted from the guidance pertinent to the proposed development are summarised in the following sections.

3.2.1 The Statutory Technical Standards for Sustainable Drainage Systems

The requirements are described in the Statutory Standards for Sustainable Drainage Systems for Wales, which also references the CIRIA SuDS Manual (C753).

There are criteria for prioritising the choice of destination for runoff, followed with standards which state the design criteria and how SuDS should be built, maintained, and operated.

A summary of the criteria is provided below:

Runoff Destination (Standard S1)
Surface water runoff destination priority levels:

Level 1 - Collected for use
Level 2 - Infiltrated to ground
Level 3 - Discharge to surface water body
Level 4 - Discharge to surface water sewer or drainage system
Level 5 - Discharge to combined sewer

Hydraulic Control (Standard S2)
A summary of standards and guidance on hydraulic criteria follows:

- Interception

Surface water should be managed to prevent, so far as possible, any discharge from the site for the majority of rainfall events of less than 5 mm. A suggested target is 80% compliance in summer and 50% compliance in winter.

- Run-off rate control

For previously developed sites, runoff rates should be reduced to the greenfield rates wherever possible. Betterment of at least 30% should be considered as a minimum requirement for Brownfield sites.

- Run-off volume control

For previously developed sites, the surface water management system should be designed so the volume of runoff discharged for the 1 in 100 year, 6-hour event is as close to greenfield conditions as possible. Where volumes cannot be sufficiently reduced, they should be discharged at a rate of 2 l/s/ha, or the average annual peak flow (QBAR), whichever is greater.

- Flood protection

Protection against flooding for external areas should be ensured for events up to 1 in 30 year return period event. Protection against flooding of buildings should be ensured for events up to the 1 in 100 year return period event.

Water Quality (Standard S3)
Treatment of surface water runoff should be provided to prevent negative impacts on the receiving water quality. The simple index approach in the SuDS manual should be followed.

Amenity & Biodiversity (Standards S4 and S5)
The design of surface water management systems should maximise amenity and biodiversity benefits.

Construction, Operation and Maintenance, and Structural Integrity (Standard S6)
All elements of the surface water drainage system should be designed so that they can be constructed, maintained and operated easily, safely and cost-effectively. Structural integrity of all elements under anticipated loading conditions should be ensured.

3.2.2 Climate Change

Planning Policy Wales advises an uplift on rainfall intensities of 40% for climate change when designing for 2085 and beyond.

Planning policy requires all surface water drainage systems to be designed to retain runoff on the site up to a 1 in 100 year rainfall event, with an allowance for climate change.

3.2.3 Hydraulic Criteria

3.2.3.1 Surface Water

The minimum size of a gravity surface water sewer is to be 100 mm diameter. To provide a self-cleansing flow regime, the minimum velocity should be 1 m/s at pipe full flow.

The system should be designed so pipework is just full, not surcharged, in events up to and including a 1 in 2 year design storm.

The system should be designed not to flood the site in events up to and including a 1 in 30 year design storm. During events exceeding that threshold, consideration should be given to the flow paths of any water escaping from the system onto the site to ensure it is contained above ground temporarily.

To ensure sufficient treatment takes place in swales, the maximum velocity should be 0.3 m/s and the residence time should be at least 9 minutes in 1-year 15-minute rainfall events.

3.2.3.2 Foul Water

The minimum size of a gravity foul water lateral drain is to be 100 mm diameter, and the minimum size of a gravity foul water sewer is to be 150 mm diameter. To provide a self-cleansing flow regime, the minimum velocity should be 0.75 m/s at one third design flow.

3.2.4 Physical Criteria

Where possible, drainage systems outside of buildings will be designed with a minimum depth of cover as follows, or protected with concrete bedding and surround:

- 0.35 m in pathways without any possibility of vehicular access.
- 0.5 m in parking area with height restriction and max gross vehicle weight of 7.5 tonnes.

- 0.9 m in parking area with limited access for vehicles in excess of 7.5 tonnes, or public open spaces.
- 1.2 m in highways or unrestricted parking areas.

Sewers and lateral drains should be positioned such that the external face is:

- At least 1.2 m from a building or structure, or a distance equivalent to the depth of the sewer below the foundation, whichever is greater.
- At least 1 m from any kerb line.

The design of all drains must conform to BS EN 752, Building Regulations 2010 Part H, planning policy and best practice guidelines (such as Sewers for Adoption 7th Edition) wherever applicable. Sanitary systems within buildings should be designed in accordance with BS EN 12056-2.

4. Existing Site Information

4.1 Site Location

Coleg Gwent, Crosskeys Campus is located adjacent to Risca Road in the centre of Crosskeys, South Wales. The site is a brownfield site home to the current college campus. The site, along with indicative boundary lines, are shown in Figure 4-1.

Figure 4-1 - Location with Campus Boundary and Proposed Phase 1 Boundary

4.2 Topography and Site Features

Phase 1 currently consists of two car parks and landscaped areas.

The site is relatively flat, with levels falling generally from Northwest to Southeast, varying from approximately 60.77mAOD to 59.29mAOD across Phase 1. The topography survey used for reference is “Coleg Gwent Crosskeys Campus Site Survey” carried out by John Vincent Surveys Ltd, however this was completed in 2007. A new topography survey has been commissioned to establish current site levels and features in detail.

A GPR utility survey has been commissioned to determine underground services and has not been received at the time of writing. The impact of the survey results on drainage proposals cannot be determined until such survey is received and reviewed.

4.3 Ground Investigations and Geology

At time of writing, there is no Ground Investigation (GI) information to inform the drainage design, although a GI has been instructed. As a result, infiltration will not be considered viable as part of the surface water management plan. Infiltration potential will be assessed as soon as the relevant information becomes available.

4.4 Water Environment

4.4.1 Existing Water Features

The closest river to the site is the Ebbw River, approximately 350m to the south, measured from Risca Road, which equates to approximately 280m south of the Phase 1 boundary.

4.4.2 Existing Drainage Features

This preliminary assessment is based on historic drainage survey information. The information contains cover levels, depths, and pipe sizes; however the information is incomplete and engineering assumptions have been made.

4.4.2.1 Surface Water

The existing area of the site is served by 100mm diameter surface water drains. The majority of the SW network within Phase 1 connects RWPs and road gullies from the site to the SW network in Risca Road. The depths of the SW network range from approximately 0.5m to 2.9m deep at the boundary.

4.4.2.2 Foul Drainage

The existing area of the site is served by 100mm diameter foul water drains. It can be assumed that half of these discharge foul flows from within the site to Dwr Cymru Welsh Water (DCWW) combined sewer in Risca Road. It can be assumed that the remaining discharge foul flows from Phase 1 to the existing network within the Crosskeys Campus. These will likely need to be retained to ensure the function of the foul network out with Phase 1. There are also disused foul drains which may need to be removed once connectivity is confirmed. The depths of the FW network range from approximately 0.5m to 2.1m deep.

A CCTV and Drainage Survey Scope will be issued. The results will be used to determine the levels, capacity, condition and connectivity for both surface water and foul water networks on site, and within Risca Road where the

proposed discharge locations are located. Drainage information resulting from these surveys will inform later design stages.

4.5 Existing Surface Water Runoff

The existing surface water runoff has been calculated the modified rational method. A copy of the calculations can be found in Appendix B.

	Existing Discharge modelled from area (4776.9m^2) l/s
15min 2year	35.1
15min 30year	68.9
15min 100year	85.3

Table 4-1 - Discharge rates from the existing site

5. Drainage Strategy

5.1 Surface Water Drainage Proposals

This is a brownfield site therefore the drainage proposal will require a minimum of 40% betterment on existing discharge rates.

5.1.1 Runoff destination (Standard S1)

The following runoff destinations have been considered:

Level 1	Collected for use	Assumed not to be appropriate in this instance due to the site use. However further consideration can be given to this during RIBA stage 3. The use of rainwater harvesting would need to be justified in conjunction with one of the below methods.
Level 2	Infiltrated to ground	Infiltration testing is yet to be carried out, therefore infiltration has been assumed to be not viable. Soakaway infiltration testing is advised as part of the Ground Investigation to determine infiltration potential.
Level 3	Discharge to surface water body	Not viable as the Ebbw River is not within reasonable distance and would involve crossing third party land not in control of our client.
Level 4	Discharge to surface water sewer or drainage system	Propose to connect into existing on site surface water sewer which discharges into the highway drain on Risca Road, running along the Northern boundary of the site.
Level 5	Discharge to combined sewer	N/A based on the above.

5.1.2 Surface Water Runoff Hydraulic Control (Standard 2)

5.1.2.1 Interception

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 Statutory Standards for Sustainable Drainage Systems 2018 document published by Welsh Government for details of interception mechanisms and their assumed compliance with the standards.

The SuDS systems are to be typically sized to be one fifth of the size of the contributing area as specified in the Sustainable Drainage Systems Standards for Wales to ensure interception of the first 5 mm of runoff.

Table 4-1 – Interception summary

Area of site	Interception method	Details of system arrangement	Interception comments
Main building	Attenuation basin	The runoff from the roof will be directed into the basin to the south of the building.	To be fully compliant, contributing areas are to be no larger than five times the basin base area. The basin has been sized to achieve the 5:1 ratio.
Energy Centre	Bioretention systems	The runoff from the roof will be directed into the rain gardens surrounding the Energy Centre.	To be fully compliant, contributing areas are to be no larger than five times the bioretention system surface area. Bioretention systems have been sized to achieve the 5:1 ratio.
Hard landscaped area and pathways to east of the main building	Bioretention systems	Paved area to the east of the main building is to be directed to the bioretention systems.	To be fully compliant, contributing areas are to be no larger than five times the bioretention system surface area. Bioretention systems have been sized to achieve the 5:1 ratio.
Pathway to north of main building	Permeable paving	Pathway to north of main building to be permeable paving.	To be fully compliant, contributing areas are to be no larger than two times the bioretention system surface area. The permeable paving systems have been sized to achieve the 2:1 ratio.
Car park and access road	Bioretention systems	Parking area is to be directed to bioretention systems along the south edge of the road and within the parking area.	To be fully compliant, contributing areas are to be no larger than five times the bioretention system surface area. Bioretention systems have been sized to achieve the 5:1 ratio.

5.1.2.2 Hydraulic Control

For the purposes of this section of the report, infiltration will not be accounted for as a means of disposing surface water runoff generated from the development, therefore the discharge volume for the site will not decrease.

As the site is brownfield in nature the statutory standards requires that the discharge rate for the site to be limited to provide a 40% betterment on the existing runoff as a minimum requirement. However, in order to provide further

betterment it is proposed to restrict the proposed discharge rates to the existing greenfield runoff rate (2.85l/s) which has been calculated using FEH rainfall data and the Wallingford website. A copy of the calculation output can be found in Appendix B.

The limited discharge will be controlled by a flow control chamber upstream of the discharge location into the existing surface water network with the proposed rate of 2.85l/s being maintained for all storm events up to and including a 1in100 year return period event with 40% allowance for climate change. Table 2-1 below provides the levels of betterment achieve for each return period.

	Existing discharge (l/s) (4776.9m^2)	**Proposed discharge (l/s)**	**Betterment (%)**
Q2	35.1	2.85	92.1
Q30	68.9	2.85	96.0
Q100	85.3	2.85	96.7

Table 2-1 - Discharge rates for Phase 1

5.1.2.3 Flood Risk and Storage

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 and urban creep allowance, these allowances will have to be agreed with the SAB prior to detailed design. It is proposed to discharge surface water runoff from the development via gravity to the highway sewer in Risca Road with runoff rates being restricted to 2.85l/s, this will need to be agreed with the adopting SAB's authority and local authority's drainage department.

InfoDrainage has been used to make an estimate of the attenuation storage requirement. The total volume of storage required for the 100-year return period event has been estimated to be 545m³. A copy of the calculation output can be found in Appendix C.

The proposed drainage system has been modelled in Innovyze InfoDrainage software to carry out checks for flood protection and sizing of attenuation storage. Further detailed model development will be required in later stages; however, it has been shown that the volumes provided with the basin and bioretention system sub-base are sufficient

Areas of the existing campus outside Phase 1 will remain unchanged; these areas will not be requiring SuDS design as the existing drainage will remain intact.

A copy of the proposed drainage layout can be found in Appendix D.

5.1.3 Water quality (Standard S3)

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 aim of the surface water management strategy with regards to water quality is to follow the guiding principles of the SDSSW and use simple, natural processes that promote biodiversity and long-term sustainability. As such, it employs a SuDS management train approach, providing drainage components in series.

The management trains to be used on the project will be 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.

Planting within the SuDS features should form part of the water quality strategy. SuDS components like bio retention areas provide water quality improvements by reducing sediment and contaminants from runoff either through settlement or biological breakdown of pollutants as part of their interceptor function, so only robust and tolerant species of planting should be specified. Once these species establish this will decrease the flow rate of water travelling through and filter pollutants and contaminants before entering the downstream network.

5.1.4 Amenity (Standard S4)

The primary amenity focus of the SuDS scheme should be to improve the health and well-being of the users. The scheme will need to be based on natural forms that mimic natural landscapes found within the region and the vegetated rain garden planting areas are designed with locally contextual species that will encourage natural colonisation. Other key amenity benefits should include improving air quality around the development, increasing carbon sequestration and improving water quality through removal of pollutants via bio retention area and the attenuation basin.

5.1.5 Biodiversity (Standard S5)

The SuDS scheme biodiversity strategy should revolve around the creation of significant and varied habitat to increase the overall biodiversity of the site and ecological value. 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 should be used where possible.

The plant species selected should be both 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 and attenuation basin will be the focal habitat for the site and will enhance the site over the current site layout by adding areas of water and damp soils. Exposed areas of rain gardens will attract certain species and shaded areas under adjacent buildings and trees will further enhance the varied ecosystem potential.

5.1.6 Design of Drainage for Construction and Maintenance and Structural Integrity (Standard 6)

The surface water drainage system should be 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

Information with regards to the construction methodology and requirements of the proposed system will be developed as part of the detailed design stage of the project, likewise the maintenance requirements and regime of the proposed system will be developed into the full maintenance strategy for the site during the next phase of design development. This will be developed in conjunction with the client's maintenance team, as it is not considered appropriate for these details to be developed by the design team in isolation from the end users. This will then need to be confirmed and submitted for approval to the SAB prior to construction commencing on site.

6. Foul Water Drainage Proposals

6.1 Peak flow calculation

Peak flows have been calculated as 1.8 l/s, as follows:

- Peak flow = 6 x (PG + I), where P = population, G = consumption of water, I = infiltration.
- Student and staff population is 471.
- Consumption of water has been based on British Water Code of Practice “Flows and Loads – 4” for non-residential school with canteen facilities which is 90 l/h/d.
- Infiltration has been allowed for at 10 per cent of PG.

PG	471 x 90	42390 l/d	0.491 l/s
I	42390 x 0.1	4239 l/d	0.049 l/s
PG+I	42390 + 4239	46629 l/d	0.540 l/s
6x(PG+I)	6 x 46629	279774 l/d	**3.24 l/s**

Table 6-1 - Peak flow calculation

6.2 Design summary

The proposed strategy is to collect the flows from the building and discharge them via a new connection into the existing on-site sewer system in front of the new building. The new connection will be made as close to the proposed building as possible to limit the need for works to be carried outside of the Phase 01 boundary. It is proposed to route all below ground drainage from the rear of the building east and then back northwest in front of the building to avoid the location of the future Phase 02 building to ensure there are no clashes in the future.

To the front of the building on the ground floor there will be a commercial kitchen which will require a grease trap. A separate drainage run will be proposed at the front of the building to pick up the outlets from the kitchen that require treatment, the grease trap will be located externally at the end of this proposed run and will then be combined with rest of the foul flows ad discharge to the existing on-site sewer system. Grease traps will be required for the proposed commercial kitchen. These will be located externally adjacent to the proposed kitchen and will be routed towards the proposed foul system to the north.

Grease traps are a critical requirement to ensure compliance with local health and safety regulations. Grease traps are designed to capture fats, oils, and grease (FOG) from wastewater before it enters the sewer system, preventing blockages and environmental contamination.

I. Installation Locations: Grease traps must be installed at all sinks, dishwashers, floor drains, and cooking equipment that produce or handle grease-laden wastewater.

II. Sizing and Capacity: The size and capacity of the grease trap should be appropriate for the volume of wastewater generated by the kitchen. This ensures efficient separation and capture of FOG.

III. Maintenance: Regular maintenance and cleaning of grease traps are mandatory to ensure their effective operation. This includes routine inspections and removal of accumulated grease.

IV. Compliance: Adherence to local regulations is essential. This may involve obtaining necessary permits and ensuring that the installation meets all specified standards set by the water authority.

By following the above requirements, commercial kitchens can maintain efficient operations, prevent drainage issues, and contribute to environmental protection.

The existing pipework downstream of the connection point will need to be surveyed to confirm the level at the proposed new manhole location and a CCTV will also need to be conducted to establish the existing pipes condition and suitability for reuse by the new phase of works. These investigation works will need to be carried out during stage 3 to inform the detailed design.

At the time of writing this report a pre planning advice (PPA) has been submitted to DCWW to confirm the capacity within the existing system to accept the flows from the development and a response has been received confirming that there is capacity within the local sewer network (PPA0008756).

All on site sewerage systems will be designed and constructed to comply with 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.

6.3 Capacity of receiving network

The existing college is currently connected into the existing combined network in Crosskeys which is owned by DCWW. DCWW have been contacted via a pre planning advice (PPA) submission, a response has been received confirming that there is capacity within the local sewer network (PPA0008756), a copy of the correspondence can be found in Appendix E.

6.4 Adoption

It is necessary to apply to DCWW for any connection to the public sewer under Section 106 of the Water Industry Act 1991. If the connection to the public sewer network will be via a lateral drain extending beyond the property boundary, it is mandatory to first enter into a Section 104 Adoption Agreement (Water Industry Act 1991). It is not currently anticipated that a Section 104 will be required.

All on site sewerage systems will be designed and constructed to comply with 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.

8. Summary

The aim of the surface water drainage strategy is to mimic the natural catchment processes as closely as possible and the proposed system will need to be designed in accordance with the statutory (SDSSW) document 2018 and any local authority's SAB requirements and CIRIA's C753 SuDS Manual as well as meeting the requirements of Building Regulations, Document H.

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 in the statutory (SDSSW) document 2018 published by the Welsh Government. Based on the hierarchy it is proposed to discharge surface water runoff from the development to the existing surface water sewer.

Surface water runoff is to be attenuated from site to 2.85l/s, this run-off rate will then be maintained for all rainfall events up to and including a 100YRP with 40% allowance for climate change and urban creep. Given the proposed site layout storage could be provided in the form of bioretention areas, permeable paving and an attenuation basin. The main storage features for the site will be the attenuation basin which will be located at the rear of the new building. All drainage features will be developed further at detailed design stage.

As the scheme is a school development it has been considered that 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 however other 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, however these areas will be accepting runoff for the adjacent hard paved areas.

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 along with the main attenuation basin, 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.

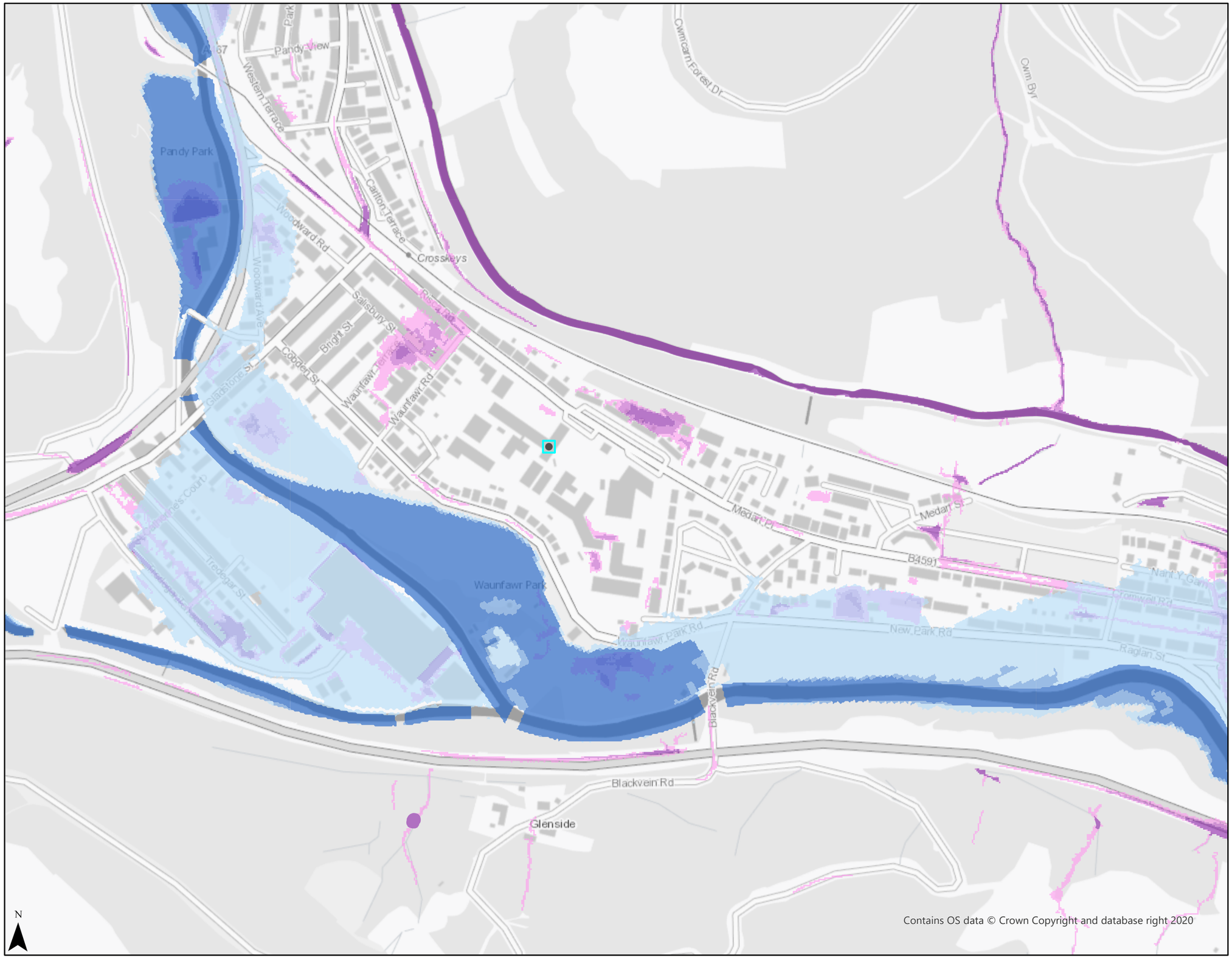
The proposed foul drainage strategy is to collect the flows from the building and discharge them via a new connection into the existing on-site sewer system in front of the new building. The new connection will be made as close to the proposed building as possible to limit the need for works to be carried outside of the Phase 01 boundary. It is proposed to route all below ground drainage from the rear of the building east and then back northwest in front of the building to avoid the location of the future Phase 02 building to ensure there are no clashes in the future. The foul drainage flow has been calculated as 3.24l/s using British Water Code of Practice "Flows and Loads – 4" for non-residential school with canteen facilities. To the front of the building on the ground floor there will be a commercial kitchen which will require a grease trap. A separate drainage run will be proposed at the front of the building to pick up the outlets from the kitchen that require treatment, the grease trap will be located externally at the end of this proposed run and will then be combined with rest of the foul flows ad discharge to the existing on-site sewer system.

All on site sewerage systems will be designed and constructed to comply with 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.

Refer to drawings in Appendix D for further details of the proposed layout and features to be used across the site.

APPENDICES

Appendix A. Existing Flood Maps



Cyfoeth Naturiol Cymru
Natural Resources Wales

Flood Risk Maps

Coleg Gwent Flood Risk Map

Legend

Flood Risk from Rivers
- High
- Medium
- Low

Flood Risk from the Sea
- High
- Medium
- Low

Flood Risk from Surface Water & Small Watercourses
- High
- Medium
- Low

Risk Level Under Review

Scale at A3: 1:5,000

Date: 26/03/2024

0.2 0.1 0 0.2
km
British National Grid

Disclaimer

https://naturalresources.wales/flooding/disclaimer-for-our-flood-and-coastal-erosion-risk-maps/?lang=en

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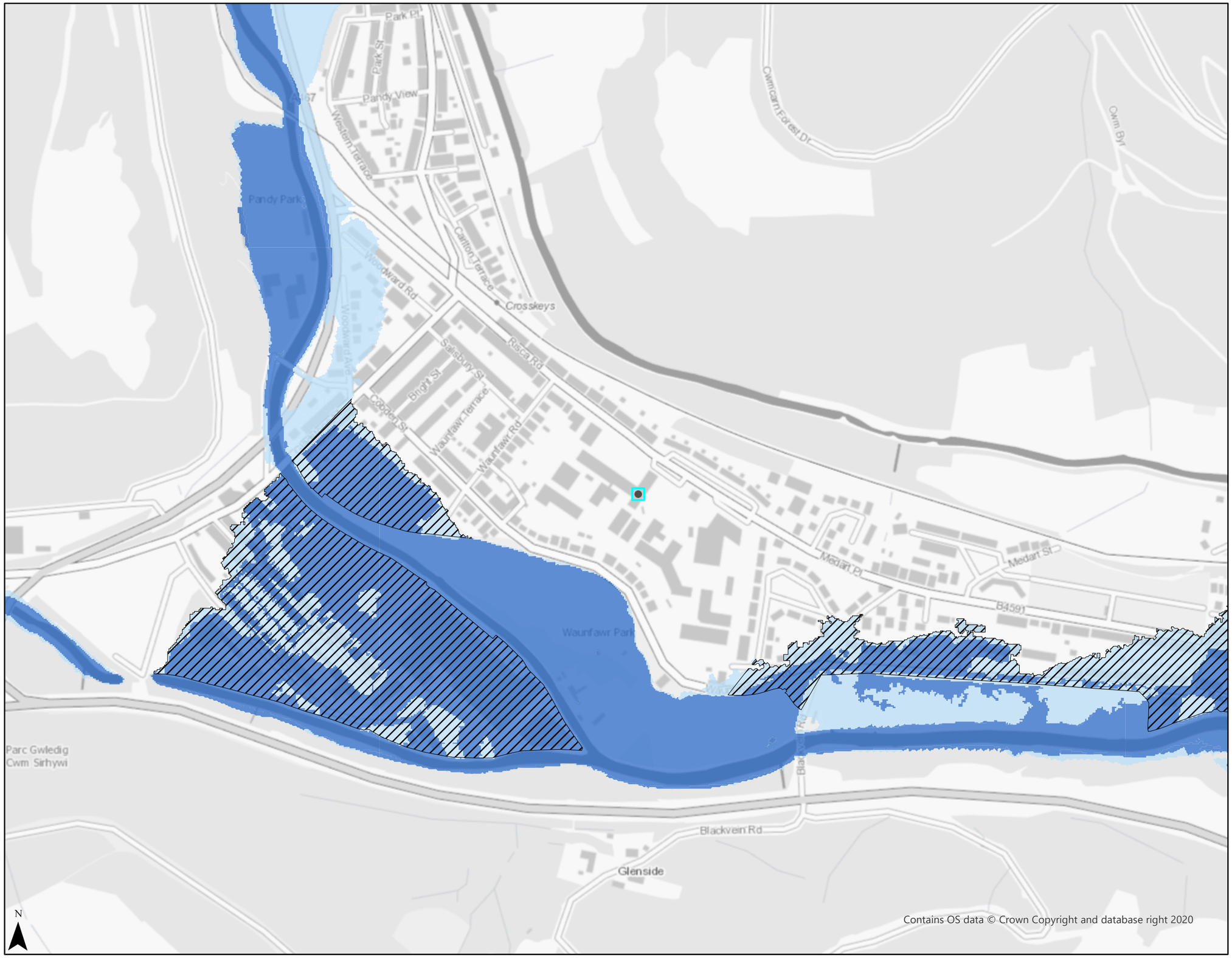
Cyfoeth Naturiol Cymru
Natural Resources Wales

Flood Map for Planning - Basic

Coleg Gwent Flood Zone



Legend

TAN15 Defended Zones

- Rivers
- Sea
- Rivers and Sea

Rivers and Sea

- Flood Zone 3
- Flood Zone 2

Scale at A3: 1:5,000

Date: 26/03/2024

0.2 0.1 0 0.2

km

British National Grid

Disclaimer

https://naturalresources.wales/flooding/disclaimer-for-our-flood-and-coastal-erosion-risk-maps/?lang=en

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Appendix B. Existing Runoff Rate Calculations

ATKINS	Project: Coleg Gwent Phase 1			Job ref: 5228425	
	Proposed Development Site Modified Rational Method			Calc sheet no of 6	rev 0
	Drawing ref.	Calc by SF	Date 02/10/2024	Check by	Date

Ref	Calculations	Output
	The Modified Rational Method	Input
Ref	*Wallingford Procedure - Vol 4 - The Modified Rational method*	Calc
	The Rational Formula **Qp = C i A**	Linked
	Qp = Peak Discharge (l/s)	
	C = Dimensionless Coefficient	
	i = Average Rainfall Intensity during time of Concentration (mm/hour)	
	A = Contributing Catchment Area (ha)	
	If the Area (A) is expressed in Hectares and the rainfall intensity (i) in mm/ hr the equation becomes	
	Qp = 2.78 C i A	
	$C = C_v C_R$ C_v = proportion of rainfall on catchment which appears as surface runoff in storm drainage system = average 0.75 (0.6 in rapidly draining soils & 0.9 in heavy soils)	
	C_R = constant value of 1.30	
	C_v = 1.00	
	C_R = 1.3	
	C = 1.3	
	Applying the dimensionless coefficient using the parameters above gives a revised equation of:	
	Qp = 2.71 i A	
	Time of Concentration (Tc)	

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	Proposed Development Site Modified Rational Method			Calc sheet no of 6	rev 0
	Drawing ref.	Calc by SF	Date 02/10/2024	Check by	Date

Ref	Calculations	Output

$t_c = t_e + t_f$

t_c = Time of Concentration

t_e = Time of Entry - represents delay & attenuation of flow over ground surface

t_f = Time of Flow through pipe system to point under consideration

The Wallingford Procedure would recommend the following t_e values:

Return Period	*t_e (mins)*
5 yrs	3 - 6
2 yrs	4 - 7
1 yr	4 - 8
1 mth	5 - 10

Use longer times of entry at each return period for large flat subcatchments (area > 400m^2, slope <1:50)

Use smaller values for small steep subcatchments (area <200m^2, slope >1:30)

t_e =	10	mins
t_f =	5	mins
t_c =	15	mins

assume 15min event is appropriate design event - see pg 5

Assessment of Rainfall Intensity

Step 1 Determine M5-60 min rainfall and the coefficient r for the

Ref	Calculations	Output

site from the mapping included in the Wallingford Procedure

M5 - 60mins = 5 year return period and 60 minute duration rainfall depth - Use M5-60 Map

M5-60 min Rainfall 19.6 (mm - Total rainfall)

r = ratio of 5yr - 60min duration and 5 yr - 2 day duration rainfall depth - Use r map

r 0.247

Step 2 Determine rainfall depths for 5 year return period for all required return periods, D = M5 - D

Using the r value above establishing the Z1 value from the graph in the Wallingford procedure (Fig A.3a)

r = 0.247

Return Period	Duration (D)		Z1	M5-D (mm total)
M5	5	Min	0.28	5.49
M5	10	Min	0.49	9.60
M5	15	Min	0.56	10.98
M5	30	Min	0.72	14.11
M5	1	Hour	1.00	19.60
M5	2	Hour	1.20	23.52
M5	4	Hour	1.60	31.36
M5	6	Hour	1.80	35.28
M5	10	Hour	2.20	43.12

M5-D values are calculated by factoring the M5-60 value by Z1

Step 3 Determine MT-D

This is determined from the relationship

ATKINS	Project: Coleg Gwent Phase 1			Job ref: 5228425	
	Proposed Development Site Modified Rational Method			Calc sheet no of 6	rev 0
	Drawing ref.	Calc by SF	Date 02/10/2024	Check by	Date

Ref	Calculations	Output

MT - D = Z2 (M5-D)

Z2 Values for Rainfall Depths

M5 Rainfall (mm)	M1	M2	M5	M10	M20	M30	M50	M100
5	0.62	0.79	1.02	1.19	1.36	1.46	1.56	1.79
10	0.61	0.79	1.03	1.22	1.41	1.55	1.69	1.91
15	0.62	0.80	1.03	1.24	1.44	1.57	1.70	1.99
20	0.64	0.81	1.03	1.24	1.45	1.56	1.66	2.03
25	0.66	0.82	1.03	1.24	1.44	1.54	1.64	2.01
30	0.68	0.83	1.03	1.24	1.42	1.52	1.61	1.97
40	0.70	0.84	1.02	1.19	1.38	1.47	1.56	1.89
50	0.72	0.85	1.02	1.17	1.34	1.43	1.52	1.81
75	0.76	0.87	1.02	1.14	1.28	1.37	1.45	1.64
100	0.78	0.88	1.02	1.13	1.25	1.33	1.40	1.54
150	0.78	0.88	1.01	1.12	1.21	1.27	1.33	1.45
200	0.78	0.88	1.01	1.11	1.19	1.25	1.30	1.40

Table A1 Relationship between rainfall of return period T(MT) and M5

Ref Wallingford Procedure Vol 4

100 Year

M5 - D Event		M5-D Total rainfall mm	Z1 values for 100 year event: Lower mm	Lower Z2	Higher mm	Higher Z2	Interpolated Z2	M100 - D Event: Total rainfall mm	Intensity mm/hr
5	Min	5.49	5	1.79	10	1.91	1.80	9.89	118.67
10	Min	9.60	5	1.79	10	1.91	1.90	18.25	109.49
15	Min	10.98	10	1.91	15	1.99	1.93	21.14	84.56
30	Min	14.11	10	1.91	15	1.99	1.98	27.89	55.77

ATKINS

Project: Coleg Gwent Phase 1			Job ref: 5228425	
Proposed Development Site Modified Rational Method			Calc sheet no of 6	rev 0
Drawing ref.	Calc by SF	Date 02/10/2024	Check by	Date

Ref	Calculations														Output			
	1	Hour			19.60			15	1.99	20	2.03	2.03			39.73		39.73	
	2	Hour			23.52			20	2.03	25	2.01	2.02			47.42		23.71	
	4	Hour			31.36			25	2.01	30	1.97	1.96			61.43		15.36	
	6	Hour			35.28			25	2.01	30	1.97	1.93			68.02		11.34	
	10	Hour			43.12			30	1.97	40	1.89	1.87			80.42		8.04	
30 Year																		
	M5 - D Event				**M5-D**			**Z1 values for 30 year event**							**M30 - D Event**			
					Total rainfall mm			Lower		Higher		Interpolated			Total rainfall mm		Intensity mm/hr	
								mm	Z2	mm	Z2	Z2						
	5	Min			5.49			5	1.46	10	1.55	1.47			8.06		96.74	
	10	Min			9.60			5	1.46	10	1.55	1.54			14.82		88.91	
	15	Min			10.98			10	1.55	15	1.57	1.55			17.06		68.23	
	30	Min			14.11			10	1.55	15	1.57	1.57			22.10		44.20	
	1	Hour			19.60			15	1.57	20	1.56	1.56			30.60		30.60	
	2	Hour			23.52			20	1.56	25	1.54	1.55			36.36		18.18	
	4	Hour			31.36			25	1.54	30	1.52	1.52			47.51		11.88	
	6	Hour			35.28			25	1.54	30	1.52	1.50			52.88		8.81	
	10	Hour			43.12			30	1.52	40	1.43	1.40			60.45		6.05	
2 Year																		
	M5 - D Event				**M5-D**			**Z1 values for 2 year event**							**M2 - D Event**			
					rainfall mm			Lower		Higher		Interpolated			rainfall mm		Intensity mm/hr	
								mm	Z2	mm	Z2	Z2						
	5	Min			5.49			5	0.79	10	0.79	0.79			4.34		52.03	
	10	Min			9.60			5	0.79	10	0.79	0.79			7.59		45.52	
	15	Min			10.98			10	0.79	15	0.8	0.79			8.69		34.77	
	30	Min			14.11			10	0.79	15	0.8	0.80			11.26		22.52	
	1	Hour			19.60			15	0.8	20	0.81	0.81			15.86		15.86	
	2	Hour			23.52			20	0.81	25	0.82	0.82			19.22		9.61	
	4	Hour			31.36			25	0.82	30	0.83	0.83			26.12		6.53	
	6	Hour			35.28			25	0.82	30	0.83	0.84			29.67		4.95	
	10	Hour			43.12			30	0.83	40	0.84	0.84			36.35		3.64	
	Calculation of Runoff for Site / Catchment																	
					Qp = 2.78 C i A													
					Qp = 2.78 Cv Cr i A													
	C_v	=			1.00													
	C_r	=			1.3													
	t_c				15			Assume 15min duration event appropriate										

ATKINS	Project: Coleg Gwent Phase 1			Job ref: 5228425	
	Proposed Development Site Modified Rational Method			Calc sheet no of 6	rev 0
	Drawing ref.	Calc by SF	Date 02/10/2024	Check by	Date

Ref	Calculations	Output
	i = 84.56	M100 - 15 appropriate for t_c
	68.23	M30 - 15 appropriate for t_c
	34.77	M2 - 15 appropriate for t_c
	A = 4776.9 m^2	Catchment area for developed site
	= 0.478 ha	
	Qp = 146.1 l/s	100 year
	117.9 l/s	30 year
	60.1 l/s	2 year
	Note the above value considers that the catchment as 100% impermeable. The value needs to be factored by an appropriate value to account for the surface type	
Ref	McGhee: Water Supply and Sewerage Table 13-3 Runoff coefficients for different areas	

TABLE 13-3
Runoff coefficients for different areas[3]

Description of area	C
Business	
Downtown area	0.70–0.95
Neighborhood area	0.50–0.70
Residential (urban)	
Single-family area	0.30–0.50
Multiunits, detached	0.40–0.60
Multiunits, attached	0.60–0.75
Residential (surburban)	0.25–0.40
Apartment areas	0.50–0.70
Industrial	
Light	0.50–0.80
Heavy	0.60–0.90
Parks, cemeteries	0.10–0.25
Playgrounds	0.20–0.35
Railroad yards	0.20–0.40
Unimproved areas	0.10–0.30

Pre Development				
Permeable Area =	52.00%	Unimproved areas C =	0.2	Undeveloped Land
Impermeable Area =	48.00%	All Run-off C =	1	Asphalt Road, existing plot
Runoff Coefficient = permeable area x C + impermeable area x C				
Selected runoff coefficient	0.584			
	Residential - Multiunits, attached			
Factored runoff from Site				

ATKINS	Project: Coleg Gwent Phase 1			Job ref: 5228425	
	Proposed Development Site Modified Rational Method			Calc sheet no of 6	rev 0
	Drawing ref.	Calc by SF	Date 02/10/2024	Check by	Date

Ref	Calculations				Output
	Qp =	85.3	l/s	100 year	
		68.9	l/s	30 year	
		35.1	l/s	2 year	
	Post Development				
	Permeable Area =	25.00%	Unimproved areas C =	0.2	Undeveloped Land
	Impermeable Area =	75.00%	All Run-off C =	1	Asphalt Road, existing plot
	Runoff Coefficient = permeable area x C + impermeable area x C				
	Selected runoff coefficient	0.8			
	Factored runoff from Site				
	Qp =	116.9	l/s	100 year	
		94.3	l/s	30 year	
		48.1	l/s	2 year	

Greenfield runoff rate estimation for sites

www.uksuds.com | Greenfield runoff tool

Calculated by:	Suzy Facey
Site name:	Phase 1 Coleg Gwent, Crosskeys Campus
Site location:	Crosskeys

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:	51.61857° N
Longitude:	3.12273° W
Reference:	968915010
Date:	Dec 06 2024 11:59

Runoff estimation approach

FEH Statistical

Site characteristics

Total site area (ha):	0.4777

Methodology

Q_{MED} estimation method:	Calculate from BFI and SAAR
BFI and SPR method:	Specify BFI manually
HOST class:	N/A
BFI / BFIHOST:	0.639
Q_{MED} (l/s):	
Q_{BAR} / Q_{MED} factor:	1.08

Hydrological characteristics

	Default	Edited
SAAR (mm):	1317	1317
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

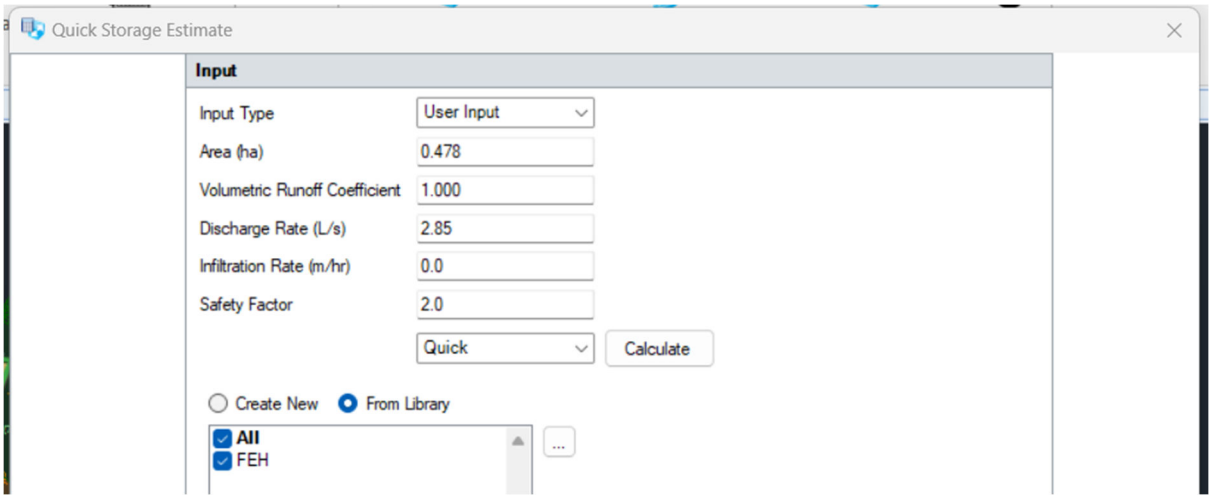
Q_{BAR} (l/s):		3.24
1 in 1 year (l/s):		2.85
1 in 30 years (l/s):		5.77
1 in 100 year (l/s):		7.07
1 in 200 years (l/s):		7.98

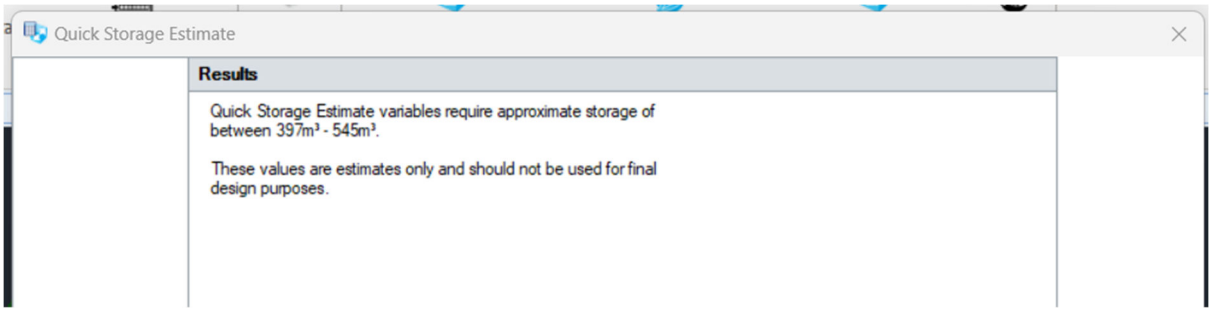
This report was produced using the greenfield runoff tool developed by HR Wallingford and available at www.uksuds.com. The use of this tool is subject to the UK SuDS terms and conditions and licence agreement , which can both be found at www.uksuds.com/terms-and-conditions.htm. The outputs from this tool are estimates of greenfield runoff rates. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, CEH, Hydrosolutions or any other organisation for the use of this data in the design or operational characteristics of any drainage scheme.

Appendix C. Storage Estimate Calculations

Storage estimate Phase 1

1. Discharge rate = 2.85 l/s
2. Total Area = 4776.9 m2





Appendix D. Drainage Layout Plan

DO NOT SCALE

Millimetres 0 10 100

BIO RETENTION AREA TO RECEIVE RUNOFF FROM ADJACENT HARD LANDSCAPED AND CARPARK AREAS. PLANTING IN THESE AREA TO BE AS PER THE LANDSCAPE ARCHITECTS SPEC. OUTFALL MANHOLE TO HAVE GRATED COVER TO ACT AS OVERFLOW INTO MAIN SW SYSTEM

PROPOSED SURFACE WATER DISCHARGE POINT FOR NEW BUILDING TO BE AT THIS LOCATION - SUBJECT TO CONFIRMATION OF LEVELS AT NEXT STAGE OF DESIGN

PROPOSED FOUL DISCHARGE POINT FOR NEW BUILDING TO BE AT THIS LOCATION - SUBJECT TO CONFIRMATION OF LEVELS AT NEXT STAGE OF DESIGN

PROPOSED NEW TURNING AREA TO FALL INTO BIO RETENTION AREA

ALL EXISTING DRAINAGE AND OTHER SERVICES BELOW PROPOSED NEW BUILDING TO BE REMOVED PRIOR TO CONSTRUCTION WITH ALL NECESSARY DIVERSION DESIGNED

BIO RETENTION AREAS TO RECEIVE RUNOFF FROM ADJACENT CARPARK AREA. PLANTING IN THESE AREAS TO BE AS PER THE LANDSCAPE ARCHITECTS SPEC. OUTFALL MANHOLE TO HAVE GRATED COVER TO ACT AS OVERFLOW INTO MAIN SW SYSTEM

PROPOSED PERMEABLE PAVING TO FRONT OF BUILDING TO PROVIDE STORAGE AND TREATMENT FOR RUN OFF ON THIS SIDE OF THE BUILDING

PROPOSED NEW CARPARK TO FALL TOWARDS BIO RETENTION AREAS ADJECENT TO BUILDING

PROPOSED GREASE TRAP TO BE LOCATED AT F8 - ALL OUTLETS REQUIRING TREATMENT TO BE CONNECTED TO PIPEWORK BETWEEN F7 - F8

PROPOSED CAR PARK DRAINAGE TO CONNECT UPSTREAM OF FLOW CONTROL CHAMBER

PROPOSED DRAINAGE CHANNEL AT SITE BOUNDARY TO ENSURE NO RUNOFF ON TO EXISTING HIGHWAY

FUTURE BUILDING LOCATION - ALL PROPOSED DRAINAGE ROUTE AROUND PROPOSED NEW BUILDING TO AVOID POSSIBLE CLASHES IN FUTURE WITH NEW BUILDING

BIO RETENTION AREA TO RECEIVE RUNOFF FROM ADJACENT HARD LANDSCAPED AND CARPARK AREAS. PLANTING IN THESE AREA TO BE AS PER THE LANDSCAPE ARCHITECTS SPEC. OUTFALL MANHOLE TO HAVE GRATED COVER TO ACT AS OVERFLOW INTO MAIN SW SYSTEM

PROPOSED FOUL DRAINAGE SHOWN INDICATIVELY AT THIS STAGE - OUTLETS FOR BUILDING AND ENERGY CENTRE TO BE CONFIRMED AT NEXT STAGE OF DESIGN

PROPOSED FLOW CONTROL CHAMBER TO RESTRICT FLOWS TO 2.85l/s FROM ALL RAINFALL EVENTS UP TO AND INCLUDING 1in100 YRP WITH 40% ALLOWANCE FOR CLIMATE CHANGE

BIO RETENTION AREA TO RECEIVE RUNOFF FROM ADJACENT ENERGY CENTRE. PLANTING IN THESE AREA TO BE AS PER THE LANDSCAPE ARCHITECTS SPEC. OUTFALL MANHOLE TO HAVE GRATED COVER TO ACT AS OVERFLOW INTO MAIN SW SYSTEM

CCTV SURVEY REQUIRED TO CONFIRM CONNECTIVITY OF SEWER PRIOR TO REMOVAL OF DOWNSTREAM RUNS

BIO RETENTION AREA TO RECEIVE RUNOFF FROM ADJACENT HARD LANDSCAPED AREAS. PLANTING IN THESE AREA TO BE AS PER THE LANDSCAPE ARCHITECTS SPEC. OUTFALL MANHOLE TO HAVE GRATED COVER TO ACT AS OVERFLOW INTO MAIN SW SYSTEM

ARROWS DENOTE INDICATIVE FLOW OF SURFACE WATER ABOVE GROUND INTO SUDS FEATURES

ATTENUATION BASIN AREA TO RECEIVE RUNOFF FROM MAIN BUILDING. PLANTING IN THESE AREA TO BE AS PER THE LANDSCAPE ARCHITECTS SPEC.

BIO RETENTION AREA TO RECEIVE RUNOFF FROM ADJACENT HARD LANDSCAPED AREAS. PLANTING IN THESE AREA TO BE AS PER THE LANDSCAPE ARCHITECTS SPEC. OUTFALL MANHOLE TO HAVE GRATED COVER TO ACT AS OVERFLOW INTO MAIN SW SYSTEM

ENERGY CENTRE

MUGA

OUTDOOR LEARNING AREA

Cycles

KEY

- SITE BOUNDARY
- SURFACE WATER SEWER
- FOUL SEWER
- FLOW CONTROL CHAMBER
- BIORETENTION AREA
- ATTENUATION BASIN
- PERMEABLE PAVING
- LINEAR DRAINAGE CHANNEL
- EXISTING SURFACE WATER SEWER
- EXISTING FOUL SEWER
- EXISTING SWS TO BE ABANDONED
- EXISTING FWS TO BE ABANDONED

GENERAL NOTES:

1. DRAWING TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT PROJECT DRAWINGS AND WITH THE HEALTH AND SAFETY INFORMATION PROVIDED AND/OR WITHIN THE PRE-CONSTRUCTION INFORMATION.
2. USE OF THIS DRAWING DOES NOT ABSOLVE THE CLIENT FROM HIS RESPONSIBILITIES UNDER THE HEALTH AND SAFETY: THE CONSTRUCTION DESIGN AND MANAGEMENT REGULATIONS 2015. THE PRINCIPAL DESIGNER IS REQUIRED TO CONTACT ATKINRÉALIS PRIOR TO PERMITTING THIS DRAWING TO BE USED IN CONNECTION WITH ANY CONSTRUCTION WORKS.
3. BEFORE COMMENCEMENT OF ANY WORKS ASSOCIATED WITH THE DRAWING REFER TO ALL RELEVANT HEALTH AND SAFETY INFORMATION FOR THE WORKS INCLUDING RESIDUAL RISK INFORMATION.
4. THE CONTRACTOR SHOULD COMPLY WITH HS(G) 47 "AVOIDING DANGER FROM UNDERGROUND SERVICES" WHEN PLANNING, LOCATING AND EXCAVATING AROUND EXISTING SERVICES. IT IS KNOWN THAT EXISTING UTILITY COMPANY UNDERGROUND SERVICES AND APPARATUS ARE PRESENT WITHIN THE PROPOSED WORKS AREA AND IT IS THE CONTRACTORS RESPONSIBILITY TO LOCATE EXISTING SERVICES ON SITE ACCURATELY.
5. THE DRAWING SHALL BE USED FOR THE INTENDED PURPOSE ONLY AND THIS DRAWING HAS BEEN BASED ON INFORMATION PROVIDED BY OTHER PARTIES AND ATKINSRÉALIS DO NOT WARRANT THE ACCURACY OF THIS INFORMATION. DIMENSIONS SHALL NOT BE SCALED FROM THE DRAWING AND THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL DIMENSIONS AND LEVELS ON SITE FOR THE ACTUAL SETTING OUT OF THE WORKS. DIMENSIONS MARKED 'DIMENSIONS TO BE SITE CHECKED' ARE SUBJECT TO CONFIRMATION BY THE CONTRACTOR BEFORE THE WORKS COMMENCE.
6. ALL FIGURED LEVELS ARE IN METRES AND RELATED TO EXISTING SURVEY GRID & DATUM UNLESS NOTED OTHERWISE.
7. ALL FIGURED DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.
8. THE CONTRACTOR SHALL MAINTAIN FREE AND OPEN ACCESS TO PUBLIC HIGHWAY AND ADJACENT LANDS AT ALL TIMES DURING THE COURSE OF THE WORKS UNLESS OTHERWISE AGREED IN WRITING WITH THE INTERESTED PARTIES.
9. CONFLICTING INFORMATION SHOWN ON THE ENGINEER'S DRAWINGS OR DISCREPANCIES BETWEEN THE INFORMATION GIVEN BY THE ENGINEER AND THAT PROVIDED BY OTHERS MUST BE REFERRED TO THE ENGINEER BEFORE THE WORKS COMMENCE.

Rev.	Date	Description	By	Chk'd	App'd
P03	06/12/24	RIBA STAGE 2 - UPDATED LAYOUT	SF	CS	CS
P02	08/10/24	RIBA STAGE 2 - UPDATED LAYOUT	MH	SF	CS
P01	17/05/24	FIRST ISSUE - RIBA STAGE 2	CS	SF	TR

Drawing Status: SUITABLE FOR INFORMATION — Suitability: S2

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AtkinsRéalis (2024)

Client: COLEG GWENT

Project Title: PHASE 1 CROSSKEYS CAMPUS

Drawing Title: DRAINAGE LAYOUT

Scale	Designed	Drawn	Checked	Authorised
1:200	CS	CS	SF	RS
Original Size: A1	Date: 09/05/24	Date: 13/05/24	Date: 16/05/24	Date: 16/05/24

Drawing Number: 5228425-ATK-XX-XX-DR-C-900300 — Revision: P03

Internal Project Number: 5228425

USER: GB87317 Date: 06/12/24 13:46:02 Filename: \\wsatkins\projects\GB88581PD\ONDVA PROJECTS\81RBST\DL PROJECTS\5228425 - Coleg Gwent - Phase 1 Crosskeys Campus\01 WIP\CED\R84254-ATK-XX-XX-DR-C-0300 Drainage Layout.dwg

Appendix E. PPA

Dŵr Cymru
Welsh Water

Developer Services
PO Box 3146
Cardiff
CF30 0EH

Tel: +44 (0)800 917 2652
Fax: +44 (0)2920 740472
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Mr Chris Stone
AtkinsRealis
Capital Quarter 2
Tyndall Street
Cardiff
CF10 4BZ

Date: 12/06/2024
Our Ref: PPA0008756

Dear Mr Stone,

Grid Ref: 322409 191615
Site Address: Crosskeys Campus, Crosskeys, NP11 7ZA
Development: Redevelopment of College Campus (part)

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 the redevelopment of part of the College Campus and acknowledge that this is a brownfield site and that there is to be no increase in staff or student numbers for this phase of the redevelopment. 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 combined sewer 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 will be permitted within 3 metres either side of the centreline of the public sewer. Arrangements can be made for Company Staff to undertake a sewer trace on request of the developer to accurately locate the asset and to establish their relationship to the proposed development. You are advised that there is a charge for this service. Should the proposed development be located within the protection zone of the public sewer there would be a need for the applicant to either re-locate the building outside of the required protection zone or apply to divert the public sewer under Section 185 of the Water Industry Act 1991.

Our strong recommendation is that your site layout takes into account the location of the assets crossing the site and should be referred to in any master-planning exercises or site layout plans submitted as part of any subsequent planning application. Further information regarding Asset Protection is provided in the attached Advice and Guidance note.

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 Caerphilly 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 and understand that communication will be via the Campus existing private drainage system. 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.

If the approved use intends to include food preparation, then an adequate grease trap to be fitted, in accordance with environmental health regulations, and maintained thereafter so as to prevent grease entering the public sewerage system.

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

We anticipate this development will require the installation of a new single water connection to serve the new premise. The provisions of Section 45 of the Water industry Act 1991 apply. We therefore rely on the Local Planning Authority to control the delivery of any required reinforcement or offsite works by way of planning condition at planning application stage.

Capacity is currently available in the water supply system to accommodate the development. We reserve the right however to reassess our position at planning application stage 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.*

CONDITIONS FOR DEVELOPMENT NEAR WATER MAINS

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. These are: -

1. No structure is to be sited within a minimum distance of **4** metres either side of the centreline of the main providing main is at a depth of 1.8m to crown. 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.

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