Blaenau Gwent County Borough Council

PROPOSED GLYNCOED PRIMARY SCHOOL

Drainage Strategy

9501-WSP-C-RP-001

APRIL 2020

PUBLIC

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Drainage Strategy

PUBLIC

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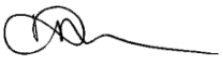
Signature				
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INTRODUCTION

1. INTRODUCTION

1.1.1. WSP have been commissioned by Blaenau Gwent County Borough Council to provide a Drainage Strategy report and preliminary BREEAM Pol 3 assessment in support of the future planning application and SAB pre-application submission for the proposed Primary School at Glyncoed, Ebbw Vale.

1.1.2. It is our understanding that the client is seeking to redevelop the former comprehensive school site into a proposed new primary school and that this report is required to support the future planning application and SAB pre-application submissions.

1.1.3. The objectives of the report are to:-

- Review the existing drainage arrangements on site for both surface and foul water;
- Assess the feasibility of Sustainable Drainage Systems (SuDS) features within the development to control and discharge surface water runoff to comply with the requirements of the statutory National Standards for Sustainable Drainage Systems;
- Assess the options for the disposal of foul water from the development; and
- Provide a preliminary design for surface water (SuDS) systems including indicative sizing of storage/attenuation features and conceptual plan suitable for inclusion in a pre-application submission to the local authority's SuDS Approval Body (SAB).
- Assess preliminary credits available under BREEAM Pol 3 based on the information available at the time of writing this report.

1.1.4. The following tasks have been undertaken to complete this report:-

- Undertake a desktop investigation of the site's existing foul and surface water drainage arrangements;
- Outline anticipated solutions for foul sewage disposal, surface water disposal and access roads/highway drainage. This will include preliminary calculations, in order that the conceptual designs may be agreed with the relevant authorities. In preparing the surface water drainage strategy, we will consider inundation of the floodplain and assess flood levels in the location of attenuation features;
- Determine the area of impermeable surfaces that will be added by the proposed development and estimate the equivalent greenfield 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 conditions;
- Estimate the size of storm water storage needed to manage run-off from the site post-development, using drainage design software (WinDes);
- Provide general information on the maintenance and adoption of SuDS via the SAB's approval process; and
- Give consideration to drainage exceedance. In particular, use topographic information to identify overland flow paths and areas susceptible to surface water ponding.

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

1.1.6. 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 WSP cannot be held responsible.

2

EXISTING SITE

2. EXISTING SITE

2.1. SITE LOCATION

2.1.1. Figure 2-1 indicates the site location, which is located off Badminton Grove, Glyncoed, Ebbw Vale, NP23 5UL (Approximate Grid Reference X-316482, Y-211244).

2.2. SITE DESCRIPTION

2.2.1. The site comprises mainly of hard landscaped areas which consists of the demolished former comprehensive school structures. There is an existing carpark and sports hall in the northern area of the site which are still operational and will remain once the site is redeveloped. The site is bordered to the north by vegetation and an existing tree line along the boundary. Between the north-eastern boundary and the existing Allotment Road public highway there is an embankment which runs down from the site plateau to the highway. South of the site are existing sport pitches and a playground which are separated from the site by an access road which runs along the south-eastern boundary of the site. Along the western boundary is the Badminton Grove public highway.

2.2.2. The site is approximately 1.33 hectares in area with the topography sloping generally from west to east across the site with the low point of the site plateau being the south-eastern boundary. A copy of the existing site plan can be found in Appendix C of this report.

2.2.3. The site has allowance for direct vehicle access via the existing access road which serves the carpark for the sport halls which is accessed off the public highway to the west, Badminton Grove.

Figure 2-1 - Site Location Plan

2.3. EXISTING WATERCOURSES AND DRAINAGE

2.3.1. From available mapping information it has been established that the nearest watercourse is the Afon Ebwy, which is approximately 100m from the northern corner of the site and is located north of Allotment Road.

2.3.2. Based on the information available, there is a public sewer crossing within site boundary. This sewer is a public combined sewer of 225mm dia running west to east through the development. The nearest surface water sewer is approximately 50m north of the site which is located in the existing housing estate north of the site and appears to discharge into Afon Ebwy. Figure 2-2 below contains an extract of Welsh Water asset plan for the area.

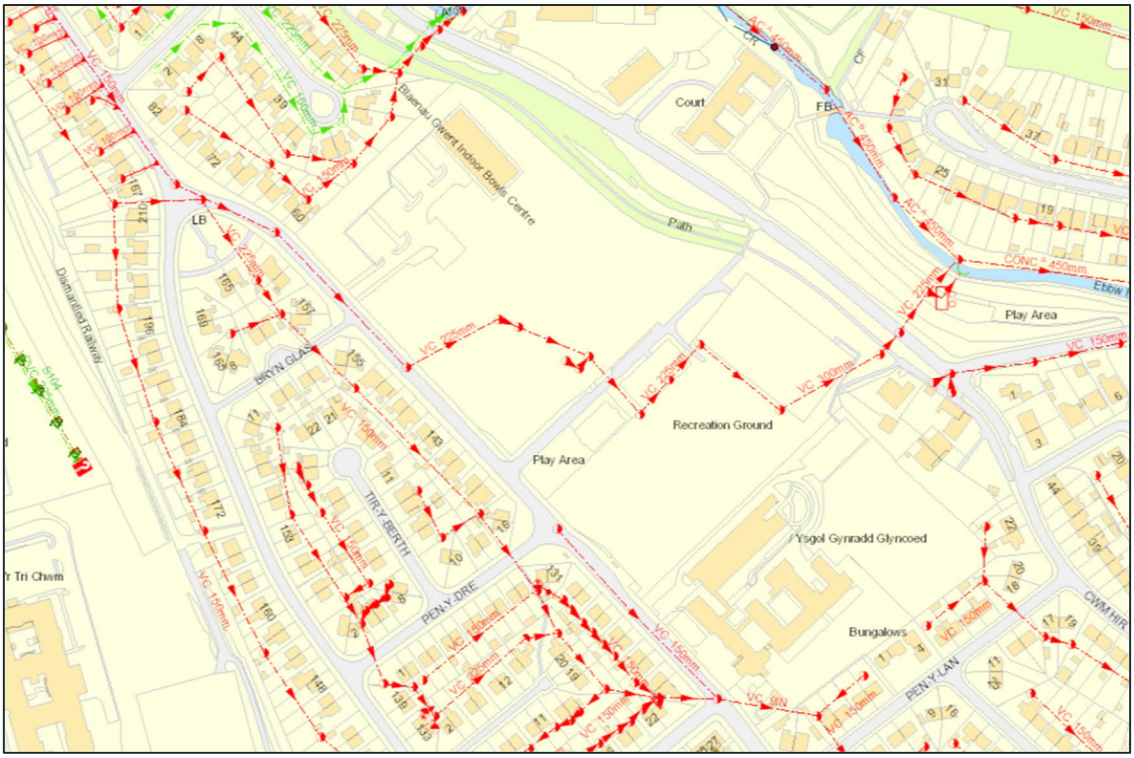


Figure 2-2 - Extract of DCWW Asset Plan

2.3.3. Consideration will have to be given to the existing drainage serving the sports hall and access road which is remaining, at this time the route of the surface water sewers are not fully unknown, however a survey was carried out on part of the system on the 02/10/2020 and also historic plan have been made available which suggest that the sports hall and part of the school site discharges a soakaway structure located south east of the sports hall.

2.3.4. The survey has also established the surface water runoff from the existing school discharges to an outfall in the existing access road which runs along the south eastern boundary of the site. It is recommended that the invert level of the outfall manhole in the existing road is established prior to detailed design. Figure 2-3 shows details of the existing surface water pipes surveyed.

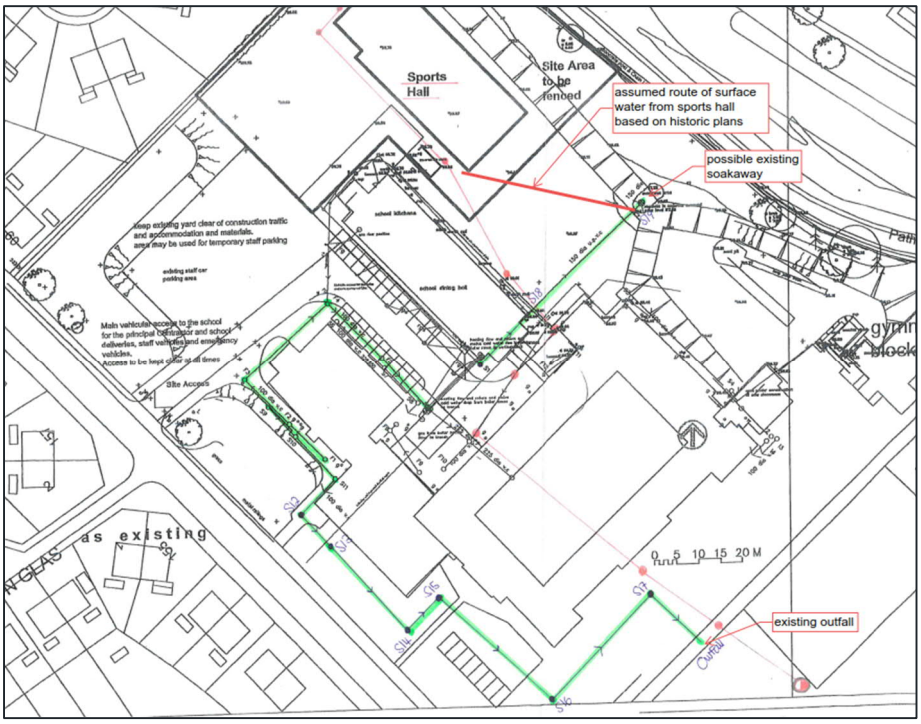


Figure 2-3 - Existing Sport Hall & School Surfcae Water Drainage Routes

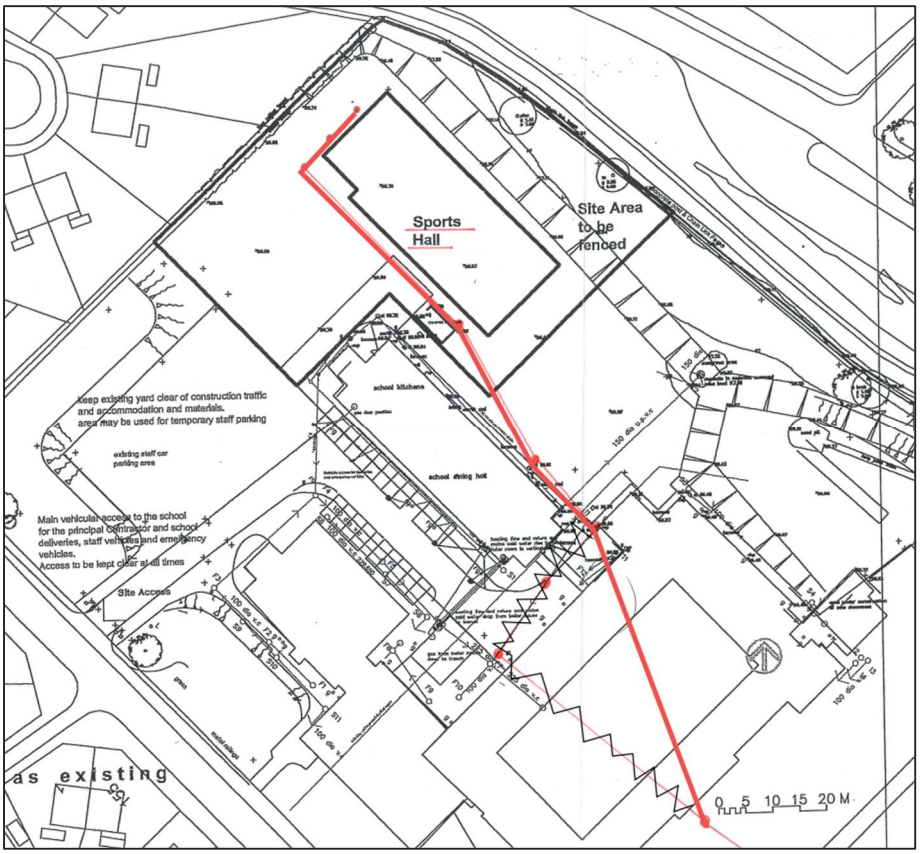


Figure 2-4 - Existing Sport Hall Foul Drainage Route

2.3.5. We have been provided with details of the foul drainage serving the sports hall which was diverted to accommodate the demolition of the existing school buildings, figure 2-4 shows the current routing of the sewer which runs from the northern elevation of the sports hall south and discharges into the combine public sewer.

2.3.6. Based on the proposals received to date this sewer will require diverting to accommodate the new building footprint, depending on levels this could either be diverted around the proposed building footprint or the drainage from the sports hall could be incorporated into the proposed drainage system for the new school building at the head of the run.

2.3.7. The existing soakaway which appears to serve the sports hall will need to be either relocated or the flows will need to be incorporated into the proposed development as the location of the soakaway will clash with the proposed development. The flows from the sports hall could be attenuated under the proposed MUGA by utilising the subbase as a storage feature. These options will need to be developed further as part of the detailed design once further survey works are undertaken to establish the size etc of the soakaway.

2.4. EXISTING CONTRIBUTING AREAS & RUN-OFF RATES

2.4.1. The total site area is circa 1.33 ha, which consists of the remaining hardstanding from the demolished school building and the existing soft play and landscaped areas. The global greenfield run-off rates have been calculated using the FEH method and table 2-2 summarises the runoff rates for each return period (Qbar, 30 & 100). Calculations detailing the derivation of the values in tables 2-1 & 2-2 are available in Appendix A.

Table 2-1 - Global Greenfield/Brownfield Run-off Rates

Method	QBar - (l/s)	
	Greenfield Rate	Brownfield (Urban) Rate
FEH	28.22	-
ICP SuDS	19.4	27.5
Average	**23.8**	**27.5**

Table 2-2 - Global Greenfield Run-off Rates by Return Period based on FEH

Return Period	Greenfield Run-off Rate (l/s)
Qbar	28.22
30 YRP	50.23
100 YRP	61.52

3

PROPOSED DEVELOPMENT

3. PROPOSED DEVELOPMENT

3.1. DEVELOPMENT PROPOSALS

3.1.1. For assessment purposes the proposed development is a new primary school complex consisting of a main school building, outdoor hard and soft play areas, service yard and separate childcare unit with external play area. The proposed school will utilise the existing highway infrastructure serving the sports hall which is to remain on site and there will also be the introduction of a layby/drop-off area adjacent to the existing public highway (Badminton Grove).

3.2. FOUL DRAINAGE

3.2.1. The proposed new development will replace the former comprehensive school buildings on site which have already been demolished to slab level. As such, a connection to the local foul sewer network has previously been established. The new development will seek to utilise the existing connection point and discharge foul waste via gravity from the site subject to confirmation from DCWW on the available capacity within the public sewer.

3.2.2. The capacity of the sewer can be confirmed by DCWW via a PPA (pre planning advice), at the time of writing this report a PPA has be submitted to DCWW and we are awaiting a response – reference number (PPA0004851). It is assumed that given the site was previously a larger comprehensive school complex than the proposed new primary school there should be capacity with the pipework however this will need to be confirmed by DCWW.

3.2.3. The nearest sewer is the combined public sewer which crosses the site from Badminton Grove to the playing field south of the site. The proposed development will involve the diversion of this sewer to accommodate the new school building, it is therefore recommended that prior to detailed design a survey of the existing sewer is undertaken to establish the existing levels and location as this will impact on the diversion design and easement requirements. For the purposes of this report it has been assumed the easement will be 3m either side of the pipework, this distance will be confirmed by DCWW in the PPA response.

3.2.4. Grease traps and/or above ground dosing will be required for the kitchen facilities, it is likely that DCWW will request below ground grease traps as part of the development, this will be confirmed by DCWW in the PPA response.

3.2.5. The existing foul flows from the sports hall will need to be maintained through the development site this can be done by either diverting the existing sewer around the proposed new building footprint or connecting it to the proposed new drainage system for the school, this will need to be explored at detailed design stage once existing and proposed design levels are established.

3.2.6. 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.

3.3. SURFACE WATER

3.3.1. 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 scheme as stated in section 2 of the statutory "Sustainable Drainage Systems Standards for Wales" (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.

3.3.2. From the 7th January 2019 Schedule 3 of the Flood and Water Management Act has been implement by the Welsh Government which requires any development of more than 1 unit or where the construction area is greater than 100m² 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

3.3.3. 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.

S1 – Surface Water Runoff Destination

3.3.4. 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 combine sewer. Each of these options are considered below.

3.3.5. Collected for Use

3.3.6. 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 events where the rainfall volume exceeds the volume of surface water storage provided by the rainwater harvesting tanks. As the development is a proposed school complex 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. other schemes. Basic forms of rainwater harvesting will be incorporated into the development in the form of rainwater butts will collect water from rainwater downpipes and store it for irrigation of the soft landscaped areas and planting beds.

3.3.7. Infiltration Methods

3.3.8. Based on the Cranfield University Soilscapes mapping the subsoils in the area of the site are noted as slowly permeable wet very acid upland soils with a peaty surface therefore it is assumed that infiltration is not feasible as a method of disposal for surface water runoff. Infiltration testing will be required to be undertaken as part of the ground investigation to either validate this assumption or determine a suitable infiltration rate for design purposes.

3.3.9. Discharge to Surface Water Body

3.3.10. Sequentially, the next consideration in the hierarchical approach is discharge to a surface water body. The Afon Ebwy watercourse is approximately 100m north of the site however forming a new connection to this location will be difficult given the level change between the site plateau and the ground adjacent to the watercourse.

3.3.11. Based on the survey data received in figure 2-3 it is unclear where the existing outfall finally discharges, and it is recommended that a survey is carried out of the existing drainage network downstream of the site to establish if the existing surface water network discharges to the watercourse. At this time it would be considered unfeasible to establish to new connection to the watercourse as this will involve crossing third party land, agreement from the SAB and Natural Resources Wales would be required in order to facilitate a new discharge into the main river.

3.3.12. Discharge to Surface Water Sewer

3.3.13. Based on the information received to date we would recommend that the proposed development utilises the existing surface water sewer connection which is shown on figure 2-3, this outfall is located along within the existing access road outside of the south eastern boundary. To avoid works outside of the site boundary it is recommend that the proposed new surface water outfall from the site is establish on the existing pipework inside the development site. Based on the survey data received the upstream manhole from the outfall is approx. 2.2m deep therefore the site should be able to discharge to this outfall via gravity.

3.3.14. Discharge to Combined Sewer

3.3.15. Based on the above this option should not be required.

S2 – Surface Water Runoff Hydraulic Control

3.3.16. 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.

3.3.17. Interception of Runoff

3.3.18. 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.

3.3.19. Hydraulic Control and Storage

3.3.20. For the purposes of this report it is assumed that infiltration will not be a feasible means of disposing surface water runoff generated from the development, therefore the discharge volume for the site will increase. In order to meet the standards this report has adopted the simple approach outlined in the statutory standards of restricting all runoff from the development site for all return periods up to and including the 1 in 100-year event to Qbar as given in table 2-2 of this report.

3.3.21. 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 30% climate change allowance. As the proposed development is a school no allowance has been made for urban creep as it is assumed any extension to the school complex would be subject to planning approval and reviewed separately by the SAB and LLFA at a later date. 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 existing surface water outfall used by the former school and therefore mimicking the previous regime with runoff rates being restricted to the equivalent Qbar greenfield runoff which will provide betterment over the historic runoff rates, this will need to be agreed with the adopting SAB's authority. Surface water flows from the proposed development would need to be attenuated via a flow control chamber, and on-site storage provided for surface water runoff for all rainfall events up to and including a 1 in 100 year event with 30% allowance for climate change.

3.3.22. Given the proposed site usage overland storage in the form of swales and/or basins across the site should be achievable, alternately storage could also be provided in the form of a permeable paving system beneath carparks and access roads across the site with the surface water storage being provided with the sub-base layer of the carriageway makeup.

3.3.23. For the purposes of this report storage requirements have been calculated based on an open storage void. The estimated storage volumes for the development have been calculated using the source control suite within WinDes and table 3-1 below provides a summary of the values. For the purposes of this calculation the overall impermeable area for the development has been taken as 0.900ha as shown by the master planners and the maximum discharge rate assumed to be the equivalent greenfield run-off rate for Qbar – 25.3l/s based on FEH. The storage volume could be reduced by the use of alternative complex controls to satisfy clause G2.30 of the standards, liaison will need to be undertaken with the SAB at detailed design stage to confirm the acceptability of the proposed runoff rates and the use of a complex control.

3.3.24. Table 3-2 below provides the estimated storage volumes based on the proposed discharge rates in Table 2-2. Calculations deriving these figures are found in Appendix B. It should be noted that the estimated attenuation storage volumes set out below are still subject to agreement of a site masterplan and detailed analysis/design. The below volumes would be split between a number of storage/SuDS features across the site.

Table 3-1 - *Storage Requirements Attenuation*

Imp Area	Discharge rate	1 in 30 year storm		1 in 100 year storm + 30%	
		Indicative storage volume	Indicative max storage structure dims (D x W x L)*	Indicative storage volume	Indicative max storage structure dims (D x W x L)*
900m²	25.3 l/s	153 - 309m³	1 m x 8m x 39m	328 - 592m³	1m x 12m x 50m

**The size and depth of the storage will be dependent on the form of storage used and the depth of the proposed outfall location which will need to be establish following further on-site investigation works.*

3.3.25. Exceedance Flows and Flood Pathways

3.3.26. "*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).

3.3.27. Flood-flow pathways would 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 should 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. These should be considered as part of the detailed drainage and levels design of the development.

3.3.28. Flood Risks to People

3.3.29. "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)

3.3.30. During the detailed design, a hydraulic model will be built to assist the design of the proposed surface water drainage networks. When an extreme storm event is simulated within the model, potential flooding locations will become evident and the flood flow pathways can be designed/defined based on the proposed layout and levels of the hard areas and landscaping. The depth and velocity of the overland flood water can be determined and then compared with Figure 2.1 (Combinations of flood depth and velocity that cause danger to people) in the Defra / EA Flood Risks to People publication. The velocity and depth as described above would then give a category

of flood hazard and the corresponding risk to people. If the risk is deemed to be too high, then the design would require reassessment.

S3 – Water Quality

3.3.31. 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.

3.3.32. 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.

3.3.33. 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. Figure 3-2 below provides a typical example of a management train.

Figure 3-2 - SuDS Management Train Example

3.3.34. The management trains to be used on the project would have 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.

3.3.35. Sediment will need to be trapped and retained on site and consideration for maintenance access to be provided for the purpose of intermittent sediment removal.

3.3.36. The possible impact of accidental spills will need to be addressed with the most vulnerable areas to a spill or other pollution incident being the car park areas and access roads. The carpark areas and some access roads could be constructed in permeable paving which will provide a level of treatment for pollution. These areas will also have to pass through swales and an attenuation basin before leaving the site boundary. As such, by having a cut-off point upstream of the discharge location, this allows the isolation of any spills within the site boundary, which can then be addressed before the surface water system is then allowed to discharge freely again.

3.3.37. Planting within the SuDS features should form part the water quality strategy. SuDS components like swales providing water quality improvements by reducing sediment and contaminants from runoff either through settlement or biological breakdown of pollutants are most likely to be exposed to contaminants 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 any downstream waterbodies, i.e attenuation basin.

3.3.38. Overall the combination of the planting will create a new eco-system and once colonised will be able to decrease the flow rate of the water within the swale, filter contaminants & pollutants and create an overall attractive biological community.

S4 – Amenity

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

3.3.40. 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 swales and detention pond areas are designed with natural slope forms, safe and accessible paths and 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 vegetated swales & attenuation basin.

S5 – Biodiversity

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

3.3.42. 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 and where possible provide meandering swales and a large attenuation basin to maximise the variety of habitats available.

3.3.43. 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

3.3.44. In general, the proposed attenuation basin and swales will be the focal habitat for the site. The basin should not be over planted to allow for natural colonisation and to ensure high visibility of people particularly children in and around the basin. Sight lines should be left open to attract certain species and shaded areas under adjacent tree canopies further enhance the varied ecosystem potential.

3.3.45. The attenuation basin should be constructed in a manner that avoids compacted sub bases and healthy organic matter will be backfilled to ensure ideal growing conditions. The varying depths will

provide refuge for overwintering species and structural diversity and the pond will be resilient to seasonal changes, drought periods and inundation.

S6 – Design of Drainage for Construction and Maintenance and Structural Integrity

3.3.46. 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).

3.3.47. The proposed system will be maintained by the client's maintenance team and therefore will be responsible for the maintenance of the system to ensure it continues to comply with SuDS standards.

3.3.48. 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.

4

BREEAM POL 03

4. BREEAM POL 03

4.1. BREEAM CREDITS UNDER POL 03

4.1.1. The BREEAM Pol 03 section is split into 3 parts with credit achievable listed below:-

- Flood risk (1 to 2 credits)
- Surface water run-off (2 credits)
- Minimising water course pollution (1 credit).

4.1.2. The aim of the BREEAM Credit Pol 03 is:

"To avoid, reduce and delay the discharge of rainfall to public sewers and watercourses, thereby minimising the risk and impact of localised flooding on and off-site, watercourse pollution and other environmental damage."

4.1.3. The flood risk credits will be determined by the flood risk assessment, refer to the FRA for further details.

4.1.4. The 'surface water runoff' category details the criteria for a drainage strategy to earn up to two credits. These requirements are detailed in Table 4-1.

Table 4-1 – BREEAM Pol 3 Credit Summary – Surface Water Runoff

Credits available	Criteria	Reason for awarding credit
One credit	5. Where drainage measures are specified to ensure that the peak rate of run-off from the site to the watercourses (natural or municipal) is no greater for the developed site than it was for the pre-development site. This should comply at the 1-year and 100-year return period events.	All site run-off is proposed to be attenuated to the greenfield runoff rate pre development for all rainfall events up to the 1 in 100 year return period events with allowance for climate change.
	6. Relevant maintenance agreements for the ownership, long term operation and maintenance of all specified SuDS are in place.	Under the SAB application the party responsible for the ownership, long-term operation and maintenance of the drainage system will need to maintain the system to ensure it continues to comply with SuDS standards for the lifetime of the project.
	7. Calculations include an allowance for climate change; this should be made in accordance with current best practice planning guidance.	All calculations include a 30% allowance for climate change in accordance with Natural Resources Wales guidance.
One credit	8. Where flooding of property will not occur in the event of local drainage system failure (caused either by extreme rainfall or a lack of maintenance); AND	Exceedance flows in the event of drainage failure are expected to be directed away from the building towards the soft play areas and then finally the attenuation features.
	9. Drainage design measures are specified to ensure that the post development run-off	The proposed site will increase the runoff volume from the pre

	volume, over the development lifetime, is no greater than it would have been prior to the assessed site's development for the 100-year 6-hour event, including an allowance for climate change.	development volumes due to the increase in impermeable area.
	10. Any additional predicted volume of run-off for this event is prevented from leaving the site by using infiltration or other Sustainable Drainage System (SuDS) techniques.	Rainwater harvesting and other SuDS features will be used across the development however as infiltration does not appear to be an option for this development this criteria is unlikely to be met.
	11. Justification from the Appropriate Consultant indicating why the above criteria cannot be achieved, i.e. where infiltration or other SuDS techniques are not technically viable options.	SuDS options will be use across the site in line with the requirements of the Sustainable Drainage Systems Standards for Wales, however as infiltration appears to not be feasible criteria 9 & 10 are not achievable.
	12. Drainage design measures are specified to ensure that the post development peak rate of run-off is reduced to the limiting discharge. The limiting discharge is defined as the highest flow rate from the following options: a. The pre-development 1-year peak flow rate; OR b. The mean annual flow rate Qbar; OR c. 2L/s/ha.	Rainwater harvesting and other SuDS features will be used across the development with all site run-off to be attenuated to the greenfield runoff rate pre development for all rainfall events up to the 1 in 100 year return period event with allowance for climate change.
	13. Relevant maintenance agreements for the ownership, long term operation and maintenance of all specified SuDS are in place.	Under the SAB application the party responsible for the ownership, long-term operation and maintenance of the drainage system will need to maintain the system to ensure it continues to comply with SuDS standards for the lifetime of the project.
	14. For either option, above calculations must include an allowance for climate change; this should be made in accordance with current best practice planning guidance.	All calculations include a 30% allowance for climate change in accordance with Natural Resources Wales.

4.1.5. The 'minimising watercourse pollution' category details the criteria for a drainage strategy to earn one credit. These requirements are detailed in Table 4-2

Table 4-2 – BREEAM Pol 3 Credit Summary – Minimising Watercourse Pollution

Credits available	Criteria	Reason for awarding credit
One credit	15. There is no discharge from the developed site for rainfall up to 5mm (confirmed by the Appropriate Consultant).	The scheme will be designed to comply with the Sustainable Drainage Systems Standards for Wales, with SuDS features used across the development and as such the criteria for meeting this credit will have to be achieved under the standards.
	16. In areas with a low risk source of watercourse pollution, an appropriate level of pollution prevention treatment is provided, using appropriate SuDS techniques	
	17. Where there is a high risk of contamination or spillage of substances such as petrol and oil (see Compliance notes for a list of areas), separators (or an equivalent system) are installed in surface water drainage systems.	
	18. Where the building has chemical/liquid gas storage areas, a means of containment is fitted to the site drainage system (i.e. shut-off valves) to prevent the escape of chemicals to natural watercourses (in the event of a spillage or bunding failure).	
	19. All water pollution prevention systems have been designed and installed in accordance with the recommendations of documents such as Pollution Prevention Guideline 3 (PPG 3) and/or where applicable the SuDS manual. For areas where vehicle washing will be taking place, pollution prevention systems must be in accordance with Pollution Prevention Guidelines 13.	
	20. A comprehensive and up to date drainage plan of the site will be made available for the building/site occupiers	
	21. Relevant maintenance agreements for the ownership, long term operation and maintenance of all specified SuDS must be in place	
	22. Where present, all external storage and delivery areas designed and detailed in accordance with the current best practice planning guidance	

4.1.6. In summary the below credits should be achieved under Pol 03 :-

- Flood risk - see FRA report
- Surface water run-off - 2 credits
- Minimising water course pollution - 1 credit

5

CONCLUSION

5. CONCLUSION

5.1. FOUL DRAINAGE

5.1.1. The most sustainable method for the disposal of foul water discharge from the proposed development site is via the existing connection to the mains sewerage network. The continued suitability of this connection point (in relation to any increase in foul water discharge) can be confirmed by DCWW ahead of the planning application via a Pre-Planning Advice application (PPA0004851).

5.1.2. The proposed development will involve the diversion of this sewer to accommodate the new school building, it is therefore recommended that prior to detailed design a survey of the existing sewer is undertaken to establish the existing levels and location as this will impact on the diversion design and easement requirements. For the purposes of this report it has been assumed the easement will be 3m either side of the pipework, this distance will be confirmed by DCWW in the PPA response.

5.1.3. The existing foul flows from the sports hall will be to be maintained through the development site this can be done by either diverting the existing sewer around the proposed new building footprint or connecting it to the proposed new drainage system for the school, this will need to be decided at detailed design stage once existing and proposed design levels are established.

5.1.4. Grease traps and/or above ground dosing will be required for the kitchen facilities, it is likely that DCWW will request below ground grease traps as part of the development, this will be confirmed by DCWW in the PPA response.

5.1.5. 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.

5.2. SURFACE WATER DRAINAGE

5.2.1. 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 “Sustainable Drainage Systems Standards for Wales” (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.

5.2.2. 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 “Sustainable Drainage Systems Standards for Wales” (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 outfall should infiltration prove unfeasible.

5.2.3. It is proposed for surface water to be discharged via the existing surface water outfall on the south eastern boundary and to attenuate the runoff generated from site to the equivalent Qbar greenfield run-off rate for all rainfall events up to and including 100YRP with 30% allowance for climate change as given in Table 2-2.

5.2.4. To avoid works outside of the site boundary it is recommend that the proposed new surface water outfall from the site is established on the existing pipework inside the development site. Based on

the survey data received the upstream manhole from the outfall is approx. 2.2m deep therefore the site should be able to discharge to this outfall via gravity.

5.2.5. Based on the survey data received in figure 2-3 it is unclear where the existing outfall finally discharges, and it is recommended that a survey is carried out of the existing drainage network downstream of the site to establish if the existing surface water network discharges to the watercourse or the public sewer system. Once this is known, approval can be sought for the proposed discharge rates which will prove large degrees of betterment over the historic connection.

5.2.6. Given the proposed site layout storage could be provided in the form of an attenuation basin and swales located to the south eastern boundary of the site, this could also be combined with a series of above ground storage features across the site and the sub-base beneath the paved areas across the site with the surface water storage being provided within the sub-base layer of the carriageway makeup. For the purposes of this report the long-term storage requirements have been calculated based on an open storage void with indicative sizes being provided in table 3-1.

5.2.7. As the development is a proposed school complex 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 basic forms of rainwater harvesting will be incorporated into the development in the form of rainwater butts will collect water from rainwater downpipes and store it for irrigation of the soft landscaped areas and planting beds.

5.2.8. The use of areas of green roof should be considered as part of the detailed design, this will help reduce the runoff from the proposed development and increase water quality as well as adding to the biodiversity of the scheme. Likewise areas of raingardens should be considered to drain small areas of the external hard surfacing or small areas of roof as this will also help reduce the runoff from the development and increase water quality as well as adding to the biodiversity of the scheme.

5.2.9. Educational features could be added to the system to enhance the amenity value of the system in the form of open rills etc through the site so students can see the journey of the water through the system with information boards to explain the function of each feature. Mud kitchens etc could be incorporated into soft plan areas which will act then act as long term storage for the more intense rain fall events.

5.2.10. 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 3 of this report.

5.2.11. The existing soakaway which appears to serve the sports hall will need to be either relocated or the flows will need to be incorporated into the proposed development as the location of the soakaway will clash with the proposed development. The flows from the sports hall could be attenuated under the proposed MUGA by utilising the subbase as a storage feature. These options will need to be developed further as part of the detailed design once further survey works are undertaken to establish the size etc of the soakaway.

Appendix A

RUN-OFF CALCULATIONS

HR Wallingford
Working with water

Greenfield runoff rate estimation for sites

www.uksuds.com | Greenfield runoff tool

Calculated by: Christopher Stone
Site name: Glyncoed School
Site location: Ebbw Vale

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: 51.79406° N
Longitude: 3.2131° W

Reference: 3454377316
Date: Apr 28 2020 07:19

Runoff estimation approach

FEH Statistical

Site characteristics

Total site area (ha): 1.3336

Methodology

Q_{MED} estimation method: Calculate from BFI and SAAR
BFI and SPR method: Specify BFI manually
HOST class: N/A
BFI / BFIHOST: 0.292
Q_{MED} (l/s):
Q_{BAR} / Q_{MED} factor: 1.08

Hydrological characteristics

	Default	Edited
SAAR (mm):	1463	1463
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):		28.22
1 in 1 year (l/s):		24.83
1 in 30 years (l/s):		50.23
1 in 100 year (l/s):		61.52
1 in 200 years (l/s):		69.42

ICP SUDS Mean Annual Flood

Input

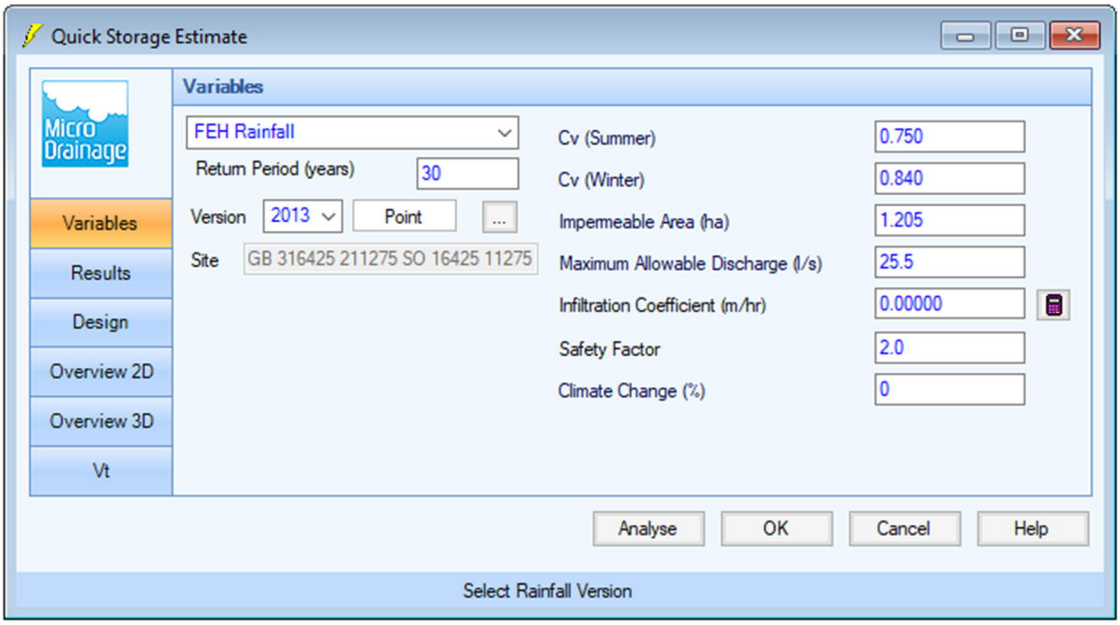
Return Period (years)	1	SAAR (mm)	1600	Urban	0.300
Area (ha)	1.334	Soil	0.500	Region Number	Region 9

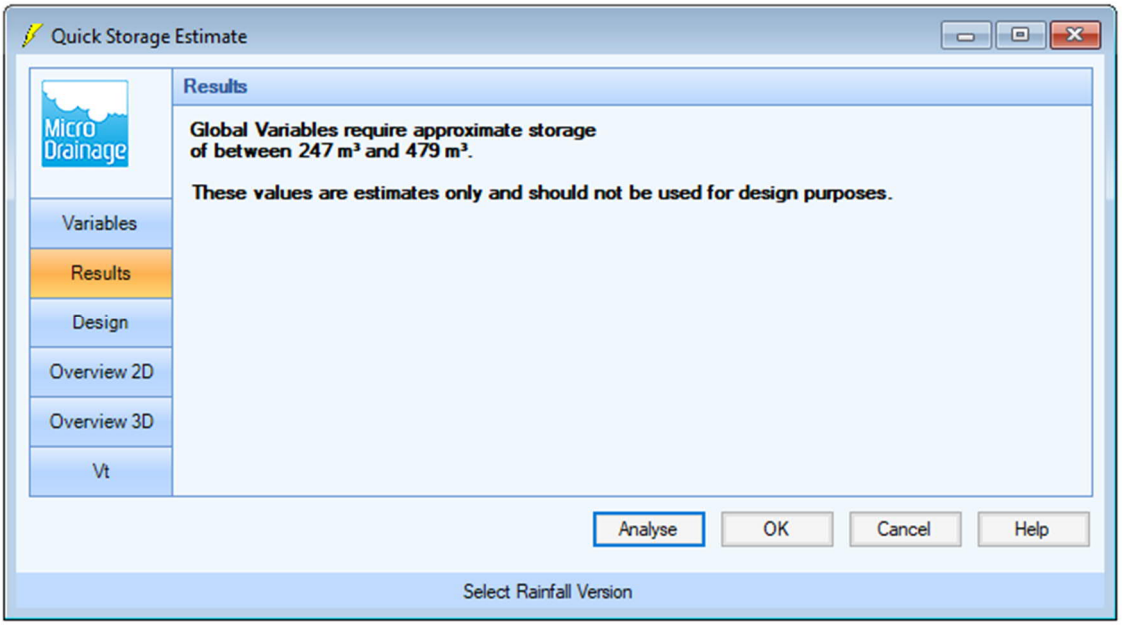
Results l/s

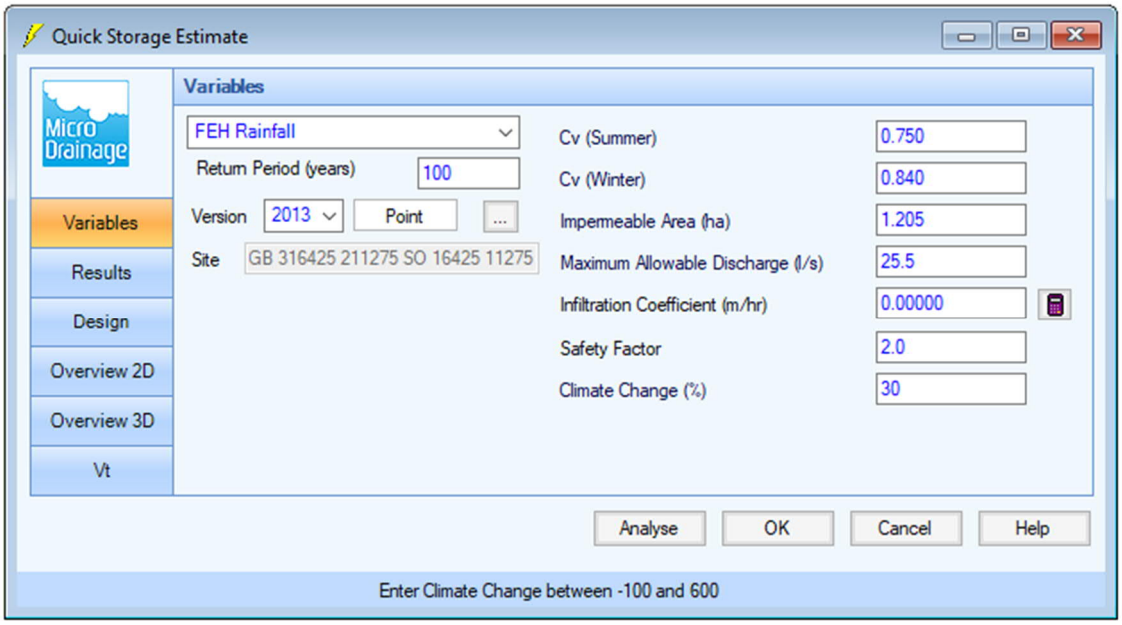
QBAR Rural	19.4
QBAR Urban	27.5
Q1 year	24.2
Q1 year	24.2
Q30 years	45.0
Q100 years	52.0

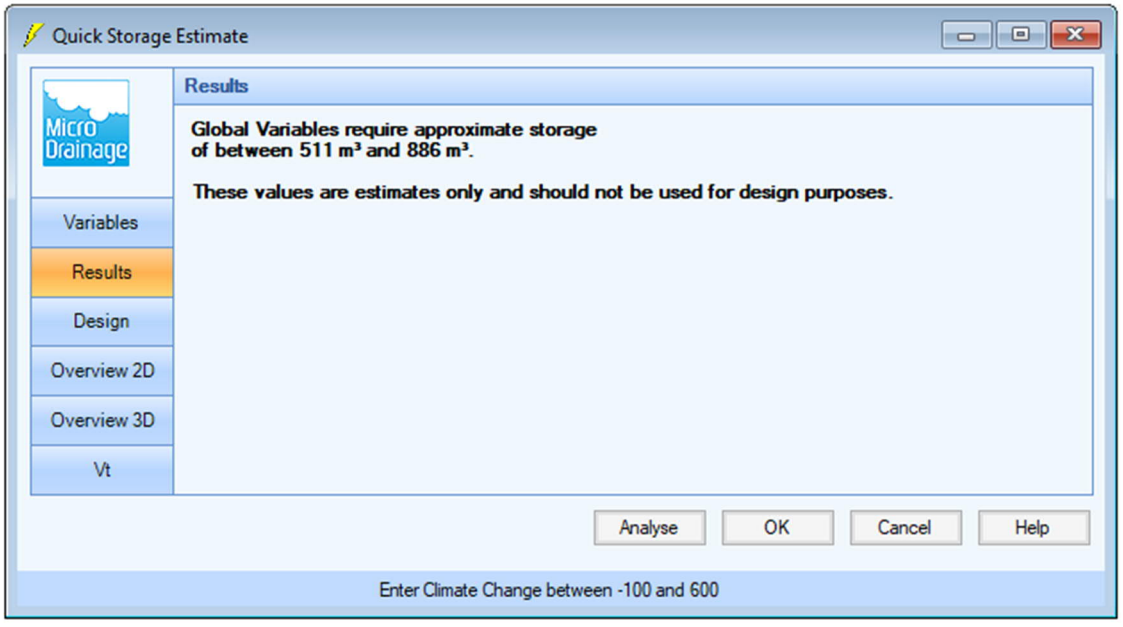
Appendix B

STORAGE CALCULATIONS


Quick Storage Estimate
Micro Drainage
Variables
Results
Design
Overview 2D
Overview 3D
Vt
Variables
FEH Rainfall
Return Period (years)
30
Version
2013
Point
...
Site
GB 316425 211275 SO 16425 11275
Cv (Summer)
0.750
Cv (Winter)
0.840
Impermeable Area (ha)
1.205
Maximum Allowable Discharge (l/s)
25.5
Infiltration Coefficient (m/hr)
0.00000
Safety Factor
2.0
Climate Change (%)
0
Analyse
OK
Cancel
Help
Select Rainfall Version


Quick Storage Estimate
Micro Drainage
Variables
Results
Design
Overview 2D
Overview 3D
Vt
Results
Global Variables require approximate storage
of between 247 m³ and 479 m³.
These values are estimates only and should not be used for design purposes.
Analyse
OK
Cancel
Help
Select Rainfall Version


Quick Storage Estimate
Micro Drainage
Variables
Results
Design
Overview 2D
Overview 3D
Vt
Variables
FEH Rainfall
Return Period (years)
100
Version
2013
Point
...
Site
GB 316425 211275 SO 16425 11275
Cv (Summer)
0.750
Cv (Winter)
0.840
Impermeable Area (ha)
1.205
Maximum Allowable Discharge (l/s)
25.5
Infiltration Coefficient (m/hr)
0.00000
Safety Factor
2.0
Climate Change (%)
30
Analyse
OK
Cancel
Help
Enter Climate Change between -100 and 600


Quick Storage Estimate
Micro Drainage
Variables
Results
Design
Overview 2D
Overview 3D
Vt
Results
Global Variables require approximate storage
of between 511 m³ and 886 m³.
These values are estimates only and should not be used for design purposes.
Analyse
OK
Cancel
Help
Enter Climate Change between -100 and 600

Appendix C

SITE PLANS

DO NOT SCALE

INDOOR BOWLS CENTRE

BADMINTON GROVE

Path

ALLOTMENT ROAD

Tennis Court

Sports Court

Shelter

REV	DATE	BY	DESCRIPTION	CHK	APP
P01	30/04/2020	CD	FIRST ISSUE	CS	CS

DRAWING STATUS:
S0 - WORK IN PROGRESS

wsp
1 Capital Quarter, Tyndall St, Cardiff, CF10 4BZ, UK
T+ 44 (0) 292 076 9200
wsp.com

CLIENT:
BLAENAU GWENT COUNTY BOROUGH COUNCIL

ARCHITECT:

SITE/PROJECT:
PROPOSED GLYNCOED PRIMARY SCHOOL

TITLE:
EXISTING SITE PLAN

SCALE @ A1:	CHECKED:		APPROVED:
1:200			
PROJECT NO:	DESIGNED:	DRAWN:	DATE:
70069501	CS	CS	May 20

DRAWING No: 9501-WSP-XX-C-DR-0100 REV: P01

DO NOT SCALE

EXISTING DRAINAGE REGIME MAINTAINED FOR BOTH FOUL AND SURFACE WATER FLOWS FROM THE SPORT HALL WITH PIPEWORK TO BE DIVERTED IF REQUIRED TO SUIT THE NEW DEVELOPMENT

PROPOSED SERVICE YARD COULD BE CONSTRUCTED IN PERMEABLE SURFACING OR DISCHARGE TO THE ADJACENT FILTER DRAIN LOCATED IN THE SOFT LANDSCAPING

EXISTING DRAINAGE REGIME MAINTAINED FOR ACCESS ROAD AND EXISTING CARPARKING, PIPEWORK TO BE DIVERTED TO SUIT NEW DEVELOPMENT IF REQUIRED

PROPOSED BUILDING, TO INCORPORATE GREEN ROOFS, RAINWATER HARVESTING IN THE FORM OF RAINWATER BUTTS AND DISCHARGE OF RAINWATER PIPES INTO RAIN GARDENS

PROPOSED ATTENUATION BASIN(S) OR SWALE TO BE CONSTRUCTED TO THE NORTH OF THE SOFT PLAY, DISCHARGE LOCATION FOR THE SUDS FEATURES IS TO BE CONFIRMED FOLLOWING DRAINAGE SURVEY

ABOVE GROUND RILLS AND OTHER FEATURES TO BE USED TO CONVEY RUNOFF FROM THE ON SUDS FEATURES TO THE ATTENUATION BASIN/SWALE

HARD SURFACING IN THIS AREA COULD DISCHARGE TO A FILTER DRAIN TO CONVEY FLOWS TO THE BASIN(S)

EXISTING COMBINED SEWER WHICH CROSSES THE SITE TO BE DIVERTED SUBJECT TO DCWW APPROVAL

PROPOSED DROP AREA TO DRAIN TO ADJACENT SOFT LANDSCAPING AREAS

PROPOSED FOUL DRAINAGE FLOWS WILL DISCHARGED INTO THE EXISTING COMBINED SEWER WHICH CROSSES THE SITE - SUBJECT TO DCWW APPROVAL

EXISTING PUBLIC SEWER, LOCATION AND DEPTH TO BE CONFIRMED, ASSUMED 3m EASEMENT EITHER SIDE OF PIPEWORK HAS BEEN SHOWN

FLOW CONTROL DEVICE TO BE INSTALLED ON LINE OF EXISTING SURFACE WATER SEWER

EXISTING SURFACE WATER OUTFALL TO BE REUSED WITH FLOWS LIMITED TO NOT TO EXCEED PRE DEVELOPMENT RATES

CHILDCARE UNIT TO INCORPORATE SUDS FEATURES TO DISCHARGE INTO MAIN SITE DRAINAGE NETWORK

EXISTING PUBLIC SEWER, TO BE DIVERTED - INDICATIVE ROUTE SHOWN (SUBJECT TO DETAILED DESIGN)

REV	DATE	BY	DESCRIPTION	CHK	APP
P03	01/04/2021	CD	SITE LAYOUT UPDATED	AB	AB
P02	09/11/2020	CD	AMENDED TO SUIT REVISED SCHEME	CS	CS
P01	30/04/2020	CD	FIRST ISSUE	CS	CS

DRAWING STATUS: S0 - WORK IN PROGRESS

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wsp.com

CLIENT: BLAENAU GWENT COUNTY BOROUGH COUNCIL

ARCHITECT:

SITE/PROJECT: PROPOSED GLYNCOED PRIMARY SCHOOL

TITLE: PRELIMINARY SURFACE WATER DRAINAGE STRATEGY

SCALE @ A1:	CHECKED:		APPROVED:
1:200			
PROJECT NO:	DESIGNED:	DRAWN:	DATE:
70069501	CS	CS	April 21

DRAWING No: 9501-WSP-XX-C-DR-0101 REV: P03

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